In the Matter of an Arbitration

BETWEEN:

ONTARIO MEDICAL ASSOCIATION

(the "OMA")

- AND -

MINISTRY OF HEALTH

(the "MOH")

(together, "the PARTIES")

REPLY BOOK OF DOCUMENTS OF THE ONTARIO MEDICAL ASSOCIATION VOLUME 2 OF 2

GOLDBLATT PARTNERS LLP
Barristers and Solicitors
20 Dundas Street West, Suite 1039
Toronto, ON M5G 2C2
Tel.: 416-977-6070

Howard Goldblatt
hgoldblatt@goldblattpartners.com

Steven Barrett
sbarrett@goldblattpartners.com

Colleen Bauman
cbauman@goldblattpartners.com

Counsel for OMA

TO: **BOARD OF ARBITRATION**

William Kaplan
william@williamkaplan.com

Michael Wright
mwright@wrighthenry.ca

Kevin Smith
kevin.smith@uhn.ca

AND TO: **HICKS MORLEY HAMILTON**

Barristers and Solicitors
77 King Street West, 39th Floor
Toronto, ON M5K 1K8
Tel.: 416-362-1011

Craig Rix
craig-rix@hicksmorley.com

BASS ASSOCIATES

16 Edmund Avenue
Toronto, ON M4V1H4
Tel.: 416-962-2277

Bob Bass
bbass@bassassociates.com

Counsel for MOH

INDEX

VOLUME ONE:

TAB	DOCUMENT
1.	Ministry of Health, “Quality-Based Procedures” (December 14, 2023)
2.	Ontario Hospital Association, Professional Staff Credentialing Toolkit (September 2021)
3.	Cancer Care Ontario, Ontario Cancer Screening Performance Report 2023: Special Focus: Equity in Cancer Screening
4.	Pandemic-era trends in patient attachment to an aging comprehensive family physician workforce in Ontario, Canada K Premji1,2, ME Green3,4, RH Glazier3,5,6, S Khan3, SE Schultz3, M Mathews1, S Nastos7, E Frymire4, BL Ryan1
5.	Barbara Patrocinio, “Ontario family physicians call for health minister's resignation” (May 13, 2024)
6.	Mohammed Adam, “Adam: It's ridiculous for Ontario to say it's not worried about 'diminished' supply of doctors” (May 14, 2024)
7.	Ontario Legislature Hansard (May 14, 2024 Question Period: Marit Stiles to Nolan Quinn (PA, minister of Health)
8.	David Helwig, “Shoemaker blasts province over doctor shortage,” *Soo Today* (May 14, 2024)
9.	Isaac Callan & Colin D'Mello, “‘Fire that minister’: Ontario NDP calls on Ford to sack minister of health,” *Global News* (May 13, 2024)
10.	Information and Privacy Commissioner, Order PO-4508 (April 16, 2024), 2024 CanLII 35289 (ON IPC)
11.	Ministry of Health, Health Human Resources Overview, May 2022
12.	Ministry of Health, “Physician Workforce Evidence & Analytical Modelling” Capacity & Health Workforce Planning Branch Nursing & Professionals Practice Division, November 2022
13.	Carly Weeks, “Canada faces critical anesthesiologist shortage, causing backlog of surgeries” Globe and Mail (August 23, 2023)
14.	Ministry of Health, “Embargoed until May 5, 2023: ISSUE: To provide a summary of the results of the Canadian Medical Resident Matching Service (CaRMS) 2023 second iteration match”

15. Ministry of Health, “CaRMS Table Historic”

16. Ministry of Health, “CIHI Release of Health Information 2021 Report”

17. Ben Richardson, Yadullah Hussain, Naomi Powell, “Proof Point: Canada needs more doctors—and fast,” RBC (November 23, 2022)

18. Northern Ontario School of Medicine University, “Physician Workforce Strategy”

19. Tristan Brownrigg, “Perspectives on Ontario Health Care by a Recent Graduate” (May 12, 2024)

VOLUME TWO:

TAB DOCUMENT

20. D.A. Henry, S.E. Schulz, R.H. Glazier, R. S. Bhatia, I.A. Dhalla and A. Laupacis, Payments to Ontario Physicians from Ministry of Health and Long- Term Care Sources 1992/93 to 2009/10: ICES Investigative Report (Toronto: Institute for Clinical Evaluative Sciences, February 2012)

21. Ministry of Health, “Issue: Physician Supply and Distribution” (September 19, 2023)

22. Nasrin Mohammadiaghdam , Leila Doshmangir , Javad Babaie , Roghayeh Khabiri and Koen Ponnet. “Determining factors in the retention of physicians in rural and underdeveloped areas: a systematic review.” BMC Family Practice (2020) 21:216.

23. Nathan Ferreira, Odessa McKenna, Iain R. Lamb, Alanna Campbell, Lily DeMiglio and Eliseo Orrantia. “Approaches to locum physician recruitment and retention: a systematic review”. Human Resources for Health (2024) 22:24

24. OMA Economics. “Northern Physician Retention Initiative Study.” October 2005. Report prepared at the request of bilateral System Management Committee

25. Sameer Rajbhandary, Kisalaya Basu. “Interprovincial migration of physicians in Canada: Where are they moving and why?” Health Policy 79 (2006) 265–273

26. Brian R. Golden PhD, Rosemary Hannam MBA, Douglas Hyatt PhD. Managing the supply of physicians’ services through intelligent incentives. Canadian Medical Association Journal, January 10, 2012, 184(1)

27. OMA “2024 SGFP Tariff Committee Survey for NTF/Arbitration” (April 19-22, 2024) and Text Analysis by OMA Survey Insights

28. David C. Chan Jr, Yiqun Chen “The Productivity of Professions: Evidence from the Emergency Department" (October 2022)

29. Ontario Physician Reporting Centre (OPRC), *Physicians in Ontario 2022 Report (Revision)*

30. Ontario, “Ontario Helping Family Doctors Put Patients before Paperwork” (April 24, 2024)

31. Statistics Canada, “Work absence of full-time employees by public and private sector, annual” (January 5, 2024)

32. Canadian Institute for Health Information. Population Grouping Methodology. Accessed May 28, 2024

33. American Society Anesthesiology, ASA Classification System Physical Status, Last amended: December 13, 2020

34. Lavergne R, Peterson S, Rudoler D, Scott I, Mccracken R, Mitra G, Katz A. Productivity Decline or Administrative Avalanche? Examining Factors That Shape Changing Workloads in Primary Care. Healthc Policy. 2023 Aug;19(1):114-129. doi: 10.12927/hcpol.2023.27152. PMID: 37695712; PMCID: PMC10519339

35. Hoogerboord, Marius, James Ellsmere, Antonio Caycedo-Marulanda, Carl Brown, Shiva Jayaraman, David Urbach, and Sean Cleary. "Laparoscopic colectomy: trends in implementation in Canada and globally." Canadian Journal of Surgery 62, no. 2 (2019): 139

36. Megan Ogilvie, “Patients are ‘routinely’ being diagnosed with cancer in busy Canadian emergency rooms, doctors warn,” (May 16, 2024)

37. **Appendix A**: Modeling Assumptions

TAB 20

Payments to Ontario Physicians from Ministry of Health and Long-Term Care Sources 1992/93 to 2009/10

ICES Investigative Report

FEBRUARY 2012

ICES Institute for Clinical Evaluative Sciences

Payments to Ontario Physicians from Ministry of Health and Long-Term Care Sources 1992/93 to 2009/10

ICES Investigative Report

Authors
David A. Henry
Susan E. Schultz
Richard H. Glazier
R. Sacha Bhatia
Irfan A. Dhalla
Andreas Laupacis

February 2012

PUBLICATION INFORMATION

© 2012 Institute for Clinical Evaluative Sciences

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any format or by any means, electronic, mechanical, photocopying, recording or otherwise, without the proper written permission of the publisher.

The opinions, results and conclusions included in this report are those of the authors and are independent from the funding sources. No endorsement by the Institute for Clinical Evaluative Sciences (ICES) or the Ontario Ministry of Health and Long-Term Care (MOHLTC) is intended or should be inferred.

Institute for Clinical Evaluative Sciences (ICES)
G1 06, 2075 Bayview Avenue
Toronto, ON M4N 3M5
Telephone: 416-480-4055

Canadian Cataloguing in Publication Data

Payments to Ontario Physicians from Ministry of Health and Long-Term Care Sources, 1992/93 to 2009/10. ICES Investigative Report.

Includes bibliographical references.

ISBN 978-1-926850-28-3 (Online)

How to Cite This Publication

Henry DA, Schultz SE, Glazier RH, Bhatia RS, Dhalla IA, Laupacis A. *Payments to Ontario Physicians from Ministry of Health and Long-Term Care Sources, 1992/93 to 2009/10*. ICES Investigative Report. Toronto: Institute for Clinical Evaluative Sciences; 2012.

TABLE OF CONTENTS

I Authors' Affiliations
I Acknowledgements
II About Our Organization
III Executive Summary
IX List of Exhibits

1 **CHAPTER 1 / INTRODUCTION**
3 Background
4 Policies and Programs Affecting Physician Payment
5 Report Objectives
6 Report Structure

8 **CHAPTER 2 / METHODS**
8 Introduction
9 Data Sources
11 Inclusion/Exclusion Criteria
12 Assigning Payments to Individual Physicians
12 Defining Physician Specialties
12 Analytical Methods
13 Time Frame

14 **CHAPTER 3 / RESULTS FOR ALL ONTARIO PHYSICIANS**
14 Introduction
15 Findings

20 **CHAPTER 4 / RESULTS FOR GENERAL PRACTITIONERS/FAMILY PHYSICIANS**
20 Introduction
21 Findings

27 **CHAPTER 5 / RESULTS FOR MEDICAL NON-PROCEDURAL SPECIALISTS**
27 Introduction
28 Findings for Individual Specialties

67 **CHAPTER 6 / RESULTS FOR MEDICAL PROCEDURAL SPECIALISTS**
67 Introduction
68 Findings for Individual Specialties

85 **CHAPTER 7 / RESULTS FOR SURGICAL SPECIALISTS**
85 Introduction
86 Findings for Individual Specialties

119 **CHAPTER 8 / RESULTS FOR IMAGING SPECIALISTS**
119 Introduction
120 Findings for Individual Specialties

128 **CHAPTER 9 / RESULTS FOR ANESTHESIOLOGISTS**
128 Introduction
129 Findings

133 **CHAPTER 10 / RESULTS FOR EMERGENCY DEPARTMENT PHYSICIANS**
133 Introduction
134 Findings

138 **CHAPTER 11 / SUMMARY**

154 **CHAPTER 12 / DISCUSSION AND CONCLUSION**
154 Discussion
158 Conclusion

AUTHORS' AFFILIATIONS

David A. Henry, MBChB, MRCP, FRCP (Edin)
President and Chief Executive Officer, Institute for Clinical Evaluative Sciences / Professor, Faculty of Medicine, University of Toronto / Adjunct Professor, School of Medicine and Public Health, University of Newcastle, Australia.

Susan E. Schultz, MA, MSc
Epidemiologist, Institute for Clinical Evaluative Sciences

Richard H. Glazier, MD, MPH, CCFP, FCFP, ABMP
Senior Scientist, Institute for Clinical Evaluative Sciences / Scientist, Centre for Research on Inner City Health, St. Michael's Hospital / Professor, Department of Family and Community Medicine, University of Toronto

R. Sacha Bhatia, MD, MBA
Clinical and Research Fellow, Massachusetts General Hospital / Research Fellow, Harvard Medical School / Fellow, Institute for Clinical Evaluative Sciences

Irfan A. Dhalla, MD, MSc, FRCPC
Scientist, Department of Medicine and Li Ka Shing Knowledge Institute, St. Michael's Hospital / Adjunct Scientist, Institute for Clinical Evaluative Sciences / Assistant Professor, Department of Medicine and Institute of Health Policy, Management and Evaluation, University of Toronto

Andreas Laupacis, MD, MSc, FRCPC
Executive Director, Li Ka Shing Knowledge Institute of St. Michael's Hospital / Adjunct Scientist, Institute for Clinical Evaluative Sciences / Professor, Faculty of Medicine, University of Toronto

ACKNOWLEDGEMENTS

This report analyzes public sector payments to physicians in Ontario between 1992 and 2009. The original plan to conduct this work was developed within ICES and resulted from discussions between the authors regarding the necessity of creating a publicly available source of accurate information on payments to doctors in Ontario. The project was proposed to the Ministry of Health and Long-Term Care, and resources were made available through the core agreement (2010–2013) between ICES and the MOHLTC.

The work was overseen by a working group chaired by Susan Fitzpatrick, Assistant Deputy Minister, Negotiations and Accountability Management Division at the MOHLTC. We are very grateful for the support provided by Ms. Fitzpatrick. We are also indebted to many staff at the MOHLTC who assisted us in identifying data gaps, facilitated access to data and tirelessly responded to questions regarding the characteristics of the data. We are also grateful to staff at the Ontario Medical Association and the Ontario Hospital Association and to others who provided extremely useful advice and insights.

ABOUT OUR ORGANIZATION

The Institute for Clinical Evaluative Sciences (ICES) is an independent, non-profit organization that produces knowledge to enhance the effectiveness of health care for Ontarians. Internationally recognized for its innovative use of population-based health information, ICES evidence supports health policy development and guides changes to the organization and delivery of health care services.

Key to our work is our ability to link population based health information, at the patient level, in a way that ensures the privacy and confidentiality of personal health information. Linked databases reflecting 13 million of 33 million Canadians allow us to follow patient populations through diagnosis and treatment and to evaluate outcomes.

ICES brings together the best and the brightest talent across Ontario. Many of our scientists are not only internationally recognized leaders in their fields but are also practicing clinicians who understand the grassroots of health care delivery, making the knowledge produced at ICES clinically focused and useful in changing practice. Other team members have statistical training, epidemiological backgrounds, project management or communications expertise. The variety of skill sets and educational backgrounds ensures a multi-disciplinary approach to issues and creates a real-world mosaic of perspectives that is vital to shaping Ontario's future health care system.

ICES receives core funding from the Ontario Ministry of Health and Long-Term Care. In addition, our faculty and staff compete for peer-reviewed grants from federal funding agencies, such as the Canadian Institutes of Health Research, and receive project-specific funds from provincial and national organizations. These combined sources enable ICES to have a large number of projects underway, covering a broad range of topics. The knowledge that arises from these efforts is always produced independent of our funding bodies, which is critical to our success as Ontario's objective, credible source of evidence guiding health care.

"ICES brings together the best and the brightest talent across Ontario. Many of our scientists are not only internationally recognized leaders in their fields but are also practicing clinicians who understand the grassroots of health care delivery."

Executive Summary

BACKGROUND

In Canada, payments to physicians consume approximately 20% of provincial health care budgets. In the last decade, this expenditure increased at a rate exceeding inflation. Expenditure was relatively flat during the 1990s when Canadian governments capped payments and controlled physician supply. In 1998, these policies were discontinued in favour of a more sophisticated approach that centred on negotiating alternate funding arrangements with groups of physicians.

In Ontario, these policies were designed to encourage graduates to enter and stay in under-supplied specialties (e.g., family practice and general internal medicine), and to reduce wait times for key surgical procedures, certain diagnostic tests and emergency care.

Here, we report on trends in public sector payments to Ontario physicians between 1992/93 and 2009/10, the variation between specialty groups and the resulting financial impacts on the province. We also report on the impacts of changes in the different models of payment (fee for service, capitation and alternate payment plans).

The data provide an assessment of the magnitude of, and trends in, payments during the different policy environments. However, the analyses were not designed to measure impacts beyond the financial outcomes. In other words, we did not try to determine if the increased investments led to better outcomes for patients.

The work was initiated by ICES scientists, most of whom are physicians. The motivation behind the work was a belief that the public should have access to a source of accurate information on payments to doctors in Ontario. The project was proposed to the Ministry of Health and Long-Term Care, and resources were made available through the core agreement between ICES and the MOHLTC. ICES conducted the work under its mandate, which is to carry out independent research that stimulates improvements in health system performance and promotes better health for Ontarians.

REPORT OBJECTIVES

1 / To estimate public payments to individual physicians from multiple sources between 1992/93 and 2009/10 and report these by specialty, specialty group and overall, using several different measures:

- the average payment per physician,
- the median (and selected percentiles) of the distribution of payments, which illustrates the range of payment levels; and
- the total of all payments to physicians in a given group.

2 / To analyze and report on changes over time in overall physician supply and in the main specialty groups between 1992/93 and 2009/10 as supply is an important component of expenditure.

3 / To analyze how payments and supply varied between the main specialty groups, and how each contributed to the rise in overall physician payments.

4 / To analyze how changes in the different types of payments (fee for service and other models) contributed to the observed increases in total payments and payments to physicians.

METHODS

Because payments to physicians in Ontario come from multiple sources, we combined data from different databases at the level of individual physicians. This was done with linked de-identified data. Analysts did not have access to the names or addresses of individual doctors at any stage.

We obtained payment data from the following sources:

- Ontario Health Insurance Plan Fee-for-Service billings (1992/03–2009/10)
- Ontario Health Insurance Plan Architected Payments (2003/04–2009/10)
- Academic Health Sciences Centre governance payment database (2003/04–2009/10)
- GAPP (Generalized Alternate Payment Plan) database (2005/06–2009/10)
- Primary Care Network capitation payments (1999/00–2003/04)
- Miscellaneous payments (2005/06–2009/10)

The payments presented here exclude direct payments from hospital budgets, payments by the Workplace Safety and Insurance Board, hospital on-call funds administered by the Ontario Medical Association (OMA) and private payments for uninsured services. We have not corrected the totals for practice overhead costs, which are commonly quoted as being around 30% of gross payments and can vary among specialties.

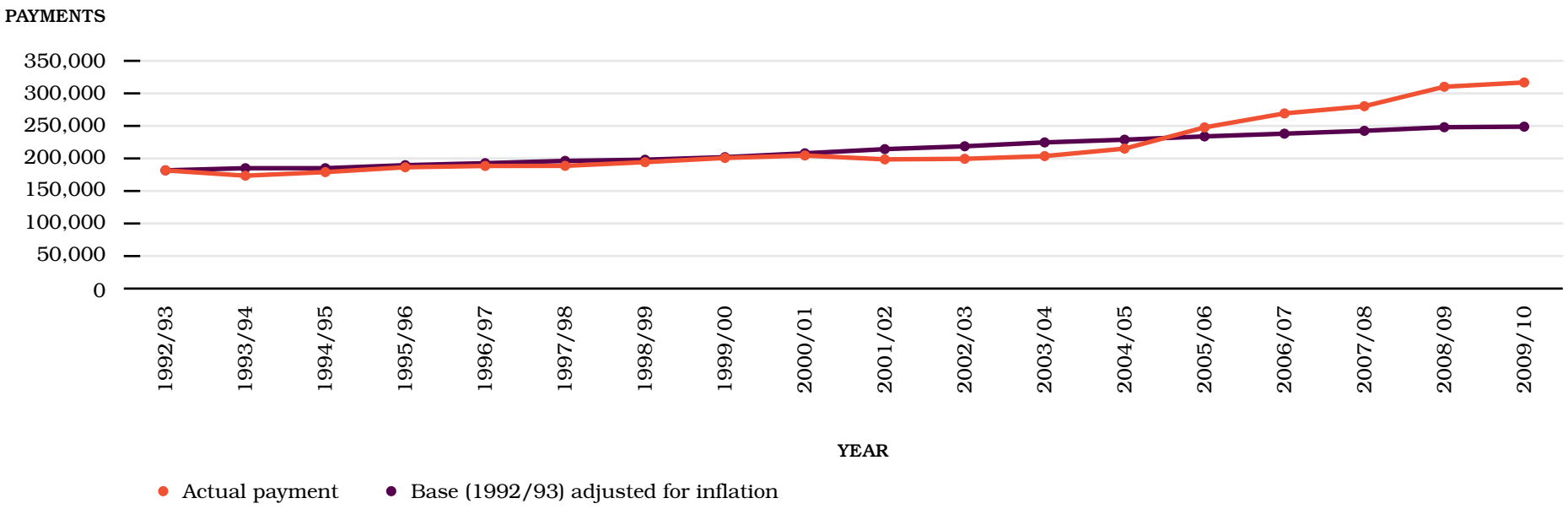
RESULTS

Overall Payments to Physicians

We identified payments of approximately $8 billion to doctors in Ontario in 2009/10. This is more than twice the amount, or approximately $4.3 billion more, than they were paid in 1992/93 (all in unadjusted dollars). On a per-specialty basis, by far the largest increase in total payments was to general practitioners/family physicians (GP/FPs)—an increase of more than $1.5 billion between 1992/93 and 2009/10. The next in rank order was the increase in payments to anesthesiologists ($298 million) followed by radiologists ($294 million), emergency physicians ($256 million), cardiologists ($223 million) and pediatricians ($193 million). Four of these are in the top five specialties ranked by increases in numbers of active physicians.

On a per-physician basis, the mean payments to physicians in Ontario, having remained fairly flat between 1992/93 and 2003/04, rose by around $100,000 between 2004/05 and 2009/10 (all unadjusted dollars). As figure 1 below makes clear, the average payment remained at or below the rate of inflation (using 1992/93 as the base year) until 2004/05, after which it rose at a rate well above the rate of inflation. This increase followed the implementation of the 2004/05 agreement between the OMA and the MOHLTC that included the strengthening of a number of new policies, in particular alternate payment plans for GP/FP and a number of other specialties, and additional payments to support the wait times strategy. It is important to note that these are gross payments and do not take account of practice costs, which vary among specialties and are believed to average around 30% of gross payments.

FIGURE 1 Mean annual payments per head to all Ontario physicians and inflation-adjusted base (1992/93) payment, 1992/93 to 2009/10



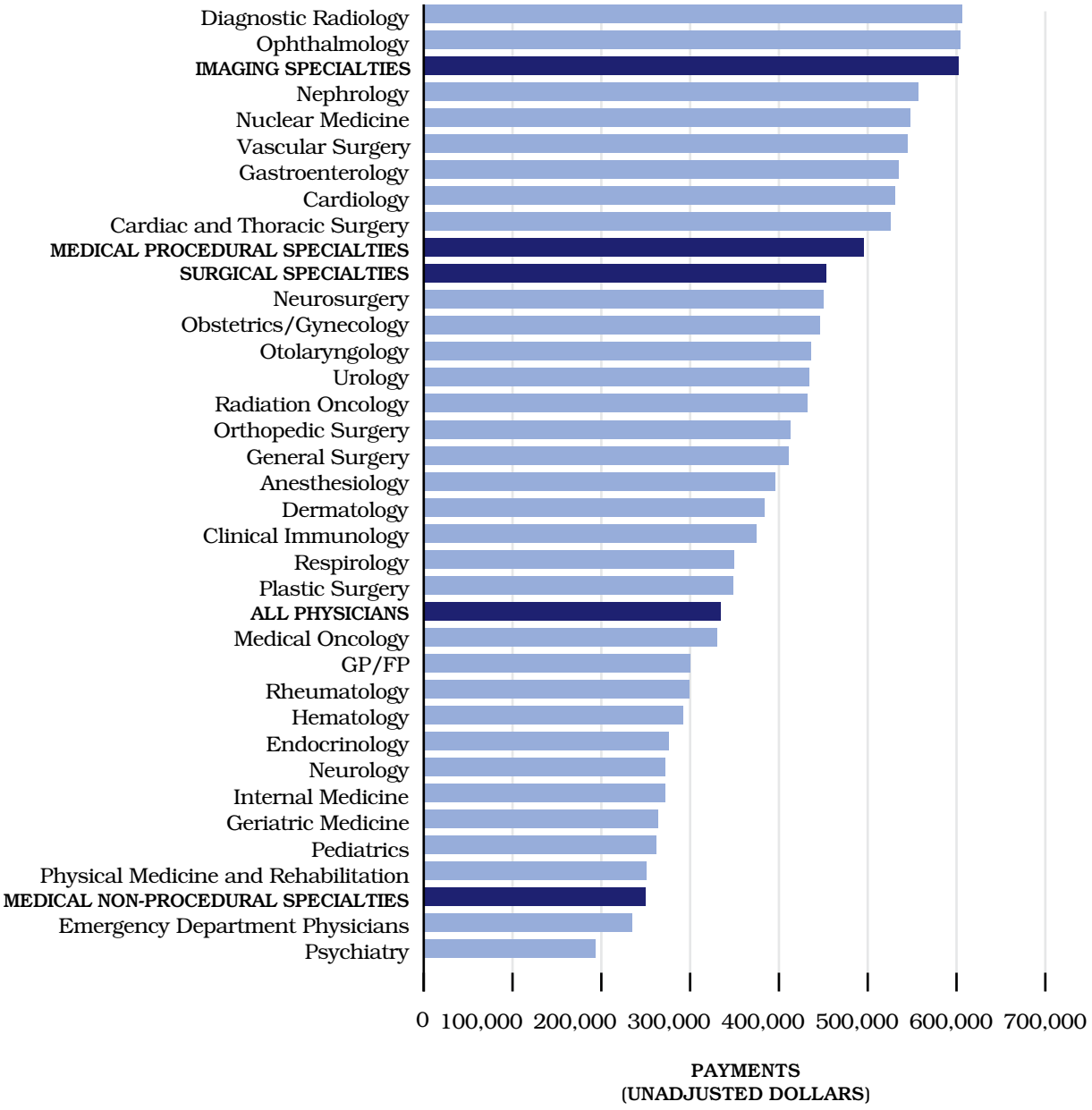
Payments to Individual Specialties

The average payments per physician in the main specialty groups in 2009/10 are summarized in figure 2.

The highest payments to individual physicians went to those in surgical, diagnostic and medical procedural specialties and the lowest payments went to those in non-procedural medical specialties. The estimate for psychiatrists is unreliable as it does not include mental health sessional fees.

Approximately 63% of the $4.3 billion increase in total payments was related to an increase in average payments per physician. The other 37% was a result of the increase in physician supply. Additional analyses at the physician level showed that between 2004/05 and 2009/10 the substantial increases in OHIP payments to radiologists, nephrologists and ophthalmologists were due almost exclusively to an increase in the average number of services provided by each specialist.

FIGURE 2 Average payment per physician from all sources by specialty and specialty group, in Ontario, 2009/10



Trends in Payments to Specific Groups of Physicians

We observed the following trends among specialty groups:

- ***General Practitioners/Family Physicians***
  The median payment per active GP/FP was relatively flat from 1992/93 to 2004/05 and rose steadily between 2005/06 and 2009/10. Fee-for-service payments remained relatively flat over the whole time period, with a slight increase from 2005/06 to 2007/08 and a small decrease thereafter. Payments specific to primary care models, the majority of which were capitation-based, rose rapidly after 2004/05 and accounted for a large proportion of the observed increase.
- ***Medical Procedural Specialists***
  Within this group, notable increases in total and individual payments were seen for cardiology, gastroenterology and nephrology, and most of the payments to these specialists continue to be in the form of fee for service.
- ***Medical Non-Procedural Specialties***
  Payments to these groups remained generally at the low end of the distribution for all physicians. Alternate payment plans appear to have been an important factor in determining retention and payments in several of these specialties.
- ***Imaging Specialists***
  Payments to diagnostic radiologists and nuclear medicine specialists have risen substantially in recent years and both remain in the upper range of payments to physicians. The great majority of payments are by fee for service.
- ***Surgical Specialties***
  Some of the traditional surgical specialties have seen only small rates of growth in supply. This may reflect the impact of non-invasive medical procedures, which in some cases are replacing open surgery. Payments to these groups have remained in the upper range for all physicians. The number of ophthalmologists increased only slightly during the observation period. However, this specialty received the largest increase in mean payments, approximately $300,000, between 1992/93 and 2009/10.

Physician Supply

The overall number of physicians for whom we had payment information increased by 4,811 (24%) between 1992/93 and 2009/10. This is slightly higher than overall population growth (about 20%) during the same period. Growth was not constant over time, and there was a slight contraction in the number of doctors between 1993/94 and 1999/00. Growth was greatest (2.3% per year) between 2005/06 and 2009/10. Growth in physician supply was variable across specialty groups. Proportionally, the greatest increases have been seen in emergency medicine, medical procedural specialties, anesthesia and diagnostic imaging. The smallest overall proportional increase (4.5% between 1992/93 and 2009/10) was among GP/FPs. However, this overall figure disguises a decline of almost 8% between 1993/94 and 1999/00, which then reversed.

CONCLUSIONS

Physician payments account for about 20% of total health care costs in Ontario. Although overall physician supply rose in line with population growth, this varied considerably among specialties. The rise in payments since the turn of this century has been substantially greater than the overall increase in physician numbers and has been growing significantly above the average rate of inflation since 2004/05. Directed increases in physician payments, achieved through negotiated agreements with the Ontario Medical Association in 2004 and 2008, were aimed primarily at reducing wait times and improving access to physician services, particularly primary care. This policy intervention represents the largest financial investment in physicians made by the provincial government. The most important positive outcome arising from it has been the reversal of the decline in GP/FPs seen in the 1990s. Much of the impact of this policy appears to have been related to the change in financial models, with a shift from fee-for-service to capitation-based payments. Efforts to reduce wait times in a fee-for-service environment have disproportionately benefited key surgical, medical procedural, and diagnostic specialties. These groups have also gained financially from demographic changes, technological advances and increased health system capacity (i.e., increased hospital funding) that have enabled larger numbers of services to be provided by certain specialists in recent years.

The government of Ontario spent $8 billion on physician services in 2009, $4.3 billion more than in 1992. This investment has provided a larger number of active physicians and an increase in services, particularly in areas targeted by certain policies. Alternative payment plans have supported certain government priorities and policy directions, particularly in primary care and the non-procedural medical specialties. This report cannot answer whether this increased investment has led to improved patient outcomes or to improved functioning of the health care system. To our knowledge, no such impact analysis has been undertaken. We believe this subsequent work is critical to ensuring that taxpayer dollars invested in the health care system provide maximal benefits for the patients of Ontario.

List of Exhibits

Exhibit 3.1 / Median and percentiles of payments (in unadjusted dollars) to individual physicians, in Ontario, 1992/93 to 2009/10

Exhibit 3.2 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to all physicians, in Ontario, 1992/93 to 2009/10

Exhibit 3.3 / Total payments to all physicians by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 4.1 / Median and percentiles of payments (in unadjusted dollars) to individual GP/FPs, in Ontario, 1992/93 to 2009/10

Exhibit 4.2 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to GP/FPs, in Ontario, 1992/93 to 2009/10

Exhibit 4.3 / Total payments to GP/FPs by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 4.4 / Mean payments (in unadjusted dollars) to GP/FPs by payment type and patient enrolment model, in Ontario, 2005/06 to 2009/10

Exhibit 4.5 / Total payments (in unadjusted dollars) to GP/FPs by payment type and patient enrolment model, in Ontario, 2005/06 to 2009/10

Exhibit 5.1 / Median and percentiles of payments (in unadjusted dollars) to individual general internists, in Ontario, 1992/93 to 2009/10

Exhibit 5.2 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to general internists, in Ontario, 1992/93 to 2009/10

Exhibit 5.3 / Total payments to general internists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 5.4 / Median and percentiles of payments (in unadjusted dollars) to individual clinical immunologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.5 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to clinical immunologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.6 / Total payments to clinical immunologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 5.7 / Median and percentiles of payments (in unadjusted dollars) to individual dermatologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.8 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to dermatologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.9 / Total payments to dermatologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 5.10 / Median and percentiles of payments (in unadjusted dollars) to individual endocrinologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.11 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to endocrinologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.12 / Total payments to endocrinologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 5.13 / Median and percentiles of payments (in unadjusted dollars) to individual geriatricians, in Ontario, 1992/93 to 2009/10

Exhibit 5.14 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to geriatricians, in Ontario, 1992/93 to 2009/10

Exhibit 5.15 / Total payments to geriatricians by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 5.16 / Median and percentiles of payments (in unadjusted dollars) to individual hematologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.17 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to hematologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.18 / Total payments to hematologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 5.19 / Median and percentiles of payments (in unadjusted dollars) to individual medical oncologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.20 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to medical oncologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.21 / Total payments to medical oncologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 5.22 / Median and percentiles of payments (in unadjusted dollars) to individual neurologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.23 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to neurologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.24 / Total payments to neurologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 5.25 / Median and percentiles of payments (in unadjusted dollars) to individual pediatricians, in Ontario, 1992/93 to 2009/10

Exhibit 5.26 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to pediatricians, in Ontario, 1992/93 to 2009/10

Exhibit 5.27 / Total payments to pediatricians by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 5.28 / Median and percentiles of payments (in unadjusted dollars) to individual physical medicine and rehabilitation specialists, in Ontario, 1992/93 to 2009/10

Exhibit 5.29 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to physical medicine and rehabilitation specialists, in Ontario, 1992/93 to 2009/10

Exhibit 5.30 / Total payments to physical medicine and rehabilitation specialists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 5.31 / Median and percentiles of payments (in unadjusted dollars) to individual psychiatrists, in Ontario, 1992/93 to 2009/10

Exhibit 5.32 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to psychiatrists, in Ontario, 1992/93 to 2009/10

Exhibit 5.33 / Total payments to psychiatrists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 5.34 / Median and percentiles of payments (in unadjusted dollars) to individual rheumatologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.35 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to rheumatologists, in Ontario, 1992/93 to 2009/10

Exhibit 5.36 / Total payments to rheumatologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 6.1 / Median and percentiles of payments (in unadjusted dollars) to individual cardiologists, in Ontario, 1992/93 to 2009/10

Exhibit 6.2 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to cardiologists, in Ontario, 1992/93 to 2009/10

Exhibit 6.3 / Total payments to cardiologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 6.4 / Median and percentiles of payments (in unadjusted dollars) to individual gastroenterologists, in Ontario, 1992/93 to 2009/10

Exhibit 6.5 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to gastroenterologists, in Ontario, 1992/93 to 2009/10

Exhibit 6.6 / Total payments to gastroenterologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 6.7 / Median and percentiles of payments (in unadjusted dollars) to individual nephrologists, in Ontario, 1992/93 to 2009/10

Exhibit 6.8 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to nephrologists, in Ontario, 1992/93 to 2009/10

Exhibit 6.9 / Total payments to nephrologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 6.10 / Median and percentiles of payments (in unadjusted dollars) to individual radiation oncologists, in Ontario, 1992/93 to 2009/10

Exhibit 6.11 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to radiation oncologists, in Ontario, 1992/93 to 2009/10

Exhibit 6.12 / Total payments to radiation oncologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 6.13 / Median and percentiles of payments (in unadjusted dollars) to individual respirologists, in Ontario, 1992/93 to 2009/10

Exhibit 6.14 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to respirologists, in Ontario, 1992/93 to 2009/10

Exhibit 6.15 / Total payments to respirologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 7.1 / Median and percentiles of payments (in unadjusted dollars) to individual cardiac and thoracic surgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.2 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to cardiac and thoracic surgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.3 / Total payments to cardiac and thoracic surgeons by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 7.4 / Median and percentiles of payments (in unadjusted dollars) to individual general surgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.5 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE), to general surgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.6 / Total payments to general surgeons by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 7.7 / Median and percentiles of payments (in unadjusted dollars) to individual neurosurgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.8 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to neurosurgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.9 / Total payments to neurosurgeons by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 7.10 / Median and percentiles of payments (in unadjusted dollars) to individual obstetricians and gynecologists, in Ontario, 1992/93 to 2009/10

Exhibit 7.11 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to obstetricians and gynecologists, in Ontario, 1992/93 to 2009/10

Exhibit 7.12 / Total payments to obstetricians and gynecologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 7.13 / Median and percentiles of payments (in unadjusted dollars) to individual ophthalmologists, in Ontario, 1992/93 to 2009/10

Exhibit 7.14 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to ophthalmologists, in Ontario, 1992/93 to 2009/10

Exhibit 7.15 / Total payments to ophthalmologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 7.16 / Median and percentiles of payments (in unadjusted dollars) to individual orthopedic surgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.17 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to orthopedic surgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.18 / Total payments to orthopedic surgeons by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 7.19 / Median and percentiles of payments (in unadjusted dollars) to individual otolaryngologists, in Ontario, 1992/93 to 2009/10

Exhibit 7.20 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to otolaryngologists, in Ontario, 1992/93 to 2009/10

Exhibit 7.21 / Total payments to otolaryngologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 7.22 / Median and percentiles of payments (in unadjusted dollars) to individual plastic surgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.23 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to plastic surgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.24 / Total payments to plastic surgeons by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 7.25 / Median and percentiles of payments (in unadjusted dollars) to individual urologists, in Ontario, 1992/93 to 2009/10

Exhibit 7.26 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to urologists, in Ontario, 1992/93 to 2009/10

Exhibit 7.27 / Total payments to urologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 7.28 / Median and percentiles of payments (in unadjusted dollars) to individual vascular surgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.29 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to vascular surgeons, in Ontario, 1992/93 to 2009/10

Exhibit 7.30 / Total payments to vascular surgeons by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 8.1 / Median and percentiles of payments (in unadjusted dollars) to individual diagnostic radiologists, in Ontario, 1992/93 to 2009/10

Exhibit 8.2 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to diagnostic radiologists, in Ontario, 1992/93 to 2009/10

Exhibit 8.3 / Total payments to diagnostic radiologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 8.4 / Median and percentiles of payments (in unadjusted dollars) to individual nuclear medicine specialists, in Ontario, 1992/93 to 2009/10

Exhibit 8.5 / Mean payments (unadjusted dollars) per head and full-time equivalent (FTE) to nuclear medicine specialists, in Ontario, 1992/93 to 2009/10

Exhibit 8.6 / Total payments to nuclear medicine specialists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 9.1 / Median and percentiles of payments (in unadjusted dollars) to individual anesthesiologists, in Ontario, 1992/93 to 2009/10

Exhibit 9.2 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to anesthesiologists, in Ontario, 1992/93 to 2009/10

Exhibit 9.3 / Total payments to anesthesiologists by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 10.1 / Median and percentiles of payments (in unadjusted dollars) to individual emergency department physicians, in Ontario, 1992/93 to 2009/10

Exhibit 10.2 / Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to emergency department physicians, in Ontario, 1992/93 to 2009/10

Exhibit 10.3 / Total payments to emergency department physicians by payment source, in Ontario, 1992/93 to 2009/10

Exhibit 11.1 / Total and percent change in number of active physicians by specialty and specialty group, in Ontario, 1993/94, 1999/00, 2005/06 and 2009/10

Exhibit 11.2 / Total and percent change in number of physician full-time equivalents (FTEs) by specialty and specialty group, in Ontario, 1993/94, 1999/00, 2005/06 and 2009/10

Exhibit 11.3 / Distribution of payments to physicians by specialty group, in Ontario, 2009/10

Exhibit 11.4 / Distribution of payments to medical non-procedural specialists, in Ontario, 2009/10

Exhibit 11.5 / Distribution of payments to medical procedural specialists, in Ontario, 2009/10

Exhibit 11.6 / Distribution of payments to surgical specialists, in Ontario, 2009/10

Exhibit 11.7 / Total and percent change in payments from all MOHLTC sources to physicians by specialty and specialty group, in Ontario, 1993/94, 1999/00, 2005/06 and 2009/10

Exhibit 11.8 / Mean payments per full-time equivalent (FTE) by specialty and specialty group, in Ontario, 2009/10

Exhibit 11.9 / Mean payments per full-time equivalent (FTE) and percent change in payments by specialty and specialty group, in Ontario, 1993/94, 1999/00, 2005/06 and 2009/10

Exhibit 12.1 / Mean annual payments per head to all Ontario physicians and inflation-adjusted base (1992/93) payment, 1992/93 to 2009/10

CHAPTER 1

Introduction

There are a number of reasons why reporting on payments to physicians is important. For one, they represent 20% of public expenditure on health care in Canada. In a recent study,[1] the Canadian Institute for Health Information (CIHI) found that spending on physicians' services has been among the fastest growing health care expenditure categories in recent years, increasing at an annual rate of 6.8% per year from 1998/99 to 2008/09. CIHI investigators found that payments to doctors grew at a faster rate than the average weekly wages of other health and social services workers, and exceeded the Industrial Composite Wage Index.

Prior to 1998/99, as noted in the CIHI report, physician compensation grew more slowly than the prices of other public goods and services. During this time, several Canadian provinces capped payments to physicians.[2] This was at a time when physicians in Canada were paid through fee for service (FFS), and the capping policy was credited with containing payments. But it may have been at a cost by precipitating a loss of doctors who could find better-paid work in the United States.[3] Since the billing caps were lifted in 1998, payments for physician services have risen, and governments have started to move away from FFS payments to alternate payment plans and, in the case of general practitioners/family physicians (GP/FPs), various models of capitation.

Payments to physicians matter for reasons other than total costs. Relative payments between the different specialty groups is important. It has long been believed that the fee-for-service model favour specialty groups that perform procedures, rather than practitioners who provide consulting services, such as GP/FPs, psychiatrists and general internal medicine specialists. Recognizing this, governments have created incentives for medical graduates to enter these and other specialty groups. In Ontario, these incentives include capitation models for GP/FPs, alternate payment plans for general internists working in hospitals, and incentives directed at emergency physicians, particularly those working in under-served areas. These programs have been most active during a period that has included a significant financial recession commencing in 2008/09. This has meant that inflation-driven increases in physician payments have coincided with a fall in government revenues, increasing the pressure on the public purse.[1]

It is appropriate and timely to review past and current trends in payments to physicians in Ontario and the distribution of these payments among the different specialty groups. However, the exercise is not entirely straightforward. It might seem a simple matter to total the payments made to each physician in the province during the relevant years. Indeed, if all payments were in the form of fees paid under the Ontario Health Insurance Plan (OHIP), it would be relatively easy. But as noted by the Auditor General of Ontario in his 2011 annual report,[4] a large number of physicians in the province participate in alternate payment plans. Participation in these plans is variable, even within defined groups; therefore, calculating total payments requires the collation of multiple streams of funding at the level of the individual practitioner. We thought it appropriate that this work should be done at ICES for although it does not involve personal health information, the data are sensitive, and ICES has a long history of protecting the privacy of personal information of all types and has rigorous data security procedures in place. No individual data are provided in this report, and all analyses were performed on de-identified data; this is consistent with all previous work done at ICES on the same and related topics.

"It is appropriate and timely to review past and current trends in payments to physicians in Ontario and the distribution of these payments among the different specialty groups."

BACKGROUND

Two recent international reports that have analyzed payments to physicians help to put Canadian data in context. Laugesen and Glied compared health spending in six countries in 2008 and analyzed the impact of physician payments.[5] In Canada, total health care spending was higher than in Australia and the United Kingdom but lower than in the United States. Laugesen and Glied questioned what was driving the very high costs of health care in the United States. Their main conclusion was simple: it was due to the high prices paid for a wide range of services. To quote the authors: "We conclude that the higher fees, rather than factors such as higher practice costs, volume of services, or tuition expenses, were the main drivers of higher US spending, particularly in orthopedics." The authors underscore the importance of studying physician payments as a general driver of health system costs.

Another recent international comparison of fees paid to doctors in different countries was conducted by the International Federation of Health Plans in 2010.[6] This study summarized data collected from 100 health insurance plans in 30 countries. Across a series of procedures (routine office visits, normal deliveries of newborns, cesarean sections, appendectomies, cataract surgeries and hip replacements) that enumerated physician fees, Canada ranked in the middle or the bottom half of a group of countries that included Argentina, Australia, Chile, France, Germany, New Zealand, Spain, Switzerland, the United Kingdom and the United States.

A more detailed analysis of the situation in Canada was conducted by CIHI.[1] This investigation found that Canada has an overall physician supply of 2.2 per 1,000 population—lower than many other OECD countries—but the rate of growth in physician supply increased between 2003 and 2008 compared with previous years. Prior to 1998, rates of increase in physician compensation followed rates of increase in the Government Current Expenditure Implicit Price Index (GCEIPI). Since 1998, rates of increase in physician compensation have exceeded rates of increase in the GCEIPI. Fee increases have been the major cost driver for physician expenditure during the last 10 years. Physician compensation increases have accounted for approximately one-half of annual growth in expenditure since 1998.

The CIHI report concluded that "after years of moderation, FFS prices have risen quite sharply since a nadir in 1997 and in the last decade have exceeded the GCEIPI, and since 1998 physician compensation has exceeded the rates of increase in the industrial composite wage index. This is compounded by an increase in rates of utilization in the last decade. As a result, increases in the prices of physician services have been the major cost driver of physician expenditures over the last 10 years."[1]

Several of these themes were also picked up in the Auditor General's 2011 annual report and provide important background to this report. The Auditor General observed that more than 60% of the province's almost 12,000 GP/FPs were participating in the new primary care models, and more than nine million Ontarians had enrolled with these physicians.[4] Based on data from 2007/08 (the latest available at the time of the audit), family physicians who were paid through Family Health Group (FHG) and Family Health Organization (FHO) models earned, on average, over 25% more than those being paid through the traditional FFS model. The Auditor General also noted that there were 10 major types of alternate funding arrangements for specialists, with approximately half of the almost 13,000 specialists in Ontario being paid, at least in part, through one of them.

All of this serves to illustrate the importance of understanding not only how much physicians are being paid, but how this has changed over time and which policies and programs are driving these changes.

POLICIES AND PROGRAMS AFFECTING PHYSICIAN PAYMENT

Between 1992/93 and 2009/10, the Ontario government initiated or participated in a number of actions that affected payments to doctors in particular groups. The following interventions should be considered when viewing the exhibits presented in subsequent chapters:

1 / *Imposition of expenditure caps.*[2] As Archibald and Flood reported, Ontario imposed "a global ceiling on expenditures for medical services during the three fiscal years beginning with 1993/94. An overall ceiling on expenditures was set in each year payments in excess of the ceiling were 'clawed back' by reducing each physician's billings by an equal across-the-board percentage."[7] Use of payment caps ceased in 1998.

2 / *Introduction of physician supply controls.*[2,3] In Ontario, temporary restrictions on new billing numbers for out-of-province graduates were put in place between 1993 and 1996. From 1997 to 1999, financial penalties were instituted for recent graduates who wanted to establish a practice in selected urban areas designated as 'over-serviced.'

3 / *Funding enhancements to improve wait times.*[8] This covers a range of strategies used to reduce wait times for cancer surgery, cardiac procedures, cataract surgery, hip and knee replacement, and magnetic resonance imaging (MRI) and computed tomography (CT) scans. Hospitals were provided with funding in addition to their base funding to help clear wait lists for procedures and MRI/CT. The extra funds provided additional operating room capacity for orthopedic surgeons, cardiologists and others to do more procedures and shorten wait lists. It also gave them an opportunity to increase their incomes. This money came with conditions: Participating centres had to use the Wait Time Information System to show improvements in wait times. The same was done for MRI/CT.

4 / *Development of alternatives to the fee-for-service model.* Since 1996, the MOHLTC has been steadily introducing programs designed to move physicians in certain specialties away from a purely FFS payment model. This process began in 1996 with emergency departments in remote and northern communities, followed in 1999 with alternate funding arrangements (AFAs) being offered to nearly all EDs in the province. This has since expanded to other specialties, so that today nearly half of all specialists receive funding from some type of alternate funding source, either an AFA, an alternate payment plan (APP) or a mixture of both.[9]

The introduction of new alternate funding models for GP/FPs began in 1999 with the first Primary Care Networks (PCNs), which were capitation-based. By 2009/10, approximately two-thirds of GP/FPs belonged to one of the primary care patient enrolment models. It has been estimated that in 2009/10 there were 302 separate contracts between the MOHLTC and the Ontario Medical Association on behalf of various physician groups.[10] This multiplicity of payment methods has implications both for physician payment itself and for tracking such payments. This latter issue will be addressed in more detail in Chapter 2.

REPORT OBJECTIVES

1 / To estimate public payments to individual physicians from multiple sources between 1992/3 and 2009/10 and report these by specialty, specialty group and overall using several different measures:

- the average payment per physician;
- the median (and selected percentiles) of the distribution of payments, which illustrates the range of payment levels; and
- the total of all payments to physicians in a given group.

2 / To analyze and report on changes in overall physician supply and in the main specialty groups between 1992/93 and 2009/10, as supply is an important component of expenditure.

3 / To analyze how payments and supply varied between the main specialty groups, and how each contributed to the rise in overall physician payments.

4 / To analyze how changes in the different types of payments (fee for service and other models) contributed to the observed increases in total payments and payments to physicians.

REPORT STRUCTURE

This report examines payments to physicians from MOHLTC sources from 1992/93 to 2009/10. Payments are reported overall for Ontario and by individual specialties. Three exhibits are presented for all physicians combined and for each specialty.

- The first exhibit in each series shows the median and selected percentiles of the distribution of payments from 1992/93 to 2009/10.
- The second exhibit shows the mean (average) payment for an individual physician and for a full-time equivalent (FTE) physician.
- The third exhibit shows the total of all payments to physicians in the specialty for each year, broken down by payment source.

Chapter 1 provides an introduction and Chapter 2 explains the methods used. Chapters 3 to 10 present results for the 32 specialties, grouped as follows:

Chapter 3/
All Ontario Physicians

Chapter 4 /
General Practitioners/Family Physicians

Chapter 5 /
Medical Non-Procedural Specialists

- General internal medicine
- Clinical immunology
- Dermatology
- Endocrinology
- Geriatrics
- Hematology
- Medical oncology
- Neurology
- Pediatrics
- Physical medicine and rehabilitation
- Psychiatry
- Rheumatology

Chapter 6 /
Medical Procedural Specialists

- Cardiology
- Gastroenterology
- Nephrology
- Radiation oncology
- Respirology

Chapter 7 /
Surgical Specialists

- Cardiac and thoracic surgery
- General surgery (including pediatric general surgery)
- Neurosurgery
- Obstetrics/gynecology
- Ophthalmology
- Orthopedic surgery
- Otolaryngology
- Plastic surgery
- Urology
- Vascular surgery

Chapter 8 /
Imaging Specialists

- Diagnostic radiology
- Nuclear medicine

Chapter 9 /
Anesthesiologists

Chapter 10 /
Emergency Department Physicians

Chapter 11 /
Summary

- provides a summary of the results, including exhibits that facilitate comparisons between specialties and specialty groups.

Chapter 12 /
Discussion and Conclusion

- contains the discussion of the overall results and our conclusions.

REFERENCES

1 Canadian Institute for Health Information. *Health Care Cost Drivers: The Facts*. Ottawa: CIHI; 2011. Accessed January 13, 2012 at http://secure.cihi.ca/cihiweb/products/health_care_cost_drivers_the_facts_en.pdf.

2 Barer ML, Lomas J, Sanmartin C. Re-minding our Ps and Qs: medical cost controls in Canada. *Health Aff (Millwood)*. 1996; 15(2):216–34.

3 Chan B. *Supply of Physician's Services in Ontario. Research Atlas*. Toronto: Institute for Clinical Evaluative Sciences; 2004. Accessed January 13, 2012 at http://www.ices.on.ca/file/mod2rp1.pdf.

4 Office of the Auditor General of Ontario. 2011 *Annual Report of the Office of the Auditor General of Ontario*. Toronto: Queen's Printer; 2011. Accessed January 13, 2012 at http://www.auditor.on.ca/en/reports_en/en11/2011ar_en.pdf.

5 Laugesen MJ, Glied SA. Higher fees paid to US physicians drive higher spending for physician services compared to other countries. *Health Aff (Millwood)*. 2011; 30(9):1647–56.

6 International Federation of Health Plans. *2010 Comparative Price Report: Medical and Hospital Fees by Country*. Presentation delivered at IFHP Council Meeting, San Francisco, CA, November 2010. Accessed January 13, 2012 at http://www.ifhp.com/documents/IFHPpricereport151210.pdf.

7 Archibald T, Flood CM. *The Physician Services Committee: The Relationship between the Ontario Medical Association and the Ontario Ministry of Health and Long-Term Care*. IRPP Working Paper Series No. 2004-03. Montreal: Institute for Research on Public Policy; 2004. Accessed January 13, 2012 at http://www.irpp.org/wp/archive/medicare_basket/wp2004-03.pdf.

8 Ontario Ministry of Health and Long-Term Care. Ontario Wait Times. Accessed January 13, 2012 at http://www.health.gov.on.ca/en/public/programs/waittimes/strategy.aspx.

9 Health Force Ontario. Specialist Practice Models. Accessed January 13, 2012 at www.healthforceontario.ca/Work/OutsideOntario/PhysiciansOutsideOntario/PractisingInOntario/SpecialistPhysician.aspx.

10 Fitzpatrick S. Physician Payments: The Ontario Experience. CHSRF Researcher on Call webinar presentation, June 2, 2011. Accessed January 13, 2012 at http://www.chsrf.ca/programs/oncall/FullSchedule/ArticleView/11-06-02/0834f3b2-c447-4d09-83e8-eff0a6ee0a6e.aspx.

CHAPTER 2

Methods

INTRODUCTION

We believe that this is the first independent attempt to make a comprehensive estimate of how much Ontario physicians are being paid from all Ministry of Health and Long-term Care (MOHLTC) sources. The biggest challenge we faced was bringing together the data from disparate sources, a number of which were new to ICES and/or had not been used previously for research purposes. The most important of these were data sources containing information about payments from the various alternate funding programs.

In the past, studies have attempted to compensate for missing alternate payment information by using shadow billings. Shadow billings are records submitted by physicians for patient services that are funded through sources other than fee for service (FFS). These records are identical to FFS billings including having a FFS fee code, but the payment amount is zero. In the past, it was thought that 'adjusting' the shadow billings, that is, applying the current price for each shadow-billed fee code, would provide a good approximation of the physician's total remuneration, including alternate payments. In recent years, as the range of non-FFS payments, such as capitation, premiums and bonuses, grew more diverse, confidence in this methodology declined. To be confident that we were representing physician payments accurately, it was necessary to obtain and use the actual data. This chapter outlines the data sources used in this study and how they were applied to estimate payments at the individual physician level.

DATA SOURCES

The following data sources were used in this study:

- ***Ontario Health Insurance Plan (OHIP) Fee-for-Service billings (from 1992/93 to 2009/10)***
  This is a database of all OHIP FFS and shadow billings. Physicians bill for the services they provide using fee service codes defined in the Schedule of Benefits.[1] In summing the payments from this source, duplicate records and invalid claims were removed, where possible. Then the payment field was summed for each physician for each fiscal year. Shadow billings were not removed but did not contribute to the total because their payment amount was zero dollars.

- ***OHIP Architected Payments (from 2003/04 to 2009/10)***
  This is a database of summary payments made on a monthly basis that do not pertain to an individual service provided to an individual patient. Rather, this database comprises such payments as premiums, bonuses and fees that can be summed across a physician's entire practice and paid at the end of the month. For example, physicians are eligible for age premiums for providing care to patients who are very young or very old, as these patients often require more of the physician's time during a visit or consultation. To illustrate with a hypothetical example: If the premium for seeing a patient in the 75- to 79-year age group was $30 and physician A saw 10 such patients during the month, then the database would record a $300 payment for the age premium. Since there is often a lag between when the service is rendered and when the payment is made, the database record includes both the payment month and the fiscal year when the eligible service occurred. To be consistent with the FFS payments, payments were included in the year in which the service was performed, not the year in which they were paid.

- ***Academic Health Sciences Centre (AHSC) governance payment database (from 2003/04 to 2009/10)***
  The AHSC program is a funding arrangement designed to compensate physicians in teaching hospitals for the time they spend training residents and doing research; this is non-clinical work for which they cannot bill OHIP. Although there may be as many as 500 physicians from a variety of specialties covered by an AHSC contract in a large teaching hospital, all payments flow through the AHSC governance group. This means that in the AHSC payment data, there are only a couple of large aggregated payments per month to each AHSC. The AHSC governance data were used to identify which physicians were affiliated with each AHSC in each year of observation. Payments not targeted for a specific specialty were divided up equally among all affiliated physicians. Specialty-specific payments were divided equally among all affiliated physicians in the designated specialty.

- ***Generalized Alternate Payment Plan (GAAP) database (from 2005/06 to 2009/10)***
  The GAPP is a database of all non-OHIP-related payments (including those to AHSCs). It includes information on the payment amount, the payment month, the payment type and the original payment data source. Many payments also include the model name, which identifies the type of APP or agreement (e.g., Emergency, Northern Specialists, Family Health Organization). With respect to identifiers, a payment record can have one or more of the following: physician billing number (encrypted), group billing number (encrypted) or contract number. For payments that only had contract numbers, the MOHLTC provided 'crosswalks' that identified groups and physicians and thereby facilitated the assignment of payments. A small proportion of payments were not be assigned because they could not be linked to any physicians.
- ***Primary Care Network (PCN) capitation payments (from 1999/00 to 2003/04)***
  The first capitation-based PCNs were introduced in 1999/00. We were able to obtain a database that captured payments to this early primary care model. Depending on the group, some payments listed the physician billing number (encrypted) as well as the group; others listed only the group billing number (encrypted). In the latter case, we were able to use the OHIP Corporate Provider Database (CPDB) to identify physicians affiliated with the group and divide the payment equally among them.
- ***Miscellaneous payments (from 2005/06 to 2009/10)***
  There are several databases that report manual payments (and sometimes charges) to physicians. These payments may be administrative in nature (e.g., processing charges). Often, it is difficult to determine the reason for the payment; these payments/charges are included in the physicians' totals, and their source is listed as 'Other.'

Missing Data

Within the data sources described above, there are several gaps that need to be acknowledged. The most important of these is APP/AFA data prior to 2005/06. The initial AFAs for emergency departments, for example, began in 1999/00 or 2000/01, but we were only able to obtain payment information beginning in 2005/06. The same is true for other APPs. For this reason, results for some or all of the years between 2000/01 and 2004/05 for certain specialties have been suppressed. In the case of other specialties, the results for these years need to be treated with caution. We have identified these examples in the exhibit footnotes.

Another type of missing data concerns physicians on alternate payment plans prior to 1999. We do not have any payment information from Community Health Centres, Health Service Organizations or early academic comprehensive agreements, such as the one with the Hospital for Sick Children. If the physicians in these plans also had FFS billings, their payments will have been underestimated. If they had no FFS billings, they will have been excluded completely prior to 2005/06.

INCLUSION/EXCLUSION CRITERIA

Payments

The totals reported in this report exclude payments to Academic Health Sciences Centres for administrative costs, and payments to Family Health Teams (FHTs) to cover such things as computer hardware and software, legal fees and human resources. They do not include payments to FHTs for other providers, such as nurse practitioners, nurses or dieticians.

Diagnostic tests and other procedures often have two fees: a professional fee and a technical fee. Professional fees are paid to the physician who performs and interprets the test, and technical fees are paid to the facility (e.g., the hospital) to offset the costs associated with providing the services (e.g., technicians' salaries, overhead expenditures, capital outlays and amortization). It was our intention to include only professional fees paid to physicians in this analysis. However, prior to 2000/01 not all technical fees could be identified as some procedures had three fees: technical, professional and a combined fee that included both. We did not attempt to remove the technical portion from the combined fee, so payments for certain specialties, particularly diagnostic imaging, are somewhat inflated prior to 2000/01 when the combined fee was discontinued.

A cautionary note is included on the exhibits where the results may include some technical fees.

Physician Specialties

Certain physician specialties have been excluded from this report. They include laboratory medicine specialties (anatomical pathology, general pathology, hematological pathology, neuropathology medical microbiology and medical biochemistry) because their payment data in the sources we used were unreliable. Many laboratory physicians work in hospitals and are paid out of the hospital global budget. There were also about 50 physicians who were listed in our data under other specialties, but whose billings were almost entirely for laboratory tests. These physicians were also excluded. Finally, where the number of physicians in a specialty was very small (fewer than 50 physicians in 2009/10), the specialty was either combined with a larger specialty or was excluded. The following specialties were combined: pediatric cardiology with cardiology, thoracic surgery with cardiac and thoracic surgery, pediatric general surgery with general surgery, community medicine with GP/FPs. The following specialties were excluded because they were both very small and there were questions about the completeness of their data: medical genetics, infectious diseases, occupational medicine.

Physicians

Physicians were included in the analysis for a given year if they met one of the following criteria: they were 'active' according to information from the Ontario Physician Human Resources Data Centre (OPHRDC) and had total payments that were more than $0, or their status was 'inactive' according to OPHRDC but they had OHIP billings during the year.

ASSIGNING PAYMENTS TO INDIVIDUAL PHYSICIANS

Payments were allocated to individual physicians in the following manner:

1 / If there was a physician billing number (encrypted) associated with the payment (as in OHIP FFS billings), the payment was allocated to that physician.

2 / For payments where only a group billing number (encrypted) was available, physicians affiliated with that group at the time of payment were identified using the OHIP Corporate Provider Database (CPDB). The payment was then divided equally among affiliated physicians.

3 / For payments where only a contract number was available, a lookup table was used to identify the group billing numbers associated with the contract. Then the CPDB was used to identify physicians affiliated with the groups. Each physician was included only once per contract. The contract payments were divided equally between all physicians associated with that contract.

4 / Payments without identifiers or with contract numbers that had no groups associated with them could not be allocated.

DEFINING PHYSICIAN SPECIALTIES

Physicians were classified according to their derived specialty in the Ontario Physician Workforce Database (OPWD). OPWD is a collaborative database created under a data sharing agreement between the OPHRDC, ICES and the MOHLTC. The derived specialty is based on a combination of physician certification and self-report. There were two exceptions to this: physicians who provided more than 50% of their FFS-billed services in the emergency department were classified as emergency physicians; and physicians who had more than 50% of their FFS billings for lab tests (with fee service codes beginning with 'L') were classified as laboratory medicine physicians and were excluded from this analysis.

ANALYTICAL METHODS

As a descriptive observational study, most of the analytical methods used are quite straightforward. The most complex part of the study involved ensuring that payments were correctly assigned to each physician and correctly identified as to the source of the payment. Once this was done, payments from all data sources were combined to achieve a total for each physician and year. The median and mean were calculated using PROC MEANS in SAS version 9.2 (SAS Institute, Cary, NC).

Means were calculated on both a per-head and per-full-time-equivalent (FTE) basis. FTE is a measure of workload and was calculated using the method originally developed by Health Canada to estimate FTE using FFS billings. For this report, FTE was calculated using total payments from all sources. The assumption is that physicians who work harder get paid more. In the standard formula, all physicians are ranked in order by the total sum of their payments. Those who fall between the 40th and 60th percentiles are assigned an FTE of 1.00.

When reporting total payments by specialty or overall, figures have been rounded to the nearest 100 and reported in thousands of dollars. However, means, medians, percentages and FTEs were all calculated on unrounded numbers. All payments are reported in actual dollars unadjusted for inflation. All the data reported are for gross payments to physicians and have not been adjusted for overhead costs.

TIME FRAME

The report examines physician payments for fiscal years 1992/93 to 2009/10, the earliest and most recent years for which data are available. In chapters 3 to 10, which present results for individual specialties, the median, mean and total payments are shown for the entire study period.

The Summary chapter (Chapter 11) contains exhibits that allow the reader to easily make comparisons between specialties and groups of specialties. These summary exhibits contain data from one or all of the following years: 1993/94, 1999/00, 2005/06 and 2009/10. These years were chosen for the following reasons:

- The 1990s represent a period when physicians were paid almost exclusively on a fee-for-service basis, so a comparison of 1993/94 and 1999/00 is illustrative of what was happening in respect of FFS.
- Comparing 1999/00 and 2005/06 shows the impact of the first wave of alternate funding plans.
- Differences between 2005/06 and 2009/10 show the impact of Ontario Medical Association agreements in 2004 and 2008, which mainly affected primary care funding.

REFERENCE

1 Ontario Ministry of Health and Long-Term Care. Ontario Health Insurance (OHIP) Schedule of Benefits and Fees. Accessed January 13, 2012 at http://www.health.gov.on.ca/english/providers/program/ohip/sob/sob_mn.html.

CHAPTER 3

Results for All Ontario Physicians

INTRODUCTION

In Ontario, the 1990s witnessed the capping of fee payments and the control of physician supply. These measures were implemented for one main purpose: cost containment. The Ontario government imposed a global ceiling on expenditures for medical services during the three fiscal years beginning in 1993/94. Payments in excess of the ceiling were 'clawed back' by reducing each physician's billings by an equal across-the-board percentage. Use of payment caps ceased in 1998. Temporary restrictions on new billing numbers for out-of-province graduates were put in place between 1993 and 1996. From 1997 to 1999, financial penalties were instituted for recent graduates who wanted to establish a practice in selected urban areas designated as 'over-serviced.'[1]

Since then, agreements between the Ontario Medical Association and the MOHLTC have governed the development of more sophisticated payment schemes for physicians. As a consequence, specialists in Ontario may now be compensated through a fee-for-service system or through a range of alternate funding arrangements. Alternate funding arrangements are contractual agreement between the MOHLTC and groups of physicians and may include other organizations, such as hospitals and universities. The process of deliberately moving GP/FPs away from a purely fee-for-service model began in earnest in 1999/00. A major expansion of primary care models began in 2001/02; details of the various models are given in the Introduction to this report.

As described in the exhibits accompanying this chapter, capping policies kept payments to physicians flat during the 1990s. The switch in policies and the introduction of strategies to reduce wait times for specific procedures and diagnostic tests led to increasing payments; these are reported in more detail in the chapters covering specific specialty groups.

As noted in Chapter 2, the following specialties have been excluded from this report: all laboratory medicine physicians (including anatomical pathologists, general pathologists, neuropathologists, hematological pathologists, medical microbiologists and medical biochemists); medical geneticists; occupational medicine specialists; public health physicians; and infectious disease specialists. These specialties were excluded because their numbers are very small (fewer than 50 physicians in 2009/10) and their payment information is not reliable. Many are paid out of hospital global budgets or by other agencies, such as the Workplace Safety and Insurance Board, whose information we could not access.

FINDINGS

Median, Mean and Total Payments (exhibits 3.1 to 3.3)

The number of active physicians in Ontario increased from 20,208 in 1992/93 to 25,019 in 2009/10 (24%). This is broadly in line with overall population growth (around 20%) during the same period. Growth was not constant, however; there was a slight contraction in the number of doctors between 1993/94 and 1999/00. Most of the expansion in physician numbers occurred in the past decade, with a 22% increase since 2000/01.

We identified payments of approximately $8 billion to Ontario's doctors in 2009/10, $4.3 billion more than they were paid in 1992/93. These estimates are in unadjusted dollars. This increase was not evenly distributed over time. Between 1992/93 and 1999/00, payments increased by 14.6%, or a yearly average of 2.4%. During this period, the average annual rate of inflation in Canada was 1.4%. Between 1999/00 and 2005/06, physician payments increased by 6.4% annually, compared with an average annual rate of inflation of 2.4%. Between 2005/06 and 2009/10, payments to physicians increased by 9.9% annually, compared with an average annual rate of inflation of less than 2% during the same period.

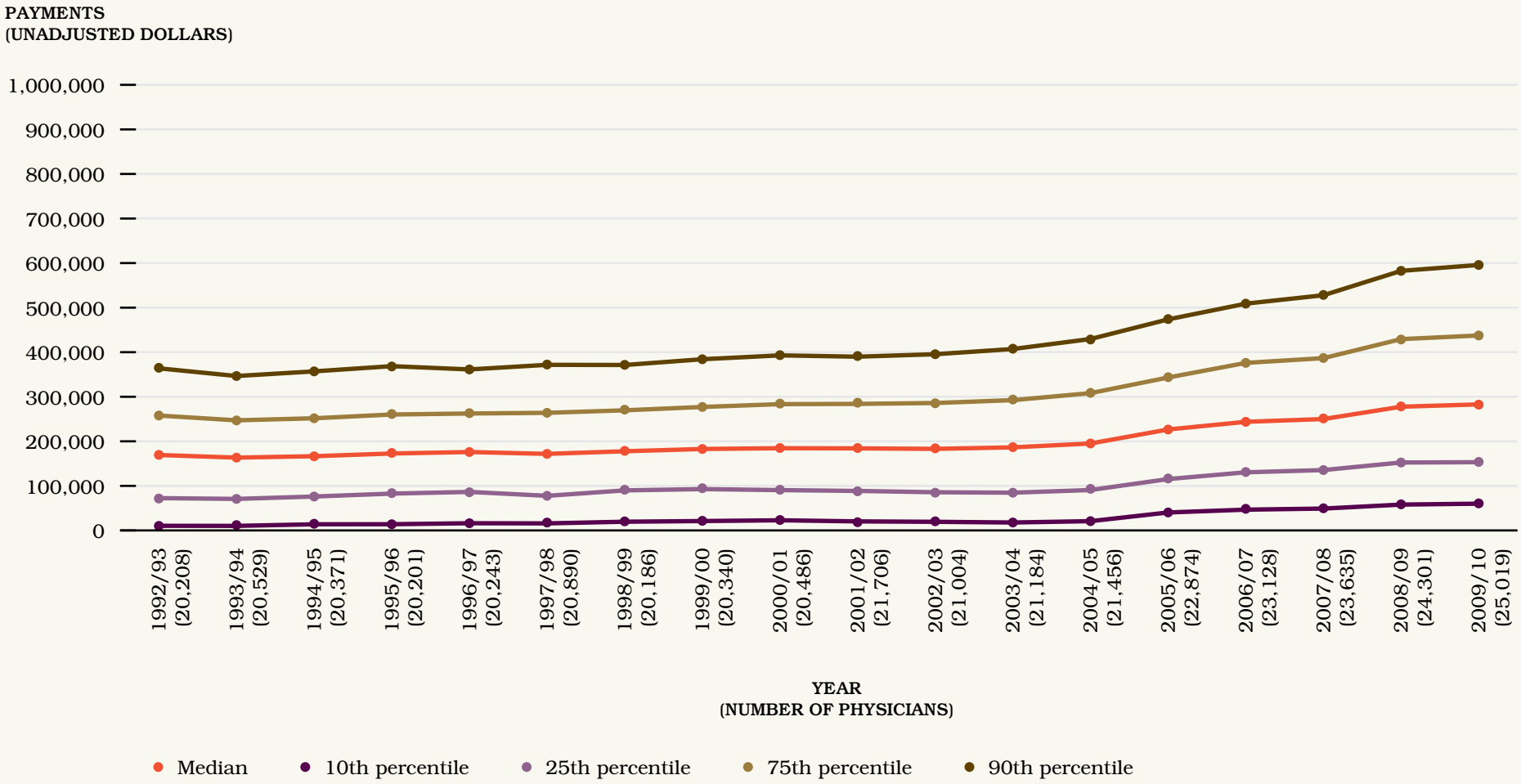
The median annual payment for all physicians combined was just under $170,000 in 1992/93 and remained flat during the 1990s (in unadjusted dollars). Between 2005/06 and 2009/10, the median payment per physician increased by 25%, from approximately $227,000 to $283,000. The mean payment per physician in 2005/06 was higher than the median at just under $250,000. This rose by 28%, to about $318,000, in 2009/10. (Note: these increases were not adjusted for inflation.) Payment by methods other than fee for service were negligible until 2004/05, but by 2009/10, they constituted 30% of total payments. From 2003/04 onward, 63% of the increase in payments to all physicians was made through some form of alternate payment plan. However, FFS payments rose during this period by 32%. Funding for the new primary care models totalled almost $1.2 billion or about 15% of the total; this was about the same as for all other payment streams combined.

REFERENCE

1 Archibald T, Flood CM. *The Physician Services Committee: The Relationship Between the Ontario Medical Association and the Ontario Ministry of Health and Long-Term Care*. IRPP Working Paper Series No. 2004-03. Montreal: Institute for Research on Public Policy; 2004. Accessed January 13, 2012 at http://www.irpp.org/wp/archive/medicare_basket/wp2004-03.pdf.

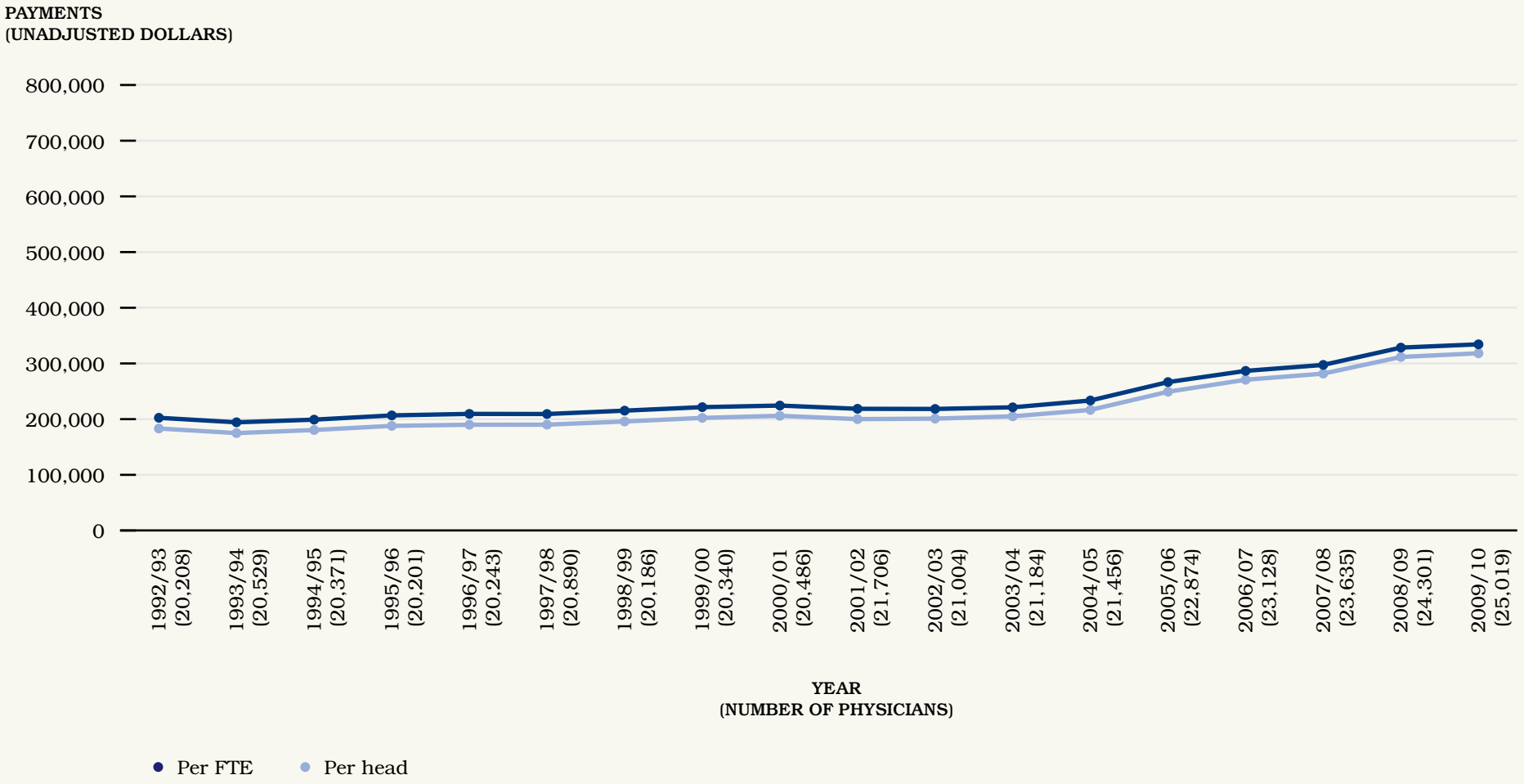
ALL PHYSICIANS

EXHIBIT 3.1 Median and percentiles of payments (in unadjusted dollars) to all individual physicians, in Ontario, 1992/93 to 2009/10



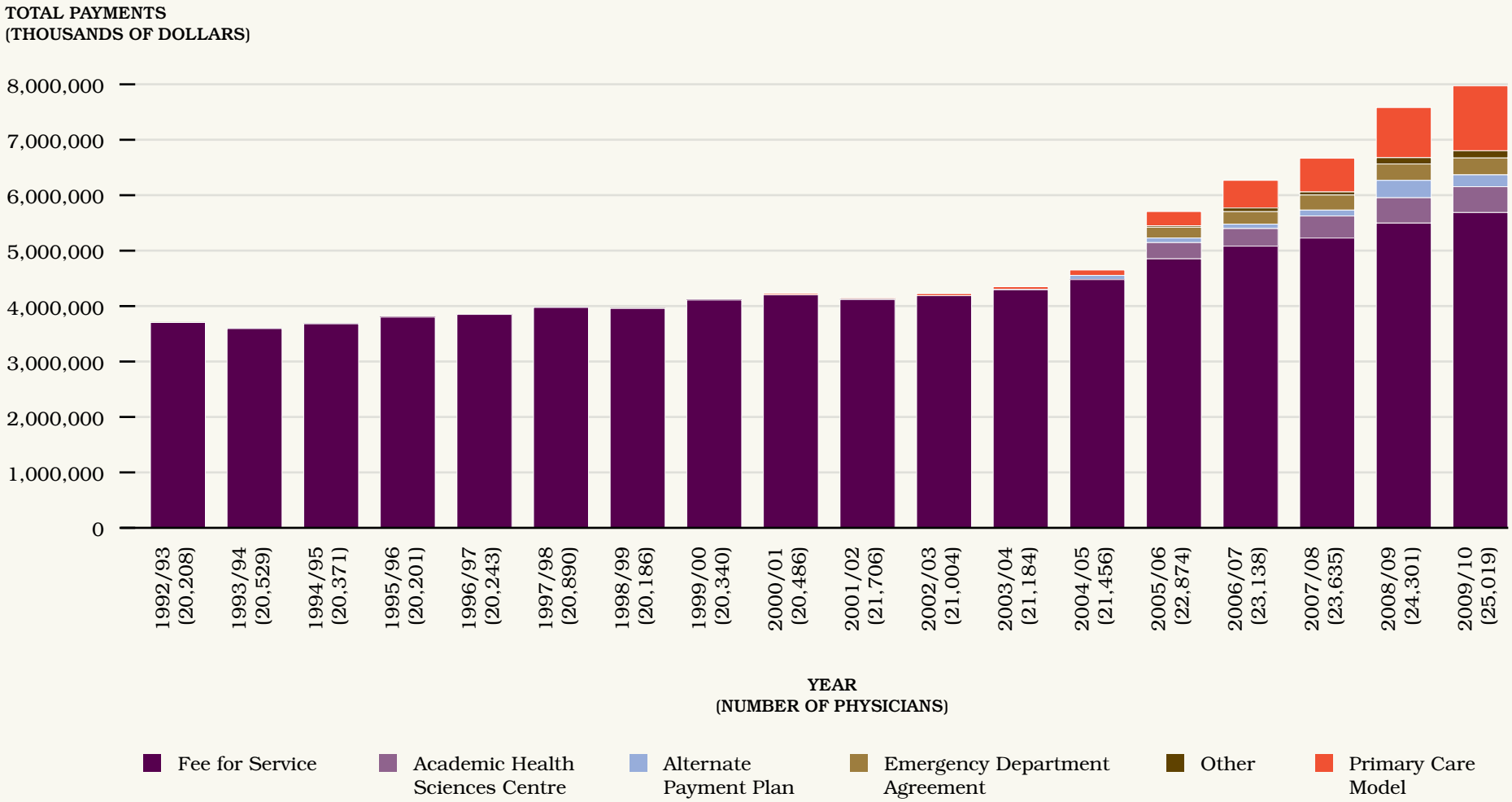
ALL PHYSICIANS

EXHIBIT 3.2 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to all physicians, in Ontario, 1992/93 to 2009/10



ALL PHYSICIANS

EXHIBIT 3.3 Total payments to all physicians by payment source, in Ontario, 1992/93 to 2009/10



CHAPTER 4

Results for General Practitioners/ Family Physicians

INTRODUCTION

This chapter presents data for the largest group of physicians—general practitioners/ family physicians (GP/FPs). GP/FPs are responsible for providing primary care to the population, and for most people, they are their main source of health care. Although GP/FPs work mainly through office-based practice, their practice venues and range of services have traditionally been very diverse. This includes, in addition to in-office visits, providing primary care to residents in nursing homes, providing supportive care to their patients who are hospitalized, working in the emergency department, providing obstetrical care in remote communities and even assisting with surgery. As well, there has always been a subgroup of physicians in this specialty who prefer to focus on a single area of practice, such as psychotherapy, allergy medicine or sports medicine. For the purposes of this report, this chapter includes all GP/ FPs except those who provided more than 50% of their services in the emergency department.

Prior to 1999/00, virtually all GP/FPs were paid on a fee-for-service (FFS) basis. The exceptions to this were two alternate payment models: Community Health Centres (CHCs) in which physicians were salaried employees, and Health Service Organizations (HSOs) in which physicians were paid a set amount for each patient on their roster (capitation). In the late 1990s, a number of capitation-based Primary Care Networks (PCNs) were formed.

The following decade saw a major expansion of primary care models, including:

- 2001/02—blended capitation Family Health Networks (FHNs);
- 2003/04—blended FFS Family Health Groups (FHGs) and Comprehensive Care Models (CCM, similar to FHG but for solo practice physicians);
- 2004/05—the group payment-based Rural-Northern Physician Group Agreement (RAN);
- 2006/07—blended capitation Family Health Organizations (FHOs), into which HSOs and PCNs were integrated.

By the end of 2009/10, more than two-thirds of Ontario's primary care physicians belonged to one of these models, with FHOs being the most popular.

The first three exhibits in this chapter show the median, mean and total payments for all GP/FPs combined from 1992/93 to 2005/06. The final two exhibits focus on the most recent years, showing the differences in payments between the various patient enrolment models (PEMs) for the years 2005/06 to 2009/10 only. Physicians often move from one type of PEM to another during the year. For the purposes of this analysis, physicians were assigned to the PEM with which they were affiliated at the midpoint of each year.

FINDINGS

Median, Mean and Total Payments (exhibits 4.1 to 4.3)

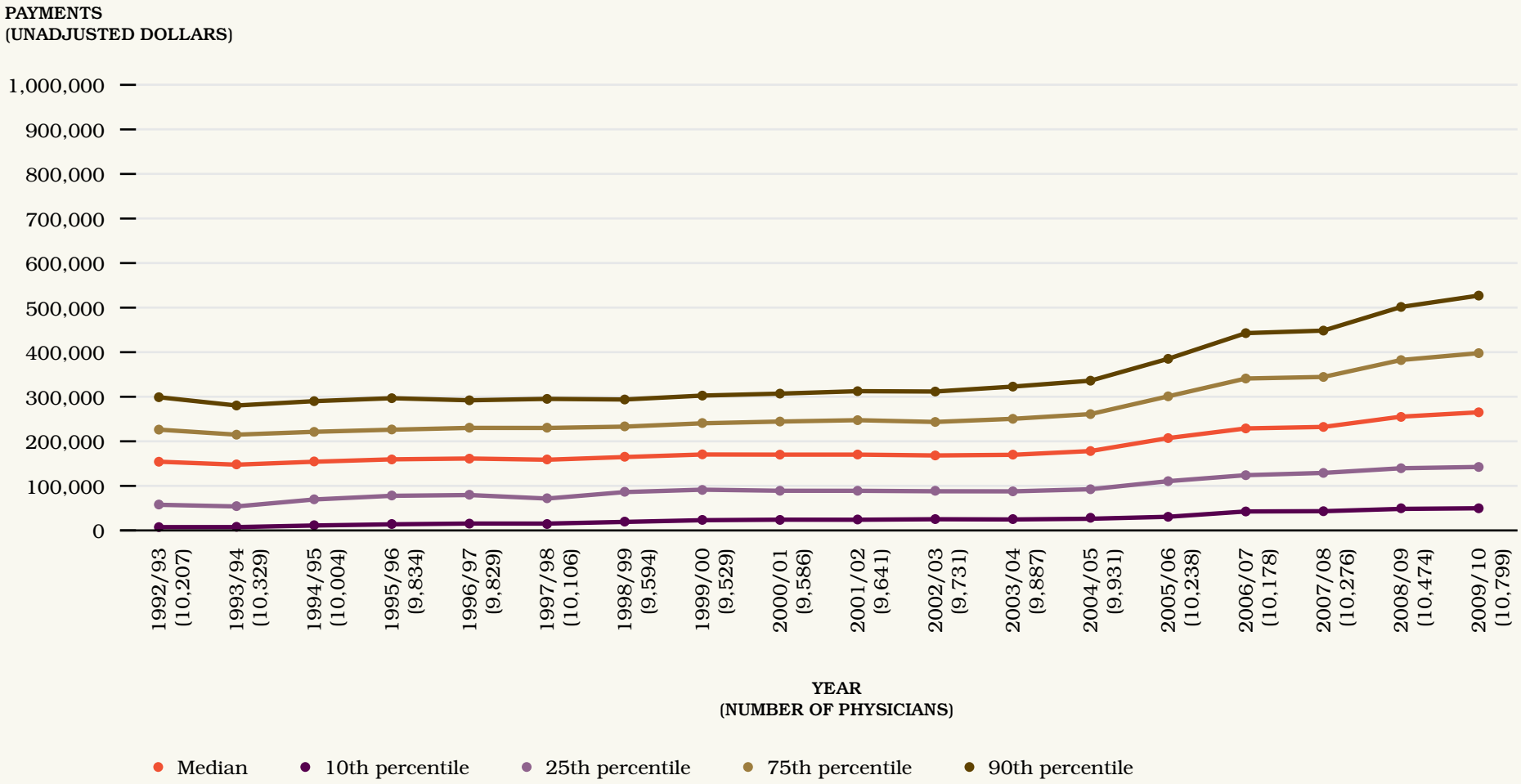
Excluding those working mainly in emergency departments, the number of GP/FPs declined approximately 7% between 1992/93 and 1999/00. Thereafter, numbers increased, and by 2009/10 there were 10,799 GP/FPs, about 6% more than in 1992/93. Between 2003/04 and 2009/10, the number of GP/FPs increased by almost 9%. Total payments to GP/FPs in 2009/10 amounted to $3.1 billion, an increase of $1.3 billion (77%) from 2003/04, or 58% after adjusting for inflation. The median payment per active GP/FP was relatively flat from 1992/93 to 2004/05, then rose steadily between 2005/06 and 2009/10. The variation in payments from the bottom 10th percentile to the top 90th percentile increased, from a gap of about $300,000 in 1992/93 to almost $500,000 in 2009/10. The mean payment per FTE for GP/FPs in 2009/10 ($300,100) was somewhat lower than that for all physicians ($334,700). Fee-for-service payments remained relatively flat over the whole time period, with a slight increase from 2005/06 to 2007/08 and a small decrease thereafter. Payments specific to primary care models, the majority of which were based on capitation, rose very rapidly after 2004/05 and accounted for a large proportion of the increase in payments.

Payments by Patient Enrolment Model (exhibits 4.4 and 4.5)

The Family Health Group (FHG), an enhanced fee-for-service model, remained the most popular patient enrolment model until the end of 2009/10, but payments to physicians in FHGs started to decline after 2007/08. Payments to physicians in Family Health Networks (FHNs), a blended capitation model, also began to decline after 2007/08. Payments to physicians in Family Health Organizations (FHOs), a blended capitation model with a larger per capita payment and basket of services than the FHN model, rose rapidly in 2008/09 and 2009/10, with the majority of the increase being capitation payments. Payments to physicians outside of patient enrolment models decreased after 2005/06, and payments in other models remained relatively flat between 2005/06 and 2009/10. Average payments per active GP/FP were highest among those in FHOs, followed by FHNs and FHGs. Payments in all models showed a general increase between 2005/06 and 2009/10.

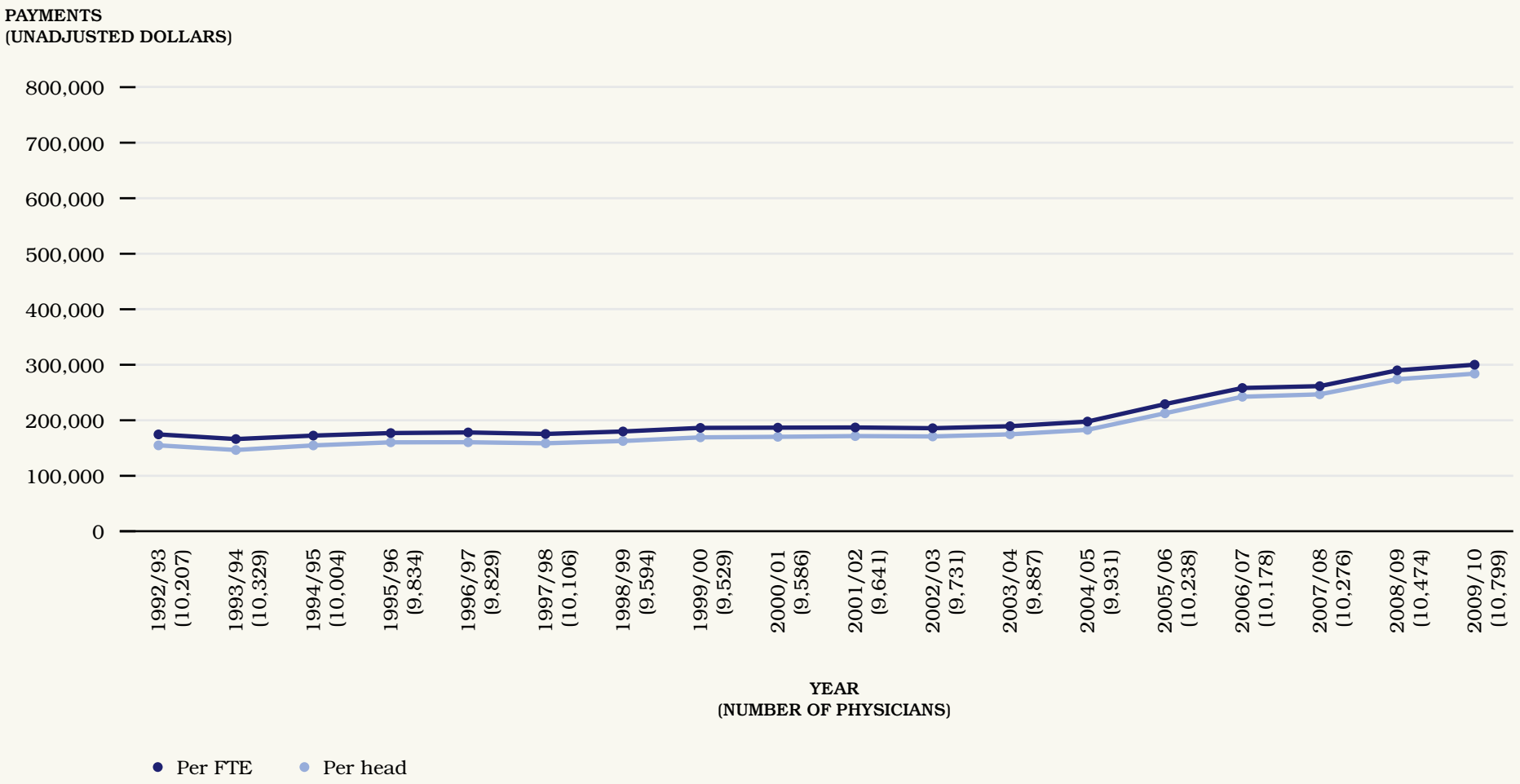
GENERAL PRACTITIONERS/FAMILY PHYSICIANS

EXHIBIT 4.1 Median and percentiles of payments (in unadjusted dollars) to individual GP/FPs, in Ontario, 1992/93 to 2009/10



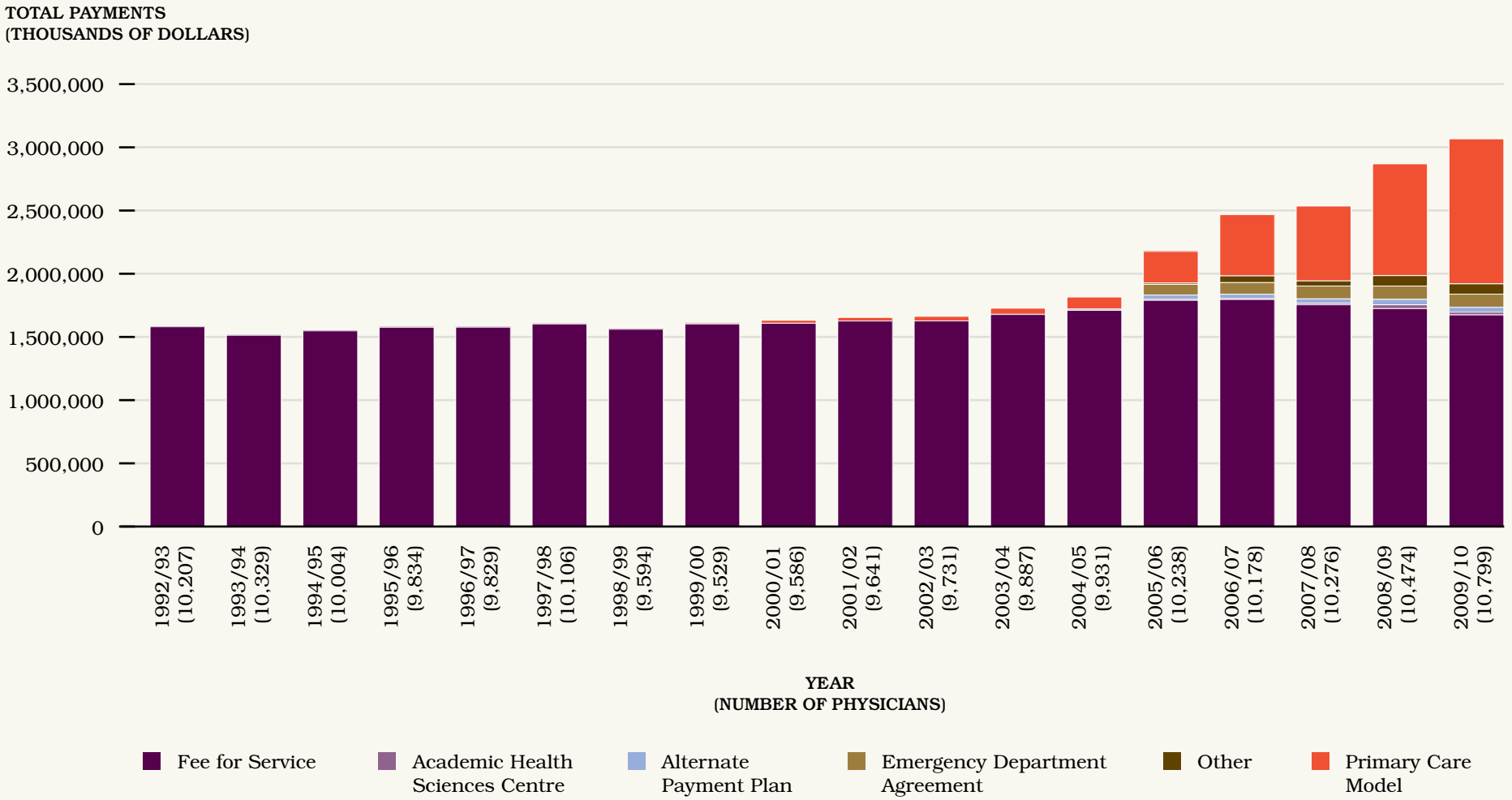
GENERAL PRACTITIONERS/FAMILY PHYSICIANS

EXHIBIT 4.2 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to GP/FPs, in Ontario, 1992/93 to 2009/10



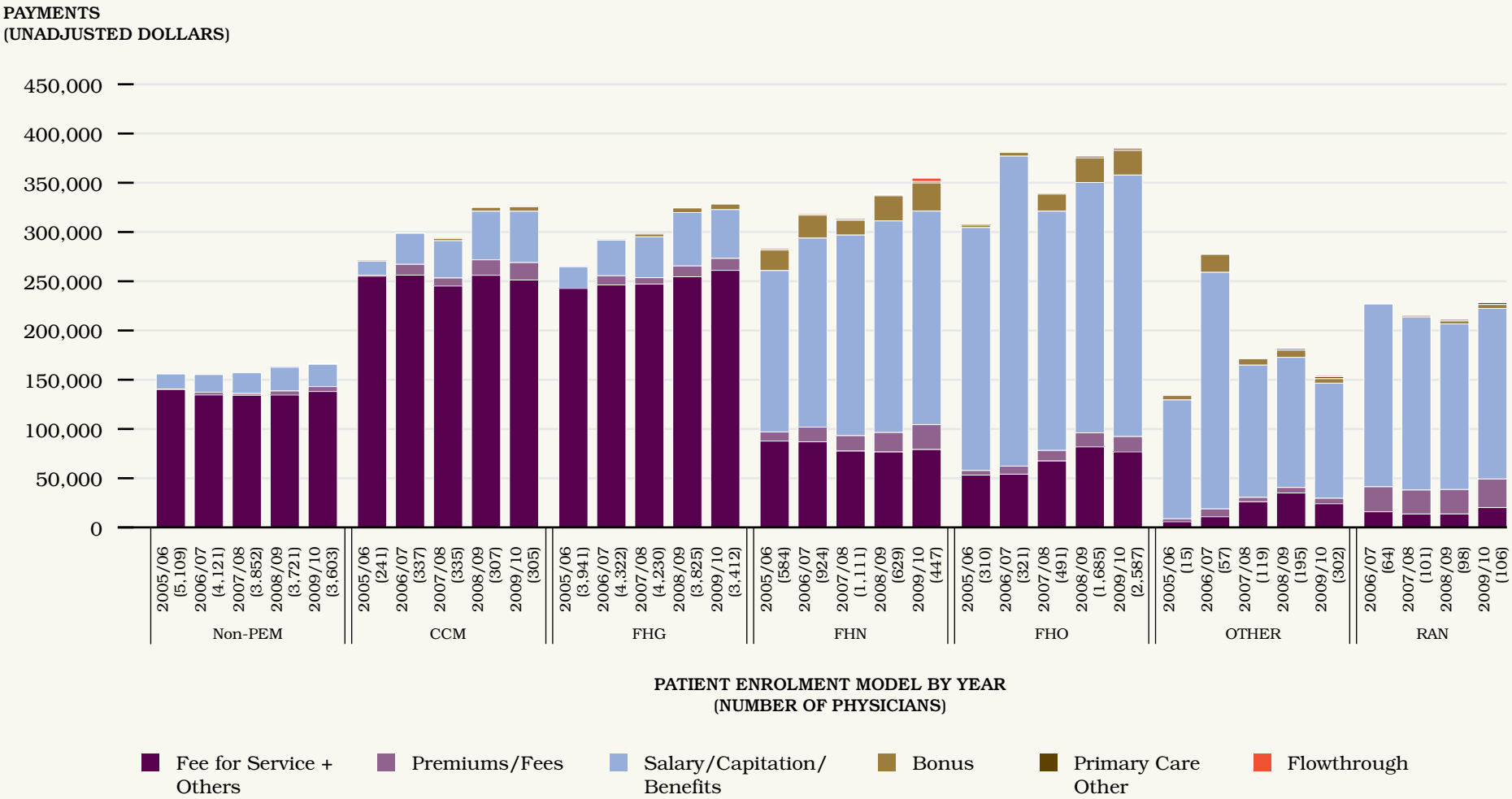
GENERAL PRACTITIONERS/FAMILY PHYSICIANS

EXHIBIT 4.3 Total payments to GP/FPs by payment source, in Ontario, 1992/93 to 2009/10



GENERAL PRACTITIONERS/FAMILY PHYSICIANS

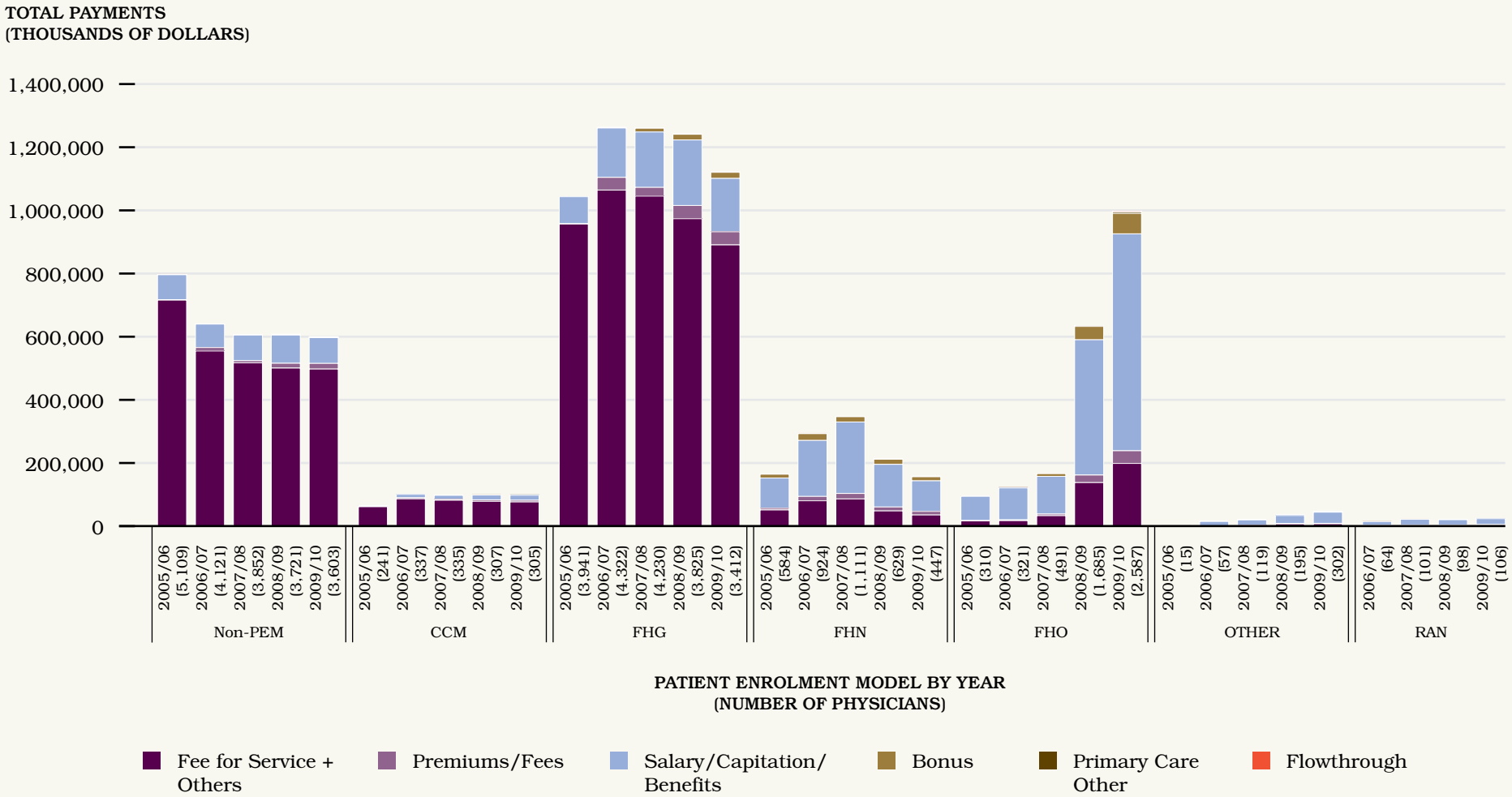
EXHIBIT 4.4 Mean payments (in unadjusted dollars) to GP/FPs by payment type and patient enrolment model, in Ontario, 2005/06 to 2009/10



Note: Each physician was assigned to only one payment model per year. Assignment was based on the physician's affiliation at the midpoint of each year.
Non-PEM = Not in a Patient Enrolment Model CCM = Comprehensive Care Model FHG = Family Health Group FHN = Family Health Network
FHO = Family Health Organization RAN = Rural-Northern Physician Group Agreement

GENERAL PRACTITIONERS/FAMILY PHYSICIANS

EXHIBIT 4.5 Total payments to GP/FPs by payment type and patient enrolment model, in Ontario, 2005/06 to 2009/10



Note: Each physician was assigned to only one payment model per year. Assignment was based on the physician's affiliation at the midpoint of each year.
Non-PEM = Not in a Patient Enrolment Model CCM = Comprehensive Care Model FHG = Family Health Group FHN = Family Health Network
FHO = Family Health Organization RAN = Rural-Northern Physician Group Agreement

CHAPTER 5

Results for Medical Non-Procedural Specialists

GENERAL INTERNAL MEDICINE
CLINICAL IMMUNOLOGY
DERMATOLOGY
ENDOCRINOLOGY
GERIATRICS
HEMATOLOGY
MEDICAL ONCOLOGY
NEUROLOGY
PEDIATRICS
PHYSICAL MEDICINE AND REHABILITATION
PSYCHIATRY
RHEUMATOLOGY

INTRODUCTION

Medical non-procedural specialists are specialist physicians whose clinical work does not involve procedures. Specialists such as internists, neurologists and endocrinologists may order tests, but their clinical work is primarily devoted to consultations and patient visits. By contrast, a gastroenterologist will often carry out both a consultation and a procedure (e.g., gastroscopy or colonoscopy) and may bill for both. In a fee-for-service (FFS) environment, this leads to higher payments to procedural specialists than to non-procedural specialists. This difference is exacerbated by factors such as the aging of the patient population and by technical advances that allow physicians to perform more procedures per day. Because of this, many non-procedural physicians are now part of a non-FFS payment plan, such as membership in an Alternate Payment Plan (APP) or Academic Health Sciences Centre (AHSC) group.

FINDINGS FOR INDIVIDUAL SPECIALTIES

General Internal Medicine (exhibits 5.1 to 5.3)

The number of general internists reached a nadir of 517 in 1999/00, then rose to 966 in 2009/10. Overall payments fell to approximately $80 million in 2003/04 and roughly trebled to over $240 million in 2009/10. In recent years, an increasing proportion of payments have been from non-FFS sources, but this remained at only 14% in 2009/10. Median payments to general internists remained flat through the 1990s and were below those to all physicians in Ontario throughout the study period. The distribution of payments was wide and included 25% that were below $100,000 annually. This suggests that either a large proportion of internists worked part-time or that some earned income from hospital salaries, which would not be captured in this report.

Clinical Immunology (exhibits 5.4 to 5.6)

This is a small specialty, and the total number in practice remained between 60 and 70 throughout the study period. Median payment was slightly higher than that of all physicians in Ontario. Mean payment in 2009/10 was 12% higher than that of all physicians. Ten percent of clinical immunologists were paid $600,000 or more (the second highest 90th percentile value in this group of specialties). FFS dominated with 92% of payments by this route.

Dermatology (exhibits 5.7 to 5.9)

The number of dermatologists in Ontario reached a nadir of 185 in 2006/07 and rose to 200 in 2009/10. The trend in total payments roughly paralleled supply, increasing from approximately $50 million in 2003/04 to approximately $78 million in 2009/10. The median annual payment to dermatologists remained flat at around $300,000 throughout the study period, somewhat higher than that of all physicians. However, the distribution widened substantially in recent years, with 25% of dermatologists paid more than $500,000 in 2009/10, and 10% paid more than $700,000 in that year. The mean annual payment rose to approximately $383,000 in 2009/10. These numbers do not take into account payments for cosmetic procedures or minor surgeries, which are not covered by OHIP. The great majority of public payments to dermatologists continue to be by FFS.

Endocrinology (exhibits 5.10 to 5.12)

The number of endocrinologists increased by around 70% during the study period, peaking at 174 in 2009/10. Median annual payments to individual endocrinologists remained slightly below those to all physicians throughout the study period. The mean payment per head and per full-time equivalent were almost identical and similar to the median value. From 2004/05 onward, a proportion of total payments were APP and AHSC payments, but the proportion of FFS payments was still high, reaching 88% in 2009/10.

Geriatrics (exhibits 5.13 to 5.15)

Geriatrics remains a small specialty in Ontario despite a doubling in the number of specialists to 102 in 2009/10, with total payments of approximately $26 million in that year. The median annual payment was flat at or below $100,000 through the 1990s, which may indicate that payment was also being received from other sources not included in our data. The data from 2005/06 onward are complete and indicate that the mean and median payments remained significantly below those of all physicians in Ontario. Although the majority of payments (65%) were still by FFS, the impact of alternate payment sources is clear for this specialty, with 28% (of the total) derived from APP and 6% from AHSC.

Hematology (exhibits 5.16 to 5.18)

The number of hematologists increased by about 50% during the study period reaching 152 in 2009/10, at a total cost of approximately $40 million in that year. Mean and median annual payments were lower than those for all physicians during most of the study period, not including any payments received from other sources not included in our data. The data from 2002/03 to 2004/05 are incomplete and have been censored. The data from 2005/06 onward are complete and show payments to individual hematologists that are similar to those for all physicians. Notably, in recent years the proportion of total payments from non-FFS sources has increased to about 50%.

Medical Oncology (exhibits 5.19 to 5.21)

The number of medical oncologists in Ontario more than doubled from 77 in 1992/93 to 187 in 2009/10, with total payments of just under $60 million in 2009/10. The data reveal that FFS payments were a relatively small component of payments to medical oncologists (less than 25% of the total). Payment levels were relatively low during the 1990s, because medical oncologists were at least partially paid out of hospital budgets. In the period for which we have complete data (2005/06 onward), mean and median annual payments to medical oncologists were similar to those made to all physicians. There was little variation in later years because most oncologists are now paid through a single APP, meaning the medians and 25th and 75th percentiles are very similar.

Neurology (exhibits 5.22 to 5.24)

During the study period, the number of neurologists in Ontario increased by 47%, reaching 295 in 2009/10, at a total cost of nearly $80 million in that year. Mean and median annual payments to neurologists remained fairly flat during most of the study period. Mean payments per head and per full-time equivalent rose to a lesser degree than those for all physicians after 2004/05 and remained significantly lower in 2009/10. The majority of payments (around 84%) were in the form of FFS.

Pediatrics (exhibits 5.25 to 5.27)

The number of active general pediatricians in Ontario increased by nearly 60% from 1992/93 reaching 1,165 in 2009/10, with total payments of over $300 million in that year. Although pediatricians comprise about 5% of all physicians, their total payments represent about 4% of total payments to physicians. Mean and median annual payments to pediatricians remained below those to all physicians, particularly in the later years. In 2009/10, general pediatricians received about 57% of payments from FFS, 37% from APPs and the remainder from other non-FFS sources. Pediatricians who worked in children's hospitals, such as the Hospital for Sick Children and the Children's Hospital of Eastern Ontario, were paid from APPs, while community-based pediatricians were paid primarily through FFS.

Physical Medicine and Rehabilitation (exhibits 5.28 to 5.30)

The number of physical medicine and rehabilitation specialists increased by 52% to 164 over the study period. Total payments in 2009/10 were approximately $40 million. Mean and median annual payments remained below those to all physicians throughout the study period. Around 81% of payments were from FFS, 10% from AHSC and the remainder from other non-FFS sources.

Psychiatry (exhibits 5.31 to 5.33)

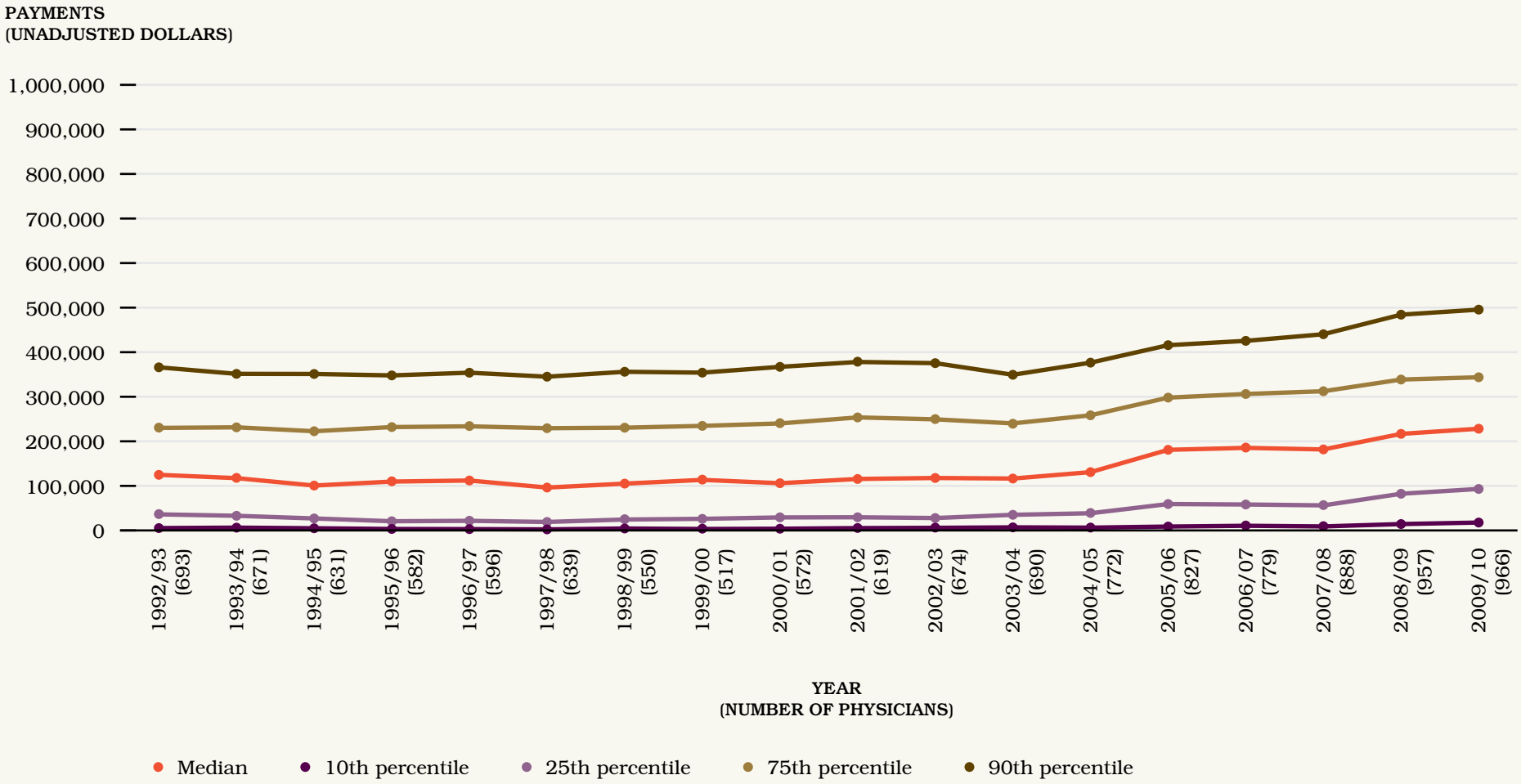
After general practice/family medicine, psychiatry is the second most populous specialty in Ontario, comprising about 8% of active physicians in 2009/10. This represents an increase of 25% since 1992/93. Total payments were over $350 million in 2009/10. It is important to realize that these numbers do not include direct payments by hospitals to psychiatrists or payments of mental health sessional fees managed directly by the Local Health Integration Networks in recent years. From the data accumulated for this study, we calculated that mean and median annual payments to psychiatrists remained fairly constant until 2004/05 and then rose modestly. These values (which we know are underestimates) are well below the average values for all physicians in Ontario. Most of these payments were from FFS with approximately 15% coming from other sources.

Rheumatology (exhibits 5.34 to 5.36)

The number of rheumatologists increased by 38% during the study period, to a total of 160. Total payments to this specialty were nearly $50 million in 2009/10. During the 1990s, mean and median annual payments to rheumatologists were similar to those for all Ontario physicians combined, and they increased at approximately the same rate as for all physicians after 2004/05. Only a small proportion of payments was from non-FFS sources.

GENERAL INTERNISTS

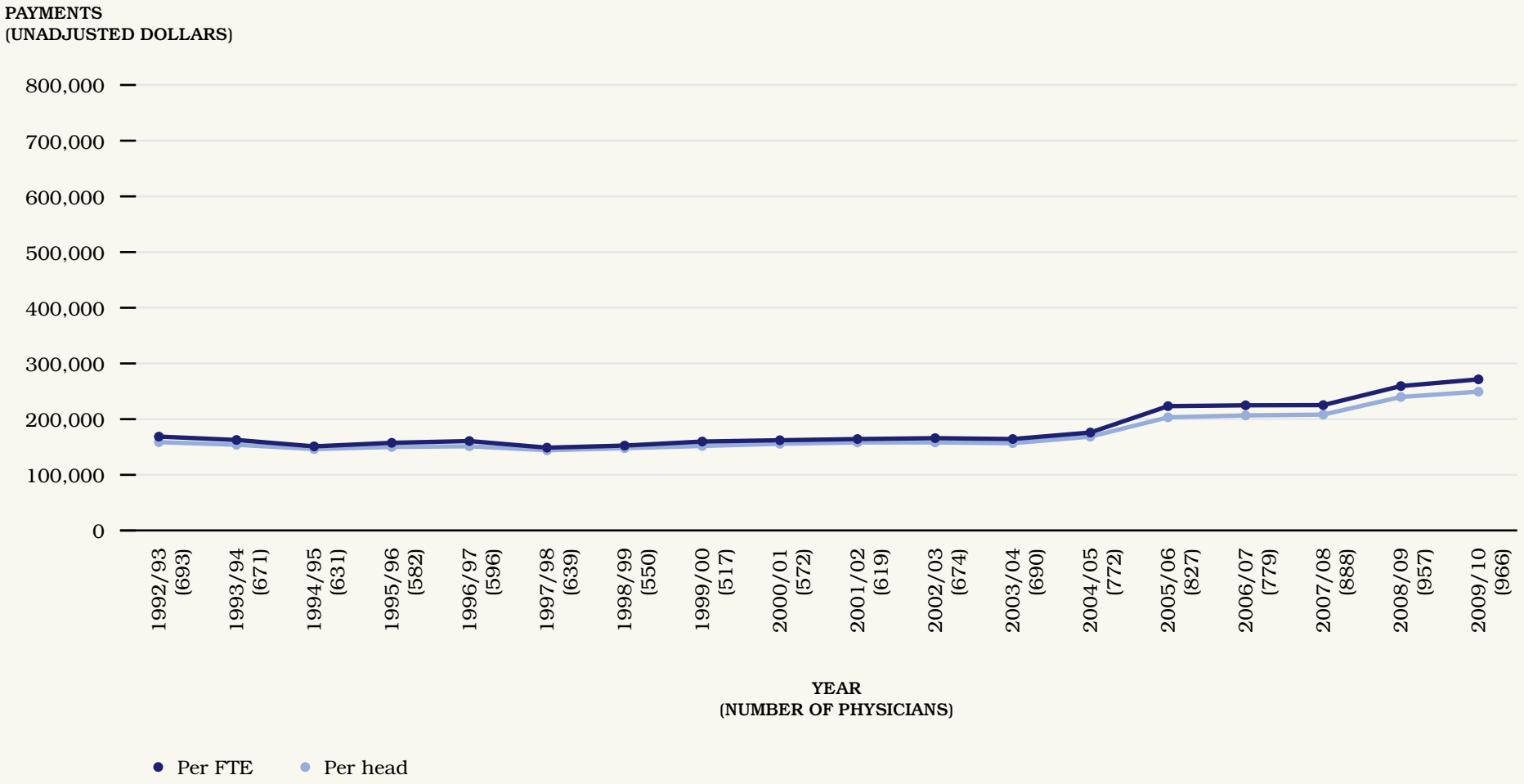
EXHIBIT 5.1 Median and percentiles of payments (in unadjusted dollars) to individual general internists, in Ontario, 1992/93 to 2009/10



Note: Data from 2001/02 to 2004/05 should be treated with caution due to missing APP payment information.

GENERAL INTERNISTS

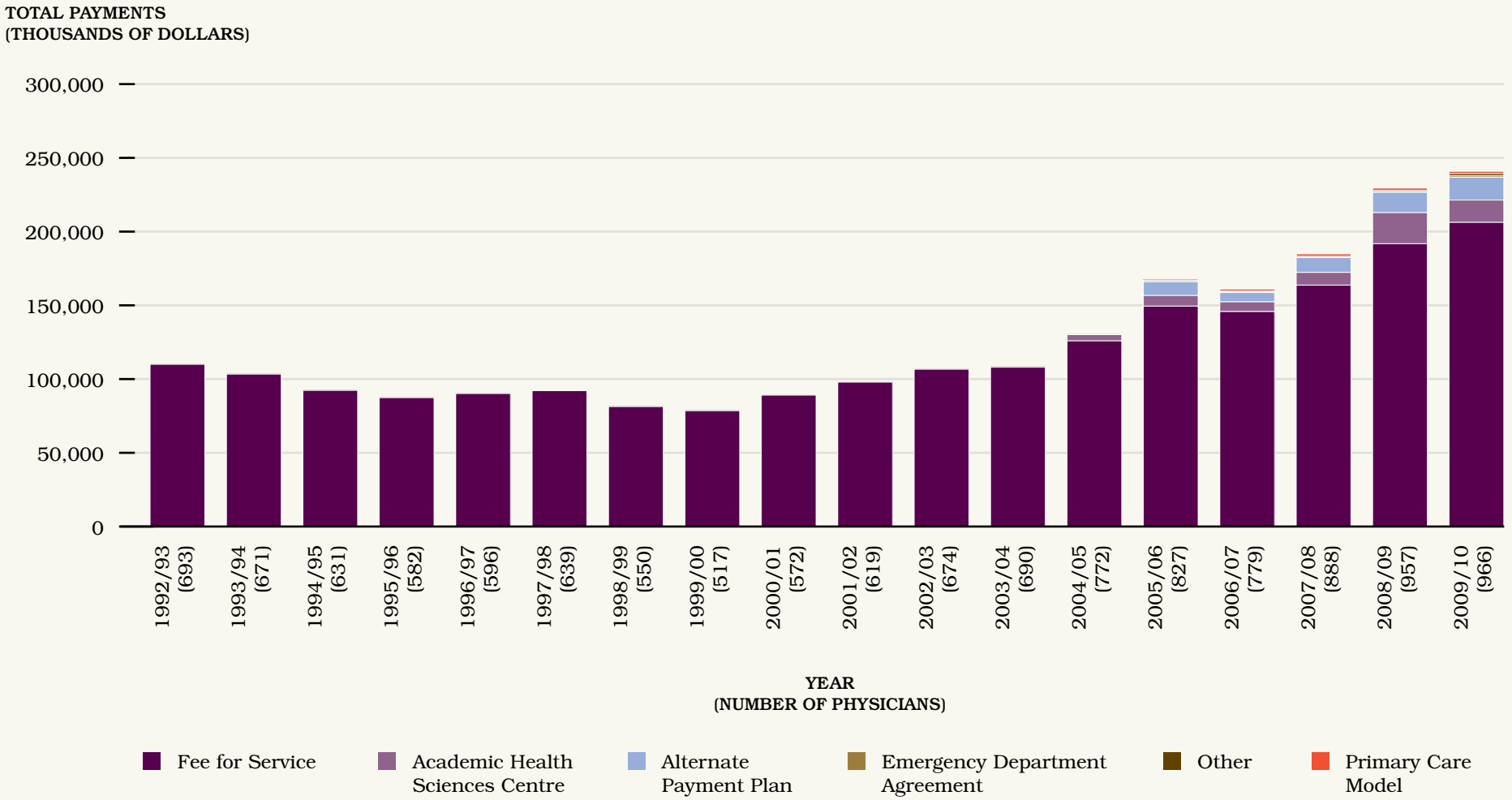
EXHIBIT 5.2 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to general internists, in Ontario, 1992/93 to 2009/10



Note: Data from 2001/02 to 2004/05 should be treated with caution due to missing APP payment information

GENERAL INTERNISTS

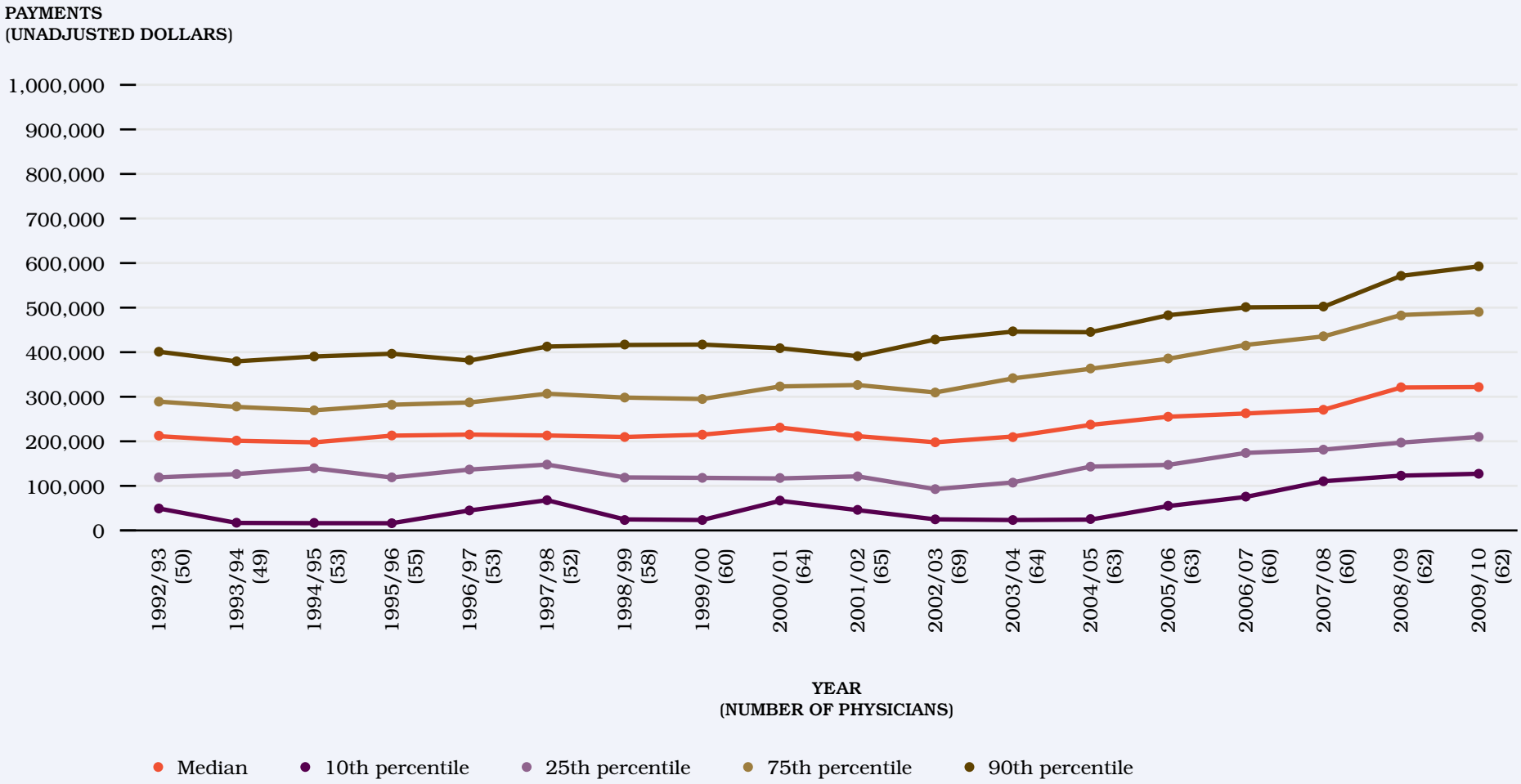
EXHIBIT 5.3 Total payments to general internists by payment source, in Ontario, 1992/93 to 2009/10



Note: Data from 2001/02 to 2004/05 should be treated with caution due to missing APP payment information.

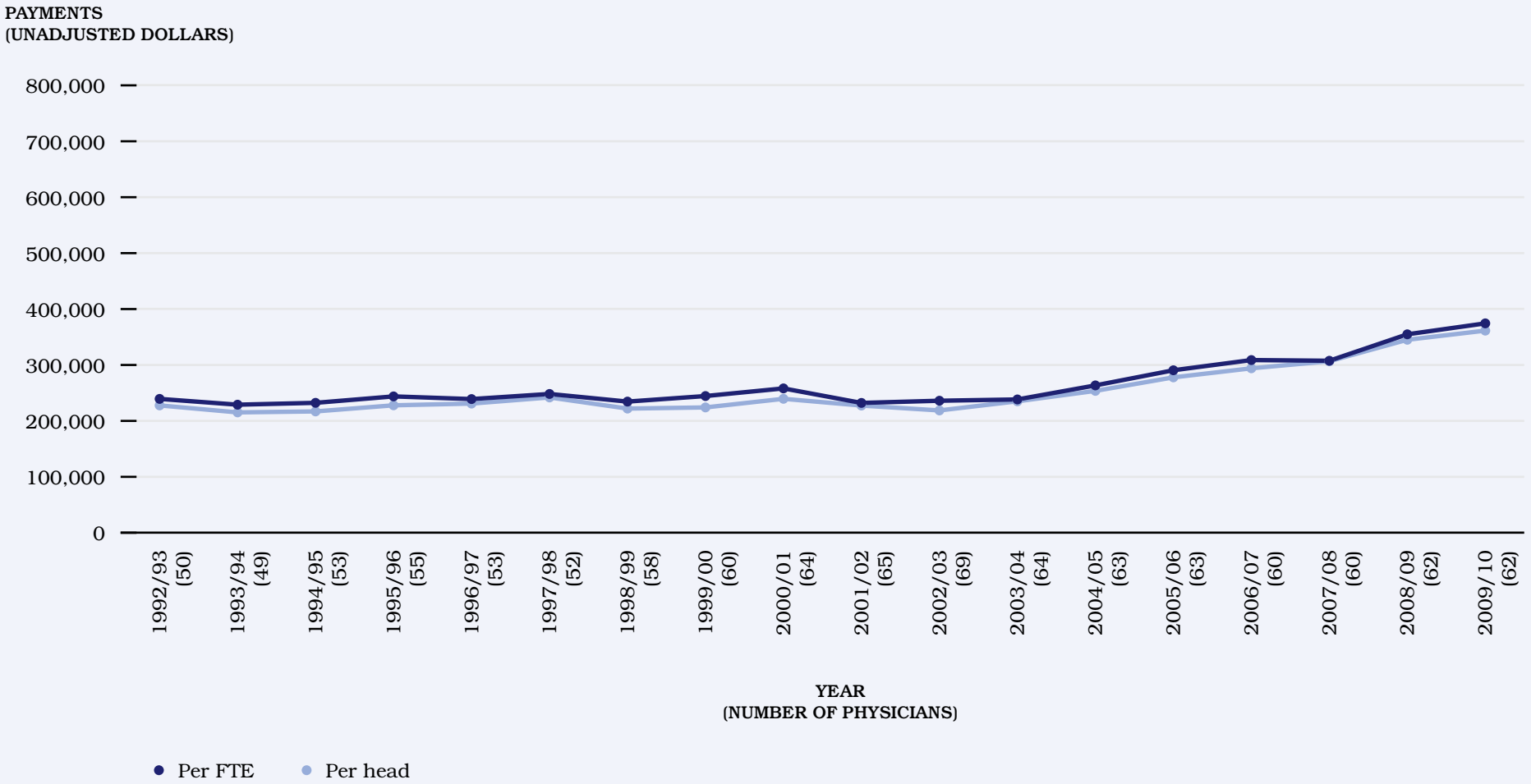
CLINICAL IMMUNOLOGISTS

EXHIBIT 5.4 Median and percentiles of payments (in unadjusted dollars) to individual clinical immunologists, in Ontario, 1992/93 to 2009/10



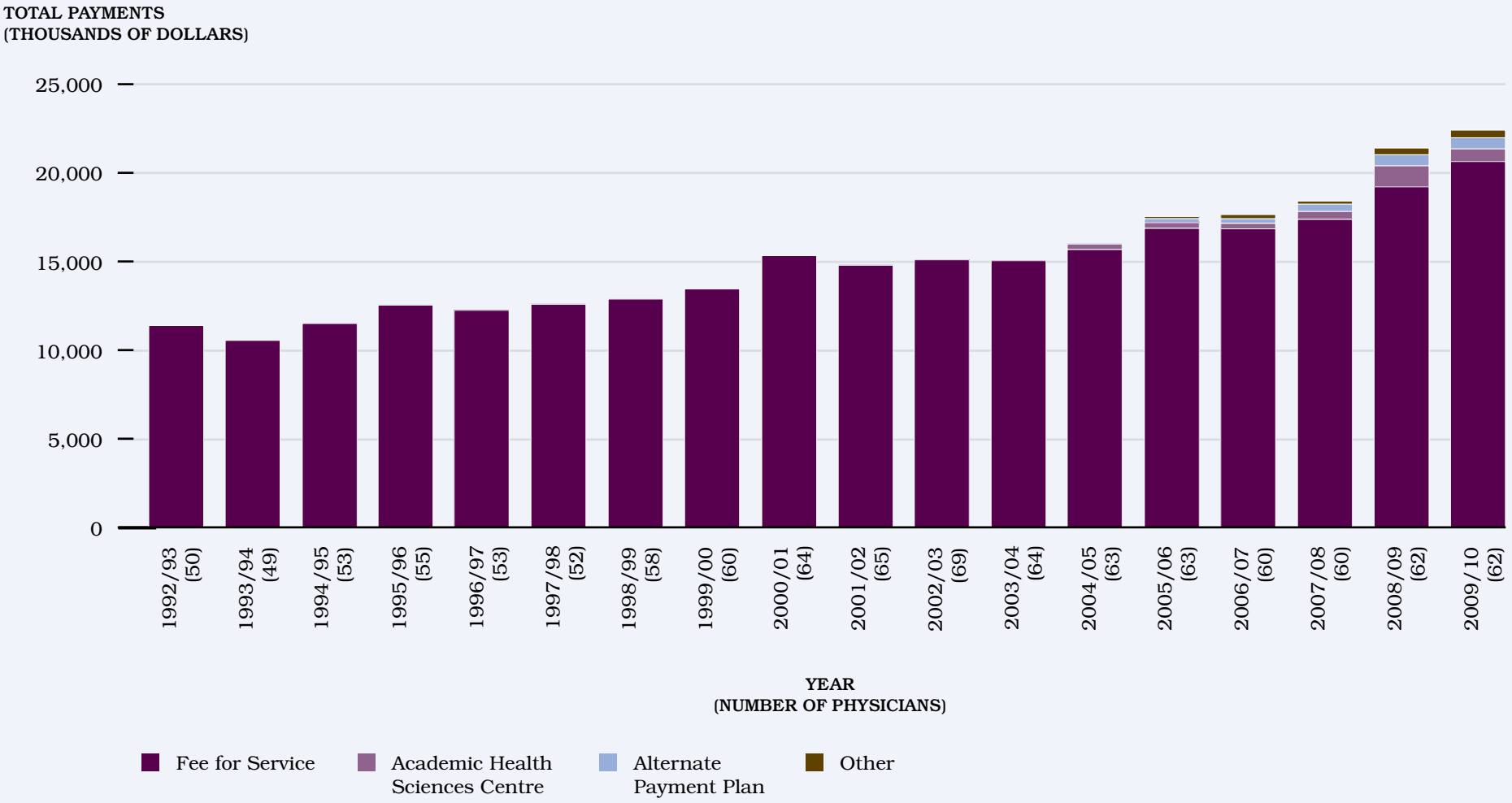
CLINICAL IMMUNOLOGISTS

EXHIBIT 5.5 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to clinical immunologists, in Ontario, 1992/93 to 2009/10



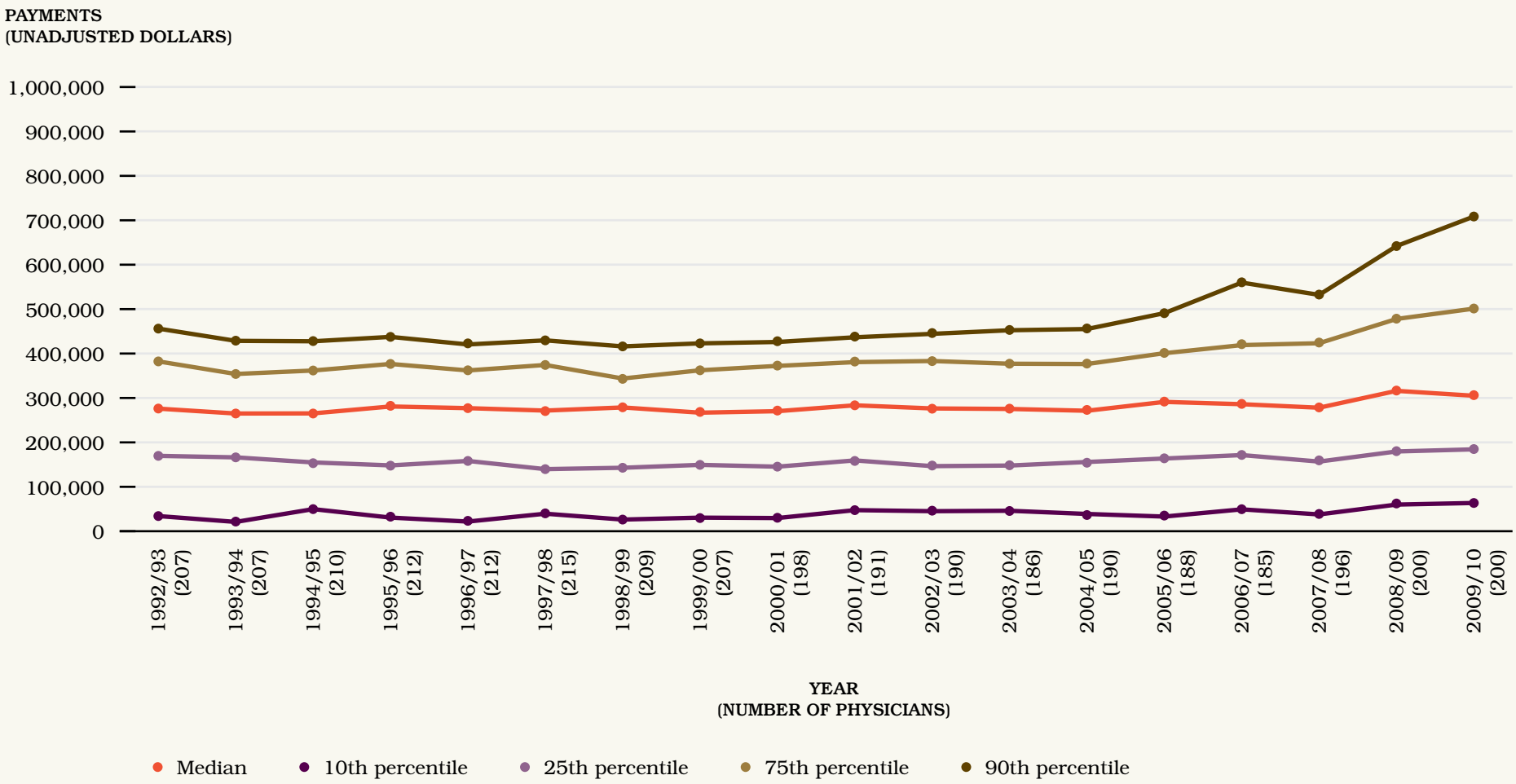
CLINICAL IMMUNOLOGISTS

EXHIBIT 5.6 Total payments to clinical immunologists by payment source, in Ontario, 1992/93 to 2009/10



DERMATOLOGISTS

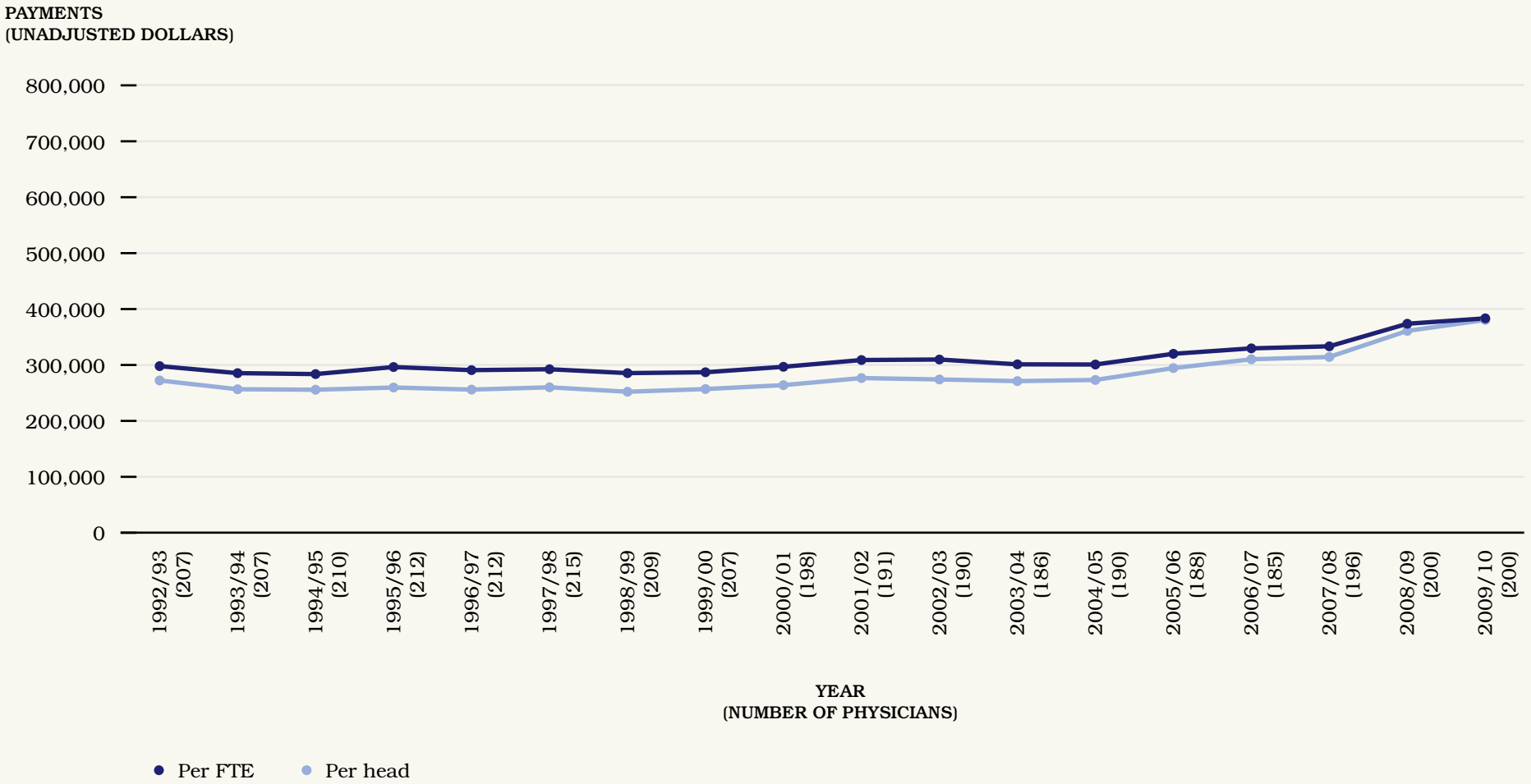
EXHIBIT 5.7 Median and percentiles of payments (in unadjusted dollars) to individual dermatologists, in Ontario, 1992/93 to 2009/10



Note: Data include payments for OHIP-insured services only and do not reflect payments for cosmetic procedures and other non-insured services.

DERMATOLOGISTS

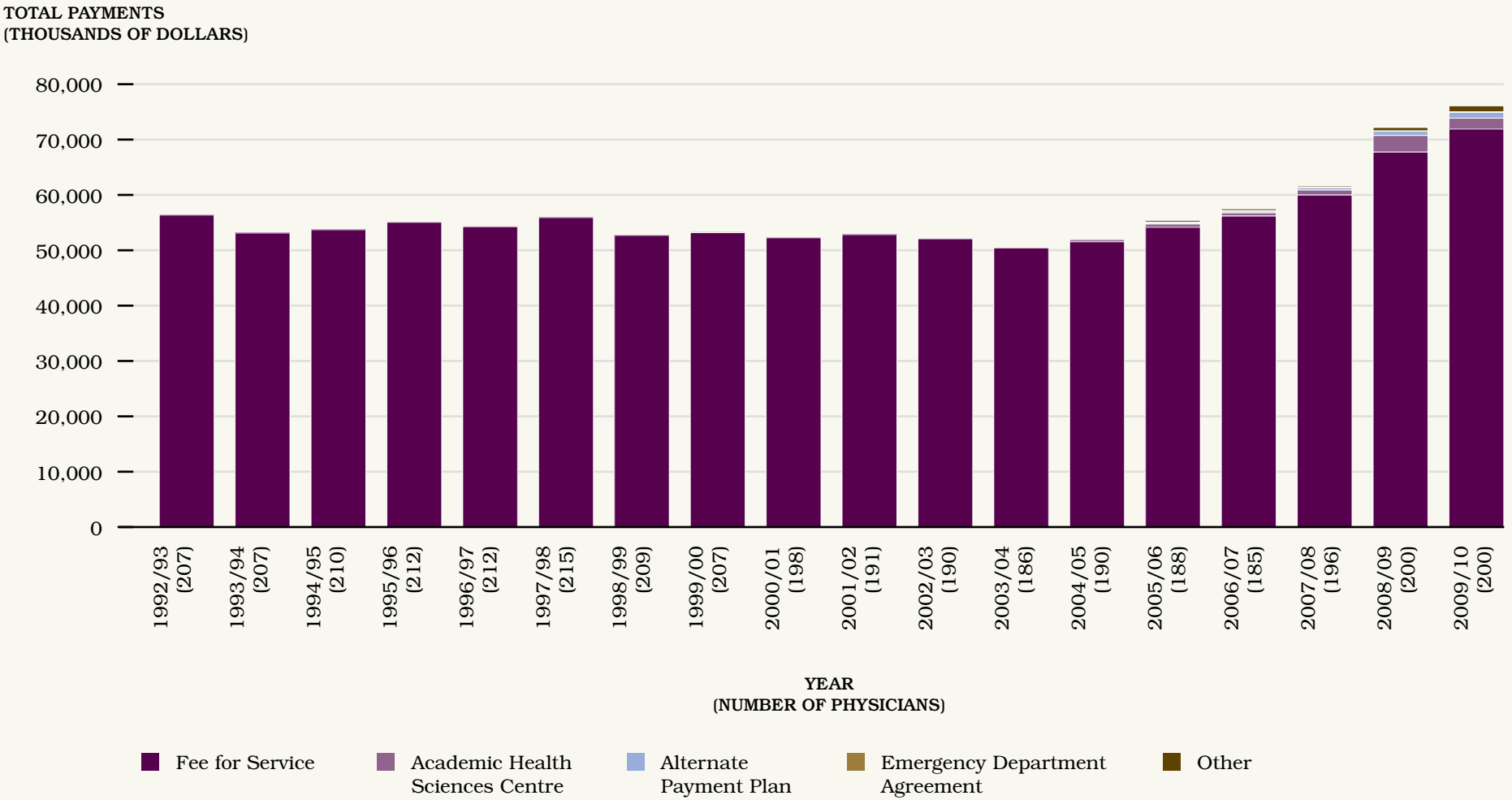
EXHIBIT 5.8 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to dermatologists, in Ontario, 1992/93 to 2009/10



Note: Data include payments for OHIP-insured services only and do not reflect payments for cosmetic procedures and other non-insured services.

DERMATOLOGISTS

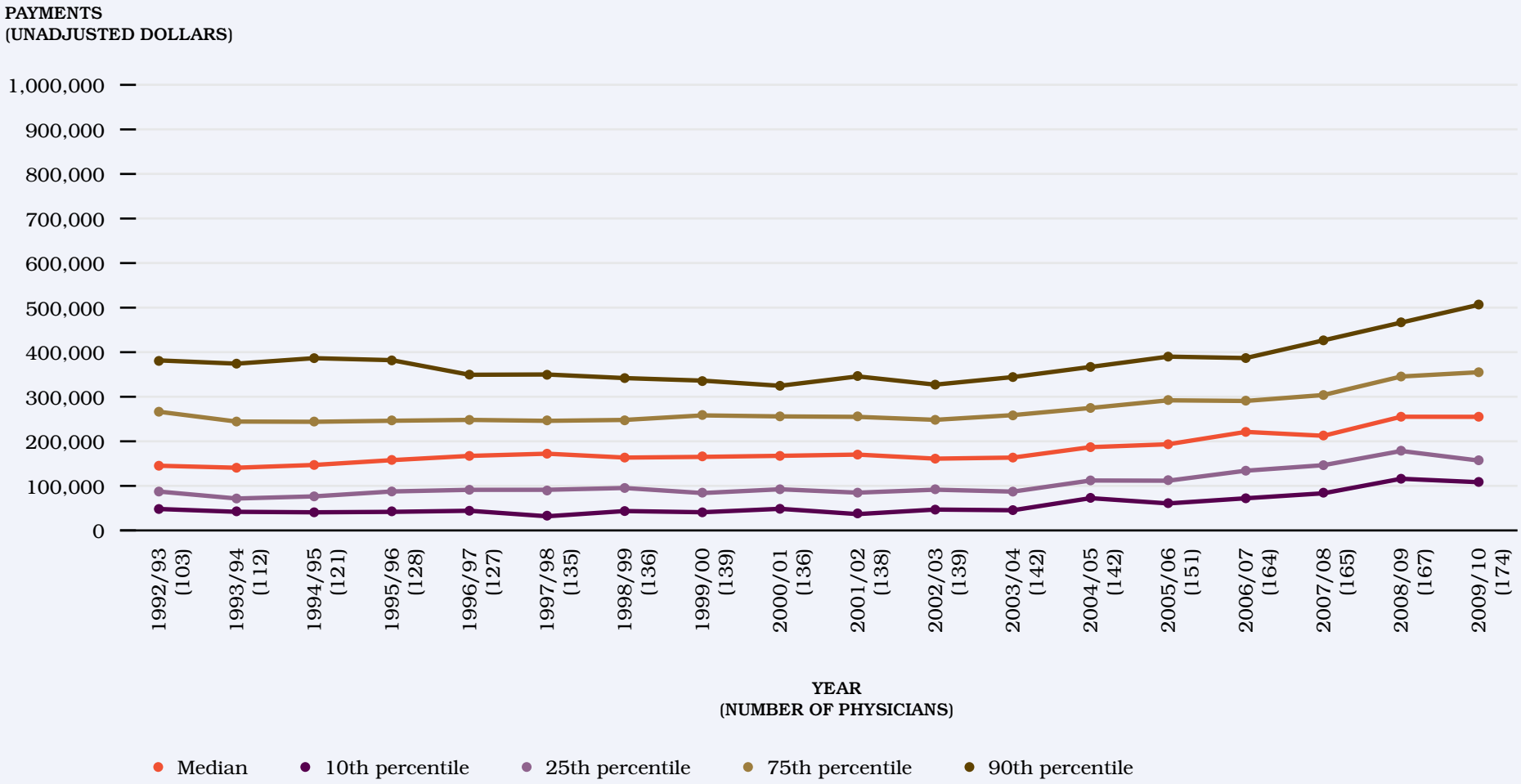
EXHIBIT 5.9 Total payments to dermatologists by payment source, in Ontario, 1992/93 to 2009/10



Note: Data include payments for OHIP-insured services only and do not reflect payments for cosmetic procedures and other non-insured services.

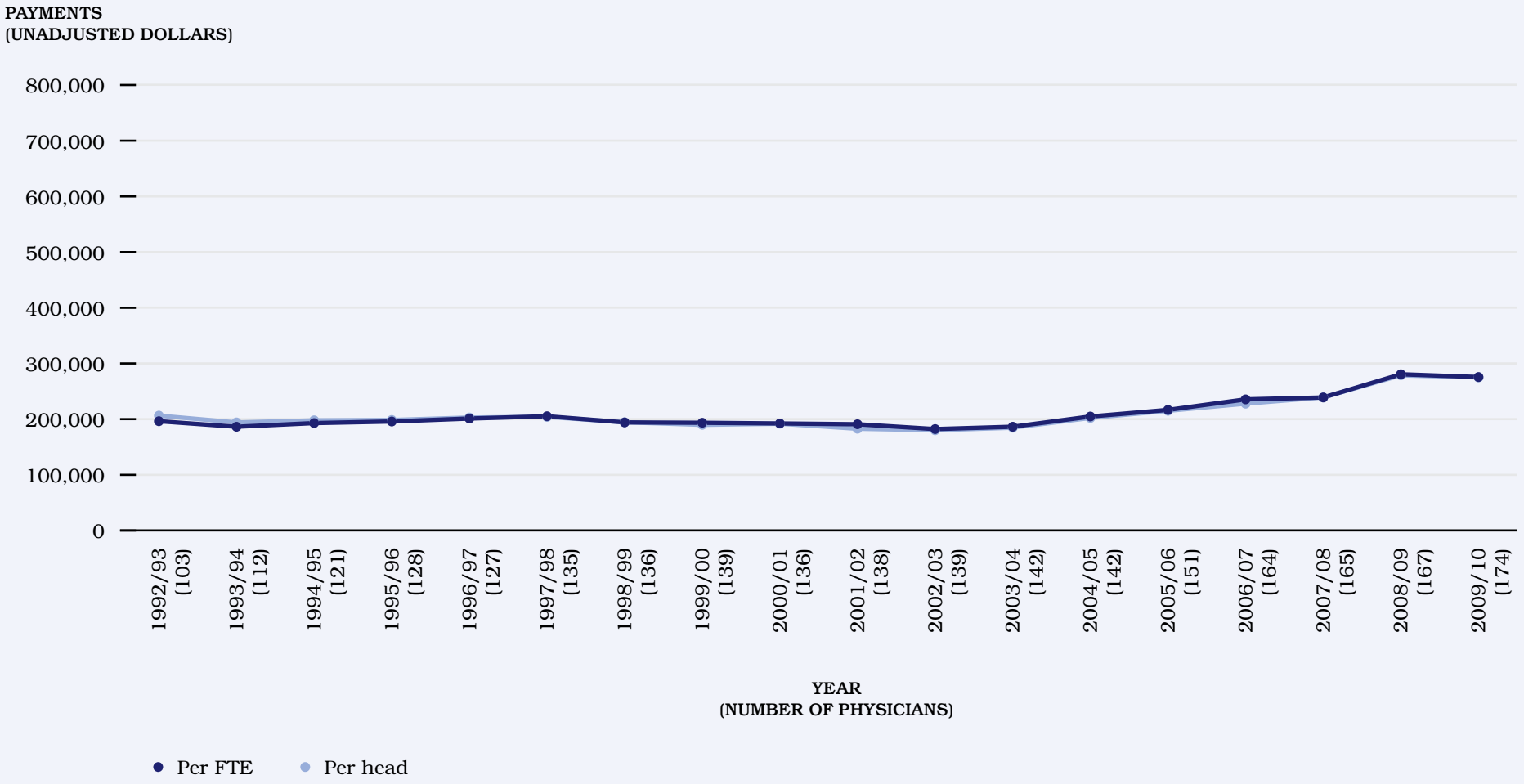
ENDOCRINOLOGISTS

EXHIBIT 5.10 Median and percentiles of payments (in unadjusted dollars) to individual endocrinologists, in Ontario, 1992/93 to 2009/10



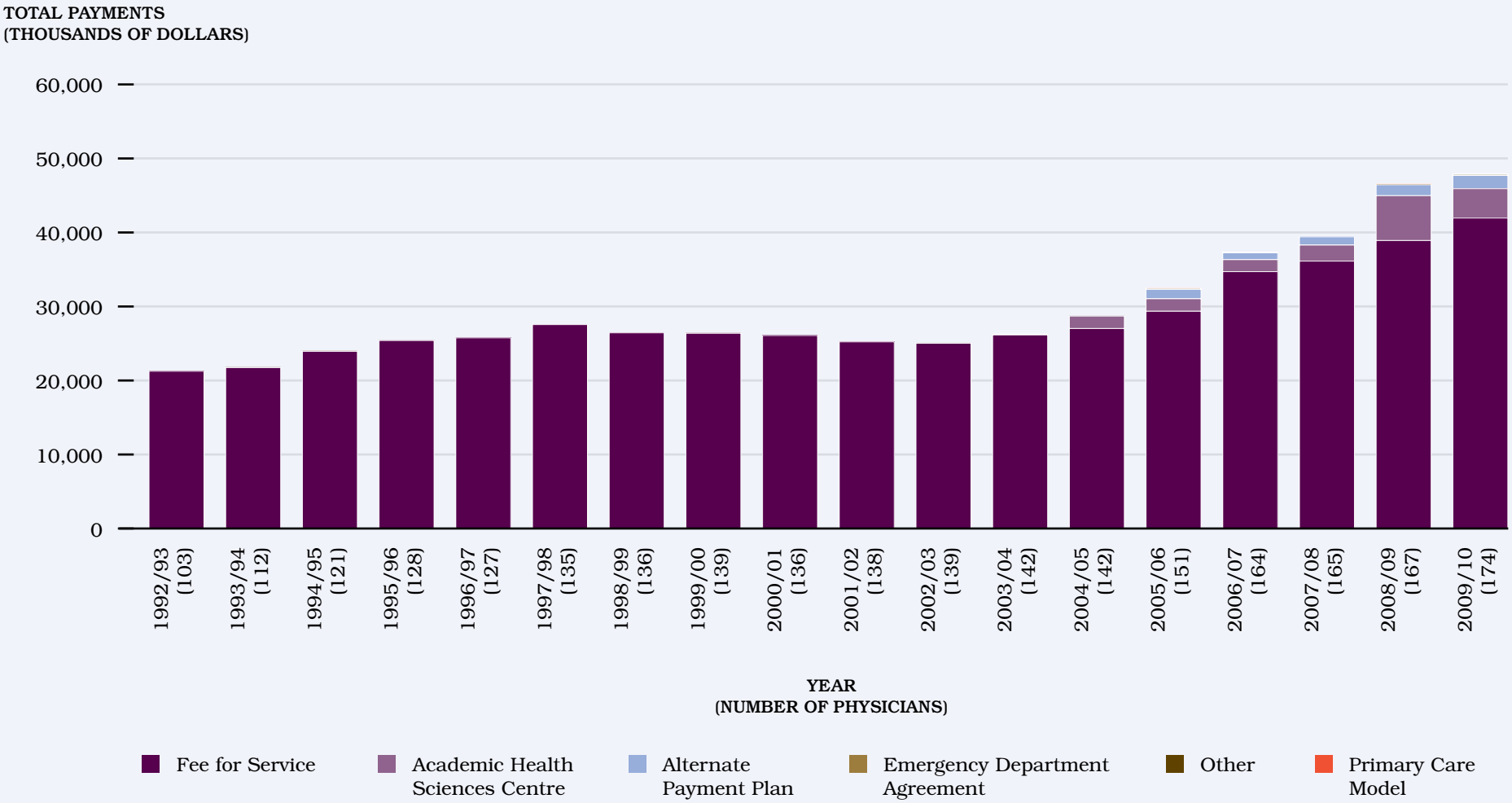
ENDOCRINOLOGISTS

EXHIBIT 5.11 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to endocrinologists, in Ontario, 1992/93 to 2009/10



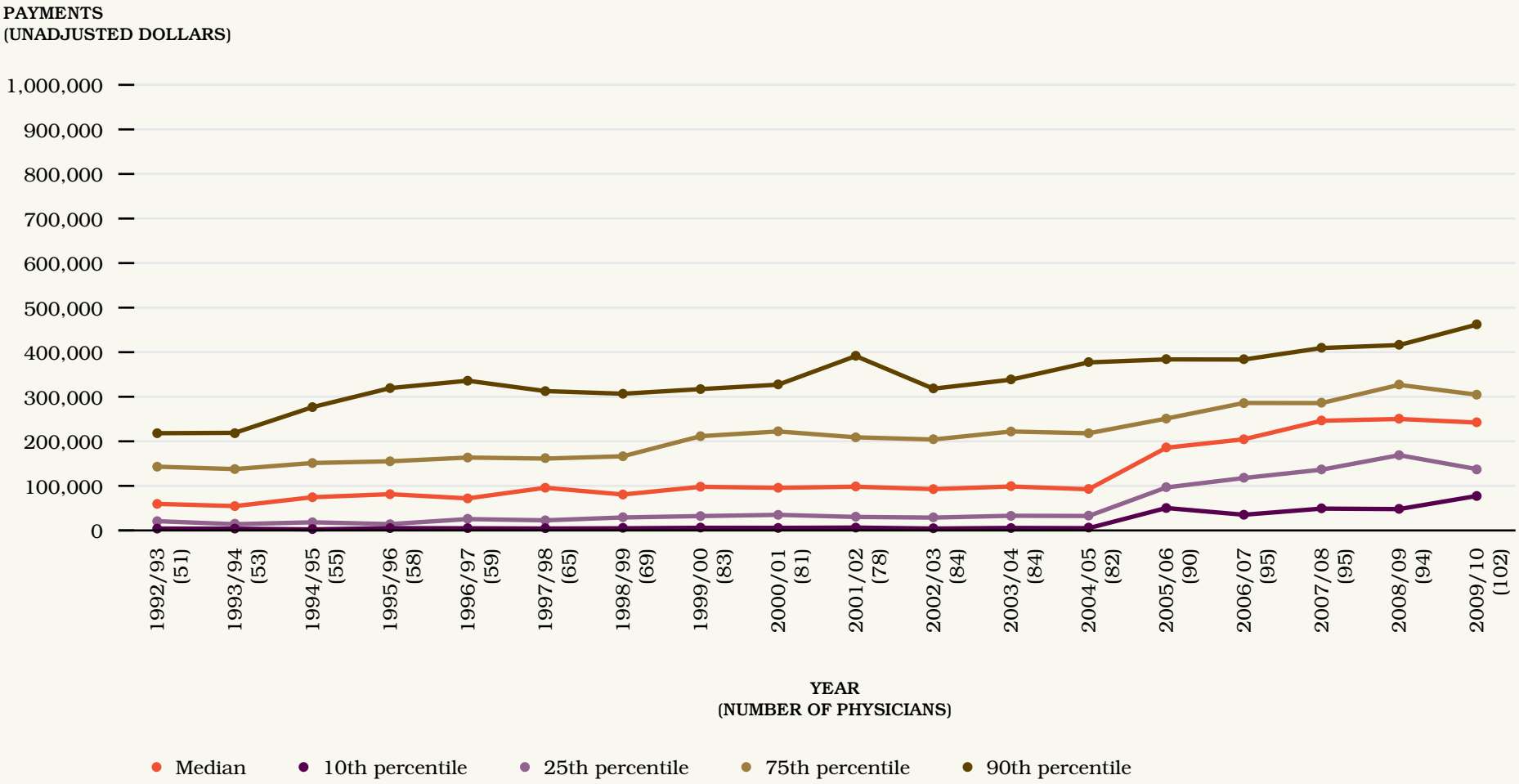
ENDOCRINOLOGISTS

EXHIBIT 5.12 Total payments to endocrinologists by payment source, in Ontario, 1992/93 to 2009/10



GERIATRICIANS

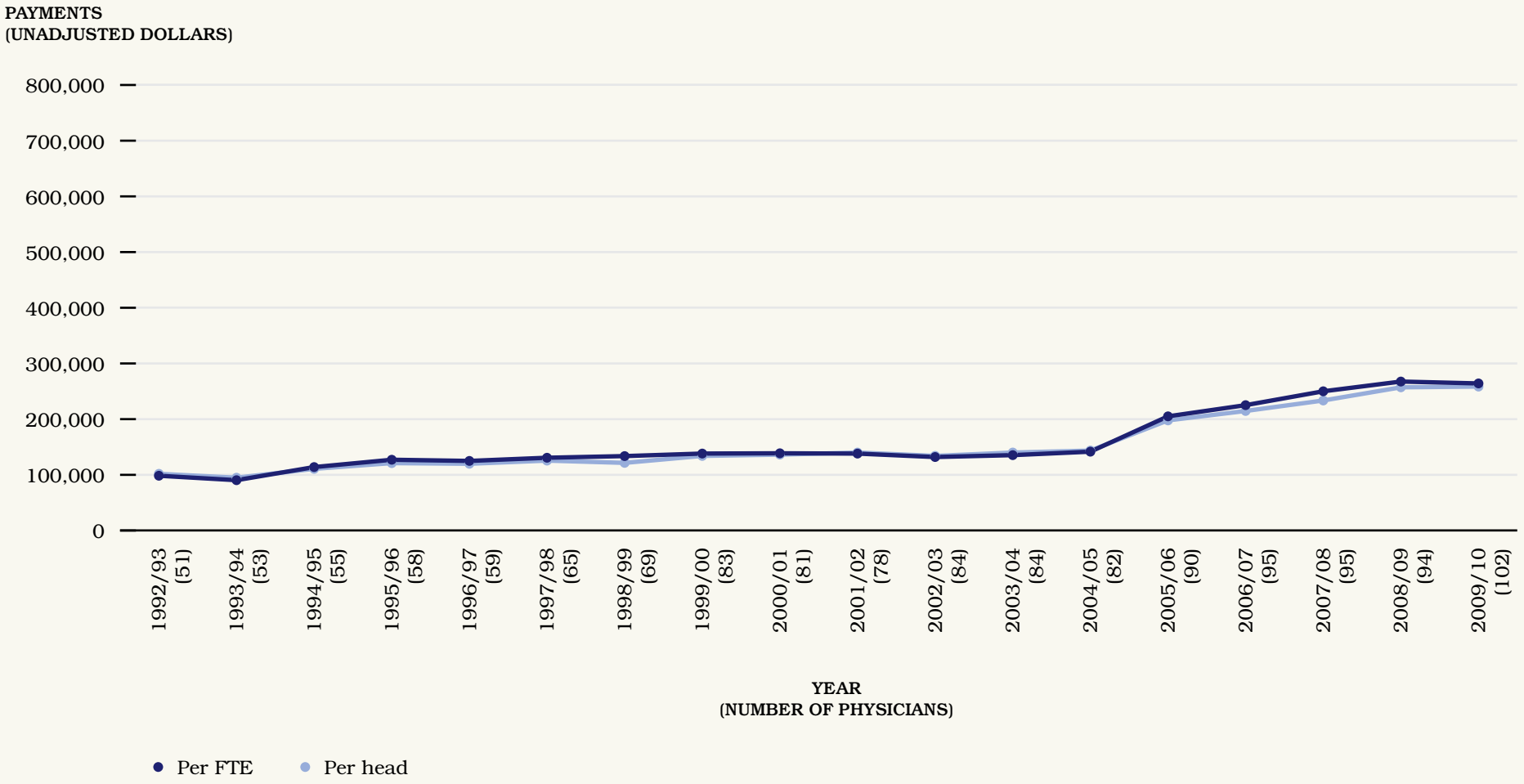
EXHIBIT 5.13 Median and percentiles of payments (in unadjusted dollars) to individual geriatricians, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2005/06 may be incomplete and should be treated with caution.

GERIATRICIANS

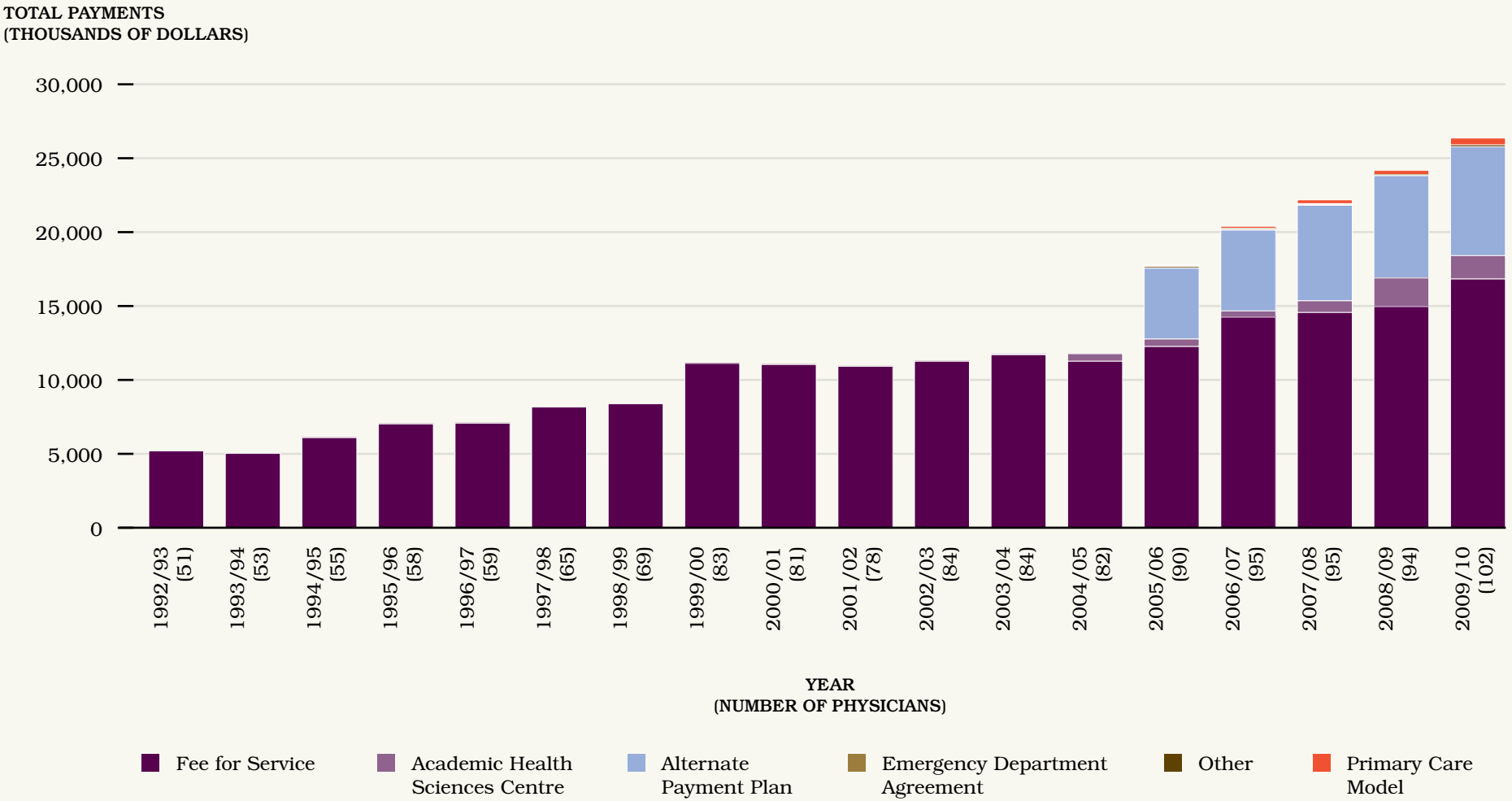
EXHIBIT 5.14 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to geriatricians, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2005/06 may be incomplete and should be treated with caution.

GERIATRICIANS

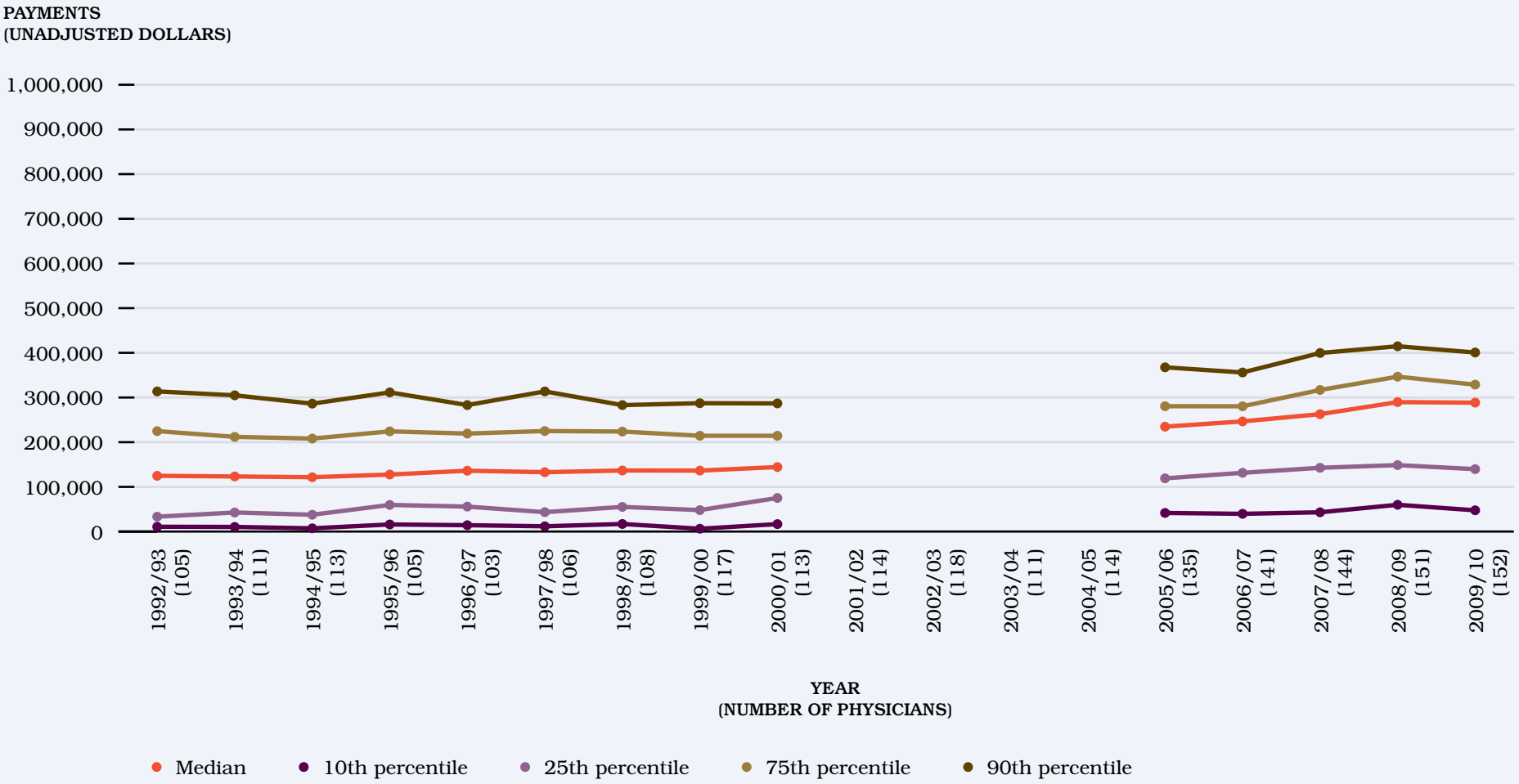
EXHIBIT 5.15 Total payments to geriatricians by payment source, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2005/06 may be incomplete and should be treated with caution.

HEMATOLOGISTS

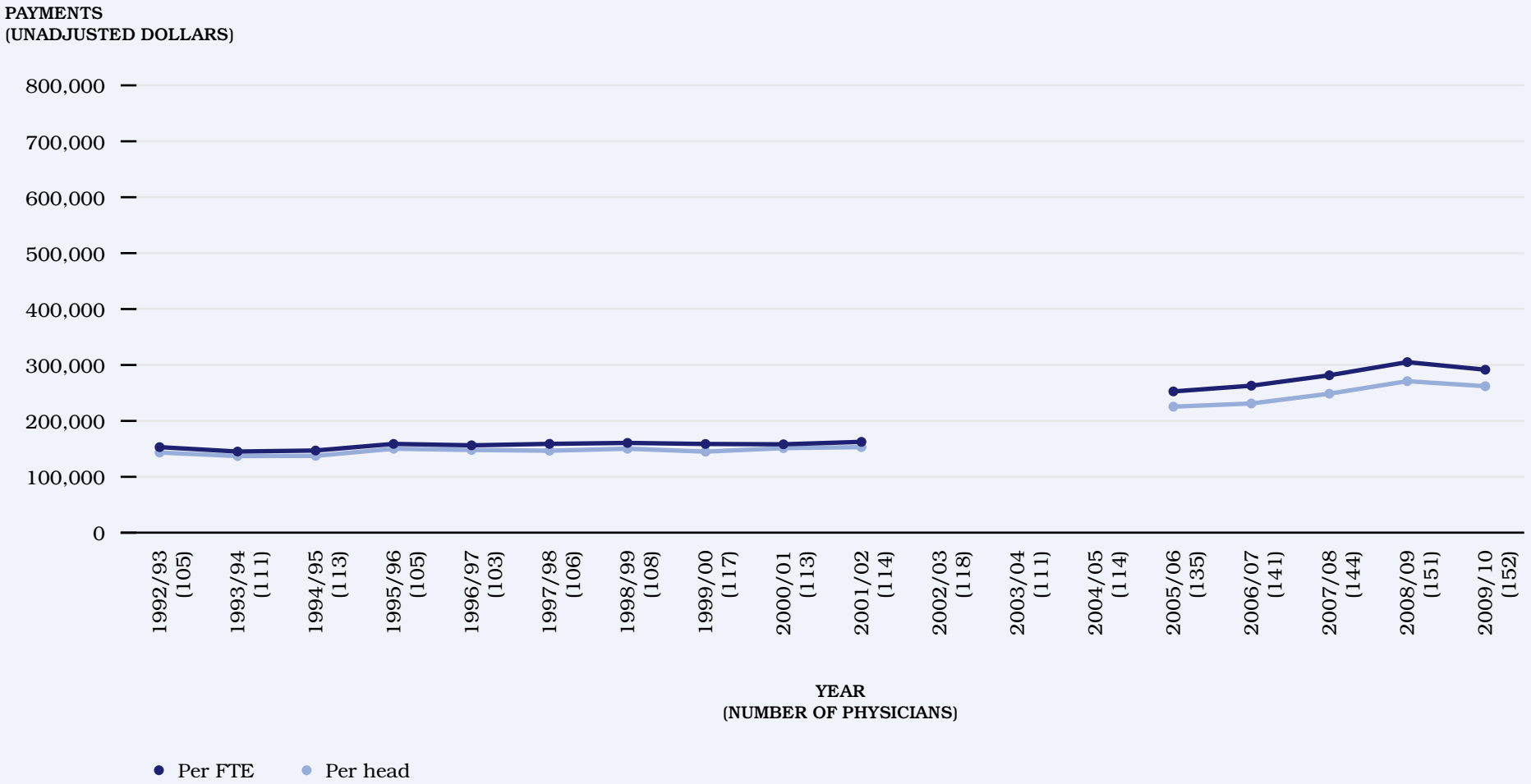
EXHIBIT 5.16 Median and percentiles of payments (in unadjusted dollars) to individual hematologists, in Ontario, 1992/93 to 2009/10



Note: Results for 2002/03 to 2004/05 have been suppressed due to missing data.

HEMATOLOGISTS

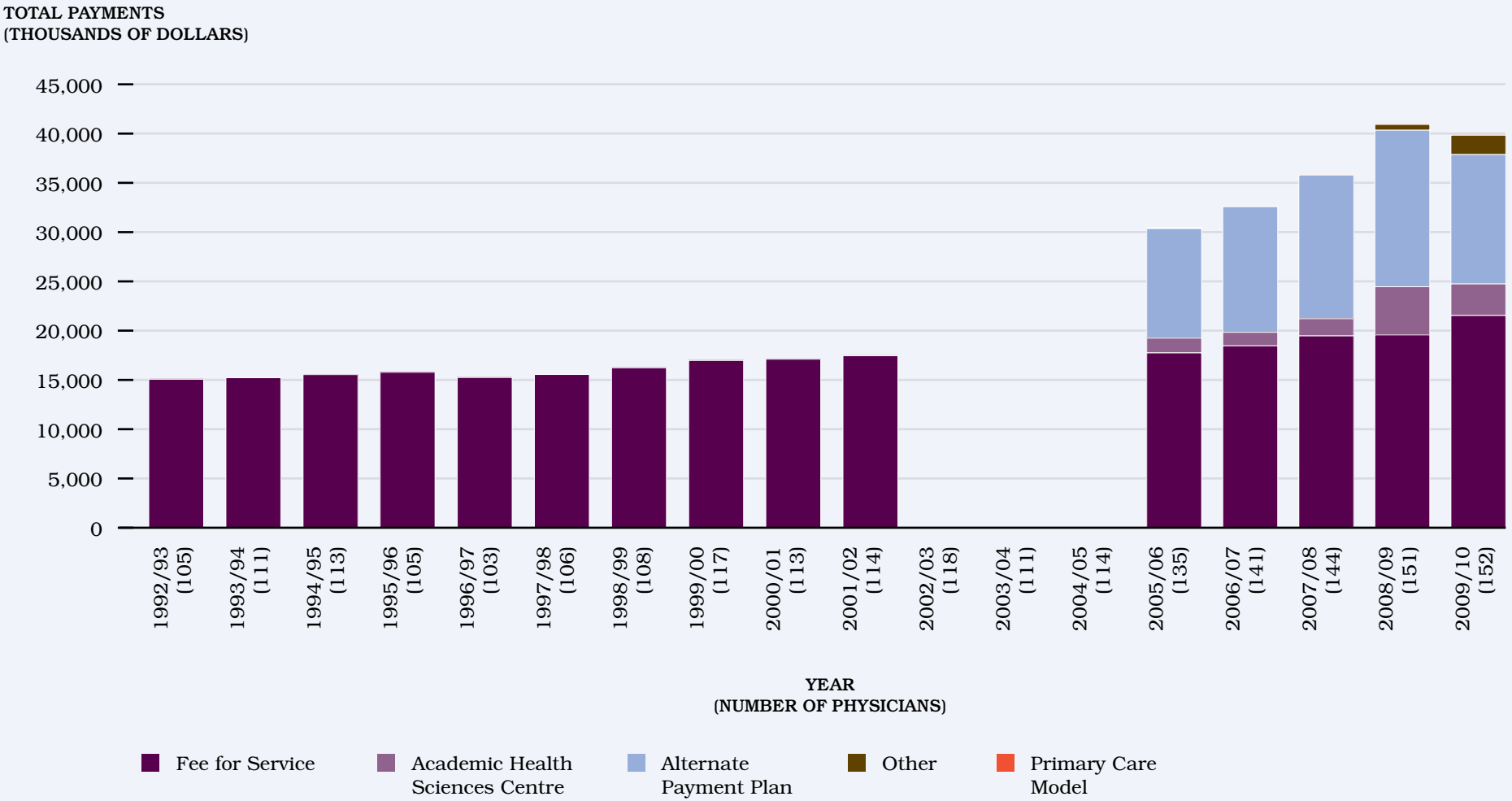
EXHIBIT 5.17 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to hematologists, in Ontario, 1992/93 to 2009/10



Note: Results for 2002/03 to 2004/05 have been suppressed due to missing data.

HEMATOLOGISTS

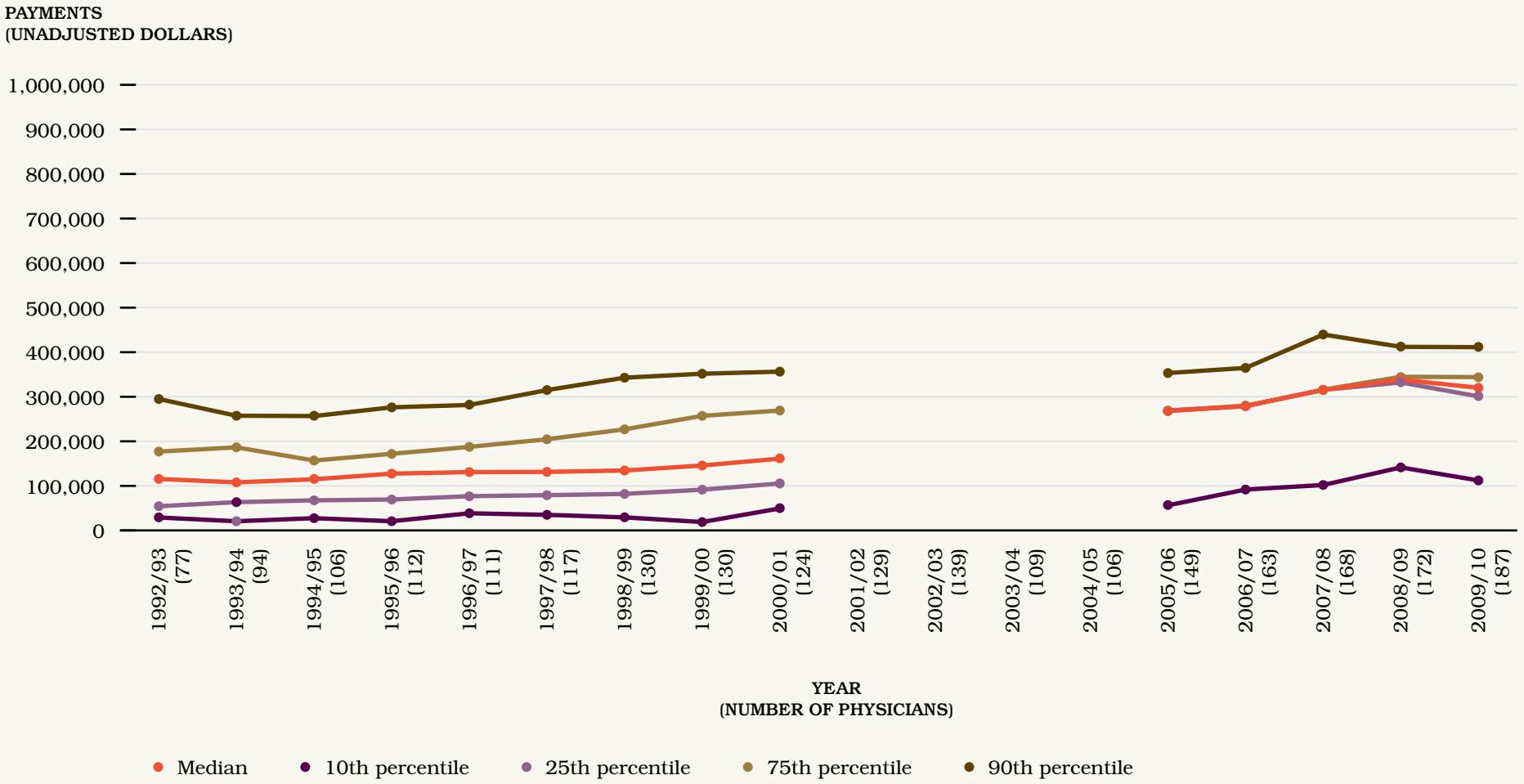
EXHIBIT 5.18 Total payments to hematologists by payment source, in Ontario, 1992/93 to 2009/10



Note: Results for 2002/03 to 2004/05 have been suppressed due to missing data.

MEDICAL ONCOLOGISTS

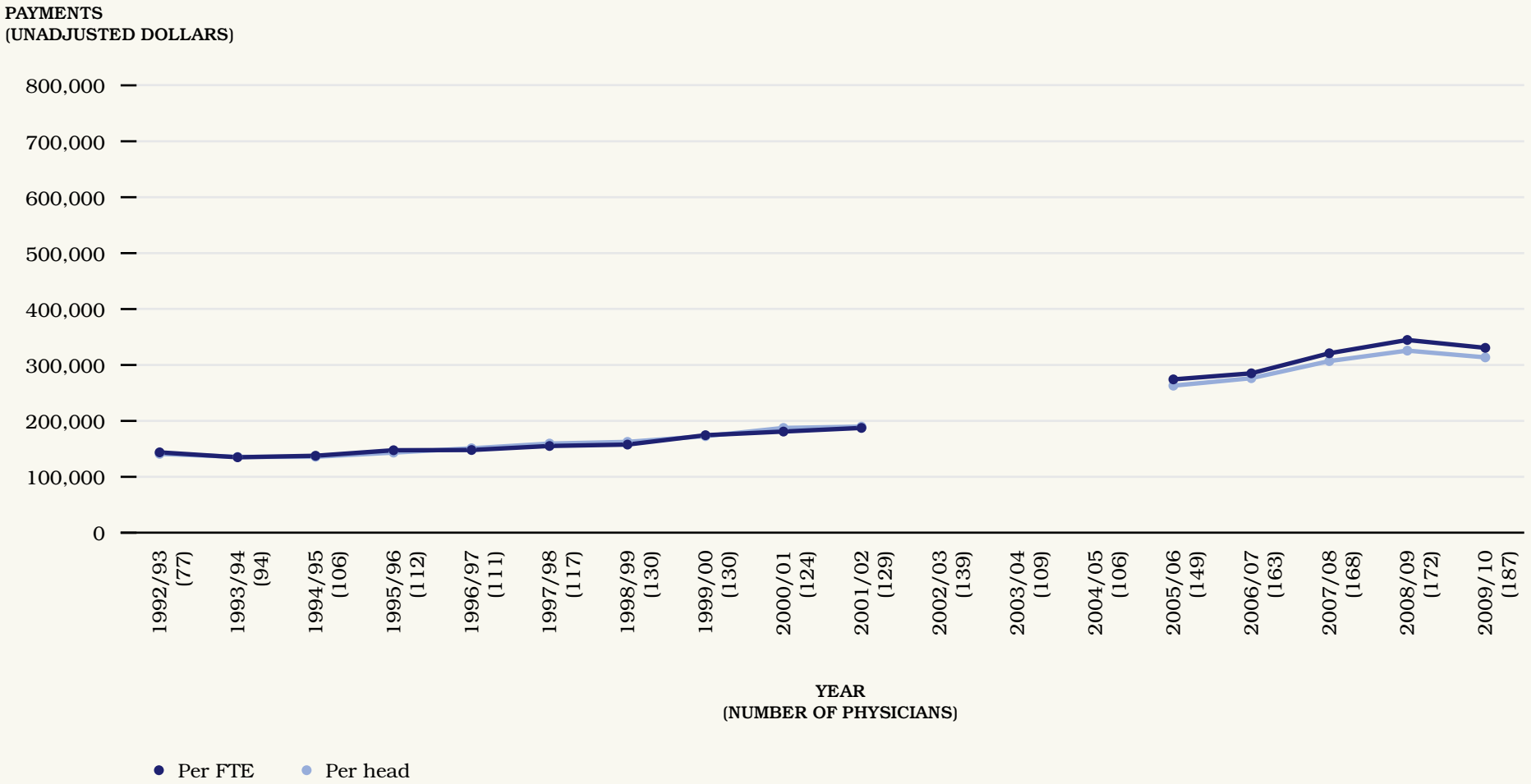
EXHIBIT 5.19 Median and percentiles of payments (in unadjusted dollars) to individual medical oncologists, in Ontario, 1992/93 to 2009/10



Note: Results for 2002/03 to 2004/05 have been suppressed due to missing data.

MEDICAL ONCOLOGISTS

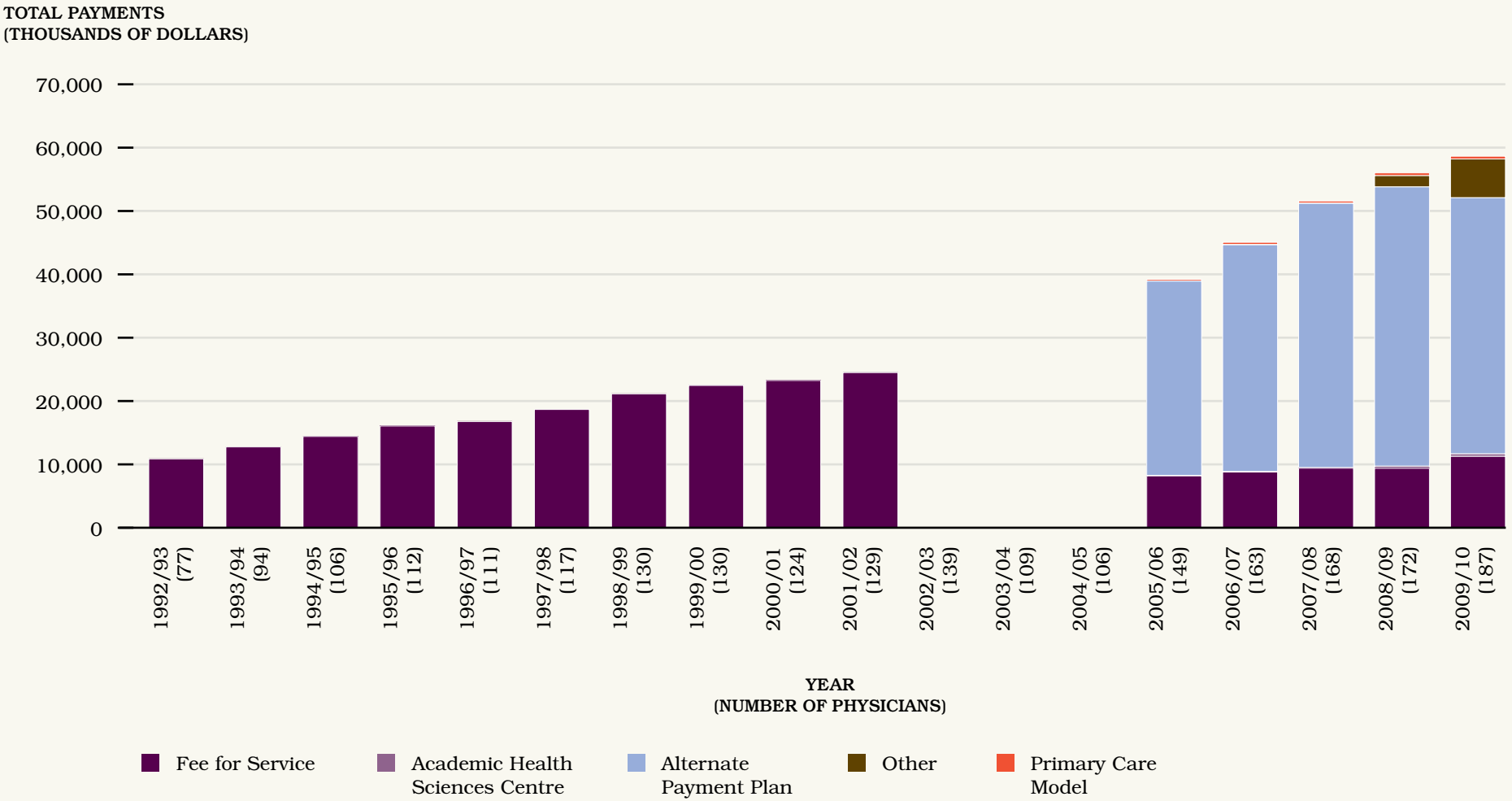
EXHIBIT 5.20 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to medical oncologists, in Ontario, 1992/93 to 2009/10



Note: Results for 2002/03 to 2004/05 have been suppressed due to missing data.

MEDICAL ONCOLOGISTS

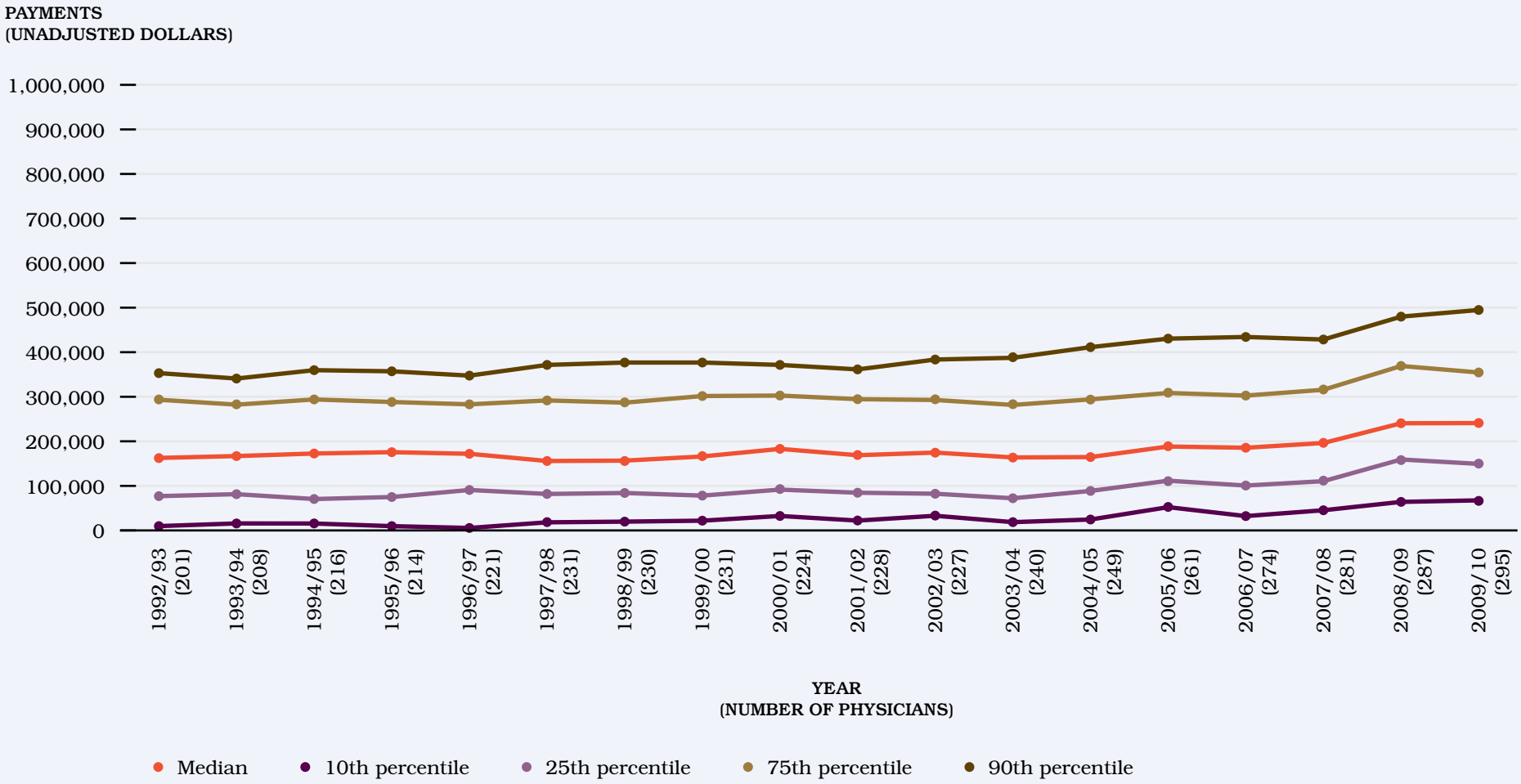
EXHIBIT 5.21 Total payments to medical oncologists by payment source, in Ontario, 1992/93 to 2009/10



Note: Results for 2002/03 to 2004/05 have been suppressed due to missing data.

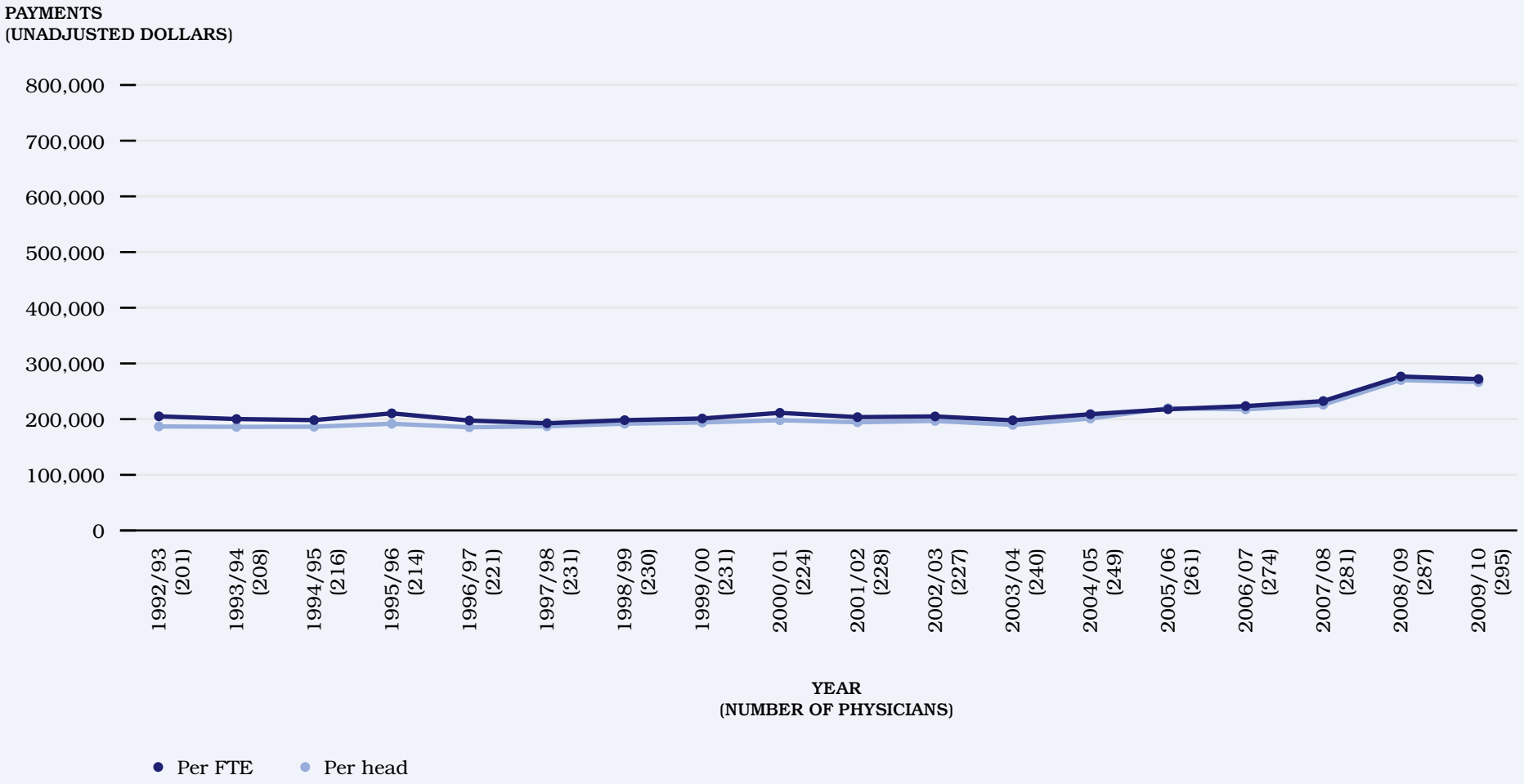
NEUROLOGISTS

EXHIBIT 5.22 Median and percentiles of payments (in unadjusted dollars) to individual neurologists, in Ontario, 1992/93 to 2009/10



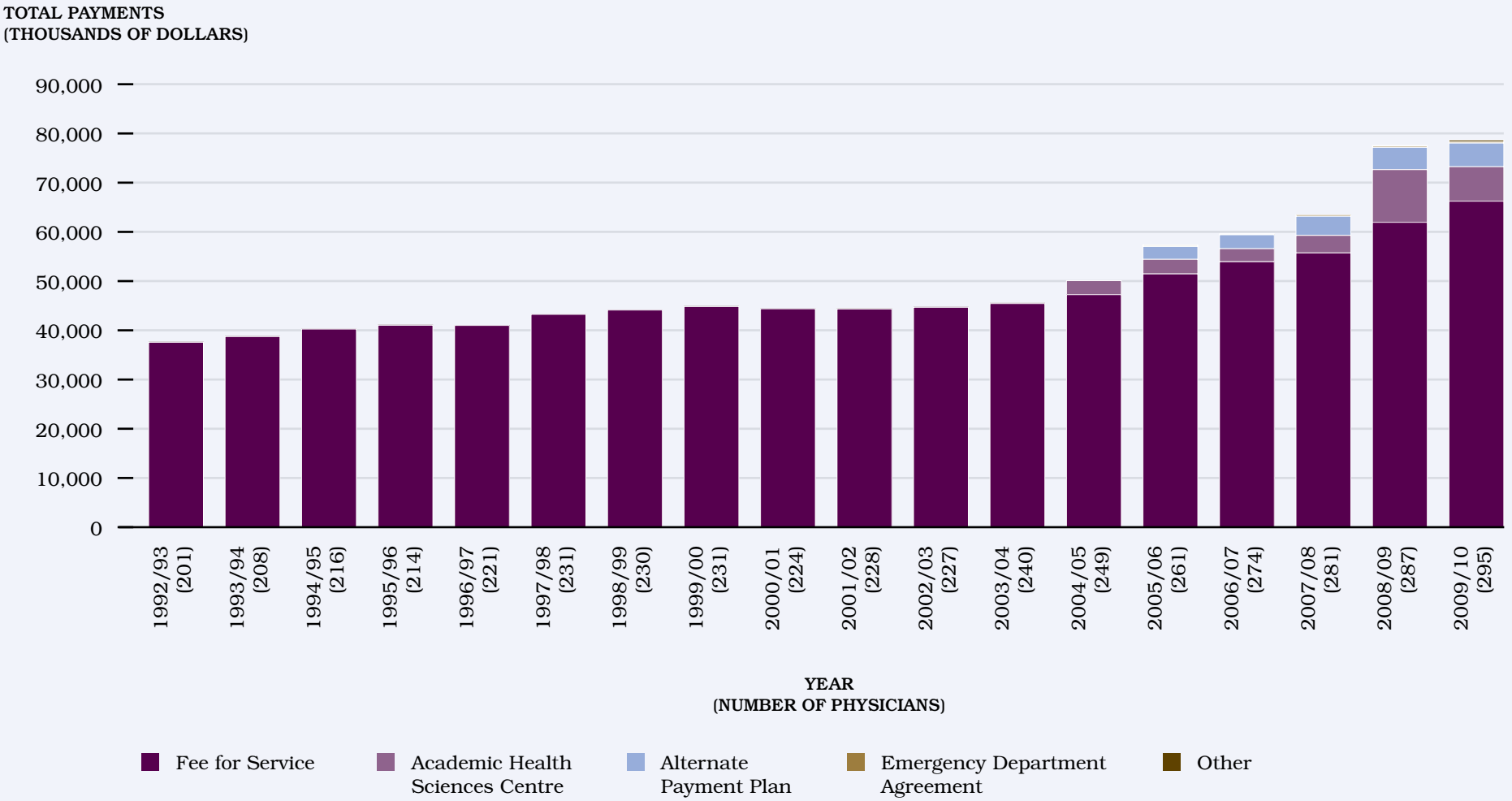
NEUROLOGISTS

EXHIBIT 5.23 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to neurologists, in Ontario, 1992/93 to 2009/10



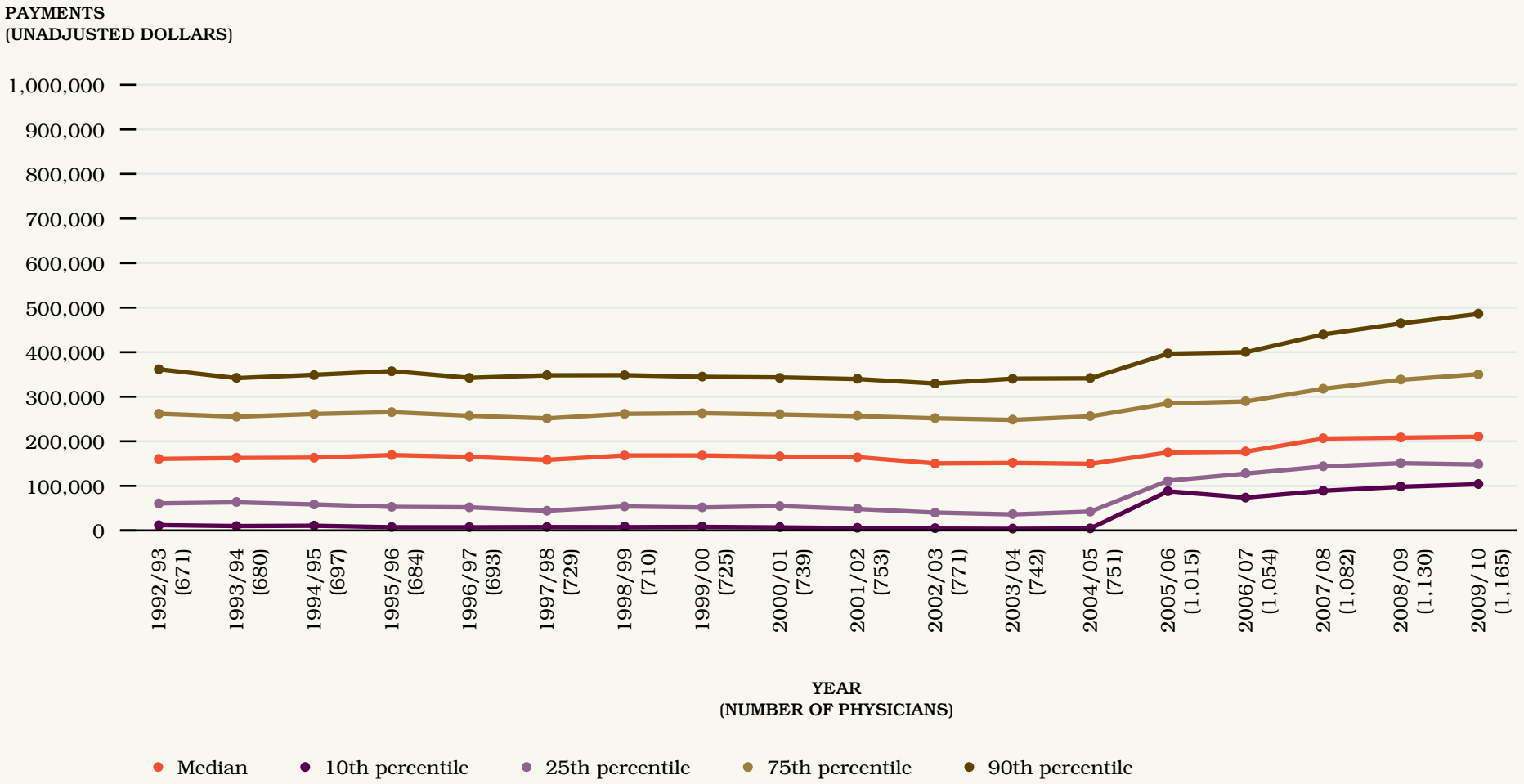
NEUROLOGISTS

EXHIBIT 5.24 Total payments to neurologists by payment source, in Ontario, 1992/93 to 2009/10



PEDIATRICIANS

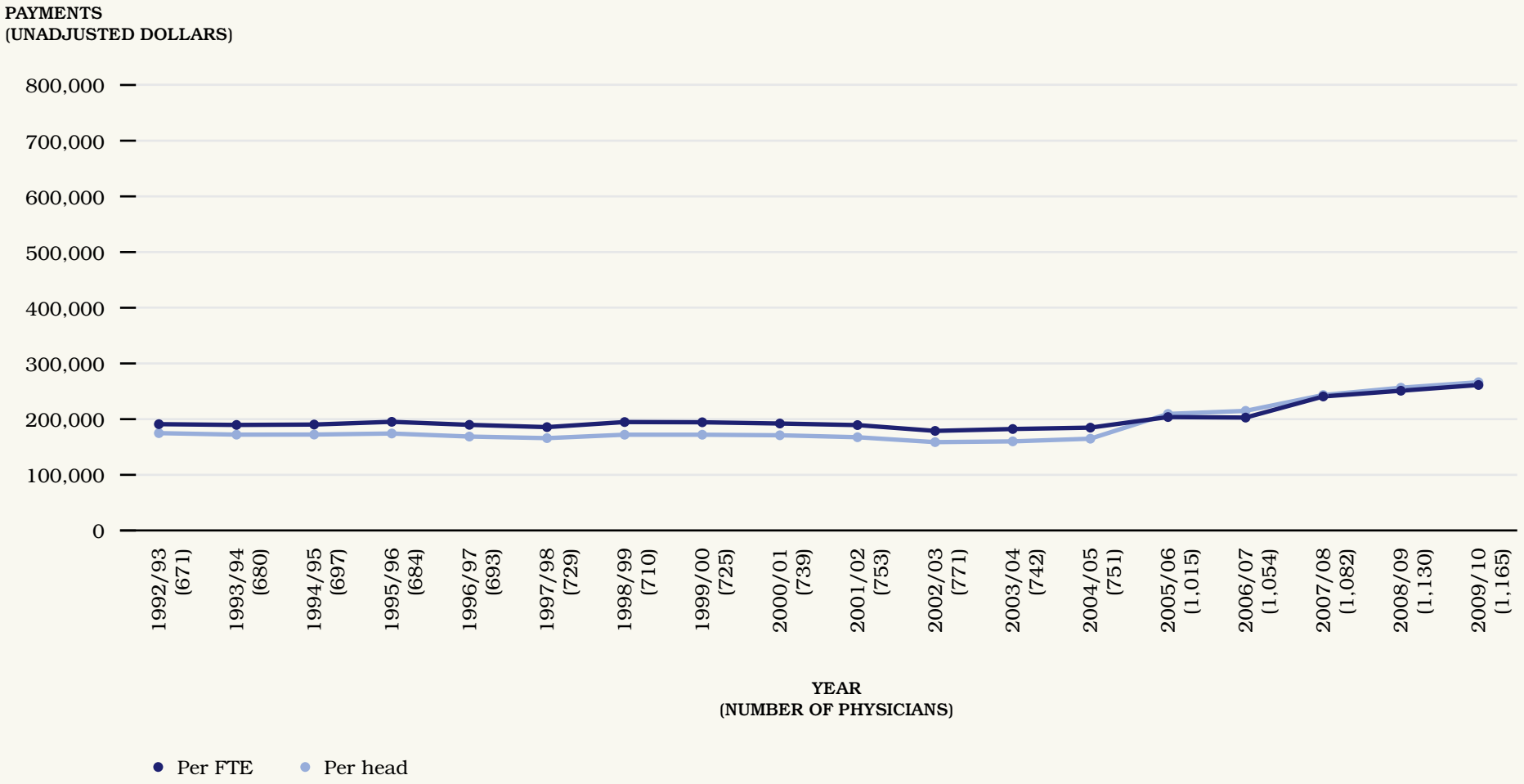
EXHIBIT 5.25 Median and percentiles of payments (in unadjusted dollars) to individual pediatricians, in Ontario, 1992/93 to 2009/10



Note: Data from 2001/02 to 2004/05 should be treated with caution due to missing APP payment information.

PEDIATRICIANS

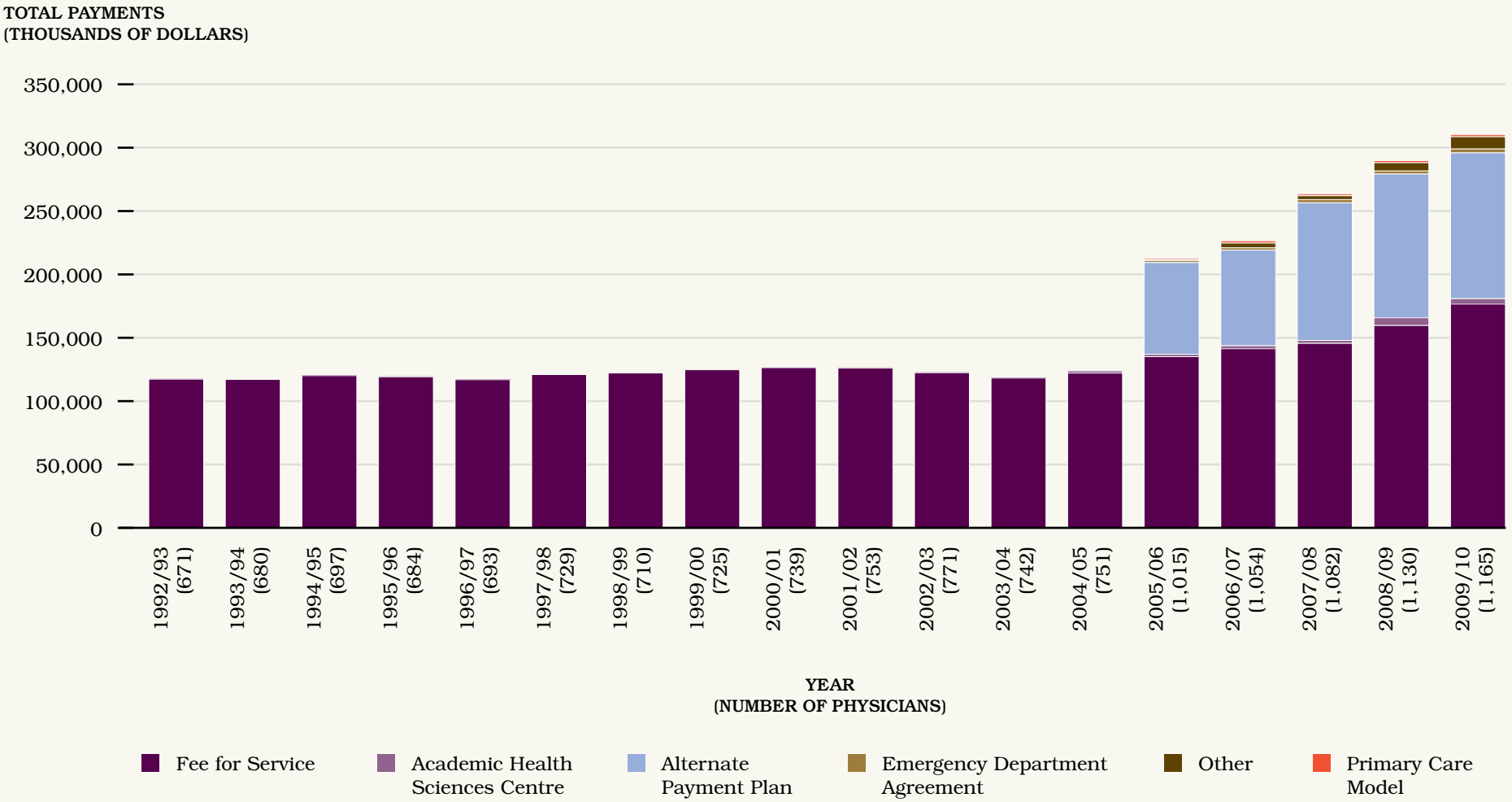
EXHIBIT 5.26 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to pediatricians, in Ontario, 1992/93 to 2009/10



Note: Data from 2001/02 to 2004/05 should be treated with caution due to missing APP payment information.

PEDIATRICIANS

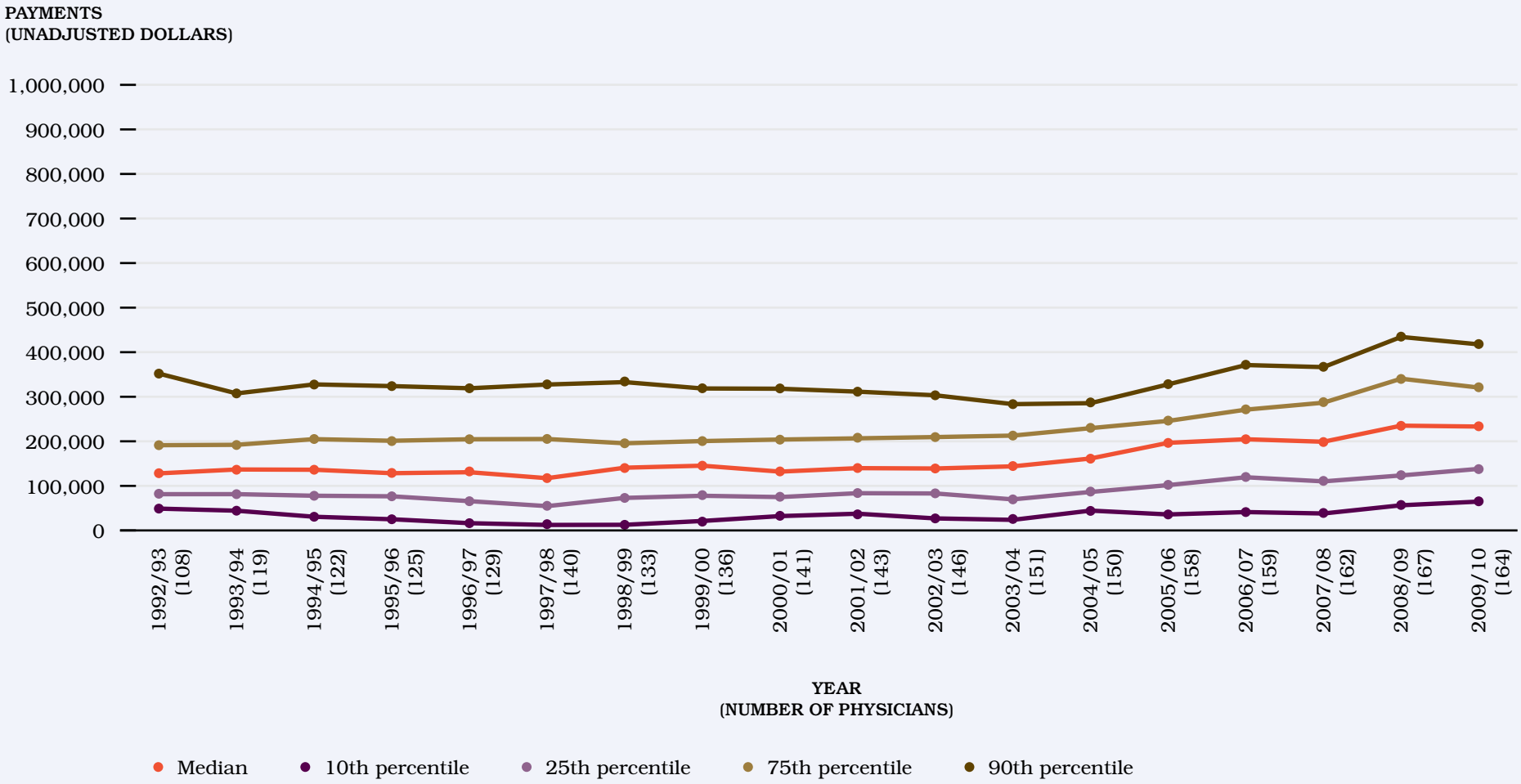
EXHIBIT 5.27 Total payments to pediatricians by payment source, in Ontario, 1992/93 to 2009/10



Note: Data from 2001/02 to 2004/05 should be treated with caution due to missing APP payment information.

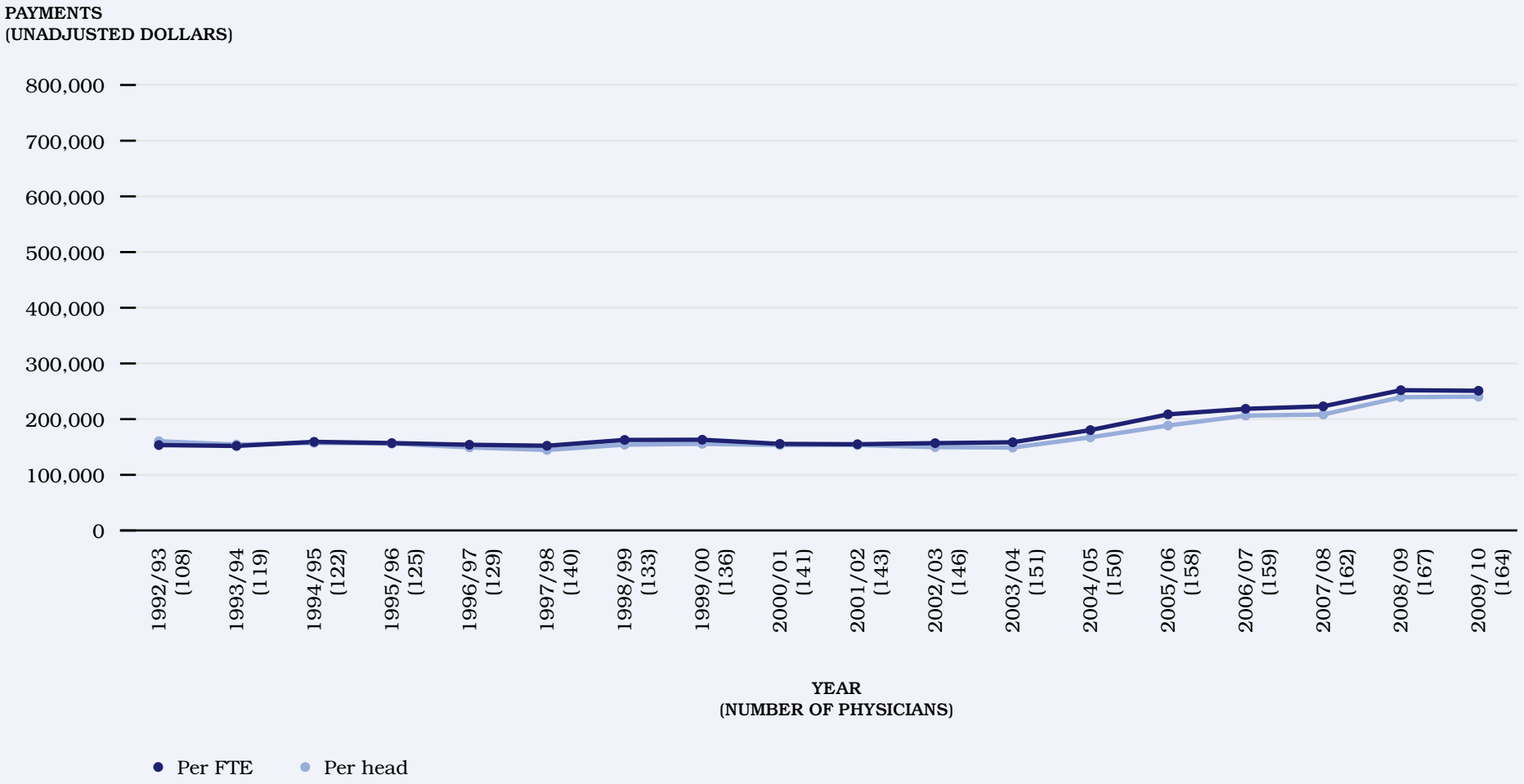
PHYSICAL MEDICINE AND REHABILITATION SPECIALISTS

EXHIBIT 5.28 Median and percentiles of payments (in unadjusted dollars) to individual physical medicine and rehabilitation specialists, in Ontario, 1992/93 to 2009/10



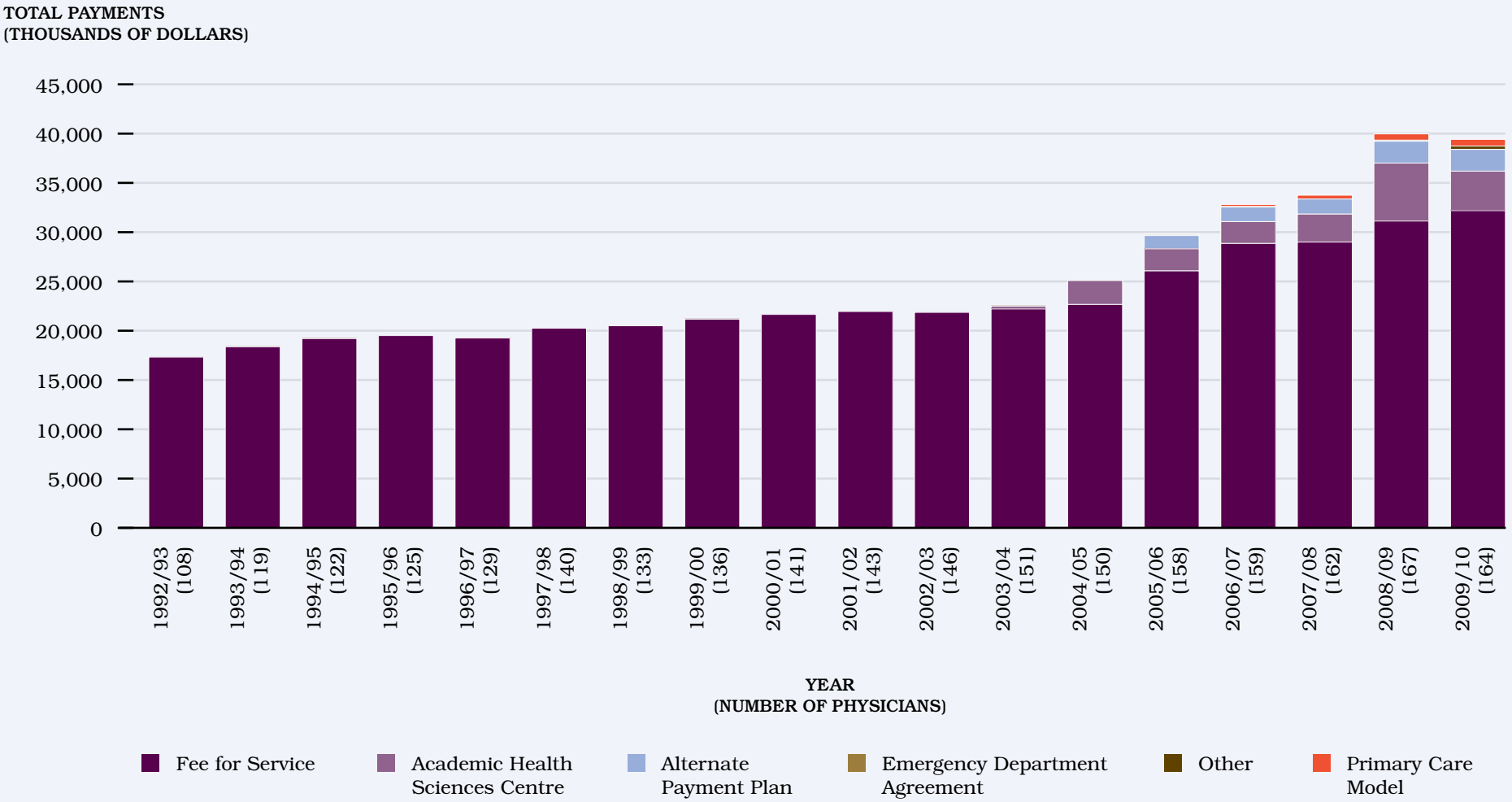
PHYSICAL MEDICINE AND REHABILITATION SPECIALISTS

EXHIBIT 5.29 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to physical medicine and rehabilitation specialists, in Ontario, 1992/93 to 2009/10



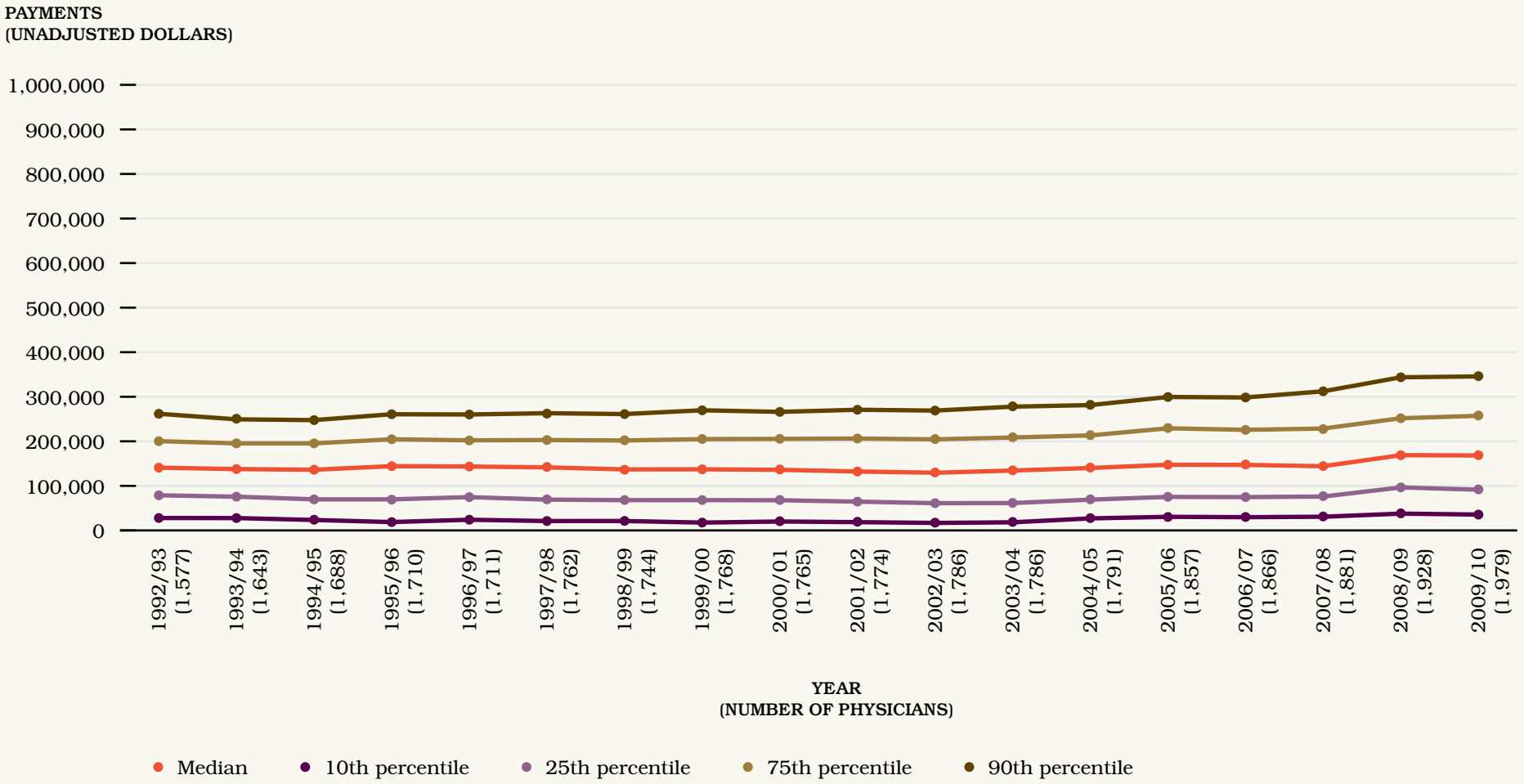
PHYSICAL MEDICINE AND REHABILITATION SPECIALISTS

EXHIBIT 5.30 Total payments to physical medicine and rehabilitation specialists by payment source, in Ontario, 1992/93 to 2009/10



PSYCHIATRISTS

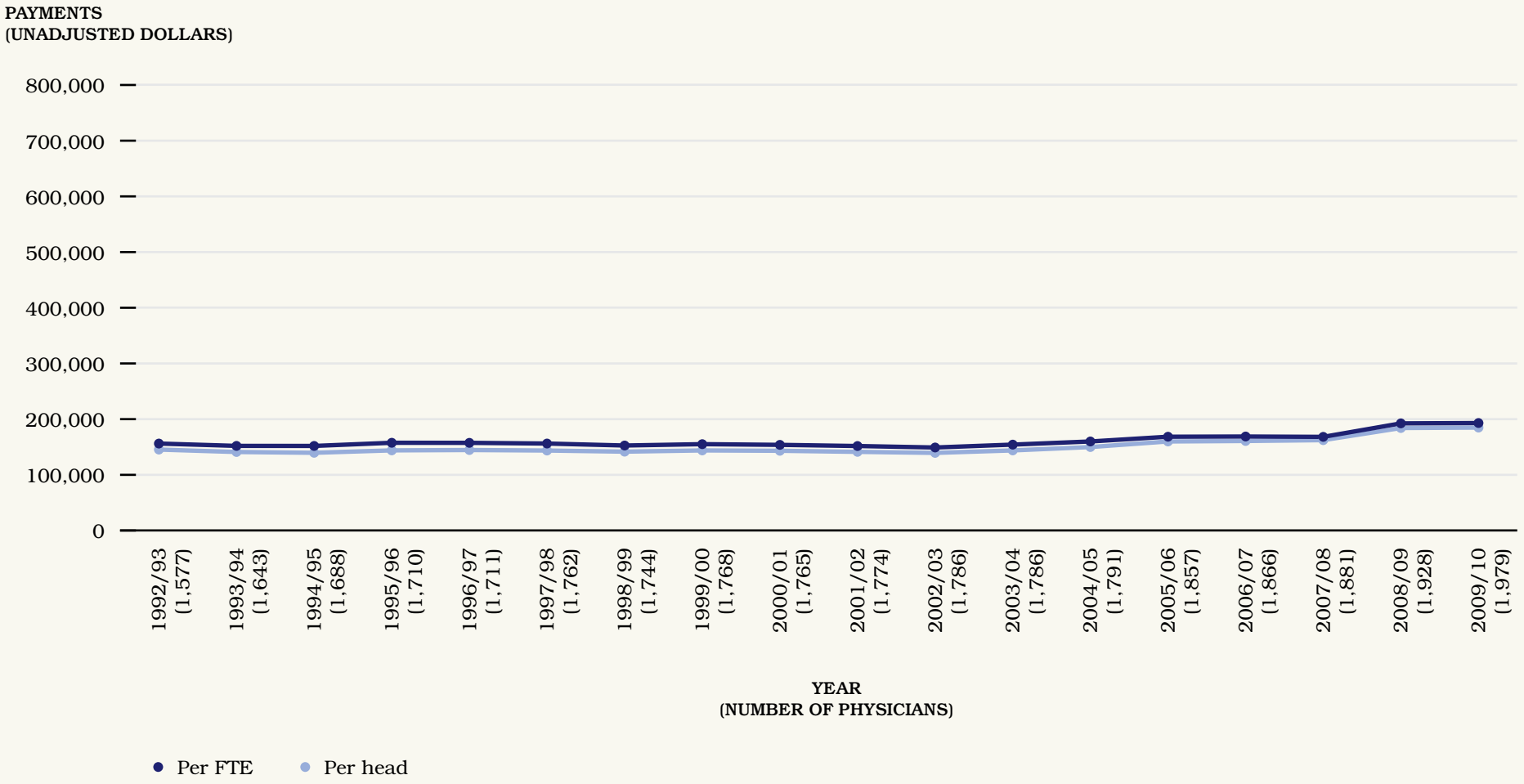
EXHIBIT 5.31 Median and percentiles of payments (in unadjusted dollars) to individual psychiatrists, in Ontario, 1992/93 to 2009/10



Note: The data do not include payments from provincial psychiatric hospitals or mental health sessional fees.

PSYCHIATRISTS

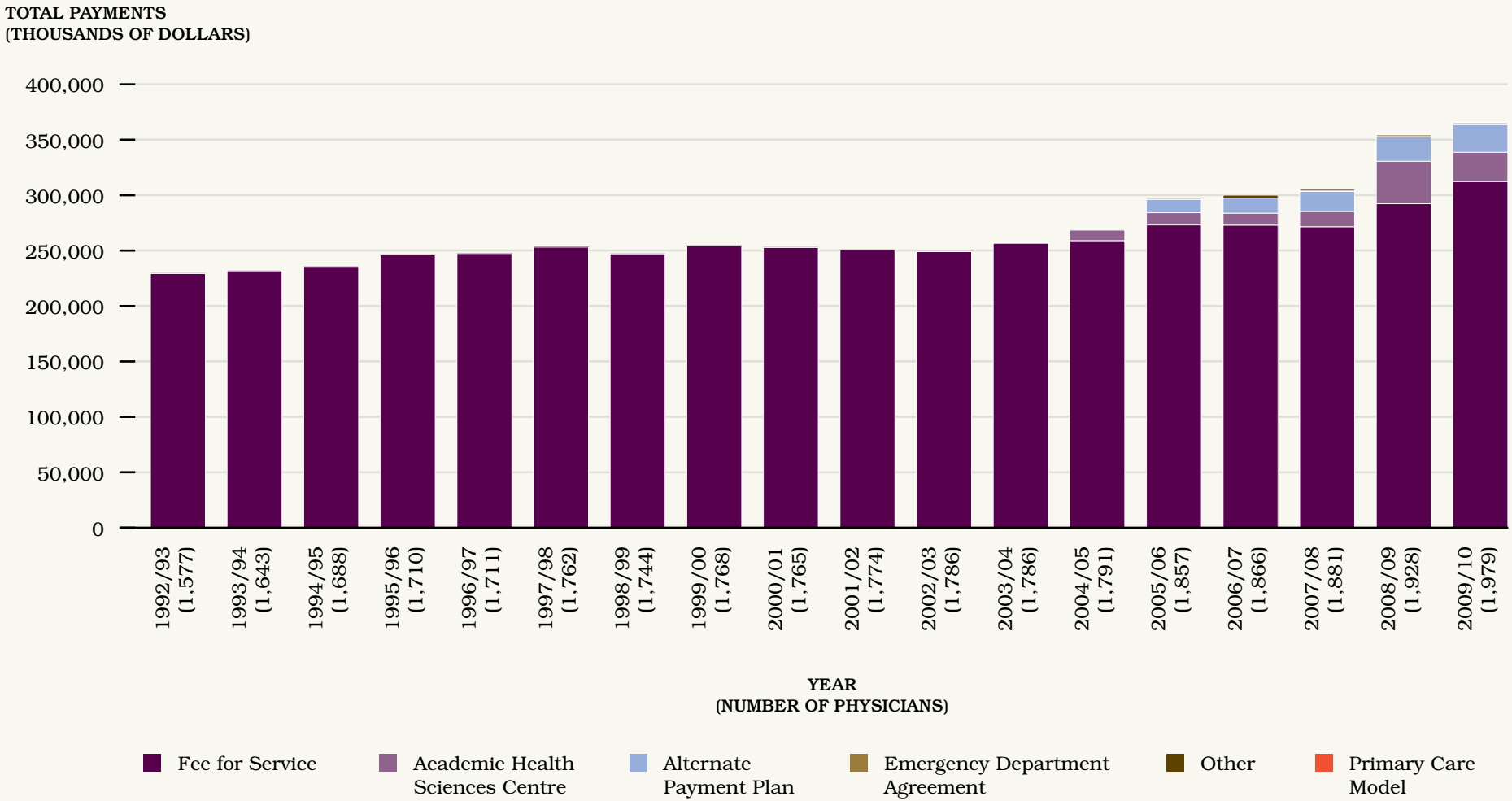
EXHIBIT 5.32 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to psychiatrists, in Ontario, 1992/93 to 2009/10



Note: The data do not include payments from provincial psychiatric hospitals or mental health sessional fees.

PSYCHIATRISTS

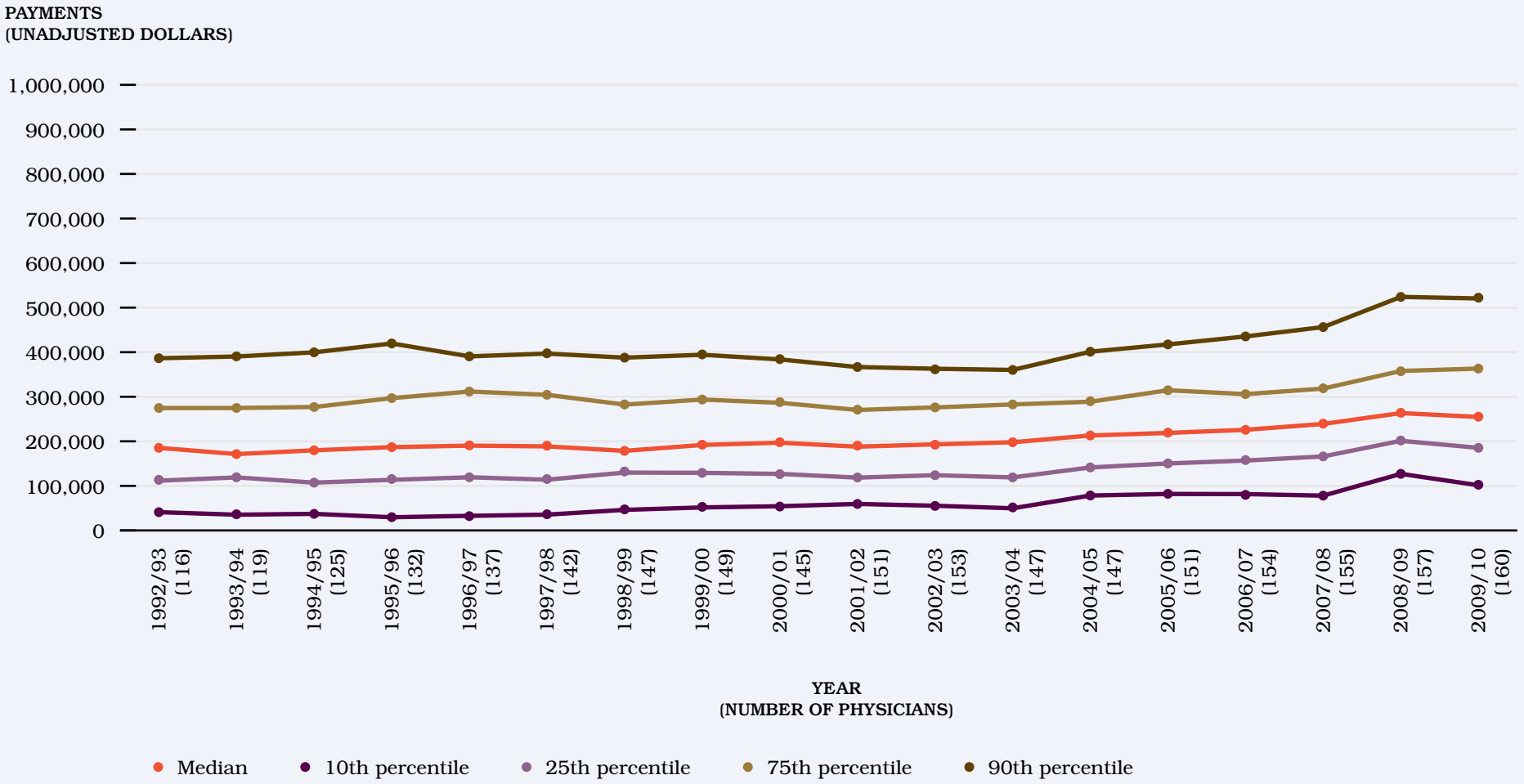
EXHIBIT 5.33 Total payments to psychiatrists by payment source, in Ontario, 1992/93 to 2009/10



Note: The data do not include payments from provincial psychiatric hospitals or mental health sessional fees.

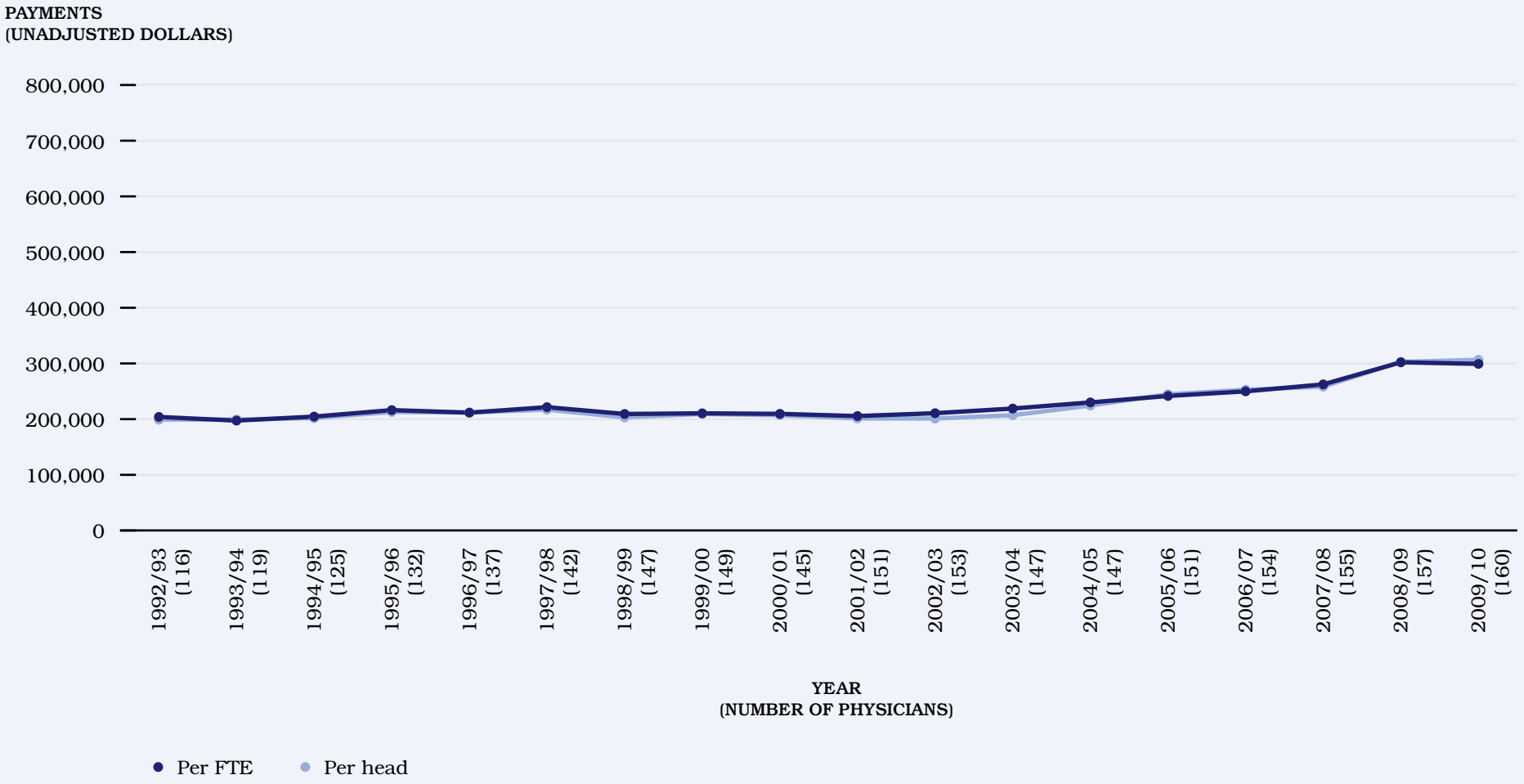
RHEUMATOLOGISTS

EXHIBIT 5.34 Median and percentiles of payments (in unadjusted dollars) to individual rheumatologists, in Ontario, 1992/93 to 2009/10



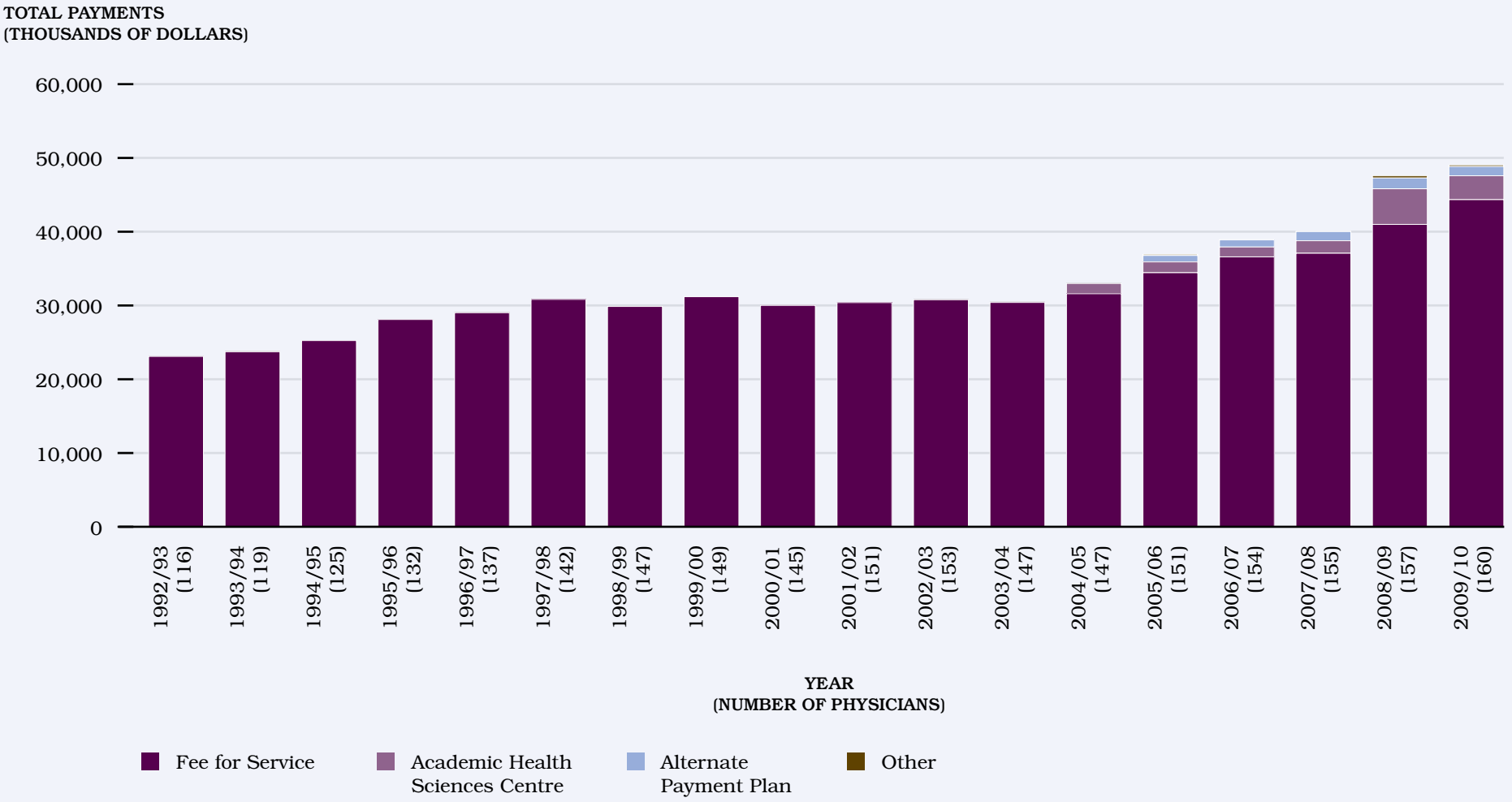
RHEUMATOLOGISTS

EXHIBIT 5.35 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to rheumatologists, in Ontario, 1992/93 to 2009/10



RHEUMATOLOGISTS

EXHIBIT 5.36 Total payments to rheumatologists by payment source, in Ontario, 1992/93 to 2009/10



CHAPTER 6

Results for Medical Procedural Specialists

CARDIOLOGY
GASTROENTEROLOGY
NEPHROLOGY
RADIATION ONCOLOGY
RESPIROLOGY

INTRODUCTION

Medical procedural specialists are specialist physicians who perform procedures that are not considered surgical because they are either non-invasive (do not involve working through a sterile incision in an operating room), do not require anesthesia, or can be performed on an outpatient basis. Many (but not all) of the procedures performed by specialists in this category involve visualization of the gastrointestinal tract, the respiratory tract, and the cardiovascular system through the use of fibre-optic endoscopes or catheters placed in blood vessels. Medical procedural specialists perform procedures such as biopsies, removal of small lesions, dilation of strictures and placement of stents through endoscopes or catheters. Some of these procedures have replaced open surgery—for instance, the shift from open coronary bypass surgery to angioplasty and stent placement in recent years. These specialties also include some physicians who do not perform procedures, but we cannot easily separate them in this analysis, but for practical reasons they have been categorized as belonging to this group. We included radiation oncology in this group as these physicians perform a range of increasingly sophisticated procedures that utilize ionizing radiation and nephrology, as these practitioners are extensively involved in the provision of dialysis to patients with end-stage renal failure.

Demand for the services provided by some procedural specialists has increased dramatically in the past decade or so. Some of this is related to the rapid development of technology that enables non-invasive procedures that previously required surgery, and some is related to increasing demand due to an aging population and the rising prevalence of many chronic conditions. For example, renal failure is a complication of diabetes, and the increase in the prevalence of Type II diabetes over the past two decades has led to an increased need for dialysis, which is managed by nephrologists. Similarly, an increase in the prevalence of congestive heart failure has led to an increased demand for echocardiograms and other studies of heart function. In the case of gastro-enterology, the campaign to encourage Ontarians 50 years and older to get screened for colorectal cancer has increased demand for colonoscopy.

For some procedures there are two types of fees: a technical fee, which is payable to the institution to cover infrastructure costs and equipment, and a professional fee, which is paid to the physician who performs or supervises the procedure and interprets the results. Where these were billed separately, the technical fees have been excluded from our analyses. In the 1990s, there were a few procedures for which physicians could bill a combined technical and professional fee. Such fees were discontinued in 2000/01, and some of the exhibits illustrate a drop in payments from 2000/01 to 2001/02 resulting from this change. This change is most noticeable in the case of respirologists, where it affected billings for sleep studies. There was a lesser effect on payments to cardiologists. Payments to the other specialties in this group were unaffected by this change.

FINDINGS FOR INDIVIDUAL SPECIALTIES

Cardiology (exhibits 6.1 to 6.3)

By 2009/10, there were 590 cardiologists practicing in Ontario, an increase of 74% from 1992/93. This is one of the larger specialties, and total payments in 2009/10 were $316 million. In 2009/10, individual cardiologists received, on average, approximately 75% more in payments compared with all physicians combined. The 90th percentile for payments in 2009/10 was $940,000, meaning that 10% of cardiologists were paid more than this. Ten percent of cardiologists were paid less than $155,000 in that year. The 90th percentile for payments increased from being 75% higher than the median in the 1990s to nearly 95% higher in 2009/10, indicating a widening variation in payments to cardiologists. Cardiologists are primarily paid on a FFS basis, with 93% of their 2009/10 payments coming from this source.

Gastroenterology (exhibits 6.4 to 6.6)

In 2009/10, there were 289 gastro-enterologists practicing in Ontario, an increase of 82% from 1992/93. Total payments to gastroenterologists were nearly $150 million in 2009/10. Median and mean annual payments to individual gastro-enterologists increased steadily from 1997/98 and were about $500,000 in 2009/10, over

60% higher than the average for all physicians in Ontario. The distribution of payments was wide and increased over the period of the study, particularly since 2002/03. As a result, the top 10% of gastroenterologists were paid over $850,000 in 2009/10 and the lowest 10% were paid $175,000 or less. The great majority of payments (93%) to this specialty are from FFS.

Nephrology (exhibits 6.7 to 6.9)

This specialty has grown substantially. In 2009/10, there were 191 practicing nephrologists in Ontario, an increase of 136% from 1992/93. Total payments to nephrologists in 2009/10 were $102 million. The median payment to a nephrologist in 2009/10 was $500,000 and the mean was approximately $550,000. The median payment in 2009/10 was more than double that in 1992/03, was 75% higher than that for all physicians, and increased steadily throughout the observation period. In contrast to the average results for payments to all doctors, payments to nephrologists did not display the flat trend observed during the 1990s when income capping was in place. The variation in payments was wide and increased throughout the study. By 2009/10, the upper 10% of nephrologists were paid over $900,000 (88% higher than the equivalent value for all physicians), and the lowest 10% were paid $145,000 or less. The great majority of nephrologists (94%) are paid through FFS.

Radiation Oncology (exhibits 6.10 to 6.12)

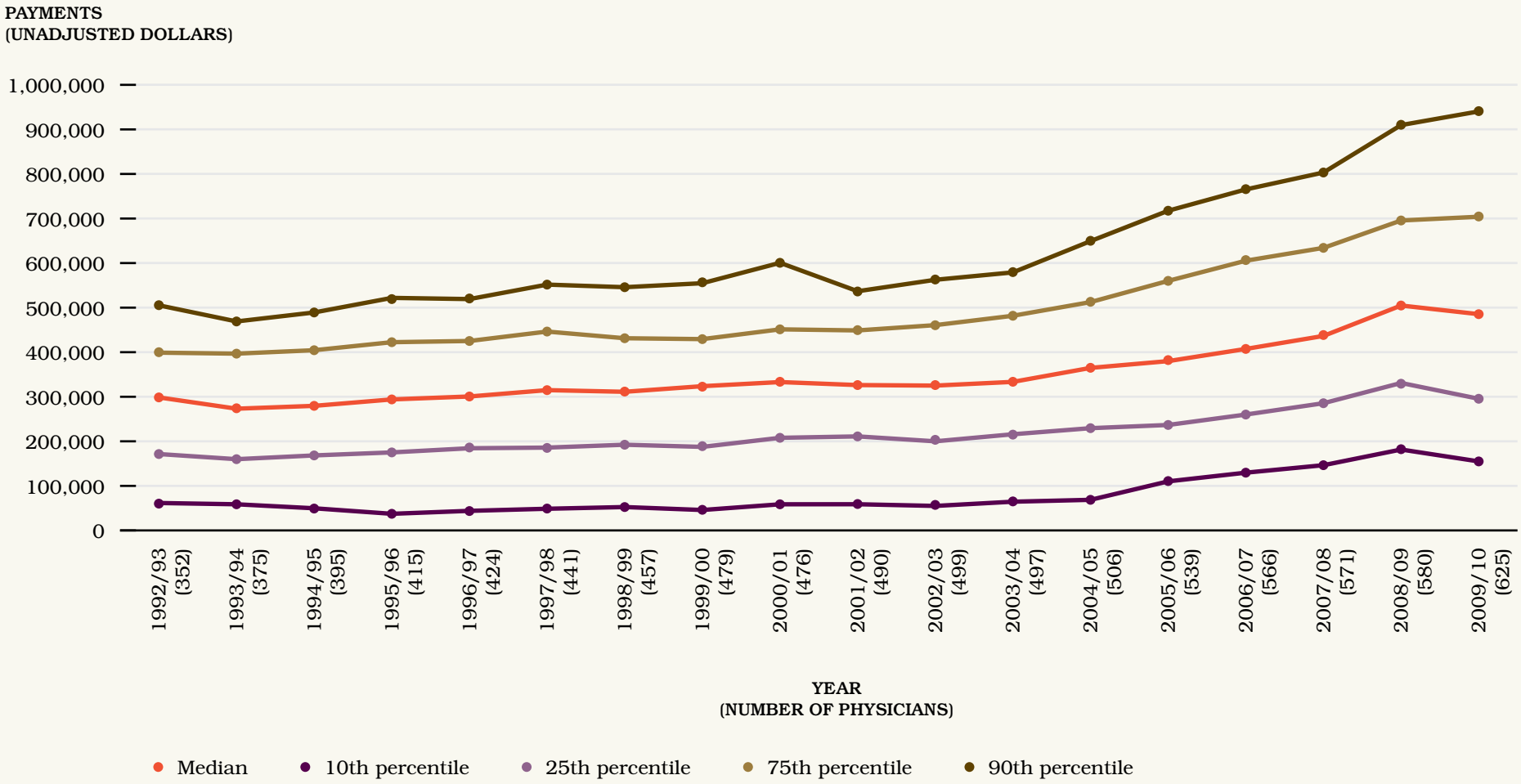
The number of radiation oncologists in Ontario rose from 105 in 1992/93 to 182 in 2009/10, a 73% increase. Total payments in 2009/10 were $76 million. We cannot analyze the increase in payments due to missing data prior to 2005/06, so apparent trends prior to that date need to be regarded with caution. Payments to radiation oncologists are more complex than for other procedural specialties in that approximately 63% are in the form of FFS, with the remaining 37% through APPs. In 2009/10, the mean payment to radiation oncologists was over $400,000, about 30% higher than for all physicians. This value increased by about 16% from 2005/06 to 2009/10 (the period for which we have reliable data). In 2009/10, the median payment to radiation oncologists was approximately 50% higher than for all physicians. The observed distribution in payments is quite narrow. The highest 10% of radiation oncologists were paid just over $500,000 or more, a value that is only 25% more than those at the median. The lowest 10% were paid approximately $280,000 or less.

Respirology (exhibits 6.13 to 6.15)

The number of respirologists increased 72% during the study period, from 137 in 1992/93 to 236 in 2009/10. Total payments in 2009/10 were just under $80 million. Average payments to individual respirologists increased modestly by 19% between 2005/06 to 2009/10, a period during which there was rapid growth in some other specialties. This value was lower than the 28% increase in average annual payments to all physicians. Nevertheless, the median and mean payments in 2009/10 were slightly higher than the average for all physicians. In other words, respirologists have not seen the large increases in payments evident with other procedural specialists. The variation in payments across this specialty is narrower than that seen with other procedural physicians. In 2009/10, the highest 10% of respirologists earned $580,000 or more, compared with $100,000 or less for the lowest 10%. In 2009/10, nearly 90% of payments were in the form of FFS.

CARDIOLOGISTS

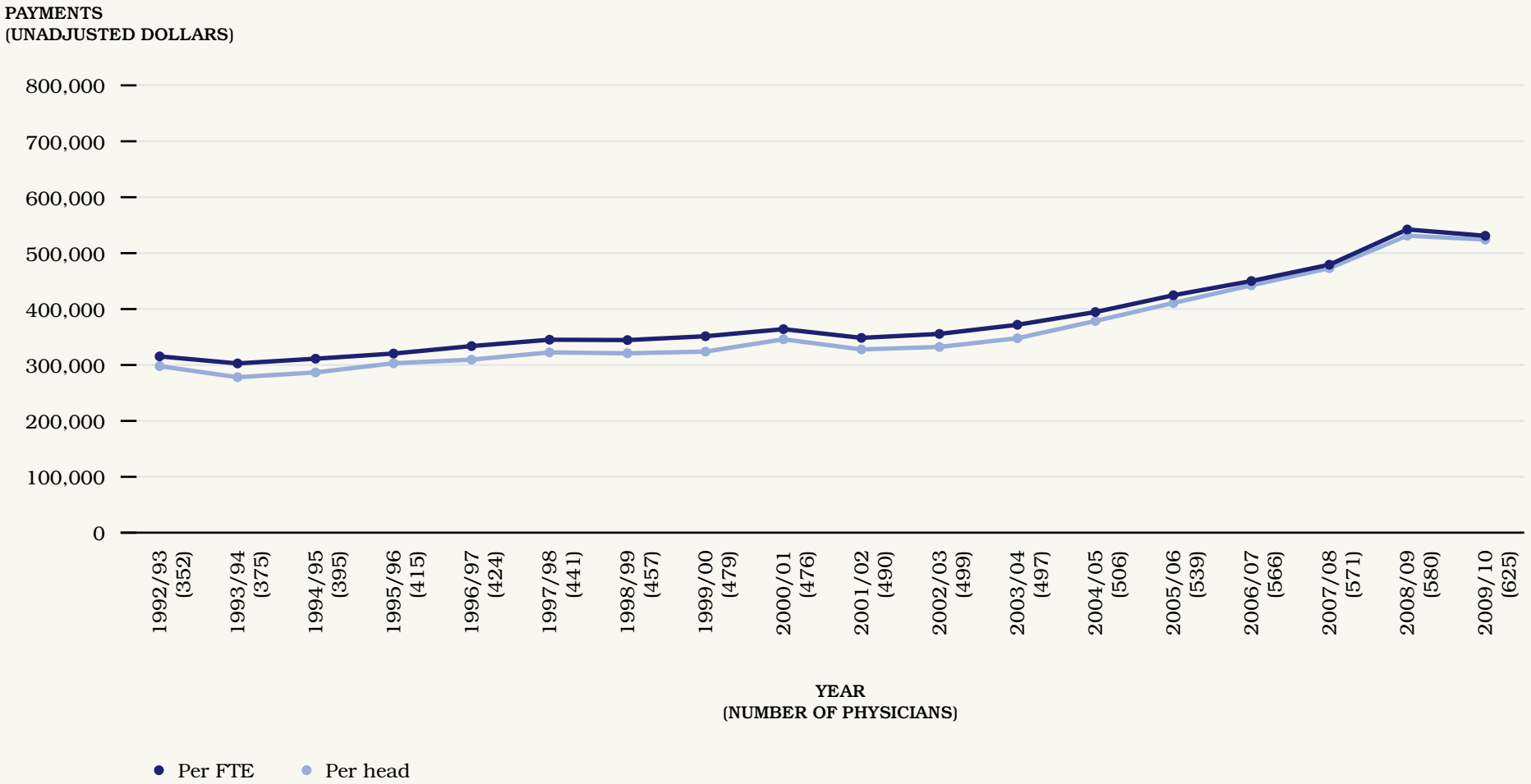
EXHIBIT 6.1 Median and percentiles of payments (in unadjusted dollars) to individual cardiologists, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2001/021 include some fees that combined technical and professional fees. Such combined fees were discontinued in 2000/01.

CARDIOLOGISTS

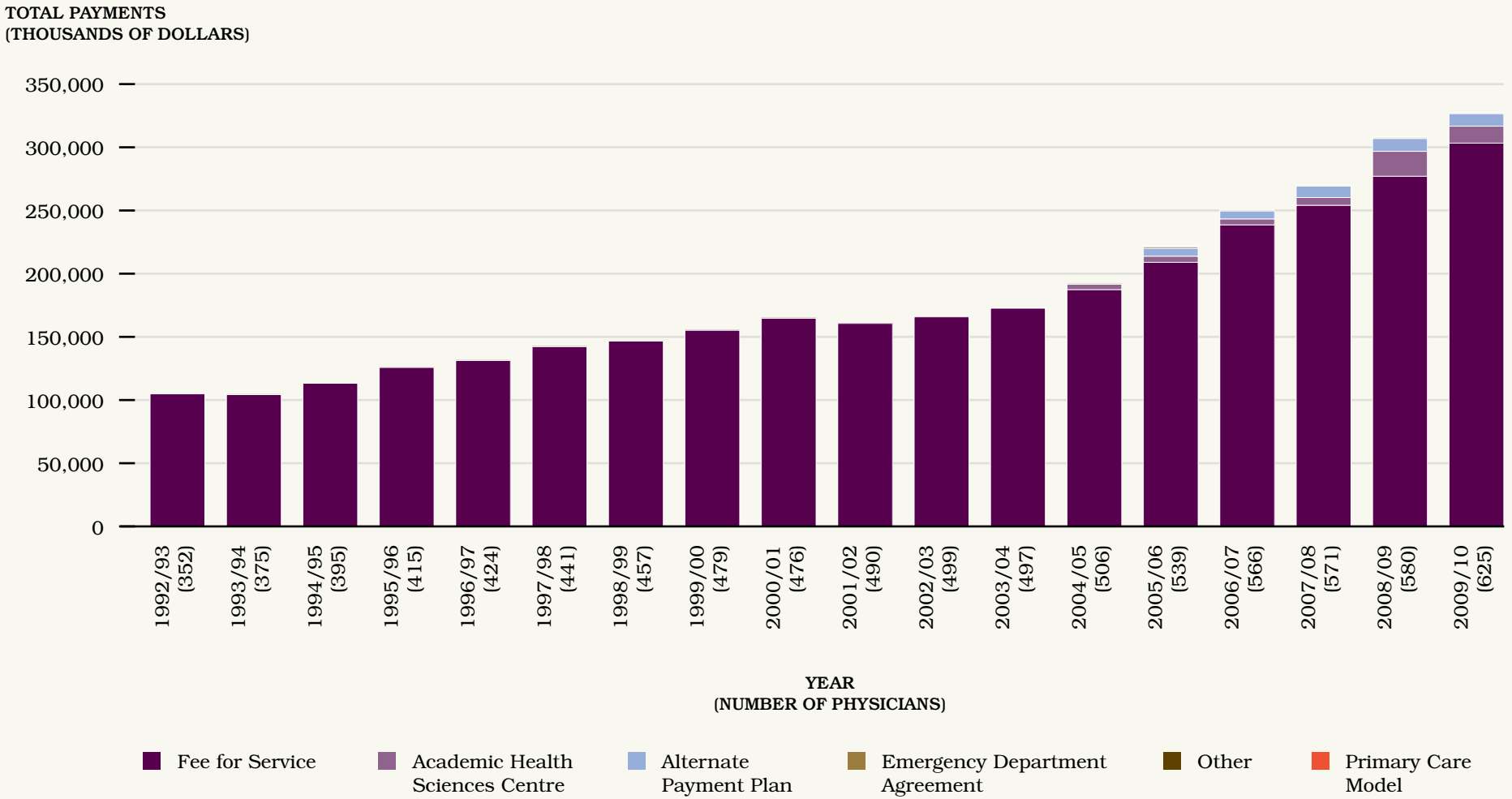
EXHIBIT 6.2 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to cardiologists, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2001/02 include some fees that combined technical and professional fees. Such combined fees were discontinued in 2000/01.

CARDIOLOGISTS

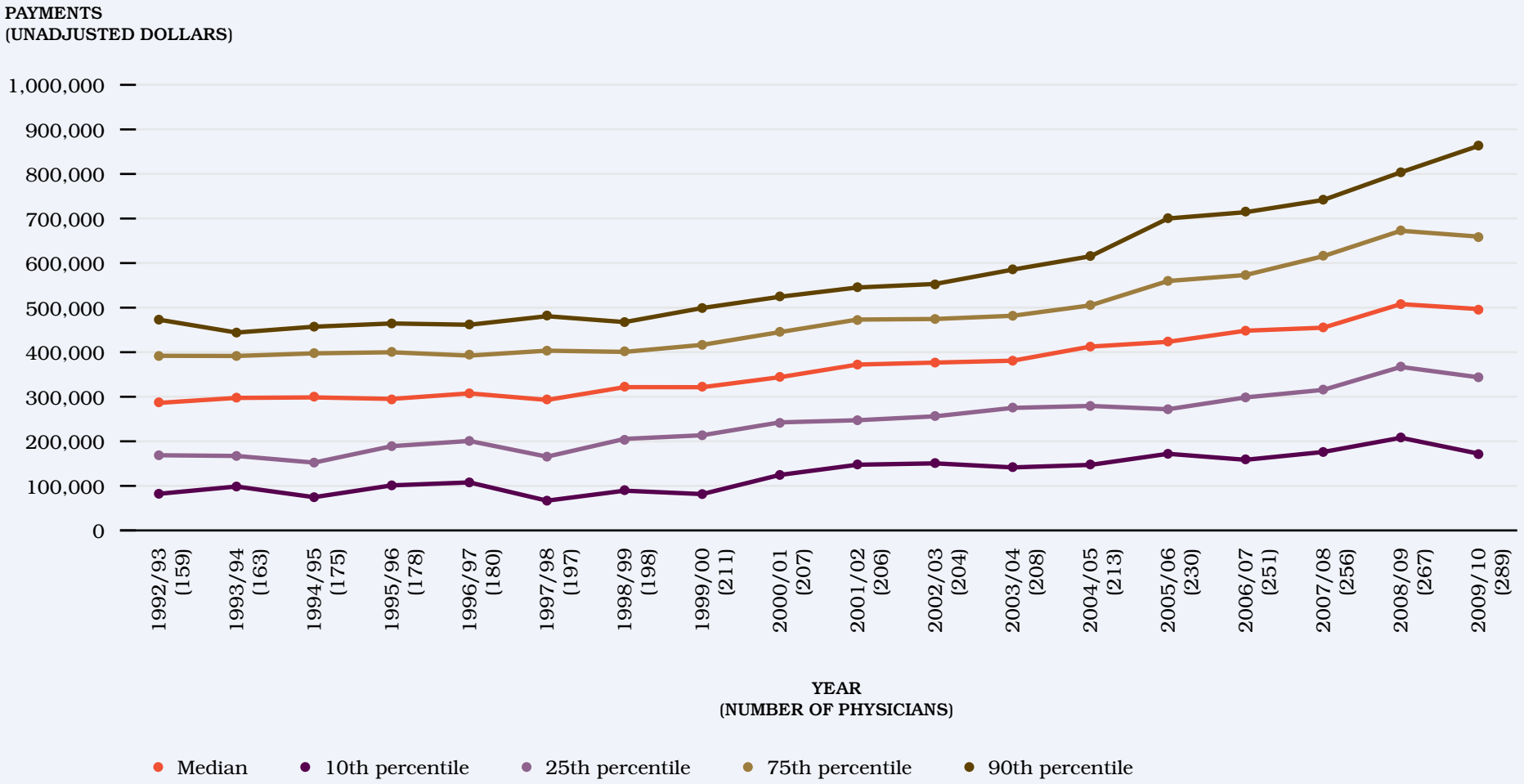
EXHIBIT 6.3 Total payments to cardiologists by payment source, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2001/02 include some fees that combined technical and professional fees. Such combined fees were discontinued in 2000/01.

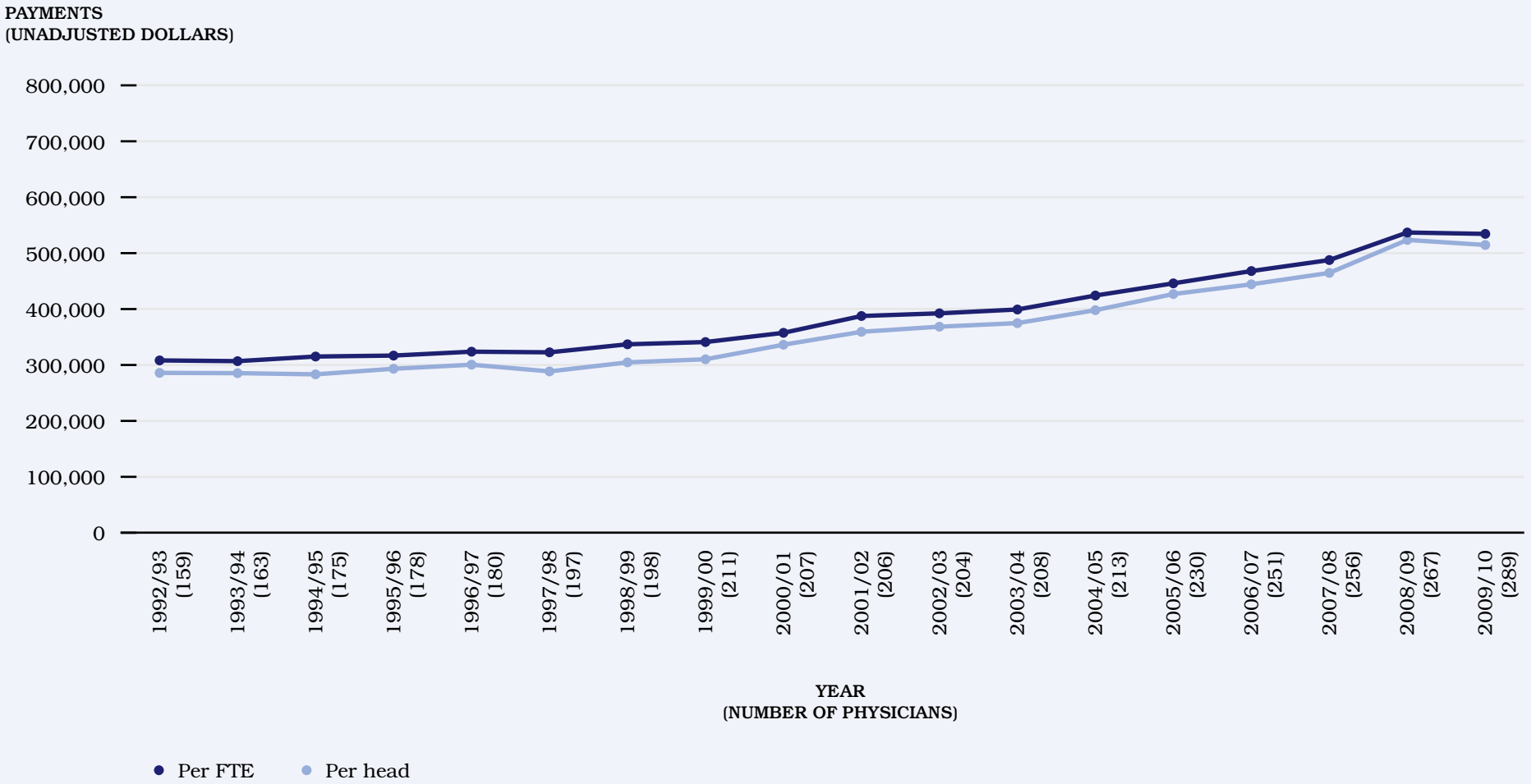
GASTROENTEROLOGISTS

EXHIBIT 6.4 Median and percentiles of payments (in unadjusted dollars) to individual gastroenterologists, in Ontario, 1992/93 to 2009/10



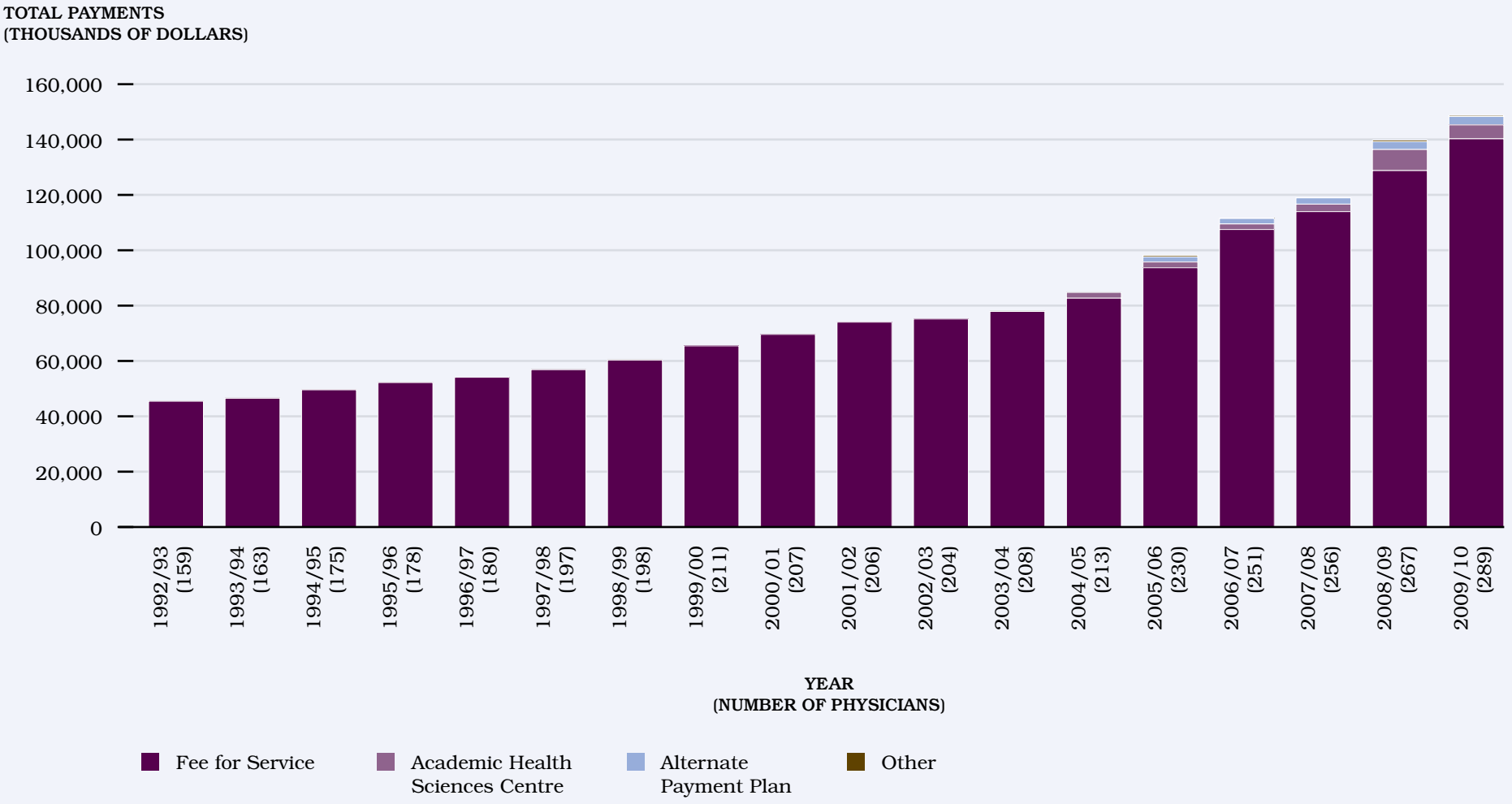
GASTROENTEROLOGISTS

EXHIBIT 6.5 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to gastroenterologists, in Ontario, 1992/93 to 2009/10



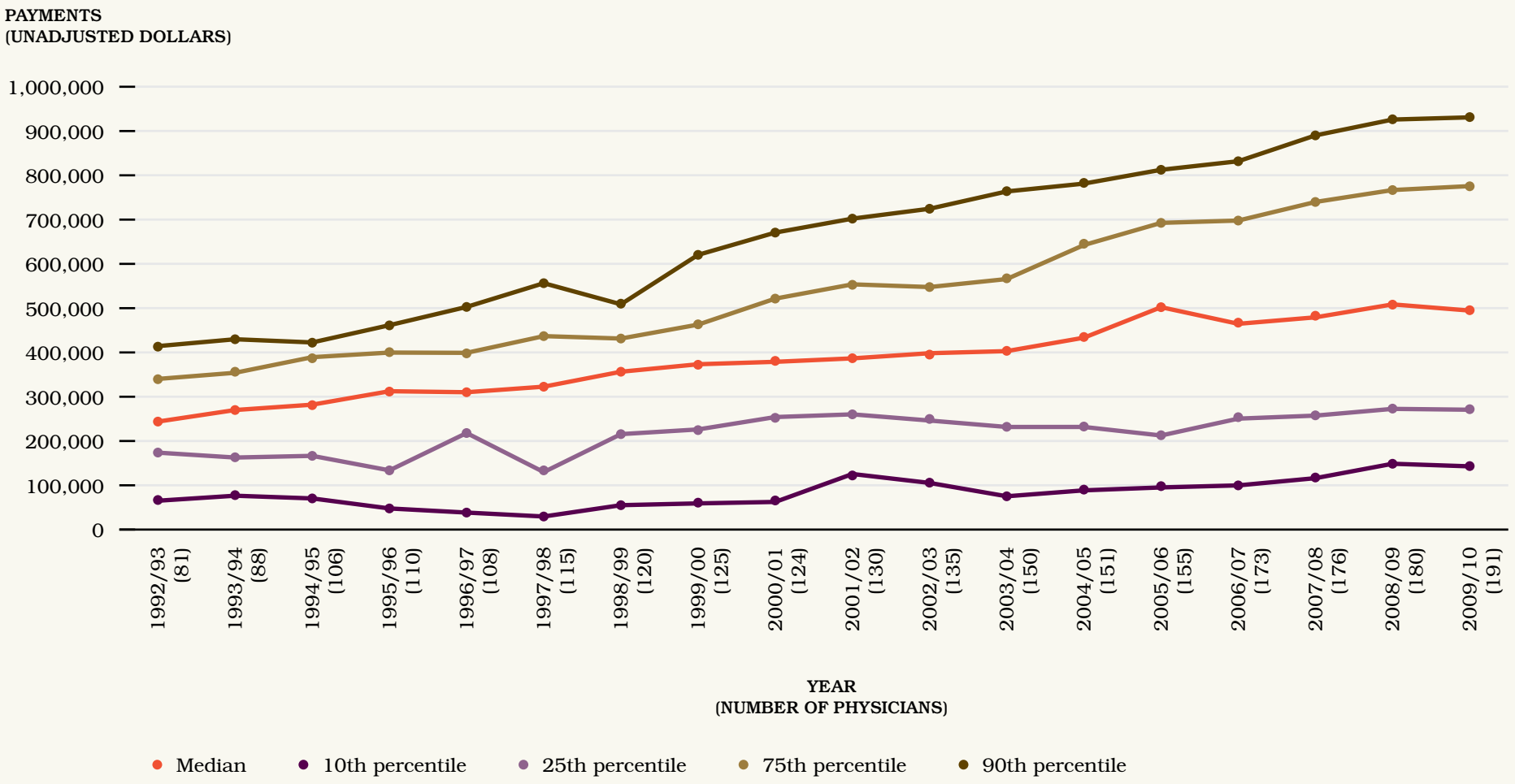
GASTROENTEROLOGISTS

EXHIBIT 6.6 Total payments to gastroenterologists by payment source, in Ontario, 1992/93 to 2009/10



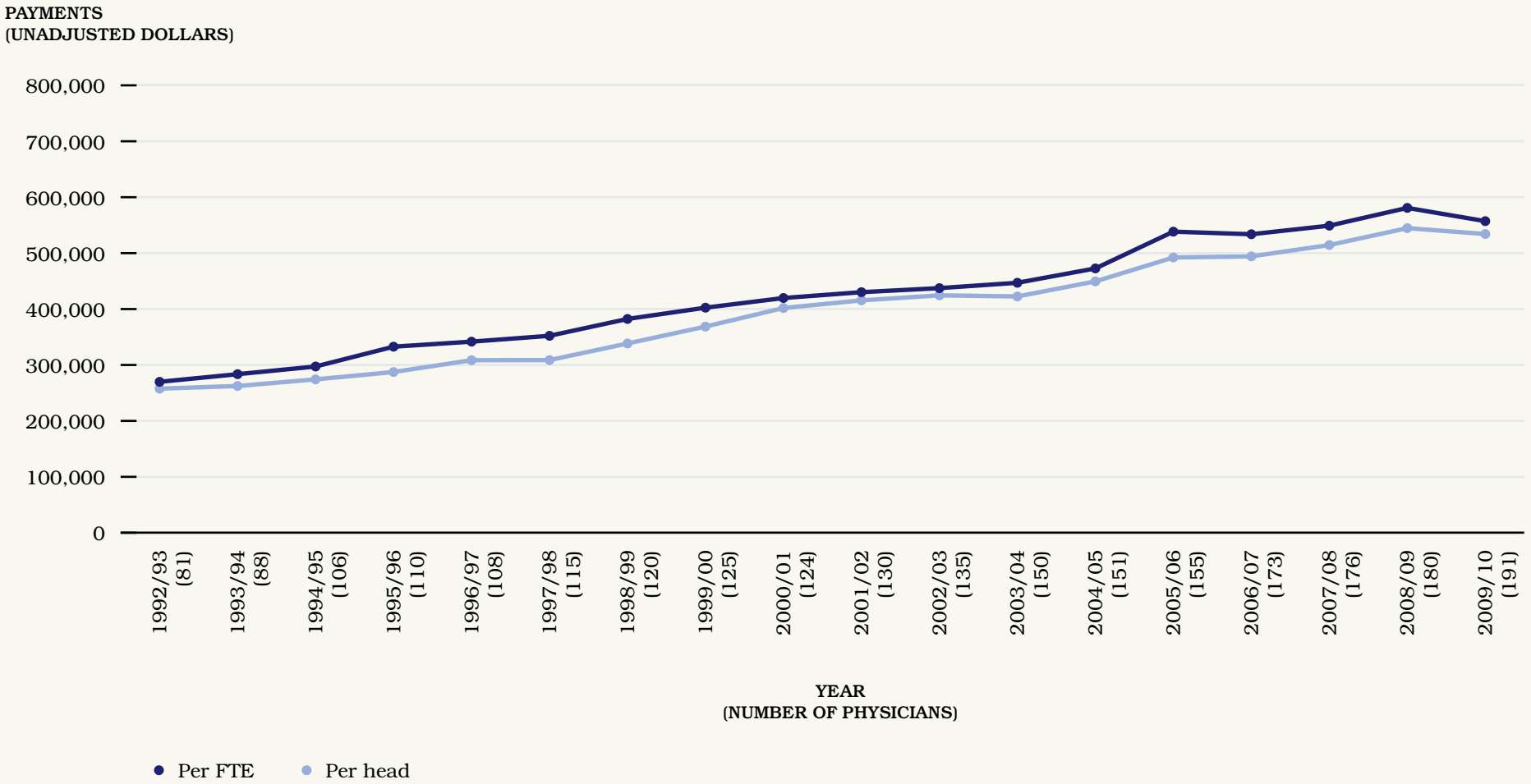
NEPHROLOGISTS

EXHIBIT 6.7 Median and percentiles of payments (in unadjusted dollars) to individual nephrologists, in Ontario, 1992/93 to 2009/10



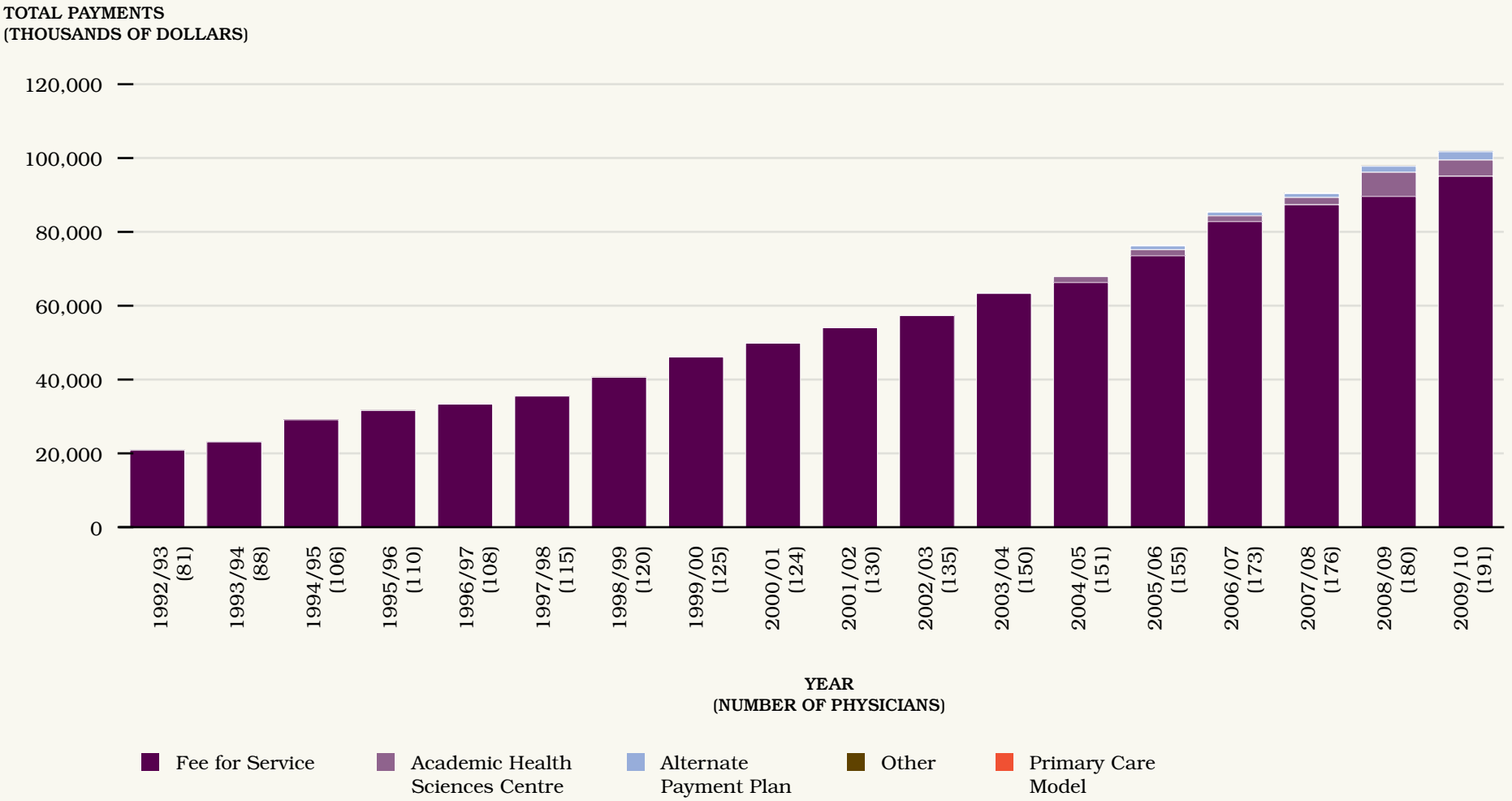
NEPHROLOGISTS

EXHIBIT 6.8 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to nephrologists, in Ontario, 1992/93 to 2009/10



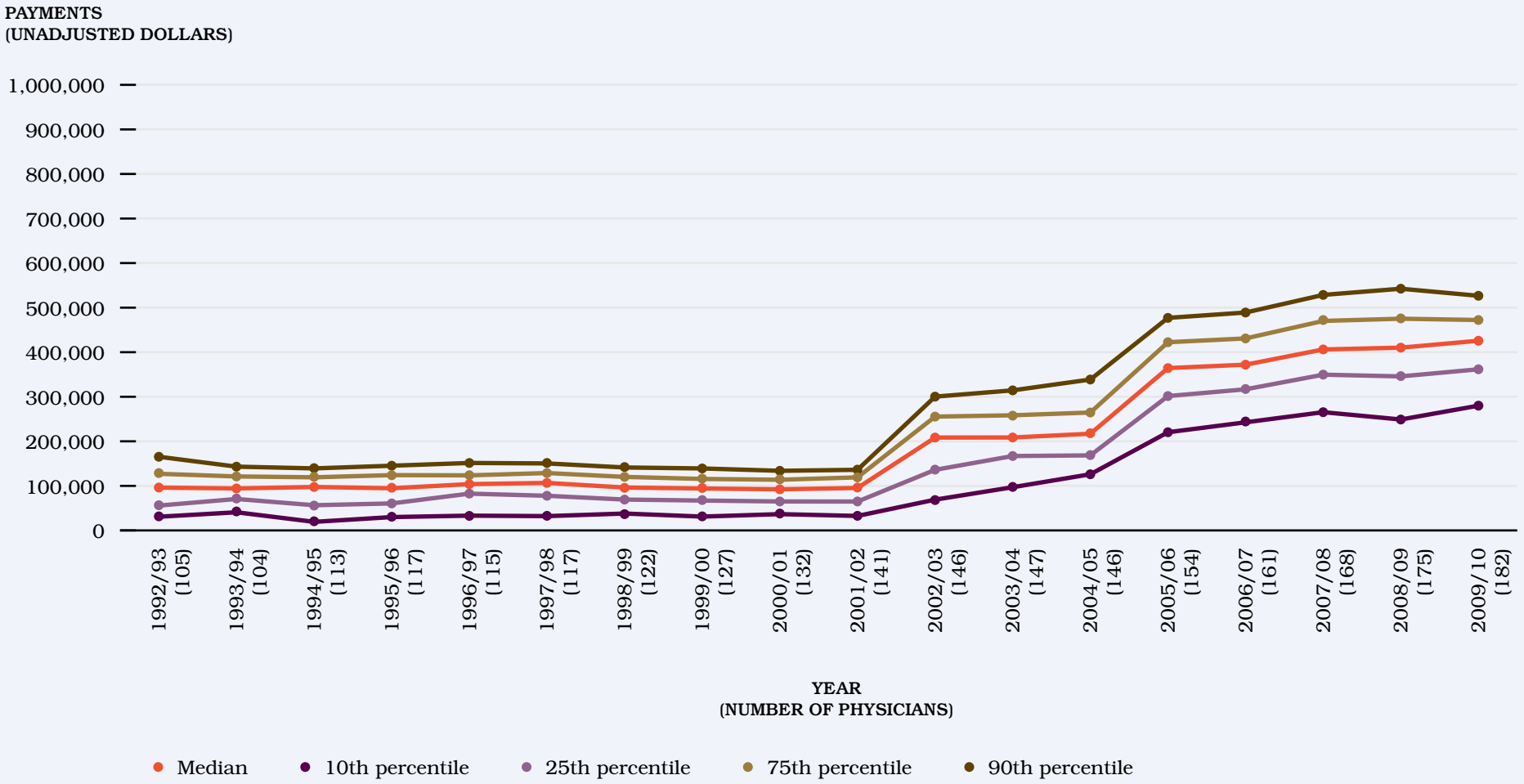
NEPHROLOGISTS

EXHIBIT 6.9 Total payments to nephrologists by payment source and year, in Ontario, 1992/93 to 2009/10



RADIATION ONCOLOGISTS

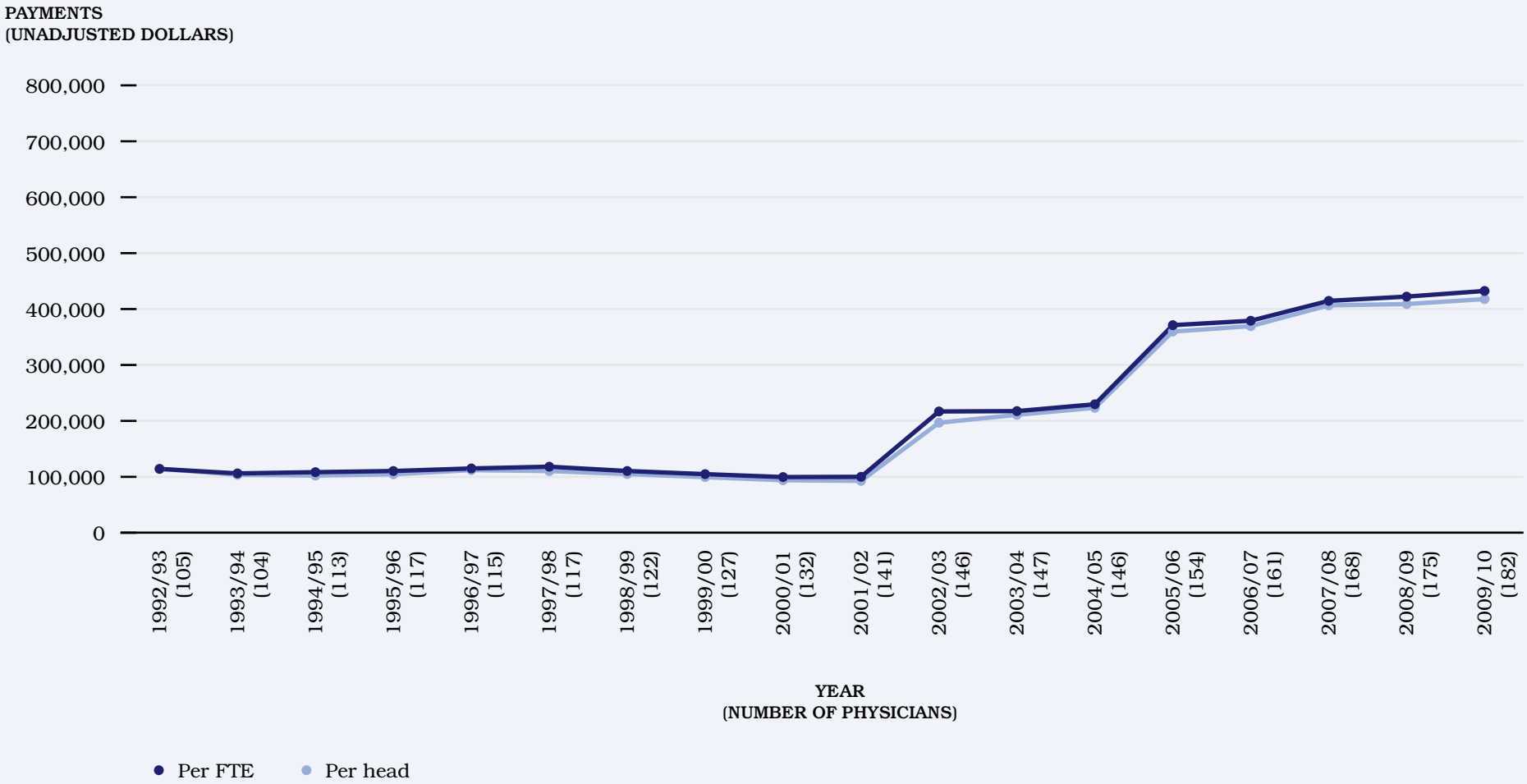
EXHIBIT 6.10 Median and percentiles of payments (in unadjusted dollars) to individual radiation oncologists, in Ontario, 1992/93 to 2009/10



Note: Results for radiation oncologists must be treated with caution prior to 2005/06 due to missing data.

RADIATION ONCOLOGISTS

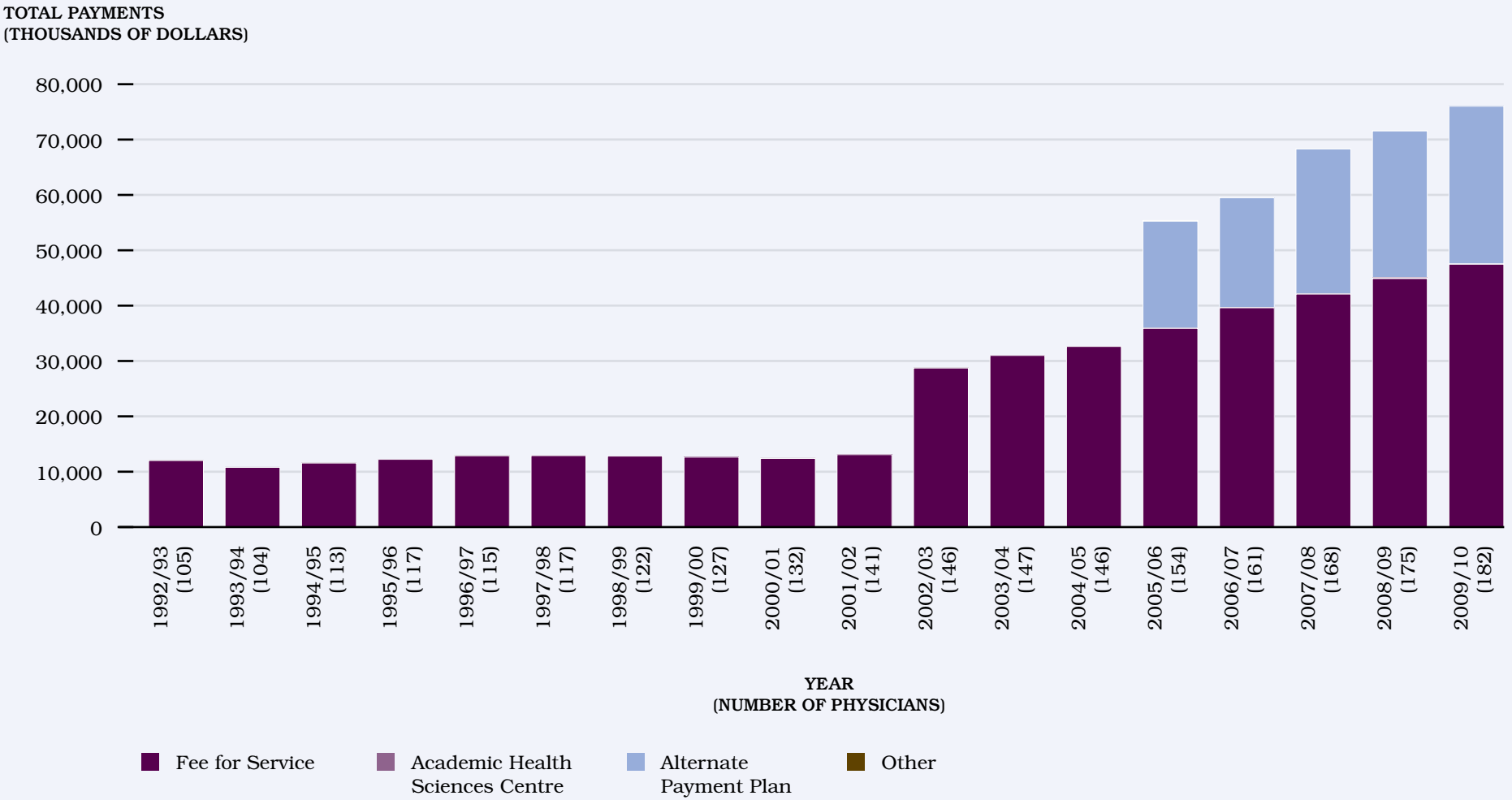
EXHIBIT 6.11 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to radiation oncologists, in Ontario, 1992/93 to 2009/10



Note: Results for radiation oncologists must be treated with caution prior to 2005/06 due to missing data.

RADIATION ONCOLOGISTS

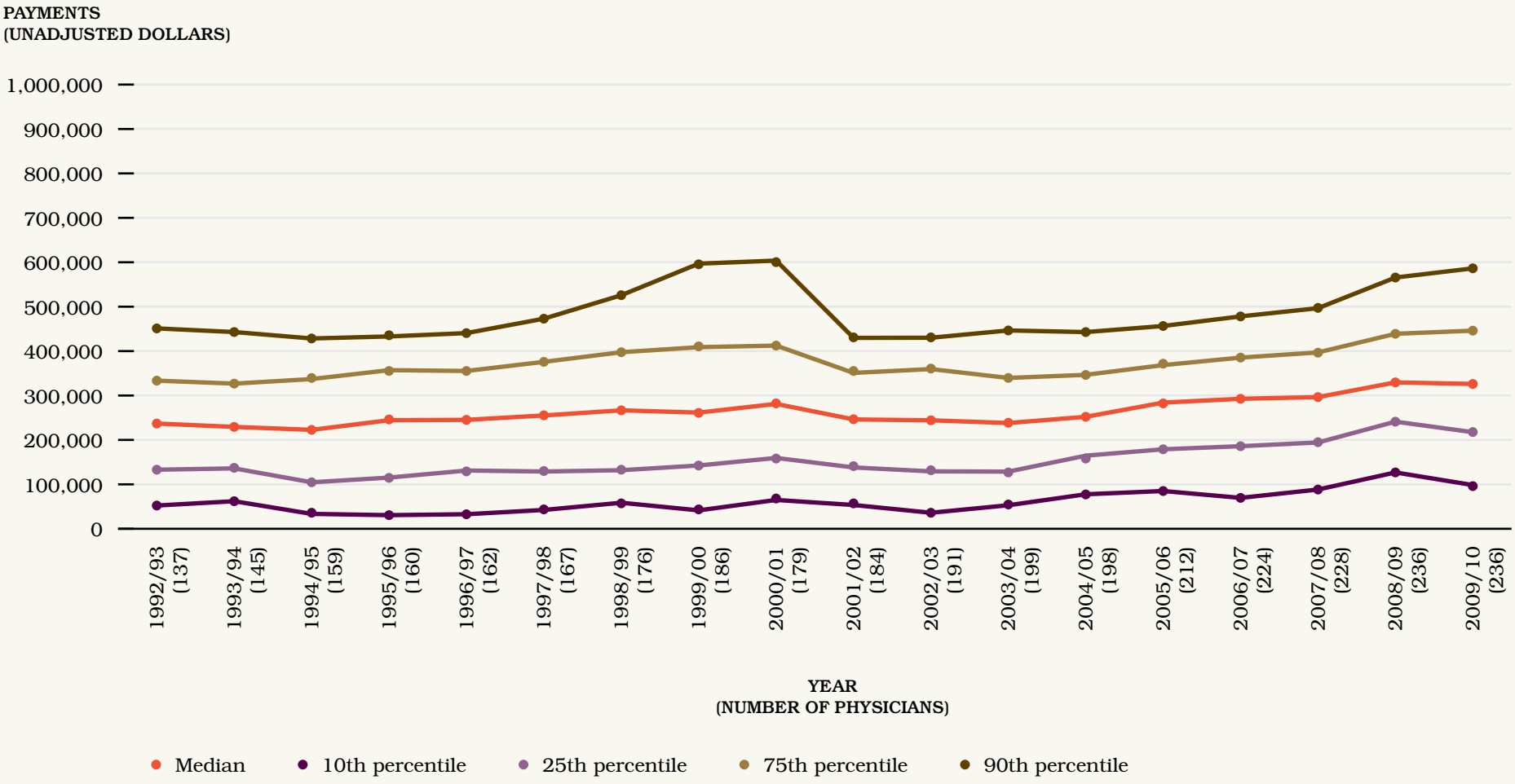
EXHIBIT 6.12 Total payments to radiation oncologists by payment source, in Ontario, 1992/93 to 2009/10



Note: Results for radiation oncologists must be treated with caution prior to 2005/06 due to missing data.

RESPIROLOGISTS

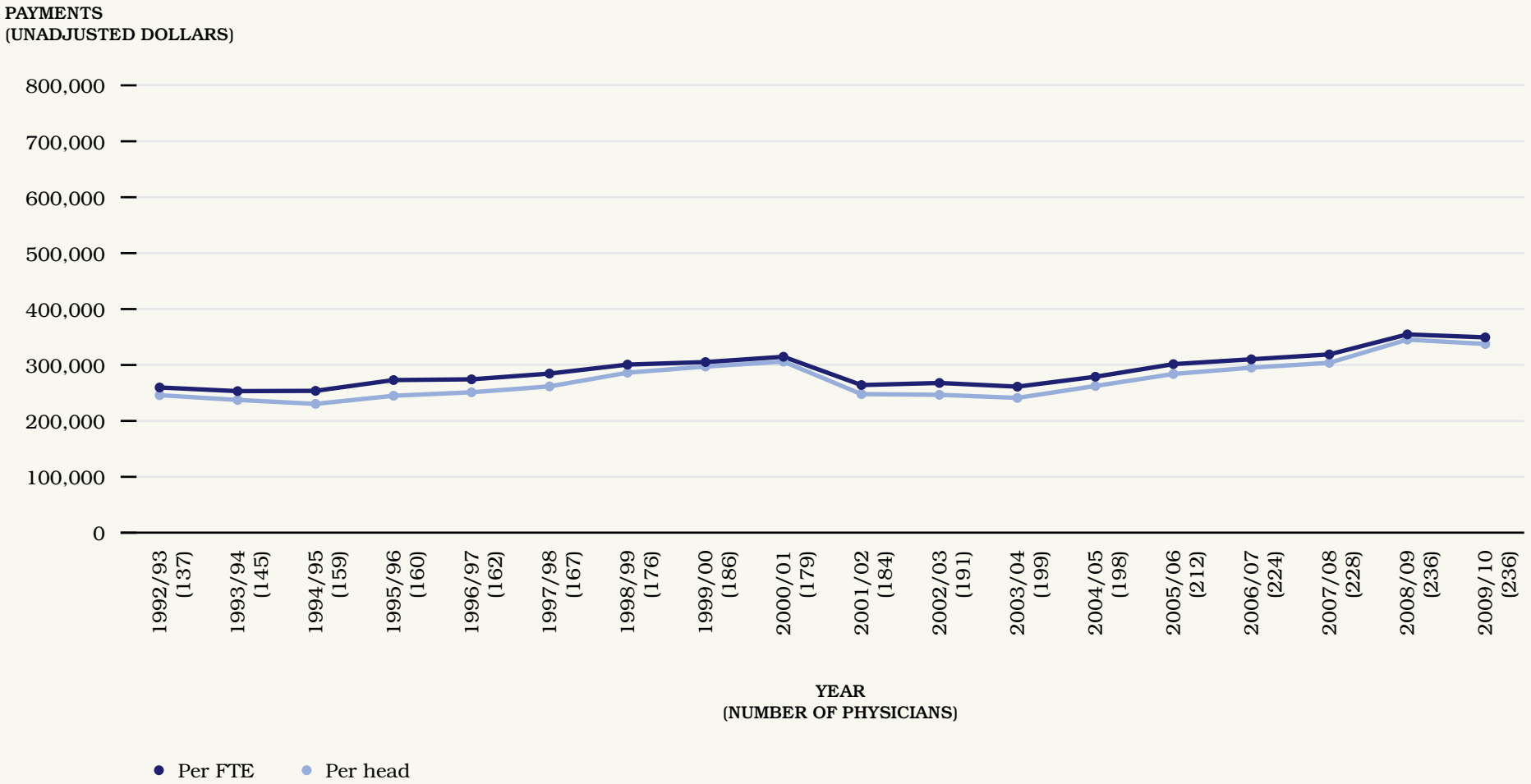
EXHIBIT 6.13 Median and percentiles of payments (in unadjusted dollars) to individual respirologists, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2001/02 include some fees that combined technical and professional fees. Such combined fees were discontinued in 2000/01.

RESPIROLOGISTS

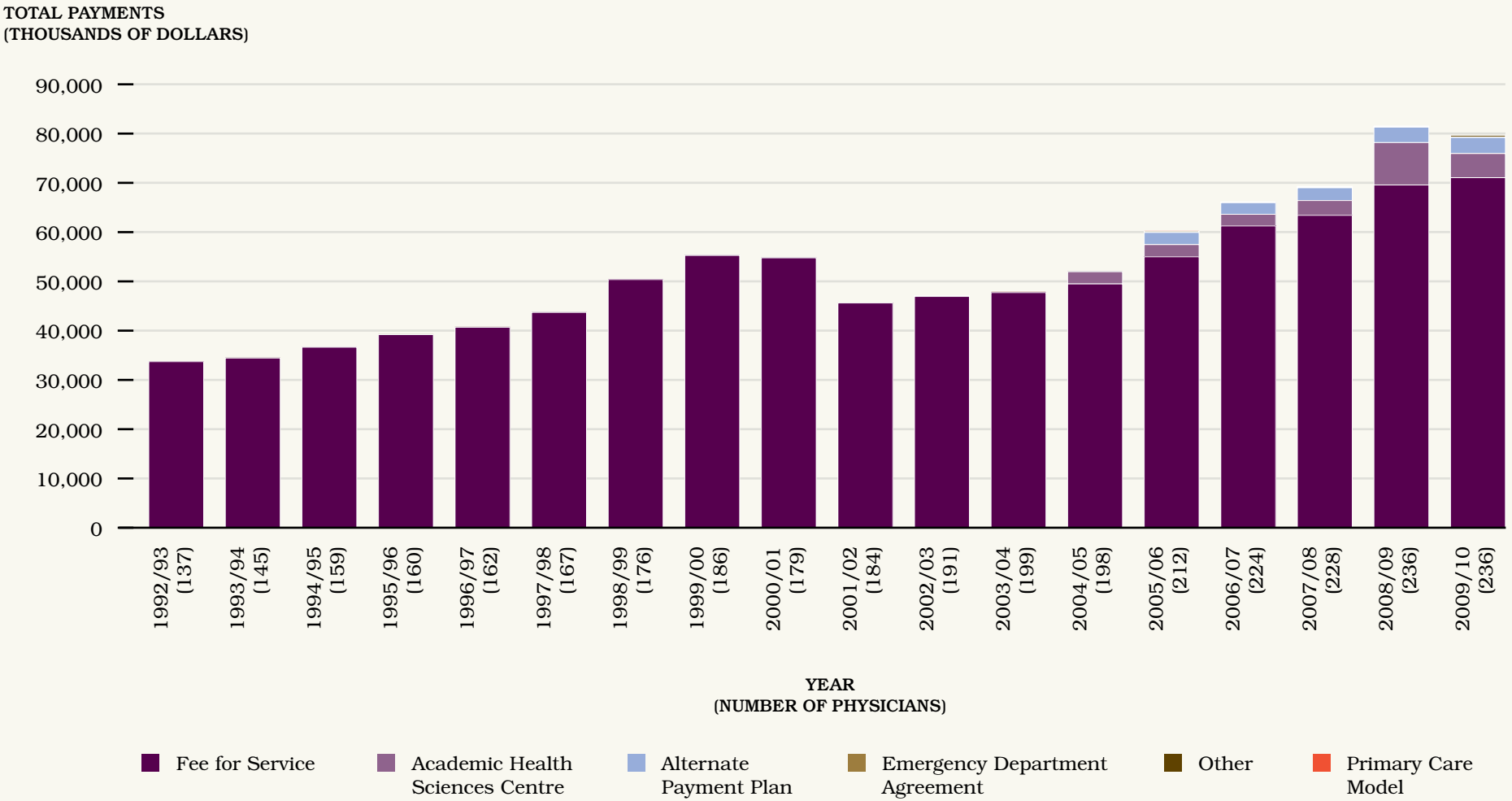
EXHIBIT 6.14 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to respirologists, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2001/02 include some fees that combined technical and professional fees. Such combined fees were discontinued in 2000/01.

RESPIROLOGISTS

EXHIBIT 6.15 Total payments to respirologists by payment source, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2001/02 include some fees that combined technical and professional fees. Such combined fees were discontinued in 2000/01.

CHAPTER 7

Results for Surgical Specialties

CARDIAC AND THORACIC SURGEONS

GENERAL SURGEONS
(INCLUDING PEDIATRIC GENERAL SURGEONS)

NEUROSURGEONS

OBSTETRICIANS/GYNECOLOGISTS

OPHTHALMOLOGISTS

ORTHOPEDIC SURGEONS

OTOLARYNGOLOGISTS

PLASTIC SURGEONS

UROLOGISTS

VASCULAR SURGEONS

INTRODUCTION

This chapter describes payments to physicians who perform surgical procedures.

Surgery, perhaps more than other types of medical practice, is a collaborative effort. Most surgeries require, in addition to a surgeon, access to an operating room, an anesthesiologist, nursing staff and sometimes one or more additional doctors to provide assistance. Limits in any of these areas can have an effect on the number of surgeries performed and thus on payment levels. Conversely, investment in these areas, such as opening and staffing additional operating rooms, can increase the number of surgeries.

As noted elsewhere in this report, Ontario made a commitment in the early 2000s to reduce wait times for a range of surgical procedures. Hospitals received funding to increase the number of surgeries performed and thus reduce their waiting lists and patients' wait times. The initial strategy focused on wait times for three types of surgery: cataract removal, hip and knee replacement and cancer surgery. Subsequent funding initiatives have included general and pediatric surgery.

As discussed in the previous chapter in relation to procedural specialists, advances in technology have enabled a widening array of minimally invasive procedures to be performed under imaging guidance or through catheters or fibre-optic endoscopes. Some of these procedures (e.g., laparoscopic cholecystectomy and hysterectomy) continue to be performed by surgeons, but others are performed by medical procedural specialists, which are reviewed elsewhere in this report. Some surgeons have found efficiencies by focusing on a small range of procedures, with staffing and protocols in place that allow the surgeon to maximize the number of procedures that can be performed in a given time period. Two examples of this are cataract surgery and arthroscopic knee surgery.

Note: In compiling this chapter, we combined cardiac, cardiothoracic and thoracic surgeons into one group called 'cardiac and thoracic surgeons' because of the small number in the thoracic surgery group. For the same reason, pediatric general surgeons were included with general surgeons.

FINDINGS FOR INDIVIDUAL SPECIALTIES

Cardiac and Thoracic Surgery (exhibits 7.1 to 7.3)

Cardiac and thoracic (CT) surgery is a relatively small specialty. Although its numbers increased by 50% during the study period, there were fewer than 100 practicing CT surgeons in Ontario in 2009/10. Total payments to this group in 2009/10 amounted to $45 million. The median and mean annual payments to CT surgeons rose steadily through the period, amounting to $500,000 in 2009/10, an increase of about 20% from 2005/06. The median annual payment to CT surgeons was consistently higher than for all physicians combined. In 1992/93, it was about 82% higher; in 2009/10, it was 79% higher. The range of payments was wide, with the top 10% of CT surgeons being paid a minimum of $800,000 compared to the bottom 10% who received $100,000 or less. The size of this difference suggests a wide variation in practice patterns, with those at the low end either working part-time or perhaps devoting more time to teaching or research.

General Surgery (exhibits 7.4 to 7.6)

The supply of active general surgeons fell 12% during the 1990s from 655 in 1992/93 to 575 in 2001/02. Since then it has grown to 699 in 2009/10, an overall increase of only 7% from 1992/93. Total payments to general surgeons in 2009/10 amounted to $264 million. The median and mean annual payments to general surgeons have increased steadily since around 1997/98 and have remained above the levels paid to all physicians. Approximately 10% of general surgeons were paid more than $650,000 in 2009/10 and the lowest 10% were paid $50,000 or less. General surgeons received about 88% of their payments from FFS in 2009/10.

Neurosurgery (exhibits 7.7 to 7.9)

This is a relatively small specialty. The number of neurosurgeons declined from 85 in 1992/93 to 65 in 2003/04 (a 24% decrease) before rebounding to 97 in 2009/10 (an overall increase of 14%). The total of all payments to neurosurgeons in 2009/10 was $41 million. The median payment for this specialty in 1992/93 was higher than that for all physicians. The median payment began to increase in 1997/98 and by 2009/10 had risen 126%. The range of payment was wide with 10% of neurosurgeons being paid more than $800,000 and 10% less than $100,000. Alternate funding in addition to FFS for neurosurgery was introduced in 2002/03 (although data were only available from 2005/06). In 2009/10, only 68% of neurosurgery funding was by FFS; the rest was from alternate funding sources.

Obstetrics and Gynecology (exhibits 7.10 to 7.12)

Obstetricians and gynecologists (OB/GYNs) comprise a large specialty that numbered 790 in 2009/10, an increase of 18% from 1992/03 (667). The total of all payments to this specialty in 2009/10 was $323 million. The median and mean payments to OB/GYNs rose steadily from 1999/00 and remained approximately 50% higher than those for all physicians throughout the period of observation. Ten percent of OB/GYNs were paid more than $670,000 in 2009/10 and 10% were paid less than $100,000. The great majority of payments (89%) were by FFS.

Ophthalmology (exhibits 7.13 to 7.15)

The number of ophthalmologists rose only 8% over the study period, from 408 in 1992/93 to 441 in 2009/10. Total payments to this specialty amounted to $257 million in 2009/10. The median payment rose steadily from just under $300,000 in 1997/98 to $500,000 in 2009/10 and remained well above that of all physicians with the difference increasing over time. However, the mean payment to ophthalmologists rose sharply to around $600,000 in 2009/10, indicating a skewed distribution of values. This is confirmed by the fact that 10% of ophthalmologists were paid more than $1.1 million in 2009/10, whereas the bottom 10% were paid $100,000 or less. The great majority of payments (98%) were by FFS.

Orthopedic Surgery (exhibits 7.16 to 7.18)

The supply of orthopedic surgeons in Ontario increased by 40%, from 374 in 1992/93 to 524 in 2009/10. The total of all payments to this specialty in 2009/10 was $192 million. The median payment to orthopedic surgeons was about $100,000 higher than for all physicians throughout the study period. Payments were fairly flat during the 1990s and rose after 2003/04. The mean and median values were quite similar with a fairly equal distribution of values above and below the median. The top 10% of orthopedic surgeons were paid more than $600,000 in 2009/10 and the bottom 10% received less than $50,000. Approximately 90% of payments were by FFS.

Otolaryngology (exhibits 7.19 to 7.21)

The supply of otolaryngologists changed very little over the study period, rising from 235 in 1992/93 to 248 in 2009/10. All payments to this specialty totalled $97 million in 2009/10. Mean and median annual payments to individuals in this group remained about $100,000 higher than for all physicians, staying fairly flat through the 1990s and rising after 2003/04. The median payment in 2009/10 was around $400,000 with 10% of otolaryngologists being paid more than $600,000 and 10% being paid $100,000 or less. About 90% of payments were by FFS.

Plastic Surgery (exhibits 7.22 to 7.24)

The number of plastic surgeons practicing in Ontario increased by 29% from 1992/93 to 200 in 2009/10, with payments totaling nearly $64 million in that year. Mean and median payments to individuals remained fairly flat and only rose after 2004/05, by about 21%. Median payments to plastic surgeons were about 40% higher than median payments to all physicians in 1992/93, compared with 15% higher in 2009/10. Mean payments followed a similar trend. In 2009/00, 10% of plastic surgeons were paid over $550,000 and 10% were paid less than $100,000. Eighty-six percent of payments were from FFS and 14% from alternate payment sources.

Urology (exhibits 7.25 to 7.27)

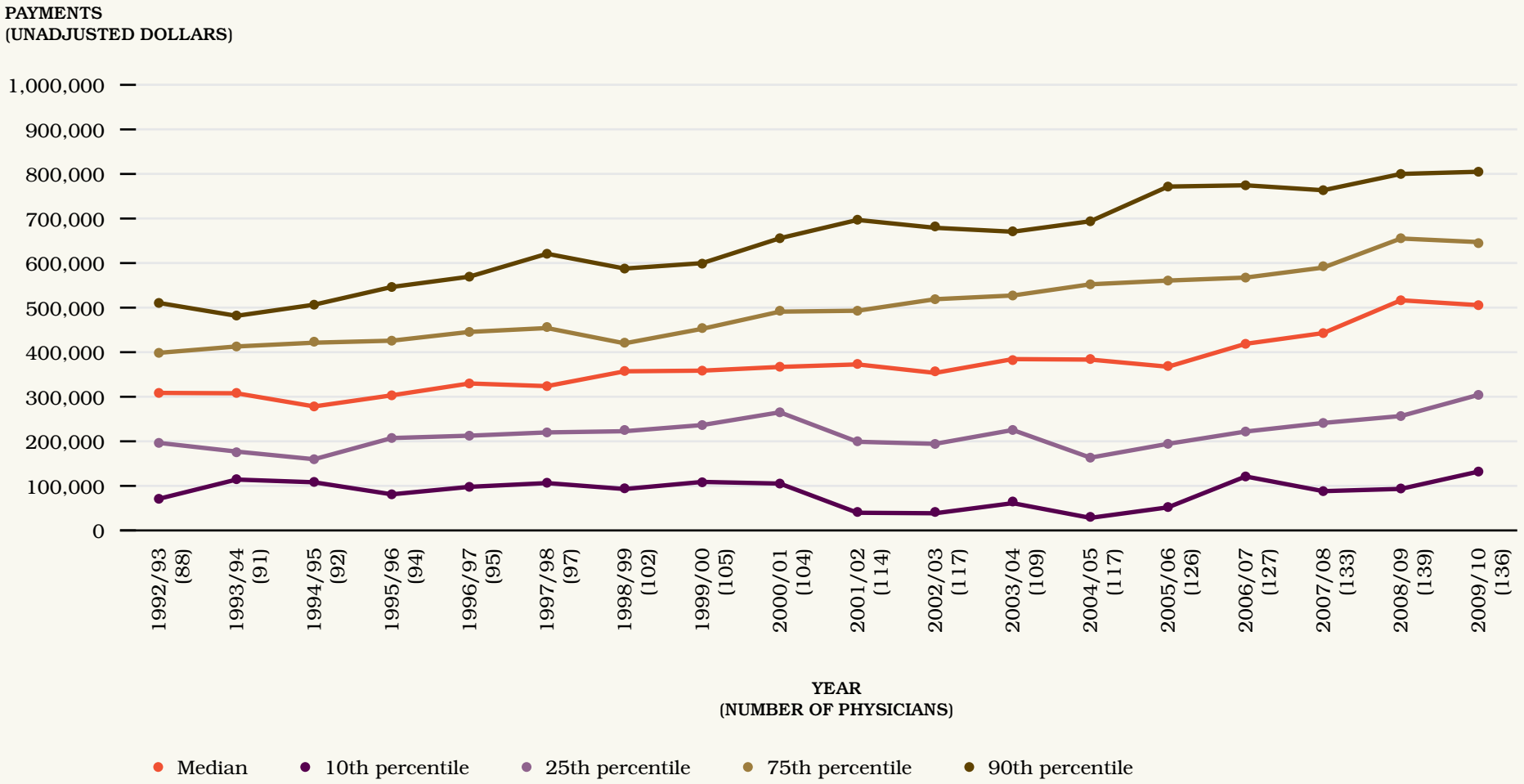
The number of practicing urologists increased by 31%, from 205 in 1992/93 to 268 in 2009/10. The total of all payments in 2009/10 was $106 million. Median and mean annual payments to individual urologists were similar and rose from about $300,000 in 1999/00 to around $400,000 in 2009/10. The mean payment for urologists was around $100,000, more than the average for all physicians during much of the period of observation. Ten percent of urologists were paid $665,000 or more in 2009/10, and 10% received less than $100,000. Ninety percent of payments were by FFS.

Vascular Surgery (exhibits 7.28 to 7.30)

This is a small specialty with 50 surgeons practicing in 1992/93 and 72 in 2009/10. Payments totalled $38 million in the latter year. The median payment to vascular surgeons was 75% higher than the median payment for all physicians, increasing by 22% between 2005/06 and 2009/10. Exhibit 7.28 does not include the 10th and 90th percentiles because they would be based on payments to a small number of physicians and therefore would be very unstable (e.g., the top and bottom 10% each included only five physicians in 1992/93 and only seven in 2009/10). Seventy-nine percent of payments reported for this specialty were from FFS and 21% from alternate payment sources.

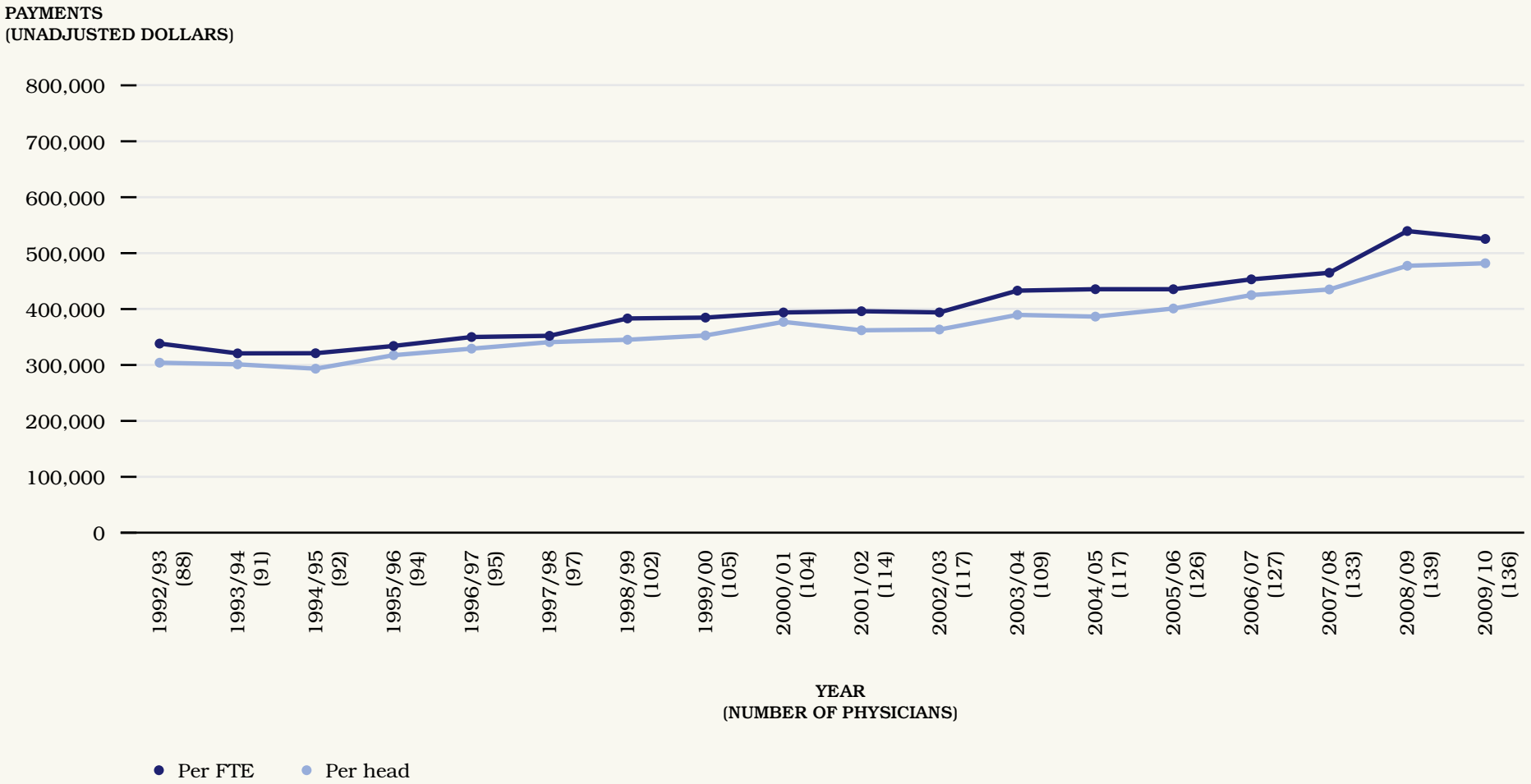
CARDIAC AND THORACIC SURGEONS

EXHIBIT 7.1 Median and percentiles of payments (in unadjusted dollars) to individual cardiac and thoracic surgeons, in Ontario, 1992/93 to 2009/10



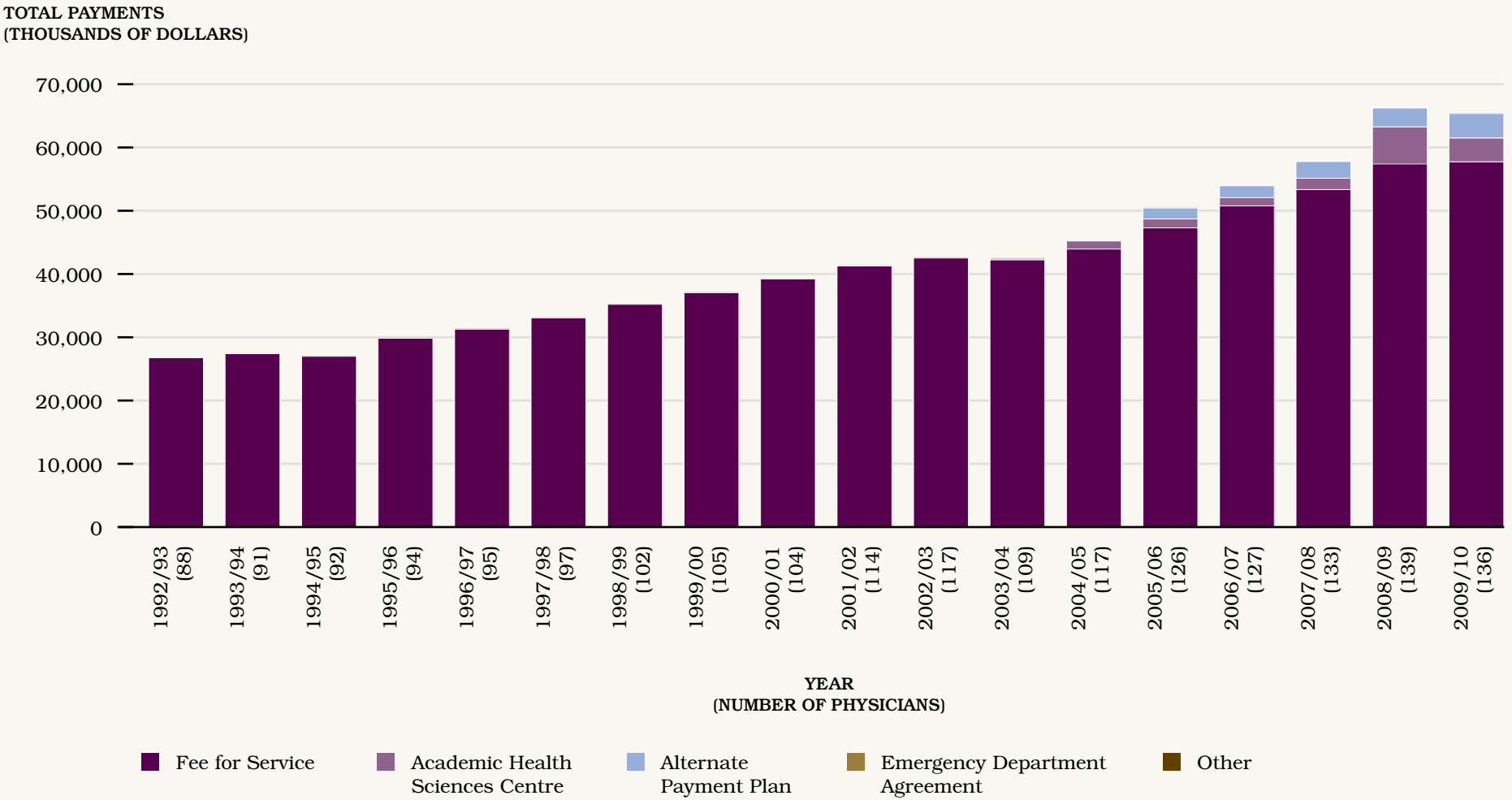
CARDIAC AND THORACIC SURGEONS

EXHIBIT 7.2 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to cardiac and thoracic surgeons, in Ontario, 1992/93 to 2009/10



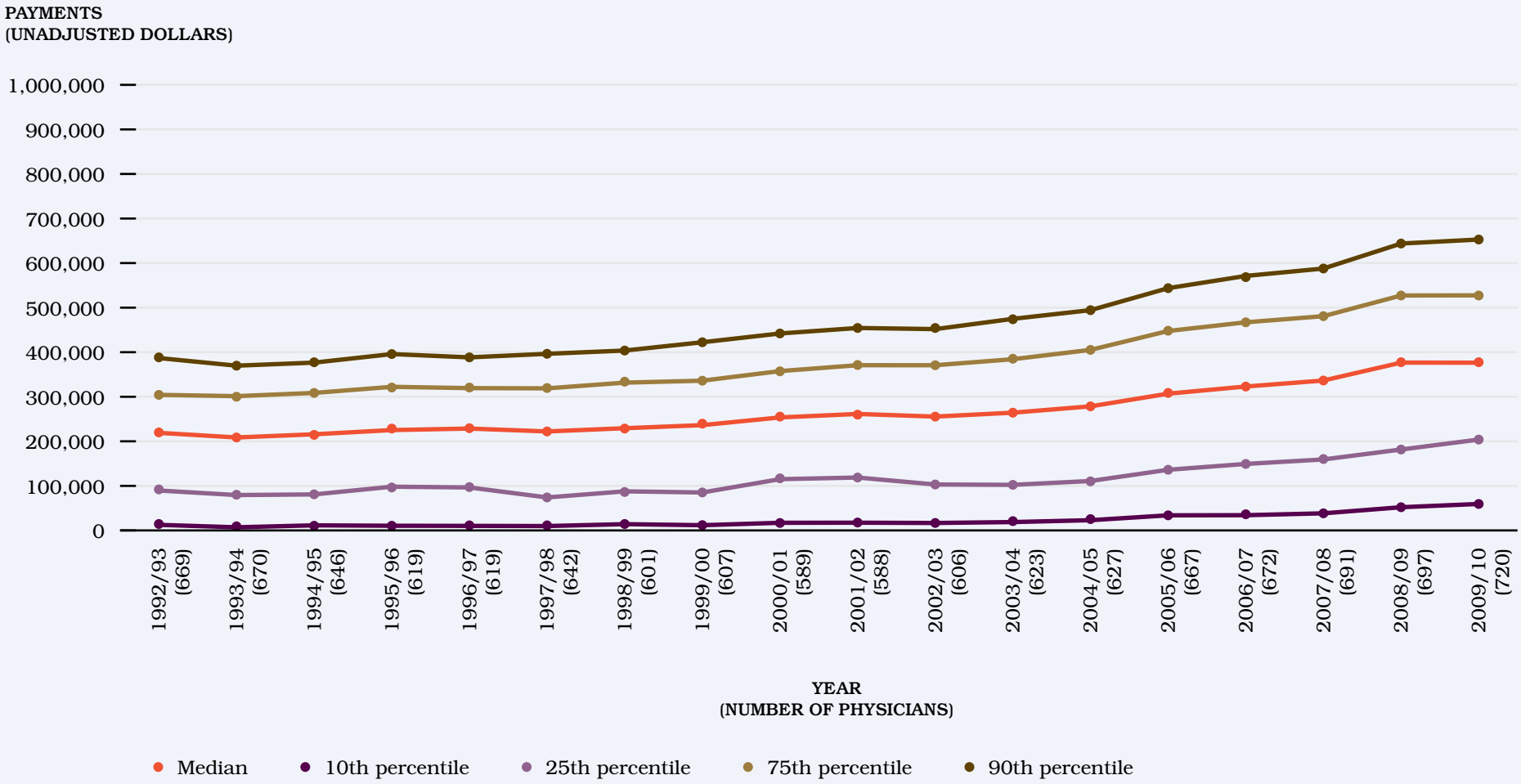
CARDIAC AND THORACIC SURGEONS

EXHIBIT 7.3 Total payments to cardiac and thoracic surgeons by payment source, in Ontario, 1992/93 to 2009/10



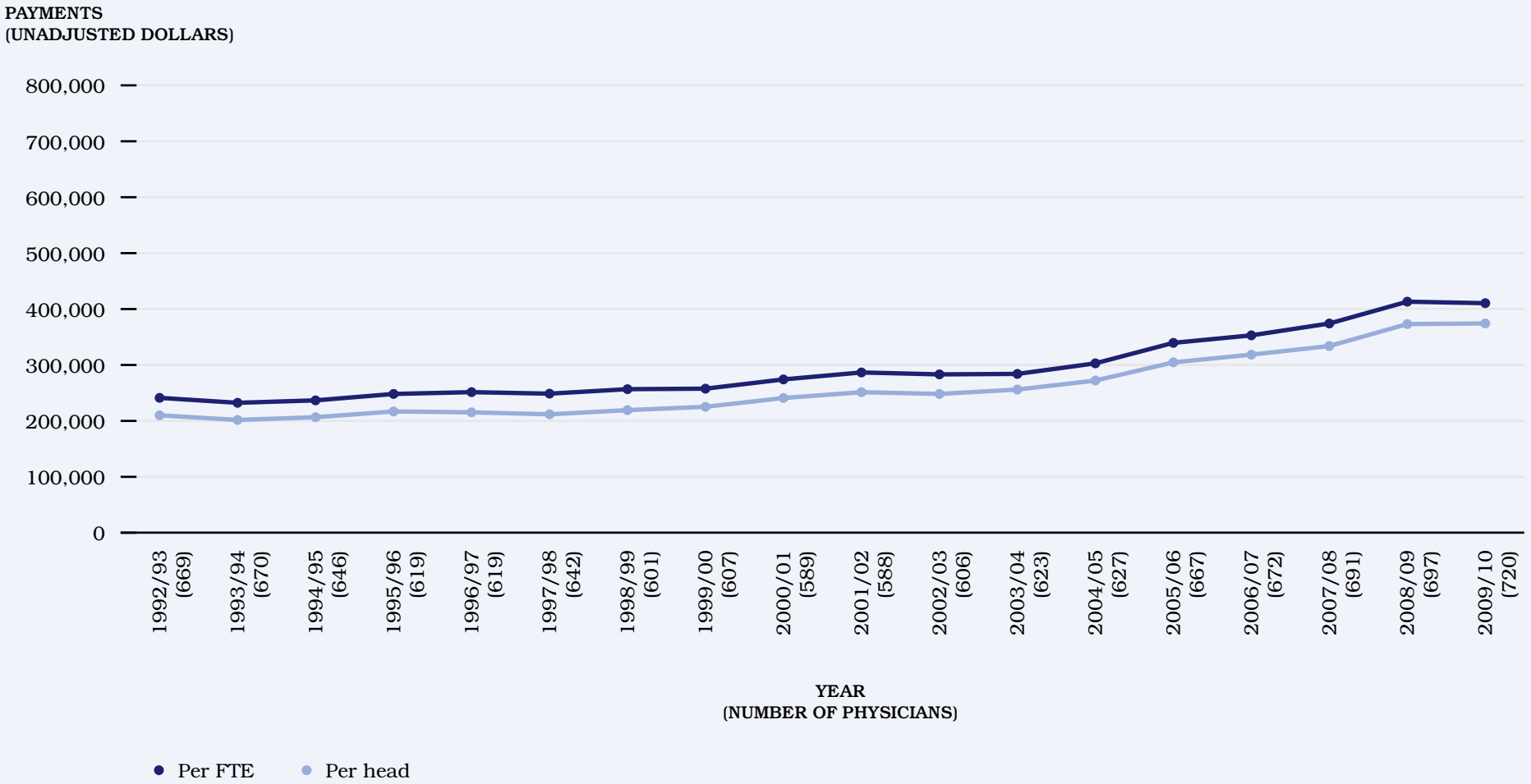
GENERAL SURGEONS

EXHIBIT 7.4 Median and percentiles of payments (in unadjusted dollars) to individual general surgeons, in Ontario, 1992/93 to 2009/10



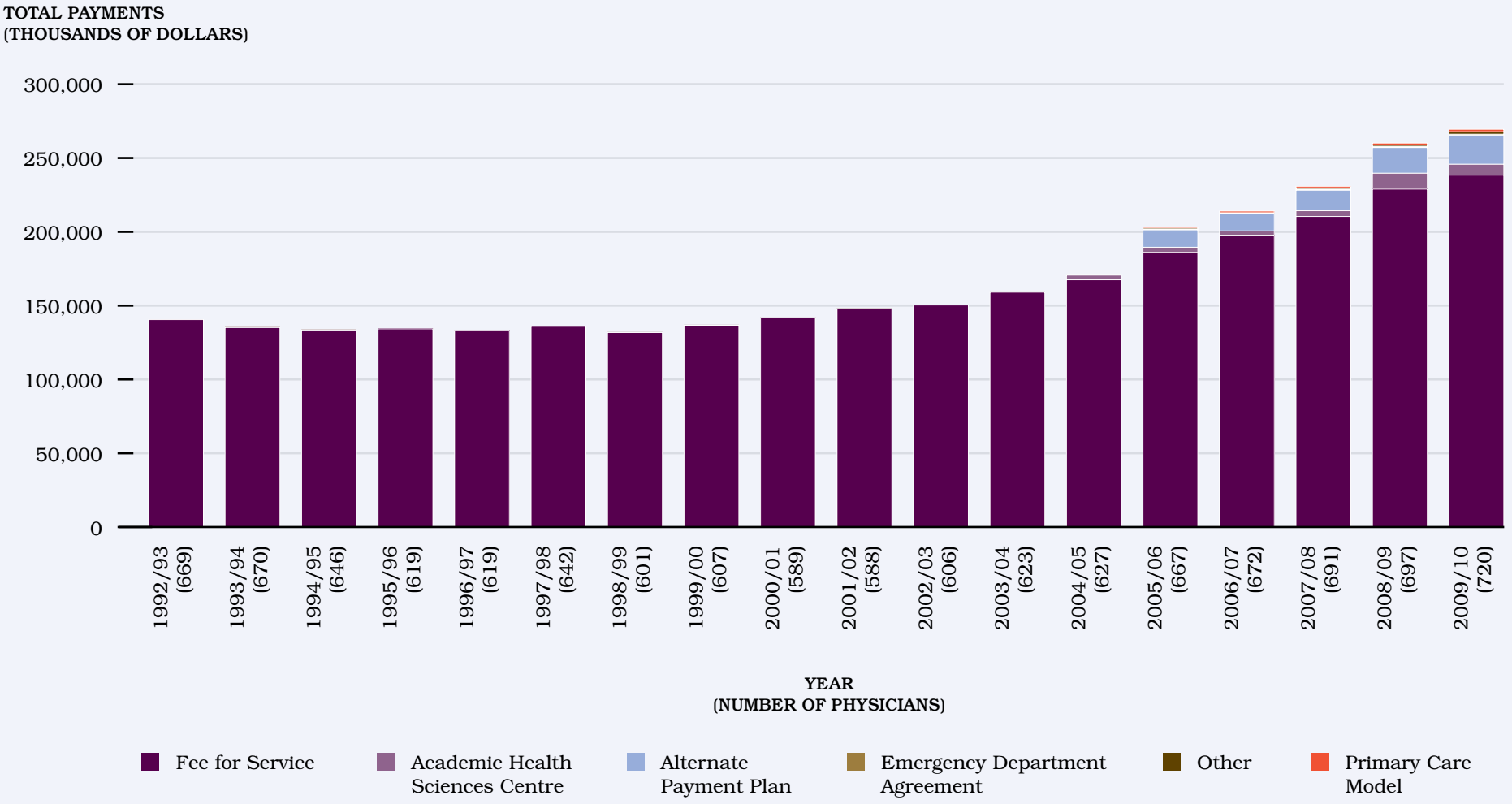
GENERAL SURGEONS

EXHIBIT 7.5 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE), to general surgeons, in Ontario, 1992/93 to 2009/10



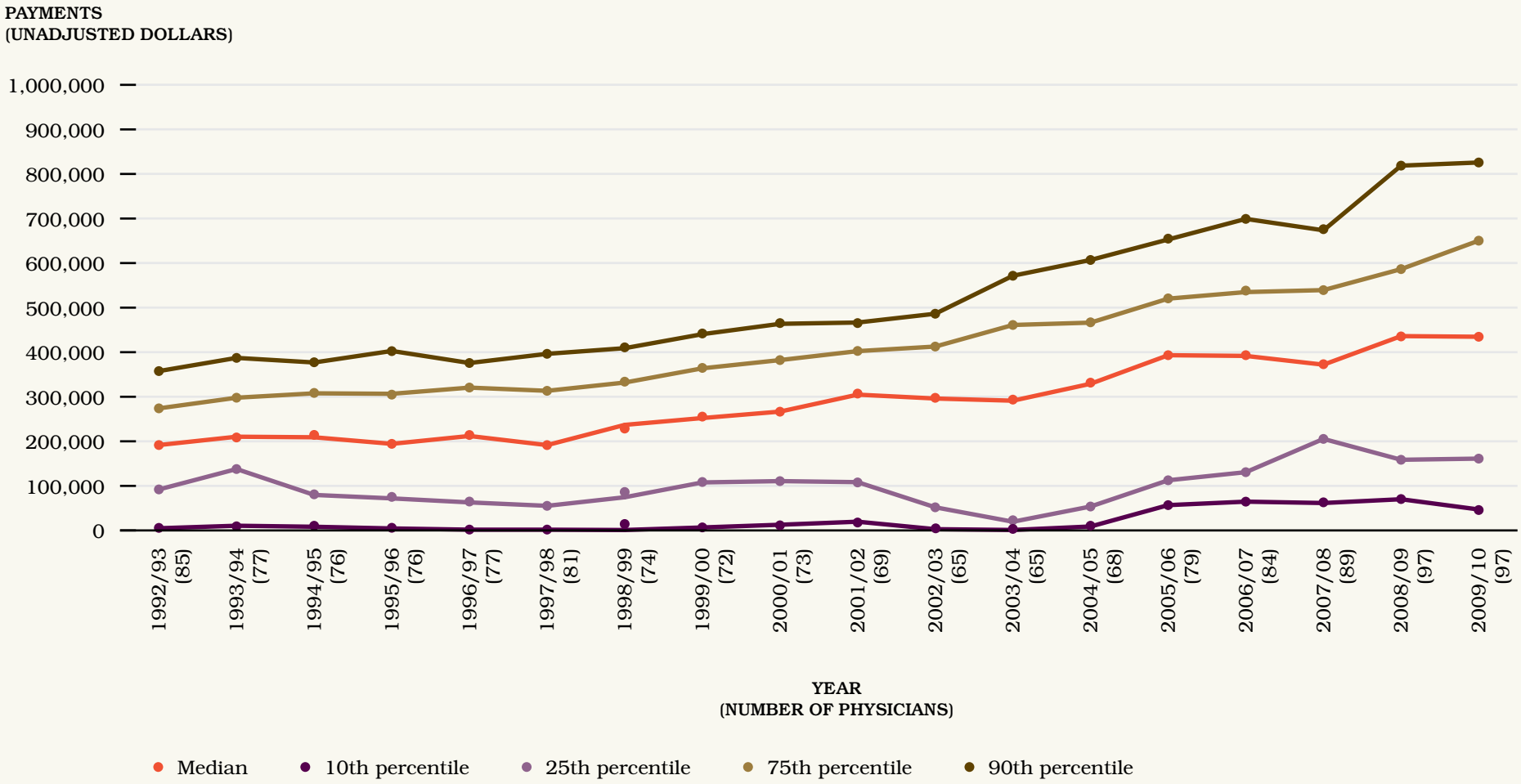
GENERAL SURGEONS

EXHIBIT 7.6 Total payments to general surgeons by payment source, in Ontario, 1992/93 to 2009/10



NEUROSURGEONS

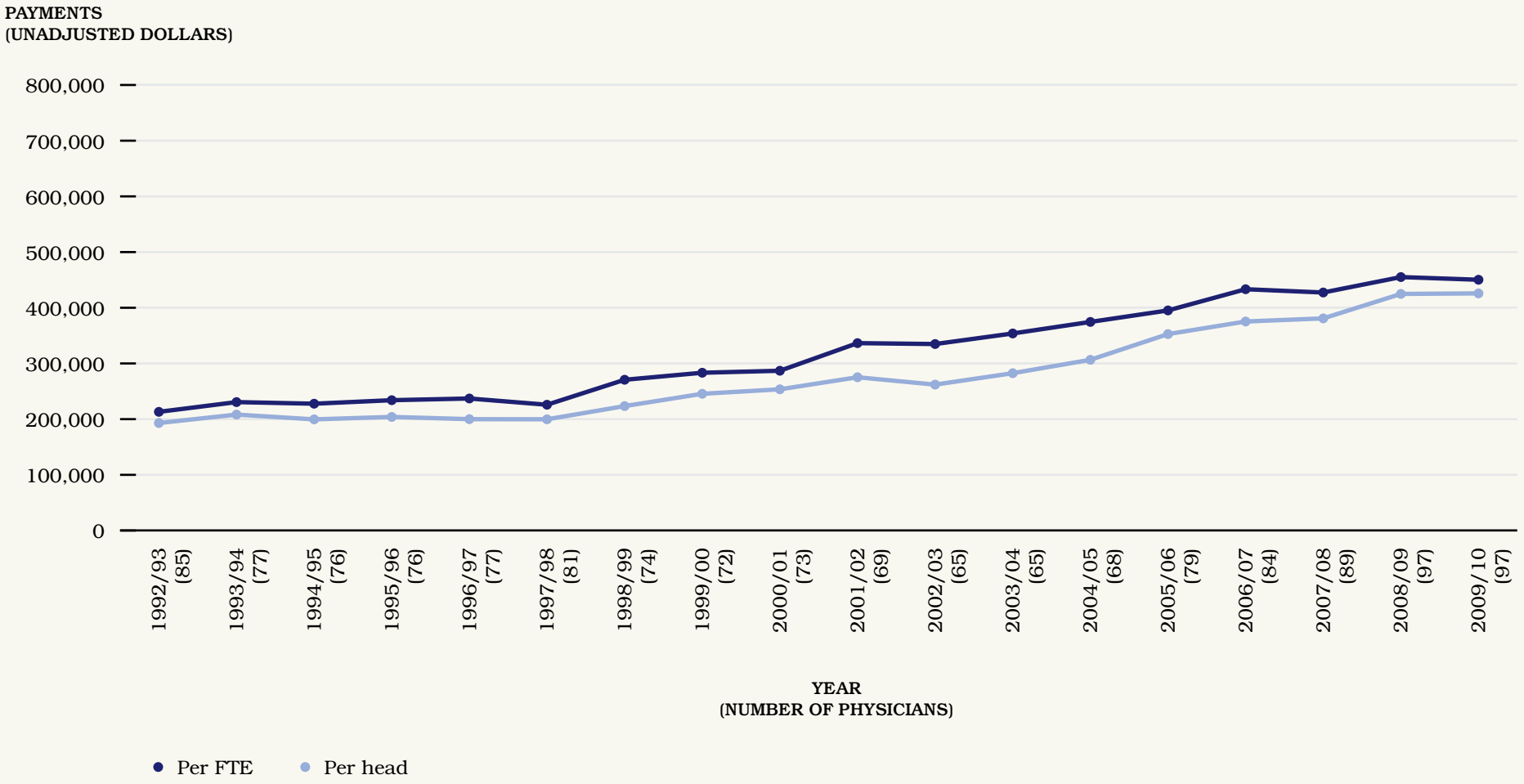
EXHIBIT 7.7 Median and percentiles of payments (in unadjusted dollars) to individual neurosurgeons, in Ontario, 1992/93 to 2009/10



Note: Data from 2002/03 to 2004/05 should be treated with caution due to missing APP payment information.

NEUROSURGEONS

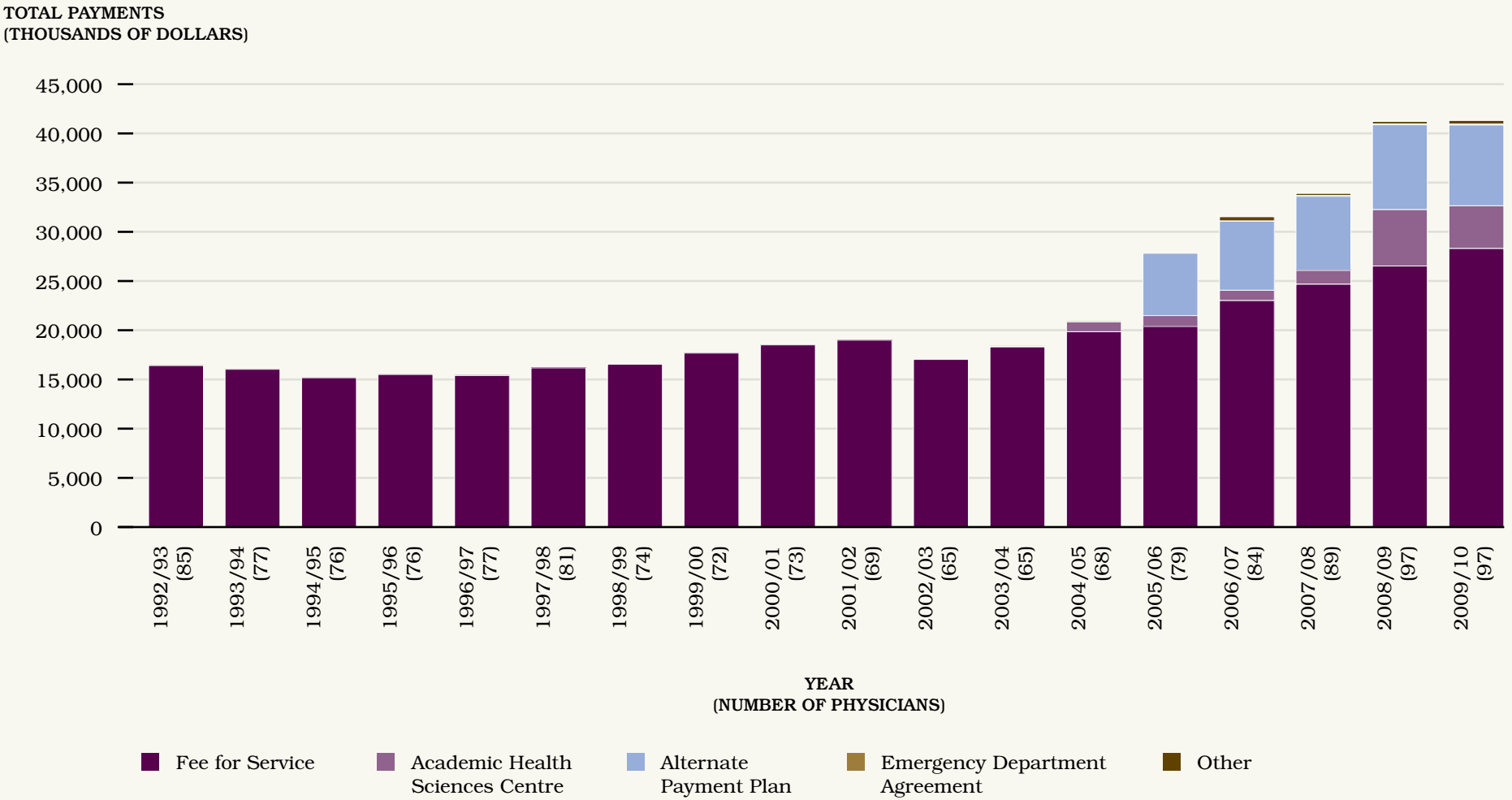
EXHIBIT 7.8 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to neurosurgeons, in Ontario, 1992/93 to 2009/10



Note: Data from 2002/03 to 2004/05 should be treated with caution due to missing APP payment information.

NEUROSURGEONS

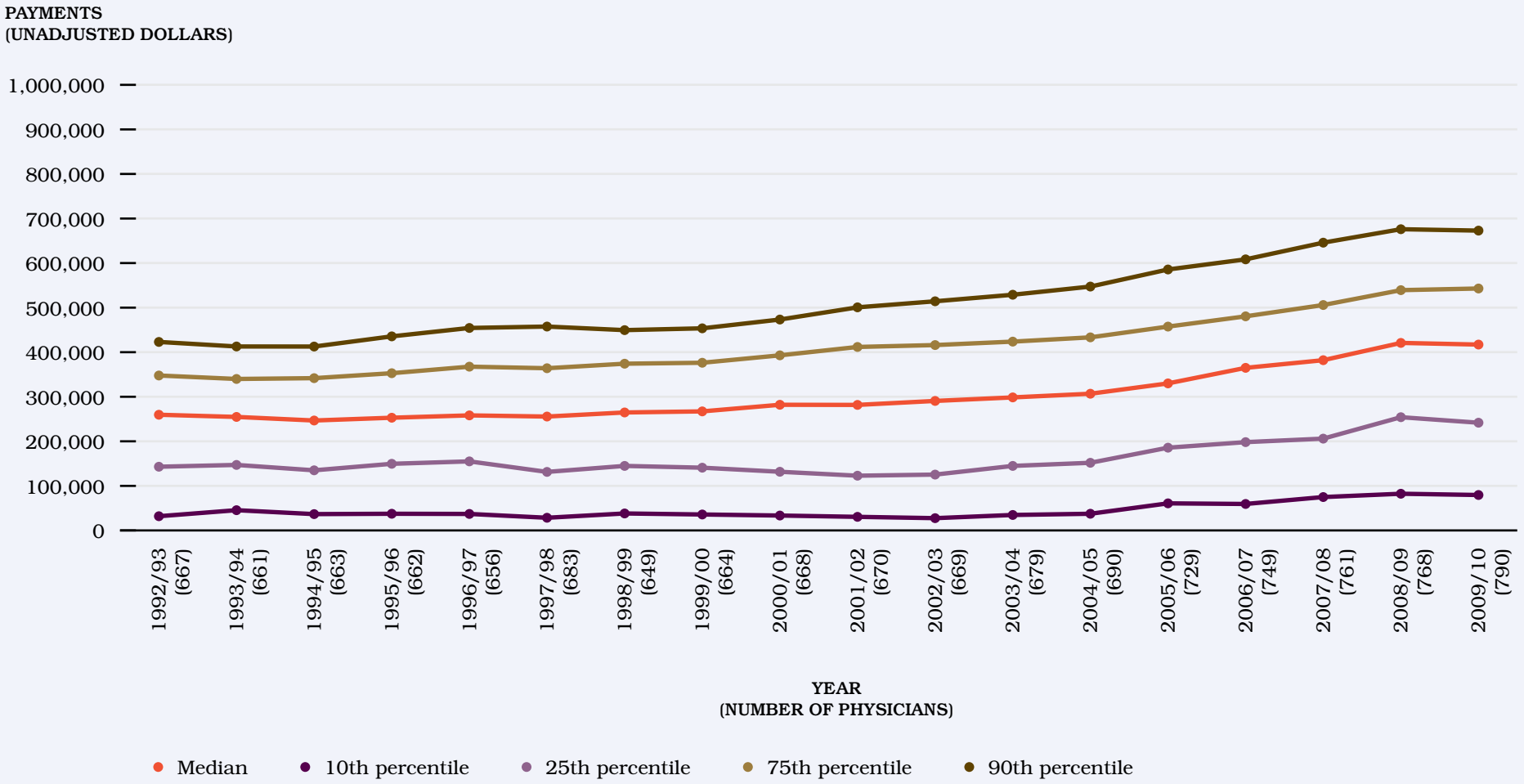
EXHIBIT 7.9 Total payments to neurosurgeons by payment source, in Ontario, 1992/93 to 2009/10



Note: Data from 2002/03 to 2004/05 should be treated with caution due to missing APP payment information.

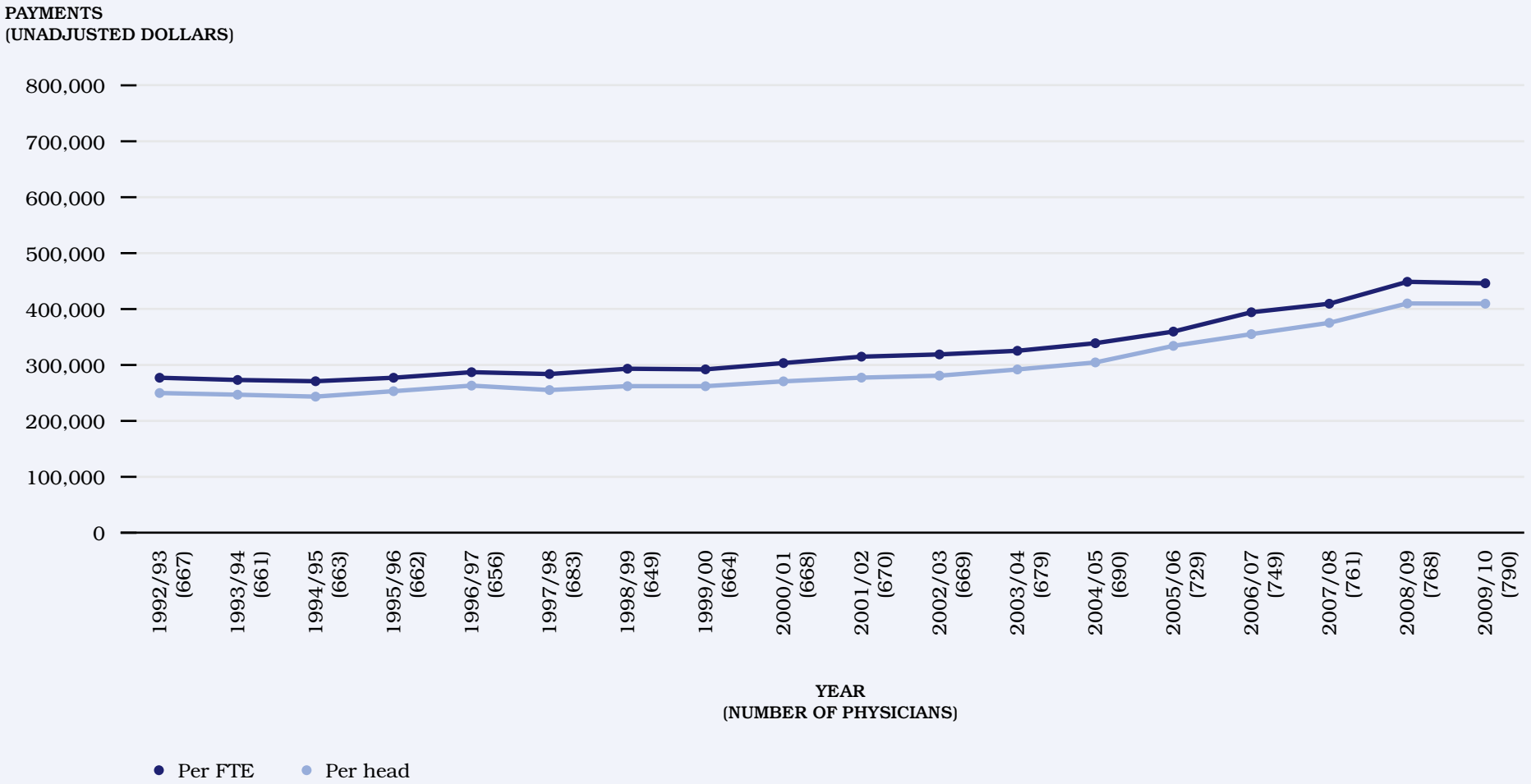
OBSTETRICIANS AND GYNECOLOGISTS

EXHIBIT 7.10 Median and percentiles of payments (in unadjusted dollars) to individual obstetricians and gynecologists, in Ontario, 1992/93 to 2009/10



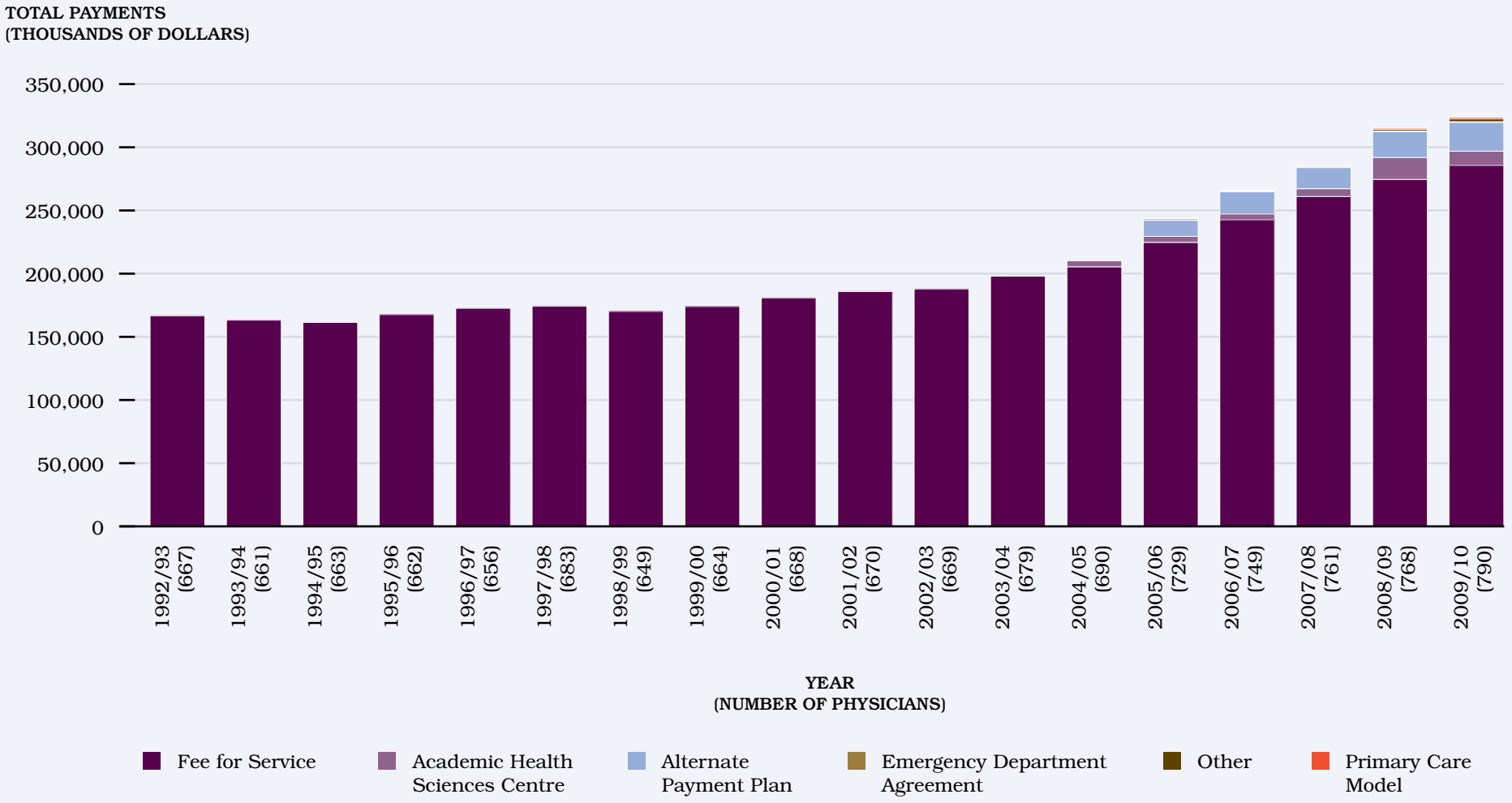
OBSTETRICIANS AND GYNECOLOGISTS

EXHIBIT 7.11 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to obstetricians and gynecologists, in Ontario, 1992/93 to 2009/10



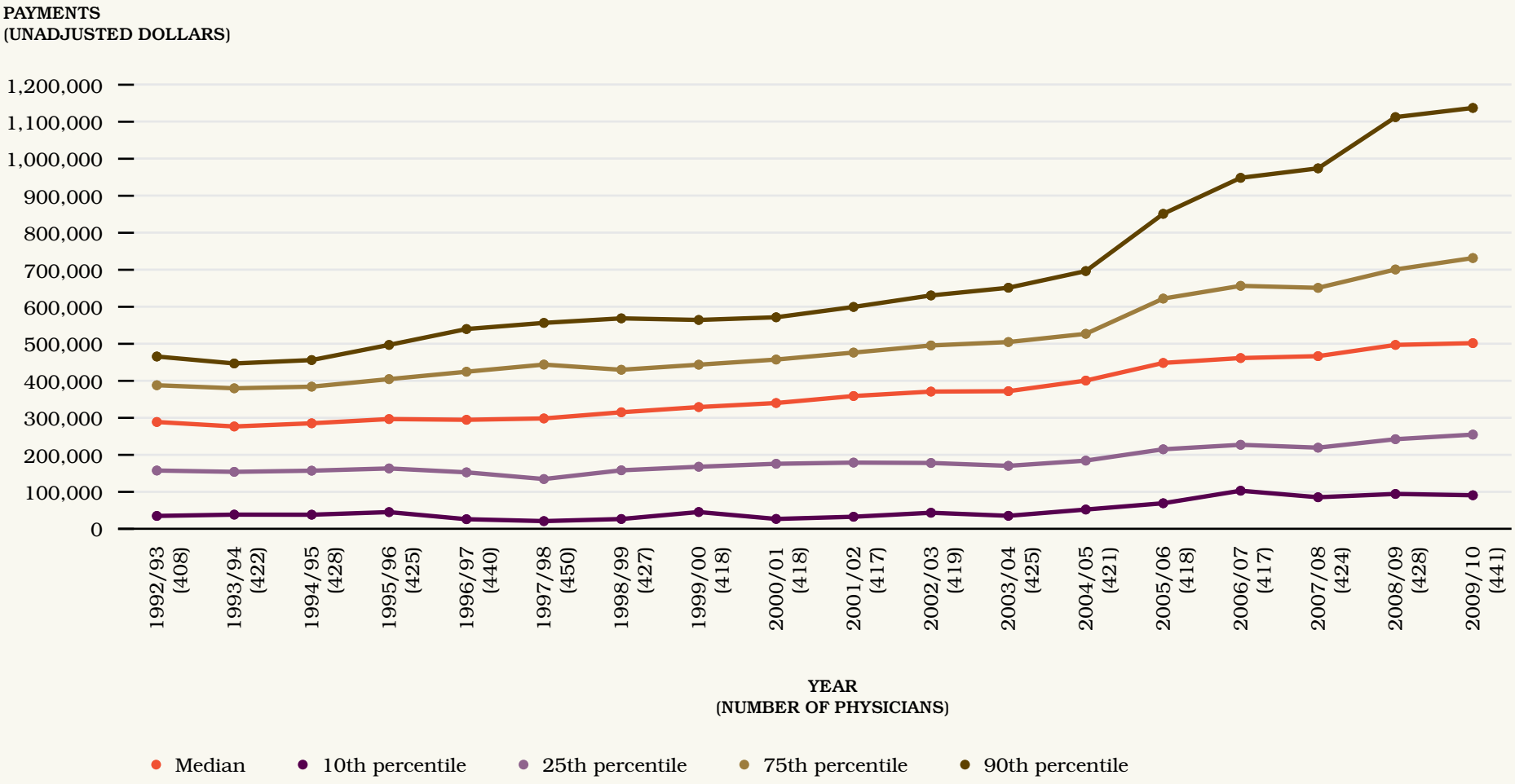
OBSTETRICIANS AND GYNECOLOGISTS

EXHIBIT 7.12 Total payments to obstetricians and gynecologists by payment source, in Ontario, 1992/93 to 2009/10



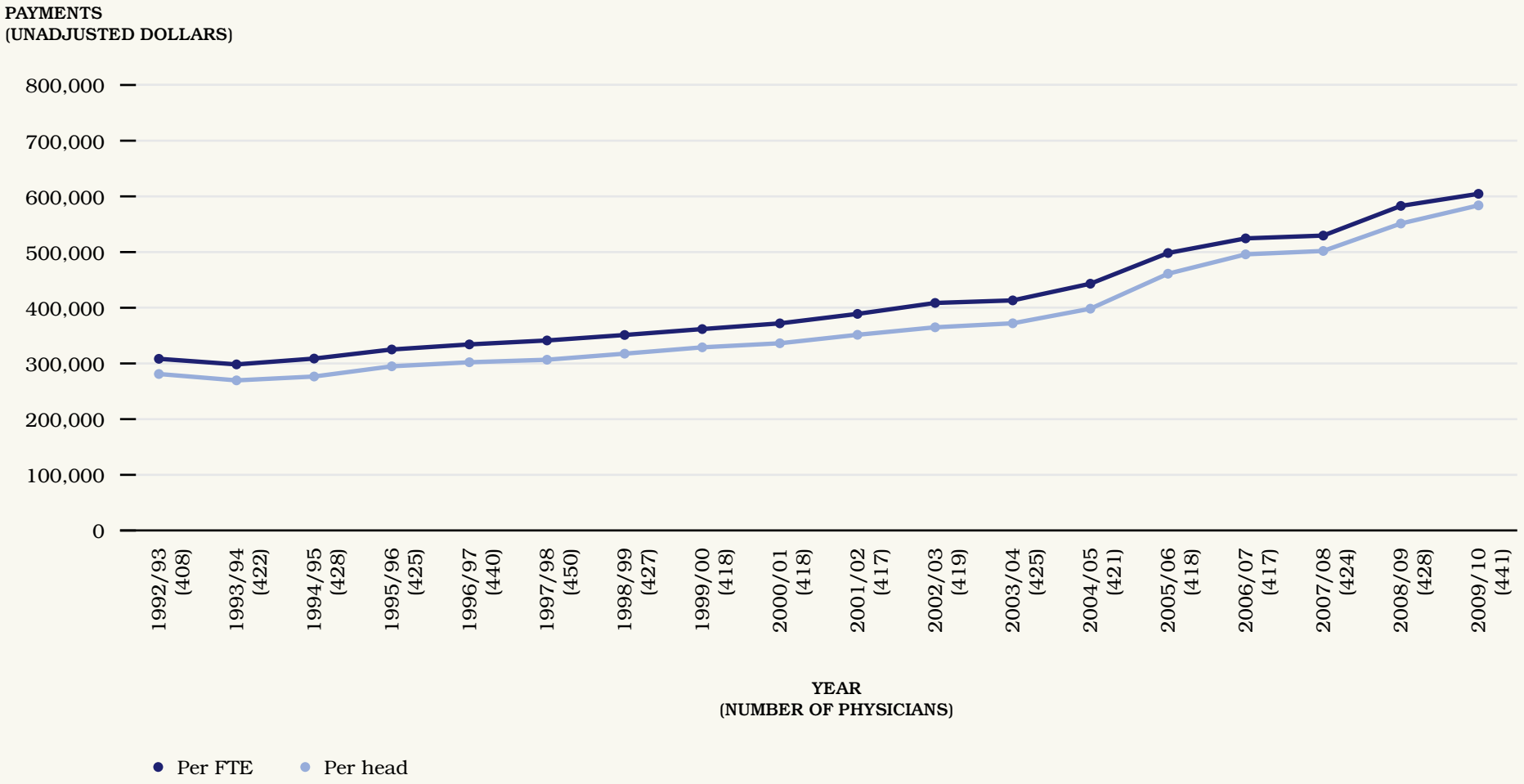
OPHTHALMOLOGISTS

EXHIBIT 7.13 Median and percentiles of payments (in unadjusted dollars) to individual ophthalmologists, in Ontario, 1992/93 to 2009/10



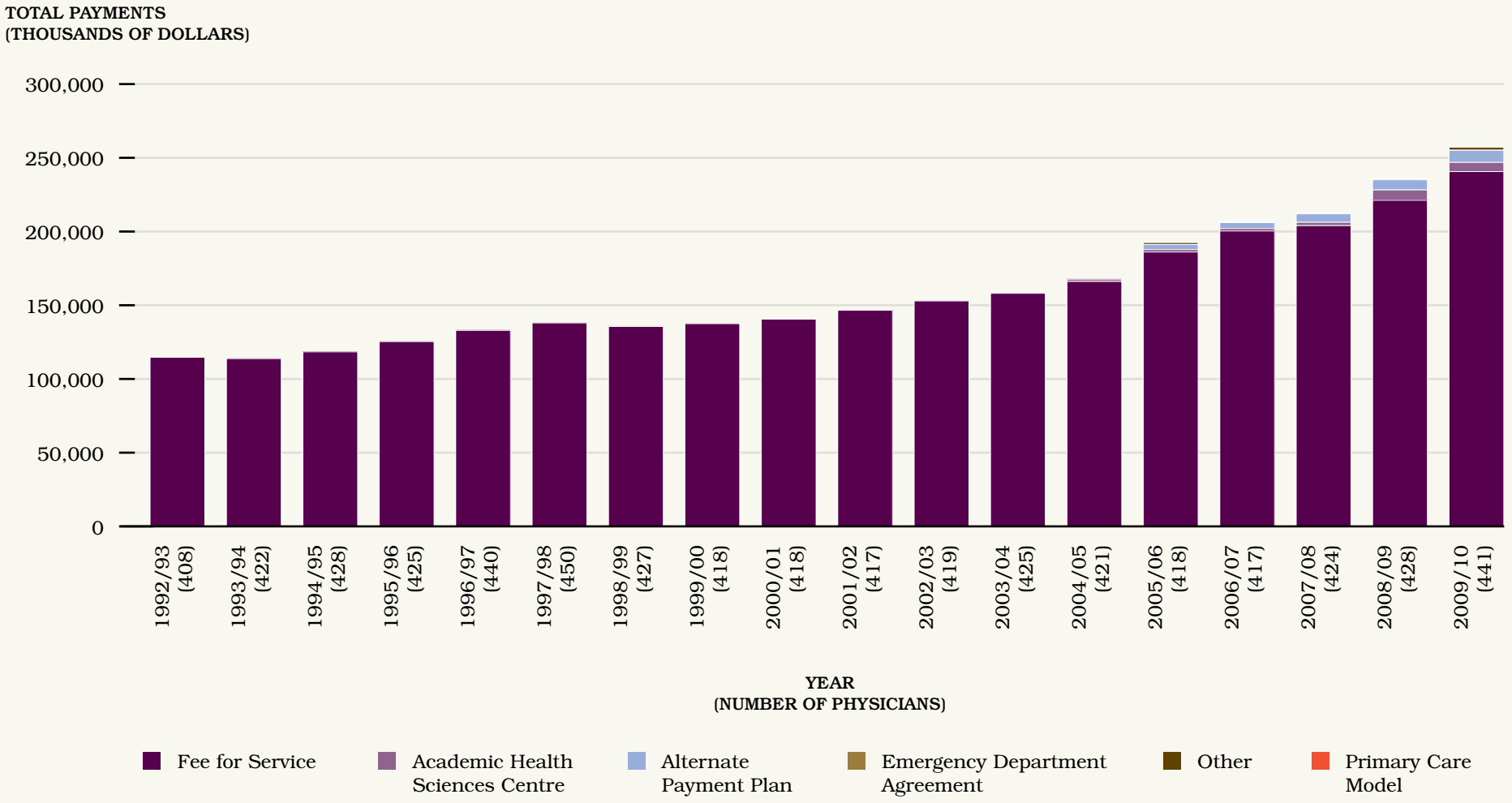
OPHTHALMOLOGISTS

EXHIBIT 7.14 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to ophthalmologists, in Ontario, 1992/93 to 2009/10



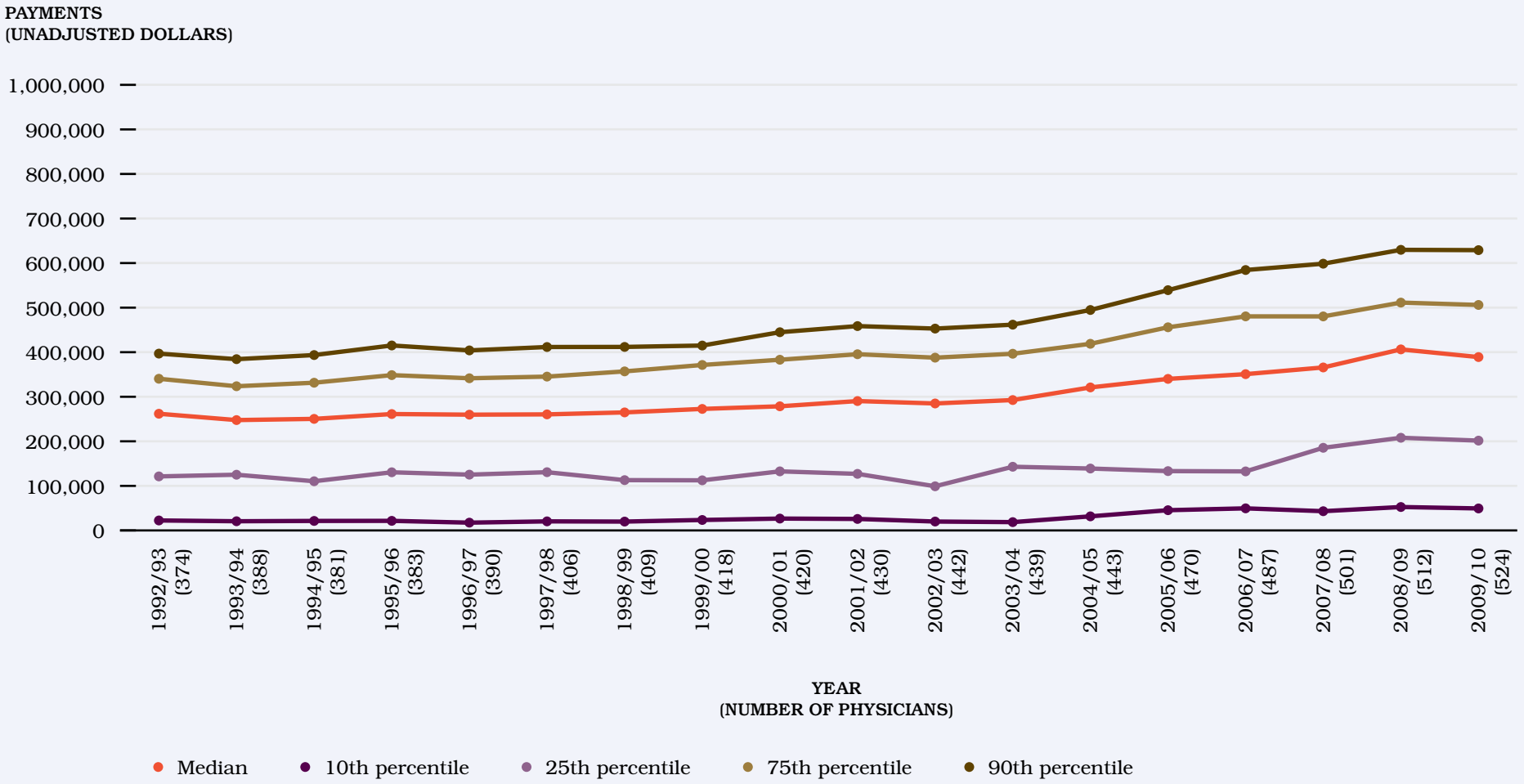
OPHTHALMOLOGISTS

EXHIBIT 7.15 Total payments to ophthalmologists by payment source, in Ontario, 1992/93 to 2009/10



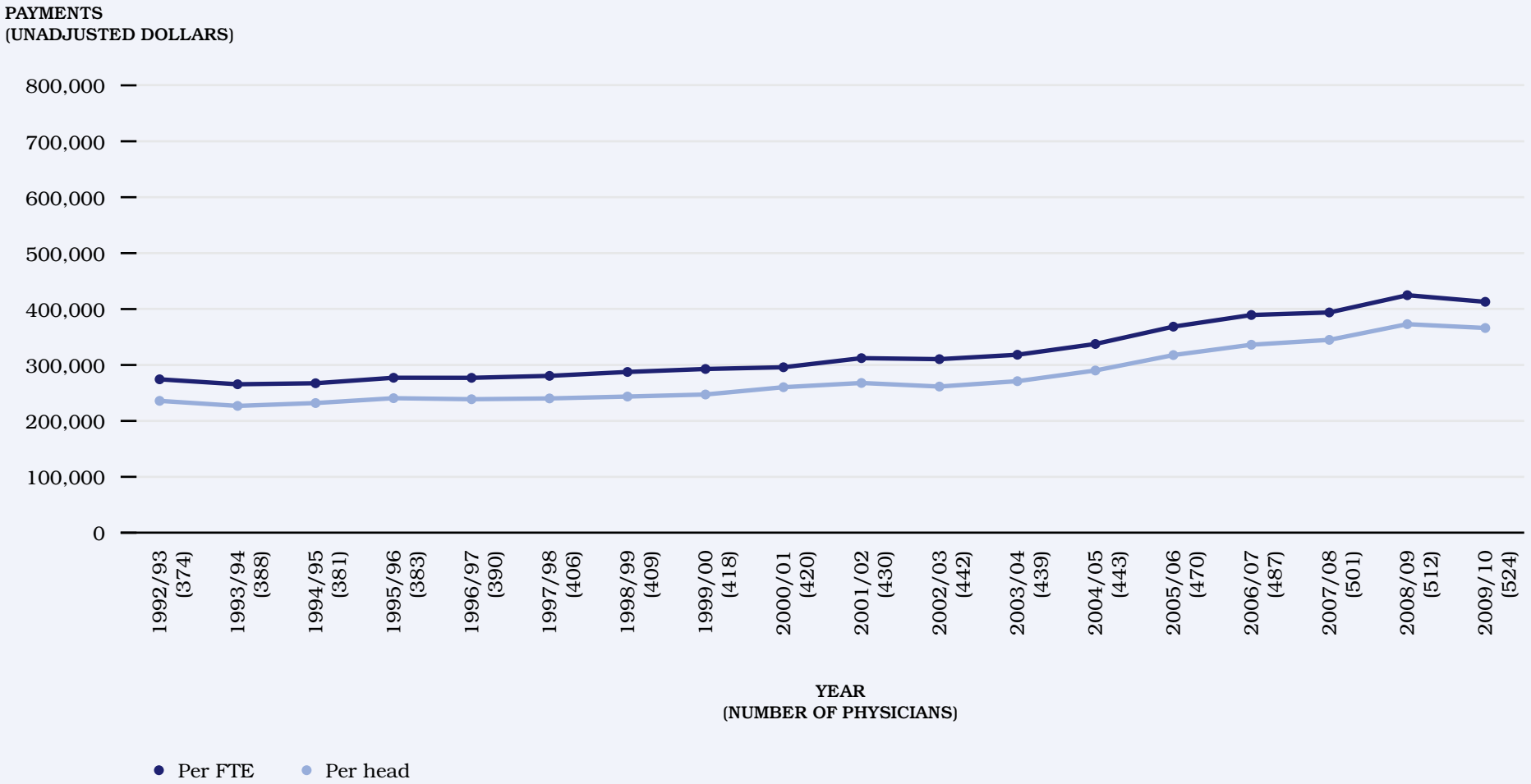
ORTHOPEDIC SURGEONS

EXHIBIT 7.16 Median and percentiles of payments (in unadjusted dollars) to individual orthopedic surgeons, in Ontario, 1992/93 to 2009/10



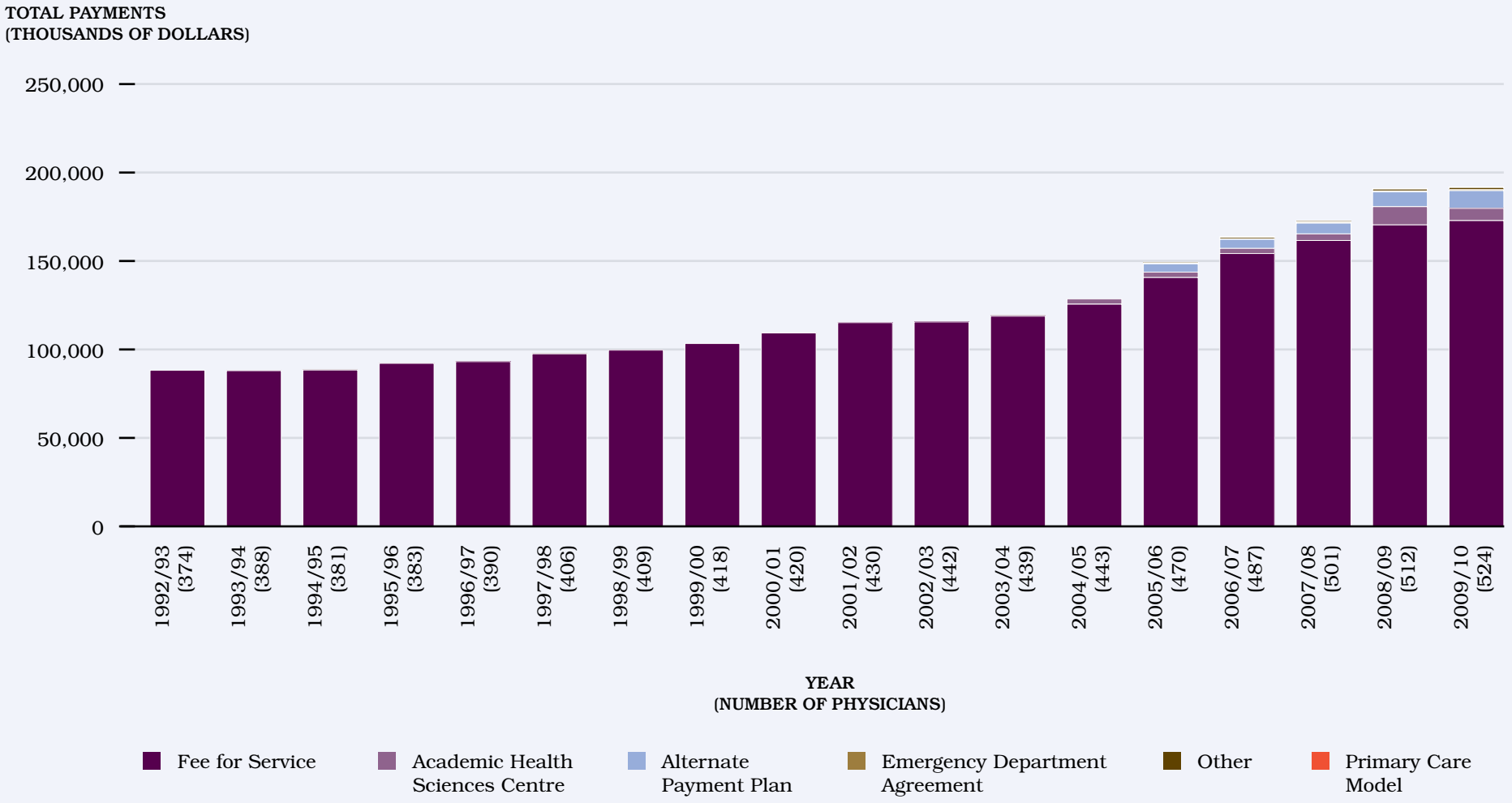
ORTHOPEDIC SURGEONS

EXHIBIT 7.17 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to orthopedic surgeons, in Ontario, 1992/93 to 2009/10



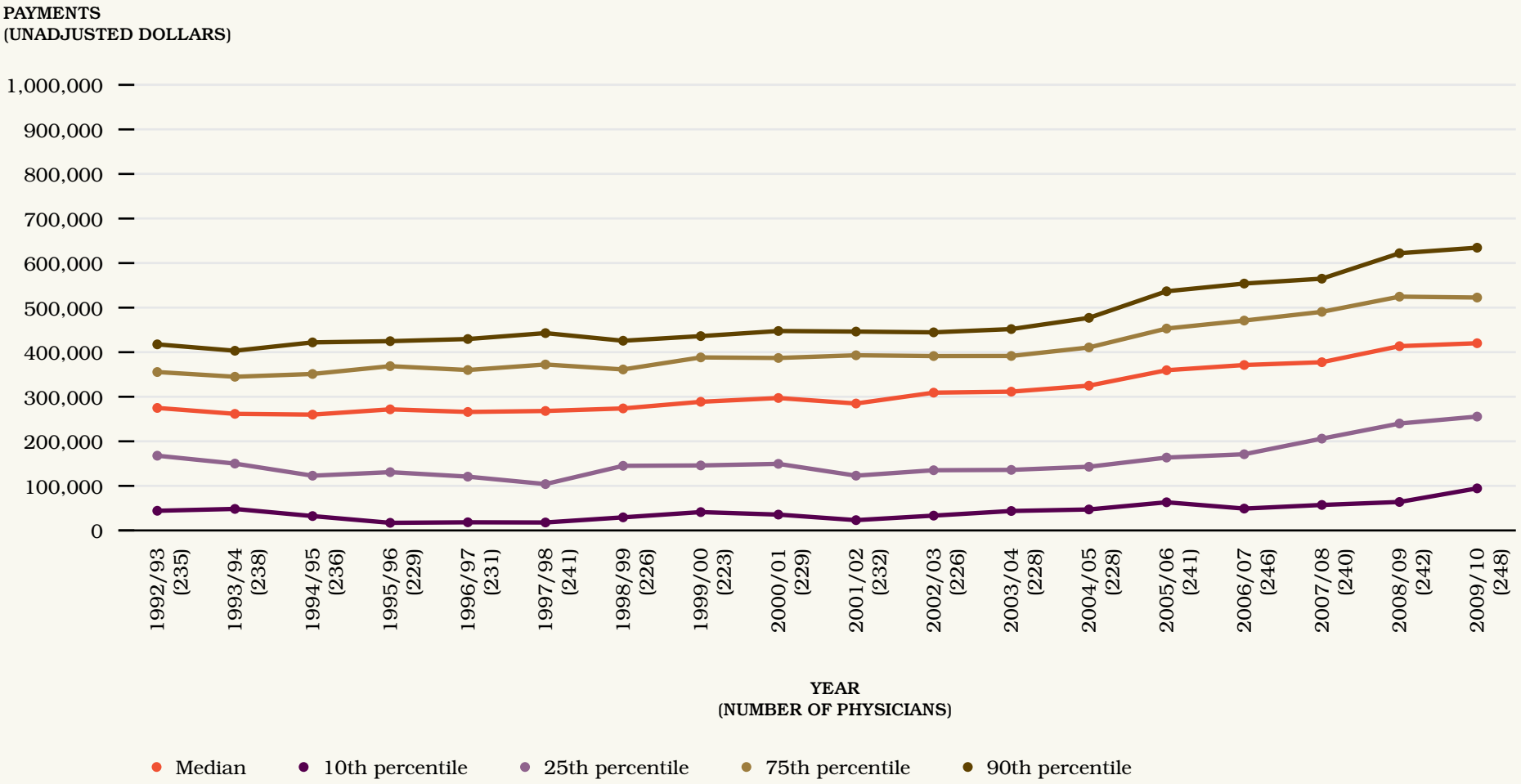
ORTHOPEDIC SURGEONS

EXHIBIT 7.18 Total payments to orthopedic surgeons by payment source, in Ontario, 1992/93 to 2009/10



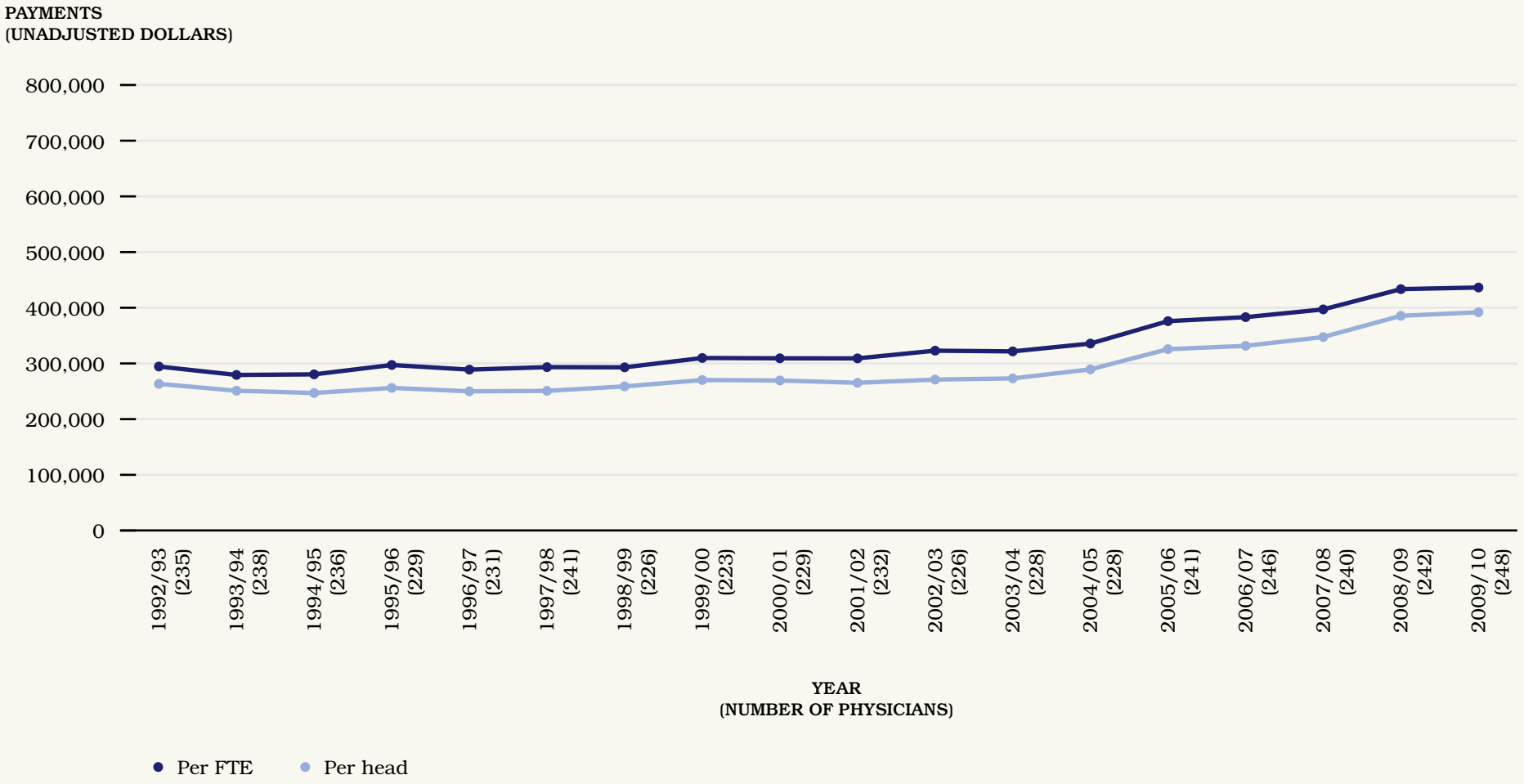
OTOLARYNGOLOGISTS

EXHIBIT 7.19 Median and percentiles of payments (in unadjusted dollars) to individual otolaryngologists, in Ontario, 1992/93 to 2009/10



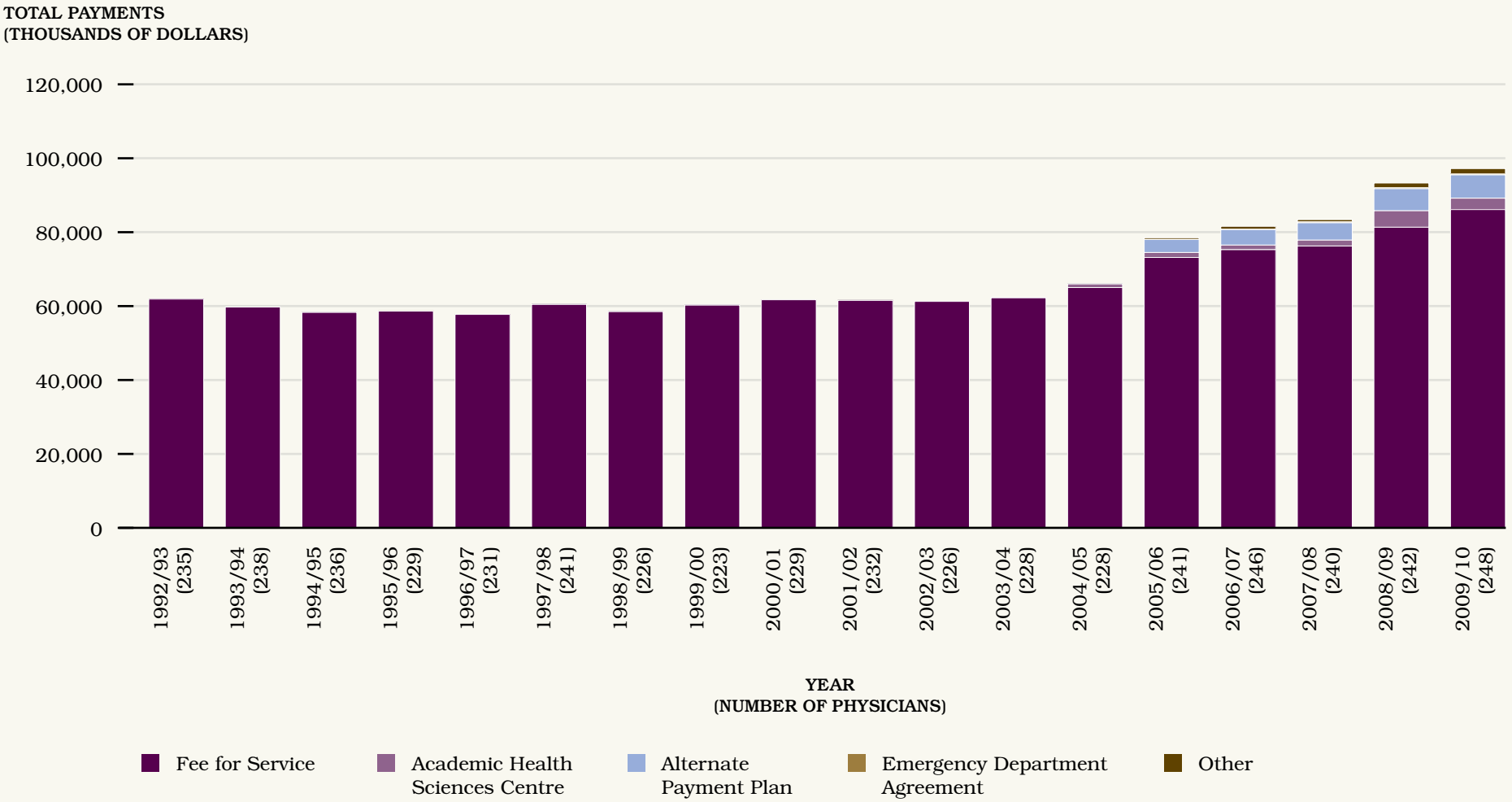
OTOLARYNGOLOGISTS

EXHIBIT 7.20 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to otolaryngologists, in Ontario, 1992/93 to 2009/10



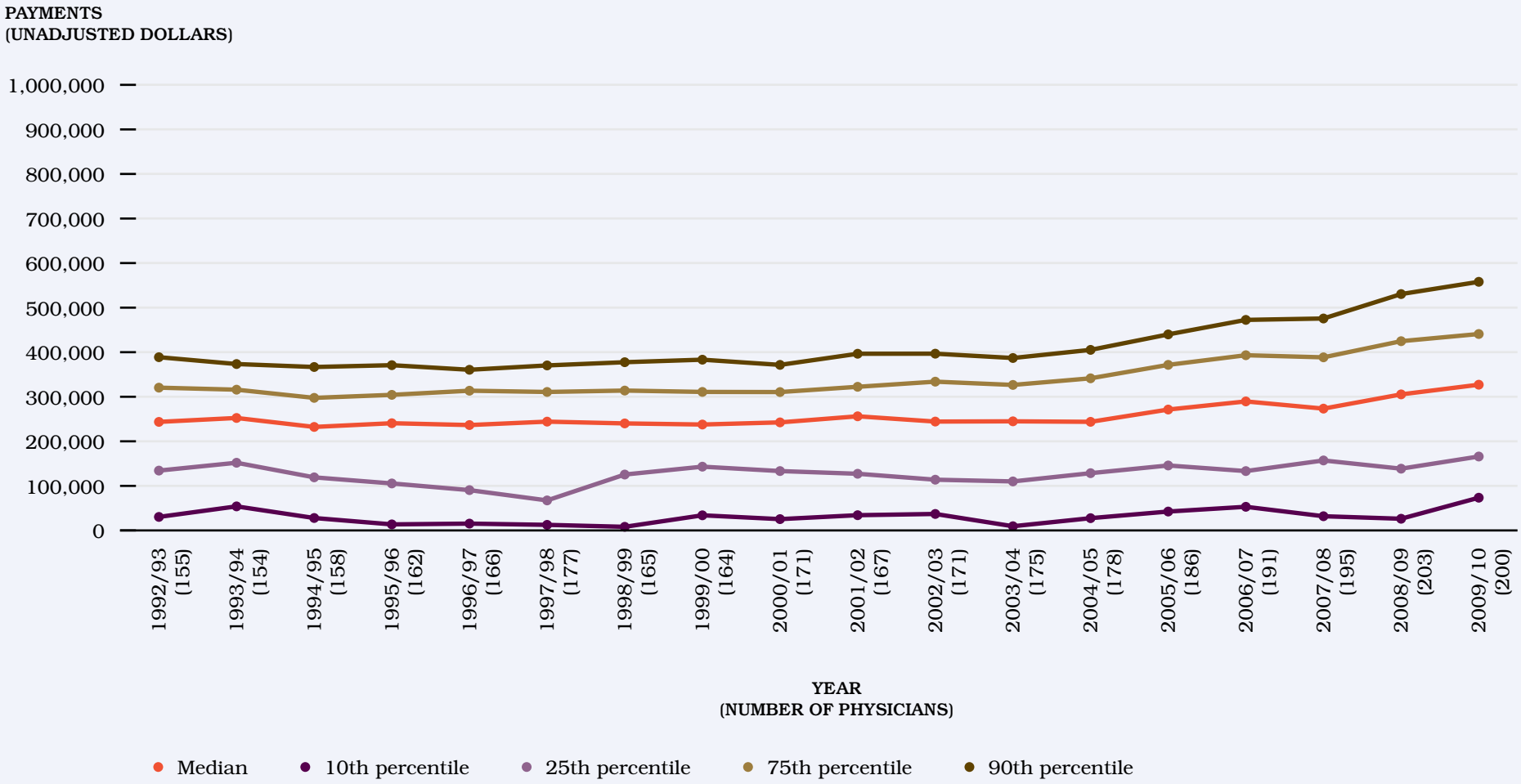
OTOLARYNGOLOGISTS

EXHIBIT 7.21 Total payments to otolaryngologists by payment source, in Ontario, 1992/93 to 2009/10



PLASTIC SURGEONS

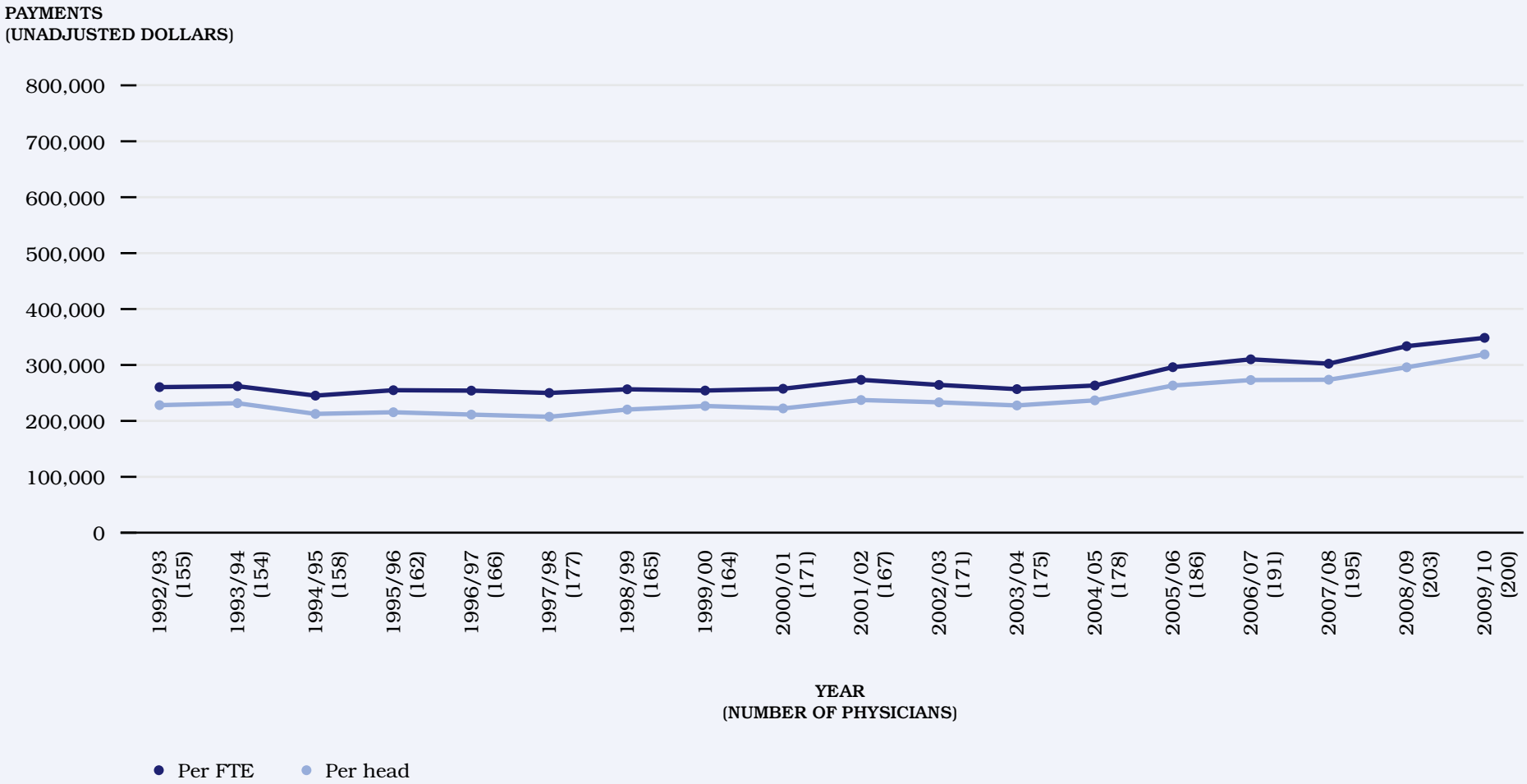
EXHIBIT 7.22 Median and percentiles of payments (in unadjusted dollars) to individual plastic surgeons, in Ontario, 1992/93 to 2009/10



Note: Data include payments for OHIP-insured services only and do not reflect payments for cosmetic surgery or other non-insured services.

PLASTIC SURGEONS

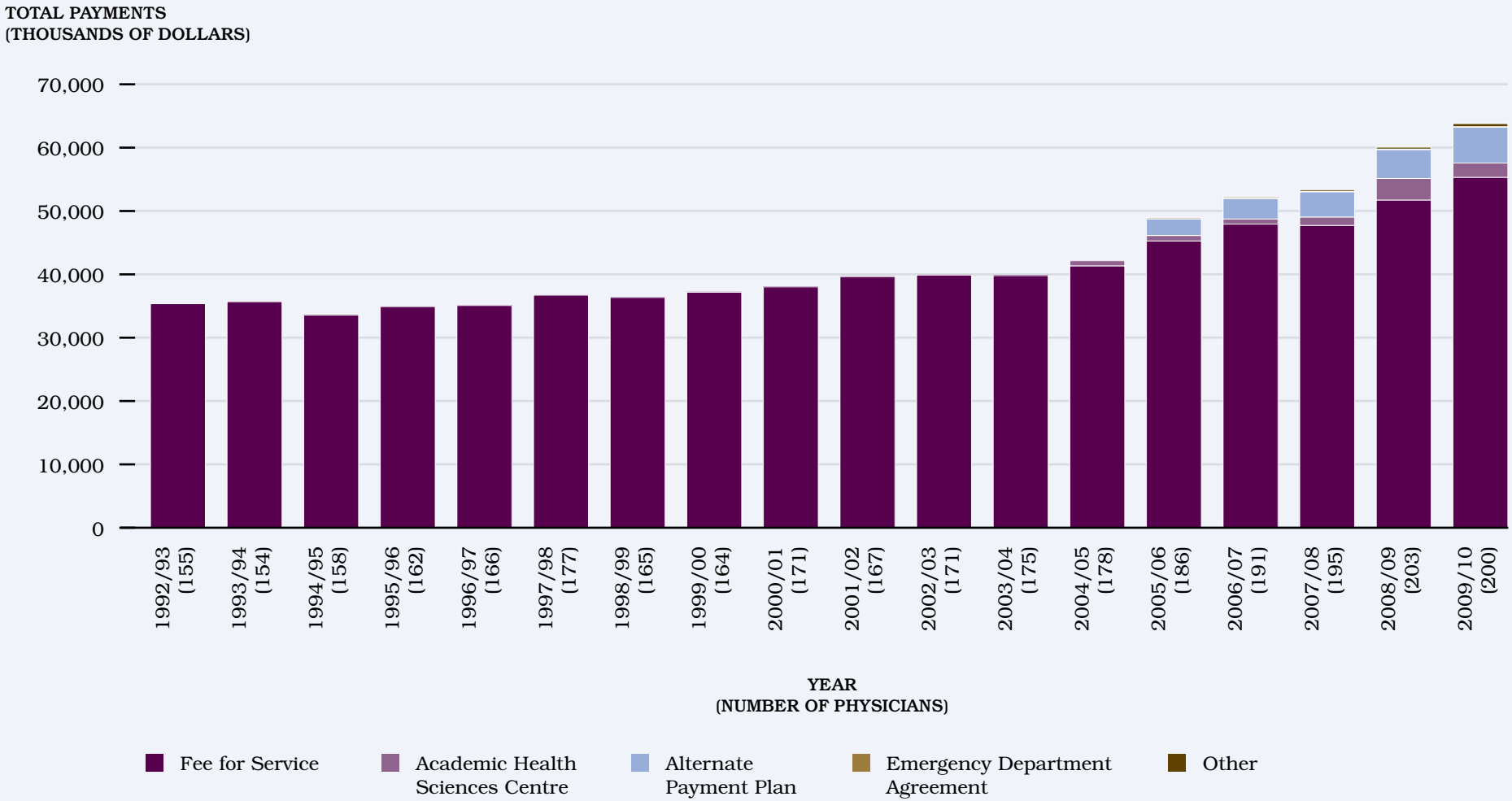
EXHIBIT 7.23 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to plastic surgeons, in Ontario, 1992/93 to 2009/10



Note: Data include payments for OHIP-insured services only and do not reflect payments for cosmetic surgery or other non-insured services.

PLASTIC SURGEONS

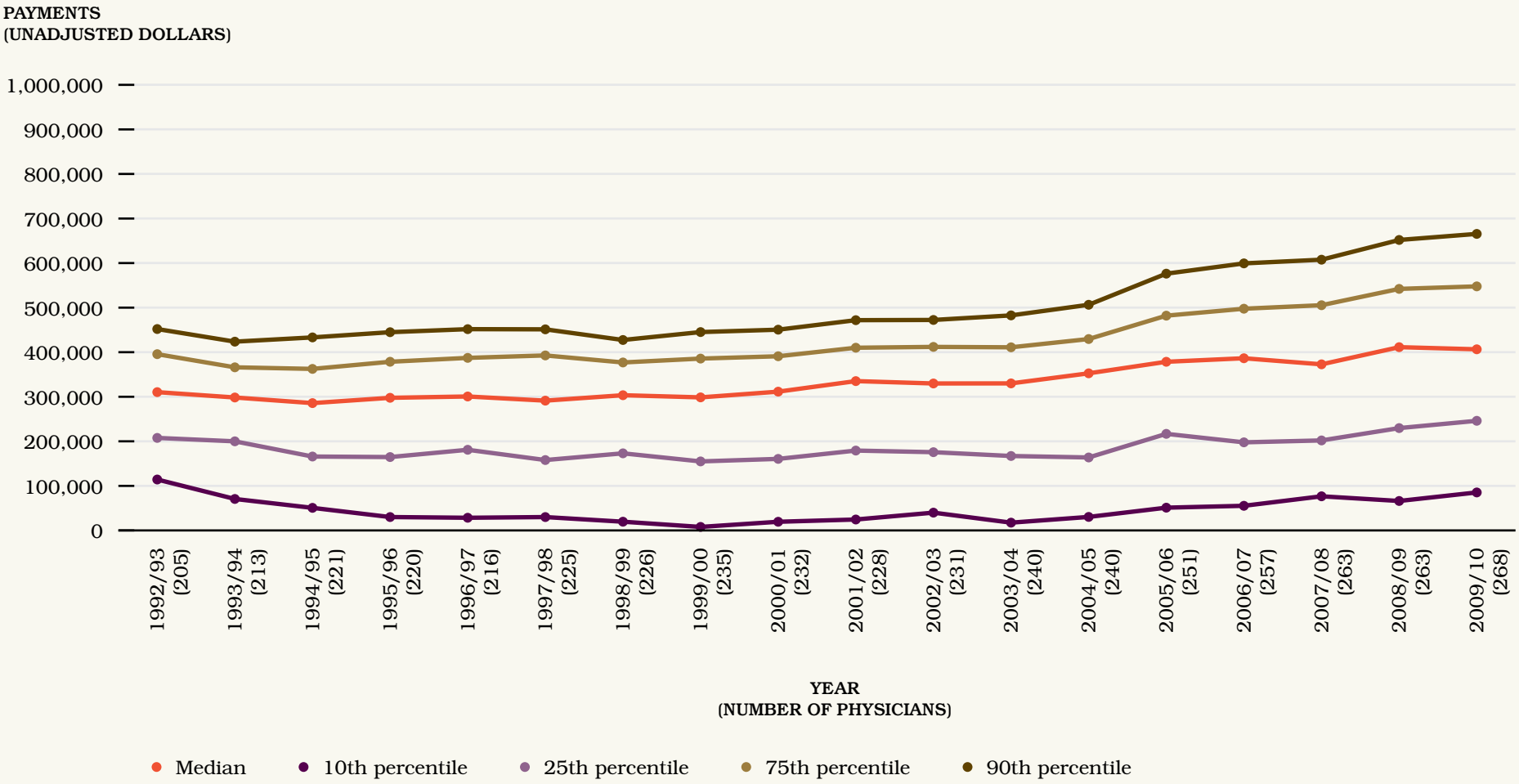
EXHIBIT 7.24 Total payments to plastic surgeons by payment source, in Ontario, 1992/93 to 2009/10



Note: Data include payments for OHIP-insured services only and do not reflect payments for cosmetic surgery or other non-insured services.

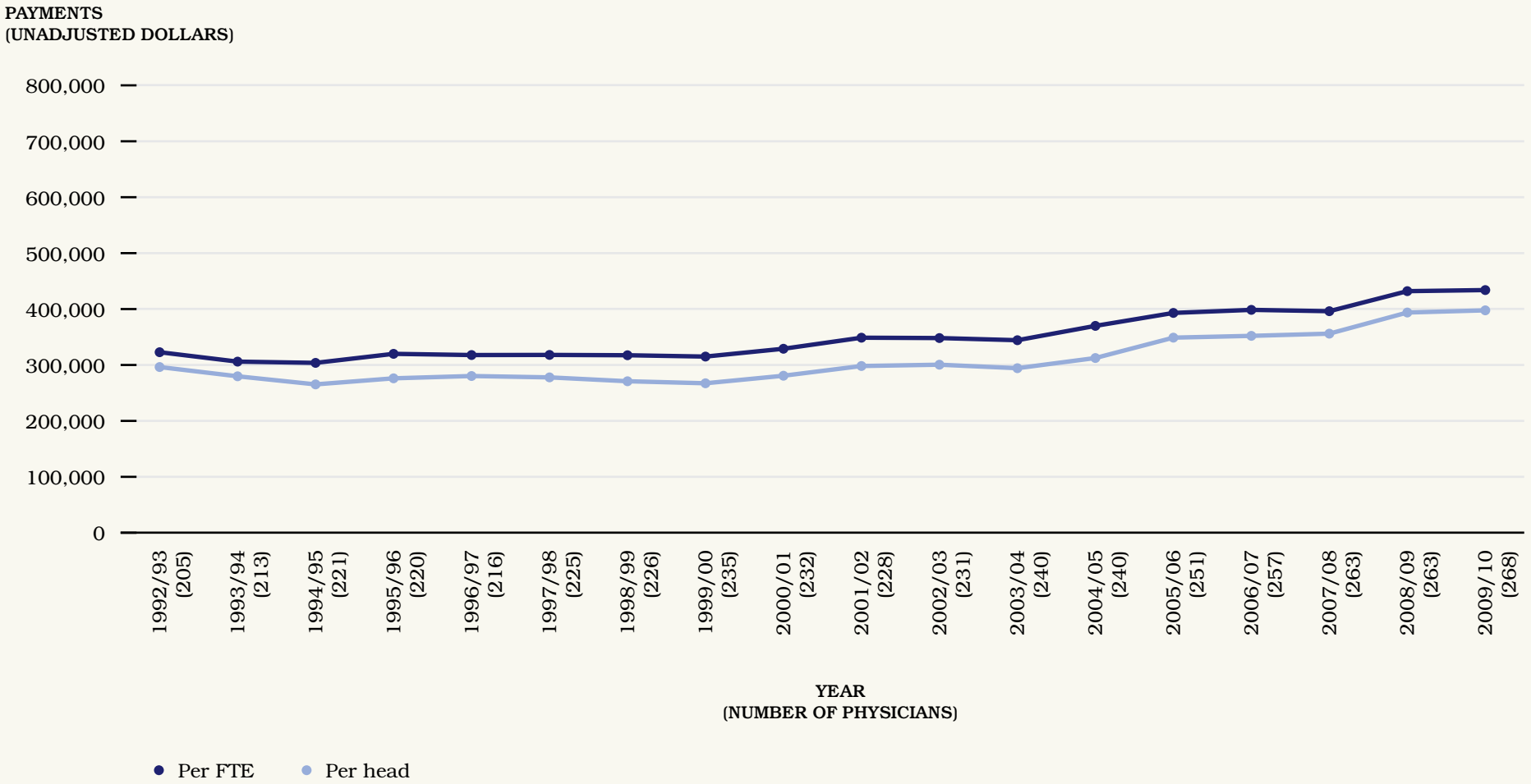
UROLOGISTS

EXHIBIT 7.25 Median and percentiles of payments (in unadjusted dollars) to individual urologists, in Ontario, 1992/93 to 2009/10



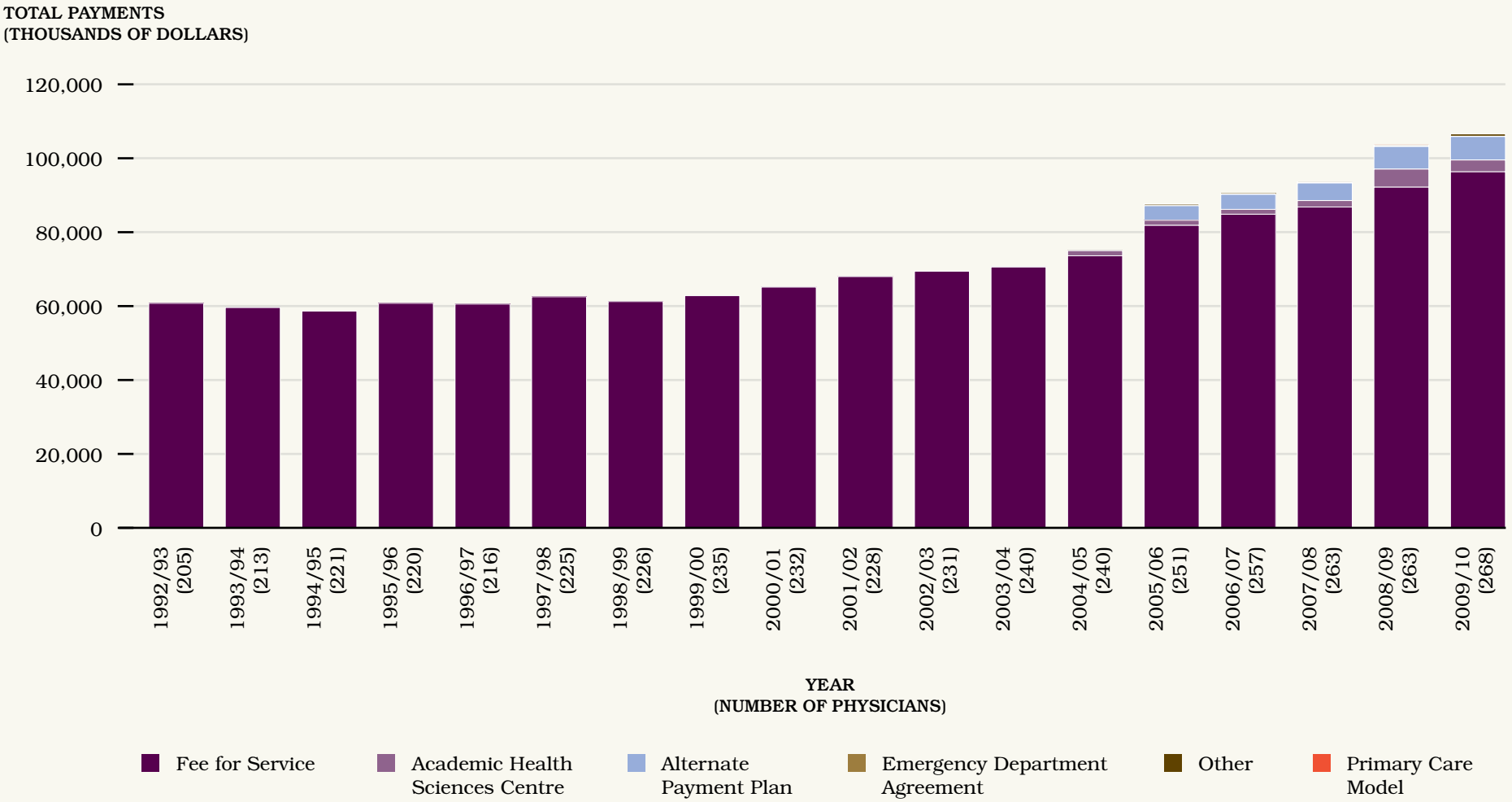
UROLOGISTS

EXHIBIT 7.26 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to urologists, in Ontario, 1992/93 to 2009/10



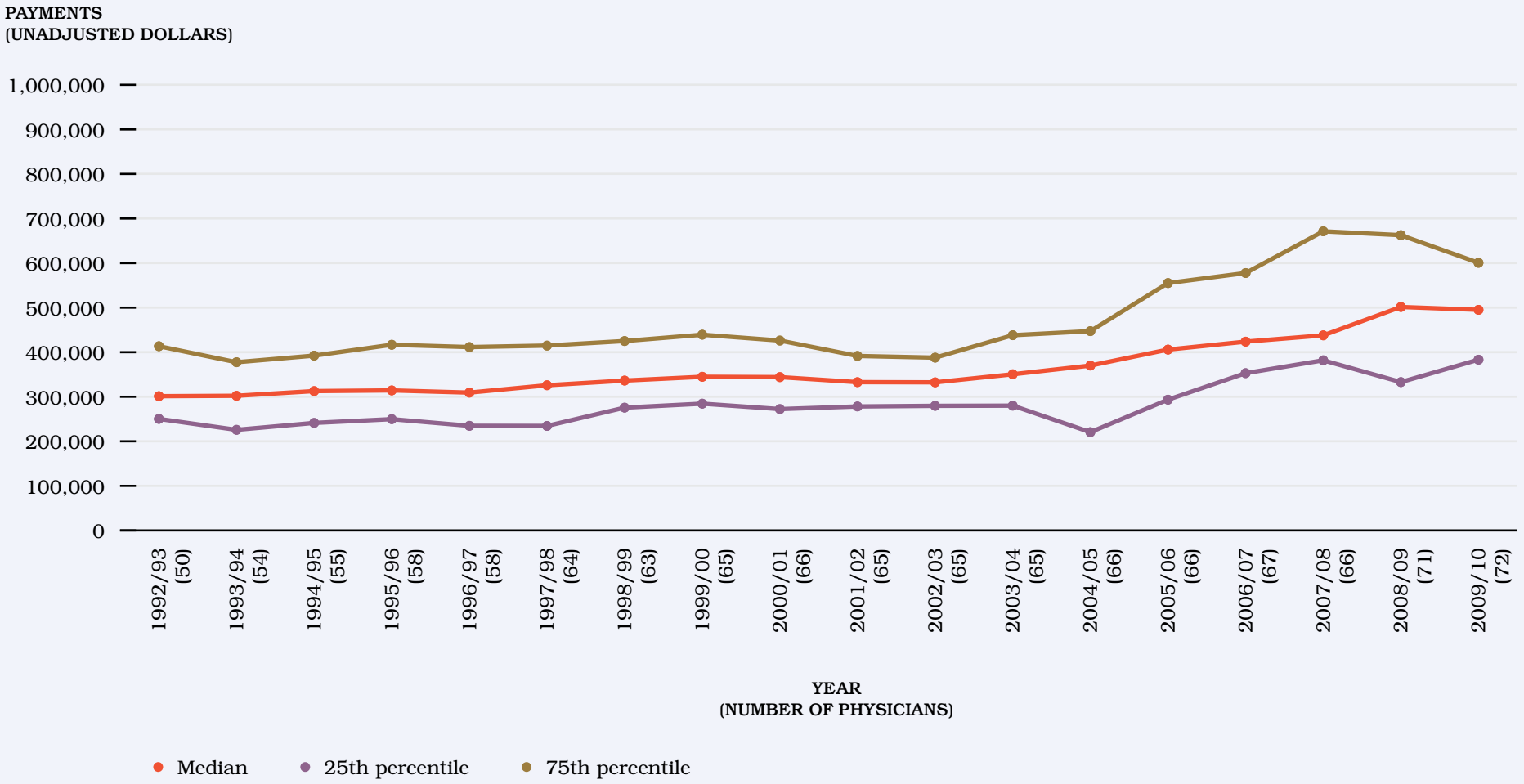
UROLOGISTS

EXHIBIT 7.27 Total payments to urologists by payment source, in Ontario, 1992/93 to 2009/10



VASCULAR SURGEONS

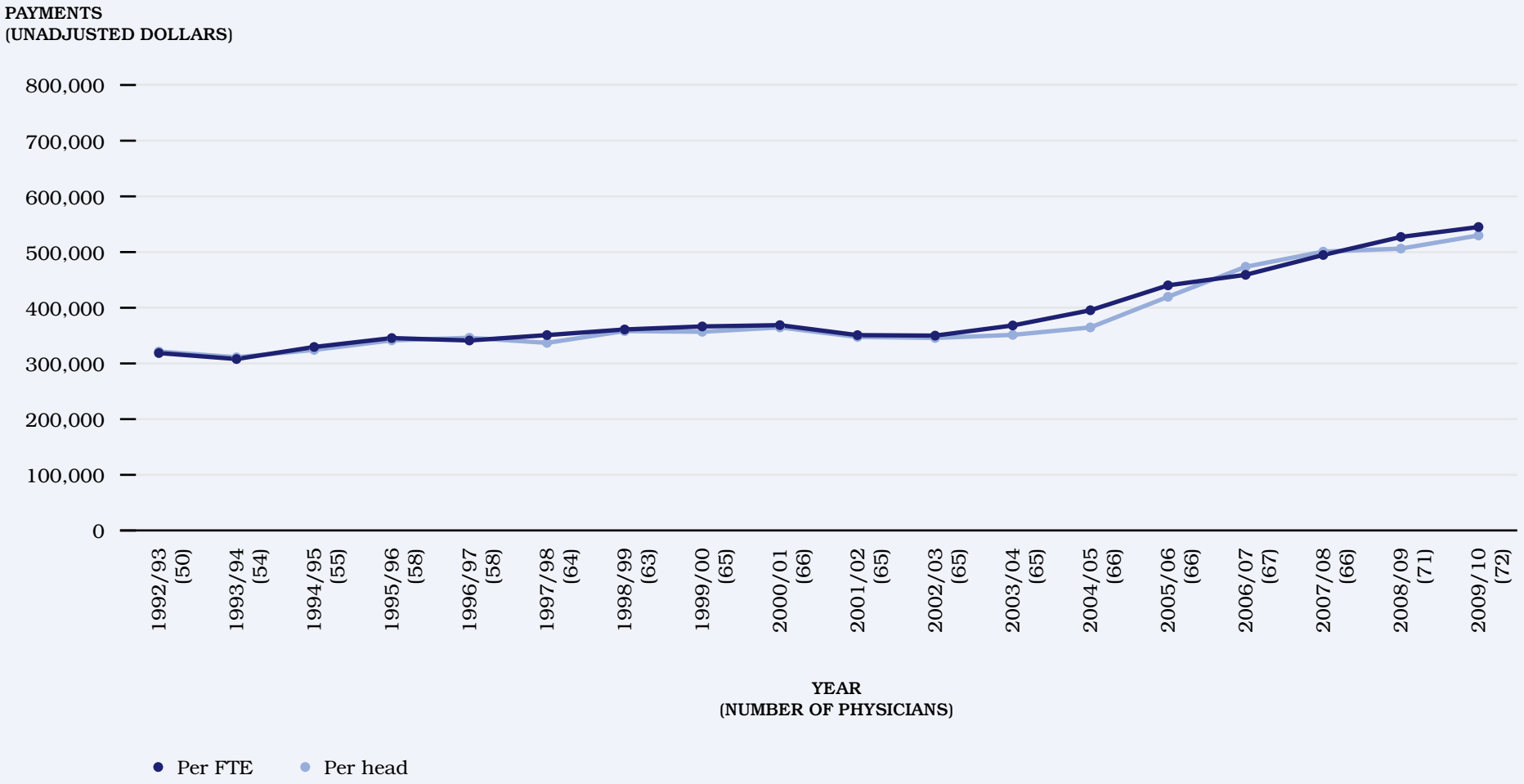
EXHIBIT 7.28 Median and percentiles of payments (in unadjusted dollars) to individual vascular surgeons, in Ontario, 1992/93 to 2009/10



Note: The 10th and 90th percentiles are omitted due to the small number of physicians in the top and bottom 10%.

VASCULAR SURGEONS

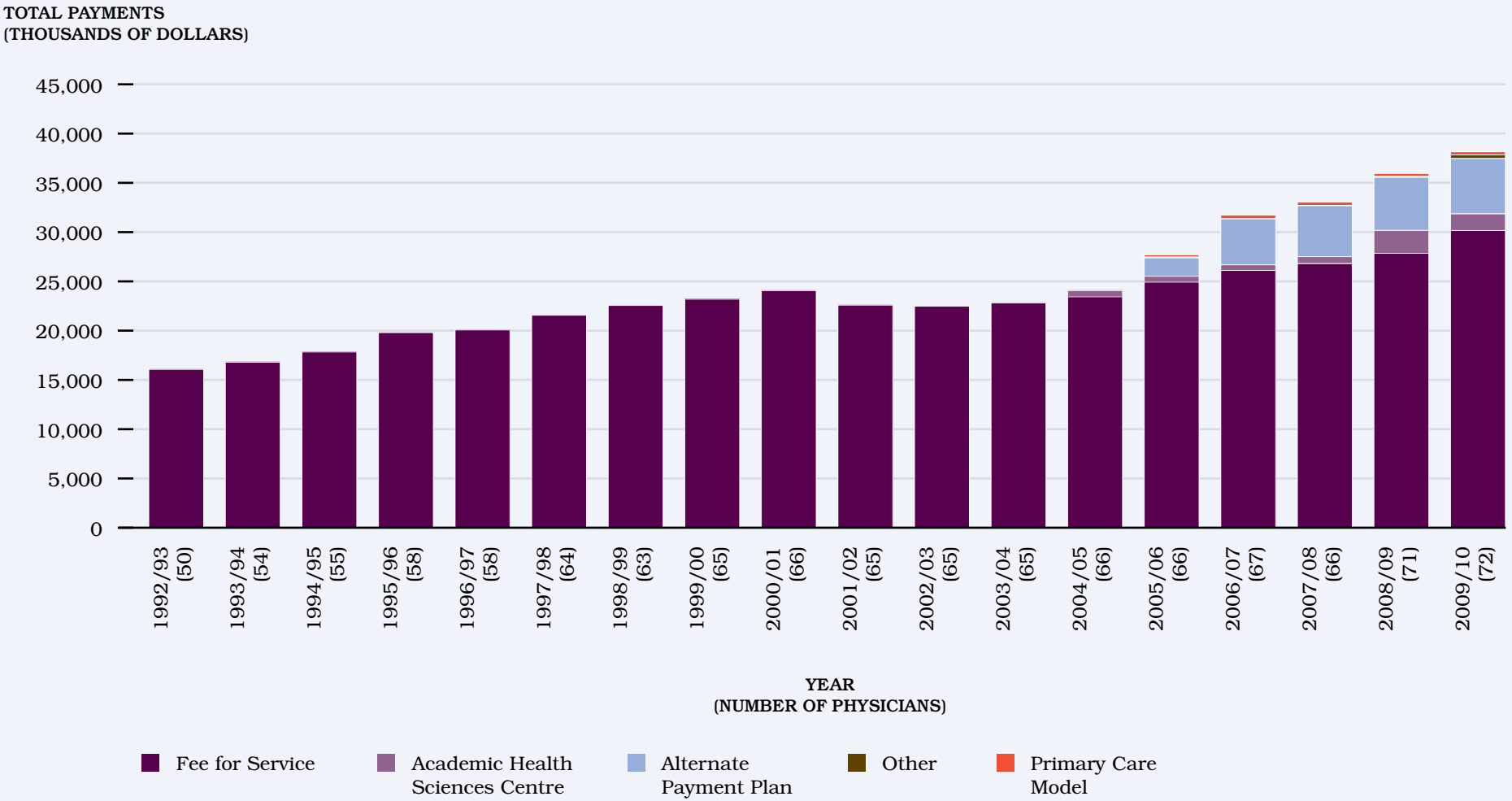
EXHIBIT 7.29 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to vascular surgeons, in Ontario, 1992/93 to 2009/10



Note: The 10th and 90th percentiles are omitted due to the small number of physicians in the top and bottom 10%.

VASCULAR SURGEONS

EXHIBIT 7.30 Total payments to vascular surgeons by payment source, in Ontario, 1992/93 to 2009/10



Note: The 10th and 90th percentiles are omitted due to the small number of physicians in the top and bottom 10%.

CHAPTER 8

Results for Imaging Specialists

INTRODUCTION

The imaging specialty group includes diagnostic radiologists and nuclear medicine specialists. Radiologists use a range of imaging modalities to aid in the diagnosis of disease. The range of imaging techniques has progressively widened to include traditional X-rays, computerized tomography (CT), ultrasound and magnetic resonance imaging (MRI). Radiologists use a variety of contrast agents to enhance definition of certain tissues. They provide imaging guidance for certain procedures (for instance, biopsies, placement of stents). Radiologists increasingly perform these procedures, and interventional radiology has developed as a discipline that uses minimally-invasive, image-guided procedures to diagnose and treat diseases in nearly every organ system. Modern radiologists perform a wide variety of diagnostic and some therapeutic procedures, and two of these, CT and MRI, have been the subject of additional public funding to reduce wait times in Ontario.

Nuclear medicine is sometimes called radiology 'inside out' as this specialty records radiation emitting from within the body rather than radiation that is generated by external sources like X-rays. This is achieved by administering a range of radio-pharmaceuticals to the patient that localize to particular tissues, organs and cellular receptors. By doing this, nuclear medicine specialists can study disease through altered cellular function and physiology rather than relying on physical changes in the tissue anatomy. This can enable a better definition of the extent of disease. Nuclear medicine is a much smaller specialty than radiology, with a limited number of procedures. One of these, positron emission tomography, has been subject to an evaluation program in Ontario, which has restricted access to public funding. In October 2009, OHIP coverage was extended to a range of diseases where conventional imaging could not provide essential information.[1]

Historically, two fees have applied to diagnostic tests: a professional fee and a technical fee. Professional fees are paid to the physician who performs and interprets the test, whereas technical fees are paid to the imaging facility (e.g., the hospital) to offset the costs associated with providing the imaging services (including the costs of paying technicians, overhead expenditures, capital outlays and amortization).[2] In this report, we are concerned with the professional fees paid to radiologists and nuclear medicine specialists. As the footnotes to the exhibits indicate, payments before 2000 included some professional and technical fees and those after that did not, so data from the two periods should not be compared.

FINDINGS FOR INDIVIDUAL SPECIALTIES

Diagnostic Radiology (exhibits 8.1 to 8.3)

The supply of diagnostic radiologists increased steadily throughout the study period. In 2009/10, there were 975 radiologists, about 43% more than in 1992/93. Total payments to this specialty in 2009/10 were about $550 million, an increase of about $250 million (82%) compared with 2003. Radiologist numbers increased by 145 (approximately 18%) during this period. Diagnostic radiologists had the highest mean payments per FTE of any specialty in 2009/10 ($606,700), which was almost double the average paid to all physicians in the province in that year. The median payment was lower than this (about $555,000), and the variation in payments was very wide, with 10% of radiologists paid more than $945,000 and 25% paid more than $775,000. At the other end of the scale, 25% of radiologists were paid less than $300,000 and 10% were paid less than $132,000. This very wide variation in payments may indicate that a significant proportion of radiologists worked part-time. Almost all payments were by FFS.

Nuclear Medicine (exhibits 8.4 to 8.6)

By comparison with diagnostic radiology, nuclear medicine is a small specialty with only 54 practitioners in 1992/93, increasing to 88 in 2009/10. Total payments to this specialty in 2009/10 were approximately $46 million. The median payment to nuclear medicine specialists in 2009/10 was approximately $500,000, substantially more than the average payment to all physicians. The mean payment was slightly higher than the median. The great majority of payments (97%) were by FFS.

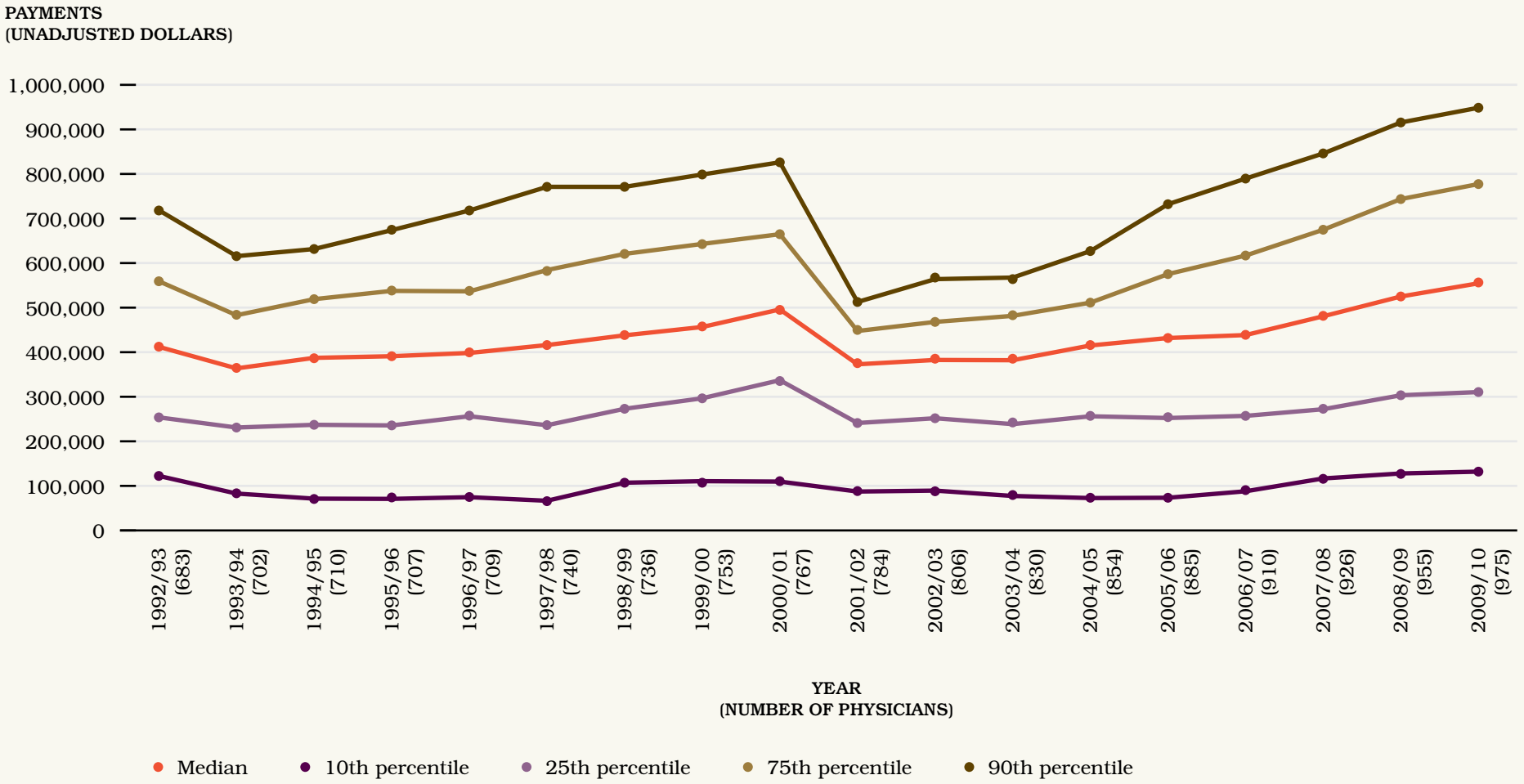
REFERENCES

1 Ontario Ministry of Heath and Long-Term Care. OHIP Coverage for Positron Emission Tomography (PET) Scanning, Effective October 1, 2009. Accessed January 16, 2012 at http://health.gov.on.ca/en/public/publications/ohip/pet.aspx

2 Toronto Health Economics and Technology Assessment Collaborative. *The Relative Cost-effectiveness of Five Non-invasive Cardiac Imaging Technologies for Diagnosing Coronary Artery Disease in Ontario*. Toronto: THETA; 2010. Accessed January 16, 2012 at http://theta.utoronto.ca/papers/theta_report_007.pdf

DIAGNOSTIC RADIOLOGISTS

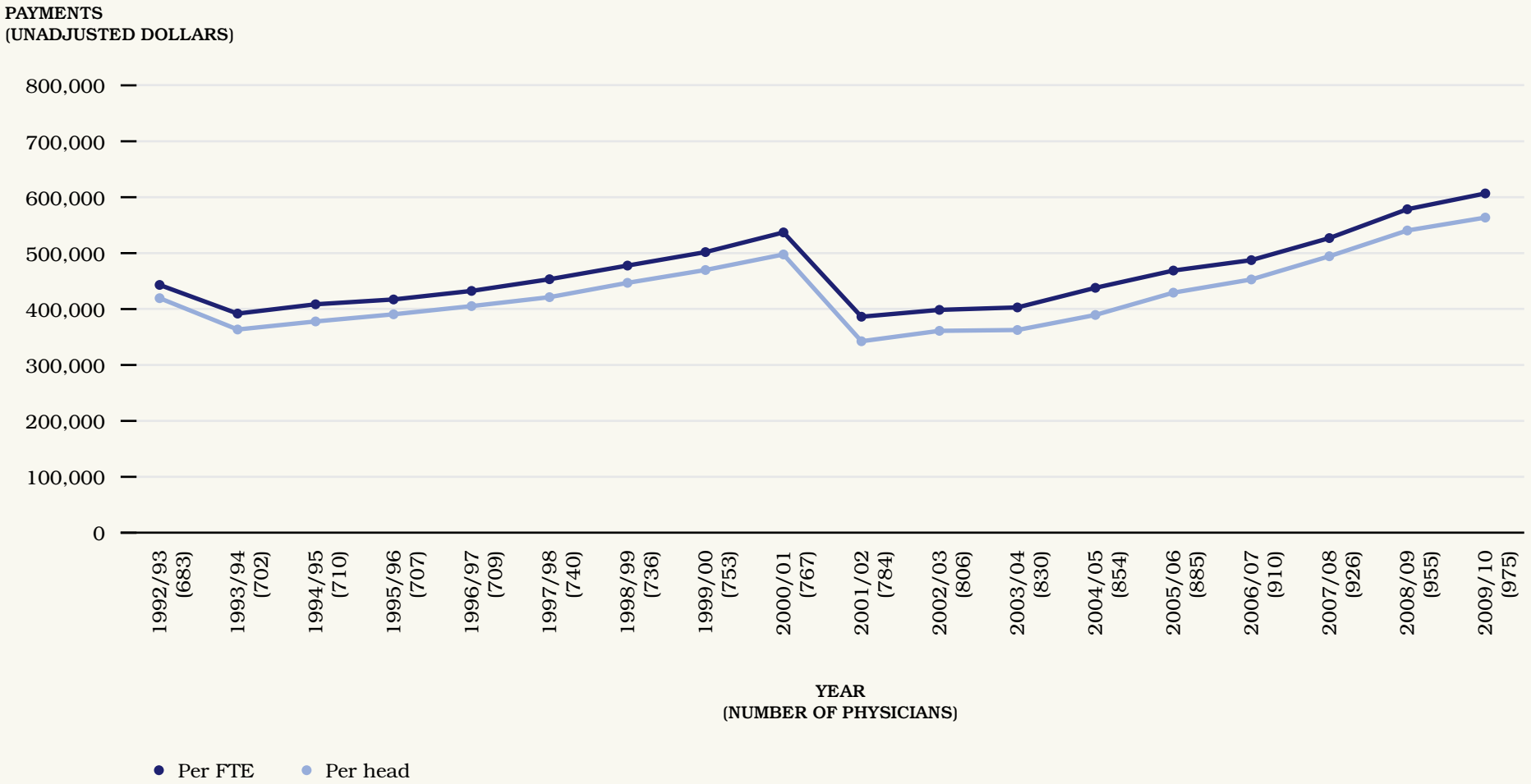
EXHIBIT 8.1 Median and percentiles of payments (in unadjusted dollars) to individual diagnostic radiologists, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2001/021 include some fees that combined technical and professional fees. Such combined fees were discontinued in 2000/01.

DIAGNOSTIC RADIOLOGISTS

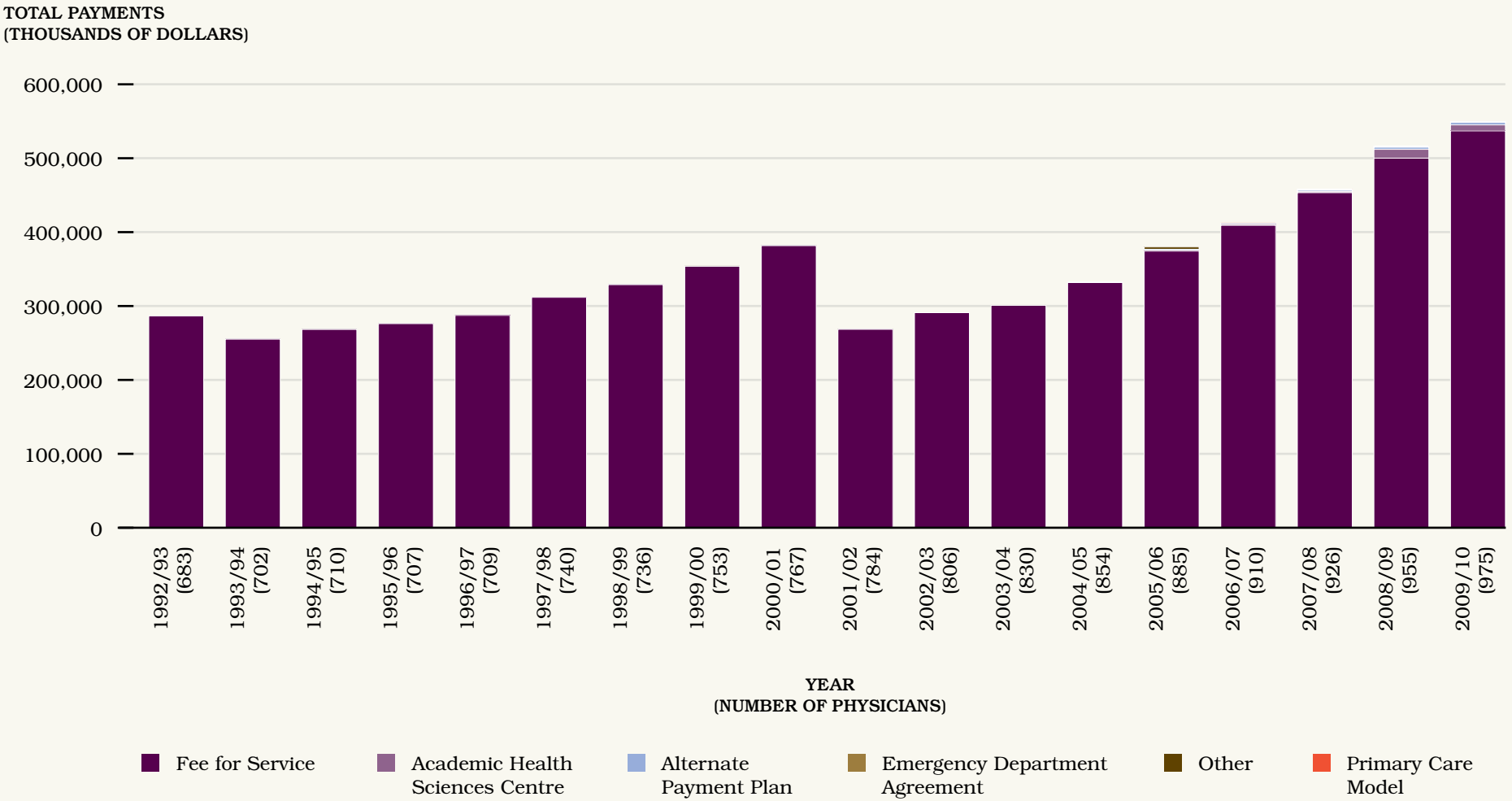
EXHIBIT 8.2 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to diagnostic radiologists, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2001/021 include some fees that combined technical and professional fees. Such combined fees were discontinued in 2000/01.

DIAGNOSTIC RADIOLOGISTS

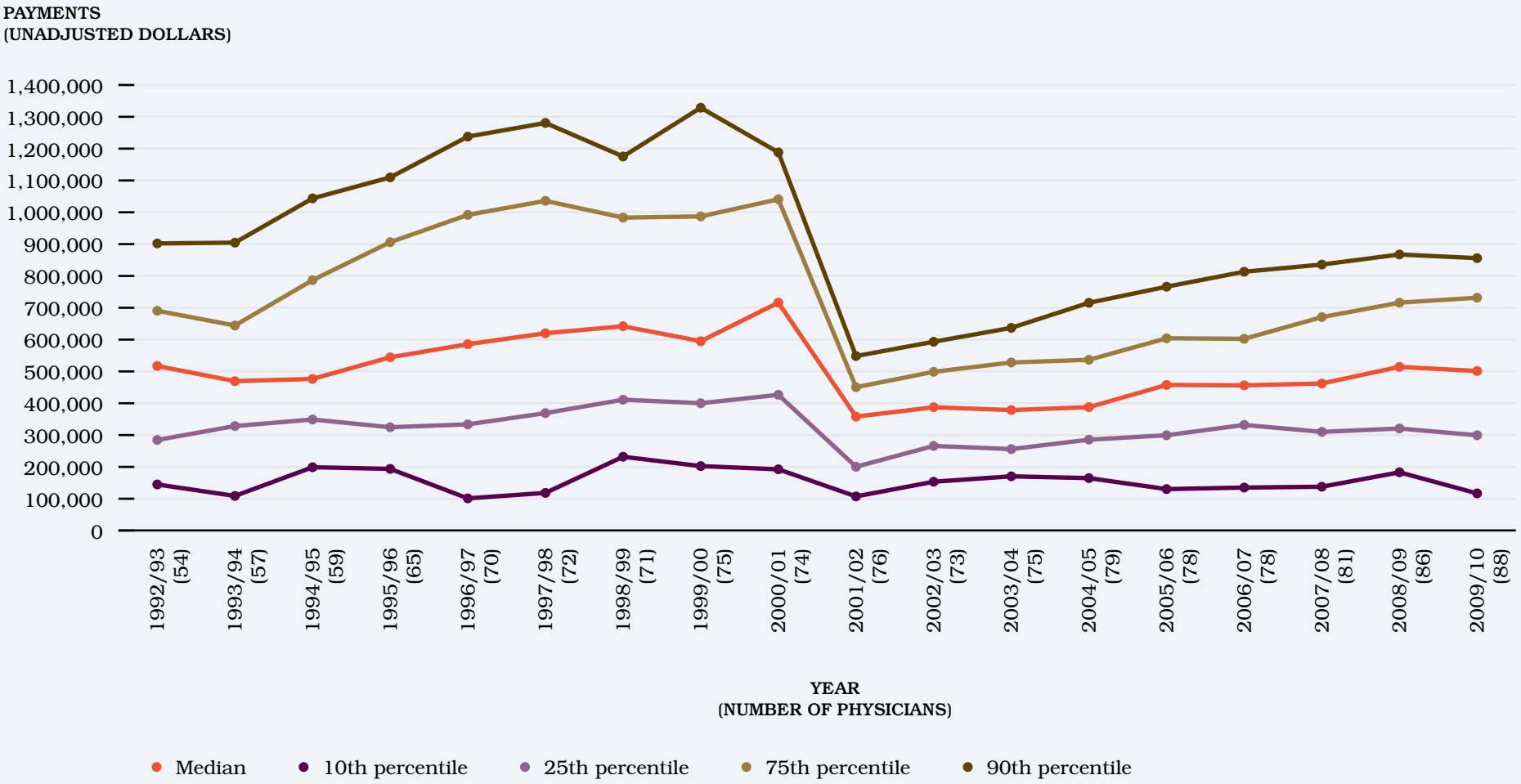
EXHIBIT 8.3 Total payments to diagnostic radiologists by payment source, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2001/021 include some fees that combined technical and professional fees. Such combined fees were discontinued in 2000/01.

NUCLEAR MEDICINE SPECIALISTS

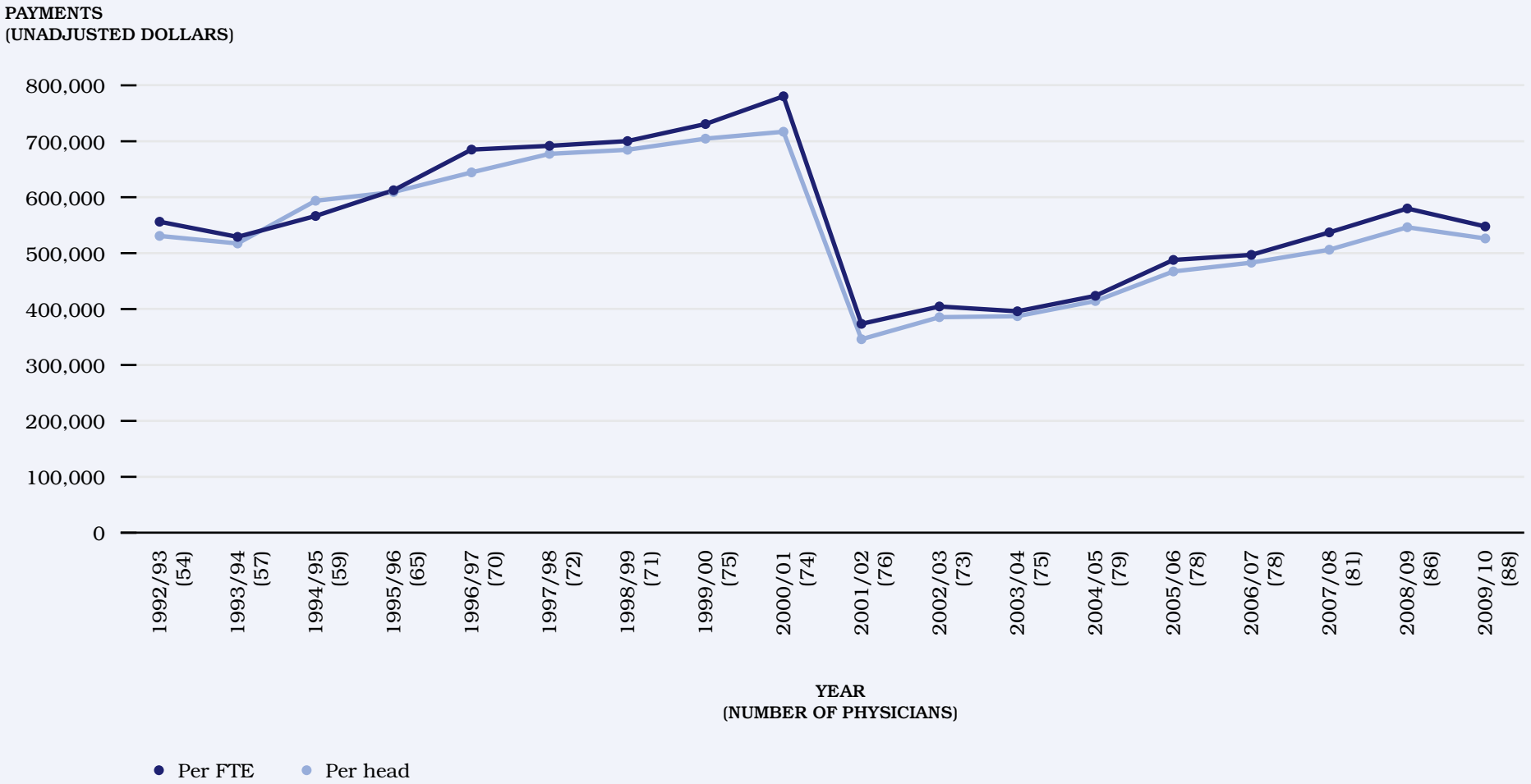
EXHIBIT 8.4 Median and percentiles of payments (in unadjusted dollars) to individual nuclear medicine specialists, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2000/01 may include some technical and professional fees.

NUCLEAR MEDICINE SPECIALISTS

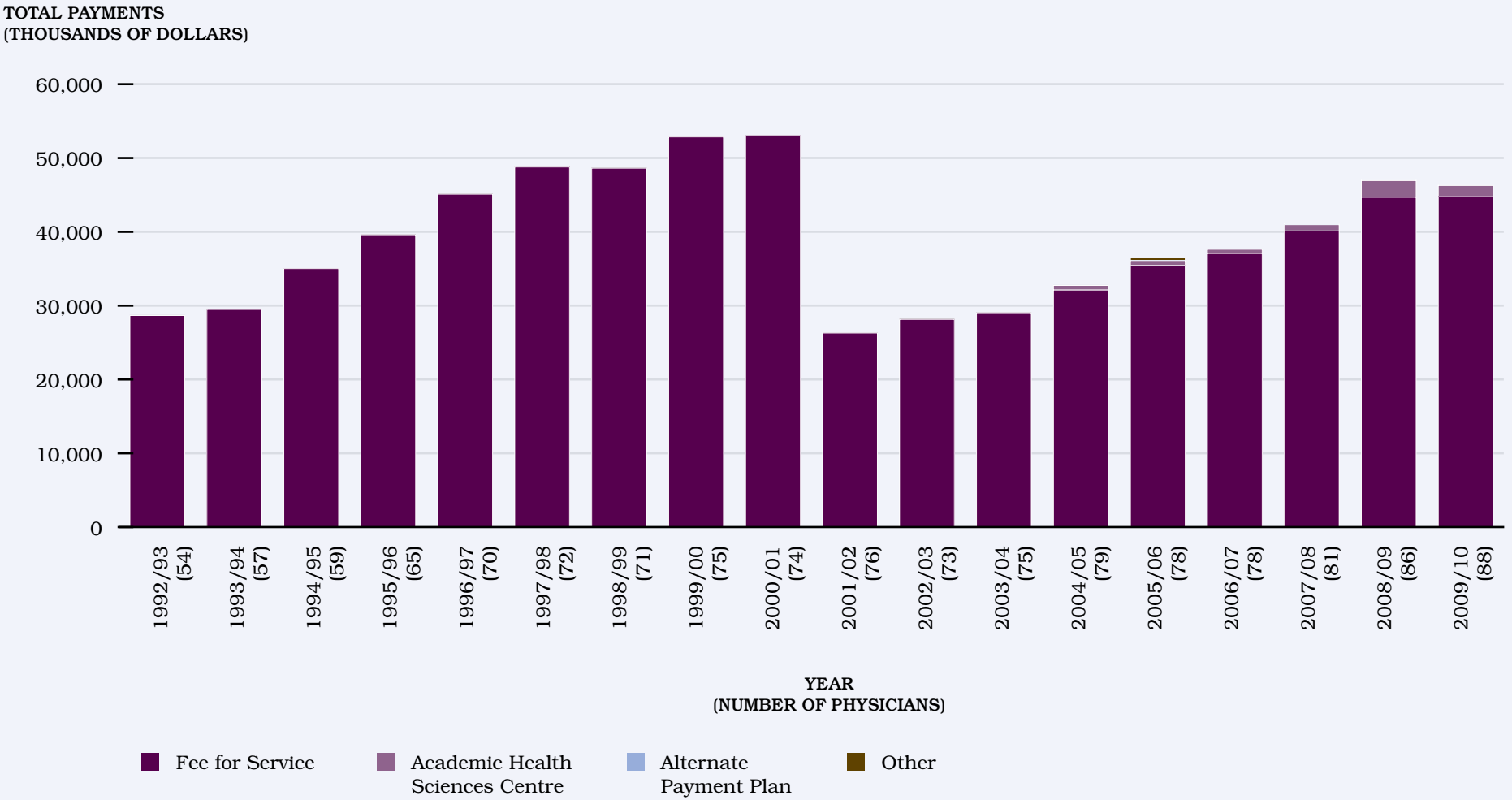
EXHIBIT 8.5 Mean payments (unadjusted dollars) per head and full-time equivalent (FTE) to nuclear medicine specialists, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2000/01 may include some technical and professional fees.

NUCLEAR MEDICINE SPECIALISTS

EXHIBIT 8.6 Total payments to nuclear medicine specialists by payment source, in Ontario, 1992/93 to 2009/10



Note: Data prior to 2000/01 may include some technical and professional fees.

CHAPTER 9

Results for Anesthesiologists

INTRODUCTION

The administration of anesthesia is an important component of surgery and a number of other clinical procedures. Anesthesiologists play a key collaborative role with surgeons and physicians from a variety of clinical specialties and have provided important support to the wait times strategy in recent years. In this report, we have decided to present anesthesiologists separately from other specialties because of the diversity of their role in the health care system. Operating room time and the availability of anesthesiologists are two factors that can affect surgical wait times.

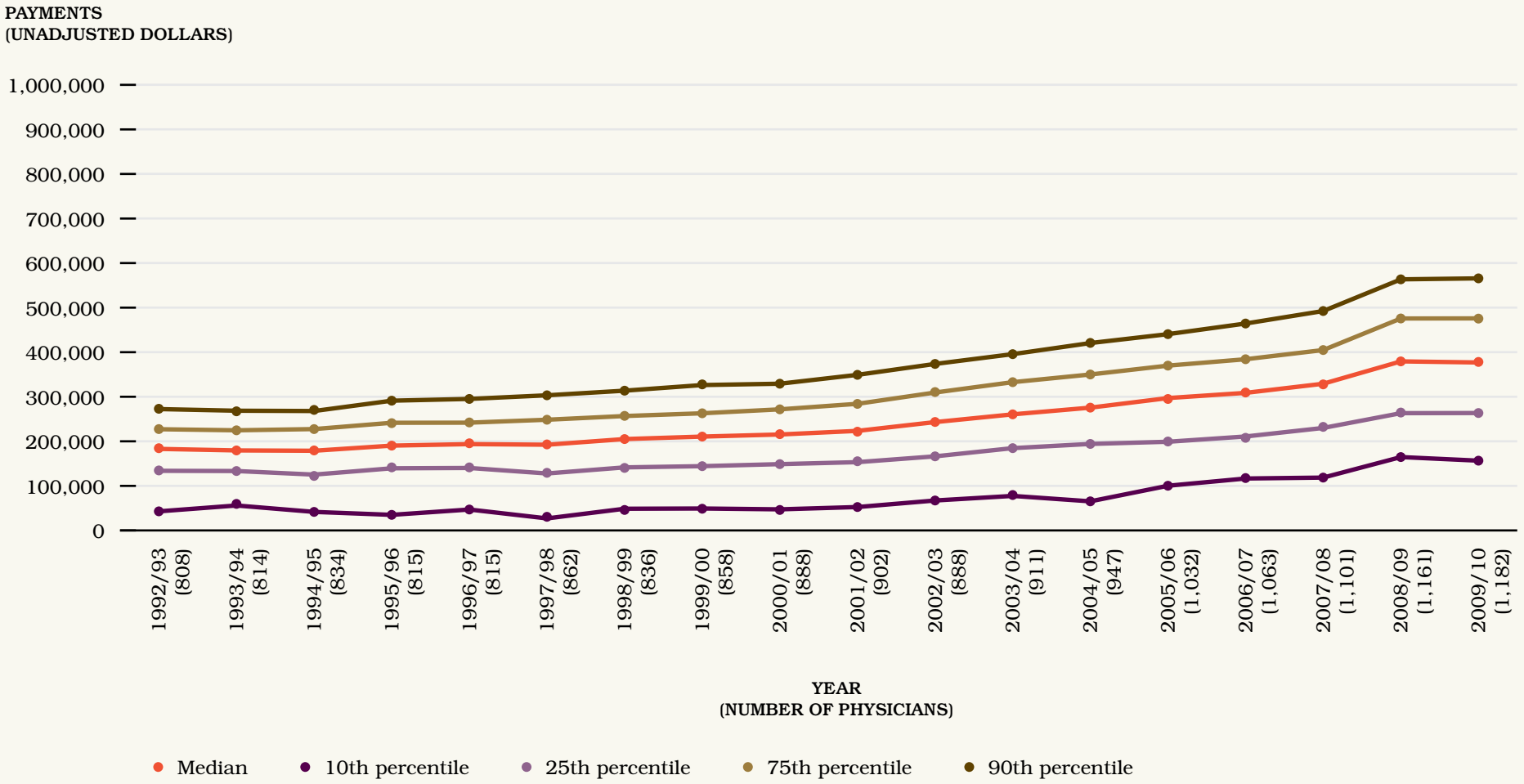
FINDINGS

Median, Mean and Total Payments (exhibits 9.1 to 9.3)

The number of anesthesiologists in Ontario rose from 808 in 1992/93 to 1,182 in 2009/10, an increase of 46%. Total payments to this specialty tripled in that period: from about $143 million to over $440 million (in unadjusted dollars). During the 1990s, the median payment to anesthesiologists was slightly higher than for all physicians; subsequently, the median payment rose 79% between 1999/00 and 2009/10. The mean payment doubled between 1992/93 and 2009/10, with most of the increase occurring after 1999/00. The distribution of payments was relatively narrow, with the 90th percentile being 50% higher than the median. In 2009/10, 85% of payments were from fee for service, 7% from academic health sciences centres, 6% from alternate payment plans, and the remainder from other non-FFS sources.

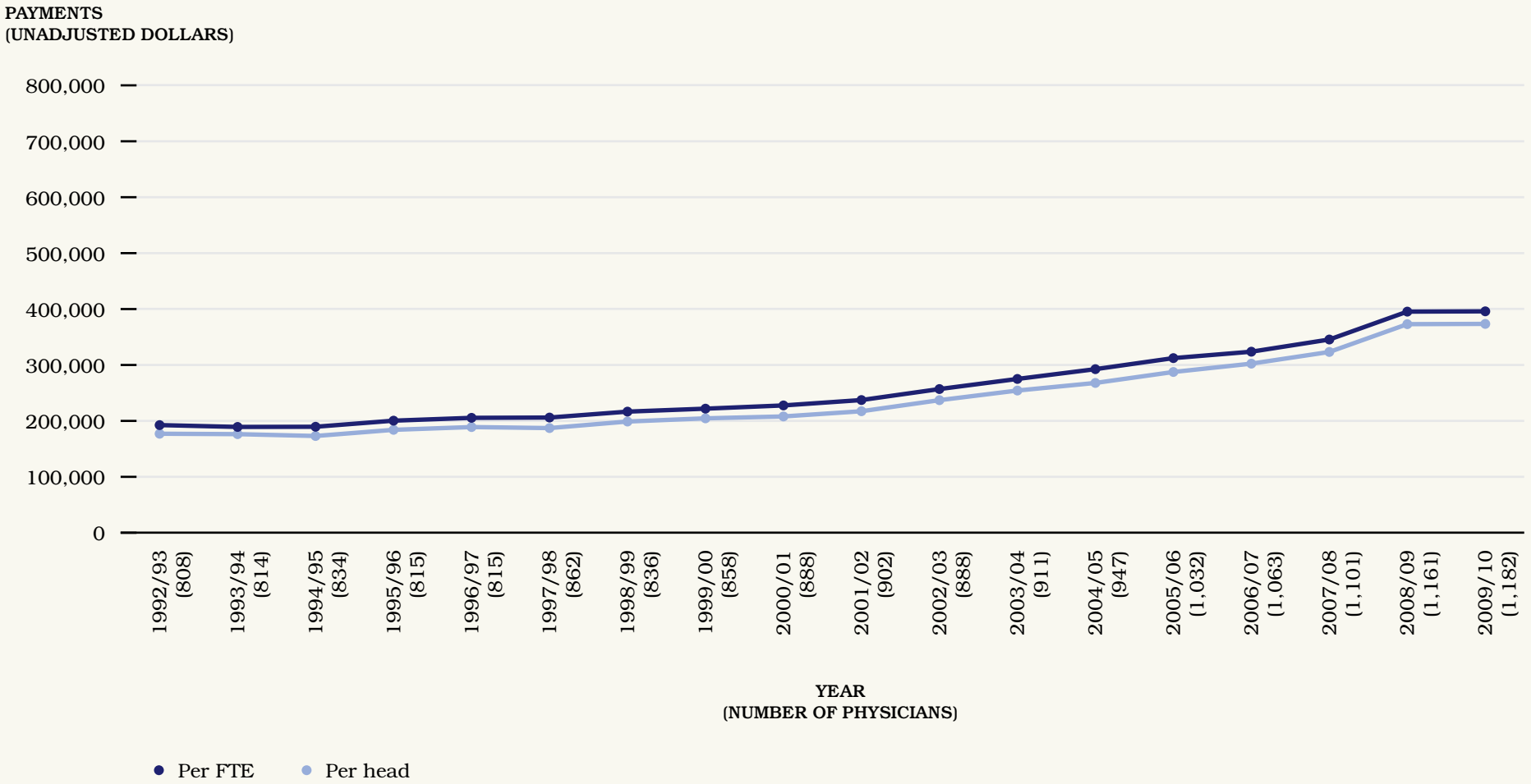
ANESTHESIOLOGISTS

EXHIBIT 9.1 Median and percentiles of payments (in unadjusted dollars) to individual anesthesiologists, in Ontario, 1992/93 to 2009/10



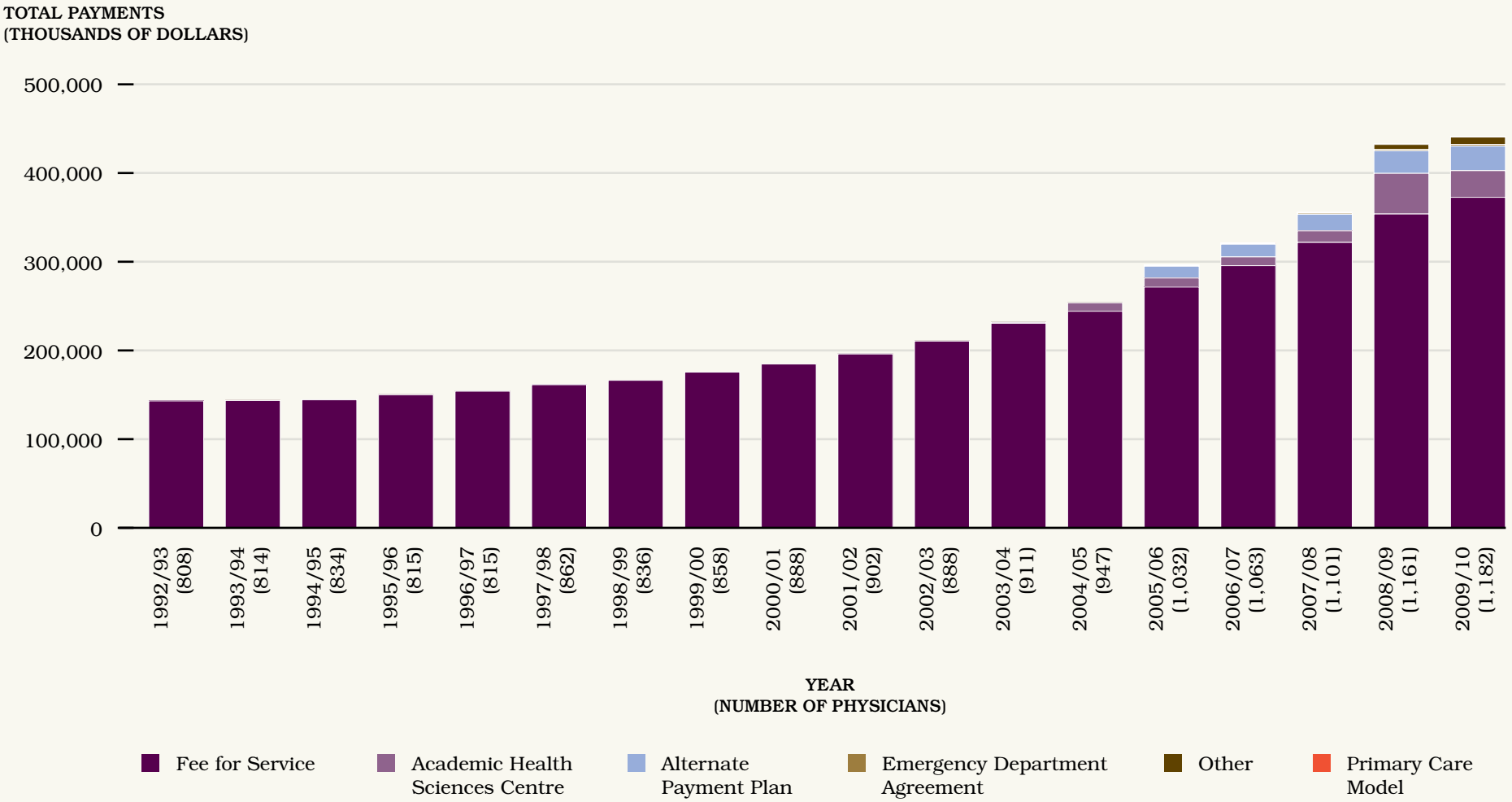
ANESTHESIOLOGISTS

EXHIBIT 9.2 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to anesthesiologists, in Ontario, 1992/93 to 2009/10



ANESTHESIOLOGISTS

EXHIBIT 9.3 Total payments to anesthesiologists by payment source, in Ontario, 1992/93 to 2009/10



CHAPTER 10

Results for Emergency Department Physicians

INTRODUCTION

Emergency departments (EDs) in Ontario hospitals may be staffed by:

- general practitioners/family physicians;
- family physicians with an additional year of training in emergency medicine and certification from the Canadian College of Family Physicians (CCFP(EM)s); or
- physicians who have completed a five-year residency and passed certifying exams to earn the designation of Fellow of the Royal College of Physicians and Surgeons of Canada (FRCPC EM specialists).

For the purposes of this report, an emergency medicine physician is any physician who has more than 50% of billings for services rendered in the ED. It includes physicians from all three groups listed above. In this chapter, we will refer to them collectively as ED physicians.

Staffing and funding EDs has long presented a challenge to health planners and policy makers. A 2001 ICES report found that the total number of physicians working in EDs declined from 2,525 in 1993/94 to 1,987 in 2000/01.[1] There were reports in the media from time to time of EDs having to close temporarily due to a lack of physician coverage. For this reason, EDs were one of the first physician sectors in the health care system to see the introduction of widespread alternate funding arrangements. As Chan et

al. reported, this began in 1996 with the introduction of sessional fees for after-hours and weekend coverage. In the same year, the MOHLTC began offering Alternate Funding Plans (AFPs) as a recruiting tool to physicians in rural Northern Ontario. In 1999, the MOHLTC implemented a new Alternate Funding Arrangement (AFA) that was intended to replace sessional fees, any existing AFPs and fee-for-service billings. It was offered to most EDs in the province, and introduced on an interim basis in three waves between September 1999 and November 2000. Permanent AFAs were introduced in 2002.

All of these funding changes have implications for the results presented in this chapter. No payment information was available for AFAs prior to 2005/06 or for the earlier AFPs (data were available for FFS payments and sessional fees). From 1996/97 to 1998/99, we are missing data on payments to Northern Ontario physicians who were part of AFPs. From 1999/00 to 2004/05, we are missing data for nearly all payments to ED physicians, which is why the results for these years have been suppressed. The data for 1992/93 to 1995/96 and 2005/06 to 2009/10 are complete.

FINDINGS

Median, Mean and Total Payments (exhibits 10.1 to 10.3)

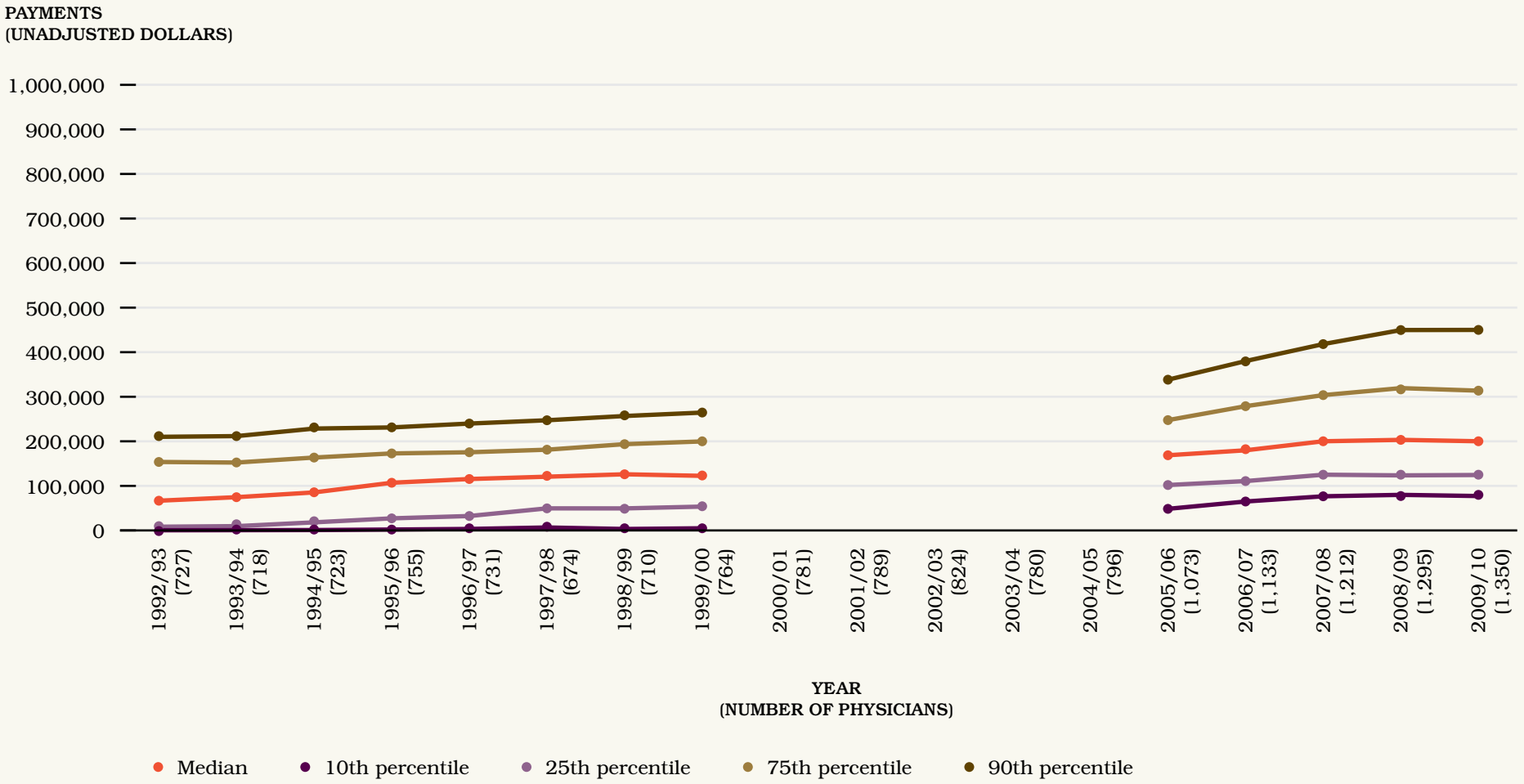
In 1992/93, there were 727 ED physicians in Ontario, 75% of whom were GP/FPs; the remainder were evenly split between 84 CCFP(EM)s and 85 FRCPC-EM specialists. By contrast, of the 1,350 ED physicians in 2009/10, 550 (41%) were GP/FPs, 43% (578) were CCFP(EM)s and 16% were EM specialists. In 2005/06, the median payment to ED physicians was just under $170,000, much lower than the $226,000 median for all physician in that year. The low median for ED physicians may reflect the fact that this group includes a significant proportion of newly graduated physicians who, not having started their own practices, chose to work part-time or do locums in the ED. ED physicians in the top 10% earned more than $338,000, while those in the lowest 10% earned less than $50,000. The mean payment per full-time equivalent (FTE) increased by about 24% between 2005/06 and 2009/10, from approximately $190,000 to $235,000. Payments to ED physicians totalled about $323 million in 2009/10, with only 27% coming from FFS billings.

REFERENCE

1 Chan BTB, Schull MJ, Schultz SE. *Emergency Department Services in Ontario*. Toronto: Institute for Clinical Evaluative Sciences; 2001. Accessed January 13, 2012 at http://www.ices.on.ca/file/Emergency_department_services_in_Ontario.pdf.

EMERGENCY DEPARTMENT PHYSICIANS

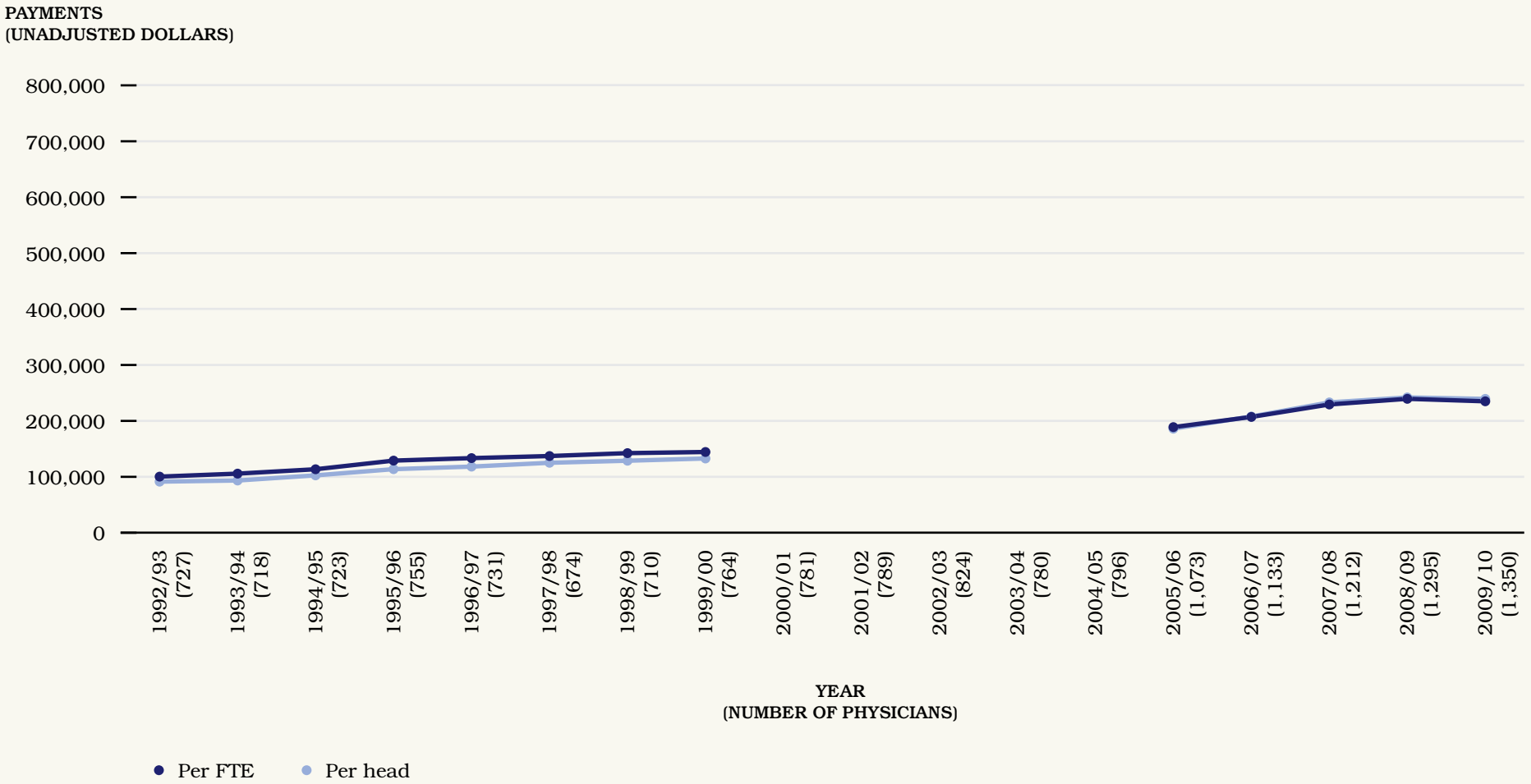
EXHIBIT 10.1 Median and percentiles of payments (in unadjusted dollars) to individual emergency department physicians, in Ontario, 1992/93 to 2009/10



Note: Results for 2000/01 to 2004/05 have been suppressed due to missing data.

EMERGENCY DEPARTMENT PHYSICIANS

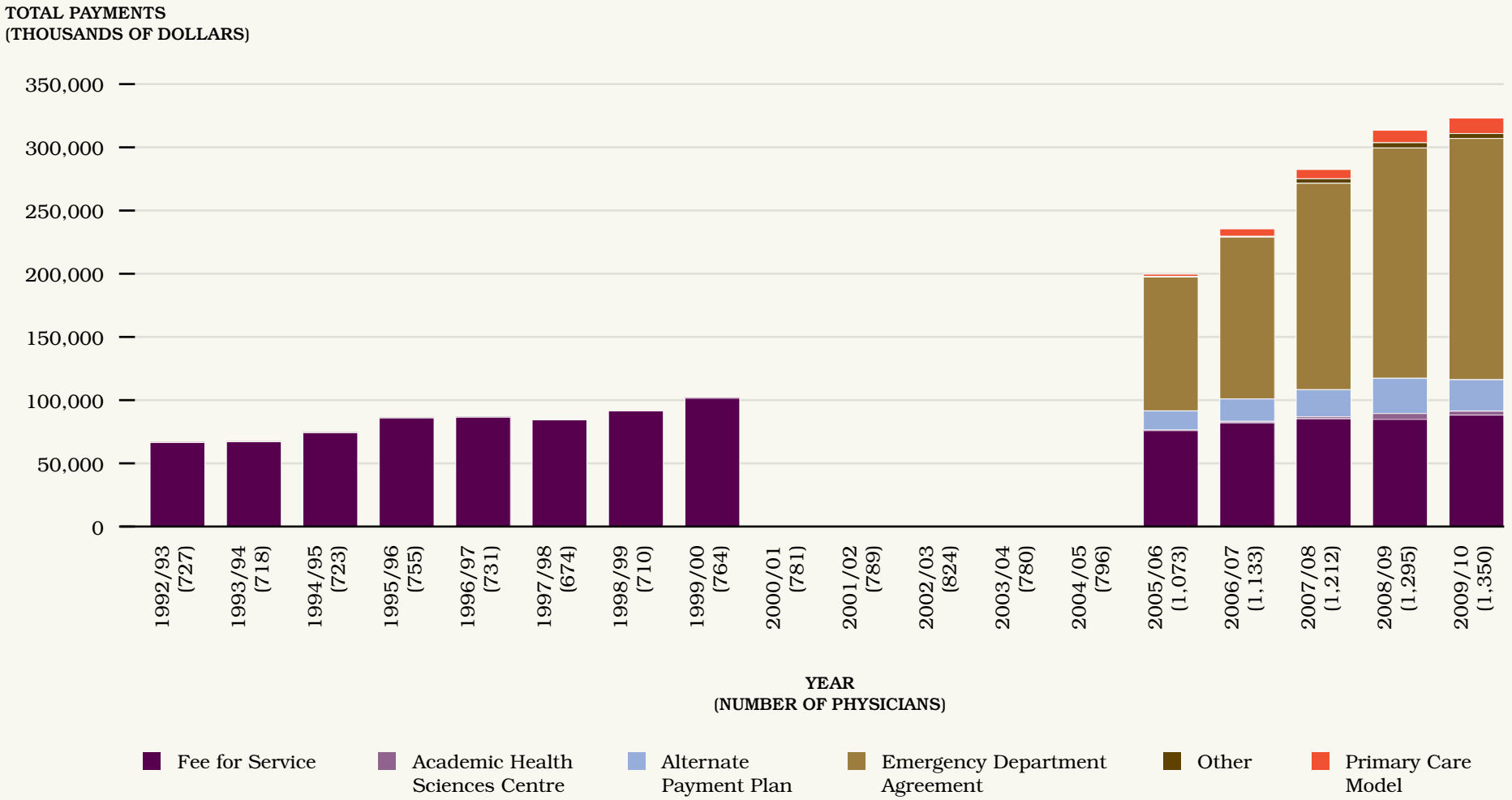
EXHIBIT 10.2 Mean payments (in unadjusted dollars) per head and full-time equivalent (FTE) to emergency department physicians, in Ontario, 1992/93 to 2009/10



Note: Results for 2000/01 to 2004/05 have been suppressed due to missing data.

EMERGENCY DEPARTMENT PHYSICIANS

EXHIBIT 10.3 Total payments to emergency department physicians by payment source, in Ontario, 1992/93 to 2009/10



Note: Results for 2000/01 to 2004/05 have been suppressed due to missing data.

CHAPTER 11

Summary

Chapters 4 to 10 reported payments to physicians in individual specialties separately. In this chapter we bring the results together to show how physician supply and payments and the changes within them varied among specialties between 1992/93 and 2009/10.

Physician Supply (exhibits 11.1 and 11.2)

The overall number of physicians for whom we had payment information increased by 4,811 (24%) between 1992/93 and 2009/10. This is slightly higher than Ontario's overall population growth (20%) in this period. Growth was not constant over time; in fact, there was a slight contraction in the number of doctors between 1993/94 and 1999/00. Growth was greatest between 2005/06 and 2009/10 (2.3% per year).

Growth in physician supply was variable across specialty groups. Proportionally, the greatest increases were seen in emergency medicine and the medical procedural specialties. As a group, the procedural specialties showed the largest increase, with the number of physicians in this group growing by 58% between 1992/93 and 2009/10. The smallest overall proportional increase (4.5% between 1992/93 and 2009/10) was among GP/FPs. However, this overall figure disguises a decline of almost 8% between 1993/94 and 1999/00, which then reversed. Significantly, the numbers of GP/FPs grew substantially between 1999/00 and

2009/10 (the largest growth in any specialty seen during this period). These growth periods compensated for the loss of GP/FPs between 1992/93 and 1999/00.

Among specialist groups, the combined surgical specialties grew the least, with overall growth of only 18% between 1992/93 and 2009/10. Within a number of specialties in this group, supply remained flat or contracted between 1992/93 and 1999/00. Overall, specialist numbers increased to a proportionally greater extent than did the numbers of GP/FPs.

We estimate that the density of physicians in Ontario in 2009/10 was 1.9 per 1,000 population. An analysis of the situation in Canada prepared by the Canadian Institute for Health Information found that Canada has an overall physician supply of 2.2 per 1,000 population, which is lower than other OECD countries such as Australia (3.2 per 1,000), the United Kingdom (2.5 per 1,000) and the United States (2.6 per 1,000).[1]

Overall Payments to Physicians (exhibits 11.3 to 11.7)

We identified payments of almost $8 billion to doctors in Ontario in 2009/10, $4.3 billion more than they were paid in 1992/93. These estimates are in unadjusted dollars. Exhibit 11.3 presents a breakdown of the total payments by physician groups in 2009/10. Thirty-nine percent of the expenditure went to GP/FPs, with 18% and 17% going to surgical and medical non-procedural specialist groups, respectively. Comparing this with physician supply, GP/FPs comprise 43% of the physician population, medical non-procedural specialists 22%, and surgical specialists only 14%.

Exhibits 11.4 to 11.6 present the distribution of overall payments within the large multispecialty groups. With respect to the non-medical procedural specialists, 22% of payments in 2009/10 went to pediatricians. This is commensurate with the fact that they make up 21% of all non-procedural specialists. Psychiatrists, on the other hand, received the largest proportion of payments, 26%, but they make up 35% of all non-procedural specialists. The discrepancy is due, in part, to the fact that we are missing mental health sessional fees and other payments to psychiatrists. Within the procedural specialty group, cardiologists received 45% of payments followed by gastroenterologists at 20%. Among the surgical specialist group, obstetricians/gynecologists received the largest proportion (21%), followed by general surgeons (19%) and ophthalmologists (18%); these specialties comprised 23%, 21% and 13% of the surgical specialty group, respectively.

By far the largest increase in total payments was to family physicians—an increase of more than $1.5 billion between 1993 and 2009 (exhibit 11.7). Next in rank order were anesthesiologists ($298 million), diagnostic radiologists ($294 million), emergency department physicians ($256 million), cardiologists ($223 million) and pediatricians ($193 million). Four of these are in the top five specialties ranked by increase in numbers of active physicians. The list also includes specialties that have been key to the wait times strategy.

Payments per Physician (exhibit 11.8 and 11.9)

Average payments per full-time equivalent (FTE) are summarized in exhibit 11.8. Diagnostic radiologists had the highest payments per FTE, with ophthalmologists, nephrologists, nuclear medicine specialists and vascular surgeons rounding out the top five. Among the multispecialty groups, imaging specialties had the highest payments per FTE, followed by procedural and surgical specialties. All of these groups rank higher than the mean for all physicians combined.

When we looked at the change in mean payments to physician specialties since 2005/06, GP/FPs came out on top with a 31% increase in four years (exhibit 11.9). This is related to the introduction and uptake of new models of funding primary care. The most lucrative of the models, the Family Health Organization, was also the most popular as at the end of 2009/10.

Other specialties that experienced relatively large increases in the past four years include diagnostic radiology (29%), clinical immunology (29%), geriatric medicine (29%) and pediatrics (28%). However, although the rate of increase might be the same, the average payments per physician were not. Pediatricians, for example, ranked 29th out of 32 specialties in their mean payments per FTE. Geriatricians ranked 28th and clinical immunologists 18th; diagnostic radiologists were first overall. Pediatricians with an average payment per physician of $260,000 ranked far below diagnostic radiologists and ophthalmologists at over $600,000 each.

REFERENCE

1 Canadian Institute for Health Information. *Health Care Cost Drivers: The Facts*. Ottawa: CIHI; 2011. Accessed January 13, 2012 at http://secure.cihi.ca/cihiweb/products/health_care_cost_drivers_the_facts_en.pdf.

ALL PHYSICIANS

EXHIBIT 11.1 Total and percent change in number of active physicians by specialty and specialty group, in Ontario, 1993/94, 1999/00, 2005/06 and 2009/10

	NUMBER OF ACTIVE PHYSICIANS				PERCENT CHANGE IN PHYSICIAN SUPPLY				
Specialty/Specialty Group	**1993/94**	**1999/00**	**2005/06**	**2009/10**	**1993/94-1999/00**	**1999/00-2005/06**	**2005/06-2009/10**	**1993/94-2009/10**	**Rank, 1993/94-2009/10**
Anesthesiology	814	858	1,032	1,182	5.9	19.7	14.5	45.2	13
Emergency department physicians	718	764	1,073	1,350	7.2	39.4	25.8	88.0	4
General practice/family medicine	10,329	9,529	10,238	10,799	-7.5	7.3	5.4	4.5	29
IMAGING SPECIALTIES									
Diagnostic radiology	702	753	885	975	7.3	17.5	10.2	38.9	16
Nuclear medicine	57	75	78	88	31.6	4.0	12.8	54.4	11
Group Total	**759**	**828**	**963**	**1,063**	**9.1**	**16.3**	**10.4**	**40.1**	
MEDICAL NON-PROCEDURAL SPECIALTIES AND SUBSPECIALTIES									
Clinical immunology	49	60	63	62	22.4	5.0	-1.6	26.5	23
Dermatology	207	207	188	200	0.0	-9.2	6.4	-3.4	32
Endocrinology	112	139	151	174	25.9	7.1	15.2	55.4	10
Geriatric medicine	53	83	90	102	58.5	7.1	13.3	92.5	3
Hematology	111	117	135	152	8.8	9.8	12.6	34.5	19
Internal medicine	671	517	827	966	-22.9	60.0	16.5	43.8	14
Medical oncology	94	130	149	187	39.4	13.7	25.5	98.9	2
Neurology	208	231	261	295	13.4	10.1	13.0	41.1	15
Pediatrics	680	725	1,015	1,165	10.3	26.2	14.8	59.8	9
Physical medicine and rehabilitation	119	136	158	164	15.0	14.5	3.8	36.7	17
Psychiatry	1,643	1,768	1,857	1,979	8.1	4.6	6.6	20.5	26

Note: Totals include only physicians for whom payment information was available.

continued on next page...

EXHIBIT 11.1 CONTINUED...

	NUMBER OF ACTIVE PHYSICIANS				PERCENT CHANGE IN PHYSICIAN SUPPLY				
Specialty/Specialty Group	**1993/94**	**1999/00**	**2005/06**	**2009/10**	**1993/94-1999/00**	**1999/00-2005/06**	**2005/06-2009/10**	**1993/94-2009/10**	**Rank, 1993/94-2009/10**
Rheumatology	119	149	151	160	29.4	-1.9	6.0	34.5	20
Group Total	**4,066**	**4,262**	**5,045**	**5,606**	**6.5**	**16.6**	**11.3**	**38.2**	
MEDICAL PROCEDURAL SPECIALTIES AND SUBSPECIALTIES									
Cardiology	375	479	539	625	27.9	11.8	16.0	65.8	7
Gastroenterology	163	211	230	289	27.5	8.0	25.7	73.1	6
Nephrology	88	125	155	191	41.6	23.0	23.2	114.6	1
Radiation oncology	104	127	154	182	22.1	21.3	18.2	75.0	5
Respirology	145	186	212	236	30.8	11.0	11.3	61.6	8
Group Total	**875**	**1,128**	**1,290**	**1,523**	**23.5**	**9.8**	**16.6**	**58.1**	
SURGICAL SPECIALTIES									
Cardiac and thoracic surgery	91	105	126	136	16.5	18.9	7.9	49.5	12
General surgery	670	607	667	720	-9.0	9.3	7.9	7.5	28
Neurosurgery	77	72	79	97	0.0	2.6	22.8	26.0	24
Obstetrics/gynecology	661	664	729	790	0.5	9.8	8.4	19.5	27
Ophthalmology	422	418	418	441	-0.9	0.0	5.5	4.5	30
Orthopedic surgery	388	418	470	524	7.7	12.4	11.5	35.1	18
Otolaryngology	238	223	241	248	-5.5	7.1	2.9	4.2	31
Plastic surgery	154	164	186	200	6.5	13.4	7.5	29.9	22
Urology	213	235	251	268	10.3	6.8	6.8	25.8	25
Vascular surgery	54	65	66	72	20.4	1.5	9.1	33.3	21
Group Total	**2,968**	**2,971**	**3,233**	**3,496**	**0.5**	**8.4**	**8.1**	**17.8**	
ONTARIO	**20,529**	**20,340**	**22,874**	**25,019**	**-0.9**	**12.5**	**9.4**	**21.9**	

Note: Totals include only physicians for whom payment information was available.

ALL PHYSICIANS

EXHIBIT 11.2 Total and percent change in number of physician full-time equivalents (FTES) by specialty and specialty group, in Ontario, 1993/94, 1999/00, 2005/06 and 2009/10

	NUMBER OF FTES				PERCENT CHANGE IN FTES		
Specialty/Specialty Group	**1993/94**	**1999/00**	**2005/06**	**2009/10**	**1993/94-1999/00**	**1999/00-2005/06**	**2005/06-2009/10**
Anesthesiology	758	791	950	1,115	4	20	17
Emergency department physicians	634	703	1,057	1,375	11	50	30
General practice/family medicine	9,105	8,657	9,500	10,220	-5	10	8
IMAGING SPECIALTIES							
Diagnostic radiology	651	705	810	906	8	15	12
Nuclear medicine	56	72	75	85	30	3	13
Group Total	**707**	**777**	**885**	**990**	**10**	**14**	**12**
MEDICAL NON-PROCEDURAL SPECIALTIES AND SUBSPECIALTIES							
Clinical immunology	46	55	60	60	19	10	-1
Dermatology	186	185	173	198	0	-7	15
Endocrinology	117	136	150	174	17	10	16
Geriatric medicine	56	80	87	100	45	8	15
Hematology	105	107	120	137	2	13	13
Internal medicine	635	491	753	887	-23	53	18
Medical oncology	94	129	143	177	36	11	24
Neurology	193	223	263	289	15	18	10
Pediatrics	617	642	1,043	1,187	4	63	14
Physical medicine and rehabilitation	121	130	143	157	7	10	10
Psychiatry	1,525	1,640	1,763	1,895	8	8	8

Note: Totals include only physicians for whom payment information was available.

continued on next page...

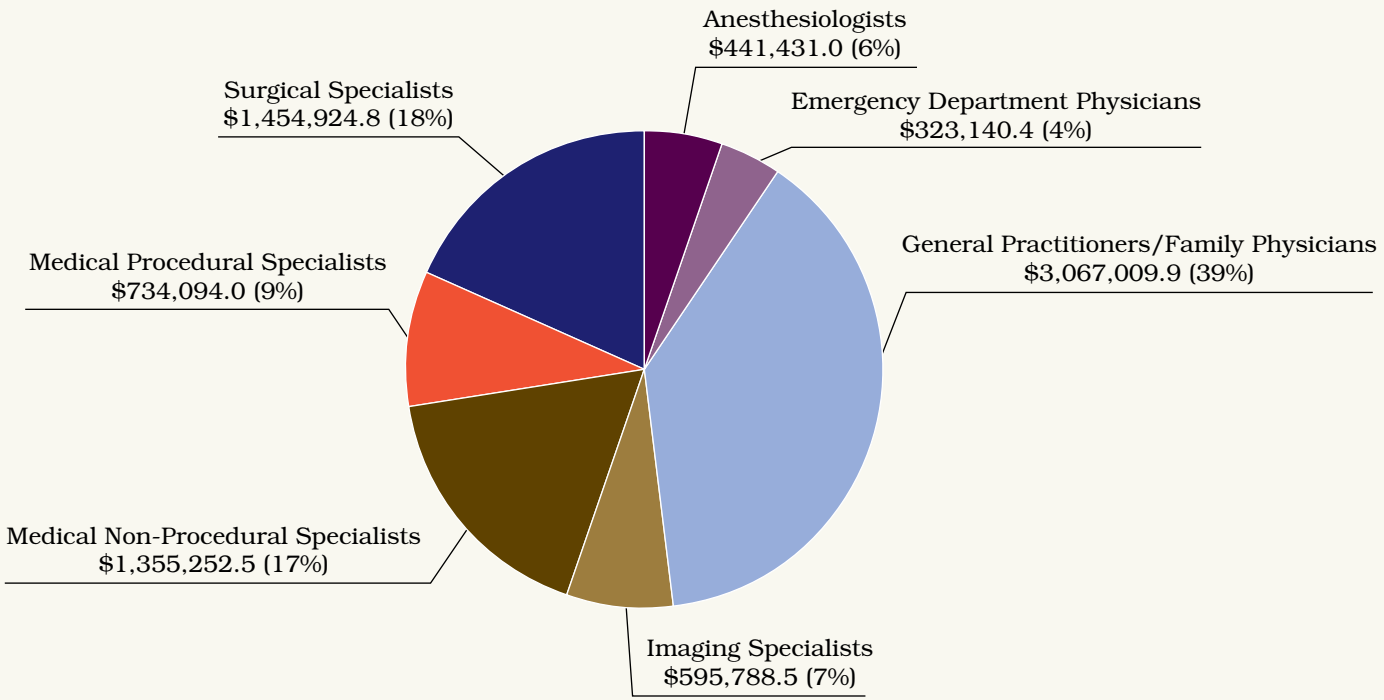
EXHIBIT 11.2 CONTINUED...

	NUMBER OF FTES				PERCENT CHANGE IN FTES		
Specialty/Specialty Group	**1993/94**	**1999/00**	**2005/06**	**2009/10**	**1993/94-1999/00**	**1999/00-2005/06**	**2005/06-2009/10**
Rheumatology	120	148	153	164	23	3	7
Group Total	**3,816**	**3,966**	**4,851**	**5,425**	**4**	**24**	**12**
MEDICAL PROCEDURAL SPECIALTIES AND SUBSPECIALTIES							
Cardiology	344	442	521	617	28	18	18
Gastroenterology	152	192	220	278	27	15	26
Nephrology	81	115	142	183	41	24	29
Radiation oncology	102	120	149	176	19	24	18
Respirology	136	181	200	228	33	10	14
Group Total	**815**	**1,050**	**1,232**	**1,482**	**23**	**14**	**20**
SURGICAL SPECIALTIES							
Cardiac and thoracic surgery	85	96	116	125	13	21	8
General surgery	582	531	598	656	-9	13	10
Neurosurgery	70	62	71	92	-10	13	30
Obstetrics/gynecology	597	596	677	725	0	14	7
Ophthalmology	381	380	387	426	0	2	10
Orthopedic surgery	331	353	405	465	7	15	15
Otolaryngology	214	194	209	223	-9	7	7
Plastic surgery	136	146	165	183	7	13	11
Urology	195	199	223	246	2	12	10
Vascular surgery	55	63	63	70	16	-1	11
Group Total	**2,646**	**2,621**	**2,914**	**3,210**	**-1**	**11**	**10**
ONTARIO	**18,481**	**18,565**	**21,389**	**23,818**	**1**	**15**	**11**

Note: Totals include only physicians for whom payment information was available.

ALL PHYSICIANS

EXHIBIT 11.3 Distribution of all payments (in thousands of dollars) to physicians by specialty group, in Ontario, 2009/10

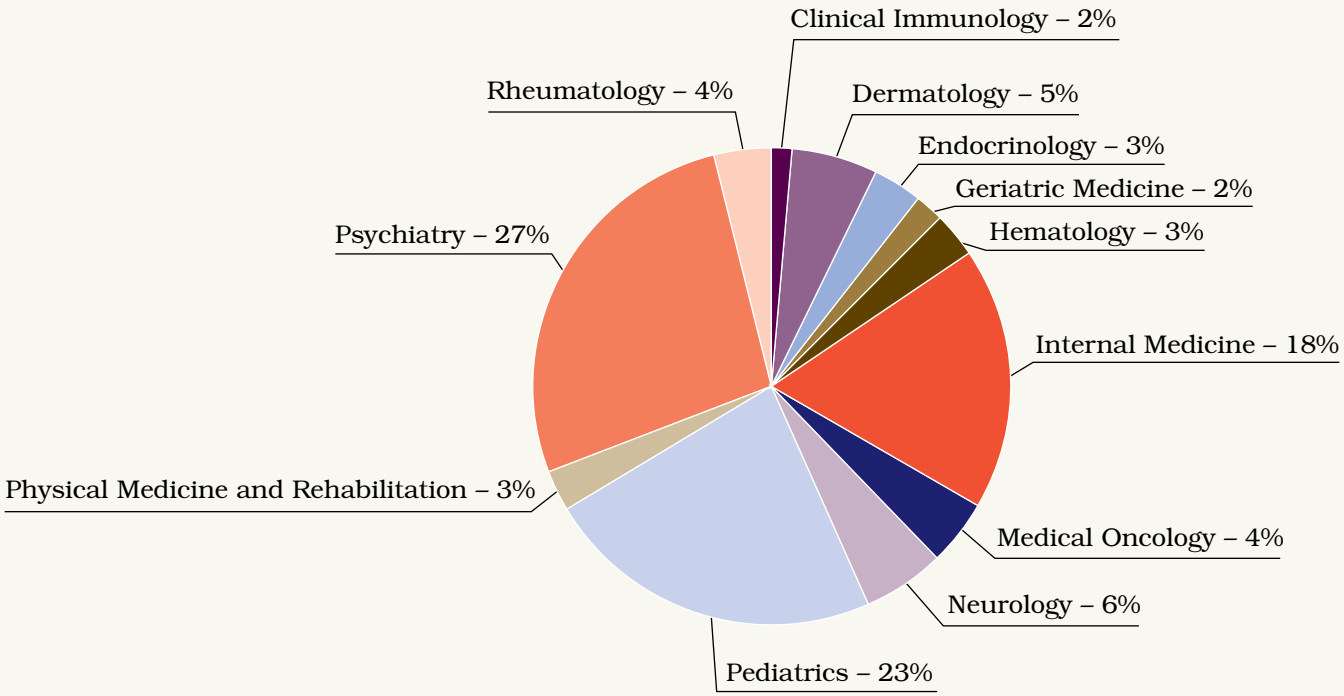


Total: $7,971,641.2

Note: All payment estimates are rounded to the nearest hundred and presented in thousands of dollars. Percents are calculated on unrounded numbers and rounded to the nearest integer.

MEDICAL NON-PROCEDURAL SPECIALISTS

EXHIBIT 11.4 Distribution of payments to medical non-procedural specialists, in Ontario, 2009/10

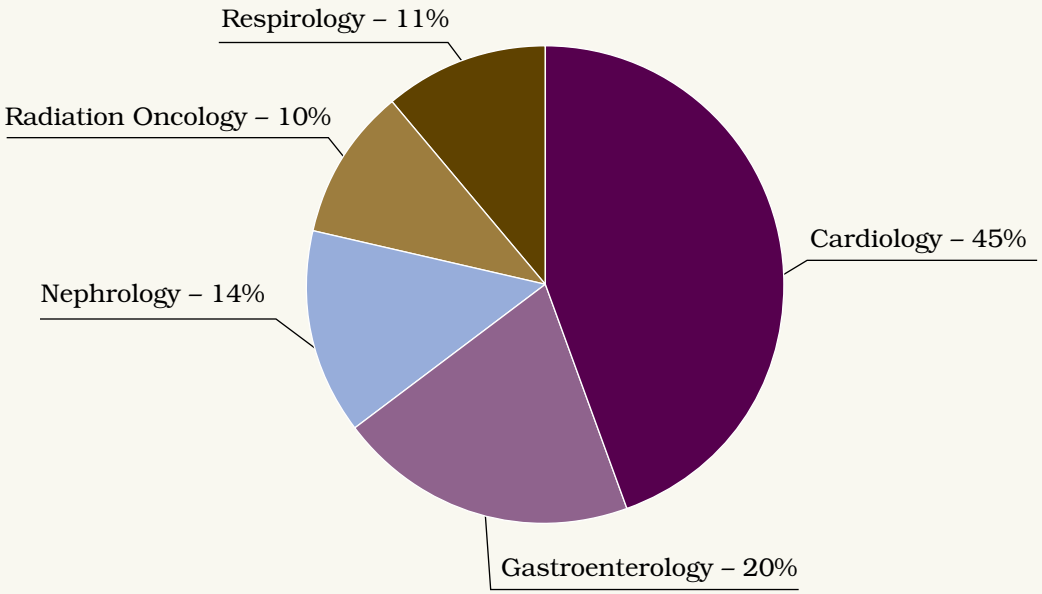


Total (in thousands of dollars): $1,355,252.5

Note: Payment estimates are rounded to the nearest hundred and presented in thousands of dollars. Percents are calculated on unrounded numbers and rounded to the nearest integer.

MEDICAL PROCEDURAL SPECIALISTS

EXHIBIT 11.5 Distribution of payments to medical procedural specialists, in Ontario, 2009/10

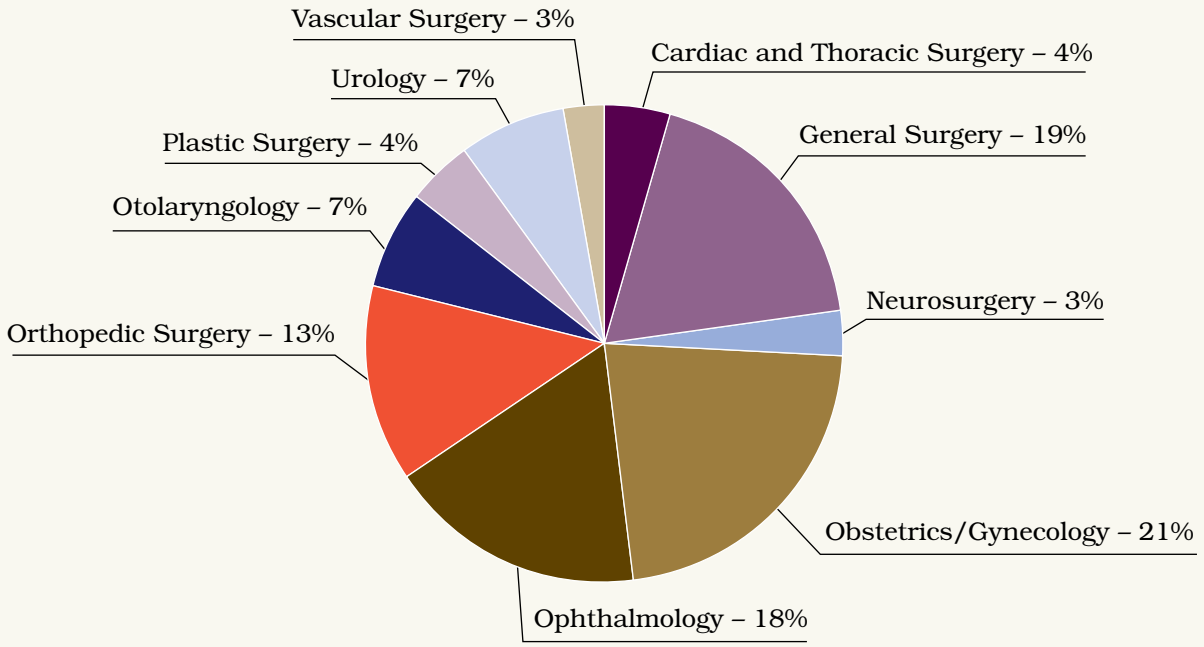


Total (in thousands of dollars): $734,094.0

Note: Payment estimates are rounded to the nearest hundred and presented in thousands of dollars. Percents are calculated on unrounded numbers and rounded to the nearest integer.

SURGICAL SPECIALISTS

EXHIBIT 11.6 Distribution of payments to surgical specialists, in Ontario, 2009/10



Total (in thousands of dollars): $1,454,924.8

Note: Payment estimates are rounded to the nearest hundred and presented in thousands of dollars. Percents are calculated on unrounded numbers and rounded to the nearest integer.

ALL PHYSICIANS

EXHIBIT 11.7 Total and percent change in payments from all MOHLTC sources to physicians by specialty and specialty group, in Ontario, 1993/94, 1999/00, 2005/06 and 2009/10

	PAYMENTS FROM ALL SOURCES, IN THOUSANDS OF DOLLARS				CHANGE IN TOTAL PAYMENTS, IN THOUSANDS OF DOLLARS (% CHANGE)			
Specialty/Specialty Group	**1993/94**	**1999/00**	**2005/06**	**2009/10**	**1993/94-1999/00**	**1999/00-2005/06**	**2005/06-2009/10**	**1993/94-2009/10**
Anesthesiology	143,531.7	175,534.0	296,667.6	441,431	32,002.3 (22)	121,133.6 (69)	144,763.4 (49)	297,899.3 (208)
Emergency department physicians	67,077.6	101,464.7	199,660.6	323,140.4	34,387.1 (51)	98,195.9 (97)	123,479.8 (62)	256,062.8 (382)
General practice/family medicine	1,513,228.0	1,612,869.7	2,176,527.1	3,067,009.9	99,641.7 (7)	563,657.4 (35)	890,482.8 (41)	1,553,781.9 (103)
IMAGING SPECIALTIES								
Diagnostic radiology	255,123.2	353,764.1	379,946.2	549,480.9	98,640.9 (39)	26,182.1 (7)	169,534.7 (45)	294,357.7 (115)
Nuclear medicine	29,485.4	52,853.4	36,445.2	46,307.7	23,368.0 (79)	-16,408.2 (-31)	9,862.5 (27)	16,822.3 (57)
Group Total	**284,608.6**	**406,617.5**	**416,391.3**	**595,788.5**	**122,008.9 (43)**	**9,773.8 (2)**	**179,397.2 (43)**	**311,179.9 (109)**
MEDICAL NON-PROCEDURAL SPECIALTIES AND SUBSPECIALTIES								
Clinical immunology	10,545.6	13,445.9	17,504.2	22,407.7	2,900.3 (28)	4,058.3 (30)	4,903.5 (28)	11,862.1 (112)
Dermatology	53,120.8	53,191.2	55,354.8	76,090.8	70.4 (0)	2,163.6 (4)	20,736.0 (37)	22,970.0 (43)
Endocrinology	21,738.5	26,377.8	32,463.8	47,854.8	4,639.3 (21)	6,086.0 (23)	15,391.0 (47)	26,116.3 (120)
Geriatric medicine	5,027.7	11,120.0	17,801.1	26,365.6	6,092.3 (121)	6,681.1 (60)	8,564.5 (48)	21,337.9 (424)
Hematology	15,222.1	16,971.6	30,442.7	39,828.8	1,749.5 (11)	13,471.1 (79)	9,386.1 (31)	24,606.7 (162)
Internal medicine	103,324.3	78,499.2	168,113.7	240,869.8	-24,825.1 (-24)	89,614.5 (114)	72,756.1 (43)	137,545.5 (133)
Medical oncology	12,752.1	22,458.3	39,189.5	58,643.2	9,706.2 (76)	16,731.2 (74)	19,453.7 (50)	45,891.1 (360)
Neurology	38,732.5	44,827.3	57,355.2	78,650.2	6,094.8 (16)	12,527.9 (28)	21,295.0 (37)	39,917.7 (103)
Pediatrics	117,090.4	124,729.9	212,546.3	310,240.7	7,639.5 (7)	87,816.4 (70)	97,694.4 (46)	193,150.3 (165)
Physical medicine and rehabilitation	18,366.7	21,172.3	29,794.2	39,413.2	2,805.6 (15)	8,621.9 (41)	9,619.0 (32)	21,046.5 (115)
Psychiatry	231,716.3	254,314.3	296,987.6	365,840.1	22,598.0 (10)	42,673.3 (17)	68,852.5 (23)	134,123.8 (58)

Note: Payment estimates are rounded to the nearest hundred and presented in thousands of dollars.
Percentages are calculated on unrounded numbers and rounded to the nearest integer.

continued on next page...

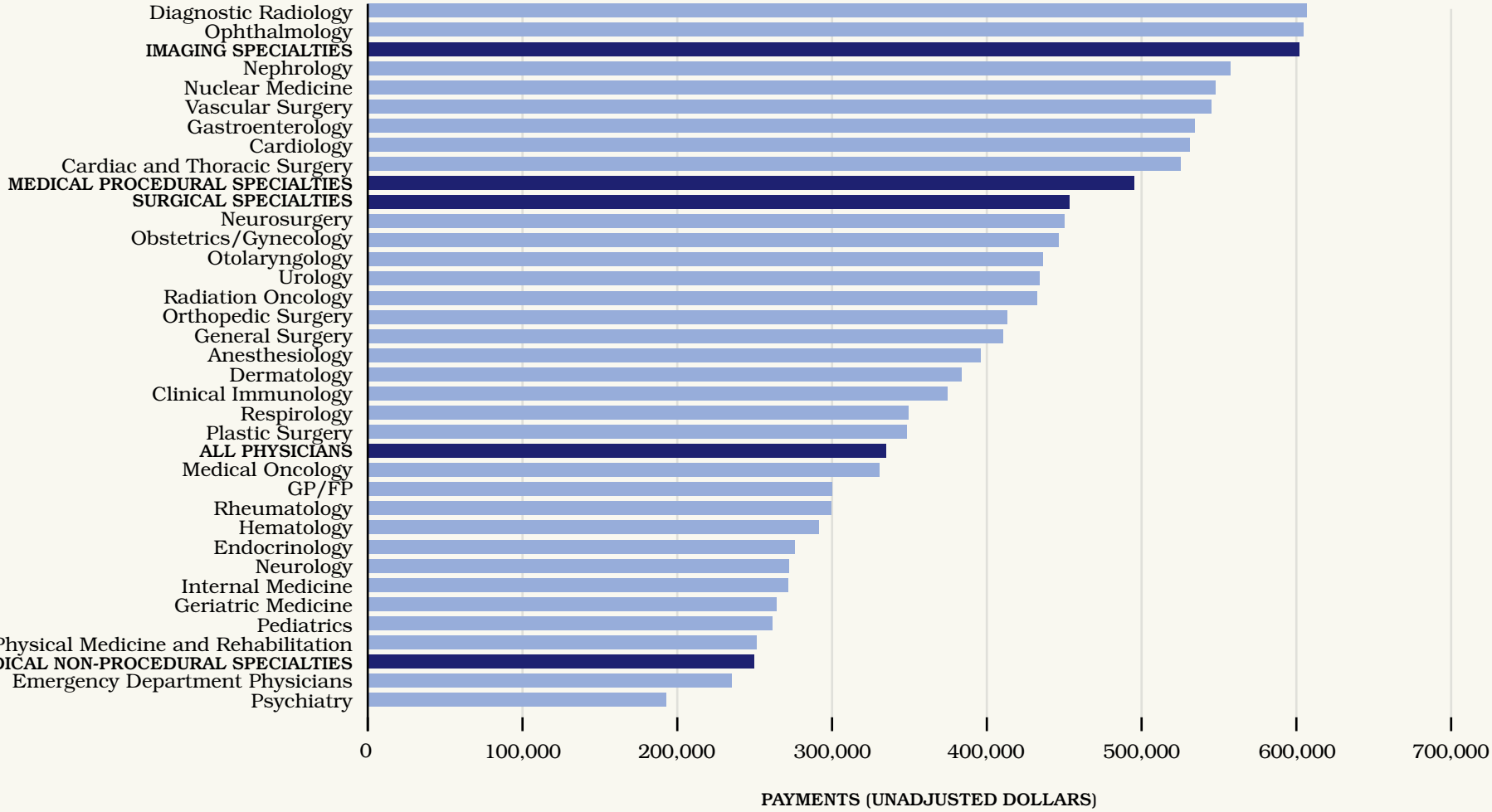
EXHIBIT 11.7 CONTINUED...

	PAYMENTS FROM ALL SOURCES, IN THOUSANDS OF DOLLARS				CHANGE IN TOTAL PAYMENTS, IN THOUSANDS OF DOLLARS (% CHANGE)			
Specialty/Specialty Group	**1993/94**	**1999/00**	**2005/06**	**2009/10**	**1993/94-1999/00**	**1999/00-2005/06**	**2005/06-2009/10**	**1993/94-2009/10**
Rheumatology	23,721.9	31,185.3	36,933.2	49,047.6	7,463.4 (31)	5,747.9 (18)	12,114.4 (33)	25,325.7 (107)
Group Total	**651,358.9**	**698,293.1**	**994,486.3**	**1,355,252.5**	**46,934.2 (7)**	**296,193.2 (42)**	**360,766.2 (36)**	**703,893.6 (108)**
MEDICAL PROCEDURAL SPECIALTIES AND SUBSPECIALTIES								
Cardiology	104,288.7	155,158.6	221,417.7	327,642.4	50,869.9 (49)	66,259.1 (43)	106,224.7 (48)	223,353.7 (214)
Gastroenterology	46,515.8	65,447.6	98,168.9	148,718.1	18,931.8 (41)	32,721.3 (50)	50,549.2 (51)	102,202.3 (220)
Nephrology	23,093.6	46,081.9	76,294.8	102,022.3	22,988.3 (100)	30,212.9 (66)	25,727.5 (34)	78,928.7 (342)
Radiation oncology	10,779.6	12,626.1	55,399.5	76,050.0	1,846.5 (17)	42,773.4 (339)	20,650.5 (37)	65,270.4 (605)
Respirology	34,438.2	55,269.1	60,186.8	79,661.2	20,830.9 (60)	4,917.7 (9)	19,474.4 (32)	45,223.0 (131)
Group Total	**219,115.9**	**334,583.4**	**511,467.7**	**734,094**	**115,467.5 (53)**	**176,884.3 (53)**	**222,626.3 (44)**	**514,978.1 (235)**
SURGICAL SPECIALTIES								
Cardiac and thoracic surgery	27,404.1	37,042.6	50,525.1	65,534.8	9,638.5 (35)	13,482.5 (36)	15,009.7 (30)	38,130.7 (139)
General surgery	135,125.0	136,705.7	203,194.2	269,461.2	1,580.7 (1)	66,488.5 (49)	66,267.0 (33)	134,336.2 (99)
Neurosurgery	16,029.9	17,678.7	27,867.3	41,302.8	1,648.8 (10)	10,188.6 (58)	13,435.5 (48)	25,272.9 (158)
Obstetrics/gynecology	163,179.5	174,001.8	243,598.4	323,594.1	10,822.3 (7)	69,596.6 (40)	79,995.7 (33)	160,414.6 (98)
Ophthalmology	113,782.2	137,503.4	192,750	257,465.6	23,721.2 (21)	55,246.6 (40)	64,715.6 (34)	143,683.4 (126)
Orthopedic surgery	88,001.4	103,339.3	149,319	191,847.6	15,337.9 (17)	45,979.7 (44)	42,528.6 (28)	103,846.2 (118)
Otolaryngology	59,740.1	60,256.6	78,476.7	97,196.9	516.5 (1)	18,220.1 (30)	18,720.2 (24)	37,456.8 (63)
Plastic surgery	35,679.4	37,171.5	48,960.3	63,792.0	1,492.1 (4)	11,788.8 (32)	14,831.7 (30)	28,112.6 (79)
Urology	59,594.7	62,809.8	87,566.6	106,580.4	3,215.1 (5)	24,756.8 (39)	19,013.8 (22)	46,985.7 (79)
Vascular surgery	16,799.7	23,196.7	27,698.6	38,149.4	6,397.0 (38)	4,501.9 (19)	10,450.8 (38)	21,349.7 (127)
Group Total	**715,336.1**	**789,706.1**	**1,109,956.1**	**1,454,924.8**	**74,370.0 (10)**	**320,250.0 (41)**	**344,968.7 (31)**	**739,588.7 (103)**
ONTARIO	**3,594,256.8**	**4,119,068.5**	**5,705,156.7**	**7,971,641.2**	**524,811.7 (15)**	**1,586,088.2 (39)**	**2,266,484.5 (40)**	**4,377,384.4 (122)**

Note: Payment estimates are rounded to the nearest hundred and presented in thousands of dollars. Percentages are calculated on unrounded numbers and rounded to the nearest integer.

ALL PHYSICIANS

EXHIBIT 11.8 Mean payments per full-time equivalent (FTE) by specialty and specialty group, in Ontario, 2009/10



ALL PHYSICIANS

EXHIBIT 11.9 Mean payments per full-time equivalent (FTE) and percent change in payments by specialty and specialty group, in Ontario, 1993/94, 1999/00, 2005/06 and 2009/10

	MEAN PAYMENTS PER FTE					CHANGE IN MEAN PAYMENTS PER FTE (% CHANGE)				
	1993/94	1999/00	2005/06	2009/10	Rank, 2009	1993/94-1999/00	1999/00-2005/06	2005/06-2009/10	Rank of % change, 2005/06-2009/10	1993/94-2009/10
Anesthesiology	189,200	221,900	312,300	395,900	16	32,700 (17)	90,400 (41)	83,600 (27)	6	206,700 (109)
Emergency department physicians	105,700	144,400	188,900	235,000	31	38,700 (37)	44,500 (31)	46,100 (24)	10	129,300 (122)
General practice/family medicine	166,200	186,300	229,100	300,100	22	20,100 (12)	42,800 (23)	71,000 (31)	1	133,900 (81)
IMAGING SPECIALTIES										
Diagnostic radiology	391,900	501,800	468,800	606,700	1	109,900 (28)	-33,000 (-7)	137,900 (29)	2	214,800 (55)
Nuclear medicine	529,000	730,800	487,800	547,700	4	201,800 (38)	-243,000 (-33)	59,900 (12)	29	18,700 (4)
Group Total	**402,700**	**523,100**	**470,400**	**601,700**		**120,400 (30)**	**-52,700 (-10)**	**131,300 (28)**		**199,000 (49)**
MEDICAL NON-PROCEDURAL SPECIALTIES AND SUBSPECIALTIES										
Clinical immunology	229,000	244,500	290,600	374,400	18	15,500 (7)	46,100 (19)	83,800 (29)	3	145,400 (63)
Dermatology	285,400	287,000	320,000	383,400	17	1,600 (1)	33,000 (11)	63,400 (20)	19	98,000 (34)
Endocrinology	186,300	193,500	216,600	275,600	25	7,200 (4)	23,100 (12)	59,000 (27)	7	89,300 (48)
Geriatric medicine	90,400	138,200	205,000	264,100	28	47,800 (53)	66,800 (48)	59,100 (29)	4	173,700 (192)
Hematology	145,200	158,700	252,700	291,500	24	13,500 (9)	94,000 (59)	38,800 (15)	26	146,300 (101)
Internal medicine	162,600	159,800	223,400	271,500	27	-2,800 (-2)	63,600 (40)	48,100 (22)	14	108,900 (67)
Medical oncology	135,000	174,500	274,200	330,600	21	39,500 (29)	99,700 (57)	56,400 (21)	15	195,600 (145)
Neurology	200,200	201,200	217,800	271,900	26	1,000 (0)	16,600 (8)	54,100 (25)	8	71,700 (36)
Pediatrics	189,600	194,400	203,800	261,300	29	4,800 (3)	9,400 (5)	57,500 (28)	5	71,700 (38)
Physical medicine and rehabilitation	151,900	163,000	208,600	251,000	30	11,100 (7)	45,600 (28)	42,400 (20)	20	99,100 (65)
Psychiatry	152,000	155,100	168,400	193,000	32	3,100 (2)	13,300 (9)	24,600 (15)	27	41,000 (27)

Note: Payment estimates are rounded to the nearest hundred. Percentages are calculated on unrounded numbers and rounded to the nearest integer.

continued on next page...

EXHIBIT 11.9 CONTINUED...

	MEAN PAYMENTS PER FTE					CHANGE IN MEAN PAYMENTS PER FTE (% CHANGE)				
	1993/94	1999/00	2005/06	2009/10	Rank, 2009	1993/94-1999/00	1999/00-2005/06	2005/06-2009/10	Rank of % change, 2005/06-2009/10	1993/94-2009/10
Rheumatology	197,400	210,500	241,600	299,200	23	13,100 (7)	31,100 (15)	57,600 (24)	11	101,800 (52)
Group Total	**170,700**	**176,100**	**205,000**	**249,800**		**5,400 (3)**	**28,900 (16)**	**44,800 (22)**		**79,100 (46)**
MEDICAL PROCEDURAL SPECIALTIES AND SUBSPECIALTIES										
Cardiology	302,800	351,400	424,700	531,000	7	48,600 (16)	73,300 (21)	106,300 (25)	9	228,200 (75)
Gastroenterology	306,900	341,000	446,000	534,400	6	34,100 (11)	105,000 (31)	88,400 (20)	21	227,500 (74)
Nephrology	283,500	402,500	538,400	557,200	3	119,000 (42)	135,900 (34)	18,800 (3)	32	273,700 (97)
Radiation oncology	106,100	104,800	371,200	432,400	13	-1,300 (-1)	266,400 (254)	61,200 (16)	23	326,300 (307)
Respirology	253,200	305,200	301,500	349,300	19	52,000 (21)	-3,700 (-1)	47,800 (16)	24	961,00 (38)
Group Total	**268,800**	**318,800**	**415,100**	**495,200**		**50,000 (19)**	**96,300 (30)**	**80,100 (19)**		**226,400 (84)**
SURGICAL SPECIALTIES										
Cardiac and thoracic surgery	320,800	384,700	435,500	525,400	8	63,900 (20)	50,800 (13)	89,900 (21)	16	204,600 (64)
General surgery	232,400	257,600	339,600	410,500	15	25,200 (11)	82,000 (32)	70,900 (21)	17	178,100 (77)
Neurosurgery	230,600	283,300	395,200	450,300	9	52,700 (23)	111,900 (39)	55,100 (14)	28	219,700 (95)
Obstetrics/gynecology	273,200	292,200	359,700	446,100	10	19,000 (7)	67,500 (23)	86,400 (24)	12	172,900 (63)
Ophthalmology	298,300	361,700	498,300	604,600	2	63,400 (21)	136,600 (38)	106,300 (21)	18	306,300 (103)
Orthopedic surgery	265,500	292,800	368,500	412,900	14	27,300 (10)	75,700 (26)	44,400 (12)	30	147,400 (56)
Otolaryngology	279,400	309,800	376,000	436,400	11	30,400 (11)	66,200 (21)	60,400 (16)	25	157,000 (56)
Plastic surgery	262,100	254,300	296,100	348,500	20	-7,800 (-3)	41,800 (16)	52,400 (18)	22	86,400 (33)
Urology	306,000	315,000	393,100	433,900	12	9,000 (3)	78,100 (25)	40,800 (10)	31	127,900 (42)
Vascular surgery	308,000	366,500	440,200	545,000	5	58,500 (19)	73,700 (20)	104,800 (24)	13	237,000 (77)
Group Total	**270,400**	**301,300**	**380,900**	**453,200**		**30,900 (11)**	**79,600 (26)**	**72,300 (19)**		**182,800 (68)**
ONTARIO	**194,500**	**221,900**	**266,700**	**334,700**		**27,400 (14)**	**44,800 (20)**	**68,000 (25)**		**140,200 (72)**

Note: Payment estimates are rounded to the nearest hundred. Percentages are calculated on unrounded numbers and rounded to the nearest integer.

CHAPTER 12

Discussion and Conclusion

DISCUSSION

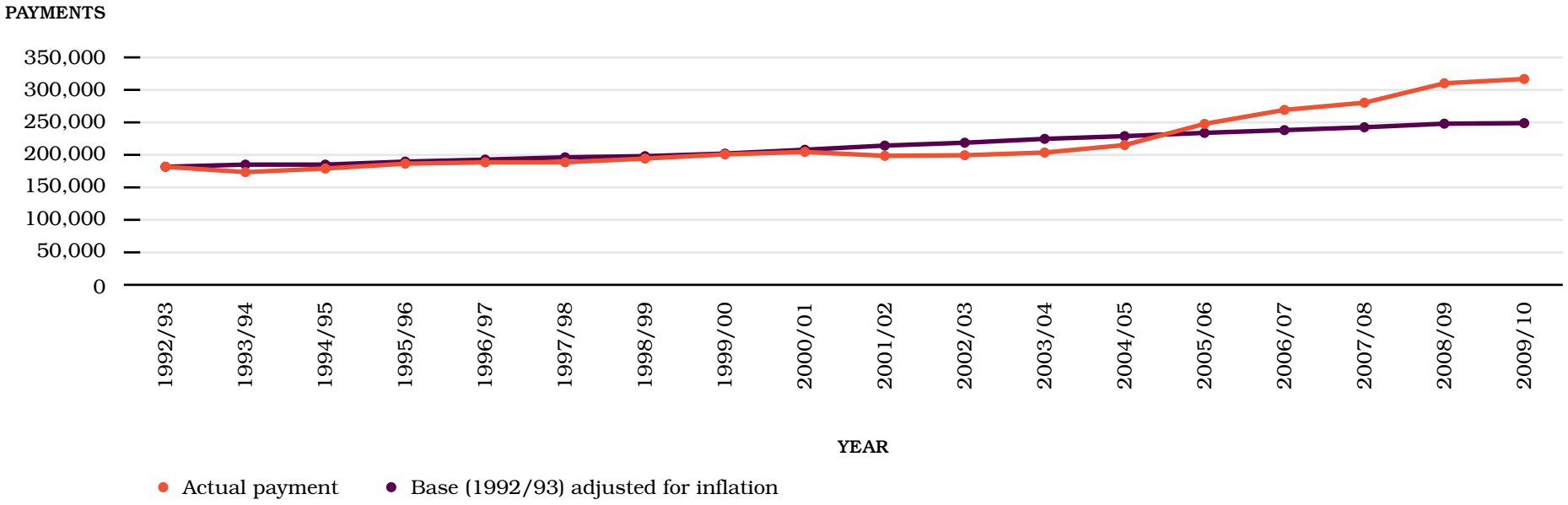
This report has documented payments to physicians during two different policy environments. The first phase included the period up to 1998 when, in common with other provinces, Ontario capped payments to physicians and restricted the numbers of physicians who could receive full payment of fees under the Ontario Health Insurance Plan (OHIP). Most payments during this period were made under fee-for-service (FFS) arrangements. The second period from 1998 onward represented a sharp change in policies with a shift to alternate payment plans (including capitation) to bolster recruitment and retention in certain specialties and in general/family medicine in particular. This period also coincided with the implementation of a range of interventions designed to reduce wait times for certain surgical procedures and diagnostic tests.

There were many other factors in play during this second period; examples include the promotion of screening tests for colorectal and breast cancer and major changes in the treatment of coronary heart disease, with increasing use of angioplasty and stents rather than open heart surgery. The period also coincides with a better appreciation of the importance of chronic diseases, including diabetes, congestive heart failure and chronic pulmonary disease in an aging population. It is to be expected that these trends would be reflected in payments for services provided by particular groups of physicians.

The two policy environments had different impacts on the trajectory of payments, as exhibit 12.1 illustrates.

The average per capita payment to Ontario physicians remained at or below the rate of inflation until 2004/05, after which it increased sharply and exceeded inflation (using Ontario's consumer price index) until the end of the study period. This finding is consistent with a 2011 CIHI study that found that across Canada the rates of increase in physician compensation followed rates of increase in the Government Current Expenditure Implicit Price Index (GCEIPI) prior to 1998.[1] Since 1998, rates of increase in physician compensation have exceeded rates of increase in the GCEIPI. CIHI reported that physician compensation grew faster than wages for other health and social services workers. There are a number of theoretical reasons for this recent increase, including a rise in the number of patients treated since 2004/05, an increase in services received by each patient, a rise in fees, and a shift to more expensive services.

EXHIBIT 12.1 Mean annual payments per head to all Ontario physicians and inflation-adjusted base (1992/93) payment, 1992/93 to 2009/10



A full evaluation of these potential explanations is beyond the scope of this report as it would require that analyses be performed at the level of individual patients. However, to get a lead on the main drivers of the increase in payments we performed some additional analyses at the physician level. Approximately 63% of the $4.3 billion increase in total payments was related to an increase in average payments per physician. The other 37% was a result of the increase in physician supply. Between 2004/05 and 2009/10, the substantial increases in OHIP payments to radiologists, nephrologists and ophthalmologists were due almost exclusively due to an increase in the average number of services provided by each specialist.

In its report, CIHI concluded that fee increases were the major cost driver for physician expenditure during the last 10 years. Per capita utilization (adjusted for aging) was the second major cost driver, and population growth and aging were the third and fourth most important.[1] Our data suggest that for key growth specialties, fee increases per se were not the main factor, and utilization (as reflected in services provided per physician) was more important, at least during the all-important period between 2005 and 2009. CIHI also reported that for both medical and surgical specialties a rise in the use of diagnostic and therapeutic services has been a significant cost driver. Population aging on its own was responsible for a relatively modest rate of growth in expenditure: 0.6% per year.[1] Further elucidation of these trends will require a patient-level analysis of the types of services provided and how these have changed over time. This is beyond the scope of the present analysis.

Payments to Specialists

As noted earlier, the policy initiatives directed at specialists have included a wide variety of alternate payment plans. The analyses presented here indicate that they have become significant payment programs for geriatrics, pediatrics, medical oncology, radiation oncology, hematology, and emergency medicine. Doubtless these payment models, as an alternative to FFS, have helped to retain practitioners in these specialties all of which have seen an increase in physician supply in recent years. However, with the exception of radiation oncology, payments to these specialties remain below the average for all specialist physicians. Those that rank highest include specialties that have had a key role in the government's wait times strategy. Those specialties, for instance ophthalmology and radiology, continue to have a high dependence on payments under FFS. As noted earlier the increased number of services provided by them in recent years has been the main cost driver rather than an increase in the scheduled fees. This increase in productivity may have resulted from longer working hours, but it is also likely that these specialties have benefitted from improvements in technology, and access to hospital facilities, which have allowed them to manage increased numbers of patients in a working day.

Under fee-for-service arrangements, more treated patients translates directly into more money. Doubtless, patients have been beneficiaries, but we undertook no patient-level analysis in this work and are not able to comment on clinical outcomes.

Payments to General Practitioners/ Family Physicians

We found that the numbers of GP/FPs have increased significantly since reaching a nadir in 2001/02. Their payments have increased, and the majority have enrolled in an alternative funding model. Arguably, these are the most important findings in this report. GP/FPs are the first point of contact for many patients, provide consultation and care for common problems and have a key role in disease prevention (through immunization, screening and risk factor reduction). They are the largest group of physicians in Ontario, and therefore, changes in their payments have a large financial impact.

Alternatives to FFS in general/family practice are not new. Before the start of our observation period, Ontario had a number of health service organizations that paid physicians on a capitation basis, and Community Health Centres, where physicians were (and still are)

salaried employees. However, prior to 2000 the number of physicians being paid primarily through non-FFS sources was quite low, estimated at 2–5% of the total physician pool.[2] The process of deliberately moving GP/FPs away from a purely FFS model began in earnest in 1999/00. In that year, several primary care capitation pilot projects (called Primary Care Networks) began. A major expansion of primary care models began in 2001/02 with blended capitation Family Health Networks (FHNs), in 2003 with blended fee-for-service Family Health Groups (FHGs) and Comprehensive Care Models (CCMs, similar to FHGs but for solo-practice physicians), in 2004 with the group payment-based Rural-Northern Physician Group Agreement (RNPGA), and in 2006 with blended capitation Family Health Organizations (FHOs), into which the old HSOs and PCNs were integrated. By 2010, more than two-thirds of Ontario's primary care physicians belonged to one of these models, with FHOs being the most popular.

The financial results of this reform program are seen here. Total payments to GP/FPs in 2009/10 were $3.1 billion, an increase of $1.3 billion (77%) from 2003/04, or 58% after adjustment for inflation. Fee-for-service payments remained relatively flat over the whole time period. Payments specific to primary care models, the majority of which was capitation, rose very rapidly after 2004/05 and accounted for a large proportion of the increase in payments. Payments to physicians outside of patient enrolment models decreased after 2005/06 and payment in other models remained relatively flat between 2005/06 and 2009/10. Average payments per active GP/FP were highest among those in FHOs, followed by FHNs and FHGs. Payments in all these models showed a general increase between 2005/06 and 2009/10.

It appears clear that more GP/FPs were recruited and retained as a result of the new funding models. What is unclear at this time is the extent to which this has translated into better access and better services for patients. Two recent reviews have found mixed results.

In a 2011 report, the Auditor General for Ontario noted that the MOHLTC had not yet conducted any formal analysis of whether the expected benefits of these alternate payment plans have materialized.[3] The Auditor General reported: "Although many more Ontarians are enrolled with multi-physician practices under the new alternate funding arrangements than in the 2006/07 fiscal year, the wait time to see a family physician if they become sick has not changed as a result. Based on ministry survey results, while more than 40% of patients got in to see their physician within a day, the rest indicated that they had to wait up to a week or longer."

Health Quality Ontario in its 2011 annual report observed that the number of individuals without a regular family doctor has dropped in recent years and is on a par with the best results of 11 countries that were surveyed.[4] However, fewer than 50% are able to see their doctor on the same day when they are sick and in that regard Ontario (and the rest of Canada) lags behind other countries.[4]

Report Limitations

It is important to recognize a number of limitations to this work, most of which relate to incomplete capture of payments and as a result may hamper the interpretation of some of the data. At the outset we will make the point that these errors will have tended to underestimate the payments to physicians, meaning that the numbers given here are probably conservative. A few doctors are salaried and their payments come from hospital budgets and are not tracked here. Some physicians may work in more than one specialty; usually this will be general internal medicine combined with another (e.g., diabetes/endocrinology). For some years of observation, data were missing and we have highlighted these in the relevant exhibits. The analyses are fairly high level and cannot capture all the details and intricacies of alternate payment plans that apply to individual specialties. When a block grant was provided to a specialist group under an alternate payment plan, we allocated this equally across all members of that plan, which will have led to some inaccuracies at the individual level.

With the exception of the exhibit in this chapter which explicitly compares the overall increase in physician payments with inflation, none of the figures in this report have been adjusted for inflation. No adjustments were made for the overhead costs of running a medical practice. These are widely believed to average around 30% but vary among specialties. It is unclear to what extent overhead costs rise with increased numbers of services. There is likely to be both a fixed and a variable component, and we did not have data to inform this question.

We did not investigate the very wide variation in payments among some specialty groups. In some cases (e.g., ophthalmologists, radiologists, cardiologists and nephrologists), these variations increased substantially over time. It is not clear if the highest paid physicians in a specialty are seeing more patients, doing more procedures, or both. It is also unclear if the lowest paid physicians are working part-time. This is an important issue that we flag here as needing further investigation.

CONCLUSION

Physician payments comprise approximately 20% of total health care costs in Ontario. Although overall physician supply rose in line with population growth, it varied substantially among specialties. The rise in physician payments since the turn of the century was considerably greater than the overall growth in physician numbers and has been growing significantly above the average rate of inflation since 2004/05. Directed increases in physician payments through negotiated agreements with the OMA in 2004 and 2008 were aimed primarily at improving patient access to primary care and reducing wait times.

Primary care-related policies represent the largest financial investment in doctors that has been made by the provincial government. The most important positive change resulting from these policies has been the reversal of the decline in numbers of GP/FPs seen in the 1990s. Much of this impact appears to have been related to the change in financial models, with a shift from fee for service to capitation-based payments.

Efforts to reduce wait times in a fee-for-service environment have disproportionately benefited key surgical, medical procedural and diagnostic specialties. These groups have also gained financially from demographic changes, technological advances and increased health system capacity (i.e., increased hospital funding) that have enabled larger numbers of services to be provided by certain specialists in recent years.

The government of Ontario spent $8 billion on physician services in 2009, $4.3 billion more than in 1992. This investment has resulted in more practising physicians and an increase in services, particularly in areas targeted by certain policies. Alternative payment plans have supported certain government priorities and policy directions, particularly in general/family practice and the non-procedural medical specialties. This report cannot answer whether increased investment has led to better patient outcomes or improved functioning of the health care system. To our knowledge, no such impact analysis has been undertaken. We believe this subsequent work is critical to ensuring that taxpayer dollars invested in the health care system provide maximal benefits for the patients of Ontario.

REFERENCES

1 Canadian Institute for Health Information. *Health Care Cost Drivers: The Facts*. Ottawa: CIHI; 2011. Accessed January 13, 2012 at http://secure.cihi.ca/cihiweb/products/health_care_cost_drivers_the_facts_en.pdf.

2 Chan B. *Supply of Physician's Services in Ontario. Research Atlas*. Toronto: Institute for Clinical Evaluative Sciences; 2004. Accessed January 13, 2012 at http://www.ices.on.ca/file/mod2rp1.pdf.

3 Office of the Auditor General of Ontario. *2011 Annual Report of the Office of the Auditor General of Ontario*. Toronto: Queen's Printer; 2011. Accessed January 13, 2012 at http://www.auditor.on.ca/en/reports_en/en11/306en11.pdf.

4 Health Quality Ontario. *Quality Monitor: 2011 Report on Ontario's Health System*. Toronto: Queen's Printer; 2011. Accessed January 13, 2012 at http://www.ohqc.ca/pdfs/2011_report_-_english.pdf. Toronto: Queen's Printer; 2011.

Institute for Clinical
Evaluative Sciences (ICES)

G1 06, 2075 Bayview Avenue
Toronto, Ontario M4N 3M5

Email: info@ices.on.ca
416.480.4055

www.ices.on.ca

ICES Institute for Clinical Evaluative Sciences

TAB 21

Issue: Physician Supply and Distribution

Key Messages:

- On March 15, 2022, the government announced a significant expansion of medical school education in Ontario, adding 160 undergraduate seats and 295 postgraduate positions over the next five years.
- This is the largest expansion of undergraduate and postgraduate education in over 10 years and includes the creation of Ontario's seventh medical school, the Toronto Metropolitan University Medical School.
- In addition, as announced in the 2023 Budget, Ontario is helping more Ontario students become doctors by more than doubling the previous investment of $42.5 million over two years, with an additional $100.8 million over the next three years to expand and accelerate the rollout of the 160 undergraduate seats and 295 postgraduate positions by 2028.
- Ontario is also investing an additional $33 million over three years to add 100 undergraduate seats beginning in 2023, as well as 154 postgraduate medical training seats to prioritize Ontario residents trained at home and abroad beginning in 2024 and going forward.
- This brings the total to an additional 260 undergraduate seats and 449 postgraduate seats being added to the medical system. These investments will bring the total number of undergraduate seats to 1,212 and postgraduate training seats to 1,637 in Ontario by 2028.
- The expansion aims to increase access to family and specialty physicians and other health care professionals across the province.
- We are already seeing the impact of this historic expansion, with the first 60 seats being added this year and new residents starting training in July 2023.
- Training more doctors will ensure that Ontarians can access the health care they need, when they need it, wherever they may live.
- In 2021, there were 33,170 physicians practicing in Ontario. The number of physicians practicing in the province increased by 30.2% between 2011 and 2021, or 7,690 additional doctors.
- Prior to the medical education expansion announcement in 2022, the ministry's physician supply model estimated that Ontario's physician supply growth would continue to exceed population growth, with an average annual net increase of approximately 521 physicians each year from 2022 to 2031[1].
- However, this growth was not forecasted to be consistent each year. These increases were projected to gradually decrease over time.
- Based on our preliminary analysis over the next ten years, Ontario's physician supply would experience an average annual net increase of 635 physicians from 2022-2031.

[1] Average increase between the years 2022 to 2031. Using ADIN base 2020.

- The ministry also recognizes the need to improve the geographic distribution of physician services in certain regions of the province. We are actively working to develop and revise the distribution and mix of postgraduate positions with medical schools to improve access in rural, remote and underserviced areas.
- Initiatives to help improve access to physician services throughout the province include:
    - The Northern Ontario School of Medicine University (NOSM U), which trains medical students and residents throughout Northern Ontario;
    - Distributed medical education (DME) programs, which provide clinical education opportunities outside of traditional settings to promote physician practice in rural and northern communities;
    - The Ontario Health (OH) Agency, which helps communities with recruitment and retention, and promotes career opportunities in places that need doctors; and,
    - The Northern and Rural Recruitment and Retention Initiative (NRRRI), which offers financial incentives for physicians to establish practice in rural and Northern Ontario.
- Physician assistants, nurse practitioners and other non-physician health care providers also deliver team-based care in Ontario.
- That is why, as part of our Your Health: A Plan for Convenient and Connected Care, we have introduced an additional 52 funded positions, bringing the total up to 104 in the province. We also expanded the number of nurse practitioner positions with an additional 150 training seats added, bringing the total to 350.
- As announced in the 2023 Budget, to improve the integration of physician assistants in the health care system, the College of Physicians and Surgeons of Ontario will deliver a framework for regulating physician assistants as members in late 2023 and physician assistants will be regulated in 2024.
- On March 14, 2023, Ontario launched the Northern Ontario Resident Streamlined Training and Reimbursement Program (Nor-Star), which reimburses medial residents for travel and accommodation expenses when completing clinical assignments in the Northeast and Northwest Ontario Health Regions. Nor-Star supports increased access to northern learning experiences for medical residents, while also enabling immediate and longer-term physician support to communities in northern Ontario.
- Between 2021 and 2022, the primary care provider attachment rate for Ontario adults was 89.9%.[2]

On International Medical Graduates (IMGs)

- IMGs are a vital part of Ontario's physician workforce. For over a decade, Ontario has provided more resident training positions dedicated to IMGs than the rest of Canada's provinces combined.

[2] Health Care Experience Survey (HCES), June 2021 to June 2022.

- That is why as part of our additional expansion of 154 medical school training positions, 63 are being dedicated to IMGs.
- In the recently announced expansion, the proportion of new postgraduate positions allocated for IMGs is nearly 41 percent (63 of 154 positions). This will bring the overall proportion of positions allocated for IMGs to 19.6 percent (321 of 1,637 positions offered in 2028), up from the current 16.8 per cent. Starting this year and over the next four years, Ontario will be increasing the number of entry positions dedicated to IMGs by 121, from the current 200 entry positions to 321 by 2028.
- In 2022, over one quarter of physicians practicing in the province were IMGs (over 29% or almost 10,000).
- There are a range of supports for IMGs seeking to practice medicine in Ontario, including:
    - Offering 238 dedicated first-year residency positions for IMGs starting in the 2024 academic year;
    - Changing the Canadian Resident Matching Service (CaRMS) position eligibility designation to open more Ontario positions to IMG candidates;
    - Funding Touchstone Institute to provide standardized evaluation and training services to IMGs; and,
    - Funding OH to help IMGs find the most effective path to practice.

On Specialist Physician Supply

- Ontario's investments have significantly increased the supply of specialist physicians.
- Between 2011 and 2021, the number of specialists in Ontario increased by 31.1% or 4,229 additional specialists, while the population grew by 11.8%.
- Between 2020 and 2021 the number of specialists increased by 2.9% or 494 additional specialists, while the population remained stable. This was higher than the rate of specialist physician growth between 2019 and 2020 (1.6%), and above the 10-year average annual specialist physician growth rate of 2.7% (between 2011 and 2021).
- Although the growth in all specialist physicians was higher than the 10-year average between 2020 and 2021, this was not the case for every specialty (e.g., Psychiatry - Child & Adolescent (11.3% decrease), Pediatrics (1.7% decrease) and Family Medicine (FM)-Emergency Medicine (1.6% decrease)). Below are the results for some key specialties over the past year:
    - Anesthesiology: 4.0% increase,
    - Critical Care Medicine: 5.0% increase,
    - Physical Medicine & Rehab.: 4.2% increase,
    - Internal Medicine & General Internal Medicine (combined): 7.8% increase,
    - Diagnostic radiology: 2.6% increase,
    - Obstetrics & Gynecology: 0.8% increase,
    - Emergency Medicine: 2.8% increase,
    - Neurology: 5.4% increase,
    - General Surgery:4.2% increase.

- Ontario's physician supply and specialty mix are closely monitored to ensure that the province meets the health needs of the Ontario population now and into the future.

On Family Medicine Physician Supply

- Between 2011 and 2021, the number of FM physicians (including family medicine/emergency medicine) in Ontario increased by 29.1%, or, 3,461 additional physicians, while the Ontario population grew by 11.8%.
- Between 2020 and 2021 the number of family physicians increased by 2.3% (339 physicians). This was higher than family physician growth in 2019 (1.1%) and 2020 (2.0%), but below the 10-year average annual growth rate of 2.6% (between 2011 and 2021).
- Ontario's medical training system had been in a steady state for several years. However, announced expansions will result in a total of 260 new medical school seats and 449 new postgraduate positions representing the largest increase in Ontario's medical education system in over a decade.
- Prior to the medical education expansion announced in 2022, the ministry's physician supply model estimated that Ontario's FM physician supply growth would gradually slow in the years ahead and fail to keep pace with population growth (The recently announced medical school expansion will be key to improving the supply of FM physicians in the province. Of the 295 new postgraduate training positions announced, 60% will be dedicated to FM.
- Taking into account the seat expansion, the ministry's physician supply model estimates that the 10-year projected average annual growth rate increases to 2.0% for FM (between 2022 and 2032) or an average increase of 331 FM physicians each year.
- As mentioned above, Ontario's physician supply and specialty mix are closely monitored to ensure the needs of Ontario's population can be met now and into the future.

On International Medical Graduates and Ontario Medical Graduates

- IMGs are either Canadian citizens or permanent residents and are an important part of our medical system. They compete in a competitive process and do not prevent qualified Canadian Medical Graduates (CMGs) from obtaining post graduate positions, as they too live and work right here in Canada.
- Further, they are a ready-to-go source of candidates for postgraduate programs as they have already completed their undergraduate education and can move straight into residency spots and enter practice more quickly.
- By increasing the number of positions available to IMGs we can ensure we are bolstering our physician supply.
- At the same time, Ontario is the only province that does not prioritize a certain amount of undergraduate medical training seats for its own residents.
- That is why we are also creating more opportunities for Ontario Medical Graduates to pursue their post graduate medical education in Ontario and not have to resort to going to other jurisdictions to be trained.

Appendix

Quick Facts

Ontario Physician Supply Statistics 2011 – 2021[3] (Refer to Table 1)

- The number of physicians in Ontario increased by 30.2% (from 25,480 to 33,170 physicians), while the population grew by 11.8%. Consequently, the ratio of physicians for every 10,000 people increased between 2011 and 2021, from 19.2 to 22.4. These increases included:
    - 29.1% increase in family physicians (FPs) (11,902 to 15,363); and
    - 31.1% increase in the number of specialists (from 13,578 to 17,807).

Table 1: Family Physicians, Specialists and Total Physicians in Ontario and Physician to Population Ratios, 2011 to 2021

	2011	2021	% Change	Physician/10K 2011 pop.	Physician/10K 2021 pop.
Family Physicians	11,902	15,363	29.1%	9.0	10.4
Specialists	13,578	17,807	31.1%	10.2	12.0
Total	25,480	33,170	30.2%	19.2	22.4

Sources:
1. Physician Data: Ontario Physician Human Resources Data Centre, 2011 and 2021
2. Ontario Population Data: Statistics Canada Annual Population Estimates July 1, 2001 to 2021, Census Subdivisions Canada. Release date 2022-01.

Current Status

Physician Supply Initiatives

Medical Education

- On March 15, 2022, the government announced the expansion of medical school education by adding 160 undergraduate seats and 295 postgraduate positions over the next five years.
- The expansion will support all existing medical schools across Ontario, as well as the new Toronto Metropolitan University medical school in Brampton. The seats for the University of Toronto will support the new University of Toronto Scarborough Academy of Medicine and Integrated Health, which will also receive funding for enrollment in life sciences and physical therapy programs. The expansion will also support the Queen's Lakeridge Health Campus, the Northern Ontario School of

[3] a) Ontario Physician Human Resources Data Centre (OPHRDC), Physicians in Ontario, 2011 and 2021.
b) Ontario Population Data: Statistics Canada Annual Population Estimates July 1, 2001 to 2021, Census Subdivisions Canada, Release date 2022-01.

Medicine University, Western University, McMaster University and the University of Ottawa.

- The 2022 expansion of 160 undergraduate and 295 postgraduate medical school positions will be allocated as follows and implemented over 5 years

Name of Institution	No. of Undergraduate Seats	No. of Postgraduate Seats
McMaster University	--	28
Northern Ontario School of Medicine University	30	41
University of Ottawa	--	28
Queen's University	20	30
Toronto Metropolitan University	80	95
University of Toronto	30	45
Western University	--	28

- The ministry is working with our seven medical schools to determine the distribution of the 2023 expansion of 100 undergraduate seats and 154 postgraduate positions.
- The annual number of medical school graduates in Ontario has increased by over 12% since 2010/11, from approximately 845 to 952 in 2021/22.
- In 2022, there were 988 first year residency/postgraduate positions dedicated to CMGs; and 200 positions dedicated to IMGs.
- In 2022, across Ontario's six medical schools, there were over 4,745 ministry funded medical residents at all levels of training in Ontario's postgraduate medical training system.
- The ministry works with Ontario's medical schools, and other partners, to plan the number and location of training positions; as well as mix of specialties according to the health care system's evidence-based needs.

<u>Ontario's IMG Program</u>

- Ontario offers multiple pathways to a health care career for IMGs with varying levels of qualification. While some IMGs meet the College of Physicians and Surgeons of Ontario registration requirements, and are able to enter practice directly, others require additional assessment or training (funded by the Ontario government).
- Starting in 2023 Canadian Resident Matching Service (CaRMS) process, Ontario will offer 210 dedicated first-year residency positions for IMGs each year, the largest cohort of postgraduate training spots for IMGs in the country.
- In the recently announced expansion of medical school education, the proportion of new postgraduate positions allocated for IMGs is nearly 41 percent (63 of 154 positions), which will bring the overall proportion of positions allocated for IMGs to 19.6 percent, up from the current 16.8 percent.

- As announced on February 16, 2023, to provide further support to internationally educated physicians who need to complete residency training, we have worked with Ontario medical schools on changes to the CaRMS process:
    - The changes will enable internationally educated physicians to apply for residency positions that had been previously reserved for CMGs, but which were not filled during the first phase of the match process.
- In exchange for a training opportunity, IMGs are required to complete five years of Return of Service (ROS) program (see page 10 for more information).

Other Health Care Providers

- Physician assistants (PAs), nurse practitioners (NPs), and other non-physician health care providers provide team-based care to meet patient needs in Ontario.

Physician Assistants (PAs)

- The Physician Assistant Career Start Program provides financial support to employers to assist with the costs of full-time employment of a current year PA graduate from one of the two PA education programs in Ontario.
- In 2022-23, 25 PAs were hired through the program to work in different clinical settings.
- Program funding for 2022-23 is up to $1,262,000.
- As of March 2023, there were approximately 466 PAs that have been supported through the PA Career Start Program to work across Ontario in a variety of clinical settings including emergency medicine and primary care. Note: this figure does not include PAs who have been employed outside of this program.
- In addition to employed PAs, there are also over 100 students enrolled in Ontario's two PA education programs, with approximately 50 graduates expected annually.
- As announced on February 2, 2023, the ministry is adding 52 more training positions for PAs, starting in 2023-24. This brings the total up to 104 PA training positions each year.

Nurse Practitioners (NPs)

- As of March 1, 2023, Ontario had 4,718 nurse practitioners eligible to practice; 78.2% (or 3,689) are registered with the "Primary Health Care" specialty; 15.8% (or 746) with the "Adult specialty"; 5.5% (or 260) with the "Pediatrics specialty"; and 0.5% (or 23) with multiple specialties. The College of Nurses of Ontario (CNO) has the authority to register NPs in the Anesthesia specialty; however, no one is currently registered in this category[4] OBJ
- As announced on February 2, 2023, the ministry is adding 150 more training positions for NPs, starting in 2023-24. This brings the total up to 350 NP training positions each year.
- Twenty-five (25) Nurse Practitioner Led Clinics (NPLCs) in the province provide comprehensive, accessible, and coordinated family health care services, targeting

[4] College of Nurses of Ontario, Membership Totals at a Glance

Ontarians who have trouble accessing primary care. All Nurse Practitioner Led Clinics have a lead nurse practitioner, a collaborating physician, and an interdisciplinary team of providers.

Physician Distribution Initiatives

- **Distributed Medical Education (DME)**: DME programs provide rural and regional clinical education opportunities outside of Academic Health Sciences Centres (AHSCs) to undergraduate and postgraduate medical trainees at all medical schools and targets:
    - promoting physician practice in rural and northern communities;
    - increasing medical students and residents learning in rural/small urban communities; and,
    - improving access to health care in underserviced communities.
- **Medical Education Campuses (MECs):** MECs provide medical education outside of traditional settings, such as AHSCs; as well as assisting in addressing local physician resources issues:
    - The University of Toronto opened the Mississauga MEC in September 2011;
    - McMaster University established MECs in Kitchener-Waterloo in December 2007 and in St. Catharines, and Regions of Niagara, in September 2008; and,
    - The University of Western Ontario opened its Windsor MEC in September 2008.
- **Northern Ontario School of Medicine University (NOSM U):** The NOSM U was created with an explicit mandate to improve the health of the peoples and communities in Northern Ontario. The NOSM U addresses the health needs of Northern Ontarians; improves access to quality health care; and contributes to the economic development of communities across the North.
    - NOSM U reported that 902 MDs graduated as of June 2023—73 are Indigenous and 179 are Francophone. More than half of these physicians have stayed in Northern Ontario.
    - As part of Ontario's announced medical school expansion, NOSM U will be increasing the number of medical school seats by 44 (from 64 to 108) between 2022 and 2026. This will result in an increase of 176 undergraduate medical students in training, from 256 to 432 in Northern Ontario annually and,
- NOSM U's postgraduate resident training programs will also be increasing between 2023 and 2028 by 63 entry positions (from 60 to 123). This will result in an increase of an estimated 210 residents in training (from 186 to ~400).**Supplemental Emergency Medicine Experience (SEME)** is a continuing medical education program that provides professional development training to family medicine (FM) physicians seeking to build the competence to provide emergency medicine services, particularly in rural and northern areas. The SEME seeks to address the need for more FM physicians with emergency medicine training by supporting FM physicians in obtaining the practical skills and experience they need to meet the needs of the rural and remote communities they serve.
- **Ontario Health:** Ontario Health offers the below services.

    - Regional Advisors work with communities and local health care organizations on their physician recruitment and retention goals.
    - Practice Ontario is a career planning service where Regional Advisors help residents explore locum and permanent opportunities across the province as well as assist residents with a smooth transition to practice.
    - HFOjobs.ca is an online employment portal for Ontario communities and health care organizations to post permanent and locum opportunities.
- **Northern Ontario Resident Streamlined Training and Reimbursement Program (Nor-Star):** reimburses medial residents for travel and accommodation expenses when completing clinical assignments in the Northeast and Northwest Ontario Health Regions. Nor-Star supports increased access to northern learning experiences for medical residents, while also enabling immediate and longer-term physician support to communities in northern Ontario.
- **Postgraduate ROS Programs**: Ontario has several programs that admit medical doctors to postgraduate residency training in exchange for their commitment to provide ROS in eligible Ontario communities.
    - For IMG physicians, eligible areas for ROS are anywhere in Ontario, except the Toronto area[5] and the City of Ottawa. They are required to serve a minimum of
      5 years in an eligible community to meet their ROS commitment.
    - Re-entry physicians can practice anywhere in Ontario; and must return 2 years of service in Ontario.
    - Repatriation physicians must provide ROS in eligible communities, which is anywhere in Ontario, except the City of Toronto and surrounding municipalities (Pickering, Markham, Vaughan, Brampton and Mississauga); and the City of Ottawa. They are required to provide ROS of up to 5 years, based on their stream of entry to the Repatriation program.
    - As of August 2023:
        - Approximately 1,135 physicians are currently returning service;
        - Approximately 1,600 physicians are still completing their residency training; and
        - Over 1,330 physicians have successfully completed their ROS commitment.[6]
- **Northern and Rural Recruitment and Retention Initiative (NRRRI):** The NRRRI which began in 2010, offers financial initiatives to physicians to establish practices in rural[7] and Northern Ontario. NRRRI grants range from $80,000 to $117,600, paid out over four years, while the physician establishes a practice. They are available in any community defined as rural, using the Rurality Index of Ontario (RIO); and, also in all five of Ontario's Northern Urban Referral Centers (Timmins, North Bay, Sudbury, Sault Ste. Marie, and Thunder Bay).

[5] Defined as the City of Toronto and adjacent municipalities of Mississauga, Brampton, Vaughan, Markham and Pickering

[6] MOH Physician Tracking Database

[7] Rurality is defined as a community with a score of 40 or more on the Rurality Index of Ontario (RIO), which was developed by the Ontario Medical Association. RIO scores range from 0 (metropolitan) to 100 (highly isolated).

- **Northern Physician Retention Initiative (NPRI):** The Northern Physician Retention Initiative provides eligible physicians in northern Ontario with a $7,000 retention incentive, paid at the end of each fiscal year in which they continue to practice full-time in Northern Ontario beyond an initial four years.
- **Rural and Northern Physician Group (RNPG) Agreement:** This agreement is a comprehensive alternative funding agreement designed to strengthen the ability of designated communities to recruit, and retain, physicians to primary care group practices. It includes substantial enhancements, such as financial bonuses for preventative; prenatal; and palliative care; as well as a rural bonus recognizing the isolation and remoteness faced by physicians working in northern communities.
- **Locum Programs:** Locum programs, funded by the ministry, provide coverage for rural and northern communities experiencing shortages of physician services for a variety of reasons, including physician absences during vacations; educational; and other personal leaves.
  - **Temporary Locum Program (TLP)** provides eligible hospitals in rural and northern Ontario the opportunity to offer eligible physicians a temporary premium to maintain 24/7 Emergency Department (ED).
    - The TLP was first launched in the Summer of 2021 as a short-term COVID-19 program to keep EDs in rural and norther Ontario open 24/7. Since then, the program has been extended 4 times.
    - In 2022-2023, over 593,573 hours of coverage have been provided through this program.
    - 93 hospitals are participating in the program and the program is valid from April 1, 2023 to March 31, 2024.
- **Rurality Gradient Premium (RGP)** consists of payment premiums to physicians having a practice address with a RIO score of 40 or greater. Payments range from $5,000 to $15,000 per year, depending on the RIO score of the practice community.
- **Hospital Premium for Rural and Northern Physicians:** Physicians with a practice location RIO score of 40 or more, who have provided $2,000 in eligible hospital services, are entitled to a $7,500 Hospital Premium payment. Once $6,000 in eligible hospital services is provided, an additional $5,000 payment will be made for a total $12,500 Hospital Premium.

Updated by: Nasrin Amiri, Data Management Specialist
Rubaba Ismayilova, Senior Planning and Programs Analyst, Health Workforce Planning and Programs Unit (HWPPU). CHWPB
Peter Rizzo, Senior Planning and Programs Analyst, Health Workforce Planning and Programs Unit (HWPPU). CHWP
Will Skilliter, Senior Health Workforce Analyst, Health Workforce Evidence Unit (HWEU), CHWPB
Haley Roher, Senior Health Workforce Analyst, Health Workforce Evidence Unit (HWEU), CHWPB
Julie Tran, Senior Health Workforce Analyst, Health Workforce Evidence Unit (H\
CHWPB
Folake Irojah, Planning and Programs Analyst, Health Workforce Planning and Programs Unit (HWPPU), CHWPB

Approved by Stephanie Akers, Manager, HWEU, CHWPB
Tim Blakley, Manager, HWSPU, CHPWB
Laura DesRoches, A/Manager, HWPPU, CHWPB
David Lamb, Director, Capacity and Health Workforce Planning Branch, Nursing and Professional Practice Division
(416) 453-4898

Date: September 19, 2023

TAB 22

BMC Family Practice

RESEARCH ARTICLE Open Access

Determining factors in the retention of physicians in rural and underdeveloped areas: a systematic review

Nasrin Mohammadiaghdam[1], Leila Doshmangir[1,2*], Javad Babaie[1], Roghayeh Khabiri[1] and Koen Ponnet[3]

Abstract

Background: Imbalance in distribution of Health Care Workers (HCWs) in a country is a global challenge. Almost all of the rural and underdeveloped areas are struggling with the shortage of HCWs, especially physicians. Therefore, this study aimed to identify factors governing the retention of physicians in rural and underdeveloped areas.

Methods: International databases including Scopus, PubMed, Web of Science, Proquest, and Embase were searched using Mesh terms in order to find peer-reviewed journal articles addressing physicians' retention factors in rural and underdeveloped areas. The records were screened, and any duplicate results were removed. The quality of the studies was assessed according to the Critical Appraisal Skills Program developed for different types of studies. Then, through content analysis, the related factors were identified from finally selected papers, coded, and categorized.

Results: The initial search resulted in 2312 relevant articles. On the basis of specific selection criteria, 35 full-text articles were finally reviewed.. The major affecting factors in physicians' retention in rural and underdeveloped regions were classified into the following six categories: 1) financial; 2) career and professional; 3) working conditions; 4) personal; 5) cultural; and 6) living conditions factors.

Conclusion: There is a complex interplay of factors governing physicians' retention in rural and underdeveloped areas. If health organizations are concerned with physicians' retention in deprived areas, they should take into account these main factors. Moreover, they should develop policies and strategies to attract and retain physicians in rural and underdeveloped areas.

Keywords: Health care workers, Health system, Physicians, Retention, Rural areas, Under developed areas

* Correspondence: Doshmangirl@tbzmed.ac.ir
[1]Department of Health Policy& Management, Tabriz Health Services Management Research Center, Iranian Center of Excellence in Health Management, Tabriz University of Medical Sciences, Tabriz, Iran
[2]Social Determinants of Health Services Research, Health Management and safety Promotion Research Institute, Tabriz University of Medical Sciences, Tabriz, Iran
Full list of author information is available at the end of the article

© The Author(s). 2020 **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

Background

Health Care Workers (HCWs) are the backbone of health organizations [1] and are considered as the main factor in public access to health services [2, 3]. In most countries, 10% of the total government employment is allocated to the health sector [4]. The World Health Organization (WHO) defines Health Workers (HWs) as all the people who are engaged in actions primarily intended to improve health [5]. The imbalance in the distribution of HCWs within countries is a common serious problem and can lead to challenges such as shortage of physicians in underdeveloped areas which in turn could pose challenges for the public access to health care services [6, 7].

Physicians play a vital role among the HCWs [4]. Although they form a major group of HCWs, they have been neglected in the discussions about the health system functions in many developing as well as developed countries [8]. Migration of physicians from rural and underdeveloped areas to affluent ones has caused major concerns for health policymakers. A disproportionate distribution of physicians can cause a disturbance to the performance and stability of health systems [9]. In most of the rural and underdeveloped areas, lack of physicians is a long-standing challenge with serious consequences for the quality and quantity of provided services and equity of access [10]. Moreover, it restricts access to health services for people in these areas.

Previous experiences suggest that, in general, increasing the number of physicians in a country is not a determining factor in the increase in their retention rate in rural and underdeveloped areas [11, 12].

Conducted in 1998 in the United States, one study revealed that there was a 75% shortage of physicians in rural areas [13]. The results of a similar study in Argentina in 2014 showed that 21% of the physicians had a strong desire to leave the deprived areas, 57.3% had a moderate desire to desert these areas, and 21.5% were reluctant to leave the aforementioned areas and were willing to be active in their relevant areas [12]. In Iran, the distribution of HCWs is not equitable between and within provinces, especially in deprived and underdeveloped areas [14, 15]. Based on a study conducted in Kerman in 2014, the proportion of doctors who had quit working in deprived and rural areas was 26, and 77.3% of them intended to leave health services in the near future [16].

Many countries suffer from critical shortage of physicians in marginal and underdeveloped rural areas. Moreover, little is known on determining factors in the retention of physicians in these areas. Therefore, this study aims to identify pivotal factors governing physicians' retentions in rural and underdeveloped areas in order to develop evidence-informed policy interventions to deal with the issue of physicians' inaccessibility.

Methods

Search strategy

A systematic review of the literature was conducted in order to identify the factors that influence physicians' retention in rural and underdeveloped areas. We searched five distinct databases including Scopus, Web of Science, PubMed, Embase, and ProQuest. The search focused on the articles which had been published in the relevant databases from their inception until December, 2019. The reference lists of the articles were also checked to find additional studies to complete the search process and to find all of the relevant studies. The detailed search terms were developed in consultation with a librarian. The search terms and the sample of search strategy, taken from the PubMed database, are provided in Table 1 in the Additional file 1.

Study selection process

All of the retrieved citations were imported to EndNote (V. X8; Clarivate Analytics, Philadelphia, PA) after searching in the relevant databases. The title and abstract (if available) of each unique citation were screened by one reviewer (NM) according to the prespecified inclusion and exclusion criteria. The final stage of the screening of the articles (full-text review) was carried out by the two researchers (NM and LD). The researchers (NM and LD) independently extracted relevant data from the articles. In cases of disagreements, the researchers' views on the elimination of the studies were compared in order to reach a consensus. There were few discrepancies in the data extractors' views.

Inclusion and exclusion criteria

On the basis of the inclusion criteria, the selected studies: 1) were published in English language; 2) focused on physicians, including general practitioners, general physicians, family physicians and specialists as the target population; 3) were related to deprived, remote, rural and underdeveloped areas; 4) involved any type of article including letters to the editor, any type of review, original articles, debates, and perspectives; and 5) were full-text articles.

Moreover, based on the exclusion criteria, the excluded articles were: 1) the ones whose target populations were not physicians for example they were administrative staff, managers, or nurses in the health sector; 2) full-text articles were not available.; and 3) were low quality based on the quality appraisal analyses.

Data extraction

In order to extract the relevant data, a data extraction checklist was used. Title, author(s), referencing style, country, year of publication, study type, study population, data collection method, extracted factors, quality

appraisal, effect of the context on how the factors influenced the retention of physicians in rural and underdeveloped areas, and the positive or negative effects of the extracted factors on the retention of physicians were noted. In addition, the checklist contained a column for presenting research findings which were related to the factors governing the retention of physicians in the underdeveloped areas and their effects.

Quality appraisal

The Critical Appraisal Skills Program (CASP) checklists were used to assess the quality of the articles. CASP checklists are quick, simple, and straightforward tools for answering common questions on a scientific study [17]. We downloaded various relevant standard checklists from the website of the program (www.casp-uk.net) for the various types of studies (i.e., cross-sectional, review, qualitative, and analytical) which were included in our study.

The used checklists included 10 questions on the aims of the research, appropriateness of the methodology, research design, data collection, and data analysis. In order to assess the quality of studies, each question was scored 1 point for *Yes* or 0 for *No*. Then, the studies were categorized as *low quality* (i.e., studies with a score range of 0 to 3), *medium quality* (i.e., studies with a score range of 4 to 6), and *high quality* (i.e., studies with a score range of 7 to 10). Two of the researchers conducted quality appraisal independently. Finally, the differences in the researchers' appraisals were resolved by discussion.

Data analysis

Inductive content analysis was performed in order to understand, extract, and categorize factors governing the retention of physicians in rural and underdeveloped regions. Two members of the study team coded and categorized the data. To this end, they: 1) examined the selected full-text studies carefully and extracted the determining factors, 2) developed potential themes which involved the extracted factors, 3) generated a thematic map, 4) gave a name to the themes and defined and generated examples for each of them, and 5) assessed the reliability of the analyses through discussions regarding the contradictions to achieve full agreement.

Results

The searching process from the five databases provided the researchers with a total of 2312 articles: (1737 in Scopus, 289 in Embase, 215 in PubMed, 62 in Proquest, and 9 in ISI Web of Science,). A total of 490 duplicate articles were identified, leaving us a total of 1822 unique citations on the topic. The screening process of the extracted studies is shown in Fig. 1.

Moreover, 1311 titles were excluded due to the fact that they were not relevant to the purpose of study. The abstracts of 511 remaining studies were reviewed. Furthermore, 406 studies, whose aims were different from our purpose, were excluded. The remaining 105 full-text studies were carefully examined. On the basis of this examination, 71 studies were excluded because they only described the distribution of physicians and their desertion rates. In addition, these studies did not identify factors associated with retention or desertion. However,

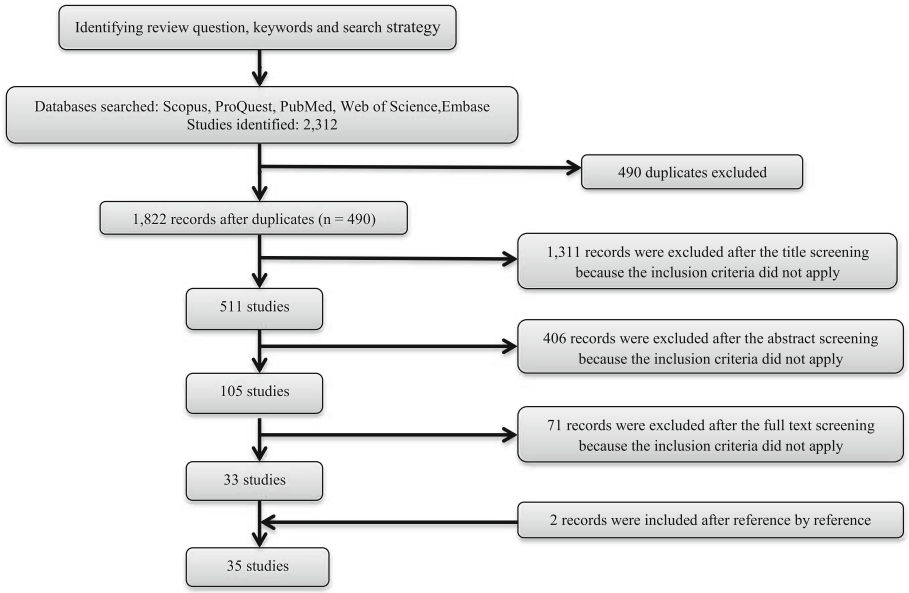


Fig. 1 Flow chart of study selection process

two related studies were identified using a manual search (reference by reference) and were added to the study. At the end of this phase, 36 studies were included in the present study. One article did not get an acceptable quality score and was excluded from the corpus. A careful examination of the selected articles showed that 45 and 55% of the studies were concerned with the exploration of the factors governing the retention of physicians in underserved settings of the developed countries and the developing or underdeveloped countries, respectively. The characteristics and findings of all included studies are presented in Table 1.

The identified themes were classified into six main categories of factors: financial, career and professional, working conditions, personal, living conditions, and cultural.

Financial factors focused on the physicians' income level, salary, payment interval, reimbursement of tuition fees, various allowances and loan repayment. Personal factors were related to the physicians' demographic factors such as age, sex, education level, marital status, number of children, rural background, previous exposure or service in a deprived area and birthplace. Career and professional factors included factors such as job performance, evaluation of superiors, job improvement and educational opportunities, job position, willingness to change the performed job or the employer or support for professional development or research marketing and opportunities to achieve professional goals.

Working conditions or environment referred to the employment relationships and comprised all of the existing circumstances which affected physicians' work in the workplace, including work schedules, breaks, work hours, legal rights, and responsibilities, possibility of relocation and job security and job flexibility. Living conditions or recruitment situation encompassed the conditions in which physicians lived such as suitable housing and accommodation, educational opportunities for the children, access to refreshment facilities as well as recreational activities. Finally, cultural factors involved the customs, traditions, beliefs, moral values, code of communication and used language(s) of the rural community.

Table 2 provides the influential factors in the retention of physicians in rural and underdeveloped areas based on the identified category of factors. Moreover, Fig. 2 provides information on the percentage of the influential factors in the selected studies.

Discussion

In this study, factors governing the retention of physicians in rural and underdeveloped areas were identified through a systematic literature review. According to our findings, the following six major categories govern the retention of physicians in the mentioned areas: financial, professional, working condition, living condition, cultural, and personal factors.

Financial factors

Most of the studies had examined the desertion and retention of physicians in rural and underdeveloped areas mainly based on financial factors, such as income, salary, loans and appropriate reimbursement. One of the major incentives for most of the physicians is their revenue. Many of them neglect the well-being of cities in order to have more income, although this is not the only motivational factor. Physicians who were employed in underdeveloped and remote areas had numerous complaints regarding their low income, reimbursements and compared them with their counterparts in the urban areas.

Financial rewards and incentives have a significant effect on the desertion and retention of physicians in the aforementioned areas. It makes sense for people to prefer urban and well-developed areas to rural in terms of equal income.

Two studies reported that the inappropriateness of income rates and interrupted payments cause the physicians' reluctance to serve in rural areas [16, 20]. In most of the studies, salary was a factor significantly affecting the retention rate in rural and underserved areas [46, 47]. Furthermore, the physicians in rural and deprived areas had fewer opportunities for working in private sector and seemed to be less satisfied with their incomes [23]. A study by Colleen Morken et al. (2018) showed that loan repayment was the least important factor in physicians' retention in rural areas [48]. Pathman and Konrad (2004) indicated that economic vitality of communities attracted physicians. However, it did not influence physicians' subsequent retention [21]. The result of another in Turkey demonstrated that an increase in physicians' income reduced their willingness to work in rural areas [25]. Thus, the solution to this challenge is to increase the physicians' salaries or to change reimbursement methods [26].

Career and professional factors

Providing educational and skill improvement opportunities was another factor in the satisfaction of physicians who served in deprived areas [5]. Nonetheless, there was no public agreement on it [26]. Medicine is a science that needs to be updated based on the newest validated information and knowledge. Although there are many possibilities for being updated in today's world, these facilities are less accessible in rural areas. Some physicians, who worked in rural and deprived areas, argued that activities in rural areas prevented them from developing professional skills [25]. According to the evidence, educational factors were the most effective factors

Table 1 The characteristics and findings of included studies in the review

No	Title and Authors (Reference No)	Country and Date	Type of study	Study population	Data collection method	Quality appraisal	Effect of the context on how the factors influence the retention of physicians in rural and underdeveloped areas
1	Recruitment and Retention of General Practitioners in Rural Canada and Australia (Marco Viscomi, Hon BSc) [18]	2013 Canada and Australia	review	*n* = 86 sources for review/ Canada Astralia	MEDLINE/Ovid	High	-Further follow-up of the highlighted educational programs is warranted to ensure continued refinement of socially accountable policies and initiatives.
2	Sustaining Family Physicians in Urban Underserved Settings (Anne Getzin MD, Bennle L) [19]	2016 United States	qualitative study	*N* = 16family physicians	Semi-Structured Interviews/ multi-step process	High	-Training in the personal and professional skill sets identified may improve physician retention in urban underserved settings.
3	Retention of General Practitioners in Rural Nepal: A qualitative study (Katrina Butterworth, Bruce Hayes) [20]	2008 Nepal	qualitative study	n = 86 General practitioner Questionnaire *n* = 11 Semi structured interviews	Questionnaire/ semi structured interview and focus group discussions	High	-Career development is considered as a key issue that must be addressed by the government of Nepal. GPs need to have a clear career ladder, with recognition of the value of service in rural areas. -A multifaceted, holistic response is necessary. From the level of community awareness, a career structure and financial remuneration to adequately set up hospitals, functional teams, family support, continuing professional development and a secure working environment – each area must be addressed for the whole to function.
4	Factors Affecting Leave out of General Practitioners from Rural Family Physician Program(Amiresmaili M, Khosravi S, YazdiFeyzabadi V) [16]	2014 Kerman, Iran	Survey cross-sectional	*n* = 271 Family Physicians	Questionnaire	High	-Educating native manpower has been one of the main strategies of medical education system in Iran in order to increase physicians' retention in deprived areas. -General practitioners cooperate with the educational programs as part time physicians and seek further education to gain a competitive advantage and better social position and income.
5	Analysis of a survey on young doctors' willingness to work in rural Hungry (Edmond Girasek) [9]	2010 Hungary	Survey	*n* = 785 four Hungarian medical universities	Questionnaires and focus group interviews		-The current system of medical training in Hungary tends to produce doctors who want to live in big cities and work in central hospitals. Rural regions and non-in-patient service alternatives seem either not to be targeted or seen as unattractive work places. More doctors would be willing to work in smaller towns and villages if in-hospital training was altered and if doctors

Table 1 The characteristics and findings of included studies in the review *(Continued)*

No	Title and Authors (Reference No)	Country and Date	Type of study	Study population	Data collection method	Quality appraisal	Effect of the context on how the factors influence the retention of physicians in rural and underdeveloped areas
							were offered adequate incentives as part of a comprehensive human resource strategy (high salaries, high professional standards, good working environment, reasonable workload). If these changes do not occur, the existing geographical and structural imbalances will not be improved.
6	Rural Physician Satisfaction: Its Sources and Relationship to Retention (Donald E. Pathman, Eric S. Williams, Thomas R. Konrad) [14]	1996 United States	Survey/ Cross-sectional	$n = 620$ prima y care physicians	Mail questionnaires	High	-Physicians' satisfaction with their communities and their opportunities to achieve professional goals predicted longer retention. Satisfaction with income also tended to predict longer retention.
7	Retention of Primary Care Physicians in Rural Health Professional Shortage Areas (Donald E. Pathman, MD, MPH, Thomas R. Konrad, PhD, Rebekkah Dann, MS, and Gary Koch, PhD) [21]	1991 United States	Survey/ Cross-sectional	$n = 505$ physicians/ randomly selected	Questionnaire	High	-Retention is related to modifiable characteristics of work, whereas recruitment is related to the relatively immutable characteristics of physicians' backgrounds and professional and lifestyle preferences, as well as the socioeconomic features of communities. -To promote retention, local, state, and federal programs can promote practice ownership through low-interest loans and start-up income guarantees. Practice administrators can build a sense of personal investment and control among employed physicians by offering leadership opportunities and providing a greater voice in clinic policies and work schedules. -Local hospitals and practice networks can reduce on-call frequency by coordinating cross-coverage arrangements. Work demands while on-call can be lessened by providing telephone call triage systems and full-time physician staffing in local emergency rooms.
8	Why do Junior doctors not want to work in a Rural location and What would induce them to do so? (Mary E. Rogers, Judy Searle and Peter A. Creed) [22]	2009 Australia	Survey/ Cross-sectional	$n = 190$ Junior doctors	Questionnaire	High	-Infrastructure and professional development opportunities are the influential factors. -Women gave more importance to partner and family factors than men.
9	What Factors Contribute most to The Retention of General Practitioners in	2008 Australia	Survey/ Cross-sectional	$n = 1189$ general Practice	Questionnaire	High	-Ideally such factors would be supported by an existing evidence base, be amenable

Table 1 The characteristics and findings of included studies in the review *(Continued)*

No	Title and Authors (Reference No)	Country and Date	Type of study	Study population	Data collection method	Quality appraisal	Effect of the context on how the factors influence the retention of physicians in rural and underdeveloped areas
	Rural and Remote areas? (Deborah J. Russell, Matthew R. McGrailB,, John S. Humphreys, and John WakermanB,) [23]						to measurement and able to be influenced by management policy (such as remuneration, availability of suitable housing, paid locum relief, work culture and perceptions of work life balance). Such information may facilitate the further 'unpacking' of factors that have been demonstrated to be important for Australian rural and remote GP retention.
10	Physician Shortages in Rural Vietnam: Using a labor market approach to inform policy. (Marko Vujicic, Bakhuti Shengelia,, Marco Alfano, Ha Bui Thu) [7]	2009–2010 Vietnam	Survey	$n = 292$ Physicians (rural $n = 57$ and urban $n = 235$)	Questionnaire/ multistage sampling	High	-Providing preferential access to short term training and paying financial bonuses in rural areas are policies that the government of Vietnam should seriously consider. For short-term training, the government might consider a program where physicians in rural areas are guaranteed access to short-term training courses that are most in demand. In terms of bonuses, these can be implemented either as separate allowances or by revising the current salary points system to reward locating in a rural area much more.
11	Factors and Outcomes in Primary Care Physician Retention in Rural areas (Glasser M, PhD MacDowell M, DrPH, MBA Hunsaker M, MD Salafsky B, PhD Nielsen K, MPH Peters K, DrPH Meurer M, MS) [13]	1997 United States	Survey	$n = 107$ Primary care and Specialty care	Non structured interview	*Medium*	-Keys to success in rural physician retention seem to include identifying and recruiting medical students of rural origin and focusing on a healthy practice environment. Policy makers need to work with local government; schools and employers to offer programmers that provide information on health careers in rural areas and begin to identify local youth for induction in rural health care.
12	Relationship Between Personal Characteristics of Specialist Physicians and Choice of Practice Location. (Taati Keley E, Ravaghi H, Salehi M, Nasiripour A, Abdi Z, Meshkini A) [24]	2013 Iran	Survey/ cross-sectional	$n = 3825$ physicians who graduated from all public medical schools across the country between 2009 and 2012		High	-Increasing the enrollment of physicians with a rural background in residency programs may solve the problem of uneven distribution of specialist physicians in Iran. Because female physicians are less willing to work in the underdeveloped areas than male physicians, increasing the number of male student admissions to residency

Table 1 The characteristics and findings of included studies in the review *(Continued)*

No	Title and Authors (Reference No)	Country and Date	Type of study	Study population	Data collection method	Quality appraisal	Effect of the context on how the factors influence the retention of physicians in rural and underdeveloped areas
							programs, particularly in certain specialties that are more in demand in the underdeveloped areas, could alleviate the problem of uneven distribution of physicians in the short run. Further, programs that support raising the admissions of female students with a rural background into local medical universities along with providing incentives to encourage them to live and work in rural areas should be put on the policy agenda.
13	Attracting and Retaining Doctors in Rural Nepal (Shankar PR) [8]	2010 Nepal	Review	Original research articles, reviews, magazine articles and project reports dealing with Nepal and other developing countries during the period 1995 to 2010	PubMed/ Google scholar/ WHO's HINARI database	*Medium*	-A range of strategies developed elsewhere could be used in Nepal, especially community-oriented medical education that involves rural doctors in training medical students. The reimbursement of tuition fees, assistance with relocation, and provision of opportunities for academic and professional advancement for rural doctors should also be considered. Government investment in improving working conditions in rural Nepal would assist rural communities to attract and retain doctors.
14	Factors affecting the work of physicians in rural areas of Turkey (Mollahaliloglu S, Ugurluoglu Ö) [25]	2009 Turkey	Survey	$n = 1340$ physicians working in urban areas	Questionnaire	High	-Medical residents working in the university hospitals, their willingness to work in rural areas can be related to their continuing education with temporary status and their obligation to go to another healthcare institution for a long-term employment option. Physicians who are in the early stages of their careers can be thought to be more open to changing location compared with more experienced ones who have an established career path. -Financial incentives, non-monetary incentive policies that consider the physicians' views should be developed to achieve permanent success. -Regulations that make the physician's life easier, such as housing provision, better

Table 1 The characteristics and findings of included studies in the review *(Continued)*

No	Title and Authors (Reference No)	Country and Date	Type of study	Study population	Data collection method	Quality appraisal	Effect of the context on how the factors influence the retention of physicians in rural and underdeveloped areas
							service infrastructure and flexible working regimes, can motivate young and single physicians to work in rural areas.
15	Factors Affecting Willingness to Practice Medicine in Underserved Areas (Borracci RA, Arribalzaga EB) [12]	2013–2014 Argentina	Survey/ cross-sectional descriptive	$n = 400$ Argentine Medical students	Questionnaire	High	-Government policy-makers must recommend changes in resource allocation to better promote official proposals and opportunities to work.
16	Factors Influencing the Geographic Distribution of Physicians (Ravaghi H, Taati E, Abdi Z) [26]	2012 Iran	qualitative study	$n = 82$ key officials from medical universities	Open-ended Questionnaire	High	-Policies such as providing more financial and non-financial incentives, reducing disparities between physicians' income in rural and metropolitan areas, selection of students with rural background, and supportive measures for physicians working in underserved areas were recommended.
17	Key factors leading to reduced Recruitment and Retention of Health Professionals in Remote areas of Ghana (Rachel Cnow, KwesiAsabir) [27]	2010 Ghana	qualitative study	$n = 84$ doctors and medical leaders	In-depth interviews	High	-Expanding opportunities for post-graduate specialization may offer a significant return on investment; establishment of postgraduate training in Obstetrics and Gynecology in Ghana in 1989 led to high retention rates among graduates of the program. Graduates cited the appeal of adding a chance for specialization in their own country to their continued service in Ghana. -Career advancement incentives will be critical to any successful incentive package. Proposed incentives include guaranteed promotion or study opportunity after service in hardship areas contact with mentors through rural rotation of specialists or remote learning centers, and reliable terms of appointment with fixed end-points.
18	What Factors Influence the Choice of Urban or Rural Location for Future Practice of Nepalese Medical Students? (Bhim Prasad Sapkota, Archana Amatya) [28]	2015 Nepal	Cross-sectional descriptive	$n = 393$ medical students from four medical colleges	Questionnaire/ In-depth structured interviews	High	-The government should attract the students from a rural place of rearing and rural secondary education for medical education. -Newly established medical college by the Nepal government (Patan Academy of Health

Table 1 The characteristics and findings of included studies in the review *(Continued)*

No	Title and Authors (Reference No)	Country and Date	Type of study	Study population	Data collection method	Quality appraisal	Effect of the context on how the factors influence the retention of physicians in rural and underdeveloped areas
							Sciences) has started to enroll students having a rural rearing and rural schooling in MBBS.
19	A systematic review of strategies to recruit and retain primary care doctors (Puja Verma, Arabella Stuart) [29]	January 2015 England	review	*n* = 42 studies	MEDLINE, EMBASE, CENTRAL	High	
20	Factors That Influence the Turnover Intention of Chinese village Doctors based on the Investigation Results of Xiangyang City in Hubei Province (Pengqian Fang, Xiangli Liu) [30]	July and August in 2012 China	Survey	*n* = 1889 Doctors	Questionnaire	High	-The government should raise the income of village doctors and provide them with suitable promotion opportunities and security insurance, such as health insurance and pension insurance. In addition, low education levels of village doctors, as a barrier to achieve the educational goals for the village doctors set by the government, should also be tackled through further on the-job training or by recruiting more college medical graduates into the village clinics.
21	Physicians' retention rate and its effective factors in the Islamic Republic of Iran (Ehsani-Chimeh E, Majdzadeh R, Delavari S, et al) [31]	2000–2001 Iran	Survey /cross-sectional	*n* = 5482 physicians	Questionnaire	High	-About three-fourths of Iranian physicians would work in underserved areas if there were some special privileges for them, mainly income and employment relationship. Younger males and those who belonged to the Medical Student Boom Generations had more inclination.
22	Assessment on causes of physicians' abdication from Rural Family Physician Plan in 2012 (Sadighi S, Amini M, Pourreza A) [32]	2012 Iran	Analytical descriptive study	*n* = 26 Family physicians	Questionnaires	High	-With regard to the effective components in social and cultural resignation and leave family physicians in the main step of implementing this national plan, optimally between the two sides in a suitable provider of service and recipient country according to current laws will be.
23	Factors influencing desertion of family physicians working in rural areas with deprivation index less than 1.4 (prosperous) in 2010 (Atefi A, Aghamohammadi S) [33]	2010 Iran	cross-sectional descriptive	*n* = 6618 Family physicians	Questionnaire/ interviews	High	-There was an increasing trend on dropping out of family physician program. To seize this trend, some actions could be done, including: to promote authorization for hiring family physicians, to reform the amount of payments, to ensure timely payments, to develop residency program on family physicians and

Table 1 The characteristics and findings of included studies in the review *(Continued)*

No	Title and Authors (Reference No)	Country and Date	Type of study	Study population	Data collection method	Quality appraisal	Effect of the context on how the factors influence the retention of physicians in rural and underdeveloped areas
							dedicate an admission priority to active family physicians to enroll in the program, and finally to set a higher salary for family physicians practicing in rural areas.
24	Factors Influencing Retention of Rural Pennsylvania Family Physicians. Esther M, Forti, Kenneth E. Martin, Robert L. Jones, and Herman, J [34]	1993 United State	Cross-sectional descriptive	*n* = 398 Family Physicians	Questionnaire/ Mail Survey	High	-Health system should use the strategies that minimize perceptions of professional isolation and policy efforts that address reimbursement differentials and compliance issues in order to minimize many complaints of rural family physicians.
25	Determining the Causes of Discontinuation of Family Physicians Working in Mashhad University of Medical Sciences (Ehsan Mosa Farkhany, Hosein Khooban, Behruz Dahrazama, Vahid Reza Arefi,Fariba Saadati) [35]	2012 Iran	Analytical study	*n* = 156 Family physicians	Questionnaire	High	-The Ministry of Health and Medical Education should focus on increasing annual per capita and credit The Rural Family Physician Program has taken serious action and also revised the plan to reduce the responsibilities of members of the health team.
26	Physician preferences for working in deprived areas: a systematic review of discrete choice experiment(Hamouzadeh P, Akbarisari A, Olyaeemanesh A, Yekaninejad MS) [36])	2017 Iran	Systematic review	*n* = 14 studies	PubMed, Embase, Web of Science Core Collection	High	-Financial attributes are not the only significant attributes considered by the physicians for deciding where to practice, but also the other non-financial attributes are important. It is suggested that based on the economic, social and cultural conditions of each country, a specific incentive package, including a set of financial and non-financial incentives, is developed to attract physicians to the deprived areas.
27	Factors influencing turnover intention among primary care doctors: a cross-sectional study in Chongqing, China (Tong Wen, Yan Zhang) [37]	2013 China	a cross-sectional study	*n* = 440 doctors	Interviewed	High	-Improving job satisfaction, in terms of salary, promotion and job safety, is crucial for reducing turnover intention among primary care doctors. Therefore, we suggest that the government increase its financial investment in primary care facilities, especially in less-developed areas, and reform incentive mechanisms to improve the job satisfaction of primary care doctors. The government should consider policies such as establishing a social pension programme for village-level doctors and providing more

Table 1 The characteristics and findings of included studies in the review *(Continued)*

No	Title and Authors (Reference No)	Country and Date	Type of study	Study population	Data collection method	Quality appraisal	Effect of the context on how the factors influence the retention of physicians in rural and underdeveloped areas
							opportunities for job promotion among primary care doctors, especially township-level doctors.
28	The role of rural communities in the recruitment and retention of women physicians (Paladine HL, et al) [38]	2019 United States	Qualitative study	*n* = 25 women family physicians	Interview	High	-Resident selection based on a predisposition to work in underserviced areas, related to either interest or family ties, and immersing them in family practice in these areas, can enhance recruitment and retention in underserviced areas. -Positive residency experiences, established relationships with local specialists, health professionals and community services, and opportunities to practice as they had trained and how they preferred to practice, contributed to physicians' decision to practice in the same geographical area in which they train.
29	Keeping family physicians in rural practice (JTB Rourke) [39]	2003 Canada	Cross-sectional mailed survey	*n* = 276 physicians and 210 residents	Survey questionnaire	High	-It is important to facilitate referrals and provide specialist support -Availability of locums can make a big difference in continuing patient care and allowing time off for CME, family holiday time, maternity leave, and so on. -A comprehensive package based on highly rated solutions is more likely to be successful than politically expedient measures.
30	Retaining Doctors in Rural Bangladesh: A Policy Analysis (Taufique Jourder et al) [40]	2018 Bangladesh	Qualitative study	n = 11 relevant policy elites	Group discussions	High	-Applicants with relevant expertise to be recruited; recruitment should be quick, customized, and transparent; career tracks (General Health Service, Medical Teaching, Health Administration) must be clearly defined, distinct, and respected. -Facilities must be ensured prior to postings, female doctors should be prioritized to stay with the spouse, field bureaucrats should receive non-practicing allowance in exchange of strict monitoring, and no political interference in compulsory service is assured. - Specific policy guidelines should be developed to

Table 1 The characteristics and findings of included studies in the review *(Continued)*

No	Title and Authors (Reference No)	Country and Date	Type of study	Study population	Data collection method	Quality appraisal	Effect of the context on how the factors influence the retention of physicians in rural and underdeveloped areas
							establish rural medical colleges. -Commitment from the highest level of political hierarchy is the key to the successful implementation of the rural retention policies of the government.
31	Physician recruitment and retention in Manitoba: results from a survey of physicians' preferences for rural job (Witt, Julia) [41]	2017 Canada	survey	*N* = 561 physicians	Questionnaires	High	-Several of the attributes that reflected the need for professional and social inclusion were found to be important: group practice, community incentives (during the first year) and access to clinic technology, particularly telehealth.
32	Recruitment and retention of physicians in rural Alberta: The spousal perspective (Myroniuk, L., Adamiak, P., Bajaj, S., Myhre, D.L.) [42]	2016 Canada	Qualitative study	N = 84 physicians	Semi-structured interviews	High	-Considerations to accommodate the educational, professional and cultural needs of the physician spouse must be highlighted in policy if large areas of underserved rural communities continue to rely on international recruitment. -Leveraging new technologies to provide online access to education, jobs and connection to family and friends may offer a solution to some of the challenges faced by spouses of physicians that practice medicine rurally.
33	Physician recruitment and retention in rural and underserved areas (Lee DM, Nochols T) [43]	2014 Canada and USA	review	n = 86 sources for review/ Canada USA	Academic Search Complete, PubMed and The Cochrane Collaboration	High	-The first strategy is to get the chief executive officer (CEO) involved in physician recruitment, who must: first, develop a recruiting team and meet the team at least quarterly to monitor progress and offer guidance; second, participate in developing marketing and recruiting strategies; third, interview all promising candidates; fourth, financially support the recruiting team's recommended financial incentives for physicians; fifth, hold the recruiting team members accountable by tying their compensation and advancement in the organization to their recruiting performance; and sixth, request the recruiting team to brief candidates regarding abrasive personalities on the existing

Table 1 The characteristics and findings of included studies in the review *(Continued)*

No	Title and Authors (Reference No)	Country and Date	Type of study	Study population	Data collection method	Quality appraisal	Effect of the context on how the factors influence the retention of physicians in rural and underdeveloped areas
							medical staff.
34	The role of distributed education in recruitment and retention of family physicians (Lee, J; Walus, A; Billing, R; Hillier, LM) [44]	2016 Canada	Qualitative Study	*N* = 32 family physicians who graduated from a DME residency training programme.	Semi structured in person interviews	High	-Resident selection based on a predisposition to work in underserviced areas, related to either interest or family ties, and immersing them in family practice in these areas, can enhance recruitment and retention in underserviced areas. -Positive residency experiences, established relationships with local specialists, health professionals and community services, and opportunities to practice as they had trained and how they preferred to practice, contributed to physicians' decision to practice in the same geographical area in which they train.
35	Rural physician supply and retention: factors in the Canadian context (Fleming, Patrick; Sinnot, Mari-Lynne) [45]	2018 Canada	Review	n = 42 studies	PubMed, Embase, CINAHL and ERIC	High	-Overall strategies to improve retention will ensure a stable physician supply and, therefore, will have benefits for population health over the long term. Locally trained physicians practice longer in their home province than out-of-province graduates and international medical graduates. It is important to ensure that there are rural educational opportunities for learners in undergraduate and postgraduate medical training.31 ultimately, enhanced, forward-thinking retention strategies will improve community health and help correct rural disparities for Canadians.

determining the physicians' choices of workplace [34]. Therefore, the relevant educational and professional policies should be considered. These policies include reserving the post-graduate seats for physicians who have worked in remote areas, providing the physicians in rural areas with the opportunity to teach certain courses at universities of medical sciences, and arranging continuing educational programs for rural physicians [8]. On the other hand, the results of Colleen Morken's study (2018) showed that professional development opportunities and opportunities to teach medical students or residents' courses did not have a great effect on the physicians' retention in rural areas [48].

Working conditions factors

Our findings showed that working conditions factors are the factors that have significant influence on the retention of physicians in rural or under development areas. The working conditions factors have been mentioned in most of the studies.

In some studies, working conditions, environment, and opportunities for professional improvement were mentioned as affecting factors on physicians' recruitment and retention in rural areas [44, 49]. Our study showed that unavailability of surgical equipment and the lack of essential drugs are discouraging factors in the physicians' work in the rural and underdeveloped areas [50]. In

Table 2 Influential factors on retention of physicians in rural and underdeveloped areas

Category	Positive factors	Negative factors	Not clear/Not reported
Financial factors	➢ Improved earning potential (18) ➢ Individual incentive programs (18) ➢ Financial incentives (20, 23, 18, 25, 27, 29, 41, 43, 45) ➢ Adequate and fair pay scale (20) ➢ Transparency of the payment system (16) ➢ High salaries (9, 24) ➢ High Earnings from the practice (9) ➢ Bolstering incomes for employed physicians (14) ➢ Favorable salary levels (14) ➢ Increasing reimbursement levels (14) Remuneration (12,18, 23, 27) ➢ Desirable average monthly payments (7) ➢ Various allowances (7) ➢ Financial bonus (7) ➢ Good revenues/patient volume (13) ➢ Financial support (8) ➢ Increase in physicians' income (25, 30) ➢ Guarantee of a position (12) ➢ Opportunities to perform research (12) ➢ Financial compensations (26) ➢ Loan repayment (29) ➢ Scholarship throughout their medical education (29) ➢ Wages (36) ➢ Future tuition (36) ➢ An alternate payment plan (39) ➢ Comprehensive payment plans (39) ➢ Increased funding (39) ➢ Direct financial support for overhead expenses (39) ➢ Special funding for rural clinics, including facilities, support staff, and administration, regardless of compensation model (39) ➢ Financial support for travel and accommodation (39) ➢ Financial motivations (40) ➢ Funding for continuing medical education (45)	➢ Having a partner who wants to live and work in a metropolitan environment (18) ➢ Desire for a metropolitan lifestyle (18) ➢ Unsuitable requirements of salary (16) ➢ Irregular payments (16) ➢ High deductibles (16) ➢ Lower financial bonus (7) ➢ Lower income (7) ➢ Willingness to pay for working in an urban area (7) ➢ Low remuneration (8) ➢ High tuition fees (8) ➢ Lack of economic incentives (26) ➢ Differences between private and public sector payments (26) ➢ Lack of rewards (27) ➢ supplementary income from locum (27) ➢ Economic problems (32) ➢ High fuel costs (45) ➢ Inappropriate payment (33) ➢ Inappropriate salary (33) ➢ Lower reimbursements (34) ➢ Influence of monitoring score on salary (35) ➢ Delay in payments (35) ➢ Low salary(37)	➢ Income sources (22) ➢ Income expectations (26) ➢ Financing Method (32) ➢ Monthly payment time (33) ➢ Rate of payment (37) ➢ Income (41)
Career and professional factors	➢ Group practice arrangement with other clinicians (18) ➢ Opportunities for leadership (18) ➢ Job growth opportunities (19) ➢ Working toward health equity (4) ➢ Promotion prospects status (20) ➢ Providing facilities for phone or email contact with seniors or specialist colleagues for advice (20) ➢ Career development (20) ➢ Professional development opportunity (20) ➢ Functional teams (20) ➢ Autonomy on clinical issues (14) ➢ Professional support (22) ➢ Career opportunities (22) ➢ High professional expectations (22) ➢ Training opportunities (7) ➢ Skills Development (7) ➢ Longer work experience (7) ➢ Scholarship obligation (13) ➢ Autonomy/freedom in the rural practice setting (13) ➢ Recruiting and developing students with an 'affinity' for rural communities and services (13) ➢ Educational strategies (8) ➢ Reservation of post-graduate seats for doctors who have served in rural areas (8) ➢ Involving rural doctors in teaching medical students (8) ➢ Arranging continuing education programs for rural doctors (8) ➢ Introduction of compulsory rural service after graduation (8) ➢ Educational investment (8) ➢ Offering professional development opportunities (8) ➢ Educational initiatives to create doctors for rural areas (8)	➢ Lack of collegial support among rural general practices (18) ➢ Lack of opportunity to take vacations for personal reasons or continuing medical education (18) ➢ High Professional standards (9) ➢ Specialty and educational requirements and infrastructure (22) ➢ Procedural skills (23) ➢ Shorter job history (7) ➢ Barriers to career advancement (13) ➢ Increasing specialization (25) ➢ Professional isolation (27) ➢ Not having continuing education opportunities (27) ➢ Professional imprisonment (27) ➢ Study leave or international opportunities (27) ➢ Lack of career development guidelines (27) ➢ Educational problems (32) ➢ Poor transportation infrastructure (45) ➢ professional isolation (35) ➢ Lack of promotion opportunities (37) ➢ Feel negative to current job prospects (37) ➢ Seeking better career development (37) ➢ Lack of chance of promotion (37) ➢ Low education level (37) ➢ Limited professional ability (37) ➢ Limited or distant access to specialists and technological support (39) ➢ International medical graduate (42)	➢ Practice size and type (23, 41) ➢ Long term education (7) ➢ Lack of promotion opportunities (13) ➢ Having an established career path (25) ➢ improvement opportunities (28) ➢ Educational factors (28) ➢ Type of secondary education, and type of higher secondary education (28) ➢ working expertise (31) ➢ Enhanced skills programs (45) ➢ Longer postgraduate training (45) ➢ Midlevel practitioners (34) ➢ Age (37) ➢ Lack of opportunity to use the abilities (37) ➢ Medical training (42) ➢ Changing the medical education model (42)

Table 2 Influential factors on retention of physicians in rural and underdeveloped areas *(Continued)*

Category	Positive factors	Negative factors	Not clear/Not reported
	➢ Selecting medical students who have a rural background (8) ➢ Community-based medical Education (8) ➢ Providing a partial or complete tuition fee waiver in return for rural service (8) ➢ Career Development (27) ➢ Professional or career incentives (27) ➢ Chance to learn new procedures (43) ➢ Rural or underserved postgraduate training (29) ➢ Retainer schemes (29) ➢ Continuing medical education workshops (29) ➢ Initiative Zone Educational Incentive scheme (29) ➢ Financial investment (29) ➢ Graduate in family medicine (31) ➢ Early rural exposure for trainees (45) ➢ Training local students (45) ➢ Educational opportunities (45) ➢ Increasing the number of rural students in local schools (45) ➢ Increasing admissions for rural students (45) ➢ Training and education (36) ➢ Training and purchase of patient-record and information systems (39) ➢ Providing forms of licensure to provide services (39) ➢ Provide forms of licensure to permit rural physicians to cross provincial borders to provide locum services (39) ➢ Career Development Programs (40) ➢ Absence of proper system or policy (40) ➢ Expanding education services (40) ➢ Provision of post-graduation and in-service training (40) ➢ Establishment of medical colleges in rural areas (40) ➢ Continuing medical education (41) ➢ National medical graduate (42) ➢ Accessing higher education (42) ➢ Emphasize on the social aspect of recruitment (42)		
Working conditions factors	➢ Low workload (18) ➢ Regular work hours (18) ➢ level of collegial support (18) ➢ Supervisor level of support (18) ➢ Improvements in information technology (18) ➢ Job flexibility (25, 34, 19) ➢ Supporting systems (19) ➢ Staff function as team (19) ➢ Supportive family and work/life balance (19) ➢ Supportive administration (19) ➢ Effective support staff (19) ➢ Social justice (19) ➢ Developing a locum service to allow rural doctors to take annual leave and sabbaticals (20) ➢ A reasonable level of infrastructure (20) ➢ Working security (16, 20) ➢ A secure working environment (20) ➢ Opportunities for continuing medical education (20) ➢ Compulsory services commitment (16) Educating native manpower (16) ➢ Workplace with a high level of progressive healthcare (9) ➢ Good working environment (9) ➢ Good infrastructure (9) ➢ Rich instrumental background (9) ➢ Reasonable workload (9) ➢ Incentive benefits (9) ➢ Good equipment (9) ➢ Access to medical information and consultations (9) ➢ Opportunities to achieve professional goals (9)	➢ Remaining located far from family and friends over an extended period (18) ➢ Less opportunity for private practice (19) ➢ Inadequate food service equipment (20) ➢ Minimal facilities (20) ➢ Lack of operating room facilities, equipment and blood transfusion services or even basic essential drugs (20) ➢ Mismatch between doctors' skills and hospital facilities (20) ➢ Long working hours (16) ➢ Lack of job security (16) ➢ High working responsibilities (16) ➢ Local authorities' bad behavior (16) ➢ Staff's bad behavior (16) ➢ Improper facilities (16) ➢ Inefficient performance monitoring and evaluation (16) ➢ International medical school graduate (21) ➢ Restrictions on practice location (23) ➢ Lack of labor mobility among physicians (7) ➢ Distance from specialists and medical testing facilities (13) ➢ Adequate equipment (7) ➢ Hard work/long hours (13)	Work schedules (21) ➢ Workload (23) ➢ Work hours (23) ➢ Work culture (23) ➢ Hospital Infrastructure (27) ➢ Amount of work (30) ➢ Organization policies (30) ➢ Level of attention by leaders (30) ➢ Workload (45) ➢ Number of referrals for services (35) ➢ Poor work environment (37) ➢ Work hours (37)

Table 2 Influential factors on retention of physicians in rural and underdeveloped areas *(Continued)*

Category	Positive factors	Negative factors	Not clear/Not reported
	➢ Modifiable characteristics of work (21) ➢ Offering leadership opportunities (21) ➢ Promoting practice ownership (21) ➢ Coordinating cross-coverage arrangements (21) ➢ Professional work (21) ➢ Preference for a location (22) Lack of educational opportunities for children (22) ➢ Work commitments (22) ➢ High career pathways (34) Annual leave opportunities (23) ➢ Business structure (23) ➢ Paid locum relief (23) ➢ Good relations with the supervisor (7) ➢ Increasing level of the facility (7) ➢ Call coverage (13) ➢ Provision of improved working conditions (8) ➢ Improving living and working conditions and environment (8) ➢ Good service infrastructure (25) Educational incentives to promote working (12) ➢ Personal security at workplace (12) ➢ Access to online information technology for bibliographic search (12) ➢ Ability to use new cutting edge technologies (12) ➢ Access to specialist referral network via telephone and web (12) ➢ Adequate infrastructure at workplace (12) ➢ Access to high-complexity regional hospital to refer patients (12) ➢ Contact with medical technology (12) ➢ Rewards and promotion system (27) ➢ support or supervision (27) ➢ Access to the scholarships (27) ➢ ➢ No possibility for contacting a colleague for advice (27) ➢ Organizational incentives (27) ➢ Infrastructure development (27) ➢ Recruiting rural students (29) ➢ Support for professional development or research marketing (29) ➢ Wellbeing or peer support initiatives (29) ➢ Chances for advancement on this job (30) ➢ Appropriate work conditions (30) ➢ The chance to do something that makes use of their abilities (30) ➢ Competence of the manager in making decisions (30) ➢ Work stability (30) ➢ Employment relationship (31) ➢ Fixed office instructions (32) ➢ The specified working hours (32) ➢ Quantity and quality of feedback (32) ➢ Fewer working hours (45) ➢ Immigration policies (45) ➢ Broad scope of practice (45) ➢ Practice opportunities (30) ➢ Positive clerkship experiences (30) ➢ Specific practice opportunities such as teaching, hospital work (30) ➢ Lack of access to electronic medical records (30) ➢ Established relationships with specialists (30) ➢ Security at work (33) ➢ Change management (33) ➢ Political support of the government (33) ➢ Provide needed infrastructure (33) ➢ Organization of practice (35) ➢ Equipment (36) ➢ Social welfare benefits (37)	➢ Minimal laboratory and technical support (8) ➢ Lack of enough technological facilities (25) ➢ Socioeconomic characteristics of the designated areas (26) ➢ Income disparities between underserved areas and large cities (26) ➢ Inadequate accommodation facilities (26) ➢ Lack of recreational services (26) ➢ Higher workload (27) ➢ Lack of Mentoring (27) ➢ Absence of library facilities or technical resources (27) ➢ Lack of enough transportation facilities (27) ➢ Inability to use in-service training (27) ➢ Lack of clear incentives (27) ➢ Weak information systems (27) ➢ Systemic and organizational problems (32) ➢ Long working hours (33) ➢ Sharing on-call with only one other physician (34) ➢ Lack of job security (35) ➢ Low amenities (35) ➢ Long working hours (35) ➢ High work risk (37) ➢ Work pressure (37) ➢ Poor work condition (37) ➢ Lack of job safety (37) ➢ Lack the freedom to choose their own method of working (37) ➢ Amount of variety in the job (37) ➢ Industrial relationship between management and workers (37) ➢ Feeling of unsafe job (37) ➢ Continuing medical education (39) ➢ Limiting on-call duty (27) ➢ Compulsory services of doctors in rural health facilities (40) ➢ High ours worked and on-call frequency (40)	

Table 2 Influential factors on retention of physicians in rural and underdeveloped areas *(Continued)*

Category	Positive factors	Negative factors	Not clear/Not reported
	➢ Growth rate of investment in human resources (37) ➢ Devise retirement incentives specific to rural physicians (39) ➢ Clinical support program (39) ➢ Support staff (41) ➢ Ability to take time off (41) ➢ Group practice (41) ➢ No opportunity for working part-time		
Personal factors	➢ Supportive family (20) ➢ Self-care while working in high pressure settings (20) ➢ Political stability and security (20) ➢ Desirable family situations (21) ➢ having a personal and family rural background (18) ➢ Older age (22) ➢ Having a rural background (26, 22, 7, 31, 42, 45) ➢ Having a feel for the area (22) ➢ Perceptions of work life balance (23) ➢ Family ties to the community (13) ➢ Being able to help and feelings of patients' appreciation of the physician (13) ➢ Good partners (13) ➢ Dependence on rural community (13) ➢ Place of residence (13) ➢ Exposure to rural practice before residency program (24) ➢ Marriage to a person from a rural area (24) ➢ Negative opinions about working in rural areas (25) ➢ Family physicians' reluctance to change locations (25) ➢ Non-monetary incentive policies (25) ➢ Older age (12) ➢ Not having a university-trained professional parent (12) ➢ Previous exposure or service in a poor area (12) ➢ Willingness to practice medicine in rural or underprivileged areas (12) ➢ Interest in serving vulnerable people (12) ➢ Religious beliefs (26) ➢ Positive attitude towards working in remote areas (26) ➢ Lifestyle-related issues (26) ➢ Interest in serving rural setting (27) ➢ Less experience (27) ➢ Rural-origin graduates (28) ➢ Rural place of birth (28) ➢ Parent's occupation (28) ➢ Occupation of father (28) ➢ Rural health related work experience (29) ➢ Family ties to the region (45) ➢ Residency experiences (30) ➢ knowledge gained during residency of the local community programmers (30) ➢ Being native (33) ➢ Job opportunities for spouses (39) ➢ Work-life balance (41) ➢ Professional interaction (41) ➢ Rural training (41) ➢ Spousal employment opportunities (41) ➢ Importance of finding spousal employment (42) ➢ Raising a family in a rural environment (42) ➢ Alignment of personal culture and skill set with that in the community or practice (42)	➢ Unsatisfactory rural elective experiences (18) ➢ Family pressure (16) ➢ Having high professional expectations (22) ➢ Placing a high value on prestige (22) ➢ Being bonded and clinical experience (22) ➢ Family and friend closeness (22) ➢ Seeking new employment (7) ➢ Wish to change employment (7) ➢ Being female (12) ➢ Anxiety about the unfamiliarity of rural life (27) ➢ The turnover intention (30) ➢ Being away from family (35) ➢ Willingness to continue education (35) ➢ Spousal and family concerns (39) ➢ Considerations of children (39)	➢ Personal and professional characteristics (21) ➢ Gender (22) ➢ Specific demographic (23) ➢ Gender (23) ➢ Age (23) ➢ Parental education levels (7) ➢ Birthplace (24) ➢ Year of graduation (24) ➢ The rank of the university attended (24) ➢ Place of residence (24) ➢ Marital status (26, 31) ➢ Individual preferences (26) ➢ Number of children (31) ➢ Year of University entrance (31) ➢ Age (31, 39, 42, 45) ➢ Gender (26, 24, 31, 42, 32, 39, 42, 45) ➢ Family member (37) ➢ Spouse's career (42)
Cultural factors	➢ Gaining an understanding of the needs of people living in rural areas (18) ➢ Patient communication (19) ➢ Patient trust (19) ➢ Quality of doctor patient relationships (14) ➢ Nice people or community (13) ➢ Values (26)	➢ The misconception that rural practitioners are less qualified than urban specialists (18) ➢ Poor culture of people (16) ➢ Inappropriate treatment of people (33) ➢ Social problems (37) ➢ Cultural differences (38)	➢ Degree of respect and recognition (27) ➢ Relationship with patients (37)

Table 2 Influential factors on retention of physicians in rural and underdeveloped areas *(Continued)*

Category	Positive factors	Negative factors	Not clear/Not reported
	➢ Personal incentives (27) ➢ Target population culture (32) ➢ Deep mutual trust and communication (37) ➢ Lack of social networks and investment in the community (38)	➢ Lack of cultural opportunities (42) ➢ High cultural expectations (42)	
Living conditions factors	➢ Suitable housing and access to facilities (18, 23) ➢ Completion of satisfactory electives in rural areas (18) ➢ Provision of adequate schooling for their children or scholarships for boarding school (20) ➢ Jobs for spouses (9) ➢ Suitable places for their children in schools (9) ➢ free housing or subsidized house purchases (9) ➢ Opportunities to enjoy outdoor sports (14) ➢ Access to cultural activities (14) ➢ Lifestyle goals (22) ➢ Having a placement in a rural area (22) ➢ Free housing (25, 7) ➢ Lack of private paying patients (13) ➢ Lack of shopping or restaurants (13) ➢ Access to good schools for children (24) ➢ Social and recreation opportunities (30) ➢ Services in the area and lifestyle opportunities afforded by the location (30) ➢ Education facilities for children (36) ➢ Fit with the community; spouse/partner fit with the community (38) ➢ Appropriate relationships with individuals/community (38) ➢ Attractiveness of a rural location to the spouse (39) ➢ Recreational opportunities (39) ➢ Housing availability (41) ➢ Community incentives (41) ➢ Adequate housing availability (41) ➢ Strong education system for children (42) ➢ Safety of the community (42) ➢ Access to recreational facilities (42) ➢ Activities and proximity to an urban center (42) ➢ Proximity of the location for work and personal lives in a rural environment (42)	➢ Few social and recreational activities to enjoy (18) ➢ Inadequate accommodation facilities (18) ➢ Separation from partner and family (18) ➢ The absence of phone networks and other forms of communication even post (20) ➢ Lack of opportunities for a social life (20) ➢ Lack of vacation requirements or vacation leave (16) ➢ Region insecurity (16) ➢ Distrust to local authorities (16) ➢ Region depravity (16) ➢ Partner and family considerations (22) ➢ Geographic location (23) ➢ Limiting food choices (8) ➢ Unavailable Telephone services (8) ➢ Social and cultural problems (32) ➢ Environmental problems (32) ➢ Welfare problems (32) ➢ Inappropriate behavior of the people of the area (35) ➢ Political differences (38)	➢ Size of town ➢ Higher socioeconomic background (7) ➢ Wealth ranking (28) ➢ Population covered area (33) ➢ population growth and urbanization progress (37) ➢ Community size (39) ➢ Current community of residence (42) ➢ Able to grow in [a supportive] environment (42)

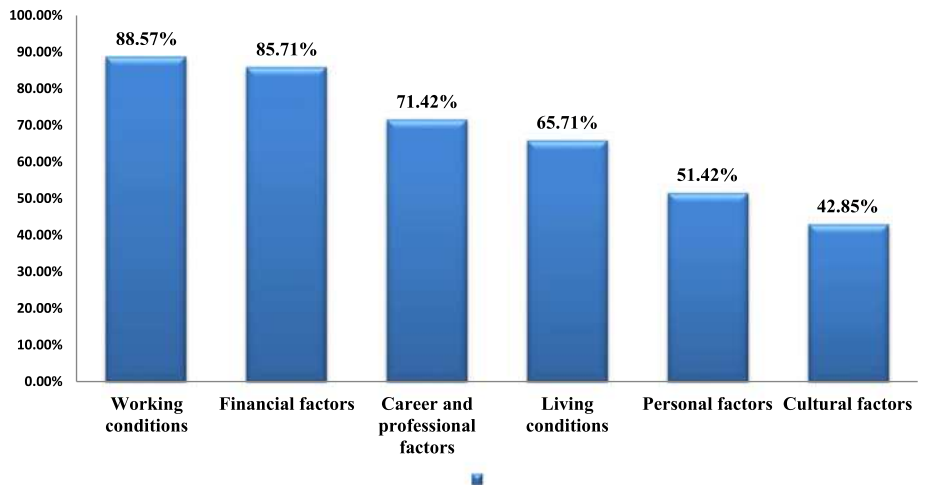


Fig. 2 Percentage of the influential factors in the selected studies

other words, the developmental condition of the region, where the physicians worked, was a very important variable adversely shaping their preferences [25]. The lack of job security, heavy workload, length of working hours, and the multiplicity of the physicians' responsibilities in rural health centers were among the other important factors in physicians' unwillingness to stay in the deprived areas.

In Vietnam, there was a distinct lack of job replacement among physicians. The physicians who worked at a certain level of an organization could only be transferred within the same region and geographical area from one level to another level in other organizations [5].

In rural areas, usually, there is not any medical specialist that could help or guide other physicians specially GPs. Thus, they should visit patients and make decisions by themselves at times even without any preclinical exams or have to work seven days of the week.

Job security and the possibility of relocation were introduced in the Shankar's (2010) review as factors in the retention of physicians [8].

Evidence showed that there was a strong relationship between the physicians' occupational group and choice of workplace. For example, specialists who worked in hospitals with access to advanced technologies were reluctant to work in rural or underdeveloped areas where technological facilities were meager [25]. Therefore, it was stated that an increase in specialization contributed significantly to the imbalance in the geographical distribution of physicians [51].

Personal factors

Personal factors were introduced in a limited number of studies [9] as influencing factors in physicians' retention in deprived areas. Prasad and Amatya (2015) argued that the personal factors including demographic factors are more significant than the financial factors [28]. Among the demographic factors, gender and age had the greatest impact In general; male physicians' tendency to serve in rural and underdeveloped areas was greater than the female physicians [12, 26]. This issue may stem from the fact that female physicians harbor more concerns on workplace conditions, and their choices are often more affected by factors such as security issues, responsibilities, family commitments, living conditions and life considerations in comparison to their male colleagues [25, 52].

In the literature, the findings concerning the effect of age on working in rural and underdeveloped areas are contradictory. According to Mollahaliloglu (2015), young physicians were the groups that could be easily motivated to work in rural areas [25]. However, most of the studies showed that older physicians had a greater tendency to serve in deprived areas in comparison with the younger ones [12, 22]. It can be argued that younger physicians often place a higher value on education, career progression, and leisure activities compared to older physicians.

According to Joseph Lee)2016(, family ties were one of the factors which influenced the physicians' decision on retention in rural areas [44]. Therefore, the selection of physicians based on their readiness and desire to work in underdeveloped areas as a result of either interest or family ties in these areas can enhance their recruitment and retention in underdeveloped areas.

The physicians, who were from the ethnic communities in rural areas along with the physicians who were born and raised in rural places (i.e., had a rural background), were more inclined to serve in rural and underdeveloped areas [24]. One possible explanation is that these physicians were more familiar with the deprived environments and were able to easily adapt themselves to the conditions and problems of the deprived environments. Furthermore, the physicians, who passed their courses in the deprived areas or had a record of serving in deprived and rural areas, tend to serve in these areas more readily in comparison with other physicians without such backgrounds. This issue stems from the fact that during their studies, these physicians had seen and experienced the living conditions in the rural environments and have kept preparing themselves to deal with such problems [2, 34]. Similarly, the findings of a number of other studies confirmed that rural background, rural origins, and rural lifestyle were the factors highly associated with recruitment and retention of health professionals in rural areas [12].

Some physicians enjoy serving in deprived areas because they had a high motivation to treat the patients who were in need of help [13]. In other words, these physicians were happy to serve in deprived areas because they believed that their efforts helped to establish a mutual understanding among community and society members.

Living conditions factors

Deprivation rates of an area had a direct impact on physicians' tendency to stay in their workplaces or to leave them. The deprivation severity of the region was a major factor in the physicians' desertion or decisions on the desertion of their workplaces in the following years [53].

Lack of amenities, accommodations, and some deficiencies such as lack of communication and internet systems, recreational facilities and interesting places prompted the physicians to leave their workplaces [14, 54].

In some cases, long distances between the rural areas and the urban centers restricted the physicians' access to shopping centers and stores which were necessary to buy their required food and clothing items. These factors made the physicians reluctant to continue to serve in

these areas [13]. Furthermore, the physicians, who worked in the rural areas, faced a higher risk in terms of health and safety in comparison with the physicians who worked in the urban areas. More specifically, the risk of certain diseases was high in rural and remote areas due to the fact that people disregarded some health issues [5]. Evidence showed that lifestyle opportunities, including the availability of cycling opportunities, parks and restaurants together with adequate recreation affected the retention of physicians in rural areas. Therefore, providing the physicians with recreational opportunities in underdeveloped and rural areas should be taken into consideration [18, 44].

Cultural factors

A limited number of studies have addressed cultural factors in the retention of physicians. The customs, traditions, beliefs, moral values, language, and laws of the rural community can help GPs to work in rural areas for a long period of time, but in some cases, they could be counterproductive.

The existence of appropriate bilateral relationships between physicians and patients was one of the important issues in these areas and could lead to these physicians' satisfaction and retention in deprived areas [33]. A number of physicians reported the people's breach of etiquette in deprived and rural areas [22]. This issue could stem from the people's poor living conditions and their lack of awareness of the rules and conventions of the etiquette in health centers. Therefore, it is necessary to develop a framework and code for communication between the physicians and their patients in order to increase the physicians' motivation to serve in disadvantaged areas [28]. The government policy makers and universities of medical sciences have a major effect on the culture of working in limited-resource and underprivileged areas of the countries [12].

Strengths and limitations

To the best of our knowledge, this is the first study of its kind to systematically explore all the factors governing the retention of physicians in underdeveloped or deprived areas in both developed and developing countries published papers, although we only included papers that were written in English. Strength of this review is conducting a systematic search in five databases, supplemented by a hand search of the bibliography in the articles identified. This review is limited by the difficulty of analyzing, identifying the category of some extracted factors and comparing findings of studies conducted in a wide diversity of contexts, with a variety of using different study designs.

Conclusion

This study demonstrates that there are different factors influences the physicians' interest in rural and remote areas and their retention in these areas. A good number of studies over this issue have been conducted in developing and developed countries. Working conditions factors and financial factors deserve healthcare policy makers' particular attention among the factors which are associated with the retention and willingness of physicians to serve in deprived areas. Recruiting physicians, who are from rural backgrounds and rural origins, is another determining factor in physicians' retention which has to be considered by the policy makers who aim to promote the physicians' retention in rural areas. There is no enough evidence regarding the cultural factors and their effect on the physicians' retention in the mentioned areas. Further studies are warranted to determine the quantitative effects of the identified determining factors on the retention of physicians in rural and underdeveloped areas.

Identifying the influential factors can be useful to policy makers and health planners who intend to develop evidence-informed policy interventions and executive programs in order to guarantee the retention of the healthcare workers in these areas which is a crucial factor in the improvement of population health.

Supplementary information

Supplementary information accompanies this paper at https://doi.org/10.1186/s12875-020-01279-7.

Additional file 1: Table 1. PubMed search strategy.

Abbreviations

HCW: Health Care Workers; GP: General Practitioner; CASP: The Critical Appraisal Skills Program

Acknowledgements

This work was supported by the Tabriz University of Medical Sciences through a Project Grant. We would like to acknowledge the advice of Professor Jafar Sadegh Tabrizi of the Tabriz Health Services Management Research Center, Tabriz, Iran for designing of some parts of the study.

Authors' contributions

NM served as the principal investigator and conducted literature review and prepared the first draft of the manuscript. LD conceived the study and supervised the entire process of the study. JB and RKh were advisors in methodology and contributed to intellectual development of the manuscript. KP contributed to the conception of the study and the intellectual development of the paper. All authors read and approved the final manuscript.

Funding

This study was funded by the Tabriz University of Medical Sciences, Tabriz, Iran. The funder had no role in the design of the study, data collection, analysis or interpretation of data, or in writing the manuscript.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate
This study was approved by the ethics committee of Tabriz University of Medical Sciences (Approval No: IR.TBZMED.REC.1396.905).

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

Author details
[1]Department of Health Policy& Management, Tabriz Health Services Management Research Center, Iranian Center of Excellence in Health Management, Tabriz University of Medical Sciences, Tabriz, Iran. [2]Social Determinants of Health Services Research, Health Management and safety Promotion Research Institute, Tabriz University of Medical Sciences, Tabriz, Iran. [3]Faculty of Social Sciences, imec-mict-Ghent University, Ghent, Belgium.

Received: 29 August 2019 Accepted: 5 October 2020
Published online: 23 October 2020

References
1. Pitblado JR, Pong RW. Geographic distribution of Physicians in Canada: Beyond How Many and Where. Ottawa: Canadian Institute for Health Information; 2005.
2. Kabene SM, Orchard C, Howard JM, Soriano MA, Leduc R. The importance of human resources management in health care: a global context. Hum Resour Health. 2006;4:20.
3. Anand S, Barnighausen T. Human resources and health outcomes: cross-country econometric study. Lancet. 2004;364(9445):1603–9.
4. Nasiripour A, Maleki M, Tabibi S, Ehsani CE. Factors influence on geographic distribution of physicians in selected countries: a review article. J Kermanshah Univ Med Sci. 2013;17(9):600–10.
5. Guilbert JJ. The World Health Report 2006: working together for health. Educ Health (Abingdon). 2006;19(3):385–7. https://doi.org/10.1080/13576280600937911.
6. Rajabi F, Esmailzadeh H, Rostamigooran N, Majdzadeh R, Doshmangir L. Future of health care delivery in iran, opportunities and threats. Iran J Public Health. 2013;42(Supple1):23–30.
7. Vujicic M, Shengelia B, Alfano M, Thu HB. Physician shortages in rural Vietnam: using a labor market approach to inform policy. Soc Sci Med. 2011;73(7):970–7.
8. Shankar P. Attracting and retaining doctors in rural Nepal. Rural Remote Health. 2010;10(3):1420.
9. Girasek E, Eke E, Szócska M. Analysis of a survey on young doctors' willingness to work in rural Hungary. Hum Resour Health. 2010;8:13. https://doi.org/10.1186/1478-4491-8-13.
10. Goddard M, Gravelle H, Hole A, Marini G. Where did all the GPs go? Increasing supply and geographical equity in England and Scotland. J Health Serv Res Policy. 2010;15(1):28–35.
11. Alla-Eddini F, Fatemi R, Ranjbaran Jahromi H, Asghari E, Eskandari S, Ardalan A, et al. Iranian physicians' willingness to work in underserved areas and related factors in 2001. Razi J Med Sci. 2004;11(40):247–55.
12. Borracci RA, Arribalzaga EB, Couto JL, Dvorkin M, Ahuad Guerrero RA, Fernandez C, Ferreira LN, Cerezo L. Factors affecting willingness to practice medicine in underserved areas: a survey of Argentine medical students. Rural Remote Health. 2015;15(4):3485.
13. Glasser M, MacDowell M, Hunsaker M, Salafsky B, Nielsen K, Peters K, et al. Factors and outcomes in primary care physician retention in rural areas. S Afr Fam Pract. 2010;52(4):336–40.
14. Pathman DE, Williams ES, Konrad TR. Rural physician satisfaction: its sources and relationship to retention. J Rural Health. 1996;12(5):366–77.
15. Doshmangir L, Moshiri E, Farzadfar F. Seven Decades of Primary Healthcare during Various Development Plans in Iran: A Historical Review. Arch Iran Med. 2020;23(5):338–52. https://doi.org/10.34172/aim.2020.24 PMID: 32383619.
16. Amiresmaili M, Khosravi S, Feyzabadi VY. Factors affecting leave out of general practitioners from rural family physician program: a case of Kerman, Iran. Int J Prev Med. 2014;5(10):1314–23.
17. Singh J. Critical appraisal skills programme. J Pharmacol Pharmacother. 2013;4(1):76.
18. Viscomi M, Larkins S, Gupta TS. Recruitment and retention of general practitioners in rural Canada and Australia: a review of the literature. Can J Rural Med. 2013;18(1):13–23.
19. Getzin A, Bobot BL, Simpson D. Sustaining family physicians in urban underserved settings. Fam Med. 2016;48(10):809–13.
20. Butterworth K, Hayes B, Neupane B. Retention of general practitioners in rural Nepal: a qualitative study. Aust J Rural Health. 2008;16(4):201–6.
21. Pathman DE, Konrad TR, Dann R, Koch G. Retention of primary care physicians in rural health professional shortage areas. Am J Public Health. 2004;94(10):1723–9.
22. Rogers ME, Searle J, Creed PA. Why do junior doctors not want to work in a rural location, and what would induce them to do so? Aust J Rural Health. 2010;18(5):181–6.
23. Russell DJ, McGrail MR, Humphreys JS, Wakerman J. What factors contribute most to the retention of general practitioners in rural and remote areas? Aust J Primary Health. 2012;18(4):289–94.
24. Taati Keley E, Ravaghi H, Salehi M, Nasiripour AA, Abdi Z, Meshkini A. Relationship between personal characteristics of specialist physicians and choice of practice location in Iran. Rural Remote Health. 2016;16(2):3412.
25. Mollahaliloðlu S, Uðurluoðlu Ö, Iþýk O, Kosdak M, Taþkaya S. Factors affecting the work of physicians in rural areas of Turkey. Rural Remote Health. 2015;15(3):3048.
26. Ravaghi H, Taati E, Abdi Z, Meshkini A, Sarvarizadeh S. Factors influencing the geographic distribution of specialist physicians in Iran: a qualitative study. Rural and Remote Health. 2015;15:2967. Available: www.rrh.org.au. Accessed 19 Mar 2018.
27. Snow RC, Asabir K, Mutumba M, Koomson E, Gyan K, Dzodzomenyo M, et al. Key factors leading to reduced recruitment and retention of health professionals in remote areas of Ghana: a qualitative study and proposed policy solutions. Hum Resour Health. 2011;9:13.
28. Sapkota BP, Amatya A. What factors influence the choice of urban or rural location for future practice of Nepalese medical students? A cross-sectional descriptive study. Hum Resour Health. 2015;13:84. https://doi.org/10.1186/s12960-015-0084-5.
29. Verma P, Ford JA, Stuart A, Howe A, Everington S, Steel N. A systematic review of strategies to recruit and retain primary care doctors. BMC Health Serv Res. 2016;16:126.
30. Fang P, Liu X, Huang L, Zhang X, Fang Z. Factors that influence the turnover intention of Chinese village doctors based on the investigation results of Xiangyang City in Hubei Province. Int J Equity Health. 2014;13:84.
31. Ehsani-Chimeh E, Majdzadeh R, Delavari S, Gharebelagh MN, Rezaei S, Rad EH. Physicians' retention rate and its effective factors in the Islamic Republic of Iran. East Mediterr Health J. 2018;24(9):830–7.
32. Sedighi S, Amini M, Porreza A. Assessment on causes of physicians abdication from rural family physician plan in 2012. Journal of healthcare management (journal of health system). 2015;5:33–43. [In persian].
33. Atefi A, Aghamohamadi S, JamshidBeygi E, Zarabi M, POURREZA A, Shariati M. Factors influencing desertion of family physicians working in rural areas with deprivation index less than 1.4 (prosperous) in 2010; 2014.
34. Forti EM, Martin KE, Jones RL, Herman JM. Factors influencing retention of rural Pennsylvania family physicians. J Am Board Fam Pract. 1995;8(6):469–74.
35. Mosa FE, Khooban H, Dahrazama B, Arefi VR, Saadati F. Determining the causes of discontinuation of family physicians working in Mashhad University of Medical Sciences. Health Inform Manage. 2015;12(1):117–24.
36. Hamouzadeh P, Akbarisari A, Olyaeemanesh A, Yekaninejad MS. Physician preferences for working in deprived areas: a systematic review of discrete choice experiment. Med J Islam Repub Iran. 2019;33:83.
37. Wen T, Zhang Y, Wang X, Tang G. Factors influencing turnover intention among primary care doctors: a cross-sectional study in Chongqing, China. Hum Resour Health. 2018;16(1):10.
38. Paladine HL, Hustedde C, Wendling A, Sola O, Prasad R, Bjorkman S, et al. The role of rural communities in the recruitment and retention of women physicians. Women Health. 2020;60(1):113–22.
39. Rourke JT, Incitti F, Rourke LL, Kennard M. Keeping family physicians in rural practice. Solutions favoured by rural physicians and family medicine residents. Can Fam Phys. 2003;49:1142–9.
40. Joarder T, Rawal LB, Ahmed SM, Uddin A, Evans TG. Retaining doctors in rural Bangladesh: a policy analysis. Int J Health Policy Manag. 2018;7(9):847–58.
41. Witt J. Physician recruitment and retention in Manitoba: results from a survey of physicians' preferences for rural jobs. Can J Rural Med. 2017;22(2):43–53.

42. Myroniuk L, Adamiak P, Bajaj S, Myhre DL. Recruitment and retention of physicians in rural Alberta: the spousal perspective. Rural Remote Health. 2016;16(1):3620.
43. Lee DM, Nichols T. Physician recruitment and retention in rural and underserved areas. Int J Health Care Qual Assur. 2014;27(7):642–52.
44. Lee J, Walus A, Billing R, Hillier LM. The role of distributed education in recruitment and retention of family physicians. Postgrad Med J. 2016; 92(1090):436–40.
45. Patrick FM. Rural physician supply and retention: factors in the Canadian context. Can J Rural Med. 2018;23(1):15–20.
46. Grobler L, Marais BJ, Mabunda SA, Marindi PN, Reuter H, Volmink J. Interventions for increasing the proportion of health professionals practising in rural and other underserved areas. Cochrane Database Syst Rev. 2009;(1): CD005314. https://doi.org/10.1002/14651858.CD005314.pub2.
47. Goel S, Angeli F, Bhatnagar N, Singla N, Grover M, Maarse H. Retaining health workforce in rural and underserved areas of India: what works and what doesn't? A critical interpretative synthesis. Natl Med J India. 2016;29(4): 212–8.
48. Morken C, Bruksch-Meck K, Crouse B, Traxler K. Factors influencing rural physician retention following completion of a rural training track family medicine residency program. WMJ. 2018;117(5):208–10.
49. Dolea C, Stormont L, Braichet J. Evaluations of interventions to increase access to health workers in underserved areas: a global review. Bull World Health Organ. 2010;88(5):357–63.
50. Ravaghi H, Abdi Z, Meshkini A, Sarvarizadeh S. Factors influencing the geographic distribution of physicians in Iran: a qualitative study; 2015.
51. Rosenblatt RA, Hart LG. Physicians and rural America. West J Med. 2000; 173(5):348.
52. Wilson NW, Couper ID, De Vries E, Reid S, Fish T, Marais BJ. A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas. Rural Remote Health. 2009;9(2):1060.
53. Mosaviraja S, Nasiripour A, Malekzadeh J. Influencing factors on family physician retaining in Kohgilouye and Boyer Ahmad Province, Iran in 2009. Armaghane Danesh. 2014;19(4):361–70.
54. Kotzee T, Couper I. What interventions do south African qualified doctors think will retain them in rural hospitals of the Limpopo province of South Africa. Rural Remote Health. 2006;6(3):581.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions

BMC

TAB 23

Human Resources for Health

REVIEW

Open Access

Approaches to locum physician recruitment and retention: a systematic review

Nathan Ferreira[1], Odessa McKenna[1], Iain R. Lamb[2], Alanna Campbell[3], Lily DeMiglio[2] and Eliseo Orrantia[2*]

Abstract

A robust workforce of locum tenens (LT) physicians is imperative for health service stability. A systematic review was conducted to synthesize current evidence on the strategies used to facilitate the recruitment and retention of LT physicians. English articles up to October 2023 across five databases were sourced. Original studies focusing on recruitment and retention of LT's were included. An inductive content analysis was performed to identify strategies used to facilitate LT recruitment and retention. A separate grey literature review was conducted from June–July 2023. 12 studies were retained. Over half (58%) of studies were conducted in North America. Main strategies for facilitating LT recruitment and retention included financial incentives (83%), education and career factors (67%), personal facilitators (67%), clinical support and mentorship (33%), and familial considerations (25%). Identified subthemes were desire for flexible contracts (58%), increased income (33%), practice scouting (33%), and transitional employment needs (33%). Most (67%) studies reported deterrents to locum work, with professional isolation (42%) as the primary deterrent-related subtheme. Grey literature suggested national physician licensure could enhance license portability, thereby increasing the mobility of physicians across regions. Organizations employ five main LT recruitment facilitators and operationalize these in a variety of ways. Though these may be incumbent on local resources, the effectiveness of these approaches has not been evaluated. Consequently, future research should assess LT the efficacy of recruitment and retention facilitators. Notably, the majority of identified LT deterrents may be mitigated by modifying contextual factors such as improved onboarding practices.

Keywords Workforce stability, Health human resources, Recruitment strategies, Retention strategies

Introduction

The shortage of a sustainable and robust physician workforce is a significant healthcare issue across most of the world [1]. In regions that face persistent challenges in physician availability, the continuity of the healthcare system heavily relies on locum tenens (LT) physicians, commonly referred to as "locums". These healthcare providers work in a temporary capacity to fill vacancies or provide coverage for permanent physicians [2, 3]. Their importance was highlighted during the COVID-19 pandemic as the lack of locums resulted in the suspension of hospital services and emergency department closures due to insufficient staffing [4].

Physician recruitment strategies primarily focus on filling permanent positions with minimal emphasis on attracting locum providers [5]. However, strategies aimed at facilitating the recruitment of permanent physicians may not effectively attract locums given fundamental distinctions in their employment preferences and priorities. LTs, for instance, are motivated by factors such as seeking greater autonomy, working part-time, transitioning into partial retirement, and supplementing income [6, 7]. Their attraction to working as a locum may be due to

*Correspondence:
Eliseo Orrantia
eorrantia@mfht.org
[1] Faculty of Medicine, University of Ottawa, Ottawa, ON K1N 6N5, Canada
[2] Division of Clinical Sciences, Northern Ontario School of Medicine (NOSM) University, Marathon, ON P0T 2E0, Canada
[3] Northern Ontario School of Medicine (NOSM) University, Sudbury, ON P3E 2C6, Canada

© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

advantages including reduced administrative burdens, lower workplace stress, and flexibility for maintaining a desired work–life balance [6, 7]. Additional advantages include competitive salaries comparable to permanent positions without a long-term commitment, travel and accommodation stipends, subsidized malpractice insurance, and lower overhead expenses [6, 7].

Governments and communities invest substantial financial resources to attract locums in order to sustain healthcare service delivery [6, 8]. As such, existing research has investigated locum recruitment and retention factors [6, 7, 9, 10]. Despite the important role that locums play in sustaining operational healthcare systems, particularly during periods of health human resources strain, there is a lack of consolidated of evidence on the recruitment of LT physicians. Consequently, there is a need for the synthesis of current research on facilitators used in the recruitment and retention of LTs. This will serve to better inform the development of comprehensive, evidence-based recruitment guidelines tailored specifically to LT physicians. Therefore, this study systematically reviewed existing literature to identify and synthesize the approaches used to recruit locum physicians. Ensuing results will provide valuable guidance to policymakers and healthcare organizations, aiding in the development of evidence-based recruitment policies and practices to address the unique needs of locum physicians.

Methods

This systematic review was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [11]. This research protocol was registered in the PROSPERO database (CRD42022339666).

Search strategy

Between April 26th and April 27th, 2022 we performed a systematic search of the electronic databases Ovid MEDLINE, Cochrane Database of Systematic Reviews, PsycINFO, CINAHL and Web of Science-Core Collection. Examples of the medical subject headings (MeSH) applied include "Contract Services", "Career Choice", "Personnel Staffing and Scheduling", "Personnel Loyalty" and "Physician Incentive Plans". This initial search has since been followed by an updated search in October of 2023 prior to submission for publication. Keywords were used to collect non-indexed material and those terms not captured by MeSH, such as "locum". No limits were applied to the searches. Articles not available in English were excluded. Secondary research (e.g., meta-analyses, dissertations, systematic reviews, case reports, commentaries, grey literature) were excluded from the scholarly search. Reference lists of included studies were searched for additional articles. Details of the scholarly search strategy appear in Additional file 1: Appendix S1. This search strategy was developed in collaboration with a librarian and peer-reviewed by a second librarian.

Between June 12th and July 16th, 2023 we performed an iterative systematic hand-search of grey literature. This included public search engines (e.g., Google), grey literature repositories (e.g., OpenGrey), health care quality organizations, and data facilities across five countries, Canada, United States of America, United Kingdom, Australia, and India. Examples of the search terms and headings applied include "Locum", "Contract", "Temporary", and "Locum Physician". Search parameters were restricted to include only articles published in the year 1990 or later. For database searches information beyond the first 150 or 250 search results were not incorporated in the analysis. For full search histories please see Additional file 1: Appendix S3.

Selection and screening process

A modified version of the PICO (population, intervention, comparison, outcomes) framework was used (Table 1) [12]. We included original qualitative, quantitative or mixed-methods studies focused on recruitment and retention initiatives specific to locums in any country across clinical settings. There was variability in how studies defined locum physicians (Table 2). Articles focusing on recruitment and retention of non-locum physicians and healthcare workers without an MD designation (with the exception of medical students training in a MD programme) were excluded, including articles that combined both populations in which individual data for locums could not be extracted. Articles that exclusively incorporated the recruitment and retention of locums in the interpretive context such that locum recruitment and retention initiatives were not prospectively mentioned in the study framework or methodology were excluded.

Retrieved articles were managed using Covidence online systematic review software (Veritas Health Innovation, Melbourne, Australia). Two reviewers independently performed title and abstract screening for relevance. Full texts were then reviewed against eligibility criteria (Table 1). In both stages of screening, discussion was used to resolve disagreements. Remaining discrepancies were resolved by a third reviewer.

Data extraction and synthesis

Data extraction took place within Covidence using two independent reviewers. A template was developed and piloted for two studies to ensure reviewer agreement prior to utilization. Outstanding conflicts were resolved by a third author. Extraction parameters included study

Table 1 Eligibility criteria involving PICoS (a modified PICO framework)

PICoS	Inclusion criteria	Exclusion criteria
Population	Physician locums, fill-in physicians, temporary physicians or locum, temporary physicians in training (e.g., medical students, residents, or fellows)	Non-physician healthcare workers (e.g., nurses, physician assistants, occupational therapists, respiratory therapists, optometrists, dentists, audiologists) lacking an accredited medical degree Permanent non-locum physicians
Interest	Recruitment and retention of locum physicians at the individual level	Proxy or composite locum recruitment and retention strategies Indirect or inferred locum recruitment or retention strategies Locum recruitment and retention strategies at the managerial, department, organizational or systemic level
Context	Any country Hospital or clinical setting	Non-healthcare settings (e.g., laboratories, pharmaceutical industries, insurance agencies, mines, biotechnology firms, consultant agencies, or medical consultant agencies)
Study type	Qualitative, quantitative, mixed-methods original research in the English language	Secondary research unavailable in English language

Table 2 Included studies' definition of a locum physician

Author (year)	Locum physician definition
Simon & Alonzo (2004, 2008) [7, 13]	*2004* A contingent physician contracted to provide clinical services for a defined period of time without obligation for permanent placement *2008* A locum physician is a temporary physician contracted to provide clinical services for a defined period of time without obligation for permanent placement
Rourke et al. (2003) [3]	NR
Jenson et al. (2008) [15]	Sessional general practitioners are a group pf GPs broadly consisting of both salaried GPs and locums and as such, follow diverse career paths and patterns
DiMeglio et al. (2018) [9]	Physicians hired on a temporary basis to fill vacancies in full-time positions
McKevitt et al. (1999) [16]	A physician who provides care for patients in the absence of permanent physicians
Woloschuk & Tarrant (2002) [17]	NR
Myhre et al. (2010) [2]	A healthcare provider who is serving as a temporary relief or substitute
Jenson et al. (2006) [14]	"Sessional GPs" encapsulated both salaried and locum (freelance) GPs
Rajbangshi et al. (2017) [18]	NR
Theodoulou et al. (2018) [8]	Locum work is multi-faceted and locum physicians cover shifts impromptu or enrol on longer-term contract
Lagoo et al. (2020) [19]	Traveling physicians' where physicians are sent to practice in hospitals away from their home institution

GP general practitioner, *NR* not reported

design, participant characteristics, context of locum assignment, and strategies used to recruit and retain locums. Two authors (NF and OM) performed an inductive content analysis to characterize recurring patterns of the locum recruitment and retention strategies discussed in each paper included in the systematic analysis. Following the identification of these strategies, they were grouped into broader, overarching themes relevant to LT recruitment and retention. Methodologic quality of each study was assessed using the Mixed Methods Appraisal Tool (MMAT) [13]; two authors (NF and OM) conducted the appraisal independently and any discrepancies in appraisal were resolved by discussion with a third author (EO). Authors of included studies were contacted if data were missing.

Results

Our initial search identified 5390 citations. After the removal of duplicates ($n=812$), 4578 studies' titles and abstracts were screened. Following this stage, 242 articles were screened using full-text, and 230 were excluded from the review. Twelve studies [2, 3, 7–9, 13–19] fulfilled inclusion criteria and were retained for data extraction. The PRISMA flow diagram detailing the screening procedure is displayed in Fig. 1. Articles reporting data from the same participant population at separate time points are reported together.

Study characteristics are summarized in Table 3. Most ($n=11$, 92%) studies [2, 3, 7–9, 13–15, 17–19] were published within the last 20 years of our search. Four (33%) studies [7, 9, 13, 19] were from the United

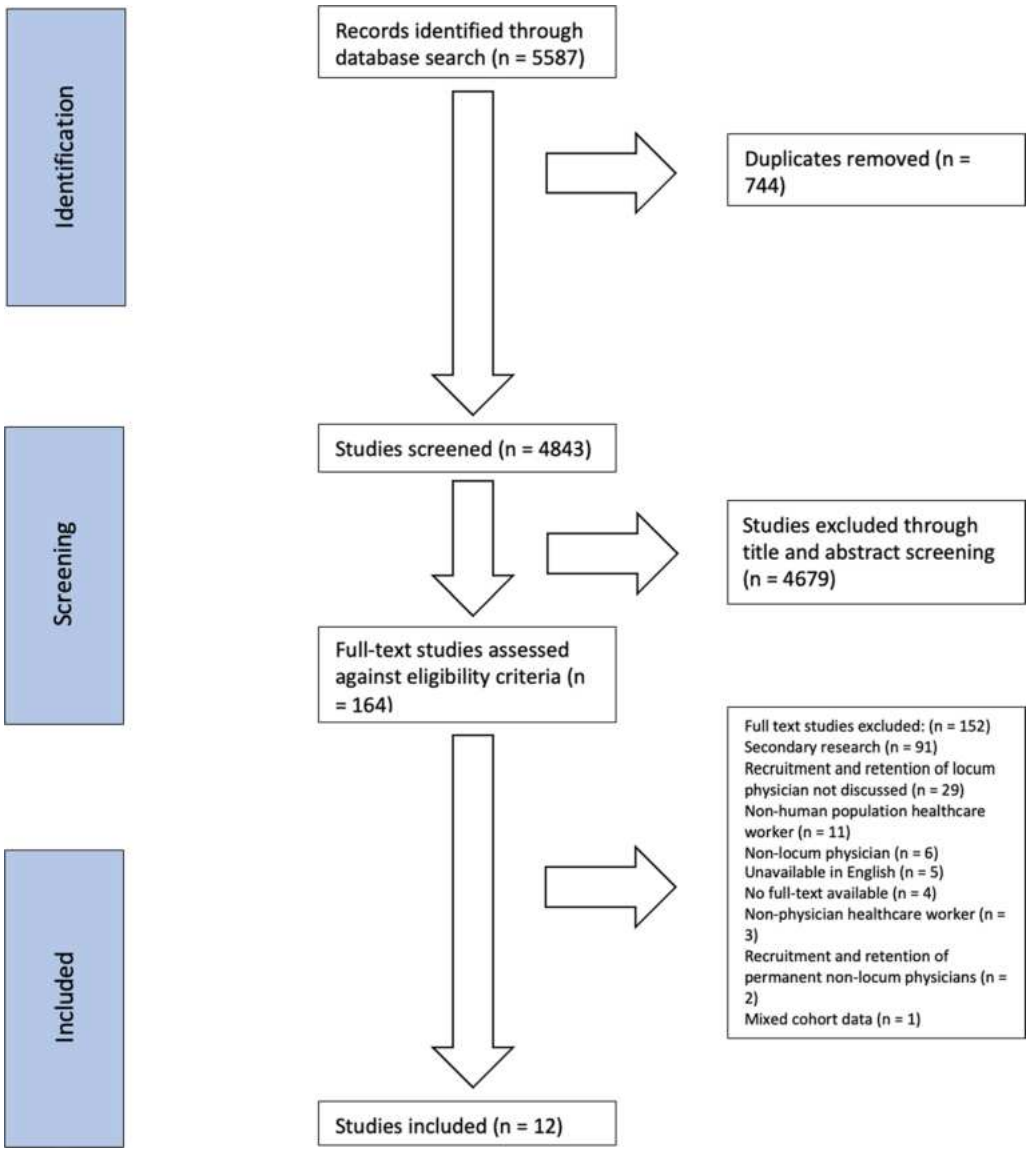


Fig. 1 PRISMA flow diagram detailing the selection process

States and four (33%) [8, 14–16] were from the United Kingdom. A smaller portion ($n=3$, 25%) [2, 3, 17] originated in Canada. One (8%) study [18] was based in India. Quantitative studies [3, 7, 9, 13, 15–17] ($n=7$, 58%) were cross-sectional ($n=6$, 50%) [3, 7, 9, 13, 15, 16] or pre–post study ($n=1$, 8%) [17] in design. Four (33%) studies [8, 14, 18, 19] used a qualitative design, including semi-structured interviews ($n=2$, 17%) [18, 19], focus groups ($n=1$, 8%) [14], and content analysis ($n=1$, 8%) [8]. One (8%) study [2] adopted a mixed-methods design.

The majority of studies [2, 7–9, 13, 15, 16, 19] ($n=8$, 67%) specified clinical setting, but did not indicate whether it was rural or urban (Table 3). A variety of specialities were reported among locum populations. The majority ($n=9$, 75%) [2, 3, 7, 13–16, 18, 19] included primary care physicians, and over half ($n=5$, 42%) [7, 9, 13, 18, 19] included specialists. Three (25%) studies [7, 13, 19] reported a subspecialist population. Two (17%) studies [2, 17] included physicians in training, with one (8%) [2] involving resident physicians and another (8%) [17] medical students. One (8%) study [8] did not indicate the specialty of the physician population. A total of six (50%) studies [7, 13–16, 19] reported years of physician practice experience.

Table 3 Study and sample characteristics in the 12 studies included in the review

Author (year)/country	Aim	Design	Setting	Population (specialty breakdown, practice experience)	Sample size (*n*)	Strategies and tools used for locum recruitment	Main findings
Simon & Alonzo (2004, 2008) [7, 13] USA	*2004* To characterize the profile of locum tenens (LT) and the motivation driving the decision to choose this type of practice *2008* To analyse who accepts LT assignments, when in their career they do so, variations in LT practice and what dimensions of satisfaction are important to LTs' in the context of contingent, non-standard employment	Cross-sectional	Hospital, clinic, single and multispecialty group practice	Primary care (26.9%), specialist (53.2%), and subspecialist (19.8%) physicians with a mean of 22.6 years practice experience	776	*2004* Respondents had been placed exclusively through LT placement agencies *2008* Placed through LT agencies; arranged for assignments through informal means (unspecified)	*2004* Female LTs were motivated by a flexible work schedule (31%) and were more likely to report locuming as their sole source of income (64%). Male LTs' primary (62%) motivation was to work part-time and used locum income to augment retirement and pension resources (38%), and as a secondary income (33%) *2008* Locum positions were often sought as an initial position after residency, during a career transition when semi-retired or fully retired. The main reasons for accepting assignments were to: practice part-time (31.5%); obtain a flexible work schedule (21.1%); increase income (15.5%); travel (9.5%); experience new practice settings (8.3%); and avoid administrative responsibilities (2.9%). LT assignments of longer duration were associated with greater problems, including working conditions, transportation, remuneration, and housing

Table 3 (continued)

Author (year)/country	Aim	Design	Setting	Population (specialty breakdown, practice experience)	Sample size (*n*)	Strategies and tools used for locum recruitment	Main findings
Rourke et al. (2003) [3] Canada	To determine how family medicine residents and practising rural physicians rate potential recruitment and retention solutions for rural practice	Cross-sectional	Broad healthcare settings in rural communities	FM staff physicians (56.8%) and junior and senior FM residents (43.2%)	486[a]	The OMA Locum Program contains a repository of registered physicians to supply locum services in rural areas	Residents rated an alternate payment plan that provides allocated CME time and comprehensive payment plans with guaranteed locum income as the most important recruitment solutions. Rated as "very important" by half or more in at least one of the groups (physicians or residents) included that of practice solutions related to locum provincial licenses, specifically the provision of locum licensure that allows rural physicians to cross provincial borders and provide their services as a locum
Jenson et al. (2008) [15] UK	To calculate the rate of retention of locum GPs and the highest rated recruitment and retention factors	Cross-sectional	PCTs	Primary care physicians (100%) with a mean of 10.4 (SD: 11.5) years practice experience, ranging from 0–49 years	13	NR	Locum recruitment was influenced by work flexibility, availability, environment, and remuneration. Seventy-three (73%) of locum respondents agreed that they would prefer to arrange locum assignments independently. Less than half of locums (46.2%) felt adequately supported with professional development

Table 3 (continued)

Author (year)/country	Aim	Design	Setting	Population (specialty breakdown, practice experience)	Sample size (*n*)	Strategies and tools used for locum recruitment	Main findings
DiMeglio et al. (2018) [9] USA	To identify clinical duties and remuneration of anesthesiology LT positions using content analysis of recruitment emails	Cross-sectional	Hospitals, surgical and trauma centres	Anesthesiologists (100%)	241[a]	Staffing agencies included the following information about assignments: payment information; licensing requirements; travel reimbursement; case load; and mean daily hours	Most opportunities came from five staffing agencies and information surrounding qualification and licensing was not consistently provided in emails. Majority of emails lacked information for the physician to make an informed decision to accept or decline the assignment. Locum anesthesiologists in the sample had an hourly rate significantly larger than the national average. Some staffing agencies covered licensing expenses (28%), travel (23%), and accommodation costs (20%)
McKevitt et al. (1999) [16] UK	To characterize the motivation behind and experiences of physicians locuming in general practice	Cross-sectional	General practices	Primary care physicians (100%) with a median of two years of practice as a locum	111	Personal network was used to contract physicians	Reasons for pursuing locum assignments included short-term work between posts, experiencing a variety of practices before committing, work–life balance, and becoming part-time after retirement. Drawbacks of LT work included frustration with low status, lack of job security, and difficulty accessing structured training and education

Table 3 (continued)

Author (year)/country	Aim	Design	Setting	Population (specialty breakdown, practice experience)	Sample size (*n*)	Strategies and tools used for locum recruitment	Main findings
Woloschuk & Tarrant (2002) [17] Canada	To determine the influence of background, gender, and rural educational experience on students' willingness to locum rurally or engage in rural permanent practice	Pre–post study	Rural-based practices	Medical students (100%) with prospective interest in FM training	254[b]	Rural educational experience for students increases likelihood of pursuing a rural locum assignment	Rural educational experiences in clerkship increased the chances of medical students choosing to take on rural locums and cemented novel rural connections
Myhre et al. (2010) [2] Canada	To understand the demographics of family medicine residency graduates choosing locum work, their reasons behind choosing and leaving locum work, and its shortcomings and rewarding aspects	Mixed-methods	Hospitals, general practice, family medicine residency training programmes	Family medicine residency graduates (100%)	155[a]	NR	Most (46.7%) cited practice exploration to increase experience and competence as the main reason to locum. The main reason for leaving a locum post was starting permanent practice (52.1%). Other reasons included desires for stability and patient continuity, and the impacts of personal life changes, financial considerations, and an end of need for exploration. Downsides to locum practice included negotiating contracts, low patient counts, lack of continuity, and working with difficult staff. Rewards of locum practice included flexibility and freedom in practice, increasing experience, and awards associated with seeing patients (unspecified)

Table 3 (continued)

Author (year)/country	Aim	Design	Setting	Population (specialty breakdown, practice experience)	Sample size (*n*)	Strategies and tools used for locum recruitment	Main findings
Jenson et al (2006) [14] UK	To gain an understanding of the role of a primary care trust (PCT) educational support group in the recruitment and retention of locum physicians	Focus group	Urban PCTs	GPs with a range of 2–40 years practice experience	9[a]	Locum bank arrangements providing administrative support	GP (general practitioner) and locum retention factors included a supportive network of colleagues, assistance keeping up to date, and financial factors. Access to an educational support group was the most impactful factor influencing retention, especially for locums
Rajbangshi et al. (2017) [18] India	To gain insight to the motivation and challenges of rural recruitment and retention of doctors and nurses in India's states of Meghalaya and Nagaland	Semi-structured interviews	Urban and rural-based district and maternity hospitals, primary and community health centres, and general government service	Generalist (90%) and specialist physicians (10%)	10	NR	Rural background and community ties were strongly associated with decisions to join rural facilities regardless of the type of contract worker (locum physician or nurse). Poor working and living conditions, poor job security, lack of professional development and recognition, low salary, and lack of incentives deterred contractual locum physicians from rural service. Lack of pay parity and job security were unique challenges faced by contractual locum physicians

Table 3 (continued)

Author (year)/country	Aim	Design	Setting	Population (specialty breakdown, practice experience)	Sample size (*n*)	Strategies and tools used for locum recruitment	Main findings
Theodoulou et al. (2018) [8] UK	To explore the locum doctor landscape, and secondarily to evaluate the implementation of a novel software platform for temporary staff recruitment in the healthcare industry	Content analysis	Workforce planning in British healthcare system	Industry experts (15%), regional based strategy consultants in digital healthcare (15%), executive trust directors (8%), specialty managers (15%) and physicians (46%)	13[c]	Key information (e.g., hourly rates, hospital maps) about locum assignments were shared between hospitals and prospective locums via point of contact. Use of internal staff bank and external agencies. Use of novel software termed "ABG"	Locum physicians were imperative to covering physician shortages, but current recruitment practices were inefficient, lacking transparency and consistency. The financial remuneration of the locum assignment has been said to be a motivator for "pay-centric" physicians. Locum physicians highlighted that this line of work does not allow for career progression and is dissatisfying because of lack of patient continuity of care. Lack of information made available about the LT assignment creates some professional isolation and logistical issues that prevent smooth completion of shifts. Mobile first solutions such as the secure third-party communication (ABG) software was more convenient, transparent, and cost and time effective. Findings enabled the development of an Information Exchange System to compare recruitment methods in healthcare

Table 3 (continued)

Author (year)/country	Aim	Design	Setting	Population (specialty breakdown, practice experience)	Sample size (*n*)	Strategies and tools used for locum recruitment	Main findings
Lagoo et al. (2020) [19] USA	To (1) better understand the potential areas of risk when a physician is first working in an unfamiliar setting; and (2) develop a tool for surgeon onboarding that can also be further refined to meet the needs of different specialties for the purposes of physicians who are recruited to work at hospitals outside of their home institution, through professional service agreements (PSA)	Semi-structured interviews	Academic medical centres and community hospitals	Family medicine (5%), emergency medicine (5%), OB/GYN (20%), general surgery (45%), anesthesiology (5%), and internal medicine (15%) physicians with most (50%) having greater than 20 years of practice experience and few (15%) with less than 10 years of practice experience	20[a]	NR	Key findings from the aspect of travelling physicians detailed that logistics of providing care in a new setting are not usually integrated into onboarding practices which can limit the ability of the physician to provide efficient and effective care. Lack of interpersonal connections impacts the physicians' ability to acquire help with working in new settings

CME continuing medical education, *FM* family medicine, *GP* general practitioner, *LT* locum tenens, *OB/GYN* obstetrics & gynaecology, *OMA* Ontario Medical Association, *NR* not reported, PCT, Primary care trust *PSA* professional service agreements, *SD* standard deviation, *SGP* sessional general practitioner

[a] Indicates that reported data are not specific to locum population and contains a mixed cohort of locum and non-locum physicians

[b] Data refer to non-physician population

[c] Data refer to mixed non-physician and locum physician population

A diversity of locum recruitment approaches were reported across studies, with some ($n=2$, 17%) [7, 8] using more than one method. Four (33%) studies [7–9, 13] used a third-party recruitment agency, two (17%) [8, 14] used a locum bank, word-of-mouth, or personal networks [16], informal means [7], and an unspecified novel recruitment software were each reported once [8] (8%). Four studies [2, 15, 18, 19] (33%) did not report a specific method.

Quality assessment

The 2018 version of the MMAT was used to appraise the quality of retained articles [20]. Overall, nine (75%) of the articles [7, 8, 13, 14, 16–19] met 75–100% of the evaluated criteria, representing high quality. Three (25%) studies [2, 9, 15] met 50–75% of the evaluated criteria, representing moderate quality. Further details regarding the assessment of quality of retained articles appear in Additional file 1: Appendix S2. Grey literature was assessed using the AACODS Checklist [21]. Additional information on the appraisal of grey literature can be found in Additional file 1: Appendix S3 and in the supplemental content titled "Grey Literature Search Strategy, Data Extraction, and Evaluation".

Facilitators of locum recruitment and retention

Six locum recruitment and retention themes were identified across retained studies (Table 4). Five overarching themes emerged for factors that facilitated LT recruitment and retention: financial incentives, familial considerations, educational or career-based factors, personal facilitators, and mentorship/clinical support. One theme focused on deterrents of locum work.

Ten (83%) studies [2, 3, 7–9, 13–16, 18] reported financial incentives with nine individual subthemes identified (Table 5). A significant portion ($n=4$, 33%) of studies' [2, 14–16] did not provide specific details about the nature of the financial incentives provided. Four (33%) of the studies' [2, 7, 8, 13] financial incentives referred to an increase in income. Reimbursement for locum travel and lodging was reported three times (25%) [3, 7, 9]. Reimbursement for medical licensure ($n=2$, 17%) and provision of malpractice insurance ($n=2$, 17%) were also reported [7, 9]. Augmented pay for challenging work conditions [18], payment assistance for continuing medical education (CME) [18], supplementation of retirement income [13], and guaranteed income [3] were all reported once (8%) each.

Three (25%) studies [2, 7, 14] reported familial considerations as facilitators to recruitment and retention which included accommodating family (17%) [2, 14], school accessibility (8%) [14], and unspecified (8%) [7]. Furthermore, eight (67%) studies [2, 3, 7, 8, 13, 14, 16, 17] reported education or career-based incentives. A total of 13 subthemes related to educational and career-based factors facilitating recruitment and retention were reported (Table 5), which included pre-permanent practice scouting [2, 7, 13, 17] and temporary or transition in employment [2, 7, 13, 16] both reported four (33%) times. Freedom from administrative responsibilities and transitioning into retirement were reported three (25%) times [7, 13, 16]. Avoiding commitment [2, 16], increasing skills and competencies [2, 8], and a desire to take on part-time employment [7, 13] was reported twice (17%). The remaining career-based facilitators to recruitment and retention were each reported once (8%), including acquiring cross-provincial locum medical licensure [3], facilitation of hospital credentialing and medical licensure [7], gaining exposure to running a medical practice [2], accessing novel CME opportunities [3], assistance with maintaining medical knowledge [14], and accessing peer-facilitated educational support [14].

A total of eight (67%) studies [2, 7, 8, 13–17] reported using personal factors as facilitators of LT recruitment and retention. Within this category, five subthemes were identified (see Table 5). Seven (58%) reported using flexible contracts (e.g., suitable availability, work schedule flexibility, and work–life balance) [2, 7, 8, 13–16]. Having the ability to travel and experience new communities (locum tourism) was reported five (42%) times [2, 7, 13, 16, 17]. Three (25%) studies [7, 14, 15] reported unspecified personal incentives including stress relief [14], structured support [14], facility amenities [7], working conditions [7], personal safety [15], and overall facility quality [7]. Compatibility with post and convenience of the assignment were reported once (8%) each [8].

Four (33%) studies [14–16, 19] reported recruitment and retention facilitators involving mentorship and clinical support with four subthemes. Having a network of supportive colleagues [14, 15] and a chance to become familiar with the practice before arrival [16, 19] were reported twice (17%) each. Intentional relationship building, whereby the seasoned colleague met with the incoming locum to ensure comfort in the practice was reported once (8%) [19]. Availability of a back-up physician for support was reported once (8%) [19].

A total of eight (67%) studies [2, 8, 9, 14, 16–19] addressed deterrents of or barriers to locum work, encompassing a total of 19 reported subthemes. Professional isolation ($n=5$, 42%) [2, 8, 14, 18, 19] was reported most frequently followed by work unpredictability (33%) [2, 8, 16, 19]. Insufficient patient continuity of care was reported three (25%) times [2, 8, 16]. The following deterrents/barriers were each reported twice (17%): inadequate employee onboarding and orientation [8, 19], demanding locum work [2, 17], poor job security [16, 18],

Table 4 Themes of deterrents and incentives of locum recruitment and retention reported by retained studies

Author (year)	Financial incentives	Familial incentives	Educational/career-based incentives	Personal incentives	Mentorship and clinical back-up support	Deterrents to locum work
Simon & Alonzo (2004, 2008) [7, 13]	*2004* Supplement retirement income for older physicians and increase in income *2008* Increased remuneration, and reimbursement for travel and lodging, cover fees for state medical licensure, and supply malpractice insurance	*2004* NR *2008* Housing (unspecified) and family (unspecified)	*2004* Pre-permanent practice scouting. Career transition and easing into retirement when considered to be semi-retired or retired. Free from administrative responsibilities. Desire to practice on a part-time basis *2008* Pre-permanent practice scouting Facilitate hospital credentialling and verify medical licensure. Career transition and easing into retirement when considered to be semi-retired or retired. Free from administrative responsibilities Desire to practice on a part-time basis	*2004* Locum tourism, to travel and experience a different practice setting. Flexibility of work schedule *2008* Locum tourism, flexible work schedule, facility amenities (unspecified), work conditions (unspecified), overall quality of the facility (unspecified)	NR	NR
Rourke et al. (2003) [3]	OMA Rural Locum Program funds accommodation, travel and guaranteed income for locum physicians (unspecified). Payment assistance for CME	NR	Access to CME and provision of a cross-provincial locum physician medical license	NR	NR	NR
Jenson et al. (2008) [15]	General remuneration for the purposes of recruitment (unspecified)	NR	NR	Flexibility of work schedule, work–life balance, and personal safety (unspecified)	Having known colleagues to work alongside	NR
DiMeglio et al. (2018) [9]	Complimentary assistance with licensing costs, paid travel and lodging, and provision of malpractice coverage	NR	NR	NR	NR	Stress due to uncertainty regarding the requirements of the assignment shown to as a significant drawback for locum tenens physician

Table 4 (continued)

Author (year)	Financial incentives	Familial incentives	Educational/career-based incentives	Personal incentives	Mentorship and clinical back-up support	Deterrents to locum work
McKevitt et al. (1999) [16]	Financial benefits (unspecified)	NR	Avoidance of commitment to a single practice. Allows for transition to retirement or temporary employment between permanent positions Practice task load and low administrative burden including paperwork, being on-call, and business management	Flexibility of work schedule, work–life balance, and locum tourism (ability to visit new places as a locum and travel)	Having familiarity with the practice	Poor job security, work unpredictability and exclusion from the National Health Service pension. Lack of career training opportunities. Perception of inferior professional status of locum by colleagues. Not enough patient continuity of care, as well as frequent travelling
Woloschuk & Tarrant (2002) [17]	NR	NR	Pre-permanent practice scouting allowing the opportunity to assess suitability of the practice and community	Locum tourism	NR	Rural locum work can be demanding for new graduates in their early years of training
Myhre et al. (2010) [2]	Financial benefits (unspecified) and the opportunity to increase income	Flexibility in accommodating family life	Increase clinical competence and skills. Pre-permanent practice scouting. Gain exposure to and develop understanding of running a professional practice. Flexibility in practice change and delaying commitment potential practice	Flexibility to accommodate lifestyle, work–life balance, and flexible work schedule. Time off to travel and participate in locum tourism	NR	Exhaustion. In addition, reasons for departure included the need for practice stability, continuity of care, and lack of patient volume, as well as being accepted by staff at the assignment were also downfalls
Jenson et al. (2006) [14]	Financial factors for improvement of retention (not further specified)	Proximity to family and friends and schooling availability	Career advancement opportunities such as peer-facilitated educational support and help with education for keeping up to date	Post with flexible contracts, structured support (unspecified) and stress relief (unspecified)	Having access to a network of supportive colleagues	Isolation due to inadequate supportive network of colleagues and absence of sense of belonging. Difficulty remaining current as a physician and not feeling part of the 'mainstream' education system, including distance from postgraduate centres, and limited accessibility of different types of group education

Table 4 (continued)

Author (year)	Financial incentives	Familial incentives	Educational/career-based incentives	Personal incentives	Mentorship and clinical back-up support	Deterrents to locum work
Rajbangshi et al. (2017) [18]	Increased remuneration for working in difficult conditions known as the "hardship allowance"	NR	NR	NR	NR	Low salary, and lack of equitable pay. Lack of career advancement, professional isolation, poor job security, and working conditions. Inadequate living conditions, difficulty in accessing leave of absences. Displeasure of administrative burdens
Theodoulou et al. (2018) [8]	Hourly rates of locums higher than full-time contracted physicians and pay-centric doctors appear content with such enticing pay rates	NR	Originating from the reality that the early training programmes limit physicians' exposure to certain specialities, locuming offers the opportunity to attain additional skills	Flexibility of work schedule and work–life balance, specifically logistical flexibility, compatibility with posts, and convenience of the locum assignment	NR	Lack of effective information sharing between physicians and managers to make informed decisions. Instability and desire to attain a secure position. Lack of care continuity. Professional isolation because of the need to adapt to new settings, no immediate "camaraderie" benefits, and native staff resentment about high locum pay. Uncertainty of where to go and who to report to, accessing buildings. Inadequate hospital onboarding practices reported as the most important deterrent to undertaking locum assignments

Table 4 (continued)

Author (year)	Financial incentives	Familial incentives	Educational/career-based incentives	Personal incentives	Mentorship and clinical back-up support	Deterrents to locum work
Lagoo et al. (2020) [19]	NR	NR	NR	NR	Back-up or buddy physician available during the assignment to aid in understanding institutional workflow and culture. Intentional relationship building whereby seasoned colleague meets with the new LT physician several times to ensure comfort in the practice. Possibility of locum physician visiting the new hospital prior to assignment increases familiarity	Poor onboarding practices cause a lack of interpersonal relationship development. Inadequate time set aside to introduce key team members and foster relationships, leading to difficulties asking for help on shift. Information such as EMR basics, email access, and key team members not always provided. Lack of information on how home institution differed from locum assignment institution reduced welcomeness to the new team. Physicians described uncertainty and high stress in providing care in an emergency while in a new setting

CME continuing medical education, *NR* not reported, *OMA* Ontario Medical Association

Table 5 Subthemes identified under each recruitment and retention incentive theme across the 12 included studies

Financial ($n=9$)	Familial ($n=3$)	Educational/career-based ($n=13$)	Personal ($n=5$)	Mentorship and clinical back-up support ($n=4$)	Deterrents ($n=19$)
Financial factors (unspecified): 4 (33%) Increase income: 4 (33%) Reimbursement travel and lodging: 3 (25%) Reimbursement for state medical licensure: 2 (17%) Provision of malpractice insurance: 2 (17%) Supplement retirement income: 1 (8%) Payment assistance for CME: 1 (8%) Increased remuneration for difficult conditions: 1 (8%) Guaranteed income: 1 (8%)	Accommodate family: 2 (17%) Unspecified familial incentives: 1 (8%) (housing and family) School availability: 1 (8%)	Pre-permanent practice scouting: 4 (33%) Temporary/transitional employment: 4 (33%) Free from administrative responsibilities: 3 (25%) Ease into retirement: 3 (25%) Increase skills and clinical competence: 2 (17%) Avoid commitment: 2 (17%) Desire to take on part-time employment: 2 (17%) Peer-facilitated educational support: 1 (8%) Help with keeping up-to-date: 1 (8%) Access to CME: 1 (8%) Gain exposure to understand running a medical practice: 1 (8%) Facilitate hospital credentialling and medical licensure: 1 (8%) Cross-provincial locum medical license: 1 (8%)	Flexible contracts (suitable availability/work schedule/work–life balance): 7 (58%) Locum tourism: 5 (42%) Unspecified personal incentives reported: 3 (25%) (Stress relief, structured support, amenities, work conditions, overall quality of facility, and personal safety) Compatibility with posts: 1 (8%) Convenience of the assignment: 1(8%)	Network of supportive colleagues: 2 (17%) Being familiar or having a chance to become familiar with the practice (e.g., locum arrives before shift (potentially a day before) to orient themselves)): 2 (17%) Intentional relationship building whereby the seasoned colleague meets with the new LT physician to ensure comfortability in the practice: 1 (8%) Back-up physician available: 1 (8%)	Professional isolation: 5 (42%) Work unpredictability: 4 (33%) Not enough patient continuity of care: 3 (25%) Inadequate onboarding and orientation practices: 2 (17%) Lack of information to make an informed decision about accepting the post: 2 (17%) Demanding locum work: 2 (17%) Poor job security: 2 (17%) Lack of career advancement/training: 2 (17%) Too frequent travelling: 1 (8%) Low patient volume: 1 (8%) Displeasure of administration burdens:1 (8%) Difficulty accessing leave of abscences:1 (8%) Difficult living conditions: 1 (8%) Difficult working conditions:1 (8%) Not included in pension plans: 1 (8%) Lack of equitable pay: 1 (8%) Low salary: 1 (8%) Feeling "distant" from the mainstream education system and difficulty keeping up to date: 1 (8%) Perceptions of inferior professional status by colleagues: 1 (8%)

CME continuing medical education

lack of information to make an informed decision about accepting the job post [8, 9], and a lack of career advancement [16, 18]. The following deterrents/barriers were reported just once (8%): excessive travelling [16], low patient volume [2], administrative burden [18], difficulty accessing time-off [18], inadequate housing [18], challenging working conditions [18], exclusion from pension plans [16], lack of equitable pay [18], low salary [18], feeling distanced from CME and limitations in staying up-to-date [14], and perceptions of inferior professional status by colleagues [16].

Facilitators of locum recruitment and retention within grey literature

Grey literature findings closely mirrored the facilitators and deterrents found in peer-reviewed literature. A notable exception captured in the 'education and career' theme involved the potential benefits of implementing a national physician licensure, which was absent in the primary literature but present in nearly a third ($n=27$, 26%) of the grey literature.

Interpretation

We identified 12 English language studies that explored the recruitment and retention of locums in Canada, USA, UK, and India over a 30-year period. Finance, education, and personal factors were the most used LT recruitment strategies while family considerations and clinical/mentorship support were less frequently cited. However, almost all studies [2, 3, 7, 8, 13–16] ($n=8$, 67%) reviewed reported using a combination of these recruitment approaches. While there is a paucity of evidence on whether employing multiple approaches leads to improved LT recruitment, utilizing a range of methods may still be a reasonable strategy. This approach prevents organizations from becoming overly reliant on a single approach and enables them to adapt their strategy more easily as required to maintain LT recruitment, retention and service. Further, as physicians choose locum positions based on different priorities, utilizing multiple strategies provides a range of incentives with wider appeal.

Across the five LT recruitment strategies, the diverse range of unique approaches used indicates there is no one-size-fits-all method. This suggests that organizations develop their own specific approach tailored to their available resources, location, and the anticipated needs of the LT physicians they aim to recruit. For instance, certain recruitment strategies incentives such as back-up availability, network of supportive colleagues and access to CME may not be feasible for some organizations given their size, location, and resource constraints. This may lead to the development of alternative recruitment approaches and/or increased emphasis on other strategies. Notably, we found that common recruitment and retention strategies used elsewhere, such as providing competitive salaries, were extensively used in the recruitment and retention of locums. However, approaches that seem to be specifically designed to address the unique requirements and preferences of locum physicians were also employed, such as offering reimbursements for travel and accommodation, providing support for family-related needs, offering flexible scheduling, and facilitating access to leisure activities. Although the effectiveness of these strategies is poorly defined, their implementation suggests that organizations recognize that conventional recruitment and retention approaches, effective in the broader health workforce, may not adequately address the unique aspects and challenges associated with the transient and temporary nature of locum work. For example, incentives like competitive compensation, while valued, might not be as appealing to those seeking the flexibility of short-term work assignments or lifestyle benefits. Therefore, acknowledging the appeal of locum work, creating incentives that emphasize these benefits, and addressing the related challenges are likely to enhance recruitment and retention efforts.

The finding that showed sites employed a wide range of recruitment and retention approaches highlights the complexity of this process. However, implementing such a wide range of strategies makes it challenging to identify the most effectives. Consequently, future work should identify optimal recruitment strategies within diverse health contexts and organizational structures. This would enable organizations to streamline their approach, maximizing recruitment success while efficiently utilizing their resources. This may be particularly valuable in resource poor healthcare environments where strategic asset allocation is essential.

Numerous factors were cited as deterrents of locum work, indicating that physicians' decision to work as a LT is influenced by a variety of considerations. Although some of the cited deterrents were addressed by recruitment strategies, it is unclear whether these approaches were effective. In the studies reviewed, professional isolation and work assignment predictability were the two most cited deterrents to locum work appearing in 42% and 33% of studies, respectively. As temporary workers, there are inherent challenges in developing rapport with colleagues. Moreover, providing coverage introduces uncertainties regarding work schedules and conditions (e.g., hours worked, frequency and duration of assignments). Together these factors can contribute to lower job satisfaction, which may result in a decreased

willingness to work as a locum. As a result, recruitment strategies should consider measures to address these deterrents. The wide range of deterrents emphasizes the importance for healthcare organizations to adopt comprehensive recruitment strategies that recognize and respond to the various unique needs of LT physicians. Further, many of these deterrents may be addressed by improving locum onboarding and job conditions, such as enhancing infrastructure quality and minimizing social isolation.

It is important to recognize information on locum recruitment and retention extends beyond peer-reviewed articles to include the grey literature. These non-academic resources contain potential insights into practical approaches for recruitment and retention, thus underscoring the need to evaluate the grey literature in this field. Interestingly, our review of the grey literature generally aligns with the facilitators and deterrents of locum work identified in this systematic review apart from support for a national physician license. Such a measure would enhance the portability of licensure, allowing improved mobility of physicians across regions, reducing administrative burdens and the time required for obtaining proper licensing, hospital privileges, and contractual agreements. This, in turn, may reduce barriers to locum recruitment and more effectively facilitate the transition of locums to their temporary place of practice. This finding, which was not identified in the systematic review, again reiterates the importance of assessing the grey literature to gain a comprehensive understanding on the current strategies being used for recruiting and retaining locum physicians.

Importantly, the success of LT physician recruitment relies on a collaborative effort that extends beyond responsibility of individual healthcare organizations. This is particularly important considering that facilitators of LT recruitment and retainment, such as remuneration, fall beyond the scope of health teams. Therefore, the various stakeholders in health human resources, including educational institutions, regulatory bodies, and professional associations, all play a role in LT recruitment efforts. Recognizing and embracing this shared responsibility will be crucial in fostering a robust and sustainable healthcare workforce that incorporates LT physicians.

Limitations

In the systematic and grey literature reviews, a comprehensive set of keywords related to locum recruitment and retention were used (as detailed in Additional file 1: Appendices S1 and S3). However, some search terms, such as region-specific terminology used to describe locums, were not included. As a result, it is possible that relevant resources may have been missed during the literature search. However, the use of diverse keywords related to locum recruitment and retention would have captured relevant studies thus reducing the likelihood that relevant resources were missed. As described in the literature search strategies, date limitations were applied to both the systematic and grey literature searches, and only select databases were searched. Therefore, there is a possibility that relevant publications or grey literature produced outside of these date ranges or databases might have been missed. The quality of synthesized evidence was moderate as most of the retained quantitative studies were cross-sectional [3, 7, 9, 13, 15, 16] (50%) or mixed-methods [2] (8%). Only one study adopted a pre–post study design [17], which is fraught with internal validity issues. Remaining studies [8, 14, 18, 19] were qualitative and not inherently generalizable to broad populations. None of the studies were intervention-based, making it difficult to draw conclusions about the effectiveness of various recruitment and retention strategies. Inconsistent reporting on locum (LT) gender limited conclusions regarding differences in motivations for LT practice. Geographies of included studies reported were likely influenced by the methodological choice to include English only articles, limiting the generalizability of the presented findings to other regions. Further, the mix of qualitative and quantitative sources make it challenging to comprehend the cumulative size of the physician population raising each issue, and the relative significance of each issue compared to others.

Conclusions

This systematic review synthesized existing knowledge pertaining to international locum physician recruitment and retention strategies. Locum physicians are essential to the delivery of quality healthcare services across Canada and other parts of the world. We demonstrate that organizations employ five main LT recruitment strategies and deploy these in a variety of ways. Though these may be incumbent on local resources, more concerning is that the effectiveness of these approaches has not been tested. Given the present financial challenges within the global healthcare landscape there is a need to better understand recruitment and retention strategies of LTs so this limited resource can be used most effectively. Findings merit future research into the effectiveness of LT recruitment approaches via prospective methodologies.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12960-024-00906-z.

Additional file 1. Appendix S1: Search Strategy. **Appendix S2**: Mixed-methods Appraisal Tool (MMAT) quality assessment of included studies. **Appendix S3**: Grey Literature Search Strategy, Data Extraction, and Evaluation.

Acknowledgements
We gratefully acknowledge the help of Jennifer Dumond, Education Services Librarian at NOSM University, for peer-reviewing the search strategy.

Author contributions
N.F and O.M were responsible for experimental design, the acquisition, analysis, interpretation of data and writing of the manuscript. A.C was responsible for acquisition, analysis, interpretation of data. I.R.L was responsible for interpretation of data, and the writing and revising of the manuscript. L.D and E.O were responsible for conception and experimental design, data analysis, data interpretation and revising the manuscript. All authors approve of the final version of the manuscript and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All persons designated as authors qualify for authorship, and all those who qualify for authorship are listed.

Funding
Supported by Northern Ontario Academic Medicine Association (NOAMA) Academic Funding Plan (AFP) Innovation Fund Project #A-22-07.

Availability of data and materials
All data generated or analysed during this study are included in this published article [and its supplementary information files].

Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

Received: 29 November 2023 Accepted: 2 April 2024
Published online: 16 April 2024

References

1. Li JH, Scott A, McGrail M, Humphreys J, Witt J. Retaining rural doctors: doctors' preferences for rural medical workforce incentives. Soc Sci Med. 2014;121:56–64.
2. Myhre DL, Konkin J, Woloschuk W, Szafran O, Hansen C, Crutcher R. Locum practice by recent family medicine graduates. Can Fam Physician. 2010;56(5):E183–90.
3. Rourke JTB, Incitti F, Rourke LL, Kennard MA. Keeping family physicians in rural practice—solutions favoured by rural physicians and family medicine residents. Can Fam Physician. 2003;49:1142–9.
4. Duong D. Why are emergency departments closing? Can Med Assoc J (CMAJ). 2022;194(33):E1138–9.
5. Abelsen B, Strasser R, Heaney D, Berggren P, Sigurðsson S, Brandstorp H, et al. Plan, recruit, retain: a framework for local healthcare organizations to achieve a stable remote rural workforce. Hum Resour Health. 2020;18(1):63–63.
6. Ferguson J, Tazzyman A, Walshe K, Bryce M, Boyd A, Archer J, et al. "You're just a locum": professional identity and temporary workers in the medical profession. Sociol Health Illn. 2021;43(1):149–66. https://doi.org/10.1111/1467-9566.13210.
7. Alonzo AA, Simon AB. Have stethoscope, will travel: contingent employment among physician health care providers in the United States. Work Employment Soc. 2008;22(4):635–54.
8. Theodoulou I, Reddy AM, Wong J. Is innovative workforce planning software the solution to NHS staffing and cost crisis? An exploration of the locum industry. BMC Health Serv Res. 2018;18:1–13.
9. DiMeglio M, Furey W, Laudanski K. Content analysis of locum tenens recruitment emails for anesthesiologists. BMC Health Serv Res. 2018;18:1–7.
10. Waldie AC. Put out the welcome mat for locums. Can Med Assoc J (CMAJ). 1998;158(8):1009–1009.
11. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. Int J Surg. 2021;88:105906–105906.
12. Larkin J, Foley L, Smith SM, Harrington P, Clyne B. The experience of financial burden for people with multimorbidity: a systematic review of qualitative research. Health Expect. 2021;24(2):282–95.
13. Simon AB, Alonzo AA. The demography, career pattern, and motivation of Locum tenens physicians in the United States. J Healthc Manag. 2004;49(6):363–75.
14. Jenson CM, Hutchins AJ, Rowlands G. Is small-group education the key to retention of sessional GPs? Educ Prim Care. 2006;17(3):218–26.
15. Jenson C, Reid F, Rowlands G. Locum and salaried general practitioners: an exploratory study of recruitment, morale, professional development and clinical governance. Educ Primary Care. 2008;19(3):285–302. https://doi.org/10.1080/14739879.2008.11493685.
16. McKevitt C, Morgan M, Hudson M. Locum doctors in general practice: motivation and experiences. Br J Gen Pract. 1999;49(444):519–21.
17. Woloschuk W, Tarrant M. Does a rural educational experience influence students' likelihood of rural practice? Impact of student background and gender. Med Educ. 2002;36(3):241–7.
18. Rajbangshi PR, Nambiar D, Choudhury N, Rao KD. Rural recruitment and retention of health workers across cadres and types of contract in north-east India: a qualitative study. WHO South East Asia J Public Health. 2017;6(2):51–9.
19. Lagoo J, Berry W, Henrich N, Gawande A, Sato L, Haas S. Safely practicing in a new environment: a qualitative study to inform physician onboarding practices. Jt Comm J Qual Patient Saf. 2020;46(6):314–20. https://doi.org/10.1016/j.jcjq.2020.03.002.
20. Hong QN, Pluye P, Fàbregues S, Bartlett G, Boardman F, Cargo M, et al. Mixed methods appraisal tool (MMAT), version 2018; 2018.
21. Tyndall J. AACODS checklist. Flinders University; 2010. https://www.library.sydney.edu.au/research/systematic-review/downloads/AACODS_Checklist.pdf

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

TAB 24

Northern Physician Retention Initiative (NPRI) Study

1. Background

- See "S:\PAPERS\NPRI\Analysis\PDF Files\NPRI Evaluation Framework Final Oct 2005.pdf".

2. Objectives

- The objective of this study is to evaluate the effectiveness of the NPRI program in achieving two of its stated objectives:

1. To retain physicians who practice in Northern Ontario
2. To recruit physicians to Northern Ontario

3. Methodology

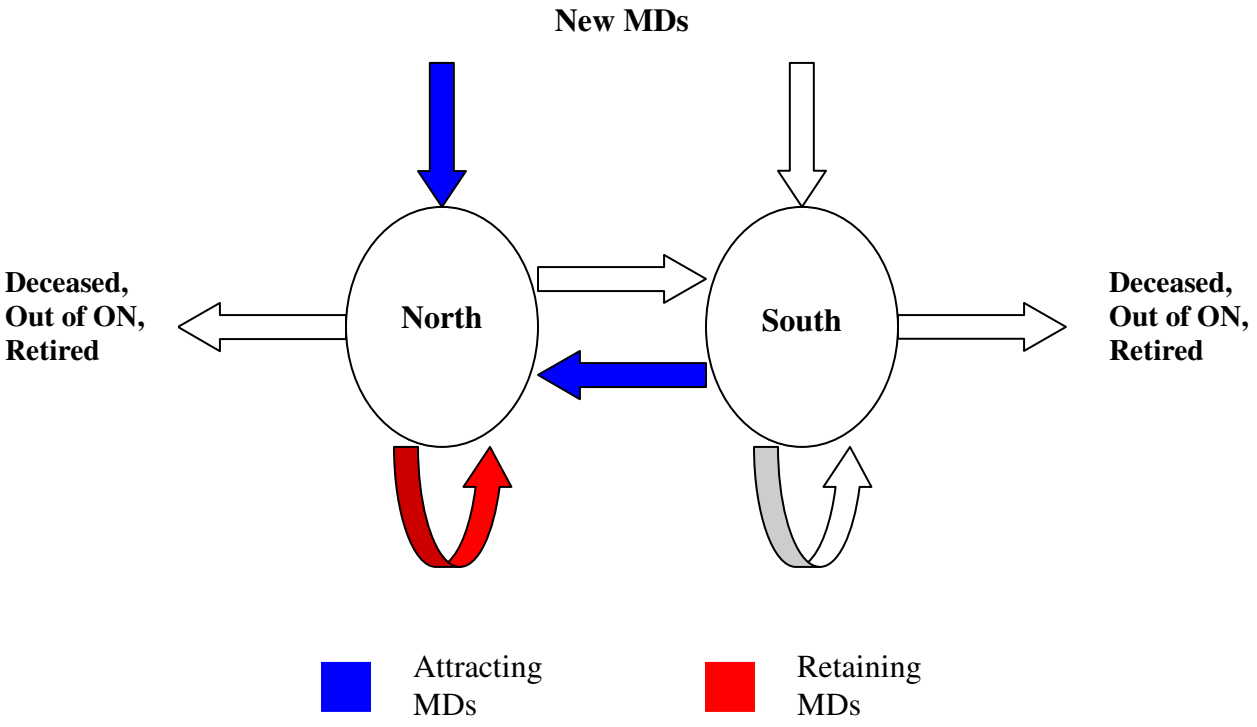
3.1 Estimation Method

- The multinomial logit model is employed to estimate the impact of NPRI program on both retention and recruitment.
- Retention of physicians in Northern Ontario is measured by comparing the probability that physicians move to Southern Ontario or exit the Ontario health care system to the probability that they stay in Northern Ontario (the red arrow in Figure 1 below).
- Recruitment is measured in two ways (see the blue arrows in Figure 2 below):
    1. By comparing the probability that new MDS locate in Northern Ontario to the probability that they locate in Southern Ontario (the top blue arrow);
    2. By comparing the probability that physicians in Southern Ontario move to Northern Ontario to the probability that they stay in Southern Ontario or exit the Ontario health care system (the bottom blue arrow).

3.2 Treatment and Control Groups

- For evaluating the impact of NPRI program on retention, two identification strategies are employed:
    1. Comparing physicians' propensity to leave Northern Ontario before and after the NPRI program was implemented.
    2. Comparing propensity of eligible and ineligible physicians to leave Northern Ontario, where eligible physicians are defined as those who received the NPRI funding in the previous year.
- The main disadvantage of the before-after comparison is that it cannot distinguish between the impact of NPRI from the impact of other determinants of physicians' propensity to migrate, such as various government programs, that may also changed in 2001.
- Therefore, caution should be exercised in interpreting the post-2001 impact as the impact of NRPI alone.
- The comparison of eligible and ineligible physicians in the Northern Ontario overcomes this problem by exploiting information on physicians who applied for and received the NPRI grant.

Figure 1. Migration Flows of Physicians



- For evaluating the impact of NPRI program on recruitment, the before-after comparison is employed in two ways:
  1. By comparing new MDs' propensity to locate in Northern Ontario before and after the NPRI was implemented; and
  2. By comparing propensity of physicians in Southern Ontario to move to Northern Ontario before and after the NPRI program was implemented.
- All comparisons are conditional on physicians' age, gender, medical specialty, county of residence (except for new MDs), and the years of continuous residence in Northern Ontario since 1995 (except for new MDs and physicians from Southern Ontario).

4. Data Sources

- There are two data sources:

1. The Ontario Physician Human Resource Data Centre (OPHRDC) data by MD, 1993-2004. For more details, see Appendix A.
2. The NPRI Program Administrative Data, 2001-2004.

5. Sample

- The sample period is 1995-2004. Table 1 presents the number of physicians in each year of the sample period.

Table 1.
Number of Physicians in the Sample

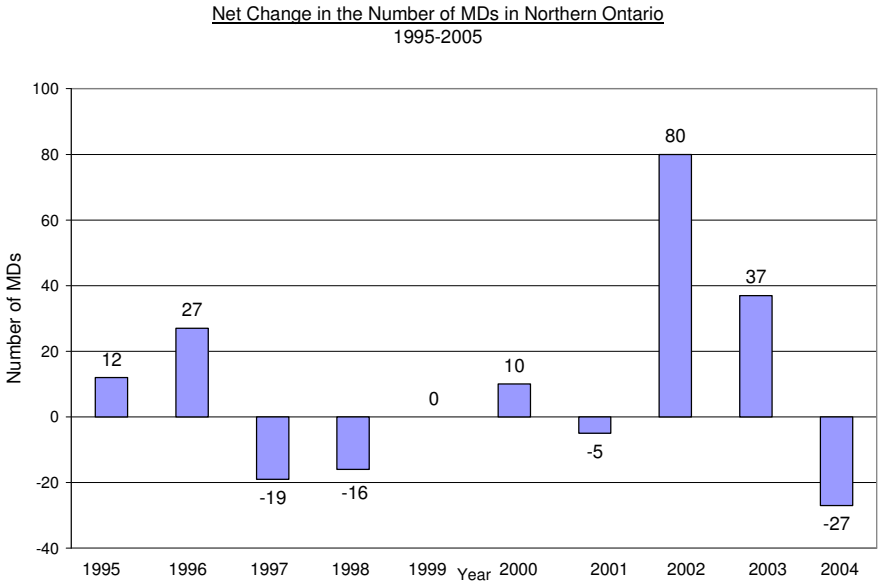
Year	Northern Ontario	Southern Ontario	Total
1995	1,205	18,605	19,810
1996	1,232	18,821	20,053
1997	1,213	18,920	20,133
1998	1,197	19,068	20,265
1999	1,197	19,283	20,480
2000	1,207	19,163	20,370
2001	1,202	19,487	20,689
2002	1,282	19,774	21,056
2003	1,319	20,153	21,472
2004	1,292	20,501	21,793

6. Results

6.1 Preliminary Analysis at the County Level

- Figure 2 presents the net change in the number of physicians in Northern Ontario 1995-2004.

Figure 2



- It is tempting to attribute increases in the number of physicians in Northern Ontario in 2002 and 2003 to the NPRI program, but this conclusion would be premature if similar increases are also observed in Southern Ontario.

- Therefore, a better way to identify the NPRI impact is to compare net changes in the number of physicians before and after the NPRI was implemented for both counties in Northern Ontario and counties in Southern Ontario. In this comparison, Northern counties are treated by the NPRI program (the treatment group), while Southern counties are not (the control group). The difference in the outcome (net change in the number of physicians before and after the NPRI program was implemented) between the Northern Ontario and Southern Ontario counties provides the so called 'the difference-in-difference estimate' of the NPRI.

- As mentioned, the post-2001 impact may be due to other factors in addition to the NPRI.

- With this qualification in mind, our results suggest the following three conclusions:

    1. There is evidence that the NPRI program had a significant, positive impact on maintaining and increasing the number of physicians in Northern Ontario counties…
        - The annual increase in the number of physicians in Northern Ontario counties in the after period was 2.94% higher ($p<0.01$) than in the before period. The corresponding figure for Southern Ontario counties is only 0.99% ($p<0.05$). The difference-in-difference estimate of the impact of NPRI program is 1.95% ($p<0.10$). See Table 2 for the regression estimates and Figure 3 for the unadjusted differences.

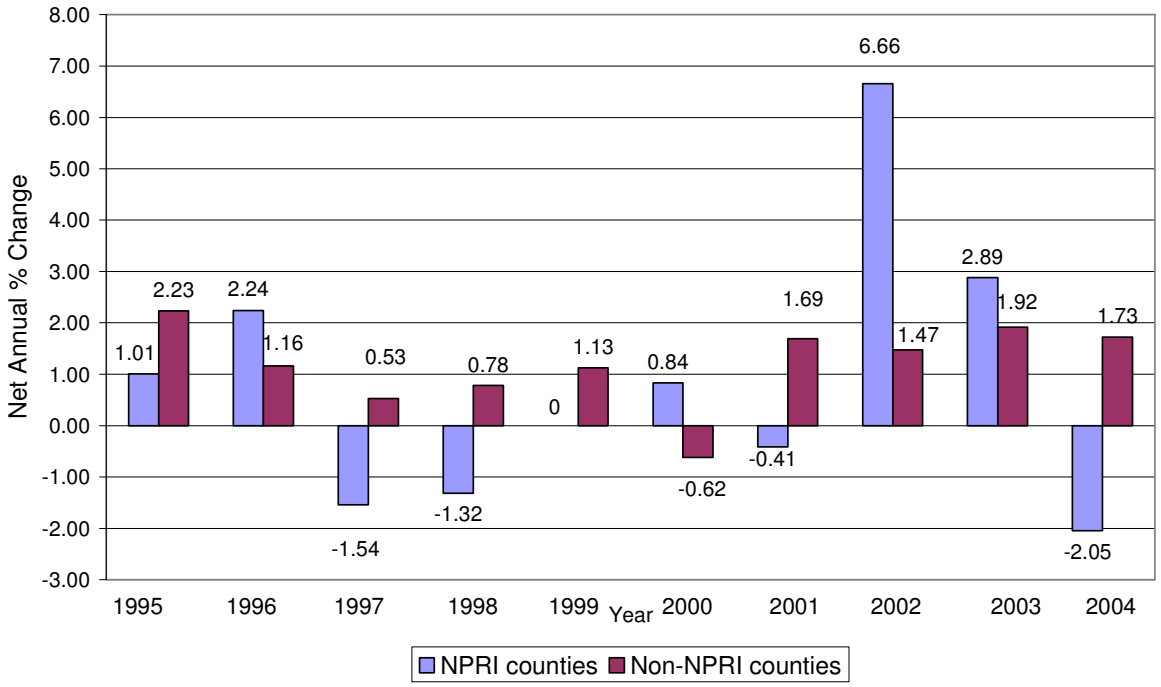
Table 2.
The difference-in-difference estimates of the impact of NPRI

	After (2001-2004)	**Before (1995-2000)**	**Difference: After minus Before**
Northern Ontario	3.17% (0.001)	0.23% (0.641)	2.94% (0.007)
Southern Ontario	1.78% (0.000)	0.79% (0.007)	0.99% (0.043)
Difference: North minus South	1.39% (0.165)	-0.56% (0.320)	**1.95%** **(0.096)**

p-values in parentheses. Robust standard errors, clustered by counties. N=490 (10 years by 49 counties).

Figure 3

Annual Net Percentage Change in the Number of MDs
Northern vs. Southern Ontario counties, 1995-2004



2. …but the impact of NPRI was not evenly distributed over NPRI years…
   - The strongest impact was in year 2002 (5.98%, p=0.019) and 2001 (3.33%, p=0.225). See Table 3 for the regression estimates and Figure 3 for the unadjusted differences.

Table 3.
Variation in the NPRI Impact Over Funding Years

Period	Southern Ontario	Northern Ontario	Difference-in-Difference	p-value
1995-2000	0.79%	0.23%		
2001	1.19%	3.96%	3.33%	0.225
2002	2.16%	7.58%	5.98%	0.019
2003	1.62%	2.72%	1.65%	0.279
2004	2.15%	-1.58%	-3.17%	0.153

Robust standard errors, clustered by counties. N=490 (10 years by 49 counties).

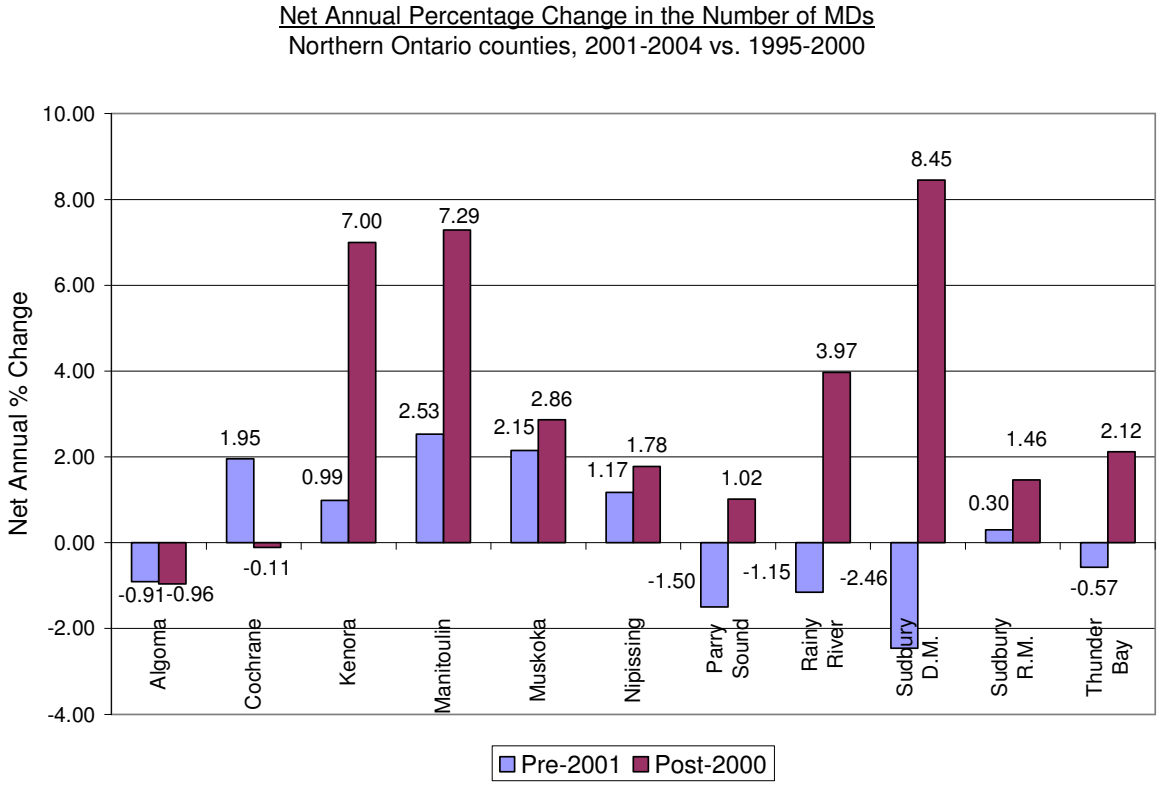
3. …nor was the impact evenly distributed across Northern Ontario counties.
   - The positive significant impact was observed only in the following counties: Sudbury D.M. (9.92%), Kenora (5.01%), Rainy River (4.13%), Manitoulin (3.77%), Thunder Bay (1.70%) and Parry Sound (1.52%). See Table 4 for the regression estimates and Figure 4 for the unadjusted differences.

Table 4.
Variation in the NPRI Impact Across Northern Ontario Counties

County	After (2001-2004)	Before (1995-2000)	Difference	Difference-in-Difference	p-value
Southern Ontario	1.78%	0.79%	0.99%		
Northern Ontario:					
Algoma	-0.96%	-0.91%	-0.04%	-1.04%	0.039
Cochrane	-0.11%	1.95%	-2.06%	-3.06%	0.000
Kenora	7.00%	0.99%	6.01%	5.01%	0.000
Manitoulin	7.29%	2.53%	4.76%	3.77%	0.000
Muskoka	2.86%	2.15%	0.71%	-0.28%	0.564
Nipissing	1.78%	1.17%	0.61%	-0.39%	0.434
Parry Sound	1.01%	-1.50%	2.51%	1.52%	0.003
Rainy River	3.97%	-1.15%	5.12%	4.13%	0.000
Sudbury D.M.	8.45%	-2.46%	10.91%	9.92%	0.000
Sudbury R.M.	1.46%	0.30%	1.16%	0.17%	0.731
Thunder Bay	2.12%	-0.57%	2.69%	1.70%	0.001

Robust standard errors, clustered by counties. N=490 (10 years by 49 counties).

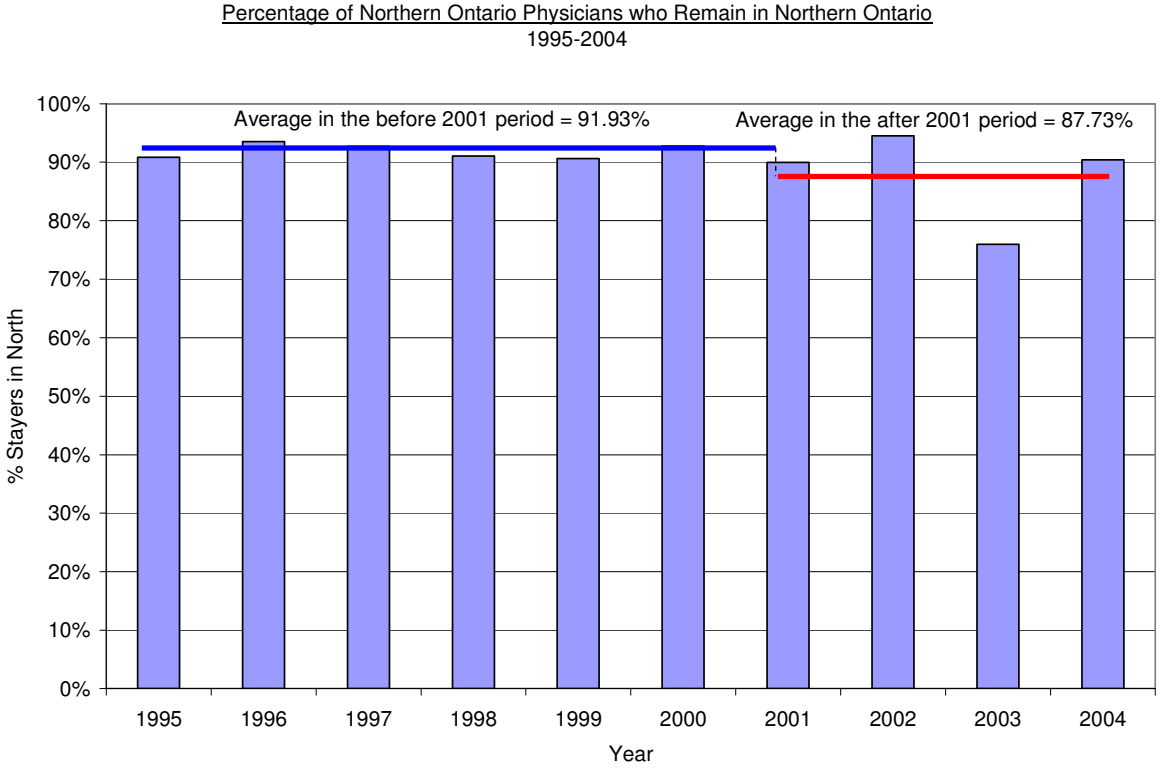
Figure 4



6. 2. Multivariate Analysis: Retention

- The percentage of Northern Ontario physicians who remained in Northern Ontario in each year from 1995 to 2004 is shown in Figure 5.

Figure 5.



- The results obtained from the comparison of physicians in Northern Ontario before and after the NPRI program are as follows:
  1. In comparison to the before period, the probability that a physician remains in Northern Ontario in the after period is not statistically different than the probability that a physician moves to Southern Ontario.
  2. In comparison to the before period, the probability that a physician remains in Northern Ontario in the after period is significantly smaller than the probability that a physician exits the Ontario health system.

- Given our earlier caution about the before-after comparison, we place more weight to the results obtained from the comparison of eligible and ineligible physicians in Northern Ontario. These results are as follows:
  1. In comparison to ineligible physicians, the probability that an eligible physician remains in Northern Ontario is significantly larger than the probability that an eligible physician moves to Southern Ontario and also the probability that an eligible physician exits the Ontario health system.
  2. In particular, a physician who received the NPRI funding in the last year (an eligible physician) is 1.7% more likely to remain in Northern Ontario than a physician who did

not received the NPRI funding in the last year (an ineligible physician). This estimate controls for differences among physicians in their age, gender, medical specialty, county of residence, and the number of years of continuous residence in Northern Ontario since 1995. The estimate is also robust to controlling for the after period, or for a full set of year effects.

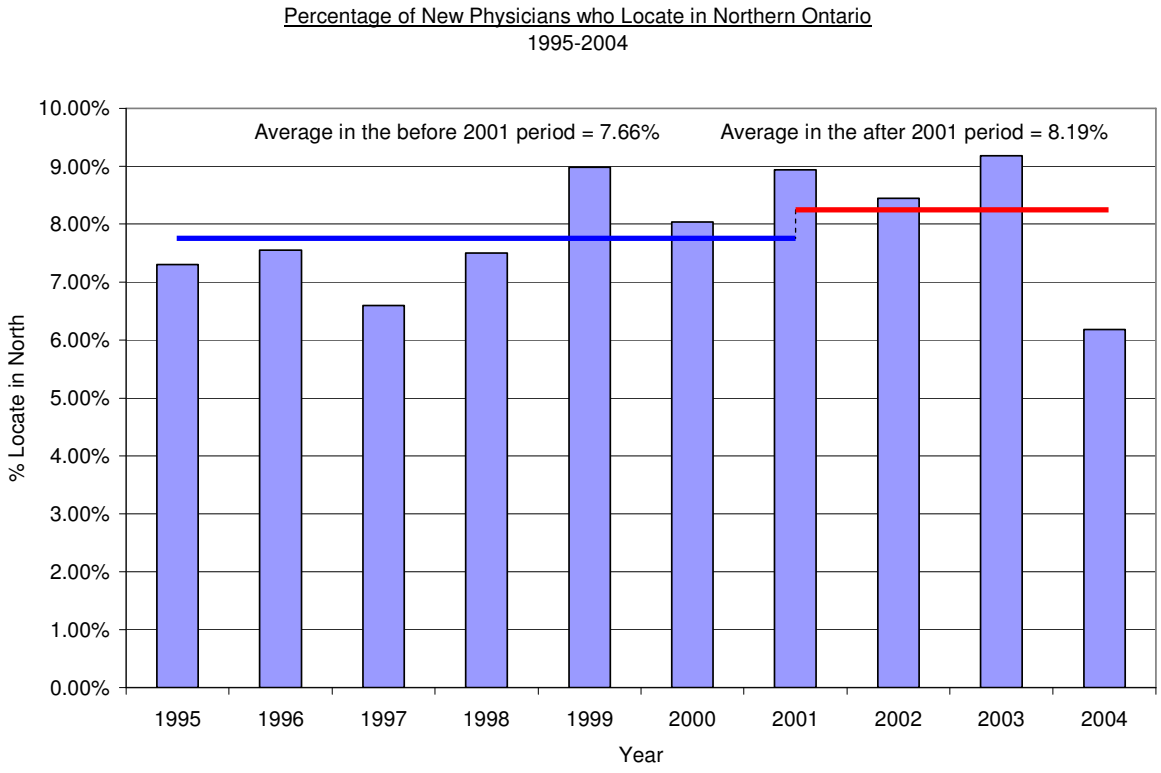
3. The impact of NPRI funding is particularly strong for female physicians and young male physicians, and for physicians residing in Kenora, Muskoka, Parry Sound, and Rainy River counties.

- Detailed results are available at: S:\PAPERS\NPRI\Analysis\Excell Files\Retention.

6. 3. Multivariate Analysis: Recruitment – New MDs

- The percentage of new physicians who located in Northern Ontario in each year from 1995 to 2004 is shown in Figure 6.

Figure 6.



- The results obtained from the comparison of new physicians in Ontario before and after the NPRI program was implemented are as follows:

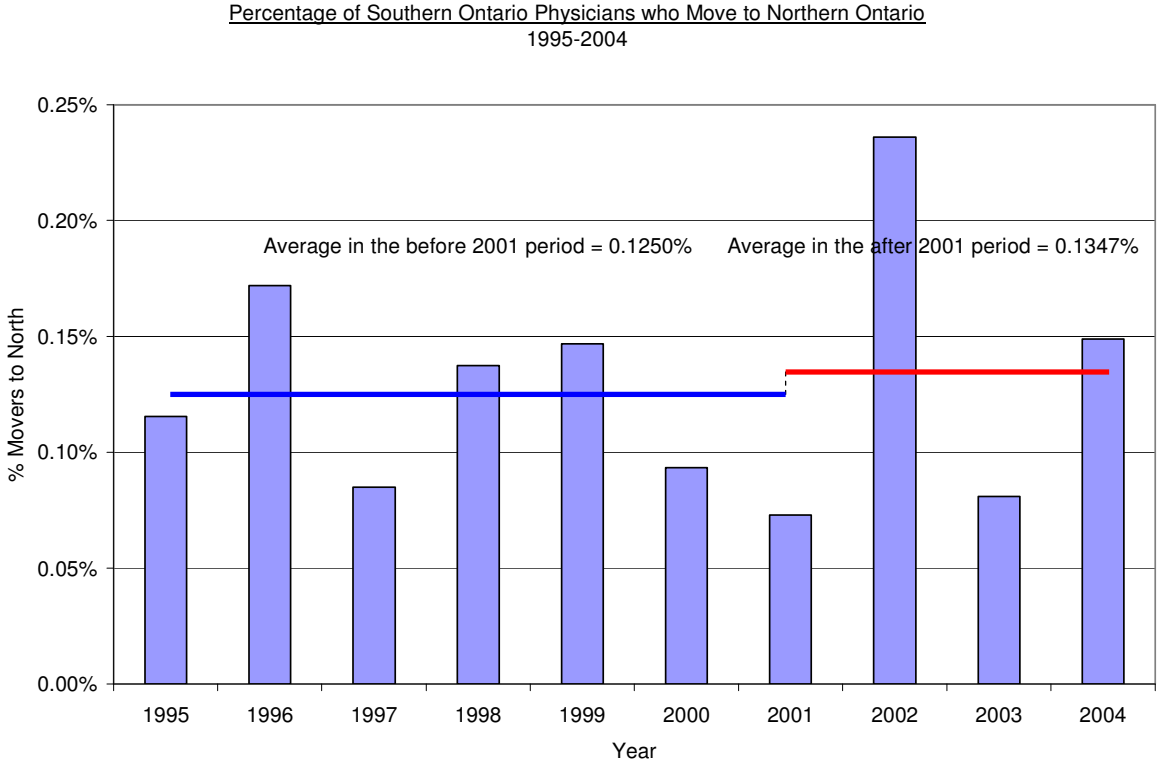
1. In comparison to the before period, the probability that a new physician locates in Northern Ontario in the after period is larger rather than the probability that a new physician locates in Southern Ontario. However, the average difference between two probabilities is not statistically significant (p=0.389). The difference is positive and marginally significant for female physicians (p=0.072) only.

- Detailed results are available at: S:\PAPERS\NPRI\Analysis\Excell Files\Recruitment.

6. 3. Multivariate Analysis: Recruitment – Physicians from Southern Ontario

- The percentage of physicians in Southern Ontario who moved to Northern Ontario in each year from 1995 to 2004 is shown in Figure 7.

Figure 7.



- The results obtained from the comparison of physicians in Southern Ontario before and after the NPRI program was implemented are as follows:
  1. In comparison to the before period, the probability that a physician moves to Northern Ontario in the after period is significantly higher than the probability that a physician remains in Southern Ontario.
  2. In comparison to the before period, the probability that a physician moves to Northern Ontario is significantly smaller than the probability that a physician exits the Ontario health system.
  3. Specifically, a physician is about 0.03% more likely to move to Northern Ontario in the period after the NPRI was implemented compared to the period before the NPRI was implemented.
- Detailed results are available at: S:\PAPERS\NPRI\Analysis\Excell Files\Recruitment.

7. Conclusions

- Our results can be summarized as follows.

Overall Impact

- There is some evidence that the overall impact of NPRI on retention and recruitment was positive and significant. Specifically, the annual increase in the number of physicians in Northern Ontario counties in the period after the NPRI was implemented was 2.94% higher ($p<0.01$) than in the period before the NPRI was implemented. Moreover, this difference was 1.95% ($p<0.10$) higher than that observed for Southern Ontario counties.

Retention

- There is strong evidence that the NPRI had a positive and significant impact on retention of physicians in Northern Ontario. Specifically, a physician who received the NPRI grant in the last year is 1.7% more likely to remain in Northern Ontario than a similar physician who did not receive the NPRI grant.

Recruitment

- There is no strong evidence that the NPRI had a significant on recruitment of new physicians.

- There is some evidence that the NPRI had a positive and significant impact on recruitment of physicians from Southern Ontario. Specifically, a physician residing in Southern Ontario in the period after the NPRI was implemented is about 0.03% more likely to migrate to Northern Ontario than a similar physician in Southern Ontario in the period before the NPRI was implemented.

Appendix A: The OPHRDC data

- Data on location of physicians in Ontario and their characteristics such as age, gender and medical specialty is provided by the Ontario Physician Human Resource Data Centre (OPHRDC).
- OPHRDC is a collaborative project of the College of Physicians and Surgeons of Ontario (CPSO), the Ontario Ministry of Health and Long-Term Care (MOHLTC), the Ontario Medical Association (OMA), and the Council of Ontario Faculties of Medicine (COFM). Currently, OPHRDC is the most comprehensive and reliable data source on physicians in Ontario.
- Since 1992, OPHRDC has maintained a registry of all licensed physicians verified as actively practicing in Ontario, called the Active Physician Registry. Currently available data are for years 1993 to 2004.
- Included in the registry are all physicians who are licensees of CPSO, except for the following:
    - Deceased
    - With birth years 85 years prior to the census date
    - With expired licences
    - With educational, short term or academic visitor licence class
    - Not residing in Ontario
    - Postgraduate medical trainees holding a general licence who had not completed training by July 31
- The Registry is renewed annually at an arbitrary Census date of December 31. As of that time, physicians who have ceased practice in Ontario are removed, new physicians and physicians who have returned to practice are added, and new physician information (e.g. location, specialty) is integrated.
- Geographic location has historically been derived from practice addresses on public record with Southam Communications as published in the Canadian Medical Directory, supplemented with information from the CPSO and data derived from the OPHRDC telephone survey.
- For more information on OPHRDC, see http://www.ophrdc.org/.

TAB 25

ResearchGate

See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/7304003

Interprovincial migration of physicians in Canada: Where are they moving and why?

Article *in* Health Policy · December 2006

DOI: 10.1016/j.healthpol.2006.01.003 · Source: PubMed

CITATIONS
6

READS
167

2 authors, including:

Kisalaya Basu
Health Canada
33 PUBLICATIONS **374** CITATIONS

SEE PROFILE

All content following this page was uploaded by Kisalaya Basu on 14 September 2018.

The user has requested enhancement of the downloaded file.

Available online at www.sciencedirect.com
ScienceDirect
Health Policy 79 (2006) 265–273
HEALTH policy
www.elsevier.com/locate/healthpol

Interprovincial migration of physicians in Canada: Where are they moving and why?

Sameer Rajbhandary, Kisalaya Basu *

Health Canada, Microsimulation Modelling and Data Analysis Division, Jeanne Mance Building, 5th Floor, PL: 1905C Tunney's Pasture, Ottawa, Ont., Canada K1A 0K9

Abstract

This paper analyzes the provincial characteristics contributing to physician's decision in his/her choice of province of residence. It (1) attempts to determine if, and the extent to which, expected income in a province plays a role in physician's decision; (2) predicts yearly probabilities of physician's choice of province of residence; (3) examines marginal effect of expected income in a province on response (choice of province of residence) probability for physicians residing in each province. We estimated McFadden's conditional logit discrete-choice model with yearly probability of choosing a province of residence as a dependent variable for physicians residing in each province separately. The results show: (1) the effect of expected income in a province on the choice of province of residence is positive and statistically significant for physicians residing in Ontario and Saskatchewan. There are other provincial characteristics besides income that affect physician's choice of province of residence; (2) most physicians choose the province they are currently residing. However, those who choose a province other than the current province of residence, the preference for a certain province varies across physicians residing in different provinces; (3) the marginal effect of expected income in a province on response probability varies across provinces for physicians residing in the same province. It also varies across physicians residing in different provinces for the same amount of change in income in the same province.
© 2006 Elsevier Ireland Ltd. All rights reserved.

Keywords: McFadden's conditional logit discrete-choice model; Choice characteristics; Marginal effect

1. Introduction

Having an adequate supply of physicians is a major concern for Canadian government and the provincial ministries. At the provincial level, even during the time of perceived oversupply of physicians at the national level, several provinces suffered acute shortages while others experienced an oversupply [1]. So, in addition to adequate supply of physicians at the national level, the distribution of physicians across provinces is important. Understanding the origin–destination specific movements of physicians across provinces and the underlying factors contributing to such a move would help policy makers develop a strategy to ensure an appropriate distribution of physicians in Canada.

Our previous work identified individual characteristics of physicians contributing to interprovincial migration of physicians in Canada [2]. Some highlights of the results of that study are: (1) younger physicians (aged

* Corresponding author.
E-mail address: kisalaya_basu@hc-sc.gc.ca (K. Basu).

0168-8510/$ – see front matter © 2006 Elsevier Ireland Ltd. All rights reserved.
doi:10.1016/j.healthpol.2006.01.003

26–30 years) are six times more likely to move than those aged 45–50 years; (2) medical and surgical specialists are 57% and 49% more likely to move than family physicians, respectively; (3) International Medical Graduates (IMGs)[1] are 33% more likely to move than those who are not; (4) compared to those residing in Ontario, those residing in any other provinces are more likely to move, for example, those residing in Newfoundland are 5.6 times more likely to move than those residing in Ontario.

This study extends our previous work by analyzing choice (province of residence) characteristics contributing to physician's decision in his/her choice of province of residence. It (1) attempts to determine if, and the extent to which, expected income in a province plays a role in physician's decision; (2) predicts yearly probabilities of physician's choice of province of residence; (3) examines marginal effect of expected income in a province on response (choice of province of residence) probability for physicians residing in each province.

2. Model

The human capital theory of migration considers migration decision as investment decisions where costs have to be borne today with an expectation of returns accrue over time. In a basic human capital model, an individual compares the present cost of migration with the discounted present value of income gains (which can be considered as return to one's human capital accumulated over time), if any, from each potential destination; and chooses the destination with the highest expected net gain.

The standard human capital theory of migration can be used to generate a reduced form equation to estimate the factors contributing to a physician's decision to move across provinces.

The technique of event-history analysis can be employed to examine the event (changing the province of residence) over the years starting from the first entry into the database to the year he/she exits the dataset as a result of death, retirement, emigration or the observation period ends. The time-series data on the province of residence of physicians available in Southam Medical Database (SMDB) can be used to track down the movement of physicians over the years. The unit of observation will be person–years contributed by individual physicians.

McFadden's conditional logit model [3,4] can be employed to model the yearly[2] probability of a physician choosing province j as his/her province of residence among the $(k-1)$ alternatives, as a function of a set of independent variables consisting of the choice characteristics as perceived by the individual. It allows us to model not only the probability of moving from current province of residence but also the choice of destination province. This model is derived from the random utility model, where it is assumed that individuals are rational, so they make choices that maximize their perceived utility subject to some constraints.

The random utility model is:

$$Y_{ij}^* = \beta' X_{ij} + \varepsilon_{ij}$$

$$Y_{ij} = 1 \text{ if } Y_{ij}^* = \max(Y_{i1}^*, Y_{i2}^*, \ldots, Y_{im}^*)$$

$$Y_{ij} = 0 \quad \text{otherwise}$$

where Y_{ij}^* is the level of indirect utility associated with the jth choice for the ith individual, X_{ij} the vector of attributes of the jth choice as perceived by individual i, ε_{ij} the residuals or stochastic part of the model and m is the number of alternatives in the choice set.

The probability that an individual i choose alternative j is

$$P_{ij} = \text{Prob}(Y_{ij} = 1) = \frac{\exp(\beta' X_{ij})}{\sum_{k=1}^{m} \exp(\beta' X_{ik})}$$

3. Data

The main data source for this study is the Southam Medical Database (SMDB) obtained from the Canadian Institute for Health Information (CIHI). It contains annual information on individual physicians in Canada

[1] Those with medical degree (MD) from institutions outside of Canada or USA are considered as IMGs.

[2] The unit of observation is the person–years contributed by individual physicians. So, we are modeling the probability that a physician residing in province A will choose province B, for example, as his/her province of residence in a given year among the alternatives, provinces A, B, C and so on.

including unique identification, province of residence, medical specialty and demographic variables like age and sex, for the period from 1974 to 2002. Using unique ID, a physician can be tracked for his/her place of residence over the period of time and identify the event of migration or the change of place of residence along with other events like retirement, death and emigration; since his/her first entry into the database (for detail, see ref. [2]).

Another data source is the National Physicians Database (NPDB) also obtained from CIHI. It contains information on fee-for-service amount paid to individual physicians, along with their province of residence, medical specialty and demographic variables, such as age and sex, for the period from 1989 to 2000. We imputed[3] average annual income (fee-for-service amount paid) of a physician by year, province, specialty and age groups from NPDB to SMDB.

4. Method

We estimated McFadden's conditional logit discrete-choice model with yearly probability of choosing a province of residence as a dependent variable for physicians residing in each province (origin) separately. We included average annual income (a proxy for expected annual income) in each province by year, age group, sex and specialty as the main choice characteristics variable along with choice-specific dummy variables to represent other provincial characteristics. The unit of observation is the person years contributed by individual physicians in each province during the period 1989–2000.

We excluded medical students, residents and interns as we are modeling interprovincial migration behavior of "active" physicians only. It was not possible to estimate a separate model for Prince Edward Island (PEI) due to very few events of migration from PEI, so we combined[4] PEI with Newfoundland and Labrador because of their geographic proximity. We estimated eight[5] separate models for nine provinces with income and eight provincial dummy variables,[6] as explanatory variables.

In the final data sets, the number of observations (person–years) ranged from the smallest 12,570 for Newfoundland and Labrador and PEI combined to the largest 230,303 for Ontario, for the 12-year period[7] from 1989 to 2000.

5. Results

5.1. Regression analysis

The estimated coefficients for eight models one for each province (except New Brunswick which is used as the reference for provincial dummy variables) are presented in Table 1.

Expected income in a province is significant only in two models—the models for physicians residing in Ontario and Saskatchewan. All provincial dummy variables are significant in the models for Nova Scotia, Quebec and British Columbia (BC); some (though not all) are significant in the other models, which suggests that there are other factors besides income in a province that affects physician's choice of province of residence.

In the model for Ontario, the parameter estimate for income in a province is significant and positive, suggesting that higher the income in a province, more likely that province will be chosen by physicians residing in Ontario. With an additional $10,000 in annual income, the odds of choosing that province is 4.8% higher than choosing any other provinces. Likewise, for physicians residing in Saskatchewan, with an additional $10,000 in annual income in a province, the odds of choosing that province is 7.3% higher than choosing any other provinces.

The preferred choices of province of residence for physicians currently residing in each of the eight provinces are shown in Table 2.

[3] We deleted the cases with the fee-for-service amount paid less than $10,000 or over $500,000. NPDB does not contain any information on physicians residing in Quebec. So, we imputed their annual income by averaging the income of those residing in neighbouring provinces, Ontario and Manitoba.

[4] For this combined province, we imputed the annual income by averaging the income for each province.

[5] New Brunswick is used as the reference for the dependent variable.

[6] New Brunswick is used as the reference for provincial dummy variables in all models.

[7] We had to restrict our sample to 1989–2000, as NPDB is available only for that period.

Table 1
Coefficient estimates of McFadden's conditional logit model of choice of province of residence (destination) for physicians residing in various provinces (origin)

Variables	Province of residence							
	NFL & PEI	NS	QC	ON	MB	SK	AB	BC
Income ($\times 10^4$)	0.0233	−0.0192	−0.0162	0.0469**	−0.0201	0.0709**	−0.0270	−0.0141
Newfoundland and PEI (NFL & PEI)	5.729**	−0.452*	−1.612**	0.024	−0.827	0.376	0.522	0.751*
Nova Scotia (NS)	0.938**	5.549**	−1.028**	0.982**	0.570	0.619	1.018**	1.554**
New Brunswick (NB)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Quebec (QC)	−1.122**	−1.312**	7.524**	1.644**	−0.119	−0.271	1.210**	0.915**
Ontario (ON)	1.672**	1.187**	2.122**	7.828**	2.600**	2.968**	3.208**	3.259**
Manitoba (MB)	−0.335	−1.523**	−1.767**	0.632**	7.033**	1.656**	0.787*	1.654**
Saskatchewan (SK)	−0.201	−2.353**	−2.633**	0.202	0.676*	7.648**	2.015**	1.355**
Alberta (AB)	−0.010	−0.511**	−0.711**	1.372**	1.563**	3.335**	8.450**	2.994**
British Columbia (BC)	0.630**	0.569**	0.320*	2.114**	2.568**	3.451**	3.841**	8.661**
Number of observations	12570	20269	157129	230303	22115	17685	51501	81664

* $p < 0.05$.
** $p < 0.01$.

Most physicians continue to live in the provinces they are currently residing, that is, the odds of choosing the province they are currently residing or the home province, is the highest in all cases. The odds ranges from 257 to 5772 for those currently residing in Nova Scotia and BC, respectively, with respect to New Brunswick. After the home province, Ontario is the preferred destination choice for physicians residing in Newfoundland and PEI, Nova Scotia, Quebec, Manitoba and BC. However, BC is the preferred choice for those residing in Ontario, Saskatchewan and Alberta. New Brunswick is the least preferred choice for physicians residing in Ontario, Saskatchewan, Alberta and BC. However, it comes just after Ontario and BC for those residing in Nova Scotia and Quebec.

For physicians residing in Ontario, the majority of them continue to live in Ontario. However, among those who move, BC is the most preferred destination followed by Quebec and Alberta. They are eight times, five times, four times and three times more likely to

Table 2
Ranking of provinces of choice (destination) for physicians residing in various provinces (origin)

Rank	Province of residence (origin)							
	NFL & PEI	NS	QC	ON	MB	SK	AB	BC
1	NFL & PEI (308)	NS (257)	QC (1851)	ON (2508)	MB (1133)	SK (2096)	AB (4673)	BC (5772)
2	ON (5.32)	ON (3.28)	ON (8.35)	BC (8.28)	ON (13.46)	BC (31.52)	BC (46.56)	ON (26.00)
3	NS (2.56)	BC (1.77)	BC (1.38)	QC (5.18)	BC (13.04)	AB (28.08)	ON (24.74)	AB (19.96)
4	BC (1.88)	NB (1.00)	NB (1.00)	AB (3.94)	AB (4.77)	ON (19.46)	SK (7.5)	MB (5.23)
5	NB (1.00)	NFL & PEI (0.64)	AB (0.49)	NS (2.67)	SK (1.97)	MB (5.24)	QC (3.35)	NS (4.73)
6	QC (0.33)	AB (0.60)	NS (0.36)	MB (1.88)	NS (1.77)	NB (1.00)	NS (2.77)	SK (3.88)
7		QC (0.27)	NFL & PEI (0.20)	NB (1.00)	NB (1.00)		MB (2.20)	QC (2.50)
8		MB (0.22)	MB (0.17)		NFL & PEI (0.44)		NB (1.00)	NFL & PEI (2.12)
9		SK (0.10)	SK (0.07)					NB (1.00)

Results from McFadden's conditional logit model of choice of province of residence, controlling for income. *Note*: The odds ratios are in the parentheses; New Brunswick is the reference.

Table 3
Predicted yearly probabilities for the choice of province of residence (destination) for physicians residing in various provinces (origin), evaluated at the choice-specific mean annual income in a province

Province of residence (destination)	Province of residence (origin)							
	NFL & PEI	NS	QC	ON	MB	SK	AB	BC
Newfoundland and PEI (NFL & PEI)	**0.95666**	0.00237	0.00011		0.00037			0.00036
Nova Scotia (NS)	0.00780	**0.97136**	0.00020	0.00092	0.00151		0.00061	0.00082
New Brunswick (NB)	0.00318	0.00366	0.00053	0.00037	0.00082	0.00041	0.00021	0.00017
Quebec (QC)	0.00102	0.00099	**0.99367**	0.00189			0.00071	0.00043
Ontario (ON)	0.01740	0.01170	0.00436	**0.99087**	0.01082	0.00872	0.00502	0.00434
Manitoba (MB)		0.00083	0.00009	0.00064	**0.96934**	0.00189	0.00048	0.00091
Saskatchewan (SK)		0.00034	0.00004		0.00157	**0.96364**	0.00151	0.00064
Alberta (AB)		0.00220	0.00026	0.00147	0.00393	0.01150	**0.98114**	0.00339
British Columbia (BC)	0.00586	0.00655	0.00074	0.00298	0.01090	0.01230	0.00996	**0.98894**

move to BC, Quebec, Alberta and Nova Scotia, respectively, compared to New Brunswick.

For physicians residing in BC, Ontario is the most preferred destination, followed by Alberta, Manitoba, Nova Scotia and Quebec. They are 26 times, 20 times, 5.2 times, 4.7 times, 3.9 times and 2.5 times more likely to move to Ontario, Alberta, Manitoba, Nova Scotia and Quebec, respectively, compared to New Brunswick.

For physicians residing in Alberta, BC is the most preferred destination, followed by Ontario, Saskatchewan, Quebec, Nova Scotia and Manitoba. They are 47 times, 25 times, 8 times, 3.4 times, 2.8 times and 2.2 times more likely to move to BC, Ontario, Saskatchewan, Quebec, Nova Scotia and Manitoba, respectively, compared to New Brunswick.

For physicians residing in Quebec, Ontario is the most preferred destination, followed by BC. They are 8 times and 1.4 times more likely to move to Ontario and BC, respectively, compared to New Brunswick. They are 51% and 64% less likely to move to Alberta and Nova Scotia, respectively, than to New Brunswick.

For physicians residing in Nova Scotia, again Ontario is the most preferred destination, followed by BC. They are 3.3 times and 1.8 times more likely to move to Ontario and BC, respectively, compared to New Brunswick. They are 40% and 73% less likely to move to Alberta and Quebec, respectively, than to New Brunswick.

5.2. Predicted probabilities

The predicted yearly probabilities for the choice of province of residence (destination) for physicians residing in various provinces (origin), evaluated at the

Table 4
Ranking of predicted probabilities for the choice of province of province of residence (destination) for physicians residing in various provinces (origin)

Rank	Province of residence (origin)							
	NFL & PEI	NS	QC	ON	MB	SK	AB	BC
1	NFL & PEI	NS	QC	ON	MB	SK	AB	BC
2	ON	ON	ON	BC	BC	BC	BC	ON
3	NS	BC	BC	QC	ON	AB	ON	AB
4	BC	NB	NB	AB	AB	ON	SK	MB
5		NFL & PEI	AB	NS	SK	MB	QC	NS
6	NB	AB	NS	MB	NS		NS	SK
7		QC	NFL & PEI		NB		MB	QC
8		MB	MB			NB		NFL & PEI
9	QC	SK	SK		NFL & PEI		NB	NB

Table 5
Predicted yearly probabilities (standardized to one excluding home province) for the choice of province of residence (destination) for physicians residing in various provinces (origin), evaluated at choice-specific mean annual income in a province

Province of residence (destination)	Province of residence (origin)							
	NFL & PEI	NS	QC	ON	MB	SK	AB	BC
Newfoundland & PEI (NFL & PEI)		0.08275	0.01738		0.01207			0.03255
Nova Scotia (NS)	0.17997		0.03160	0.10077	0.04925		0.03234	0.07414
New Brunswick (NB)	0.07337	0.12779	0.08373	0.04053	0.02674	0.01128	0.01113	0.01537
Quebec (QC)	0.02353	0.03457		0.20701			0.03765	0.03888
Ontario (ON)	0.40148	0.40852	0.68878		0.35290	0.23982	0.26617	0.39241
Manitoba (MB)		0.02898	0.01422	0.07010		0.05198	0.02439	0.08228
Saskatchewan (SK)		0.01187	0.00632		0.05121		0.08006	0.05787
Alberta (AB)		0.07682	0.04107	0.16101	0.12818	0.31628		0.30651
British Columbia (BC)	0.13521	0.22870	0.11690	0.32640	0.35551	0.33828	0.52810	

choice-specific mean annual income,[8] are presented in Table 3.

The predicted probabilities for choosing the home province, is the highest in all cases, ranging from 0.9567 to 0.9937 for physicians residing in Newfoundland and PEI, and Quebec, respectively. In other words, the yearly probability of a physician choosing a province of residence other than the home province or moving ranges from 0.0063 to 0.0433 for physicians residing in Quebec, and Newfoundland and PEI, respectively.

The ranking of the destination provinces according to the predicted probabilities are presented in Table 4. And these rankings are very similar to the one presented in Table 2.

The predicted yearly probabilities (standardized[9] to one after excluding home province) for the choice of province of residence (destination) for physicians residing in various provinces (origin), evaluated at choice-specific mean annual income are presented in Table 5.

Conditional upon the fact that they move, for physicians residing in Ontario, the probabilities of moving to BC, Quebec and Alberta are 0.33, 0.21 and 0.16, respectively. For physicians residing in Manitoba, the probabilities of moving to BC, Ontario and Alberta are 0.36, 0.35 and 0.13, respectively. For physicians residing in Saskatchewan, the probabilities of moving to BC, Alberta and Ontario are 0.34, 0.32 and 0.24, respectively.

5.3. Marginal effect

The marginal effect of income on response probability (the choice of province of residence) evaluated at choice-specific mean annual income, for physicians residing in Ontario and Saskatchewan[10] are shown in Table 6.

For physicians residing in Ontario, for an additional $10,000 annual income in Ontario, the probability of choosing that province, i.e. Ontario, increases by 0.00042, while the probabilities for choosing other provinces decrease. For example, the probability for choosing Quebec and Alberta decreases by 0.000088 and 0.000068, respectively. For the same additional amount of annual income in BC, the probability of choosing that province increases by only 0.00014.

For physicians residing in Saskatchewan, for an additional $10,000 annual income in Saskatchewan, the probability of choosing that province increases by 0.0025. The probabilities for choosing BC and Alberta decrease by 0.00084 and 0.00079, respectively. For the same additional amount of annual income in BC, the probability of choosing that province increases by only 0.00086.

[8] Mean annual income is the annual income in a province averaged over all years, age groups, sex and specialty.

[9] We recalculated the probabilities for all the provinces except the home province as follows: standardized probability for province A = probability for province A/(1 − probability for the home province).

[10] We analyzed the marginal effect of income for the models for Ontario and Saskatchewan, as income is significant with expected positive sign in these two models. Income is not significant in other models.

Table 6
Marginal effect of income in a province on response probability (choice of province of residence) evaluated at choice-specific mean annual income in a province for physicians residing in Ontario and Saskatchewan

Province	Attribute level of income for						
	NS	NB	QC	ON	MB	AB	BC
Ontario							
NS	**0.0000431267**	−0.0000000160	−0.0000000816	−0.0000427723	−0.0000000276	−0.0000000635	−0.0000001286
NB	−0.0000000160	**0.0000173540**	−0.0000000328	−0.0000172019	−0.0000000111	−0.0000000255	−0.0000000517
QC	−0.0000000816	−0.0000000328	**0.0000885112**	−0.0000878692	−0.0000000568	−0.0000001304	−0.0000002643
ON	−0.0000427723	−0.0000172019	−0.0000878692	**0.0004244685**	−0.0000297546	−0.0000683427	−0.0001385450
MB	−0.0000000276	−0.0000000111	−0.0000000568	−0.0000297546	**0.0000300096**	−0.0000000441	−0.0000000895
AB	−0.0000000635	−0.0000000255	−0.0000001304	−0.0000683427	−0.0000000441	**0.0000688710**	−0.0000002055
BC	−0.0000001286	−0.0000000517	−0.0000002643	−0.0001385450	−0.0000000895	−0.0000002055	**0.0001394049**

Province	Attribute level of income for					
	NB	ON	MB	SK	AB	BC
Saskatchewan						
NB	**0.0000290489**	−0.0000002534	−0.0000000549	−0.0000280042	−0.0000003342	−0.0000003575
ON	−0.0000002534	**0.0006126840**	−0.0000011682	−0.0005956004	−0.0000071079	−0.0000076023
MN	−0.0000000549	−0.0000011682	**0.0001337100**	−0.0001290923	−0.0000015406	−0.0000016478
SK	−0.0000280042	−0.0005956004	−0.0001290923	**0.0024834899**	−0.0007854822	−0.0008401245
AB	−0.0000003342	−0.0000071079	−0.0000015406	−0.0007854822	**0.0008057461**	−0.0000100260
BC	−0.0000003575	−0.0000076023	−0.0000016478	−0.0008401245	−0.0000100260	**0.00086110057**

6. Discussion

Expected income in a province is a significant determinant of the choice of province of residence for physicians residing in Ontario and Saskatchewan. The coefficients are positive, suggesting that higher the expected income in a province, more likely that province will be chosen by physicians residing in Ontario and Saskatchewan. The effect, however, is not large in magnitude. The same amount of change in annual income in a province affects physicians residing in different provinces differently. Income in a province is not significant in other models or for physicians residing in other provinces besides Ontario and Saskatchewan.

The significance of provincial dummy variables in all the models suggests that there are other factors besides income in a province that affect physician's choice of province of residence. Most physicians choose their home province, the province they are currently residing. The odds of choosing home province is the highest in all cases. After the home province, Ontario and BC are the most preferred destination choices. New Brunswick comes at the bottom in most cases except for the physicians residing in Nova Scotia, and Quebec, where it comes just after Ontario and BC, which is perhaps due to geographical proximity of New Brunswick to Nova Scotia; and the presence of large number of francophone (French-speaking) population[11] in New Brunswick.

The predicted yearly probabilities for the choice of province of residence (destination) for physicians residing in various provinces (origin), evaluated at the choice-specific mean annual income in a province, also gives very similar results. The probabilities are the highest for the home province in all cases. Again, after the home province, the preferences are for Ontario and BC.

Expected income in a province though statistically significant for physicians residing in Ontario and Saskatchewan, its effect is not large in magnitude. The effect varies across provinces for the same

[11] Approximately 40% of the population in New Brunswick are francophone.

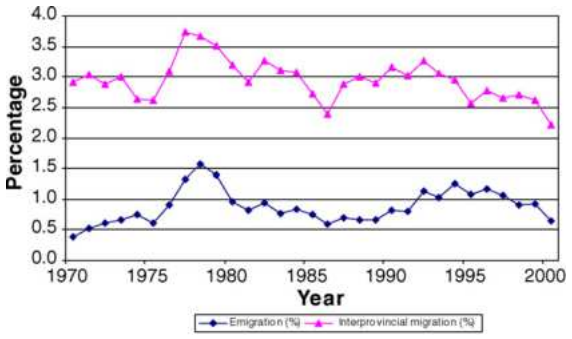


Fig. 1. Percentage of physicians who moved between provinces and abroad (1970–2000). *Source*: SMDB, CIHI.

population, e.g. physicians residing in Ontario and also across physicians residing in different provinces for the same amount of change in income in the same province, e.g. increase in income in BC by $10,000.

The proportion of physicians moved across provinces and the proportion moved abroad during the period 1970 and 2000 show a very consistent pattern (Fig. 1). While the proportion of both interprovincial migration and emigration (mostly to USA) were relatively high in the early 1990s, both declined later in the decade. This suggests the existence of some common factors affecting both interprovincial migration and emigration, but not necessarily one affecting another. Various cost cutting policies adopted by provincial governments in early 1990s could be the main contributing factor for the decline in late 1990s.

7. Limitation

One of the main limitations of our study is that we were not able to identify or model explicitly other provincial characteristics that are likely to affect physician's choice of province of residence. Our model captures those provincial characteristics in aggregate through provincial dummy variables. One previous study [5], based on aggregate data used health care proxy variables, such as non-physician health care expenditures per capita, hospital beds per 100 population; climatic and cultural amenities. However, in our model with individual level data, the variation in those explanatory variables was not enough to identify their individual effects.

8. Policy implication

Interprovincial migration aggravates the problem because physicians are moving from the provinces where they are needed most to the provinces where they are relatively less needed. The descriptive analysis of physician movement during the period 1989–2000 shows that, in general, physicians are moving from the provinces with lower physician to population ratio to the provinces with higher physician to population ratio. With physicians to population ratio classified as low, medium and high according to whether it is lower than, about the same or higher than the national average, there are net positive movement of physicians from low to medium (267), low to high (573) and medium to high (102).[12]

The pattern of physician distribution is as important as aggregate supply and demand. Interprovincial migration is one of the important factors that affect the regional distribution of physicians. It is important to note that interprovincial migration of physicians is not necessarily a bad thing.

The connections our study [2] has made between a physician's personal characteristics and their likelihood to migrate from one province to another would be useful in the policy development both in terms of managing ensuing gaps and creating incentives to steer movement of physicians. Knowing that younger physicians are more likely to migrate and settle as they age, could allow policy makers to create incentives attractive to young physicians to draw them to provinces where they are needed. This could help solve short-term supply gaps, and provide a settled and more predictable workforce for the future.

The provincial dummy variables capture other provincial characteristics that are likely to affect physician's choice of province of residence, which are not

[12] The provinces with physicians to population ratio classified as low, medium and high are as follows: low—Prince Edward Island, New Brunswick, Saskatchewan, Newfoundland and Labrador, Alberta and Manitoba; medium—Ontario and Nova Scotia; high—British Columbia and Quebec.

explicitly included in the model, such as working conditions (research opportunities, for example), living conditions, etc.

9. Conclusion

Income in a province is a significant determinant of the choice of province or their destination choice for physicians residing in some provinces. Though statistically significant, the effect is not large in magnitude. However, there are other factors besides income in a province that affect physician's choice of province of residence. Most physicians choose the province they are currently residing or their home province. But among those who choose a province other than their home province, the preference for a certain province varies across physicians residing in different provinces. For example, Ontario is the preferred destination choice for physicians residing in Newfoundland and PEI, Nova Scotia, Quebec, Manitoba and British Columbia. British Columbia is the preferred choice for physicians residing in Ontario, Saskatchewan and Alberta. The marginal effect of income in a province varies across provinces for the same population, and across population for the same amount of change in income in the same province.

Acknowledgements

We thank Anil Gupta, Gordon Hawley, Mostafa Askari and Charles Mallory for their helpful comments. We also thank the anonymous referee for his/her insightful comments. We acknowledge the financial support from Health Human Resource Strategies Division, Health Canada. However, the views expressed in this paper are those of the authors and do not necessarily represent the views of Health Canada. Any remaining errors are ours.

References

[1] Task force two final report. Physician workforce in Canada: literature review and gap analysis. A physician human resource strategy in Canada; 2003.
[2] Basu K, Rajbhandary S. Interprovincial migration of physicians in Canada: what are the determinants? Health Policy, 2006.
[3] McFadden D. Conditional logit analysis of qualitative choice behaviour. In: Zarembka P, editor. Frontiers in econometrics. New York: Academic Press; 1974. p. 105–42.
[4] Maddala GS. Limited dependent and qualitative variables in econometrics. New York: Cambridge University Press; 1994.
[5] Benarroch M, Grant H. The interprovincial migration of Canadian physicians: does income matter? Applied Economics 2004;36:2335–45.

View publication stats

TAB 26

Managing the supply of physicians' services through intelligent incentives

Brian R. Golden PhD, Rosemary Hannam MBA, Douglas Hyatt PhD

Addressing issues of access to health care for Canadians has been an ongoing challenge for policy-makers. Although Canada has experienced times of physician oversupply (e.g., in the 1990s),[1] which it could experience again as a result of delayed retirements, increased enrollment in medical schools and the arrival of international medical graduates,[2] uniformly adequate access to care remains a challenge. The state of access to health care has recently been reported by the Health Council of Canada's 2010 comparison of Canada with other developed countries in terms of access to after-hours medical care, wait times and the ability to get an appointment with a physician the same or next day.[3]

Central to the issue of access is the adequacy of the supply of physicians — specifically, whether the number of physicians and their work effort sufficiently addresses the health care needs of the population. Supply is appropriately managed when there is neither a shortage nor surplus of services. Governments, when attempting to address shortages, recognize that training and attracting new physicians is both time-consuming and expensive. Similarly, there is little recourse for immediately reducing the number of physicians when supply is too great. Governments, however, can have a more immediate impact on the supply of physicians by influencing physicians' decisions to adjust their workloads to either increase or reduce the number of services they provide.

Financial incentives can have profound effects on the behaviour of people supplying, or considering supplying, their services. However, recent reviews have concluded that the behavioural impact of such incentives is more complex than may sometimes be recognized.[4-6] It is possible that the same compensation policies aimed at attracting workers and increasing the supply of labour may also induce workers to reduce their workloads, thereby reducing supply. There is a very real risk that paying more — with the intention of buying more — could be incentive for physicians to provide fewer services. Indeed, a recent paper reports that physicians' incomes in Canada are high and growing,[7] yet there continue to be shortages of physicians throughout parts of the country.

The purpose of our paper is to introduce noneconomists to the concepts of labour supply theory in the context of physician remuneration, and to explain some of the fundamental principles that policy-makers can readily apply. We present a framework for understanding how financial incentives can influence the supply of physician services and show how it can be used to project reactions by the workforce to policy initiatives commonly used to influence supply. We do not address the frequently studied second-order question of whether physicians are providing appropriate care as a result of financial incentives; instead, we address the more fundamental first-order question of whether physicians offer their services and to what degree.

Framework for understanding physician supply

Although the focus of many of the policies to address perceived physician shortages has been increasing the number of physicians, Jeon and Hurley[8,9] and Crossley and colleagues[10] have persuasively argued that a wide array of additional factors affect supply, including opportunities for

Key points

- Canadian governments use various incentives, including increasing wages or fees and providing nonwage benefits, to ensure sufficient supply of physicians.
- An increase in the wage rate induces both an income effect (which induces less work) and a substitution effect (which induces more work); it is not possible to predict which of these effects will dominate.
- Some physicians may initially increase their workload in response to a fee increase (substitution effect), but may reduce their workloads later in their career or retire from practice earlier (income effect).
- Unlike wage increases, nonwage benefits can be designed so that either a substitution or income effect dominates, depending on the government's objectives.

This paper is based on research surrounding the most recent Physician Service Agreements between the Ontario Ministry of Health and Long-Term Care and the Ontario Medical Association. The authors were asked by both parties to act as a neutral body providing advice, based on economic theory and focus group research, on the most effective ways to match the demand for physician services with supply.

Competing interests: Brian Golden has taught seminars on change management for the Canadian Medical Association's Physician Management Institute. No other competing interests were declared.

This article has been peer reviewed.

Correspondence to:
Rosemary Hannam,
rosemary.hannam@rotman.utoronto.ca

***CMAJ* 2012. DOI:10.1503/cmaj.111018**

© 2012 Canadian Medical Association or its licensors

practice versus nonpractice income, technology, attitudes toward work and the policy environment. Importantly, a distinction is made between the extensive margin (the supply of physicians) and the intensive margin (the services supplied by each physician); it is reductions in the latter that have been an important driver of the difficulties in accessing care. Jeon and Hurley conclude that

> Although increases in the supply of providers may be important long-run policies, in the near term the most effective means of increasing access would be to increase hours of work and service provision by the existing stock of practicing physicians.[11]

The supply of physician services at a point in time is determined by the number of physicians available to work, the number of hours devoted to providing services and the associated number of services provided per hour.

There are several policy options at the disposal of provincial and territorial governments. As has been seen previously in Canada, governments can attempt to influence attraction and retention by increasing fee schedule amounts to compete with those of other provinces, or by providing nonwage incentives (e.g., recruitment bonuses, relocation assistance, reimbursement of tuition and incentives targeting recent graduates).[12] In addition, these incentives may be used to affect where in the province a physician would practise, such as in underserviced rural areas. Furthermore, the number of physicians practising in a province or territory can be influenced by changing the number of positions available in medical schools and residency programs and the process for licensing graduates of international medical schools.

To address work intensity, the government can change the rate and design of physician compensation and the services that are required in return. Aside from negotiating changes to fee schedules, governments have introduced alternative models of reimbursement (e.g., salary, capitation). The Canadian Institute for Health Information estimates that 39.1% of Canadian physicians are currently paid, at least partially, through alternate fee arrangements (up from 28.1% in 2000–2001).[13] The impact of these changes will be influenced by the relative strengths of their income and substitution effects.

Income and substitution effects

The core of the theory of labour supply is that workers make choices between time spent working and time spent engaged in nonwork activities (leisure). Influencing these choices are preferences for income and leisure, wages and nonwage income. Although wage and nonwage income are only two factors that could influence the choice between time spent at work and time spent at leisure, they are important because they can be directly influenced by policy-makers. However, the influence of changes in income and wages on behaviour is complex and sometimes ambiguous.

Wage increases may create an incentive for workers to either work more hours or work fewer hours, depending on their individual preferences, because an increase in wages has both income and substitution effects. These effects work in opposite directions, and the ultimate impact on the behaviour of workers will depend on which is the dominating effect. This basic framework has been extended by researchers, such as McGuire and Pauly,[14] to consider the labour supply of physicians. The opposing income and substitution effects in response to changes in the wage rate are the basis for the backward-bending supply curve of labour. This theory makes four assumptions: workers choose their hours, workers are homogeneous, there are no contractual obligations, and workers are utility-maximizing agents. Briefly described, the theory states that when the substitution effect outweighs the income effect, wage increases up to a certain threshold will elicit an increase in the supply of labour; further increases beyond the threshold will lead to a reduction in the supply of labour.[15]

Consider first the income effect of a wage increase. An increase in wage translates to an increase in income. Assuming that time spent in nonlabour activities such as household work and leisure is valued by workers, and that they prefer to spend more time engaged in these other activities as their income increases, the income effect of a wage increase would induce a worker to work less.

The same wage increase could also engender a substitution effect. As wages increase, the amount of money a worker foregoes by not working increases; it implicitly becomes more expensive to reduce work time. Under the reasonable assumption that a worker would purchase less of an expensive good or service when its price increases, workers will substitute time in the labour market for time out of the labour market and work more hours.

Thus, an increase in wages induces an income effect, which induces a worker to work less, and a substitution effect, which induces a worker to work more. Which of these two opposing effects will dominate ultimately depends on each worker's individual preferences for time spent engaged in work and nonwork activities. It is simply not possible to make an a priori prediction, for any person or group of people, as to which effect will dominate. Each worker will make his or her own decision and the cumulative effect of those decisions will determine the ultimate impact of time spent working in the labour market.

It is worth emphasizing that although it is not

possible to predict the impact of wage changes on the basis of theory, empirical studies of physician responses to changes in fee schedules may provide some guidance to policy-makers on what changes to labour supply might be expected.[16] However, because the theoretical prediction is ambiguous, the only way to know for certain what impact a wage change will have on a population of physicians at a given point is to make the change and perform an empirical study to measure the response. The only certainty in such a scenario is that the unit price of work will increase — although workers on the whole may ultimately provide less total work.

There are many challenges for payers resulting from the opposing income and substitution effects associated with wage increases. For example, the Ontario Ministry of Health and Long-Term Care may be concerned about access to a particular group of physicians (e.g., rural family physicians) and want to encourage those physicians to work more hours. The ministry may decide to increase physician fees for this group. If the substitution effect outweighs the income effect, the ministry will have achieved its goal. However, if the reverse is true (the income effect outweighs the substitution effect), then the ministry will have achieved the opposite of its goal: the physicians will work fewer hours and access to the services they provide will be reduced. The 2010 report from the Organisation for Economic Co-operation and Development suggested that income effects could be strong in Canada, noting that

> [A]lthough fee-for-service payment should encourage physicians to seek high volumes, income effects arising from high compensation levels as in Canada, and high marginal tax rates, may conversely induce them to limit their effort, lowering productivity.[1]

Effects of life stage

It is possible that fee increases might affect the same physician differently at different stages in his or her career. For example, physicians may respond to an increase in their fees over their career by working more (substitution effect). However, physicians may retire early (income effect), or younger physicians may work more hours when faced with a fee increase (substitution effect), while the opposite might be the case for older physicians who prefer to earn the same amount and work fewer hours (income effect). Alternatively, younger physicians may choose to work fewer hours, preferring instead to spend time pursuing other interests, whereas older physicians may have higher personal expenses and thus could choose to work more hours. Indeed, recent research suggests that physicians are not winding down their practices until well after their 65th birthday — the average age of self-reported retirement is currently 69.2 years.[17]

Nonwage benefits

Nonwage benefits (a benefit of financial value that is not connected to base pay) can be a substantial part of total compensation and can also induce income and substitution effects. Importantly, there may be ways to structure the allocation of nonwage benefits to ensure that the substitution effect dominates the income effect (or vice versa), depending on the intended goal.

Two concepts are essential for understanding the effects of nonwage benefits. First, any form of nonwage benefit that reduces the fixed costs of practising medicine (costs a physician incurs that are independent of the number of patients seen or the number of services provided) and is not linked to the number of hours worked creates a pure income effect, with no substitution effect. For example, support for the repayment of loans, support for education, payment of annual fees and contributions to overhead and staffing are all nonwage benefits that reduce the fixed costs of a practice. Second, any form of nonwage benefit that does not reduce the fixed costs of employment and is linked to time worked will induce a pure substitution effect, with no income effect. Examples that create a pure substitution effect include retention bonuses and payments tied to holding an evening or weekend clinic.

Compensation packages

The design of a total compensation package (wages or fees, nonwage benefits) intended to encourage the provision of more services can be complex. As described earlier, nonwage benefits should be linked to time worked or services provided.

Designing an appropriate package can be a challenge when an employer faces an objective beyond increasing the incentive to work, such as attracting physicians to a rural area or encouraging physicians to move to a new model of payment (e.g., capitation). Nonwage benefits that are not related to time worked, such as contributions to lease or loan payments, licensing, staffing or housing, are often used to attract new physicians to a particular jurisdiction. However, these benefits also reduce the fixed costs of a practice and create a pure income effect, thereby inducing fewer hours of work and fewer services provided. Thus, some forms of nonwage compensation produce a trade-off; they encourage new entrants, but they discourage the hours of work or the number of services provided.

Labour economic theory suggests that, when given a choice, workers will be more likely to choose forms of nonwage compensation that are not tied to hours worked (or number of services provided). That is, they will prefer forms of compensation that have a pure income effect, all other things being equal. This association is supported by a series of focus groups conducted in early 2008 and involving Ontario physicians as part of an effort to gather information about what types of nonwage benefits would appeal to them (Appendix 1, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.111018/-/DC1). Physicians were presented with typical nonwage benefits commonly considered to attract new entrants or retain current physicians and asked whether the benefit would have the intended effect. The most popular incentive was payment to support education or professional development — including pay for lost income, locum support, reimbursement of tuition and a travel allowance. The least popular incentives were payments tied to return-of-service requirements. Details on the focus groups, including responses and analysis, are presented in Appendix 1.

Conclusion

Understanding and accurately predicting the response of physicians to incentives is essential if governments wish to increase the supply of physician services. Clearly, this issue is complex, and considerations such as political realities, professional development and quality of care play central roles in the design of policy governing the compensation of physicians. Nonetheless, the basic tools of labour economics provide a perspective on how alternative forms of compensation are likely to affect the supply of physician services.

In a review of compensation policies across industries, Baron and Kreps remind us that

> [p]eople try to use pay as a scalpel. Because it means different things to different people, it's a broad sword at best.[18]

One certainty — borne out in practise — is that compensation policies that maximize the substitution effect, while minimizing the income effect, will achieve the objective of increasing hours of work. Linking compensation to time worked or services provided, as opposed to forms of pay that are unrelated to time worked, will better ensure the goal of increased work hours. Policy-makers should recognize that policies for compensation may result in just what we hope for — or just the opposite. The theory of labour supply provides guidance as we attempt to address the critical challenge of managing physician supply and work intensity.

References

1. Organisation for Economic Co-operation and Development. Organisation for Economic Co-operation and Development economic surveys — Canada 2010. Paris (France): The Organisation; 2010.
2. Celia M. Exploring a future where primary care is delivered entirely by non-MD health-care providers. *The Medical Post* [Toronto (ON)] 2011 Jan. 10. Available: www.canadianhealthcarenetwork.ca/physicians/inter-professional/what-if/introducing-a-new-series-what-if-13611 (accessed 2011 Jan. 28).
3. Health Council of Canada. How do Canadians rate the health care system? Results from the 2010 Commonwealth Fund International Health Policy Survey. Canadian Health Care Matters, Bulletin 4. Toronto (ON): The Council; 2010.
4. McGuire TG. Physician fees and behavior: implications for structuring a fee schedule. In: Sloan FA, Kasper H, editors. *Incentives and choice in health care*. Boston (MA): MIT Press; 2008. p. 263-88.
5. Deber R, Wodchis W. *Pay for performance in primary care settings: a synthesis for Ontario*. Toronto (ON): Department of Health Policy Management and Evaluation, University of Toronto; 2007.
6. Golden BR, Sloan FA. Physician pay for performance: alternative perspectives. In: Sloan FA, Kasper H, editors. *Incentives and choice in health care*. Boston (MA): MIT Press; 2008. p. 344-77.
7. Duffin J. The impact of single-payer health care on physician income in Canada, 1850–2005. *Am J Public Health* 2011;101:1198-208.
8. Jeon S-H, Hurley J. The relationship between physician hours of work, service volume and service intensity. *Can Public Policy* 2007;(Suppl 1):s17-s29.
9. Jeon S-H, Hurley J. Physician resource planning in Canada: the need for a stronger behavioural foundation. *Can Public Policy* 2010;3:359-75.
10. Crossley T, Hurley J, Jeon S-H. Physician labour supply in Canada: a cohort analysis. *Health Economics* 2009;18:437-56.
11. Jeon S-H, Hurley J. The relationship between physician hours of work, service volume and service intensity. *Can Public Policy* 2007;(Suppl 1):s17-s29.
12. *British Columbia rural physician programs review* [Appendix A]. Vancouver (BC): Harbour Peaks Management; 2008. Available: www.health.gov.bc.ca/pcb/pdf/rural_review_report.pdf (accessed 2011 Sept. 8).
13. Canadian Institute for Health Information. National Physician Database — payments data 2008–2009. Ottawa (ON): The Institute. Available: https://secure.cihi.ca/estore/productSeries.htm?pc=PCC476 (accessed 2011 Apr. 5).
14. McGuire TG, Pauly MV. Physician response to fee changes with multiple payers. *J Health Econom* 1991;10:385-410.
15. Hurkey J. *Health economics*. Toronto (ON): McGraw Hill-Ryerson; 2010.
16. Jeon S-H, Hurley J. Physician resource planning in Canada: the need for a stronger behavioural foundation. *Can Public Policy* 2010;3:359-75.
17. Canadian Institute for Health Information. Supply, distribution, and migration of Canadian physicians. Ottawa (ON): The Institute; 2009.
18. Baron JN, Kreps DM. *Strategic human resource management*. New York (NY): John Wiley & Sons; 1999. p. 268.

Affiliations: From the University of Toronto and the University Health Network (Golden); the Collaborative for Health Sector Strategy, Rotman School of Management (Golden, Hannam), University of Toronto, Toronto, Ont.; and the Rotman School of Management (Hyatt), University of Toronto, Toronto, Ont.

Contributors: All three authors conceived and designed the article. Doug Hyatt provided the primary expertise in labour economic theory, including interpretation of the results from the focus groups, and Brian Golden and Rosemary Hannam provided expertise in health policy and the application to the health care context based on experience working with the Ontario Physician Services Committee. All three authors drafted and revised the manuscript, and approved the final version submitted for publication. Brian Golden takes responsibility for the paper as a whole.

TAB 27

OMA Ontario Medical Association

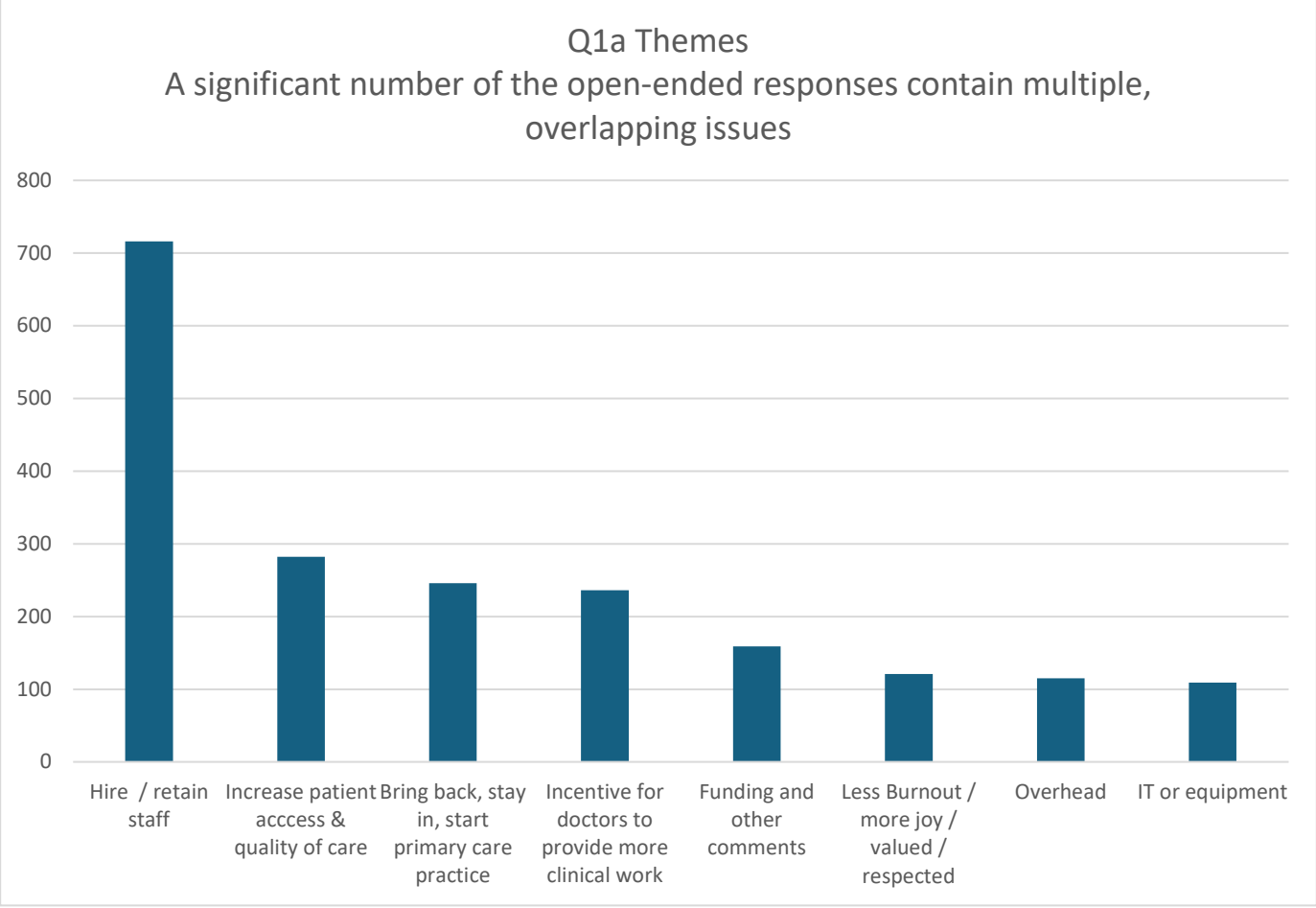
2024 SGFP Tariff Committee Survey for NTF/Arbitration

as at April 22, 2024

Text Analysis by OMA Survey Insights

Q1a. Please describe how an increase in compensation may enable you to attach more patients and/or improve patient access to your family practice.

Themes: (n: 1,275)



Common themes include:

- Increases will have to be significant
- Family Physicians are underpaid and overworked; and are experiencing burnout. Increases would show they are respected and valued.
- Instead of doing more, compensate us properly for what we are doing now, including unpaid administrative burden
- Hiring staff, IT / equipment investment, overhead support are often combined as needed to be able to increase patient access for existing patients and possibly new patients
- Money needs to go directly to physicians, not to "teams". Each practice has a different need.

Theme highlights:

- **Hire / retain staff (n= 716)**
  - Including:
    - Office administration and allied health providers
    - Hiring new staff, increasing hours for existing staff and being able to pay competitive salaries compared to hospitals, etc.
  - Decreases administrative burden for the physician freeing up more time for clinical work

- **Increase patient access & quality of care (n= 282)**
  - Allows for increases access for patients who need active care
  - Potential to increase roster size and accept new patients

- **Bring back to, stay in or start primary care practice (n= 246)**
  - Incentivize physicians to
    - return to full-time comprehensive care, stop GP Focused practice, LTC, ER and hospitalist work as it pays more and supplements costs of family practice
    - establish a family practice (instead of practicing as locums, emergency physicians & hospitalists)
    - not retire
    - not leave the province
  - Makes family medicine attractive to new graduates

- **"Incentive" for doctors to provide more clinical work (n= 236)**
  - Motivation to do full time practice / add clinic days if remuneration was higher
  - Able to spend more time at the office, less time at higher paying jobs to subsidize their clinic
  - Currently not worth it to increase office hours

- **Funding & other comments (n= 159)**
  - Need increases for current workload, additional increases to accept new patients
  - Increases plus reduced burden of unpaid forms
  - New patients require a lot of attention, new fees needed
  - Increases need to be significant

- **Less burnout, more joy, valued, respected (n= 121)**
  - Stress & burnout of maintaining practice open would be eased
  - Feeling appreciated & valued is a motivator
  - Less burnout so that more patients can be seen
  - Improve job satisfaction and morale

- **Overhead support (n= 115)**
  - Financial burden of existing overhead costs, would be eased
  - Able to expand clinic space
  - Offset increased costs generated by more patients

- **IT / equipment resources (n= 109)**
  - Investment in IT to manage the increased patient load such as AI scribes, online scheduling / appointment booking systems and EMRs

Findings as at 4:00 p.m. April 22, 2024

1a. Please describe how an increase in compensation may enable you to attach more patients and/or improve patient access to your family practice.	Hire / Retain Staff	"Incentive" doctors to provide more clinical work	Increase Patient Access & Quality	IT / Equipment Resources	Overhead Support	Bring Back, Stay, Start Primary Care Practice	Less Burnout / More Joy / Valued / Respected	Funding & Other Comments
could pay for a full time nurse which would increase my capacity	1		1					
There would be more incentive to work longer hours to accommodate increased demand and number of patients while being more fairly reimbursed.		1	1					
i would provide more hours of service		1						
Allows to hire (and retain) more staff (which allows delegation and increased capacity). Similarly, to invest in technology that increases efficiency and capacity.	1		1	1				
Allow me to leverage technology to allow patients access to me. Online portals and messaging systems are expensive and provide no net benefit to me in terms of reduced cost				1				
I would be more willing to add clinic days if the associated remuneration was higher. Currently not worth the effort/cost.		1						
Better compensation means less burnout, more willingness to do full time family practice. Less compensation for family practice means doing other jobs that are within scopes of family physician but not family practice		1				1	1	
Allow me to hire adequate reception to keep the office functioning.	1							
Able to afford more support staff to core for a larger roster	1		1					
Increased compensation would allow me to hire more ancillary staff to handle the high burden of administrative tasks so that I can spend my time in appointments, and therefore see more patients.	1		1					
adds an incentive!!!		1						

An increase in compensation would allow us to increase compensation to our support staff and potentially hire new staff. This would allow for a delegation of tasks, freeing up resources, that would increase patient contact time and number of appointments.	1		1					
use increased funds to pay other staff do do more of the adminstrative tasks that i do now and then my time can be utilized doing clincial work -- seeing more pts; improved access . Alos woudl fund AI scribe to increase my clinical time and decrease my administrative time.	1		1	1				
Could bring on RN or NP to assist - makes the hard work more worthwhile	1							
I can survive in medical practice and not leave if compensated appropriately. A small increase will do nothing though						1		
Reduce feelings of burn out and make me more inclined to take on more work if compensated appropriately.		1						1
Hiring more front staff or nursing staff	1							
motivation, motivation and again motivation. more office staff, better IT support and computers, better and bigger office for rent, means more exam rooms	1	1	1	1	1			
We could hire more allied health staff to assist with patient care or I could hire a clinical associate type person to help out with half days	1							
Presently I am burned out, exhausted, and trying to pull rabbits out of hats for my moderate roster of 1000 patients. I work many hours unpaid keeping on top of the administrative burden. I deal with multiple issues in appointments and offer services that are unpaid. This is just to keep up. Presently there is no incentive to do any of this, and I can't sustain it. Increasing compensation will at least begin to reward this work and incentivize continuing my family practice instead of other work.						1		1

YOU WOULD NEED TO PAY ME AT LEAST 50% MORE (I.E. ALL OF THE SERVICE DOES SUCH AS A007 WOULD NEED TO BE DOUBLED) IN ORDER FOR ME TO EVEN REMOTELY CONSIDER COMPREHENSIVE FAMILY MEDICINE AND TAKING ON PATIENTS.					1		
Increase staffing. Can afford More office efficiency such as paying for AI Scribe	1			1			
It's no longer worth the time and effort to see patients. Period.							1
Increase client intake and increase current work hours if there is incentive to do so.		1					
It would help me invest in technology to improve patient flow				1			
Would be able to hire assistants eg RN	1						
It can help us to hire more staff to help manage the patient flow better	1		1				
Hire a PA	1						
Compensation for each patient & extend hours of clinic hire more staff & more support person in the clinic	1						
I am currently looking for a side hustle as family medicine does not pay well. If it did I would take more patients and work in my family medicine position full time.		1	1		1		
Hire more staff, provide more phone support and more after-hours care.	1						
Would be able to hire more experienced staff who can assist with admin burden. Currently family doctors cannot afford to pay competitive wages so we often get new grads who leave for higher income once they are trained. Leaves family doctors with an overload of admin work and time training new staff.	1						
Increased compensation will allow me to hire more staff to deal with the burden of additional patients in my practice. It will also help prevent burnout and leaving my career in community based longitudinal family medicine	1		1		1	1	

Increasing my compensation will allow me to actually afford to hire nurses/nurse practitioners that can help support me during the work week and vacation in order to see more patients.	1			
In general, I think it's a sound of respect for the amount of work we do. It makes the burden seem slightly more palatable. Also, more importantly, it makes it possible for me to hire a local and actually takes some time off, which reduces my overall burden and makes me more likely to accept more patients into my practice, which is itself significant burden.	1	1		1
ability to hire more staff and use technology such as AI scribe	1			
An increase in compensation will allow me to stay in a comprehensive family practice. If there is no increase in compensation I will be leaving family practice and 1400 patients will become unattached along with the millions of other Canadians without family doctors. An increase in compensation may also allow for payment of staff to help with administrative burden as well as overhead such as the implementation of AI to assist with note taking such that more time is patient facing.	1		1	
better pay would make me willing to additional patients		1		
Currently I work as a locum, with the current pay for family doctors there is not an incentive to start my own practice. I prefer to locum or do walk in clinics than have the added responsibility of rostering patients. If the pay for family doctors were higher I would be more inclined to start a practice and take on patients.			1	
I will feel less upset about the whole situation, and stop my evening courses to study Plumbing.				1
I left family medicine because it paid half per hour vs my hospital job. Fix that and I'd go back.			1	

increased compensation leads to increase revenue for the clinic (via overhead) which allows the clinic to hire/access more resources to make patient care more efficient, thereby allowing more patients to access care with our clinic and in a more efficient manner - physicians decline taking on more patients due to an increase in unremunerated work, if this can be addressed I believe myself and many physicians will take on more patients	1		1		1	
could increase operating hours (be able to pay my staff and support additional over head costs); could hire locums for coverage if I was out of the office	1				1	
Compensation allows me to hire additional staff and upgrades in virtual meetings which can assist me in providing routine care for chronic disease. This increases access to patients who need active care.	1		1	1		
I will be able to hire more staff (admin, NP) to manage growth of my practice.	1		1			
Increased compensation would allow me access to physician extenders such as increased nursing staff hours, or technology to streamline processes. It would also increase my job satisfaction. If I felt more valued, I would, frankly, be willing to offer more of my time and energy. This is my career. I like helping people, but I'm not working this hard for free.	1					1
feeling more appreciated for my work and having an incentive to actually earn more		1				1
Pay more get more. Nobody is going to slave themselves for pennies on the dollar when there's much more lucrative options out there.		1				
Allow for more stable staffing situation and happier staff as currently my ability to pay staff fairly is limited by our low pay.	1					1
I could work more in my family practice and less at the hospital (ER/hospitalist)		1				
If compensation increase was substantial I spoke hire a PA, and this would allow me to take on more patients.	1		1			

I currently work several side jobs to sustain my family practice. I think more compensation for my family medicine work would allow me to spend more time in the office.							1			
It would make me more willing to do office work vs hospitalist that pays better and has better QOL							1		1	
Better motivation to work harder		1								
Our group could hire a nurse practitioner or physician assistant to help with managing rosters & seeing patients. This would allow more patients to be attached to the clinic. Alternatively Ohip funding for this in lieu of additional compensation would also help	1		1							
Hire more staff or feel more respected. Pay is so low I cannot afford child care or help at home. I work multiple places OUTsIDE my family practice to allow the practice to continue to run. I could reduce some of that if in clinic compensation were better but in truth it would need to go up 30-50%.	1						1		1	
hire more staff, buy better equipment, better IT etc	1			1	1					
Can spend longer time with patients, pay more staff, can spend more time with chronic care patients	1		1							
Minumum 70 dlrs for Vist A007 and to any 15 minute unit spent with patients and Increase 50% across the Board for all other billings .										1
Can Hire more staff to deal with increase in number of patients seen	1		1							
Pay for supporting staff to take on more patients	1		1							
While I doubt I would be able to add a huge number of patients, the ability to pay for a physician assistant or some additional RN time to deal with paperwork, prescription renewals, and laboratory reviews would give me a little more in person patient time	1									
I would be able to hire a RN to do routine procedures, I would be able to hire a physician assistant to provide some of the care. I would be able to afford more automation in my office (maximize EMR use)	1			1						

Increase in compensation will help to add ancillary staff to allow for a more efficient practice/patient flow re: nursing support, NP support, additional frontline staff	1		1			
money for me, govt funded np or 2	1					
More money in my pocket mean I can hire more help, also more motivated to do procedures that are otherwise a financial loss for me (I personally pay for the privilege to treat my patients!!)	1	1				1
We would be able to hire more nurse practitioners/physician assistants to see the same-day emergency appointments, improving access and allowing us to increase our roster size	1		1			
Would make me feel valued and put more effort in to contributing to a big problem by rostering patients.			1		1	1
I could hire more staff to take away the giant administrative burden that currently falls on my shoulders. And potentially hire allied health professionals.	1					
I would be able to afford the overhead to increase my clinical hours. Every increase in my hours increases my share of rents, staff salaries and use of medical supplies. At the current time increasing my patient roster may actually DECREASE my take home pay due to increased overhead by increasing my hours.			1	1		
Better compensation leads to better working conditions, greater motivation to work especially if time is being adequately valued. Greater longevity in practice rather than deciding to switch to hospital based care		1			1	
It would increase available funding for administrative support and hopefully improve retention of existing support staff (which has been a significant issue for my practice). Retention of staff leads to more efficiency in workflow which would allow me to see more patients. Appropriate compensation would also reduce the motivation to take on more lucrative side jobs outside of my family practice, leaving more time in my schedule for my family practice patients.	1	1	1			

It would incentivize me to accept the burdens associated with taking on more patient care. It would also allow, especially if there was acknowledgement that some of the downloading on family physicians (like having to sign off on independent pharmacists' or NPs' decisions to prescribe things to my patients, like I'm supposed to be responsible for their decisions????) and the administrative work that I do is recognized and paid for.			1			1	
higher compensation would make it possible to employ more allied health professionals and secretaries in the practice to help me manage the extra patient load. Currently my sectretry and nurse have great difficulty already managing the patient load we have. As a practice we cannot afford to hire more staff currently.	1						
Would provide incentive to see more patients and work more overall. Having more compensation would reduce burnout		1	1			1	
Will be able to retain nurses, staff. Without an increase I will lose staff and my ability to see patients will DROP	1						
Would make the administrative burden a little more bearable.						1	
Must be in parallel with reduced burden of unpaid forms, eg 8 page unpaid government form to pursue contact tracing of ubiquitous Chlamydia patients .							1
I would be able to hire more staff and assistance to help serving more patients	1		1				
An increase in compensation would have a trickle down effect and ultimately improve access to family practice in a number of ways- 1. Incentivize new grads to join family practice, 2. Compensate for increased overhead to allow us to increase our pay to staff and prevent staff turnover to improve office flow and increase number of patient visits per day, 3. If we are paid for the work that we do incentivizes better access (ex being paid for after hours, incentivizes DRs to have evening office hrs	1	1	1	1	1		

We need more compensation to keep up with inflation to pay for office expenses.					1	
Less need to do better remunerated non-comprehensive side jobs						1
If there were new subsidies/reimbursements for allied health, then this could free up additional patient encounters in my schedule. Specifically, having supports for PAs or NPs would help offload some cases that may not require my direct care.	1					
Funding for more nurses and secretaries to help with admin burden	1					
it would encourage me to shunt my work hours more towards office work if it was well compensated.						
Right now it's the least-compensated part of my practice (between hospitalist, ER, clinic, and oncology). I do it simply out of service to my community. But I certainly don't add extra clinic hours or take on extra patients at the current situation.		1				1
help cover costs					1	
In the context of a capitated practice we would be able to employ more technology and people to serve a greater number of patients more efficiently.			1	1		
I can hire more staff to help with administrative burden. This would allow me to spend more time face-to-face with patients and less time doing admin and paperwork.	1		1			
it would need to be a significant raise of 35% at least		1				
Willing to work more if better remunerated		1				
I would be able to afford more support staff (nurses, PAs) which would allow me to increase my roster size.	1		1			
It will allow me to allocate more office time and let go other responsibilities		1				

Family Physicians are underpaid and overworked; and are experiencing burnout. All family docs are feeling unappreciated and feel doing more work is not making any positive difference in their lives and many are reducing hours or just retiring. Increasing compensation is, at the very least, showing that the work family docs do is being actually respected and acknowledged and efforts are being taken to come close to paying what a family physician is actually worth						1
Allow me to hire more staff to support this	1					
Increase in compensation would allow me to increase the amount of time I will spend in family practice as opposed to other non-community based practice streams (ie LTC) thus allowing me to increase access to my patients and I would be happy to take on more patients if the compensation for doing this was worthwhile.		1	1			
would consider working more hours in comprehensive family practice as opposed to other work					1	
I would feel valued as a professional						1
I can pay for more hours to my physician assistant	1					
Can't keep the doors open now - seriously, overhead makes this a losing business. Plan to leave practice if no relief soon.				1	1	
I would be able to hire more allied health workers (NPs, PAs) in my office to see patients. I have the space but need increase funding from the province	1					
Compensation (can't come into physicians directly; has to be a model where it comes in to physician but with separate line budget/expenses for those additional salaries; And when it's that multi-member physician team, becomes economical too.. ie perhaps comes with agreed FTE/physician of nursing time etc..) comes in for 'team based care' with line items to hire nursing, allied health. Thus, work and tasks can be divided to most appropriate health provider, and allow taking on more patients.	1		1			

Currently I am stretched working between my comprehensive care clinic, a community homeless shelter (where I bill fee for service when patient have OHIP and nothing when they don't have coverage) as well as the university. Increased and appropriate compensation will allow me to justify the expansion of my shelter work, and support additional patients in my clinic, but increasing the number of locum 1/2 days that I currently use to support my other activities.	1		1			
It would allow better staffing in our office, and support a clinic nurse to handle some care for our group.	1					
The clinic I worked at fully shut down (7 drs, 9000 patients) because it was not financially viable to run. Only with increased compensation can clinics stay in business.						1
I would consider more in office hours if I was better compensated as opposed to spending more time doing non clinical work. I would also increase my physician assistant hours to allow for more capacjty	1	1	1			
Taking on a new patient requires a lot of initial administrative task work, which we do not have the capacity for. By being compensated for it, incentivizes us to provide the care needed.	1		1			
Our operating costs are unsustainably high. Our wages are too low - no reflection on the complexity of care, the significant patient demands. The decline in support from specialists is evident- no access, decline in accepting consults, consultants not ordering test, following their test results or iniating any prescriptions lead to high burden /work load. Need to be recognized financially				1	1	
It would allow me to hire more staff to help expand our practice and also recruit more physicians for our group practice	1		1			
Would be able to afford more staff upon which tasks can be delegated/practice support to take more patients	1		1			

Unrostered patients are not considered as part of our roster for bonuses (i.e. preventative care, HIV bonus) and payment for services is delayed. Provided care to urban vulnerable and marginalized populations should not come at a disadvantage. I do not want to screen or turn away patients without OHIP so I am losing income when I accept these patients.												1
Hiring more staff to do admin work so I can see patients. Paying for practice improvement elements, like an AI Scribe, that make me more efficient.	1											
By increasing compensation there are more incentives to work longer hours and extra shifts . At present a huge chunk of the payment goes for overhead and there's no point of working extra .		1				1						
I could hire a nurse to help me manage my inbox with 100 new items every day. Then I could increase my hours for seeing patients and more people could get the care they need in a timely and cost-effective fashion instead of going to WICs or the ER.	1		1				1					
I could expand my clinical time and hence take on more patients		1	1									
Could potentially increase staff/nursing hours in office	1											
Pay needs to be in proportion to the stress/complexity/demands/time required for patients and their issues. Given the amount of time, energy, expense, and delayed gratification physicians invest in their training, there needs to be proportional reward given the ongoing time spent away from one's own family and wellbeing. For example, a daily MRP rounding fee for family physicians on inpatients is approximately $40, whether work takes 10min or 10h. I estimate 1h per patient is spent on average...												1
Investment in office technologies and staff that would ease workflow for MD so that it may be enjoyable and invigorating to go to work as opposed to the depressing drudgery that it currently is	1				1							

Hire more staff. Hire a PA time. May be able to take more time off to prevent burnout	1					
I will work more hours			1			
It would provide a financial incentive to see more patients, also to allow me to focus more of my energy on direct patient care rather than financial concerns of running an office		1				
It would encourage more doctors to go into family medicine. It would help us afford more administrative staff to help us do our work.	1				1	
at present and with the new capital gains taxes I will need to add on clinics						1
1. I would expand hours I am currently working 2. I would hire more staff/nursing/potentially NP to manage practice case load	1		1			
Increased compensation would allow me to hire more support staff (nurse practitioner, physician, assistant, RN, etc.), this would let me see patients more efficiently and add more appointments each day. This would improve access for my existing patients and if I'm able to sustain appropriate access I would be able to take on more patients.	1		1			
Hire a PA.	1					
I could hire more staff to accommodate more patients. Currently I take one business day off to attend to administrative tasks myself.	1					
Hire more admin support to help with paper work	1					
Hire nurse practitioner and/or a nurse to help offset the current patient burden.	1					
Increased compensation would allow us to hire more staff, pay for AI scribing, update equipment and generally make us more efficient. Thus allowing us to take on more patients and help people which is what we love to do if given the resources.	1		1	1		
I would be able to increase office hours because I would be able to pay support staff for extra hours.	1	1				
An increase in compensation will help hire allied health team members to manage the administrative and clinical demands (ie. medical assistants, clerical team, potentially PA/RN)	1					

Since Family Physicians are business owners and have to hire our own staff, with an increase in compensation I can then hire more nursing staff, NP support, etc. to help support an increased practice load that I help to oversee and manage instead of having to do everything myself, in particular the extra administrative work that continues to be downloaded to us.	1	1			
Would decrease time invest to hospital work (surgical assistant) that offsets lower income.				1	
would help with expenses and not feel would have to make cuts, would help pay staff better so to retain them. also don't have to look elsewhere for income revenue which would also decrease my hours in clinic.	1		1		
If adequate, it would allow me to hire support staff to help with paperwork and the management of minor issues which would allow me time to see more patients.	1	1			
Hire extra staff to assist with patients	1				
Hire extra staff and maybe an RN or PA	1				
less burnout while trying to pay bills					1
Increase in compensation for paperwork would allow me to cover business expenses , pay for the support staff and offload some work on them.	1		1		
Would enable us to hire more staff ie nurses which would improve access	1	1			
hire nurse practitioner	1				
Right now I have no incentive to do more work for the money I am getting. You give me a monetary incentive and I would be willing do do more hours. You pay my overhead and staff and deal with my paperwork and I can definitely see more. This is not sustainable at present. I don't need an NP. That is more work for me to monitor. I need more to cover my cost of operating business.		1			
greater ability to fund reception/nursing needed to cope with additional patient demands from new patients	1				

Less compensation for more work leads to burn out. Its frustrating when you are juggling with inflation rates on work as well as home front.							
Increase in compensation will help hire more staff, increase clinic hours. Skills we dont use due to poor compensation can be put to use.	1	1				1	
I currently work 2 different jobs and I would cut back on hours to my other job if family medicine compensated better to allow me to care for more patients					1		
Money helps to pay overhead expenses which have been rising such as staffing(minimum wage), rent(also up), utilities(gas,hydro,internet), emr fees, etc	1			1			
Currently I can barely afford my overhead, I work 2 days a week in a private clinic in order to subsidize my public ohip clinic. IT IS THE ONLY WAY IM EVEN ABLE TO KEEP MY CLINIC OPEN. If I was adequately paid for my ohip family practice, I would not need to work at another private clinic and I would definitely be able to increase my roste I am drowning in non patient facing work, if I had more income, I could hire a nurse/more admin staff to help me with that , freeing up time to see patients.	1	1		1			
More motivation to take on patients; feeling more properly compensated for the time we give to patients		1					
More time!							1
i could hire a PA	1						
Feeling more valued, less burnt out, which translates to taking on more patients and working longer hours. Currently do not feel valued - working feels like an immense chore		1				1	
An increase in compensation would enable me to hire a nurse practitioner or physician assistant to enhance my team and provide team based care. Team Based care is an effective way to expand care and enhance access so that all patients in Ontario have a primary care provider. Improved compensation would also allow enhancement of digital and AI strategies to improve access to care.	1		1				

| | | |

Currently not getting compensated for all the work we do. If there is proper compensation then I would be more incentives to take on more patients I.			1		
I would be able to start a practice if we were fairly compensated instead of working just ER and hospitalist shifts					1
As a locum, I would be more interested in either taking on a permanent primary care practice, or increasing the amount of time I spend working in family medicine clinics on Ontario (as opposed to hospitalist care or primary care in other provinces or territories where I am also licenced)					1
Use my physician assistnat more! I also need to have PA funded or be able to bill since I monitor him.	1				
An adequate increase in compensation would reduce overhead burden and facilitate hiring of more staff. This would allow shift of admin burden to staff and allow physicians to care for more patients.	1		1	1	
If I am more compensated financially for the work I do, I am less likely to close my practice and continue working as a family doctor					
Would be able to pay more staff to assist with the additional administrative burden that would come with this and would be more motivated to work longer hours	1	1			
I would be able to hire more staff (nurses, assistants etc.), and expand space in the clinic.	1			1	
I would be able to hire more staff, costs have increased a ton and we haven't been compensated.					
I would decrease other work I do that compensates better to do more clinic based family practice if the pay made sense.	1				1
Compensation increase would help cover increase in overhead costs of more patients				1	
Spend more time in clinic. Better staffing.	1	1			

| | | |

allow more money to hire staff to offload paperwork and admin and therefore add more patients. Much of my time spent on admin/paperwork that could be easily delegated to nursing or MOA but this has gotten increasingly expensive and hard to find.	1	1			
Would prevent bankruptcy and would allow hiring of more staff	1				
less burnout so that I can see more patients		1			1
We are limiting hiring medical office assistants, nurses, reception staff due to limited funding to afford these clinic expenses. Hence limiting our physical and administrative resources to take on more patients.	1	1			
Hire someone to do administrative work and not have to lay off staff. If the job ceases to pay equivalent (matched to inflation) for the massive amount of work i am doing I will be walking away from my practice. It is too much	1			1	
Increase my income, hire more staff, upgrade my equipment, get a bigger office to streamline my practice.	1		1		
I can afford to higher a nurse, social worker, NP to help with paperwork, admin work, reduce the amount of hours i spent on my second job in palliative care, home visits that I do to supplement my income. I could easily take another 1000 patients if I was paid more than the $250/year/patient for an extremely complex patient roster	1	1		1	
By employing more staff to be able to see those patients	1	1			

A small increase of a few dollars per visit or per patient would not incentivize me to take on more patients, but a larger increase eg. covering overhead, would help make me feel more positive about my job, feel more appreciated, especially compared to my specialist colleagues who are paid much more for similar work, many of whom do not need to pay 30-40% overhead. A large increase would also allow for hiring NPs, and social workers/counsellors which would free up time to take more patients.	1		1			1
I work FFS in a focus practice so an increase in FFS fees, inflationary increase - while I know will be moderate would help to increase my consultation and roster in the community. It will NOT do it alone however, I need nurses, PSW and admin support AI scribe .....all of these now not planning to plan to get them please	1					
We lost our clinic nurse due to the hospitals paying her more. So now we are responsible ourselves for doing additional duties as we cannot afford to hire a new nurse. We are also fairly increasing the compensation for our administrative front staff due to the increased cost of living. Increasing compensation would allow us to hire nursing and support staff as well as pay for additional clinic supports such as online booking systems to help facilitate patient access and improve care.	1		1	1		
Increase hours available, enhance services offered during those hours			1			
Hire more staff and get more resources to make running a bigger practice more efficient	1			1		
Would make me more likely to not consider early retirement. Would allow for me to hire more help in the office. Would make it more likely to convince more students to choose family medicine and ultimately join my practice.	1				1	
has afford more staff assistance in helping to manage patients, more IT support and manage higher overhead costs due to increased patient load	1			1	1	

Would be able to hire more support staff/nurses	1					
It would help me hire more staff to assist with tasks so I have more time for patients. Currently the administration burden is high. If I had support from other staff I would have more time for patient care	1		1			
We are working too many hours for free, for those of us working in FFS and also wanting to deliver high quality care, we are earning significantly less than our peers. We need paid admin time. We need higher fee codes especially for longer visits						1
Increased compensation would move many primary care physicians back into family medicine and if provided in a capitation form, would enable team based care (expanding a practice's capacity for more patients)			1		1	
ability to hire NP competitively against funded FHTs.						
ability to hire long term locums to look after general needs, while I take on complex patients.	1		1			
More funding can allow me to retain either a PA or a NP or even a locum to do the admin work (the dreaded inbox management!) and to do the history and patient set up so I can be faster and more efficient CLINICALLY.	1		1			
Allowing to pay and retain staff ,cover some of the very expensive and unsustainable family medicibe practice costs ; helping us get a retirement plan in place . At this point , we cannot cover the costs and save for retirement .	1			1		
Hire more administrative staff and nurses, put the money back into the practice, which I have to run very lean given lack of funding. Family doctors pay all overhead and all staffing.	1			1		
more money would allow to hire extra support incl nurses	1					
If I was being fairly compensated for my work I would increase clinic hours rather than finding other avenues for revenue (right now I do FM-Ob, walk in clinic, teaching to supplement my income)		1	1		1	

I would prioritize in office/in family practice time vs needing to do "other things" that provide better compensation/less mental load to compensate. I would be more willing to spend on technology that would allow more efficiencies and thus allow more patients to be seen.		1	1	1					
hire more allied health, continue to maximize scope of our RN who's taking the prescribing course. continue to retain our Physician assistant, bring on more docs to our office, how are we supposed to compete we ER/hospitalist rates of pay	1								1
Increase in compensation would allow me spend more time with patients, which would decrease how fast I burn out, and thus be willing to work more hours and improve patient access. Our poor compensation and outside use negation is a huge contributor to burn out and reason why I am planning to cut down my hours or leave family practice unless compensation improves significantly. We need a minimum 14% increase now to make up for the rest of inflation from 2020 and future guaranteed COLA.			1			1	1		
be rewarded for all the unpaid work we do, work longer hours									1
Could potentially afford to hire nurse. Need at minimum 30% increase for family medicine just to stay afloat	1								
If there was a substantial change in payment, our office would look to hire another staff or nurse to help improve access to care, as well as enhancement in infrastructure that we currently can't afford.	1		1		1				
Delegate to my nurse practitioner	1								
It might have encouraged me to stay! I'm leaving Ontario and moving to another province in large part because of the inadequate compensation for family doctors here.						1			
Could afford to work solely family medicine. Right now I need to work in other areas as well to afford my clinic overhead. Also funding for more staff (eg nursing) could help manage more patients.	1				1				

Increased compensation: (a) permits me to retain my current staff with salary, benefits and funding for their learning opportunities; (b) may permit me to hire additional staff, including family physicians who are interested in a salary position or long-term locum position in my practice. (c) permits me to pay for ongoing office expenses without further reductions in my income. (d) may assist me to decide to remain in comprehensive longtidinal practice instead of other roles.	1			1	1	
If there was a substantial increase in compensation - enough for me to hire a nurse - I could GREATLY increase my patient load - if it is just a measly 5% that will not let me take on any more patients but will keep me from leaving practice.	1		1		1	
More money to delegate to staff and invest in IT. Extra pay for stress relieving self care , financial burdens , decreased resentment , more respect : increases moral	1			1		1
Hire staff to assist with administrative and patient care burden	1					
Pay my nursing and reception staff to work longer	1					
More willing to start another family practice if compensation increases. Otherwise not worth the burden of responsibility.					1	
The limiting factor for patient care in our clinic is support staff and at current rates of compensation we can’t afford to increase staff.	1		1			
We will be able to afford better trained office staff to do admin work which we are drowning in. More efficient emr. More efficient charting. Won’t need to work side gig so will be able to see more patients if paid appropriately	1		1	1	1	
Increased compensation would increase our capacity to hire and retain admin support or invest in tech supports such as online booking that can improve access.	1		1	1		
more staff hiring/ PA payments	1					
Would incentivize working more hours each week		1				

Increased compensation would allow me to hire more nurses, thereby improving workflow and efficiency. I cannot afford to hire another nurse, so I'm doing much of my own rooming, administrative tasks, weights/vitals.	1			1						
An increase in pay would incentivize me to practice comprehensive family medicine, which I currently am not doing.									1	
would make me consider starting a family practice									1	
It would help offset the costs of running my practice. The cost of everything has gone through the roof. I could hire more staff enabling me to see more patients. Right now I barely break even each month. I have no savings. This is not sustainable. I don't know how I'm supposed to retire.	1			1						
Right now comprehensive family practice doesn't remunerate nearly as well as alternative types of clinical work I could be doing (e.g., emergency medicine, addiction medicine, etc.). Having higher remuneration for comprehensive family practice would allow me to cut down on these other parts of my clinical practice. Having increased compensation may also enable our group to hire supports (e.g., physician assistant) that would enable us to manage more patients.	1								1	
Would be able to hire paramedical staff to provide delegatable services	1									
If I was adequately paid, I could hire a PA to assist me in managing a larger patient population than I can currently manage.	1									
Can help pay overhead and staffing fees and account for all the extra admin burden that goes along with taking new patients or more patients in general	1			1			1			
Potential to hire more support staff. More incentive to add to work volume. Ability to pay for IT supports eg. AI scribe to increase efficiency	1		1			1				
It would allow for more support (ie more nursing hours , admin staff etc)	1									
Could potentially hire RN or RPN.	1									
Can hire extra staff to help look after the patients- may include NP/PA	1									

Motivate me to work more		1				
allow investment in more staff, AI, automation and digital tools to increase efficiency	1			1		
Will remain in family medicine					1	
A significant percentage of compensation is going to overhead and maintaining an acceptable standard of care. The financial burden of overhead limits clinical availability and compounds with unpaid administrative time to make clinical duties much less feasible financially and logistically.					1	
I could pay my RN & reception staff to work longer hours	1					
hire allied health or locums, hire someone to do other tasks to allow for more time with patients, allow me to afford online scheduling/appointment booking	1		1	1		
hire more staff eg PA	1					
Unattached patients are much more complicated and needs extras support initially to catch up on their health.						1
I wont be able to take on more patients, but I would be able to set up a webpage or online booking system/improved emr with the covered cost				1		
It would need to be a significant increase in compensation. A 35% increase would just allow us to keep the doors open (and not leave the 5000 patients in our group practice orphaned when our lease is up in just over a year). A 100% increase in compensation (double) would allow us to hire staff/PA to help with admin burden, preventative care, and other tasks we can delegate, which will free up MD time to take more patients. The staff must be hired/managed by us. More bureaucracy will not work.	1		1			1
More evenings			1			
It would allow me to hire more staff and an NP/physician assistant allowing me greater bandwidth while still being able to cover costs and fair compensation for the extra workload	1				1	

Would feel that I am being compensated appropriately for my care and expertise. Would help cover overhead costs associated with taking on more patients/ associated complexities of unattached patients		1	1		1	
Hire more/better staff. Cover more costs. Increase doctor/patient facetime.	1		1		1	
I will not quit. My lease is coming due in next few years. If there is an increase in co.pensation, it will give me more hope for the long term viability of family medicine. If I see there is stability I will take more patients. Otherwise I will not be taking new patients in the future if there is the shadow of uncertainty about whether or not I will quit in a few years.			1			
I would be able to have staff to help with patient rooming/vitals, I can invest in AI scribe to help speed up documentation. I would be able to hire a nurse to complete PAPs/immunizations so I could focus on seeing additional patients.	1		1	1		
An increase in compensation may allow me to hire additional allied support (i.e. NP or PA), which will allow me to increase the size of my roster and provide care to more patients.	1		1			
In increase would allow me to hire more admin staff and other healthcare members of the team to increase access for patients to be seen	1		1			
it would allow hiring of NP, nursing staff, to help with pt. flow, administrative staff	1		1			
significant payment increase may allow for hiring of additional support or nursing staff to offload some administrative and basic tasks	1					
I would be less resentful about the unpaid hours a family physician is burdened with. I could hire staff to assist with the administrative burden	1					1

| | | |

Increasing compensation would allow me to hire more staff and/or invest in efficiencies that address practice slow down. This would let me spend more time seeing patients.	1		1						
Hiring more staff and nurses, spending more time with each patient	1		1						
Willing to work harder / longer		1							
would (possibly) consider not closing my office as planned later this year					1				
We would not have to do side jobs to get the money to keep our offices open. We could focus more on patient care in the office. also more staff helps to answer phones/ book appointments, aid aid patient flow.	1		1		1				
more hours and more staff	1	1							
Maybe a pension plan with older doctors getting more years of service maybe 2 or three if they practice longer. Our system will fail if older doctors retire soonI am trying to cut down on extra costs so the increase will allow more also thinking of closing my practice as costs too high. May become a barber. They make mirestaff to increase practice.									
Also not worth staying open									1
Would allow me to pay more administrative/allied staff to do more of my admin work to allow me more time for patient care.	1		1						
Because I'd get paid		1							
It would help to justify taking time away from other commitments to provide direct patient care		1							
i would feel that i would be adequately compensated for the extra work that i do		1							
Allow hiring of allied support- nursing etc, admin and tech	1			1					
Improve job satisfaction, improve morale, prevent burnout									
Able to allocate funds to clinic nursing resources to assist is seeing more patients on a daily basis	1		1				1		
Hire extra staff	1								
As an FHO we could then pool resources to get a nurse or PA to help with paperwork to free up more of our time	1		1						
allow more time to properly see patients			1						

I would work more hours.	1			
More time to spend with patients helping patients by me and my staff. More job satisfaction to do it happily and diligently		1		1
I could hire help to help me with the admin junk I have to do and then focus on seeing pts.				
what I would love is to afford an AI scribe that is fabulous so admin could be done by a robot and I could actually do what I am trained for. This is the joy of medicine, seeing pts and being part of their lives... not useless paperwork that is downloaded on us. Please bring back the joy of medicine!	1	1		1
I would be incentivized to consider adding more clinical half days, allowing me to take on more patients. I may be incentivized to take on and see more complex patients if this was appropriately compensated. Compensation for administrative work like charting, creating and following up on referrals, and responding to messages would mean that I could block off less clinical time to do this kind of unpaid work, as I would be more incentivized to do it at other times.	1			
More supports, time for each patient, and less time focusing on maximizing billing/numerous codes. A simplified billing system similar to BC would also assist. I find I spend more time on billing, documentation, and admin every month versus actual patient care. Also, stop outside use negation, this fines family doctors and makes having a larger roster more complicated, we offer 5 days per week call, and weekend access. Patients still use walk ins, stop punishing family MDs for this.				
Hire extra admin staff, hire another nurse or nurse practitioner.				
Subscribe to a good AI scribe tool for my charting.	1	1		
I could hire more staff. Use more technology to drive efficiency. Would also allow me to leave hospital job where I pay no overhead.	1	1	1	

| | | |

I can hire additional staff to handle the administrative and nursing burden associated with taking on additional patients or possibly allied health staff that would assume some clinical duties under my supervision.	1	1			
Allows me to better cover my overhead to have staff to offload administrative tasks which allows me to see more patients. An increase in my compensation means I can pay for staff in ways that increases my access to see patients directly rather than focus on UNPAID administrative tasks.	1			1	
help fund efficiency measures - online booking, hiring staff, NP or PA to increase time for direct patient care	1	1	1		
Will hire more staff and/or employ new technics such as AI etc to improve the efficiency of office administration and clinical documentation; so that I can spend more time to see my patients or be able to see more patients.	1	1	1		
hire more staff to answer phones, draw blood, do immunizations, post unnecessary reports esp pharmacy incomplete 'assessments'					
more and more being dumped onto family physicians - specialists don't order/follow up their own tests/results, don't start medications - we cannot afford to be doing their work arranging/communicating about investigations and medications					
pay for technology to expedite communication with patients and referrals					
need more time for complex patient visits	1		1		
Increase in funding would allow me to either maintain or increase support staff (like nurses) that helps me to be more efficient with provision of patient care and thus increase my capacity to serve more patients.	1	1			
Recruit more nurses and staff to delegate tasks to while freeing up my schedule to see more patients and take on a bigger roster.	1	1			
Having considered retirement after over 40 years in practice, I have decided to stay on and continue in hopes there will be a marked increase in fees					1

We can hire NP and PA to help manage more patients under our own supervision.	1		1			
An increase in compensation would allow me to hire additional support staff	1					
Could pay more staff to offload some of the admin tasks that take up large amounts of my time. This would improve office efficiency. Would also improve general morale which would help motivation.	1					1
More staff. I can delegate more things I will also be more willing to work, as currently, I feel like an indentured servant, given that my compensation is so bad	1	1				
Hire more people	1					
it may be able to take some of the workload off of us by being able to hire a nurse, manager, etc. but it would have to be a significant increase to allow for that	1					
I would be willing to work extra hours knowing compensation is greater.		1				
Would be able to hire more staff to do time consuming admin work to focus on patient care	1		1			
At 67 yo, I will work a bit more vs slowly winding down as I am currently doing		1			1	
Adequate compensation for time spent would make less stressed						1
It would allow for a wider range of services offered in clinic and the hiring of more support for smoother procedure. As it is I perform abscess drainage in the office essentially at a loss	1					
Would allow for more comprehensive care, not to be constrained with the billing limitations at this time			1			
I would be able to pay staff to be around more. Currently I'm barely covering my overhead and staff wages, it's not feasible for me to be in practice more than a few half days a week. I spend the rest of the time supplementing my income with walk in shifts.	1			1	1	

I am very disappointed by the system Sometimes most of my office hrs are spent filling up forms for which I am not paid for. It's not easy charging patients when you know they are struggling to make ends meet.						1
With additional funding, I could afford to hire locums when I take vacation instead of running the office myself and never taking break - if I knew I could take a break without feeling the overwhelming crush whenever I take my foot off the gas for a second I might consider taking on more patient then I already have and can barely manage.						
Plus if I could hire more admin, increase the size of my office, have a part time nurse, that would take away from what I have to do right now.	1				1	
Would help in retaining staff	1					
I would be more will ing to work even harder in my out of office time. I would likely postpone my retirement which I have now decided to do. I would be happier.		1		1	1	
I currently do not practice comprehensive family medicine because of low compensation. If we were compensated appropriately, e.g. BC's model with an hourly base pay that covers administrative time, then I would consider practicing.				1		
I would be willing to accept unattached family members of current patients			1			
hiring more staff	1					
Depends on how significant the increase would be. Anything less than 10% would do nothing.						1
Because I'm thinking of closing and walking away. Running my solo office of 900 patients is not fully viable now.				1		
It would need to be sufficient to allow for hiring of more team members to support this.	1					
More incentive to get more pts and to compensate for the heavy admin work	1		1			1
Practice size is <1000						

I am currently limited by my overhead model/the fee structure that penalizes me for taking more time with patients. I have a high mental health/young population that pays poorly despite taking a lot of clinic time. I would add more patients but I do not have the clinic space to support them due to our overhead model that requires us to pay by the half day. If I add more patients I will need more half days, but will get little financially in return. I already pay almost 40% in overhead.			1	1	
Increased compensation would allow me to pay my nurse to work more hours, which would help with managing communications back to patients re. test results, referrals, etc.	1				
Because I’m having trouble paying expenses and need more patients to cover costs of inflation and stagnant wages.	1				
I would be able to afford to continue paying overhead which is currently too damn high.				1	
It would allow me to hire more staff to keep up with the demands of more patients - e.g. more phone calls need more admin, more clinic time to care for more patients need more clinic rooms. Currently we are only able to be in clinic 2.5 days a week due to limited space as rent costs and admin costs have increased.	1			1	
Do a lot of work for each patient that is not at all compensated. Started a new practice and each new patient comes with many many concers. I have patients who have not seen a doctor in decades. Increased compensation is the only way I want to take on any more work. I'm new and fresh and already tiring out. I could care less about reducing forms etc. just pay me more.		1			1
Hire more staff, invest in office efficiences to best use our time to serve patients, invest in reducing the documentation burden, improved job satisfaction and quality of life for all clinic staff.	1				
I may decide to work more hours!		1			

This would reduce my financial strain, thus I would spend less time trying to cut expenses to run a viable practice and more time with my patients. Also, it would expand the range of services I can offer to patients; often, the compensation provided for certain services (i.e., laceration repair, biopsy) come at larger cost to me relative to the compensation, thus would not be viable to perform routinely. Finally, I would be less incentivized to pursue other side gigs to supplement my income.		1	1	
Need to compensate for my time as the 'Quater back' of medical care!				
Only paid for direct interaction. Suggest hourly wage for all the other time!				
A007a 37 should be > 100.				
Current week: 14 hours of direct patient interaction PAID 22 Hours patient related administrative work UNPAID 2 hours per week Family Health Group as Lead 1 Hour per week running my corporation 1-2 hours CME and reading about current patients 1 Hour 'catch up' on 2700 E-mail request that occurred when I was off sick.				1
At present rates, it is not worth taking on new patients with the attendant increase in work. Better to work on work life balance at these rates.			1	
Will be able to pay for more support staff to handle administrative duties	1			
More pay increases reward for working harder		1		
I might be able to dedicate more time to the practice mostly to catch up with the records.		1		
can hire more staff to assist makes it worthehile	1			
allow more admin and nursing support so I am freed up for patient care	1			

Increase in compensation will allow me to hire more staff, pay for more efficient electronic systems that are more efficient and pay for more equipment and offer more services i.e. biopsies and bloodwork draws in the office to allow for more timely care. The cost of overhead is rising significantly and it is increasingly harder to recruit and retain administrative and clinical staff. Increased compensation will also contribute to decrease in burnout and feeling like my work is valued.	1			1		
It will increase motivation to take on more patients, can facilitate to hire additional healthcare providers expanding practice's capacity, will help to improve efficiency by investing in technology - will improve efficiency, the practice may be able to afford to extend operating hours. it would enable us to hire additional supports, freeing up time for clinical work	1	1				
hire staff to handle more patient requests	1		1			
Hire more staff to run clinic	1					
Additional staff and help/service providers for the time we spend with patients, reviewing results and consults, renewing rx's, doing pt follow up and charting - the current compensation is not adequate and I am taking on patients who are family members of my patients and as one local md is retiring and more compensation would not actually change that b/c it is what is needed but it would at least help offset the time that is put in daily that is unpaid	1					1
We need to hire staff, hire RN's IMG's and NP's that we can bill for	1					
It would decrease my overhead, allowing me to increase office hours, patient access.		1	1		1	
I can barely currently keep my clinic open with current overhead and costs rising. Family medicine is not well paid compared to current cost of living. I'm 6 years into my family med career and if compensation isn't increased I am going to leave family medicine and go where I am fairly						1

Increase in compensation means reinvestment into overhead that helps run a more efficient practice, e.g. hiring more nurses, receptionists, investing in helpful technologists like Ocean and AI scribes.	1		1			
I would be less burned out, feel appropriately compensated for my work and not have to work non-comprehensive family medicine jobs to supplement my income. Thereby freeing up time for my comprehensive practice. At this point, without an increase, I will be closing my practice within 10 years of starting it.		1		1	1	
Hiring More helping staff	1					
An increase in compensation allows for the ability to take on larger patient volumes and pay for the required overhead costs associated with running a practice. This is quite simply a mathematical issue - pay family doctors more and we will be able to cover the immense financial costs associated with running a practice. Furthermore, an increase in compensation will allow for adequate pay of locums, or admin staff etc	1		1			
The increase in compensation would have to meet inflation for fair time. If a barber can make $50 per haircut, surely we deserve more than $37 per visit with multiple issues.						1
I could hire more staff to help manage the patients. Right now staff are too busy but I can't afford to hire more and then I am doing admin or nursing tasks rather than seeing patients.	1					
Our clinic is stretched very thin as it is and taking on additional patients with significant added work burden is just not viable in the current state of compensation. It is simply not worth the adding more family practice patients and instead myself and colleagues look for revenue stream and work outside of family practice instead to supplement incomes.						1

I could hire more support staff and physician extenders to help reduce admin burden and other non clinical duties and I could expand my infrastructure. I have a part time NP supporting me.						
We could do a lot more work with more money.	1					
Would help offset overhead costs which could allow me to devote more time to family practice instead of other endeavors			1	1		
It could allow for more staff, more clinic space, attract more doctors to our group.	1			1		
We can pay additional nurses/ reception to help with increased patient needs. Right now we are struggling. I'm currently looking to leave family practice and Ontario to pursue a position on the United States with better hours and triple the amount of compensation I work here	1			1		
At current rates I cannot afford the staff that I need to serve more patients, and cannot retain staff at the salaries that I can afford, so spend too much time hiring and training. With significantly higher fees I can hire more support which will allow me to support more patients. This would include multidisciplinary care teams if fees are substantially increased. I DO NOT need government to set a team for me, as they cannot not know my community's needs as well as I do.	1	1				
I would feel like my work is more valued, less burnt out, and therefor even more efficient. I could also hire more staff to help with paps/vaccines/etc so I can see more patients. I could do less side jobs and spend more time working in front line family medicine.	1			1	1	
I make 3x doing LTC or Palliative work for the same number of patients as outpatient clinic.						1
I will have the ability to expand the space I currently practice out of, allowing me to have more waiting room space, additional exam rooms, hire more staff and nursing support.	1		1			

Currently I am needing to work in other roles to help supplement my income. An increase in compensation might allow me to focus primarily on my family practice and improving access.			1	1	
It would allow me to open my own practice; I have been avoiding it until now because of uncertain financial sustainability of comprehensive family practice.				1	
to be fairly compensated (i.e. kept up with inflation renumerated in a similar fashion to specialists) for the extremely hard work we do as family doctors is the only way I would consider providing further family medicine care and is the primary reason I am not currently accepting patients		1			
Increase in compensation allows for hiring additional hours of admin, expanding number of rooms/rent as well as hiring higher trained staff such as RNs, PAs or NPs. Much of physician time is tied up to paperwork that could be otherwise delegable. There is significant financial risk and opportunity cost in trying to incorporate new workflows or tools such as an AI scribes that could reduce non-patient-facing time. Compensation increase affords physicians the ability to invest in their clinics.	1				
Hire more admin staff to help with paperwork	1				
10-15%					1
If there was increased funding so I could Invest in better technology, hire additional clinical staff, And better manage my office infrastructure, I would spend less time managing the business side of my practice, reduce my administrative burden with better technologies such as AI infrastructure, which would free up my clinical time to see more patients. Right now I am running at 200% capacity and cannot extend myself another millimetre. A practice shutdown is otherwise highly likely	1		1	1	

More money means ability to hire more PAs and NPs to manage the extra visits and paperwork that come with new patients. Each new patient usually requires more frequent visits over the first 5 years and comes with a whole slew of specialist reports and labs to review that I don’t even order.	1					
Ability to afford nurses, admin staff, larger clinic for more patients	1			1		
I could hire a RN. Or a PA. Improve my EMR. Be more focussed on working. Not retire early . Encourage my daughter to stay in Canada. Encourage my students	1		1		1	
Could hire NP, or admin staff to help with paperwork	1					
I can hire staff to assist me in handling paperwork and admin work that requires medical expertise. This would free up my time to see more patients during normal working hours	1	1				
As it stands, I have significantly reduced my hours and roster in office FM, in lieu of taking on more LTC BC I can't afford to just do office anymore. Prev was 60/30, now flipped. #2) the admin burden. It's incomprehensible. Short term is needing dedicated staff to do the BS forms and referral "need more information" garbage that is barriers to care						1
My expenses running my family practice have significant increased over the last 2 years with inflation. I had to let go of my office nurse as we could not afford to keep her. We had to let go of a part time office administrator as we could note afford her.						
I am not doing all my own vitals, shots, and am unable to see more patients, and am burning out. With better funding, I could hire a nurse, hire an admin staff, hire a physician assistant, etc. I would take more patients	1	1			1	
Invest in nursing or IT	1		1			
Would allow my to fund more clinical help (PA / NPs) and increase administrative hours to support the larger patient roster.						

I am in the process of closing my practice as overhead costs too high.						
I would continue comprehensive practice if I was better compensated						
I love my practice but I am only making enough money to cover work and personal expenses.						
I cannot save for retirement.					1	
Would provide financial incentive for rostering more patients		1	1			
I would have the ability to hire allied health to help with patient encounters and possibly administrative tasks that can be delegated.	1					
Primary care is expensive emotionally. Currently, it is not a cost effective option for me to take on an inbox and unpaid administration hours. I rather give that energy to my young family. British Columbia's recent changes in primary care hits the nail on the head. It is what is needed in Ontario. Pay what primary care is worth. If there was higher compensation, I would choose to roster patients and have an inbox.					1	1
Hire more supportive staff to help with care provision	1					
Allow for more staff and hiring. Currently it represents over 1/3 of all revenue	1					
Hire more support	1					
It will allow me to actually hire more support staff - costs of staffing / nurse etc has gone up so high- I can't take on more patients unless compensated more- to see patients you need support staff. Inflation has gone sky high in the last decade -and our compensation is down- not up. Taking away the prevention bonus alone will cost my practice $12 K every year going forward.	1					
Increased compensation for office based family medicine would encourage me to take on more office hours and see patients in that setting, while offsetting some of the skyrocketing costs of running the office.		1		1		

Would help me afford more support staff, pay for AI to help me with notes so I can see more ppl per day, motivate me to stay in the profession since I am making less money than I did 20 years ago and what other career pays you less money with seniority!?	1			1		
More staff time would be available and this would allow more patients to be seen	1		1			
Hiring more staff	1					
Ability to hire more support to cover administrative tasks, allowing more time for patient care.	1		1			
Hire more staff to get more people seen	1		1			
I would be able to open a family practice. I currently only do locums and hospitalist because primary care clinics are poorly compensated. I could provide primary care to upwards of 1500 patients. Until primary care outpatient care is properly compensated I refuse to open or join a practice.					1	
Leading question. The focus should be on increasing pay so more doctors want to work in Ontario. Therefore more patients have access to a family doctor. Payment should not be increased as a means of trying to get family doctors to work more.						
Family doctors work enough as it is.		1	1			
increase and retain staffing, including paramedical / enhanced IT solutions	1			1		
Would be able to hire more support staff. Also pay current staff better to stem the personnel losses from the practice.	1					
Hiring more staff	1					
I would be able to increase funding for my RN to help with patient care	1					
If increase in compensation I would be willing to provide more care that was not directly billable ie apt based, virtually getting results to pt etc		1	1	1		
It will help me feel more valued and spend more time in my family practice knowing compensation is adequate. Otherwise, I'm spending my time in other areas where compensation is better or where there is less stress					1	1
Mote incentive to work harder.		1				

An increase in compensation might actually attract me to do family medicine altogether. I am in focused practice now due to how financially and administratively unsustainable community family medicine is.					1	
I may be able to take on more staff to delegate administrative burden.	1					
1. could possibly hire a nurse practitioner or physician assistant 2. we were considering moving to larger clinic to add family physicians - currently overhead is prohibitive	1		1			
I don't have the overhead capacity to adopt anymore patients right now. I can't pay out more for more staff hours. I need more money to staff my office for longer. Also, more motivation to work.						1
Currently leaning towards closing FM practice and doing only sports medicine. I have 1000 FM patients. Too many headaches, if I had more money, then I give more in overhead. This could help to actually retain a nurse that reduces my workload	1		1	1		
I'm currently contemplating retiring early due to the severe work demands and the truly low compensation.				1		
I will better be able to pay my overhead.			1			
I can keep the practice open given the increases in taxes and inflation.				1		
If I could make enough money to pay my staff more than a living wage, and if my overhead wasn't 40% of my income, and could also afford to pay a PA, I would consider adding another ~200 patients to my roster.	1	1	1			
I would have the ability to take on more patients and offer more hours in my clinic family practice, instead of doing other types of work (example: surgical assist) during the week to help subsidize the costs of my clinic family practice which is not currently financially sustainable on its own.		1		1		

with increased compensation, I could potentially hire a PA or NP and that would allow me to add some more patients to my roster	1		1			
Would not need to seek outside work to supplement income from clinic work				1		
My nurse practitioner and teacher friends are making more money than I am (their salaries available on the Sunshine List for comparison). This results in horrible job satisfaction in family medicine, and looking towards other (non-clinic) remuneration opportunities. If family medicine was better compensated then I would work more within family medicine, rather than constantly looking for any other opportunities to fill my time.				1	1	
Feeling valued=less burnout=great ability to continue					1	
enable hire more administrative staff and better efficiency.						
increase motivation to perform more work/provide increased services.	1	1				
I think you should bring back the code that allows us a one time bill for bringing on patients. It's a LOT of work to skim through a chart. This is now unpaid. Frankly, even the first year of capitation doesn't even make up for the hourly rate of creating a new chart history for them.						1
More secretarial time and more nurse time and I might feel like putting in more time myself	1	1				
With proper remuneration, the business side of Family Medicine will be less stressful. This would allow for time for clinical work, decreasing the squeeze we feel while being severely under paid for our work.		1			1	
I would work more hours in the office if I was fairly/appropriately compensated for it. Otherwise, I do additional work outside of my comprehensive family medicine practice ~1 day/week in order to supplement income.		1		1		

Currently I am not considering entering full practice, instead continuing locuming, as overhead costs compared to compensation make establishing a permanent practice a large financial risk					1	
I spend so much time on jobs I shouldn't be doing - administrative etc. If I was able to have more help with this (by hiring someone - which I can't do without more money), I could definitely see more patients	1		1			1
If compensation increased I would consider starting a practice rather than locuming right out of graduation. Also once starting a practice if compensation would allow for NP/PA hiring that would also help increase how many patients I would take on					1	
I would increase office hours, and expand my staffing hours for nurse and receptionist to handle the load.	1	1				
Direct most of the income towards two categories: 1) electronic medical record costs, including AI tools and patient self-scheduling, and 2) compensation for nurses and NPs. This will increase roster size and extend late physician careers. An agreement should indicate the number of additional patients for a certain period, barring disability or catastrophic events.	1			1		
I am now spending extra time in the hospitals where I am better paid.					1	
I have recently stepped away from comprehensive primary care after nearly 35 years of service. An increase in compensation may (depending on the size of the increase) incentivize me to return to primary care.					1	
We could consider hiring NP or PA to allow more pt flow also consider expanding office space to continue teaching…doctors of our future! The cost of running the office has gone up and up…and we get less than inflation! We cannot afford to increase our size or add staff! This is becoming impossible and a really poor role model for learners.	1					

Right now I am looking into other private income sources. I won't do this and would instead add to my practice if better compensated.				1	
1. hire more staff. 2. it would demonstrate that my hard work is appreciated and valued.	1				1
More funding for support in office	1				
Increase compensation would allow my office to hire mid level provider and administrative staff to provide care to more patients.	1		1		
Seriously, we are severely under remunerated and a lot more money would help to alleviate the feeling of being abused by gov't and OMA etc. Way back the OMA should have lobby the gov't for a pension for doctors instead of pushing for expensive incorporation. You may want to expand on this idea. Doctors also need more time off and more money means more freedom and means to cover locums etc. Considering other trade and profession we are today severely under compensated. You can hire more staff	1				1
Would be able to do less work in other settings (which are currently much more lucrative) and potentially help with staffing resources needed to take on more patients as those expenses are already so high I can't afford to hire more reception staff etc	1			1	
A 30% increase would get close to negating the generational high jacking from the specialist sections at the OMA. At a 30% increase GP's would still be underpaid for the services they provide but this would allow them to hire nurses to assist. [Sooooo over this nonsense]	1				1
I would no longer need to do hospitalist to help fund my clinic. This would free up 12 weeks a year i can see patients that i am not using for primary care at this time			1	1	
You get what you pay for. Right now there is zero incentive to take on additional patients. The increased workload, demands, and paperwork is not worth it		1			

It could offset the cost of support staff, such as a nurse , and also wil cost of me technology such as AI assistant charting that would free up significant time.	1		1		
An increase in compensation is absolutely NECESSARY to enable family physicians to attach more patients. The reason I have not taken more patients on is purely due to poor compensation. The very high work load, demands, and stresses of practicing comprehensive family medicine is only financially sustainable at a higher paid rate. The amount of unpaid inbox makes taking on more patients impossible.					1
I might hire a PA, or an NP to work with me, and therefore increase my roster panel	1	1			
I can hire RN to delegate work to (paps, well baby visits, phone calls etc)	1				
I am a locum - Would encourage me to stay in Ontario versus move to another province				1	
Can help pay for increasing overhead costs. Can hire RNs to help	1		1		
Significant increase can offset overhead and allow for hiring an assistant to help with all the unpaid paperwork	1		1		
If there was increase in compensation it would make it worthwhile to take on new patients. At this time, taking on new patients is a huge workload with very little compensation.					
Hire more office staff to increase efficiency and unload tasks that do not require the full expertise of our MD training.	1				
Less likely to do other non-clinic FM and increase clinic hours				1	
Currently I work extra ER to be able to pay for my office expenses. If family practice was better renumerated I would work less ER and thus have more time for office patients.		1		1	
1) Hire a nurse, NP, or PA to assist with clinical duties.	1				

I have to now look for another job outside of the office in order to make end's meet which is infuriating. I used to do hospitalist work but due to family commitment I had to temporarily stop. Now I may $5000-$7000 less a month but I am working exactly the same amount of hours just at my office as when I also did hospitalist work monthly which is excruciating!!				
I feel that the OMA has screwed us over! Please help!				1
Before you speak of taking on more patients why don't we focus on being able to stay afloat with the patients we have. The skyrocketing overhead costs have become prohibitive to keeping our office open and staffed and our lights on. Taking on more patients is not and will not be in consideration until we can be adequately compensated for the patients we already have. Compensate us adequately to run a private business when inflation is skyrocketing for all the time we spend on admin first!			1	1
I would be able to hire a new receptionist/increase hours of existing receptionists. We are cutting staff as our overhead is 40% for some doctors.				
This is on top of an unchanged salary in the last 10 years. Capitation rates only went up 1.8% in the last 10 years.				
Finding a new physician to join is next to impossible, despite the space we have, as no one wants 40% overhead if they can work in other settings without the overhead and responsibilities	1		1	
Hire more staff				
I won't quit my job	1			
Can help is increase staffing or utilize tools that help increase office efficiency	1			
The increase pay will aid in compensating for the unpaid indirect patient care. As well, it will encourage physicians to take on practices knowing they can cover overhead and unexpected expenses		1	1	

The increase in compensation would allow me to improve patient access in multiple ways. I would be able to hire more staff such as nursing or assistants to improve efficiency, patient flow, triaging patients, etc. it would also allow me to afford more in terms of technology and workflow improvements, all increasing access and workflow. As well, compensation for administrative tasks and paperwork would incentivize more of this to be done in a timely manner.	1	1	1			
Hire more staff	1					
Cost of running an office or split -needs 50%increase on AOO7 code .						1
More staff support in office to offload some tasks that can be completed by nursing or administrative staff that need to be hired through office overhead.	1			1		
If paid appropriately and for paper work/admin time, I would be able to hire more staff to do certain tasks allowing more time to see patients	1	1				
If I was fairly compensated for family practice I can justify working less at the hospital to spend more time in clinic. I could also justify hiring more staff saving myself more time for clinical work/seeing patients.	1				1	
Currently, the compensation for doing primary care is not sufficient to cover my expenses, so I keep my practice size capped at around 900's so that I can use my extra time in working in other areas that pay better (I do not give up my practice altogether as I actually love family medicine)					1	
I currently work only 1 day a week with direct patient care due to poor compensation and poor support						1
More ability to expand space and admin help/nursing help	1			1		

| | | |

make it worth it to add more hours: right now, if I calculate by days wage and then factor in the HOURS charting after clinic, my hourly rate goes down to $60- $85 / hour,depending on the complexity of my patient encounters. (already took out my 20% split to practise) so out of that, I still pay all my dues, cmpa, Cme, ...DISMALL						1
Could increase the income:work hours ratio making working more appealing		1				
I would prioritize office time over hospitality and locum time		1		1		
Would be able to hire out more staff and NPs to assist dealing with minor issues and increase availability	1		1			
Currently I can't afford to run a practice so I do locums for other physicians - when they can afford me!				1		
As I will stay in practice vs choose early retirement				1		
I can use that money to hire more staff to deal with administrative tasks so I can focus more time on clinical care.	1					
If I am better compensated for admin work, then I would increase office hours for patient booking.		1				
I would be able to give up my extra (higher paying) commitments, like anesthesia and hospitalist work, and increase my family practice hours.				1		
We must be compensated fairly for our time and the number of patients we care for across our clinical, clinical administrative and practice administrative roles. The BC longitudinal compensation model is the only provincial fee structure that adequately accounts for these roles. A full-time family physician (defined: 8 half-day clinical sessions and 2 half-day clinical administrative sessions per week for 44 weeks per year with 2 wk CME, 6 wk off) can accommodate 1200-1400 regular patients.						1
hire an RN or NP	1					
I may consider actually doing more office based care		1				
Feel more valued. Less burned out.					1	
Better motivation to work harder.		1				

Wiil be able to hire out more staff, NP etc to assist with minor issues	1					
I can hire more staff to help my back office needs to free up my time to see more patients. It would allow me to dedicate more time doing comprehensive family practice rather than other aspects of my clinical practice. Right now comprehensive family practice is the least well paying and my other clinical work subsidizes my family practice.	1				1	
Increased team supports/funding for locum support/funding for administrative burden would allow me more time in direct patient care.	1					
It would let me decrease my hours at the hospital, open more appointments slots and answer my inbox quicker. It would also push my decision towards keeping my roaster in my current inner debate between doing more hospital work and transitioning to locum vs keeping my current roster.					1	
Financial incentive to see more patients		1				
I would work more hours		1				
Compensation is only one piece to the family medicine crisis, but an increase would help cover inflation costs for overhead.				1		
I would be able to see more patients because I would feel more appreciated at work and could dedicate more hours to it. Right now it doesn't matter if I take the afternoon off, I'm not losing that much money, but I'm losing a ton of stress and workload.		1				1
I would reduce hours spent outside of my clinical practice and then spend more time doing office medicine		1			1	
Able to keep the office hours longer with support staff. New patients do require more administrative work that we are not compensated for that.	1		1			
willing to work longer /different hours , would delay retirement from comprehensive care if significant increase		1			1	

I am not able to take on the administrative cost of having more patients (paying receptionist to be open for longer hours, increased cost of various office supplies) without increased compensation	1					
Increase capacity to address multiple complex medical issues, more admin support to improve care delivery, ability to continue practising in a high cost of living area (GTA) keeping up with inflation	1				1	
If there was increased compensation it would be more motivation to see more patients per day and have larger rosters. Additionally, compensation for currently unpaid work (paperwork, admin time, answering messages) would make seeing more people per day feasible.		1	1			
If my compensation would increase I would be able to pay my staff better which would allow for more efficiency in my clinic. If there was more efficiency in my clinic, I would have the capacity to see patients faster. If things became very efficient, I may have the capacity to take on a small number of new patients.	1		1			
hire staff to process extra work that comes from adding patients to the practice Also would be willing to work longer hours if that will help ease doctor shortage	1	1				
I could take on another staff member, physician assistant or moa to help.	1					
This increase in compensation would need to be substantial, I.e. at least at 30% increase to account for years of underfunding, for me to consider doing this. Otherwise, I am planning to close my practice.						1
I will hire more staff to help with administrative work and invest in more software to improve access and flow.	1			1		
Incentive to continue practising comprehensive family practice and take on more patients. Currently I have put all plans on hold, considering practice closure if things don't improve significantly this time.	1					1

Hire an NP, facilitate a social worker for mental health counselling which is very time consuming and pulls away from acute medical issues, hire another no or pa to do my inbox/labs	1					
A profound fee increase would allow me to hire a PA to see additional patients and a nurse to take on tasks which suck up a lot of my time but I can not justify paying someone. I would also be able to restart offering allergy shots which we had to stop offering because they cost 20 times in staff and supplies what the clinic gets in overhead.	1					
Will attract and retain physicians which will increase ability to see patients. At this time many family physicians are leaving practice and leaving thousands patients unattached due to financial constraints. Compensation raise will facilitate recruitment retention and May make working longer hours more days and taking on more patients appealing		1			1	
I will increase my clinic hours from 6 hrs/day to 8 hrs/day, and also postpone retirement.		1			1	
Increased compensation is the ONLY thing that will prevent me from leaving family practice altogether and discharging all of my current 1500+ patients. This is not a joke, but a sad reality. There are countless other options for me that can bring in 50%+ more income for less hours worked. A significant pay increase will also allow me to potentially hire additional staff to either see patients or reduce my admin time and allow me to see more patients (ie more available apts).	1				1	1
Increase staffing ratios for efficiency. Pays for technology improvements to enhance care including higher costs for EMR/ online booking, digital scribe etc	1			1		
Better compensate for the increase in corresponding admin time that would make it worth taking on more patients. Increase overall ability to fund clinic support start to handle admin tasks so that I can address medical issues, rather than administrative ones.	1		1			

I could hire a nurse to help with immunizations and shots.	1								
Compensation needs to be brought up first to the existing panel of patients, in order to be able to hire more (and more skilled) staff - like an RN, or LPN, or another MOA. This can help streamline the current / existing practice which would open up more appt spots for existing and then more patients.									
It's a domino effect.	1			1					
would actually be able to start a practice, currently only locuming						1			
I am quite happy to work harder if I am being adequately compensated. I will also be able to hire better staff and retain staff easier if I could afford to pay better salaries. Depending on the compensation we may be able to entertain the thought of hiring other health professionals like PA's to help with administration and update our EMR systems for example AI that has monthly costs.	1	1		1					
Increased compensation would allow me to work more hours/ days, enable more patients being rostered		1	1						
If capitation model increased by 1.5x that would allow more overhead to spend on admin and allied health support, freeing my time to focus on actual medicine. If shadow billing paid at 50-75% I would then be incentivize to increase my clinic hours and will improve access. Right now Shadow Billings pay so little I feel no incentive to add more clinic time.	1		1		1				
More motivated to work more hours		1							
Overhead cost, more admin staff	1				1				
Would allow me to hire support staff (ie nursing) to help me see a higher volume of patients	1		1						
It would make me feel less demoralized about all the free work I do every week.							1		
would be able to hire MOA or NP to help with inbox management/triage/paperwork	1								
Improved staff and services									1

I will not have to pursue other forms of work such as ER or hospitalist to try to subsidize my family practice					1	
Hire nurse to manage more patients.	1		1			
1 -more incentive to improve access - ie if actually paid our value and the work we do, then more likely to do more of it; 2 -increased funding will allow us to hire admin staff to improve efficiency & reduce admin burden; 3 -increased funding will provide more incentive NOT to retire early and therefore abandon more patients!	1	1			1	
If my pay does not go up- I will give up my family practice and 1500 more patients in Ottawa will be without a family doctor, no one to take my practice , no other options to get a family doctor in Ottawa					1	
I can hire more staff to service more patients, RN, PA, MOA. Increase investments in social media and technology to increase patient accessibility, awareness for access.	1		1	1		
An increase in compensation would allow me to hire additional help in the office to relieve me of doing some of the administrative tasks that can be done by other people. This would allow me more time to see patients.	1		1			
Would not need to work outside of general family office practice in order to increase income, thus would be more available in office						
Better compensation means can compensate staff better and/or hire more staff --> increased productivity and access	1		1		1	
We could hire more staff to delegate work which could be done by other care providers, leaving me free to see more patients	1		1			
I could hire a physician assistant with the increased compensation, that would enable me to see more patients.	1		1			
This would allow me to hire more staff to accommodate the overwhelming workload facing family physicians at this time.	1					
We have not had compensation increase to cover existing costs. We cannot work harder for less money						1

Would work less ER work and do more primary care office						1	
If properly compensated for work done in clinic and paperwork, I would dedicate more time to family medicine to be able to grow the family practice. By not being adequately funded, most would prefer to spend their time doing non-generalist care that does not generate the same level of paperwork that is non remunerated at this time.		1	1				
Pay staff and supplies	1				1		
I would be willing to add more patients if the compensation was made attractive to do so		1	1				
By being paid adequately for the work we do I would then want to work more and feel more job satisfaction, and also be able to afford the staff costs and building costs for more patient visits clinic space	1		1		1		1
Improve feeling of being respected and valued, may actually feel like I want to be at work, decrease burnout. Increase staffing at front desk if compensation increase is significant enough.	1	1					1
Investment in larger practice space, more admin support, hiring a nurse. Investing in ways to run a practice more efficiently (ie scribe software, EMR add-ons)	1			1	1		
Over head can be better managed. Office can be open for longer hours, after hours and weekends.		1			1		
With access to 100% to 200% more compensation per service I could hire the staff I need to run my business.	1						
If I was being paid more I would be willing to work more. I could afford more better staff and staff retention would be better because we could pay better salaries. We could afford EMR upgrades like AI for charting and perhaps depending on the compensation be able to afford support staff like PA’s and locums so we can take more vacation time without affecting patient care.	1	1		1			
I would be able to add a physician assistant to help with new patients.	1		1				

Hire more physician assistants to assist with onboarding. Hire more admin staff to handle administrative matters I usually take care of due to funding shortfall Attract locum doctors to assist with patient care with hope to convert to starting practice Increase electronic communication options for patients to reduce scheduling redundancy. Add AI scribe to speed up appointments	1			1	1	
IF the increase was large enough, I would consider: adding nursing time (which I pay for out of my billings) to help support more patients . giving up hospital work (currently required to subsidize my office practice costs), which would afford more time in office to see more patients. diverting some of the increase towards investment in AI technology to help reduce charting burden with patient care, which could enable a larger volume of patients to be seen	1		1		1	
No desire to increase patient facing hours currently						1
At least a 50% increase, none of which we would actually get to keep as it would simply allow us to hire adequate staff	1					
The money would motivate me to assume greater responsibilities of a greater number of patients		1	1			
with an increase in compensation, I would consider spending more time in clinic due to better pay and have to be less reliant on other sources of income that take me away from clinic. Also, more pay means more attractiveness to new grads that we could bring in to our clinic who would attach patients.		1	1		1	
pay for more support staff, increase size of clinic, hire an NP.	1					
I would want to work more if I was being paid more. I could offered better staff and retention would be better. I could afford better EMR products including AI and depending on how much we were paid we could afford support staff like PA's to help with access and adminstration	1	1		1		

I will not retire later this year as I plan to do if there are no increases. I can hire more staff to allow me to service more patients.	1	1	1	
I essentially do not do chronic care because the compensation is not at all reasonable. If a family physician bills about $120 an hour, after paying staff salary -that the government simply increases at its own desire not considering that corporates have to increase their products sales price or terminate their company or staff or in health care OHIP payments not balancing evenly with that- and overhead and taxes, he takes home $50-60 an hour which is less than a gym personal trainer at $90/h!				1
An increase in compensation would result in a reduction of my work outside of my comprehensive family practice. This work is more lucrative and if the compensation for family medicine increased I would do more of it.			1	
extra work involved. need atleast $500 per new patient				1
Hire nursing staff to create more appts	1	1		
I am currently struggling to keep my practice open as our compensation is woefully inadequate to cover all our expenses.			1	
Increased compensation would allow us to adequately cover increased pay for our employs resulting in increased hours of operation and service to patients.	1	1		
It is hard to be motivated to see more patients when I earn so little. It's just not worth it				1
Allow me to do more comprehensive family practice instead of other things such as LTC, COE work, which effectively subsidizes my fam. practice. Allow me to integrate secure messaging, optimize EMR usage. Allow me to hire an NP/ PA to help manage roster.	1	1	1	
I could hire a physician assistant and provide more access to my practice	1			

An increase in compensation would encourage me to take on a practice again. I currently am reluctant to open a practice in Ontario (whereas I previously had one in BC, and moved to Ontario for family reasons).				1		
Would allow me to hire a locum or more help in the clinic so that we can accommodate more patients on our roster	1	1				
I have left comprehensive family medicine for a hospital based position due to poor remuneration four outpatient family medicine and rising overhead costs.						1
I will be able to see more patients in the community. There are about 15000 patients who need a primary care doctor today.		1				
I generally feel financially undervalued by this government. When one feels undervalued, there is little motivation to take on an increased workload especially when I feel that my job already encroaches on what should be restorative personal time (waking up at 5am to review labs, charting after putting my kids to bed, completing forms on the week-end). As it stands, there is little financial incentive to take on new patients; we are relied upon to do so out of good will but mine is depleted.						1
My model currently doesn't compensate much for increased patient roster numbers (RNPGA), and in my clinic we still pay a lot of overhead. Our FHT has cut our support services. If I were paid more to take on more patients, I could hire more supports.	1					
Hire more staff to cope with volume of administrative duties	1					
I will be able to cover higher costs of running an office and due to inflation. pay my staff a better salary that they should be receiving but are not. Higher costs may help cover for the unpaid hours of admin work which take away from seeing patients and thus reducing total income	1		1			

| | | |

Wouldn't lead to me attaching more but would attact more docs back into family medicine. More pay, depending on how it is given would mean I can open up more clinic appointments, improving access.			1			1	
If I were more poorly compensated I would feel less burnt out and more appreciated and would strive to take on more rather than scale back		1					1
It would allow me to afford the overhead to have more staff working to see more patients efficiently. I would also be willing to see more patients per day if compensation was improved	1	1	1		1		
I will consider increasing my working hours doing comprehensive family medicine		1					
Increased hours of service. Hire more staffing support.	1	1					
Less worry about bills and more focus on patient care							1
Hire staff to help run the business to allow me to spend more time with patients and less on running the business.	1						
An increase in compensation can help cover more overhead and nursing/admin support that will help streamline appointments and admin management more, allowing more time for the patients.	1		1		1		
I could hire more staff to manage the BS so I can spend more time seeing patients	1		1				
Can hire more support staff to help me manage high admin demands that have impacted time avail for pt care	1		1				
I am hesitant to take on more patients due to the disproportionate compensation versus work load and man hours each additional patient would require. It is better for my mental health, my family life, amount of spare time, and financial compensation to take on additional non-FP work.							
Increase compensation would alow me funds towards clinic supports, nursing and other ways to help with administrative burden and the flow required to see more patients instead of unpaid strain.	1			1		1	

Increased MOA and nursing support. Could explore option of nurse practitioner for diabetes clinics, blood pressure monitoring etc..	1				
I will be able to pay staff and have better added supports from the EMR	1			1	
My practice is closed to new patients with only one exception -- palliative patients. With better compensation, I would work harder by taking on more patients and pay staff better. Without better compensation, my rural comprehensive practice has an expiry date. I have booked a trip to another province this fall for job hunting, and am considering international options as well pending this PSA cycle.					
Who works harder for less money every year?	1		1		1
Can increase more staff	1				
Afford extra staff or technology to reduce admin burden allowing for more patient care hours	1		1	1	
It would allow me the capabilities to make my work easier and more productive for patients and their families.		1			
An incentive for all the extra work		1			
It may allow me to hire more support staff and expand my capacity and access to see patients.	1		1		
More staff helping pts, attract more physician colleagues	1				1
We may be able to hire and extra nurse or moa to help with workflow and increase the number of patients being seen	1		1		
Hire a PA					
Rehire my nurse I had to fire because I couldn't afford her anymore and the hospital was going to pay $7/hr more.					
Afford a locum when I take vacation instead of just close the front door.					
To do this the A007/capitation rates needs to AT LEAST double	1				

| | | |

Inflation and operating costs have skyrocketed, Patient needed and demand has increased as well as administrative burden. Easier To do OR assist or locum shifts less stress, Less responsibility, better pay.				1	1	
I would be able to hire more admin to manage some of the papework burden, or maybe an AI scribe. Maybe even a locum between a few docs to help manage the inbox	1		1			
Would potentially justify longer hours and extremely complex care for high-comorbid patients		1	1			
Atleast 50% increase in FFS fees and in FHO capitation payments or removal of in basket codes to allow 50% increase in income						1
Would allow us to pay for more admin staff time to offload some administrative responsibilities, freeing up our time for more clinical encounters	1		1			
I would return to family practice					1	
Would be able to hire more receptionists, have more nurses and shorten wait times	1		1			
Currently not feeling appreciated or fairly compensated for comprehensive family medicine. I have found other types of work that compensate better, therefore, reduced my family practice availability.						
If I am able to have increased compensation to pay for +++ office overhead, it seems worthwhile to increase my family practice hours again, and therefore could take more patients.		1	1	1	1	
It would improve access so that I could decrease my roster size, but in order to attach more patients, we need to incentivize more doctors, which requires higher compensation.						1
An increase in compensation can mean that I can hire more admin staff to help with call backs (for benign results or reminders to pts) thus freeing up my own time to see more patients.	1	1				
Appropriate compensation means I am more likely to work in the office doing comprehensive primary care rather than having to supplement my income with out of office work.		1			1	

I can afford to keep my administrative staff in place so I can continue to service my 1200+ patient practice. Without my administrative support, I would leave my primary care practice.	1				1	
I'm currently on leave. I'd return to practice if you made it worthwhile					1	
increase my ability to subscribe to AI scribes, high more in-office support like nursing.	1			1		
I would hire locums to work with me and we'd look after more patients	1		1			
need $100,000/year more to make my practice more accessible						1
My patients' demographics are such that there is a lot of psychosocial support needed. The time I spend on forms, system navigation for them is incredible. All uncompensated. I feel like I am working for nothing most of the time. If I get compensated better, maybe I can consider hiring someone to help me do that part of my work day? It takes time away from patient care, makes me late for next appointments etc etc						1
More dedicated hours for patient facing time		1				
It would make it worthwhile to work more. I have cut back as I am approaching retirement and could work more but without better compensation I am not willing to.		1			1	
we have just shifted our clinic model- All the family docs have joined the local CHC. we are pooling our income and being paid an hourly wage. increased remuneration means a larger pool of money to distribute to the docs and a higher hourly wage would allow us to hire more docs/locums. If we can hire those docs, we'll roster more patients. our goal is to cover all 6000 unattached patients in Napanee and we'll need money to pay about 4 more docs to do it.		1	1		1	

Increase compensation first needed for the already underpaid work to PREVENT PREMATURE EXIT from career. Currently not economically sustainable. SUBSEQUENT increase/commitment to economically-contemporaneous increases to enable hiring and maintenance and training of quality staff to manage high admin burden associated with clinical care (support in rooming, vitals, messages, work/insurance forms, coordinating referrals, notes) so time can be focused on taking care of CLINICAL requirements.	1				1	
More incentive to open additional clinical time to assist with unattached patients; more incentive to roster more patients.		1				
Better compensation would incentivize me to take on my patients. I could hire more reception help to book patients in more easily for same day appts (hard for patients to get through right now). I could consider hiring a PA or NP for a shared practice / help with admin so I could focus on patient appointments	1	1				
more staff	1					
I would likely not have to work as much ER work which I take on due to poor income from my practice. This would allow better access for my patients and enable me to take on more .		1	1		1	
I would be motivated to take on more patients. Right now the amount of patients I would need to make a significance difference in my salary - does not make it worth it with the burden it puts on me!		1				
How does any GP keep their practice open with the current compensation models?						1
It will help pay for overhead and technology and keep me in practice longer! It has to be significant! I don't want to be funding health care…which is what community family docs do! I can take more pts if I can pay for staff etc.	1		1	1	1	
Would encourage to work more hours		1				
Having this would allow more allied health professionals to assist - NPs, RNs, PAs	1					

I feel that if I am adequately compensated I will be able to mentally take on an additional load. I am resentful that the government will not pay more even though inflation and complexity of patients have increased. As a result at this stage, I do not want to work more as it is my protest to this egregious situation.more money would be improved morale , hence rekindling my love for this profession.					1	
Bring back 1. new patient enrollment fee 2. 10% higher visit fees for new patients for the first 2 years 3. Higher Q012 fees for more incentive to do evening and weekend hours.						1
It's more that it would prevent me from decreasing my practice size in pursuit of other endeavours. Specializing within family medicine and seeing patients for consults is more attractive when compensation for having a bigger practice is low feeling disrespected by substandard fee increases for the past many years I have intentionally reduced my clinical hours and looked at other more remunerative work (insurance, aesthetics, etc) to supplement income. Pay better for clinical care and I'd gladly go back to it. it is my preference				1		
Increase in compensation will help with overhead that comes with managing more patients- supplies, staff costs and support the addition work that comes with unattached patients particularly those that are complex	1		1			
It would allow payment for AI scribe technology, improve use of email, compensate for additional paperwork time for these patients		1				
At this time, taking on more patients means more administrative burden with minimal compensation. We already feel under appreciated so a sign of good faith would be an increase in compensation						1
I'd be able to pay secretary for extra time.	1					
Increase access		1				

Doing inpatient work is much better compensated than outpatient currently. Increase in compensation would incentivize me taking on more patients rather than taking more hospitalist weeks. Furthermore, it may allow me to offer more competitive wages to hire more competent office staff that would allow me to take more patients.	1	1			1	
An increase in compensation would allow me to improve patient access by allowing me to compensate an RN or an RPN to help in the practice. So much more could get accomplished that would be off of my plate. There is absolutely no way it is affordable in a few for service setting, and there is no way the government can afford to have all Ontario citizens rostered to a fabulous Family Health Team, and they know it- which is why there is a cap in it.	1		1			
Would incentivize working in this area more		1				
I could focus my practice in cllinical primary care rather than diversifying in other areas.		1			1	
I could hire a PA to help managing paperwork, inbox etc so I can see more pts.	1					
My overhead would go down so I wouldn't mind working an extra half day in clinic		1		1		
able to hire additional PA and/or nurses and/or NP. These professionals take on the day-to-day acute problems, as well as set up and run programs for chronic conditions..this allows us to take on more patients and still provide quality care	1		1			
Extending operating hours, hire additional staff, feeling appreciated (as opposed to constantly at the verge of quitting/burn out	1	1				1
Allows me to pay for added administrative burden, staff, supplies and additional work to manage patient needs	1			1		

I love comprehensive care and want to start a practice, but I won't do it until there is a show of faith from the government that they will remunerate fairly. Offices are barely coping now, to start a practice when the government has demonstrated for decades that they will not keep up with costs is madness. I want to commit to decades to my patients, I can't right now. I may move to another province like B.C. to start a practice instead.						1			
I could hire more support staff to assist in the day-to-day managements of patients, which would allow me to focus my time more efficienctly	1		1						
I might be able to hire more help (PA, RN, etc)	1								
Improve pay for front staff to take on heavy administrative burden of rostering new patients; better compensation for taking on complex patients to help account for current hours of unpaid work	1		1						
Hire allied health improve EMR and IT	1			1					
Higher You patient registration fees, Q012 fees. , Maybe a 10% increase in fee.Payment for new patients visits for the first two years									1
If I can hire more and/or more qualified staff and thus I can improve my efficiency and be able to see more patients. Improving technology could also help but it is expensive.	1		1	1					
I would consider returning to practice						1			
Hire more staff to help, feel more valued.	1							1	
Affordability if additional staff and/or IT needed to efficiently run a practice these days.	1			1					
Allowing funding to hire staff for nonclinical work.	1								
Motivation from better compensation		1							
Help pay increased overhead generated by more patients, such as more administrative help, more office supplies.					1				

Retention of staff and addition of staff that help us maintain larger roster sizes. More compensation in community family medicine will make it more of a desirable field to practice in and recruitment of new family physicians will improve. Also ability to pay for locum coverage to help with better work-life balance. We could hire a consultation coordinator and a preventative care nurse. Also a physician assistant - better than an NP because we can will through OHIP if we supervise them.	1			1
I would give up doing other things like hospitalist and focus exclusively on my practice.		1		1
Would allow us to hire more staff/nursing that help us manage patients or perhaps hire a PA to help.	1			
Increased compensation means being able to employ nurses and MOAs which improves efficiency, and enables me delegate tasks appropriately, resulting in more availability to provide. care	1		1	
I would go back to comprehensive medicine. Have staff paid appropriately to have a stable practice	1			1
Currently compensation is not worthwhile. If family medicine was appropriately remunerated I would consider coming back to practice more family medicine (vs focused practice.) Otherwise I am planning to exit family medicine completely in the next year, meaning my current patients would lose their access.				1
Hire care support staff	1			
Increase in competition will allow us to afford to stay open longer, after hours, and hopefully compensate our staff to stay back and/or hire new staff after hours/weekends	1	1	1	
There needs to be a cost:benefit balance. Right now we are saddled with too many restrictions on billing. Increase the income per patient and per interaction to entice me to take more patients.				

When you feel undervalued it is hard to add hours to your work day. If the fee codes reflected the amount of effort required to manage the average family medicine patient then it would be less disheartening to work longer hours and see more patients.						1
motivate me to work a little more, be able to compensate staff	1	1				
I can afford to pay physician extenders	1					
If will motivate me to continue practicing as a FD rather than going into retirement in the next 1-2 years. The work is hard as it is, and there are other easier ways to make an income than comprehensive family medicine. Overhead expenses have gone up, referrals are often returned due to "long waitinn lists", I have never before had so much hours spent on administration (often Sat & Sun) that you get discouraged.				1	1	1
Currently office longitudinal practice is poorly compensated. With my free clinic time I now work elsewhere that pays more instead of taking on more patients. The time-income trade off doesn't make sense for me to spend more time/take on more patients in my clinic.						
If it paid better, I'd be happy to take on more patients and not work elsewhere. I would also open up more clinic time. I right now have 1000 patients in 5 half days. If it paid better, I could do 6 half days and have improved access		1	1		1	
I closed my clinic in part due to the compensation. i would consider reopening a FFS clinic if the compensation model fit. Presently it doesn't make sense compared to ER, but if the A007 were doubled, it might be possible					1	
can hire more/better staff to improve efficiency	1					
Hire nurses or nurse practitioners to aid in care and access	1		1			
I could hire more staff (including admin, nurses, NPs) which would improve work flow and allow for more patients to be seen and significantly improve wait times.	1		1			

Would allow me to cover the increased overhead required to be in office more days for increased patient access/roster.			1	1	
Hire other staff to do paper work and screen patients	1				
It would allow me to offload some administrative work to secretaries (in that I could pay them to do more work) so that I could spend more time seeing patients. Alternatively, I could use increased compensation to hire a nurse practitioner to see unattached patients while I continue to do the work I currently do.	1		1		
I could afford to pay for artificial intelligence technology to assist me with the charting that takes up hours and hours and hours of my day and decreases patient access. I could also hire a nurse to help see patients. I could hire a secretary, who could help unburden me of all of the administrative tasks I complete for no compensation.	1			1	
Would allow us to keep up with expenses going up with inflation and income not doing so. Would allow us to give raises to admin staff to improve retention to find more efficiencies in practice.	1				1
Help to offset the burden of all the unpaid work I do		1			
Pay for more admin support as well as infrastructure of all kinds - from material (physical space, equipment, consumable supplies) to informational (systems, tools, programs, etc). Compensation needs to be dynamically adjusted for cost of doing business. It costs too much to do business otherwise. Ex. If inflation etc goes up, a plumber charges based on the cost of business and market rates. We need that built in to the compensation structure.	1			1	1
I will be able to pay more support staff to do the menial tasks that i do now. This will free up my time for more clinical tasks.	1		1		
could hire more staff to handle administrative & nursing chores	1				
Would allow me to work more hours		1			

I am better compensated by spending extra days in the hospital or OR assisting, others with LTC, list goes on and on. Better compensation would allow me to focus more on my family practice and spend more hours there.		1		1
It would go towards more administrative support hiring .	1			
We need money to address the 30% overhead costs and to allow us to hire better staff, and to have nurses to help or physician assistants . We need more money to have us not get paid 40 minus overhead for 20-25 min of work on many issues per average visits with administration and backlog issues. It is completely unreasonable for people working so hard so much education to have such low pay . No wonder we are all leaving the field	1		1	
This would fund necessary overhead.			1	
I will be able to pay my staff more to help with the admin burden of the current roster	1			
Hire more support staff, eg personal scribe, PA, NP, admin staff - HR manager, statistical analyist...	1			
Can hire more Frontline staff to field calls, relay communications. Could potentially hire a nurse for advanced medical directives. More patients receiving appropriate communications will mean less of them seeking care outside the practice or in ED.	1			
Hire more staff.	1			
More money to hire a nurse to offload many tasks that I currently can't afford to pay someone else to do such as immunizations, allergy shots, blood pressure, height/weight, etc.	1			
If Family practice was compensated better, I would do less hospital work (which currently pays better) and spend more time in my family practice, so I would be able to roster more patients.		1	1	1

Whenever you take on more patients, you are not only increasing the amount of time spend in direct patient care, but you are also increasing administrative work: increase in calls, Rx renewals, forms, e-mails, lab/investigation report review, specialist report review/hrm reports, admin messages in regards to patient questions etc.					
Increased compensation would allow me to hire additional staff to help me offload some admin burden so I can focus on clinical care.	1	1			
Currently am fam doc with no comprehensive practice (work hosp, emerg, etc). I love family medicine and if it paid better than my hourly ER wage I would be very tempted to open my own practice					1
Higher more staff, incorporate and upgrade AI technology, offer more online and virtual support	1			1	
Left family medicine bc of ffs codes to do gp-derm. If increased Fam med codes I could afford to do it again					
Increased compensation would allow me invest in my office staff who deserve competitive wages that keep up with inflation, re-invest in technological solutions (both physical and electronic) that improve efficiency and thereby serve more of the community.	1			1	
By increasing office hours , doctor and staff availability		1			
I currently do not do outpatient family practice. The main reason is inadequate compensation. I would return to family practice if compensation were improved sufficiently.					1
I would be able to hire more nursing and supporting staff to offload admin burden and thus increase my availability to patients.	1		1		
Allow me to hire NP or PA to share the care.	1				
If there is no increase, I will retire within 12 months which will leave 1000+ patients with no family doctor. If there is a suitable increase, I will work for 3 to 5 more years.		1			1
There will be an incentive to take more patients as remuneration will be more		1	1		

If there was 150% increase I can decrease my non-clinical/hospital involvement which is how I currently supplement my clinic income and therefore have more access for my rostered patients. The capitation from my family practice DOES NOT allow me to have enough to pay staff without my other duties.		1		1
With increase in compensation, I could hire more staff or extend hours for my current staff to allow me to see more patients and roster more patients.	1	1		
And increase in compensation, will allow me to hire more nurses in order to save more time, busy in paperwork and routine office visits, where I can be spending this time providing comprehensive care to more patients.	1	1		
Potentially hire a PA/front desk staff to help with administrative tasks. Ability to retain staff and reduce need to rehire/train new staff thereby increasing time to for patient encounters. Bring in newer technologies/software to improve patient communication.	1	1	1	
increase in compensation would allow me to pay for more services that would streamline my appointments and my administrative burden	1		1	
Would be able to hire more nursing and admin staff which will decrease the time wasted on doing a lot of things which that staff can do it so we can manage more patients and also existing patients more efficiently	1	1		
Hire a competent nurse to work with me. This would require about a 40% increase in fees, but would serve 80% more patients.	1	1		

Increase compensation first needed for the already underpaid work to PREVENT PREMATURE EXIT from career. Currently not economically sustainable. SUBSEQUENT increase/commitment to economically-contemporaneous increases to enable hiring and maintenance and training of quality staff to manage high admin burden associated with clinical care (support in rooming, vitals, messages, work/insurance forms, coordinating referrals, notes) so time can be focused on taking care of CLINICAL requirements	1			1
It would allow us to afford having either nurse practitioners or physician assistants assist in serving our patients	1			
Hire a PA or other physician extender	1			
I will be able to employ a nurse who will manage tasks tasks such as vaccination, pap etc then I will be able to take on more patients. Employing a nurse and also help to reduce my administrative burden.	1		1	
It would allow us to hire (and retain) more admin (and more skilled admin), which would free up the physicians to provide patient care. Also would allow us to consider hiring more support providers like PAs, RNs, which would allow the clinic to offer more services and frees up the physicians to see more patientd	1			
I would be motivated to extend my office hours or book more people per day, but only if it were a substantial increase.		1		
If we were able to hire more support staff, this would alleviate some of the admin burden and enable me to roster more patients / provide more in clinic hours.	1			

I would feel my work to be more validated and appreciated. I am currently paid below the suggested market rate my training and consultation services. I am currently asked to work 15-20 hours unpaid per week in keeping up with administrative burden, reviewing labs, results, messages and managing patient care expectations for being available immediately, on their schedule and convenience.					1
Can have more support staff	1				
I will be able to hire more support staff and decrease the mental strain of financial stressors	1				1
I'm currently thinking of quitting my comprehensive family practice and therefore closed my practise. Increased compensation, if appropriate inflation and costs, would allow me to continue my practice and increase my hours to accommodate new patients.				1	
I would take on more patients in my roster as I can fund the increased administrative burden by hiring more administrators and nurses	1		1		
Decrease in burnout by feeling recognized and valued for increased complexity of practice. Ability to hire and maintain more staff.	1				1
As a locum, increased compensation would enable me to feel more confident I will be able to afford overhead and bills when starting a practice. I love longitudinal primary care and would definitely start a practice accepting new unattached patients if compensation matched the level of work.					1
Motivation		1			
I can hire additional staff and/or locum support for the days when I am not in the office.	1				
If we had significant increase in compensation could hire more admin staff & physician assistants.	1				
I would be able to hire more support staff	1				

I have recently completed my residency and transitioned to practice. Currently I work as a locum, and I will not start my own practice unless there is fair compensation for this type of work. If starting or taking over a practice could be done in a financially sustainable way, I would be thrilled to be able to care for my patients as a comprehensive family physician, since this is what I trained to do and feel passionate about.					1	
An increase in compensation means I would replace my day of surgical assisting with a day in clinic. Currently I am not motivated to work in clinic because every dollar is subject to significant overhead. If compensation increased to account for this, I would prefer to work in clinic an extra day or two, and I would consider adding to my roster.		1				
Hire an NP or PA or RN	1		1			
We run 2 very busy Urgent Care Clinics and the inability to compensate staff adequately due to the erosion of professional revenue, is leading to staff retention complications and in turn reduction of service and access for our patients.						1
Only improve if A007 pays $125.00 and other service fees increase proportionately						1
I would be able to relocate to a larger office space and take on more physicians into our FHO which is currently 3 physicians in a small office. Relocating costs a lot of money (increase in rent, cost of leaseholds, increase in equipment cost, staff cost, etc.), and an increase in compensation would allow me to be able to afford to move to a bigger space. With more physicians in our FHO, we can take on new patients.			1	1	1	
more funding to support reception staff and nurse, hence more resources to take on new patients	1		1			
I will be able to hire more administrative staff and nurses and physician assistant s	1					

1) I would be able to hire more staff (specifically reception and RPN/RN) as I see fit to help run practice more efficiently. It would need to be enough to pay staff comparable wages and benefits for staff retention. If office runs more efficiently, then I could take on more patients.						
2) I would be able to afford an AI scribe to help write notes so that I would have less admin time and more clinical time.	1		1	1		
We are simply unable to afford nursing or physician assistant support anymore due to the decay in our billings relative to inflation. If we are able to hire an RN/PA/NP, it would allow us to triage tasks better and allow us to be able to take on more patients as a result.	1					
Yes it will allow me to hire other allied health professionals or admin to help delegate some work to. Truthfully without increased compensation I will be leaving family medicine.	1				1	
Hire more help - NP, PA, admin	1					
50 percent						1
At present compensation rates and complexity of medical issues dealt with high overhead costs, not beneficial to increase practice size and no money to hire extra staff to alleviate the burden. Also no money to implement technology tools to streamline care and improve access.						1
I may be able to afford to hire allied staff e,g RN/RPNs to administer vaccines, triage, Afford softwares to scribe, EMR add ons to increase efficiency	1			1		
Monetary compensation is biggest attraction						1
I can hire some help!!! Doing everything mysrlf as I can no longer afford to pay an assistant in solo CCM	1					

Compensation would pay for my costs - emr, ai scribe , staff ; 1) I can pay my staff more, keep them (less turn over, less of my time for their training, better experienced triaging from to them , better flow in office….i can see more patients) 2) pay for my EMR (and my training to use it more efficiently) and for my AI scribe - more efficient, more patients seen	1		1	1		
Don’t have to seek payment opportunities outside of family medicine					1	
The only way to improve RETENTION FOR FAMILY PHYSICIANS (not mid levels who DO NOT HAVE MDs and NOT TEAMS) is by increasing our pay. By increasing the pay, and by the necessary 150%, that is how you have more family physicians willing to take on more patients						1
Compensation for time spent on charting and documentation- percentage premium attached to the kind of issues (chronic) that generate more paperwork and admin that fills up inbox						1
INCREASE THE PAY TO HAVE MORE FAMILY PHYSICIANS WILLING TO PRACTICE CLINIC MEDICINE!!!!						
will do more family practice and less walk-in's		1				
It would allow me to incorporate technology for non clinical purposes saving several hours in a week. In addition, it would enable me to use other tools in the office and EMR to assist patients with appointment followups, reminders, messaging, etc. thus reducing provider and staff administrative burden. Further, I could consider employing other health professionals that could be delegated certain tasks, allowing me to do what family physicians are best trained to do - comprehensive care.	1			1		
It would be an incentive to see more patients and follow up more often		1	1			

we could hire more staff, implement more EMR features like online booking, messaging, reminders etc. all things that cost money. It will literally make me hate this job less I'm so burnt out after just 4 years.	1				1				1			
Incentive to adjust my work schedule to accommodate more patients		1		1								
It will allow me to not retire immediately from office based family practice -as I am soon intending to do as it has become financially foolish .It will hopefully also enable me to find a successor to help out when I do retire,.It will basically retain my services and hopefully prevent 1300 orphan patients .And if I do make the decision to stay a few more years I will feel better about accepting new patients which I now decline.								1				1
Compensation will alow us to better pay our support stay to releive us of administrative burden	1											
Maybe. Hire exec director to organize HR, IT ,etc around hiring NP etc to care for more patients	1			1								
It might make it possible to switch from walk in to having my own practice								1				
Would allow me afford a nurse to help with patient flow and care freeing up my time . Just had one nurse go up north with more pay , another on mat leave and very hard to find a nurse that will work for $25/hour. I have to book less patients do I can keep up with the day.	1											
Cover over head						1						
If the increase in compensation goes towards adminstrative tasks, I'd have more wiggle room to later on tackle more.patients	1			1								
I would feel validated in the work I do and would consider working more		1							1			
This would incentivize more clinic days vs picking up additional (high remunerated) in-hospital shifts (local ER departments)												
This would allow for added staffing to help cover more clinic appoints and/or cover more administrative work to open more clinic time for myself	1	1		1								

Hire more support staff, reduce admin burden if appropriately compensated for it which opens up more time to see patients.	1		1		
being able to hire more medical assistants and supportive care to help	1				
I will be able to hire a NP or PA to assist with paperwork burden, then I can see more patients in my clinical time	1		1		
More admin support so I'm doing less admin, and therefore can spend more time doing medicine	1		1		
I wouldn't change a tire for a dollar but I'd change four for 3 bucks each….money motivates everyone.		1			
		20%			1
More money needed to just keep my current practise as is. Without it i will decrwae hours fuether due to kther jobs and close my practise.				1	1
Allow more revenue to hire support e.g. NP or PA	1				
I have been actively trying to reduce my practice size so I can have time to take on a SECOND JOB to support my practice. I now take off one day per week from my clinic to work a SECOND JOB to earn money to support my family and subsidize my clinic. I would GLADLY give up my second job to take on more patients or improve access if I actually earned a decent salary per patient.				1	
If I have higher compensation, I can hire physician assistant or more nurses to do some of my tasks to provide more direct patient care.	1		1		
Can hire more staff or open longer hours to accommodate more patients.	1		1		
I wouid be able to hire more staff to phelp manage the administrative side of taking on more, I work without a nurse and minimal staff	1				

Greater ability to pay better staff better wages (staff are leaving due to uncompetitive wages). Increased compensation also means I would be incentivized to shift my time towards comprehensive family medicine, rather than other areas of practice. Currently, I am not compensated properly for my time - if I am actually paid for ALL of my work (including paperwork), I would have a reason to work more in family medicine.	1					1				
If I am paid appropriately for complexity of a patient and for administrative duties, like form completion, then I can take on more patients. It will also allow me to pay for more staff so I wouldn't have to spend my time triaging patients or doing tasks that do not require a physician.	1		1							
i could hire IHP help	1									
Less overhead- more staffing support	1				1					
More hours of operation, staff, supplies etc	1	1			1					
It would help me afford AI, or more admin support :nursing support to allow me to take on more. The current pay as FHO is not sufficient for me to handle more work load within my group. Also PLEASE fix the loopholes that allow walk in docs to bill all the same bonuses, etc without really doing full comprehensive care!	1		1	1						1
Family physicians should be compensated to the sane degree as specialists so that they stick with comprehensive care and stop leaving family medicine for other work that pays better and is easier. Time yo pass legislation that all Canadians should have the right to have a family doctor										1
I will be able to employ more administrative staff to help with the increased administrative workload. I will also be able to employ a nurse.	1									
Able to hire more support staff RPN , assistant, ?NP	1									
Increase payments for multiple issues we address, time based models, payments for phone care, reduce paper loads, and pay for copious forms which often patients can’t pay for. Only some codes given after 5 pm.										1

Would help to pay for additional staff to make my practice more efficient	1							
With more funding, I could take on more patients because I could pay more staff to help run my office. In addition, it would make sense for me to provide more comprehensive care such as inserting, IUD and doing biopsies, which at the current rates do not make sense financially for me to provide for my patients.	1	1						
Use an no to free up my time.								1
Ability to optimize clinic staffing to provide support needed to accommodate more patients			1					
Hire more staff . Less emotionally demoralized	1					1		
It would support the cost of hiring staff to help look after a larger roster of patients.	1		1					
Would allow me to employ additional staff for support and patient care.	1		1					
Increased compensation would allow me to hire more support staff (reception/admin, office assistants, nurses, etc) to help manage the administrative and time consuming tasks of running a clinic so that I am able to provide care/visits to more patients	1		1					
I would be able to hire more staff to be able to use my time more efficiently. I could afford other practice enhancements.	1			1				
A substantial increase would allow me to hire more staff e.g. nurse and nurse practitioner to help see more patients together as a team	1							
Increase job satisfaction, increased motivation to continue working, increased ability to hire support staff to facilitate more clinic encounters,	1		1			1		
Taking on new/unattached patients takes a lot of time and unpaid work, so having this compensated more appropriately would make it more appealing to expand practices.		1	1					
Need more staff	1							
Increase number of registered family patients			1					
Will reconsider staying in practice and not leaving					1			

It would allow me to spend less days doing non-clinic activities which compensate much better (ER, OR assist, hospitalist) I would be happy to spend an extra day per week in clinic allowing me to take on roughly another 200 patients on my roster. Financial incentive to do paperwork would also encourage me to take on more patients.		1	1		1	
It would enable me to pay support staff to accommodate the increase in volume. Our clinic is already stretched thin with multiple receptionists and nurses, and our overhead costs are exceptionally high. I don't think we could handle more patients without hiring more staff, which we currently cannot afford.	1			1		
If compensation was substantially increased I would be able to hire more staff to do things like answer phones in my clinic, call regarding results and triage concerns.	1					
Currently I have become someone who was an overachiever my entire life to someone who does fhe minimum. Why? Because I don't get paid enough for it. I don't get paid for prescription refills, so I make patients come in. It takes up spots. Patients want forms? I ask them to book an appointment- they're not getting my spare time. You want me to review labs and X-rays and consults? I'm booking off blocks of admin time. You have more than 3 issues? You're coming back for an appointment.						1
Hire more staff to be able to manage bigger pt roster	1		1			
I would be able to afford childcare (daycare hours do not suffice for our line of work) and thus be able to work more hours and take on more patients. I also along with my colleagues could afford to hire a nurse to help with clinical care in the office.	1	1	1			
I could hire a nurse or PA to help see my well child visits and paps while I see other patients	1		1			
An increase would be worth taking on patients, right now the current amount is not worth my time or effort			1			

Allow clinic to purchase more equipment, hire scribe, hire more nurse, hire NP and hire AI software for dictation services. All of these would help streamline practise efficiency.	1			1		
I work at a community health centre. An increase in compensation may sway me to increase my FTE, and thus roster more patients.		1	1			
The increased funds would allow us to hire additional admin and PAs	1					
Will be able to hire more staff to do administrative tasks and paper work that I do.	1					
A more fair and robust compensation system is needed to reflect the value of work of FP. Even though 3 or 4 issues were discussed at one visit, only one diagnostic code and one billing code (A007) was permitted, which was depressing. FP was dumped by many non-compensated work. For instance, patient came for 30 staples removal after spine surgery. It was very time consuming, and FPs have to provide all the materials to remove the staples and dress the wound, but only A007 can be billed.						1
Would be worth rostering more patients if payment was higher			1			
Hire more staff to do more admin stuff so I can do more doctor stuff	1					
may increase hours and have more support staff	1	1				
Currently when we are not in office we close the doors. We can't afford to pay staff if there are no physicians working that day. This means we are hesitant to roster more patients. We've also stopped doing certain procedures due to the cost eg if our autoclave breaks then we won't be able to replace it and will have to stop doing iuds, circumcisions, lumps and bumps.						1
I would be able to have more support staff that I can delegate some tasks to them and that would give me more time to see patients	1		1			
Allows access to better supports to provide for patients. Maybe even auxiliary services too	1		1			
I would be able to afford to higher a nurse practitioner shared amongst my colleagues.	1					

We will be able to keep clinic open more hours.		1				
Motivation which will cause better care		1				
An increase in roster size means more resources are needed						1
Hire help						
There would be funds available to hire allied staff (eg admin,RN,RPN) or employ technologies that may improve efficiencies in thin my practice. Thereby enabling me to care for more patients. With current expenses and resultant take home pay there just isn't enough funds available for these additions.	1		1			
Increased compensation would help me hire a nurse, giving me more time for the tasks only I can do	1					
I would be able to afford more support for my practice in terms of staff, interprofessional healthcare providers, and technology. This would allow me to focus more of my time on direct patient care, which would improve access and enable me to attach more patients.	1		1	1		
i closed my practice because after all the free work i was doing i was pain less than $90/hr- I am currently working in ER instead, where I have set shift start and end times and make $250-$400/hr, but I dont like working so many nights!; if the workload would decrease or the compensation would incease, I would re-open a family practice with about 1500 patients					1	
I will feel that I am compensated fairly for the amount of effort i have to put in, the sacrifice I have to make to my own health and family, as well as the liability that I have to take on						1
able to afford more staff to improve efficiency and roster more patients	1		1			

with our present fee schedule, I get paid 50 cents on every dollar of work done !!! So I am looking for a very substantial increase in the atrocious fees paid by the bureaucracy - and i encourage new Doctors NOT to go into Family Medicine because they will NOT be able to pay their bills, and have a decent life style - so, negotiations need to be real nasty, and tough as hell on these bureaucratic minions.								1
Allow hiring nurses and nurse practitioners. Pay for online booking system and EMR efficiency add-ons	1			1				
Could potentially hire an additional nurse to help with patient flow so allowing me to see more patients.	1		1					
Would make the additional work more palatable.							1	
Can hire more staff and use new technology.	1			1				
I would be able to keep my practice open. Without a significant increase that allows me to cover overhead, I will be forced to close my office. I can no longer afford to pay staff and rent, and all other enforced annual expenses associated with being a family physician.	1				1	1		
I currently locum and would be willing to open my own practice if an increase in compensation were offered. Right now, it's not worth it for me to have my own practice and instead, I'm looking at doing a focused practice even though I love family medicine and primary care.						1		
Often the 15% extra for evenings and weekends makes it easier to be available when I would rather enjoy my time with my family								1
It would allow me to hire locum coverage and hire more allied health professionals (NP, RN/RPN, PA) to allow me to take on more patients and have my patients have access to more timely services more often	1		1					
Able to employ more staff and nurses	1							
Being able to pay for staff, supplies	1				1			

I have reduced office hours by 20% recently, and plan to reduce further or quit if things do not improve for family doctors. An increase in compensation would help not feel so abused and like it's not worth working.		1	1	
GPs are significantly underpaid even now, to take care of the present patient loads. An increase in compensation is needed to just cover the cost of business and keeping the lights on particularly as pay has failed to increase with inflation. More money is needed to obtain the tools to run practices run smoothly, cover the costs of equipment, prevent more physicians from burning out and closing their practices, to incentivize those already in the career to practice community family medicine.		1	1	1
Can hire more help to streamline practice	1			
You cannot run an independent FHT currently on $38 a visit without a pharmacy subsidizing the lease.				
If that rate doubled I would consider reopening a family practice that is currently closed due to lack of financial viability		1		
It will help to think more about quality rather than quantity!				1
This is an unprecedented time where family medicine is under attack from many fronts. The role of family physicians is undermined by NPs, pharmacists and the government has done little to account for the increased administrative burden saddled on family physicians. Running a family practice is no longer a financially viable option and as such I chose to pursue jobs in hospital settings rather than take on a family practice. An increase in compensation would encourage me to provide primary care		1		
Hire staff, concentrate on patient care	1			

Incentivize me to spend more time on comprehensive family medicine rather than other more financially feasible work. This will need need to be a big increase to make me want to do more comprehensive family medicine as other work is usually less stressful, less commitment, more rewarding, better paid.		1		1	
Getting paid to take. On orphan pts					1
The current sentiment in family practice is that we work hard and are undervalued. Many of us supplement our income by other means and devote less of our time towards family medicine as a result. If the compensation matched our value, we would be more inclined to spend more time practicing family medicine.					
increase work hours					
Hire additional staff such as RN, NP, SW, MOA	1				
Hire more staff or spend time on quality improvement to get processes working to maximize efficiency invest on equipment that improves access, get more training or software support, be happier to work evenings and weekends, favour semi urgent care access	1		1	1	
1. Will be able to afford more staff 2. More incentive To work due to better compensation for doctors and staff	1	1			
1. Will be able to afford more staff 2. Incentive to work more., Currently the extra pay per patient is not worth the extra work involved	1	1			
I currently don't have a family practice because the compensation and payment models are so outdated and make it not worth the sacrifice.					1
Not more patients, but better care for existing patients since feeling the work you do is appropriately compensated helps with mental health, and thus productivity				1	1
Increased compensation will allow for hiring more support staff (admin, nursing etc). I would love to see funding to hire a counsellor or therapist directly.	1				

Our pay has not kept up with inflation the last several years despite an increase in wages for our staff and costs associated with the pandemic in terms of PPE. We lose staff to the hospital and the specialist who can offer higher wages. We spend hours unpaid posting for jobs, doing interviews and training. A higher wage would allow us to retain more qualified staff so that we can offset some of our administrative tasks which have increased dramatically. Thus allowing us to see more patients.	1		1			
This could enable us to help cover expenses to ensure we have funds to pay for things like online booking services, dragon dictation and also hire staff to help delegate more tasks so that are able to take on and see more patients.	1		1	1		
Hire additional staff if the increase was significant enough	1					
Allow me to work more hours in my family practice rather than seeking work elsewhere.		1			1	
Increase in compensation will allow me to spend more time in comprehensive care family medicine instead of supplementing my clinic with other higher paid jobs.		1			1	
I would consider return to full-time comprehensive care practice and open my roster to 1100-1400 patients					1	
I currently work only in focused practice. I would consider practicing general family medicine if it compensated much better.					1	
Less time doing other jobs that pay more, more time doing family medicine					1	
I would consider starting a practice					1	
Increased incentive to work harder, ability to employ more staff to allow for better access to services, more effective triaging, etc. Also able to justify using increased technology such as AI scribes, dictation, etc that will decrease the amount of time spent on paperwork, notes, etc.	1	1		1		
Compensating my work I mean extra work that on do in evening and weekend maybe a motive for me to take extra patients which I am already doing						1

we are underpaid. if you ask us to take on more patients, increase our workload, then we need to be compensated for it					1
Not retire early				1	
Outdoor hire more staff to help with administrative burden, triage appointments, hire allied health care eg dietician, social worker	1				
Could hire an RN.	1				
I may consider spending more time doing comprehensive care than other areas of medicine				1	
Could add staff to help with non MD tasks	1				
I would be motivated to continue working in comprehensive practice				1	
I will be able to afford help from another healthcare professional to help him manage administrative work, including patient triaging.	1				
More money would incentivize me to spend more of my time in primary care. Else I would give up my practice and find more work				1	
Wound assist in hiring extra clinic staff (front staff, nursing) to provide with more same-day services, be able to stay open more days in a week and provide after hours care. Also funding could be used to offset cost of using EMR, reminder system and other services for enhanced care.	1		1		
Depending on the degree of increase, hiring a nurse practitioner, adding more support staff, and potentially adding a physician assistant. This will reduce the workload and allow more patients to join the practice.	1	1			
Hiring more staff	1				
Able to hire more administrative staff to help with the operational aspect of the clinic. Also, I've capped my roster size because more patients = more unpaid paperwork, but if the compensation is fair and can be remunerated for paperwork, I would be more willing to accept more patients. After all, no one wants to work for free, neither do family doctors.	1	1			
Possibly willing to take more shifts as a locum	1				
Increased compensation will allow for hiring of additional staff to extend clinic hours.	1			1	

I'll be able to hire staff, pay my overhead bills, focus on my family practice without constantly worrying over applying for jobs or thinking about moving out of province or to another country to afford a normal practice and lifestyle…	1				1	1	1
I would be able to pay for technology and allied health staff to help manage my practice	1			1			
I would be more inclined to practice for comprehensive family medicine, rather than find alternative revenue streams that provide fair compensation.						1	
It would allow me, a new graduate, to feel more confident about my ability to open a new practice that was financially sustainable. Currently, opening a medical practice does not appear financially sustainable or fairly compensated.						1	
Funding for allied health staff to streamline paperwork, reduced admin burden from staff turnover, investments in emr	1			1			
Hire more and retain support staff (receptionists, nurses) to support a larger practice.							
Invest in practice solutions to increase efficiency/productivity (e.g. AI scribes, upgrading hardware/software, tech support)							
Afford renovations and increase office space to accommodate more physicians and patients.							
Attract more physicians to join family practice group with better compensation.	1		1	1	1		
Cost benefit ratio would be altered allowing me to take on new pts. I would be able to move away from non family practice work and increase hours in traditional family practice.		1					

Bringing in more patients would increase the work-load for my staff (loading charts, adding hours to the day) so would increase my overhead which is more expensive than the current benefit to adding patients with current compensation.					
I currently work more shifts in the local ER department as the money I make there (free of any overhead) helps pay for the major losses I am sustaining in my office due to increasing overhead of staff, nursing, insurance for cyber protection, etc, costs of EMR,etc		1	1		
I currently look for "side-jobs" that pay better and have less paperwork or administrative burden than comprehensive family practice to make up my total pay (including surgical assist, cosmetic lumps/bumps, LTC work). There is no drive to take on more patients when the workload is intense - unremunerated admin work, downloaded work from specialists, more after hours per MOH, and the cost of operating a business (my clinic) which is currently a failed business model, just to take care of them.			1		1
So that I feel valued and appreciated for the work that I do.				1	
I could do video - virtual medicine (which is the only option I have) if the rate was consistent with fee for service. The current rates are a joke and do not allow one to pay the costs of running even just a virtual offkice.					1
help with admin support-help subsidize staff, rent, supplies which have all increased in price yet my compensation has not. more patients calling means more staff time, supplies, and more of my time which is not compensated well- will increase morale and allow docs to feel valued and integral to the health system	1	1			

Right now, I am a rural family doc providing full scope cradle to grave care. But I choose to keep my practice small because taking on more patients is not worth the emabarrasing capitation rates I get paid. Instead I choose to do other things to make money such as air bnb rentals of my home and working cash jobs with a contractor friend of mine.					1
Extremely high overhead costs that are increasing at or above inflation and very poor compensation					1
I would be willing to work full time rather than part time		1			
I would be able to focus more time working in my practice instead of other part-time commitments, that pay better. I also would be able to hire an NP to help provide appointments and scale up my practice. At the moment, I am actually planning to scale up my other work and keep my family practice the same size or reduce due to the discrepancy in pay and time commitment.	1	1		1	
With greater financial reward, I would have a greater incentive to work harder - increasing number of half days, etc. However, in a FHO model, attaching more patients naturally comes with an increase in pay and therefore the increase in pay should be substantially more if I were to roster more patients		1			
Shift work back into regular office practice from Hospital/After hours/OR assisting etc...				1	
Feel more valued, spend more time in family med, deal with more admin that more pts bring	1				1
There is literally a disincentive these days to perform in or start a primary care clinic. Meaningless raises and hammering by increased overhead plus failing morale. Most family docs I know, including me, are seeking exit strategies from primary care in ON. Other provinces are listening. Pay is the issue, not teams or some silly altruistic theory about smiling, happy underpaid family docs serving every neighbourhood. Providing better pay is easily in the government's grasp.					1

It would reduce my financial burden and allow me to implement more measures to manage administrative burdens. (Example: paying my secretary to take on more tasks)	1				
Increased ability to fund additional staff and possibly depending on the increase allied health. Increased ability to hire a locum for periods of time when I am not available or doing my academic work.	1				
with our aging population.. each patient is now taking longer to properly assess given that they have multi issues. Right now, a physician feels resentment when they work an 7 hour day, and 10 hours into the day are still working. The feeling is that with exhausition, fatigue, and illness you end each day working several uncompensated hours (FFS). a raise may put a different light on it.. better yet,,, introducing a small OHIP "after hours chart completion" code may work.					1
I spend 2 days a week at a walk-in, if primary care paid more then I'd take those 2 days back in my family practice for rostered patients				1	
An increase in compensation would encourage me to work more hours in family practice.		1			
It would not make me want to take on more patient BUT it would make me less likely to further decrease / shut down my practice and in turn increase the number of orphaned patients.				1	
If I'm paid fairly for the work I'm doing then I will take on more patients. Patients are far more complex, multiple issues and also more entitled coming in armed with their own information thanks to all the misinformation out there... Doctors struggle to combat all of that, manage multiple issues, fill out unpaid forms.... If there is no increase in compensation, there is no incentive to take our new patients..					1
Increased compensation would allow improved patient access by better front staff levels and technical solutions such as online booking	1		1		

It would stop me from quitting my practice. It would allow me to hire and retain competent staff, and incorporate more technology to help with patient care.	1	1		
We could afford more staff to increase our hours of service and we could hire a nurse.	1			
Increase our pay… we are drowning in debt. Family medicine is the least appreciated specialty while it's the most important part of people's wellbeing. ..				1
I could hire more admin staff. I could hire more locums (who get paid more than I do) which would enable me to stave off burnout.	1		1	
it would enable me to pay for more admin support to support my practice and free up the ++ admin time that I currently do myself to spend on clinical time with patient.	1			
We should revive a new patient bonus of $500 for all new patients. This would compensate me for the time spent reviewing old records and coming up with a treatment plan. The current unattached bonus is unfair to those patients moving to a new community as it forces them to de-roster from their previous physician, leaving them without care so in the situation of a patient moving, a new patient bonus should be paid to their new physician as well.				1
More staff. I could actually afford locums which would allow a vacation and less burnout. I'm way too burned out from lack of time off to take more patients.	1			
Given the strain on family physicians and the unsustainable administrative burden and low compensation relative to colleagues, taking on new patients at this time is not possible. An increase in compensation would allow this.				1
I would be more likely to open my own comprehensive family medicine practice instead of doing other more fairly compensated work		1		
Would bring me back to full time family medicine. I have recently gone part time to work in another occupation.		1		

I would be more likely to open a practice				1
Could afford to hire staff to do jobs currently downloaded to physician (eg nurse to give injections/etc) which would make my time more available to take on more patients. Due to the professional responsibilities associated with delegated acts, I would not accept a nurse/physician extended hired by a third party who didn't have direct responsibility to me - so increasing compensation would allow me to hire a team.	1			
If family medicine was more appropriately compensated I would be more likely to open a community practice (currently locuming family clinics and doing hospitalist work)				1
It would make it more viable to afford staff and overhead	1		1	
A significant increase would allow us to increase staff members to help with the increased workload.	1			
With the current compensation model, if I have any extra time I will pick up ER/Hospital shifts over increasing my patient roster.				1
I could step away from private health care where I make significantly more and dedicate more time to a larger roster, hire a social worker and nurse to offload patient encounters that require solving social issues and focus more on actual medical care needs of my patients.	1			1
More inclined to improve hours, perhaps hire a nurse	1	1		

STOP TALKING ABOUT FUNDING HEALTH TEAMS. THIS IS USELESS. WE TAKE CARE OF 24,000 PATIENTS IN REXDALE - 10 OF US ARE GOING TO LEAVE COMPREHENSIVE MEDICINE REGARDLESS OF TEAMS IF WE ARE NOT PAID BETTER AS WE ALL MAKE WAY MORE DOING OTHER WORK. IF YOU PAY US BETTER WE WILL STAY. AN RN/PHARMACIST/NP CANNOT GO THROUGH MY LABS, SIGN INSURANCE DOCUMENTS, ADJUST MENTAL HEALTH MEDICATION, REVIEW 200 LABS/DAY AND SEE 30 PATIENTS IN A 6 HOUR WINDOW AND THEN DO 3 HOURS OF CHARTING.						1
We do not need teams. We need money to create our own teams. We do not need NPs, we need RNs. We do not need scribes - we need paid admin time.						1
With more money to hire the appropriate staff or increase the hours of my current staff I can handle a larger patient load. With higher compensation I am willing to revert back to my old schedule of work hours which I have gradually reduced over the last few years. I can resign the patients I let go of. I used to have a practice of 1700+, now I I have 400	1	1	1			
Physicians need to be paid more period. Increase our FFS rates						1
I can cover the expenses better and focusing more on patient care				1		
It would allow the following. Less time spent chasing 3rd party billing which has become a more important source of income. Less time trying to optimize billing. Less time spent meeting with office to try to optimize office expenses which continue to increase.						1
I could hire others to do tasks to decrease my non patient facing workload (filling out forms, looking up appropriate specialities to refer to who are accepting etc)	1					

Would allow me to do less “other things” and focus on patient care. Would not have to supplement my income doing extra work. Would also help me feel more motivated to complete admin work in a more timely fashion					1	
Increase in funding would allow me to feasibly allocate more time to my family practice instead of other more well paid opportunities. Increased compensation also allows us to properly retain our existing staff and prevent high staff turnover. I would be more motivated to work additional hours if I felt I was being appropriately compensated.	1	1			1	
Paying family physicians more will allow us to hire the staff and help we need to see more patients and stay in practice. Each practice and patient population is so variable that only the family physicians will know what they need in order to survive and stay in practice	1					
All overhead costs are increasing for GPs. Many GPs are looking to retire or change to hospital based salaried positions due to the lack of compensation, lack of support, overwhelming paper work, and increasingly complex patients. I love family practice BUT a lot of our "easier work" is going elsewhere (online MDs, private NPs, and Pharmacists). This leaves us with long appointments, long wait times, and complex - multi-issue patents. $37 does not cut it. (private NPs are charging $75).						1
If I can afford to hire a regular nurse to help me with simple day to day questions and requests that fill my appointments, I can take on more patients	1		1			
More money will allow me to hire admin assistant (NOT FHT TEAM MEMBERS) whom I can train to provide admin relief (as it benefits me) allowing me to see more patients - ie take on new patients and improve access !	1		1			
able to afford more support staff and training						
afford AI tools to speed up documentation time	1			1		
hire additional office supports	1					

More compensation means allowing me to pay appropriately for my overhead and my staff	1			1				
IT WILL MATCH INFLATION AND ACTUALLY GIVE ME A LIVABLE WAGE, HIRE MORE STAFF ADD IN MORE SUPPORT AND HOPEFULLY KEEP ME IN COMPREHENSIVE FAMILY MEDICINE	1							1
Hire a nurse so I can offload some responsibilities that don't require an MD. Hire more admin staff to address patient matters not requiring an MD. Buy surgical equipment so I can do procedures instead of referring these patients to a specialist. Pay for online booking.	1		1					
Willingness to work more hours.		1						
More motivation. At this point why bother taking on new patients, I get a pittance per patient! And if enough of an increase I could hire staff to improve throughput in my office.	1	1						
If I felt valued for the work, I did, I could take on more patients, knowing that I am able to find my office. I could utilize my nurses appropriately and my staffing to help with the day-to-day work that I undertake. We cannot afford our auxiliary staff, and thereby cannot afford to to have more patience because I need more help with my staff.	1					1		
If there was a sufficient increase in compensation, I would either open a practice or work a longitudinal locum allowing another doc to take on more patients.					1			
I would feel more valued by public, government and other specialists and have more mental bandwidth to do my job. Right now I'm doing comprehensive care but also other work that pays the same but has less admin. If I made substantially more would consider doing more primary care.						1		1

I'm currently and actively questioning to myself whether I feel that my practice is "full" vs. "80~90% full and could accept a bit more". I'm feeling fairly burned out and I'm not feeling too motivated for the latter option. Especially with the way family medicine compensation has been lately (and compensation trends have been lately), I'm leaning more towards the conclusion that "it will not be worth it" or that the "increased risk of even more burnout outweighs the benefits".				1
Can accommodate more patients wi the increased compensation. Can pay staff to assist - also more motivated to work more hours				
I'm an FHO doc. If higher pay doesn't come soon, then less patients will be attached because I'll be closing my practice and move elsewhere.				1
Would add more meaning and value/worth to our profession as a whole to be motivated to take on more patients. At the current rate and compensation we are provided to engage in comprehensive care it's not worth our time or effort			1	
Allow for increased working hours by paying for other tasks in life to be completed.		1		
hire nurse or medical assistant	1			
would be willing to work more clinic days in my family medicine practice be adding on more well-@compensated shifts elsewhere		1	1	
I would be able to hire a nurse or a PA	1			
I need an increase in funds in order to higher more staff to take on the administrative burden. Any money that goes to "teams" instead of directly to the physician does not and will not help serve this purpose. I need money to be able to take vacation time and get locum coverage so I do not burn out.	1			
it's all about incentive - simple economics to increase productivity		1		

| | | |

1. Increase wages for staff 2. Help cover year over year increasing overhead costs 3. Provide appropriate compensation for many hours spent doing unpaid administrative duties 4. Provide family physicians an appropriate compensation relative to the industry standard	1		1	
Hire a nurse/PA	1			
Allow me to hire a PA or NP to share .in my family medicine group.retain me as a physician for 5 more years instead of retiring	1			1
I can hire an MOA	1			
If there is significant increase in compensation with adding more patients to my roster, I will be so motivated to increase my roster significantly and accept the associated increase in workload and administrative load associated with this increase. This is the only motive and reason that makes me increase my roster size. In my opinion the current compensation fees are so humiliating and embarrassing. The only solution that we agreed on is to increase the compensation that we deserve .				
		1		
1- I will extend my clinic hours since I will be able to pay my staff better.		1		
I would be more motivated to work longer hours and see more patients. Right now the compensation is not great for seeing more patients. Right now i would rather work as a hospitalist or surgical assist instead of taking on more patients as these jobs pay better and have less work		1		1
I would be able to hire the appropriate support staff the help manage a larger patient base.	1			
would Allow us to hire more support staff - RNs, RPN, other	1			
More incentive to work more hours, build my own private practice and expand roster (currently in specialized practice with only 200 roster)		1		

In hospital practice.....better compensation means less time running around doing token visits to generate fees and more time spent with families, HomeCare, community helpers, organizing discharge for success, moving patients through hospital TO home instead of in hospital AS home, reducing deterioration in patient ability and the inevitable pathway to Long Term Care			1
I currently am locuming for FHO physicians as well as practicing walk-in. I do not think it makes financial sense to start a practice. I can work in Sioux Lookout where I do not have to roster, I can do private medical billing for companies where I get paid much better. Private pay from internationals who do not have OHIP pay 100 dollars compared to the 37 an A007 makes. That tells me my market value as a physician and unless we get paid better I do not see why I should roster patients to me.			1
An increase in pay would make additional work hours worthwhile, while at the moment increasing hours only adds a minor financial benefit.	1		
I would be able to hire additional staff to help with administration	1		
Our clinic has been hanging by a thread as office rent continues to go up sharply, staff salary continue to go up sharply, while our compensation remains marginally changed. We resorted to reducing staff hours to limit expenses, and therefore reduce patient access to care. The answer to this question should be a no-brainer.			1
It would incentivize family medicine again. I've thought about quitting if there's no change in pay, that's 1000 patients not attached. If there is better compensation it will help retain current family doctors and attract new grads to start practices. Right now family medicine residents are not opening practices. This is very problematic. When Covid hit there was incentive to work those clinics. Increase compensation will incentivize doctors back to family practice, or they will leave		1	1

Incentive to take on the complex patients that exist. Right now there is no incentive. There needs to be an out of basket code in FHOs like (k037) to compensate for complex patients which require more time and follow ups.				1
I would actually start up a comprehensive practice again. I had to close down a few years ago because it is not a sustainable business model currently. If the pay was reasonable (ie. Following OMA prescribed rates AT A MINIMUM) then I would be happy to open a new comprehensive family practice again, and attach anywhere from 900-1300 patients, with a plan to practice for the next 3 decades.		1		
Currently, with the costs of rising inflation, family doctors can barely keep their head above waters and are having difficulty keeping their doors open. If there was a significant increase in compensation this would allow us to higher additional medical staff (Nurses, social work etc..) and care for more patients. Family health teams are so limited in terms of physicians working within them; the funding needs to be at the individual physician level gives more motivation	1			1
Ability to hire staff to support work load, offset office costs, decrease burnout	1	1	1	
I would not have to find other work that I am currently doing to generate income in another clinic/hospital		1		
I am not willing to add more patients at the current level of compensation. The workload involved in each patient is already burning me out				1
I would actually consider opening my own practice in this province, rather than continuing with locum arrangements. Until compensation is increased for Family Physicians (i.e. a commitment from the Government of Ontario to Family Physicians - NOT "team based care"), I will likely not take on the overhead required to have my own roster of 1500-2000 patients.		1		

More $ available to hire clinic support staff. Less burnout when we are compensated appropriately for our time and work	1				1
Right now, I refuse to open my own primary care practice. I love general cradle to grave primary care, but the compensation is just too poor and the workload is too high. I have a focused practice, and sometimes locum in primary care to keep my skills up, but if admin burden went down and pay went up, I would likely open up my own practice, and serve my community. As is, I refuse to open up a practice, I don't want to be tied down or stuck financially on a sinking ship.				1	
Increased compensation can help support hiring additional administrative and clinical support staff	1				
Can spend more on hiring nurse/moa to go thru paper work and inbox so I can see more patients	1				
I would focus more on OHIP care (give up more lucrative non OHIP care contracts)		1			
Hire more staff to help with paperwork, offloading so I can deal with direct patient care	1				
Improve access, improve staffing due to inflationary costs	1		1		
Hire more support staff to assist in delegated tasks and paperwork management	1				
An increase in compensation will at least off set the significant administrative burden we hold and thus incentivize to have more access/ patients because right now $37 for visit plus attached labs/ paper follow up is just not enough and morally affects my desire to take on any more	1				
This would add more value to the work I do and support the very high overhead costs we're facing				1	1
Minimum 10% to cover overhead cost and inflation costs of running my clinic				1	
increase support staff to delegate tasks and maximise my time providing medical care to patients.	1		1		
I could afford to hire an extra secretary to do admin work and support.	1				

Increased funding will allow family physicians to better run their small businesses and hire support staff.	1							
Allow more office redpurces								1
If compensation doesn't increase, I'm planning to leave my practice in 2 years when my lease is up. This will leave 1200 patients without a family physician; it's unlikely I will find a replacement. I'm saddened at the thought of abandoning my patients, but it doesn't make sense financially. If compensation is significantly increased, I will likely practice another 20-30 years, and would increase my roster size and scale back on other work I am currently doing to subsidize my family practice.					1			
I may open more spots to see more patients and soend more time with current patients.			1					
Money incentivizes work .		1						
I feel that my work is not valued. If I had an indication that it was, I would happy to consider helping the situation Ontario.					1	1		
Would allow me to add more nurse/ancillary staff hours to improve patient care and management; would facilitate better access to care. Potential to add more services for patients also. Additional funding would allow exploration of technology solutions to improve care and access.	1		1	1				
higher pay directly for physicians, not teams								1
Increase in compensation will help to higher staff , to improve equipment in the clinic , to feel you are being paid to provide a device rather than underpaid and overworked	1			1		1		
Be more adequately remunerated for the expertise, responsibility, hire midlevel provider w workload, allow for savings and investment knowing we can care for our financial health while reducing $ stress that contributes to burn out, improve faith in our profession and the system to compensate more fairly. An esthetician bills out at $3/ minute or more for a facial. I make less in emergency medicine hourly for example.								1

I am burnt out. I feel underappreciated. I feel my time is not valued. An increase in pay will allow me to feel valued, invest in technologies and supports to reduce my burden and thus take on more patients. In the current climate, it makes no sense to take on more patients. I'd rather spend my time working in other settings which is what I do.						1
Right now, I can’t afford to take on more patients in my family practice. I offer 3 full days of clinic appointments per week, but have to do side hustles (ie surgical assist) to supplement my income as the costs of running my family practice are absolutely crushing. I am less than 4 years into practice and I honestly don’t know if I can survive in clinic practice. I love family practice and would be able to take on more patients and improve access/patient facing hrs if I was better compensated					1	
Hire more staff and utilize new technologies.	1			1		
An increase in compensation would allow me to hire additional staff to aid in paperwork completion, or to split between myself and the other physicians in my group salary for social worker or physio taking some patient visits off my plate and allowing me to add additional patients.	1		1			
I will not be forced to close my clinic, I will increase clinic hours and will be able to afford hiring more staff, perhaps another family doctor would agree to join with a competitive split	1				1	
Would be able to hire our own team members to increase efficiency in seeing patients, and increased compensation can help compensate for UNPAID admin burden causing burnout	1		1			1
Would make me more motivated to work more, see more patients and feel properly compensated allowing me to devote more time to care		1				

This is all about increased compensation. I prefer and enjoy family medicine, but do hospitalist simply because my practice does not make me enough money. If I was paid similarly, I could easily drop my “side gigs” to roster my patients, because I enjoy family medicine more. My practice is 850 patients, and I could easily roster another 500 if this change is made				1	
I pay 32% of my salary to work in a clinic in area that is high cost already and the clinic could use more help with staff which we can’t afford. If there’s more staff I can allocate task to them and use that time to see patients then paperwork/charting. This improves hours i can be available directly and also may be able to take more patients.	1				
I would be able to hire more help for admin tasks which would open up my availability to patients	1	1			
Part-time CHC employee - would actually like to have more hours, but budget limitations prevent this and my roster is full.					1
Instead of working as a hospitalist, I would spend more time as a family physician				1	
help pay nursing & clerical staff	1				
I don't currently practice comprehensive primary care, focusing instead on areas of focused practice, in part because these are more lucrative. If it were more financially viable to practice primary care, I would be more likely to open a practice.				1	
At the moment< there is no incentive to accept/enrol new patients, thus, why do it?! Just more paper work with no compensation!					1
getting more pay for over-work is common sense.					1
Considering leaving outpatient family practice. An increase in compensation would allow me to keep practicing outpatient family medicine and continuing care for current and future attached patients.				1	
Motivation to take on more patients and be appropriately compensated		1			

I could financial justify working more hours. I could see more patients, work more hours if I was paid to do so.		1				
- increase staffing; decrease stress/burden of keeping up with office expenses, more "value" for working more	1				1	
Would feel more valued and therefore more willing to work harder		1			1	
Allows to handle the burden of costs better						1
More $ to retain staff (nurse, secretaries) and possibly hire a PA to help with practise management. Actually I would then definitely try to hire a PA and try to increase my roster size by another 200-300. I am more likely to spend on a AI scribe type of tool to further increase my practise efficiency and see more patients less admin work. Less mental/financial stress they are all tied together. Feel my work is valued, less grumpy and more incentives to work	1		1		1	
It was more fairly, compensate me for my time seeing patients and doing administrative work associated with patient care. It would also allow me to staff the clinic better.	1	1				
The increase in compensation would allow me to hire more staff to fill out forms and address other administrative issues. This will free up my time to take on more patients.	1		1			
I would be able to ensure the well-being of my staff and potentially have a clinic nurse more often.	1					
I'll decide to still be a family doctor in comprehensive practice						1
I could afford more clinic hours and pay staff needed to man the clinic during that time.	1	1				
With inc compensation I can invest in more staff to extend my time. I can also invest in improved EMR software to make my practice more efficient. It will also allow me to take vacation time because I will be able to afford a locum. That will reduce burnout and keep me practicing longer	1			1	1	

I currently feel like the demands of the job are not worth what I take home and am on the verge of closing my practice. If I felt my work was valued as it should be I would likely feel less burnout and be willing to take on more patients.		1	1	
Administration compensation similar to BC model to				1
While I am absolutely unable to accept more patients and consider gradually reduce my current roster,mainly due to unbearable administrative burden and complexity of nearly each of my patient, better compensation will give me extra time to spend on my current patients and feel less frustrated				1
Considering leaving if compensation not increased. Bc compensation for clinic is so poor I'm doing other things like surgical assisting, teaching and sitting on boards that may pay a little less on paper but when you take into account that I don't have to pay overhead on that income, and that the time commitment I sign up for is actually how much I work and get paid for, it's actually better paid. Currently pay 30% overhead for clinic, and end up doing so many hours of unpaid admin.				1
perhaps I could hire more staff to help with this	1			
Ready to leave fam med. see 5+ complex things in a visit on avg, so much overhead, unpaid admin after appt, no pension, no benefits, so many expensive union fees, and unfair outside use penalties. let's talk about compensation so I don't leave fam med then we can discuss adding more pts. If increased pay only comes with stipulations and less freedoms I'm leaving. Wanting to add more team members without incr compensation makes no sense, good luck having a team of NPs + scribe w zero GPs				1

Able to add and pay better for extra admin staff and myself . Take 20 or more extra hours of unpaid paper works , referrals etc . Sometimes we get declined by specialist . Eg recently I referred a patient to 6 th endocrinologist . 4 of them seen that patient in past , declined ; I believe difficult patient encounter .	1		
We need to get at least double the fee just to pay our overhead, need to have less paperwork, nurse and pharmacist cannot do my job they only increase my work load and have to be paid for something i have to review the next day			1
need more compensation to even consider staying in family medicine. fam med is a high stress and demanding job- high overhead (30%), no pension, no benefits, exorbitant organization fees, lack of, high taxes and high cost of living, high amount of student debt I took on, I have so little money for how old I am, lost so many years of income training. Would not recommend anyone go into family medicine, and if things don't change I'm ready to leave comprehensive care.			1
More incentive		1	
Better compensation will help with hiring more staff. With more staff, patients can more easily book appointments over the phone and vital signs/other indicators could already be taken by the staff before I enter the patient room. This will help me see more patients. Increased compensation will also motivate me to want to work more.	1	1	
High more staff to assist me, hire a physician assistant or NP?	1		
hire more staff	1		
I would hire my existing part time locum to do another half day + for me so that I can increase my roster size. This is how I am choosing to manage my current roster because I have 2 young kids and it's helping transition back from mat leave. Once I no longer need a locum, I could use additional funds to pay for more nursing time or hire a PA to help with my day to day	1		

| | | |

I wouldn't be miserable due to financial stress. If I am less financially stressed I can allow more space in my life for patient care. The compensation family physicians receive currently is not worth the burden and stress of caring for others lives. So why would I burden myself further? To take an extra patient with all of the new hours required per month for that person, I will make, after taxes and overhead, 7 dollars extra a month. Wow!! What an incentive.			1	1
Truly family practice is not worth my time. The compensation is insulting. I'm planning on leaving within two months. If it were paid appropriately, I would continue some clinic				1
I would be able to hire more support staff to make the practice more efficient. I know my practice the best, so I would be able to direct the increase in compensation specifically to areas where my practice could be more efficient. Increase in compensation would also allow me to dedicate more time towards family practice rather than my other clinical interests	1	1		
hire more staff	1			
I need money for administrative help. The burden is overwhelming and I want to quit practice	1			
Can afford to have more admin and nursing support to help take on more patients or have more access.	1			
Adding more admin support, hours and therefore improving patient access. In terms of attaching more patients, could hire PAs or NPs if higher compensation	1			
More financially feasible to work in family medicine clinic				1
Allow me to hire staff to assist in burden	1			
I am struggling to cover overhead costs and staffing				1

If I will be able to afford to continue provide service for current patients then I will see if there is money left to consider accepting new patient. Right now hardly can afford to provide service for current patients due to low OHIP fees. Suggest to A007 A service fee x 2.7				1
I would have the ability to hire more staff and train them specifically to improve my workflow, decrease my administrative burden, and allow me to spend more time that I spend doing administrative tasks on seeing patients directly. Eg nurse for a diabetes visits to allow me to streamline the process, recall my diabetics. Then if improved efficiency, I could double book patients increase access for regular visits as well.	1	1		
I would work less in hospital and be more available for my rostered patients		1	1	
I would be able to consider funding a part time PA to help with forms and administrative tasks and/or NP (which we lost funding for with our FHO) leaving me with more time to see patients and help with patient communications.	1			
More funding for family physician , NOT TEAMS				1
Could hire more staff	1			
Increased compensation allows me to adequately complete paperwork and be rightfully compensated. It allows me to be paid for the work I do .				1
If I didn't have to count every dollar value i could have a qualified better receptionist (minimum pay they are asking is now $25/hr) and they don't even do 50% of the work. I would spend more time being a dr and not managing my practice and afford a PA or MA . Or best pay NPs and we can have them work with us and take more pts on.	1			
More incentive to work more hours.		1		
This will allow me to hire more staff to help open up clinical hours that are currently being used up to deal with increased administrative burden	1			
I'd consider expanding my main practice more if I was being compensated better (right now I focus more time on other activities)			1	

Increase of AT LEAST 30% which is the amount I currently pay in overhead costs which are becoming very high and not sustainable				1	
Allow us to improve support staff hours and accommodate the volume of paperwork required to increase patient roster size	1		1		
Compensation would help (although not completely) with administrative work afterhours so that I could spend clinical time on patient care	1		1		
It would help me hire the staff needed to reduce the admin burden which would improve access	1		1		
Increased compensation may help fund extra staff to help with shared care	1				
Hire more staff, would keep the locum from retiring.	1				
Hire more staff nurse and administrator	1				
Would be willing to work more hours if appropriately compensated		1			
More pay means we are able to retain more staff and pay our rent which means the door stays open for patients. More staff means more phone calls being answered and more efficiency. Increase in capitation and increase in amount paid per visit would incentivize me to take on more patients and also squeeze patients in for appointments if needed. Moreover it would attract more residents to take up family practice which is in major crisis right now.	1			1	1
I could hire more staff, have better retention of staff given inflation and wage increase. It has become very difficult to hire good staff with wages we can afford to pay given significant inflation. Cost of supplies, rent, technology, insurance has all gone up making it very difficult to afford to pay our bills with current compensation. Hard cap proposal for FHO will PROHIBT me from taking on any more patients as I already bill over cap, would need to reduce my practice size if this happens.	1			1	
Help with overhead to hire admin staff and nursing to help make clinic run more smoothly and enable me to focus on clinical practice rather than admin or nursing tasks.	1				

Allows hiring more support staff to improve efficiency. Also more motivating, allowing me to feel every additional patient is more worth the additional work.	1	1				
Without an increase in compensation, maintaining a family practice is not possible. We are not adequately paid for patient care or administrative work. This is the most important change that needs to happen to affect the family doctor crisis.						1
Hire nurse practitioner to help manage practice. They free up time so I can deal with the insane amount of paperwork. Currently my paperwork time is not compensated and it hinders me to accept more patients. More patients = more uncompensated time for paperwork = less time for my existing patients to actually see me in clinical time. My only solution right now is to get NP to see my patients and while I deal with paperwork. I need compensated paperwork time.	1					
Less burn out, more ability to pay for staff to deal with the logistic aspects of family medicine	1				1	
Current compensation is barely enough to maintain staffing levels right now. As a family doctor paying over head directly out of my billings, more staff members are very expensive. With sub-inflationary increases and needing to pay staff a living wage, I can barely afford the current staff I have. To increase my capacity (i.e. hire a physician assistant or another nurse), I would need increases of 60-80K in my compensation minimum per staff member.	1					
Would be able to afford allied health professionals to help support additional patient load.	1		1			
Additional support staff to allow for efficient and effective patient care	1					
Can hire more admin and free up clinical time	1					
Personally I would feel more valued for the hours I spend taking care of my patients. It could also allow my partners and I to hire a nurse practitioner or physician assistant to allow us to see more people.	1				1	

One of the reasons I don't take on more patients is due to lack of admin staff and time on hiring/training. If I could pay more may attract better admin staff, which would relieve some of my burden allowing more time for patient care. We are short staffed so I am doing some of the admin duties. I may be more willing to pay for tech options (self check in kiosks, online booking) if I was paid more. May be able to replace my colleagues when they retire in 3 years if paid more.	1		1		
I could provide more availability in order to increase access. Based on my current income, I'm not able to put in more hours away from my family.		1			
Afford a PA to assist	1				
HIGHER PAY FOR PHYSICIANS, NOT TEAMS					1
If compensation for caring for a family medicine practice had better compensation, then I may be willing to open a private family medicine practice of my own. Otherwise myself and others are going to pursue focussed practices such as palliative care that would compensate better and have less grunt work and downloading of work from other doctors and specialists				1	
currently a resident about to start practice taking on a practice or building in the current landscape is not feasible nor desired. Will need major revamping otherwise would not pursue				1	
Like many family physicians, I sometimes feel burnt out by the burdens of administration rather than actual patient care. More compensation would allow me to invest/purchase solutions that would help with administration.					1
Help with resources					1
Proper compensation for work done would be an incentive to increase work hours		1			
More compensation and resource will allow for family physicians to be able to provide comprehensive practice					1

I work 2 days a week outside of family practice every week because it pays better. I'm also not going to roster more patients and do more uncompensated EMR work (FHG model)					1
Able to pay front staff to avoid turnover, more funding to pay for locums, able to pay more for equipment to run an office, etc	1	1			
decreased overhead burden			1		
Could hire more staff and improve efficiency	1				
Might make it actually worth it to see patients in a clinic instead of doing hospitalist work LTC work, real estate or other nonOHIP work				1	
I'd be less likely to quit/work in a different area/move				1	
Higher pay..not teams					1
Higher pay will allow me to address needs specific to my practice, which may enable better access to care for more patients					1
Being able to pay overhead/ obtain greater administrative support/ nursing to support a larger practice/ improved access	1		1		
Compensation for administration work and more to appreciate today's inflation and overheard costs.	1		1		
Overall increase in per visit renumeration and attaching new pt fees atleast 10 pts per year will help to take new pts on					1
More compensation will keep me from walking away from my practice of ~1200 patients; if I leave my practice, another 1200 patients will be added to the 2.8M people in Ontario who don't currently have a family MD.				1	
This will help me hire more staff or consider updated software, etc. to better run the practice. The work is so overwhelming and the after-hours paperwork is all consuming, more than just my office hours. I believe I should at least be better compensated for all the administrative work and the responsibilities I carry in all aspects of care.	1	1			

Currently pay is so low per visit and inbox time is unpaid for on top of that. It makes no sense to do family medicine anymore as we cannot even pay for our front staff so family doctors are not incentivized to do family medicine anymore. We are switching to alternatives that are more financially sustainable. If we are compensated fairly, it will allow more family doctors to stay in family medicine.				1
Hire more administrative support to manage my current roster more efficiently.	1			
If I am paid more fairly for the work that I am doing, I may stay in comprehensive family medicine longer.		1		
Cost of staffing has gone up considerably while family physician wages have remained stagnant relative to inflation. Being able to hire better-educated staff with more competitive wages can reduce the number of unnecessary visits and increase patient access	1			
I would be able to hire resources to focus on scheduling , triaging and administrative tasks and focus more on patient care	1			
Would allow me to retain and possibly hire extra admin staff or nursing, so patients can reach us by phone mote easily and nurse can help with visits such as allergy injections to allow me to see more patients per day	1			
At present my practice is split between hospital based and family practice based. My family practice takes up 75% of my time but represents only about 45% of my income. I actually enjoy family practice more and If I was better compensated I would spend more time there. Currently I cannot afford to.			1	
Ability to hire a nurse or PA/clinical assistant to assist with clinical tasks and reviewing reports.	1			
Can hire more staff thereby increasing flow of the clinic and seeing more patients per day. Work more days in office as it would now be worth my time.	1	1		

Improved access by less financial stress about equipment software and hiring and retaining staff							1
It would better justify the amount of unpaid hours required for admin/paperwork required for outpatient medicine.							1
I would increase hours in my office instead of looking at other ways to supplement income.		1			1		
Increased compensation enables me to run my small business more effectively and sustainably, as well as pay employees a fair wage. It will incentivize me to stay in community general practice as opposed to spending more of my time working hospitalist or in the ED, where the financial compensation is far better right now.	1				1		
Pay for more overhead so potential increase in nursing support and admin support. Pay for AI charting allowing for more patient care.				1	1		
Hire more support staff and clinicians (np pa rn)	1						
I would be willing to accept some unattached patients.			1				
increased compensation could make it worthwhile adding additional appointments to my weekly clinic time so that I see more patients		1					
would allow more overhead which translates to more help with my aready heavy burden					1		
If we don't get an improvement in compensation, I will be quitting family practice this year. If you improve compensation, you entice more family practice-trained physicians to re-enter longitudinal care. We do not need more sports med docs, cosmetics or vein clinics. If you want to crack the whip again, don't be surprised when it hits less backs.					1		
Would help with increased cost associated with increased work load. Get an additional front desk staff plus nurse practitioner and a nurse for an additional day . I could extend my work hours from 8 to 7 pm if I had additional nurse practitioner and we could overlap our work hours	1	1					

| | | |

Feeling valued for my role would be motivating to take on more patients. In addition, having additional funds to cover costs for additional office resources to improve office efficiency and ability to serve more patients.			1	1	1
Would be able to afford hiring staff for more hours, would allow me to commit more to practice then finding ways to make money outside of the clinic	1	1		1	
hire more staff to assist in managing the patients	1				
Would allow me to keep the clinic open and pay for employees, expenses, etc.	1	1			
would be more likely to work walk-in shifts, or regular office shifts ---SOme evenings, some Sundays					
I wouldn't have to have an aspect of my practice be specialized in order to supplement income				1	
Could hire more staff to accommodate (eg nurse practitioners). Would also create more of an incentive to see more patients	1	1			
compensation for admin work instead of spending weekdays on unpaid work	1				
I could afford to work less in the hospital and spend more time in the clinic. I could also hire more staff to offload administrative work.	1			1	
I'll be able to take on a Physician Assistant to help with clinical and administrative duties	1				
1- It will allow me to hire more staff to better look after my patients. 2-It will reduce financial stress and allow me to spend less time looking after office finances and logistics. 3-It will improve my quality of care, allowing me to spend more time dealing with multiple complaints and issues/patient. 4-It will enhance job satisfaction (which is next to non existent) and thereby improve performance and allow an increased roster size.	1		1		1
May allow for nurse practitioner	1				
I could hire proper assistance where I need it - my current RN is drowning in secretarial responsibilities	1				

Increased incentive to work when adequate compensation is provided. Reduced burnout by being fairly paid resulting in increased hours worked. Being compensated for hours worked also would increase how much I can work as I am not providing free unpaid work		1		1	
Would be able to hire more MOAs to help with some of the admin work associated with new patients.	1				
An increase in compensation would allow me to pay for the support staff required so that I can run my office efficiently to deal with the increasing demands and allow me to focus my time on patient care.	1				
25% increase minimum					1
To pay for over head, admin work. Family physicians should receive compensation compensation for extra hours spent on patient file, reports, lab review, filling forms ,referrals, and payment to spend more time with patients.	1		1		
More staff to answer calls, nursing to do paps/wart treatment/well babies	1				
I will be able to dedicate time					1
Hiring support staff to help delegate tasks - PA, RN, PA	1				
improved pay to admin staff to allow for better support in the clinic. Maybe hiring an extra nurse in the clinic.	1				
I will actually work full time family medicine. I currently work part time because I cannot afford to outsource certain more menial tasks.		1			
Roster more patients but keep the same access.					1
would be able to hire part time staff to assist with paper work/administrative work	1				
Incentives continuing in family medicine in general, allows for hiring additional allied HCPs to improve clinic flow and be able to see more patients.	1	1			
I will be able to hire more staff, possible RN	1				
Fee to take unattached patient would help me review their past history etc					1

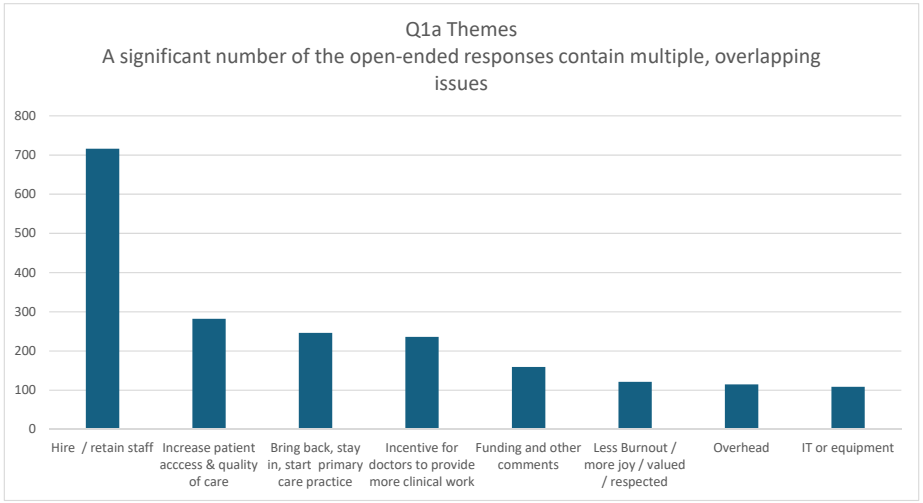
For FHO, remove ceiling/number limit that we can accept in our roster.					
Why would we accept more patient if we are limited and won't be paid if we do?					1
It will show that out hard work is appreciated and paid accordingly.				1	
Please read this very well written article in detail: https://torontolife.com/city/family-doctor-clinic-closing-burnout-inflation/ . also, it was said among physicians (for reference, Dr Mark Dermer who's been practicing for over 2 decades) that part of the problem of OMA and the MOH not able to capture complexity is CIHI data is based on the singular ICD-11 code most EMRs allow for an A007. This is very important deficit in capturing the complexity of primary care at this time.					1
I am a new grad family physician within my first 5 years of practice. I see patients 3.5 days per week and spend 1.5 days doing administrative work. I work after hours evening once every 2 weeks minimum and weekend after hours seeing patients. I work every single evening and weekend 2-4 hours doing admin work. I have 1300 patients. I will leave comprehensive family medicine and 1300 patients will not have a doctor if I'm not valued and compensated appropriately in arbitration.			1		
could hire a nurse or physician assistant.	1				
Would be able to pay for admin/support staff to facilitate administrative duties.	1				
I will work more if I feel I am being better compensated for it.		1			
MORE WILLING TO WORK LONGER HOURS		1			
It will reduce my perception of being overworked and underpaid				1	
I would be willing to put in more time		1			
I would return to comprehensive family practice instead of hospitalist care.			1		
I would start my own practice instead of locuming			1		
More admin support in office	1				

It would allow me the resources to safely manage the patient and compensate my staff who help keep my practice open.	1			1		
Hire more healthcare providers to help me employ more staff and effectively manage the practice	1					
Increase in compensation would allow me to pay for more overhead /staff/nursing and see more patients.	1					
Hire more staff, pay for better technology and training	1		1			
I would feel less burnt out if I was paid for my administrative tasks					1	
I will be leaving comprehensive family medicine within approximately a year. I trained for far too long and worked way too hard to be paid what I am paid doing this job. I am absolutely not going to continue doing any amount of unpaid work daily. It is truly a joke. I am really excited to leave family med and carve my path outside of family med.						1
I would be able to hire more staff and pay the said staff reasonable wages in order for them to work efficiently. More money is also motivator for working harder as opposed to when making peanuts.	1	1				
It would motivate me to do a little more		1				
I can have more resources then to provide better and efficient care for my patients eg hiring NP.	1					
Increase the number of hours per week Ji would allocate to family practice.		1				
Allow hiring of a social worker for palliative care or AI scribe so I can spend more time doing medicine rather than paperwork.	1		1			
Allow to manage more administrative help	1					
1: I will be able to pay for my staff and overhead	1				1	
Money for extra resources						1
Increasing the A007 is crucial to allowing family physicians to see patients. Currently at $38, many are forced to do secondary jobs such as consulting or changing careers into cosmetics.						1
IT WOULD ENABLE ME TO NOT FIND ALTERNATIVE WORK				1		

I would be in a better position to hire an additional family physician to take on a panel of up to 1000.						1
I will be able to pay more staff to answer the calls and pay locum or part time physician to help out. However, it has to be substantial in order for me to hire any PAs, assistant or NP Even if I don't object such people In principle.	1					
More money less problems						1
More money more compensation for admin	1					
It will enable me to hire more staff for help in referrals to specialists and follow up test results, refill of prescriptions and follow up of chronic health issues. Those could be physician assistants, nurses and other secretarial staff. Also, to do more procedures in the office (stitches, I&Ds, etc) that could make the burden on ED less, if there is a realistic payment for them to compensate for the time, effort, supplies and equipments needed for those procedures.	1	1				
Increased compensation would allow our clinic would allow us to hire and retain more + better staff. It opens up the option to hire nursing staff as well. Beyond this, it would also help alleviate burnout from severe undervaluation of our service as GPs reflected objectively poor compensation, e.g. pharmacists being paid $75 for meds checks while we are paid only $56.75 for a physical which will INCLUDE meds check as well. Not being paid for time outside of clinic hours as well contributes also pay for more staff to deal with admin burden, and I would spend more time in my community clinic instead of doing cosmetic medicine and consulting on the side	1				1	1	1
more funding for administrative supports. technology streamlined options (i.e. online booking)	1		1				
Might allow for extra staff support to allow for processing of more patients.	1						
use to hire more help esp NP or RN with extended abilities	1						

It might keep me from retiring. I'm close to that stage of career. Lessen frustration. Fell more valued.			1	1
Increased compensation would be motivation to add more patients or hours for many FM MDs. Currently, compensation does not equate to amount of work that is required of FM MDs.	1	1		

	N
Hire / retain staff	716
Increase patient acccess & quality of care	282
Bring back, stay in, start primary care practice	246
Incentive for doctors to provide more clinical work	236
Funding and other comments	159
Less Burnout / more joy / valued / respected	121
Overhead	115
IT or equipment	109



OMA Ontario Medical Association

2024 SGFP Tariff Committee Survey for NTF/Arbitration

April 19 to 22, 2024

Economics, Policy & Research / 2024

Survey Methodology

2024 SGFP Tariff Committee Survey for NTF/Arbitration

Survey Methodology:

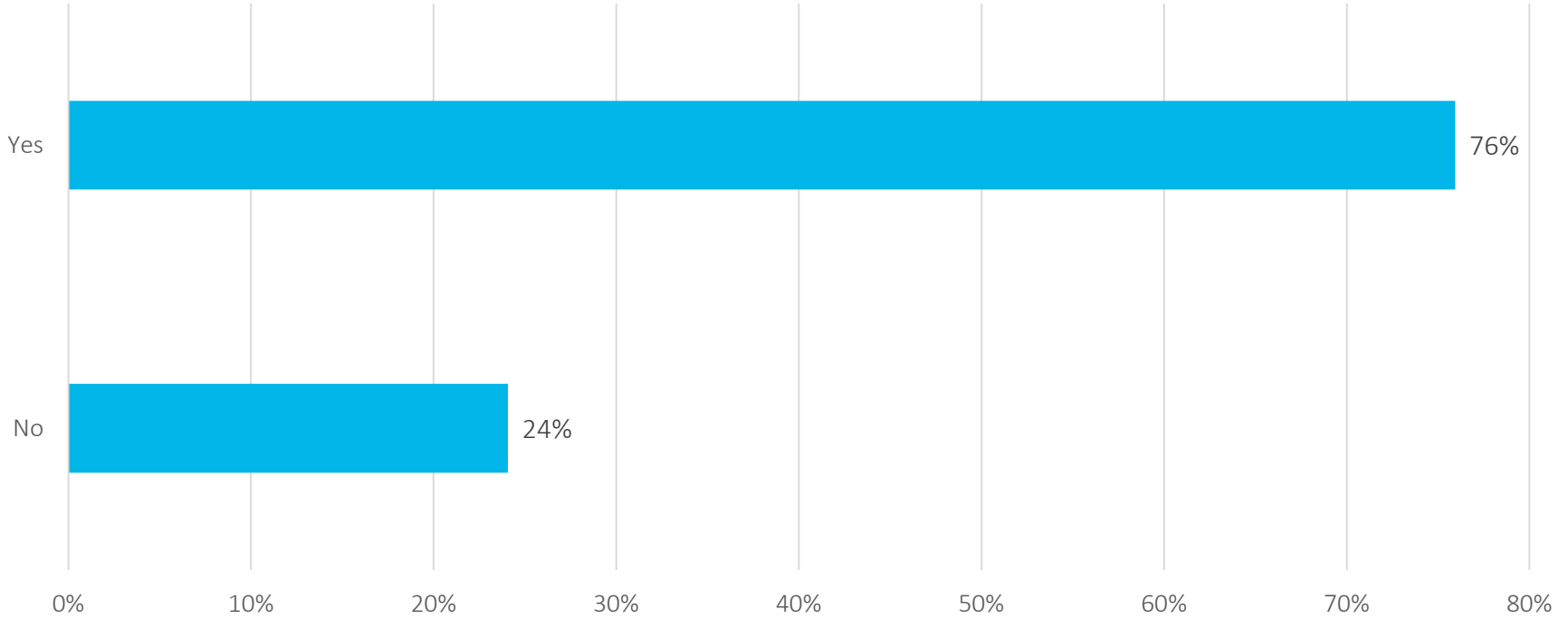
Interim	April 19 to April 22, 2024
Distribution	17,668
Survey Clicks	2,343
Participation Rate	1,978 or 11.2% (includes partly completed surveys)
Response Rate	1,570 or 8.9% (completed surveys)
Median Time to Complete	06:22

Survey Questions

2024 SGFP Tariff Committee Survey for NTF/Arbitration

1. There are **2.8 million patients** in Ontario without a family doctor. Would an increase in compensation allow you to take on unattached patients and/or improve patient access to your practice?

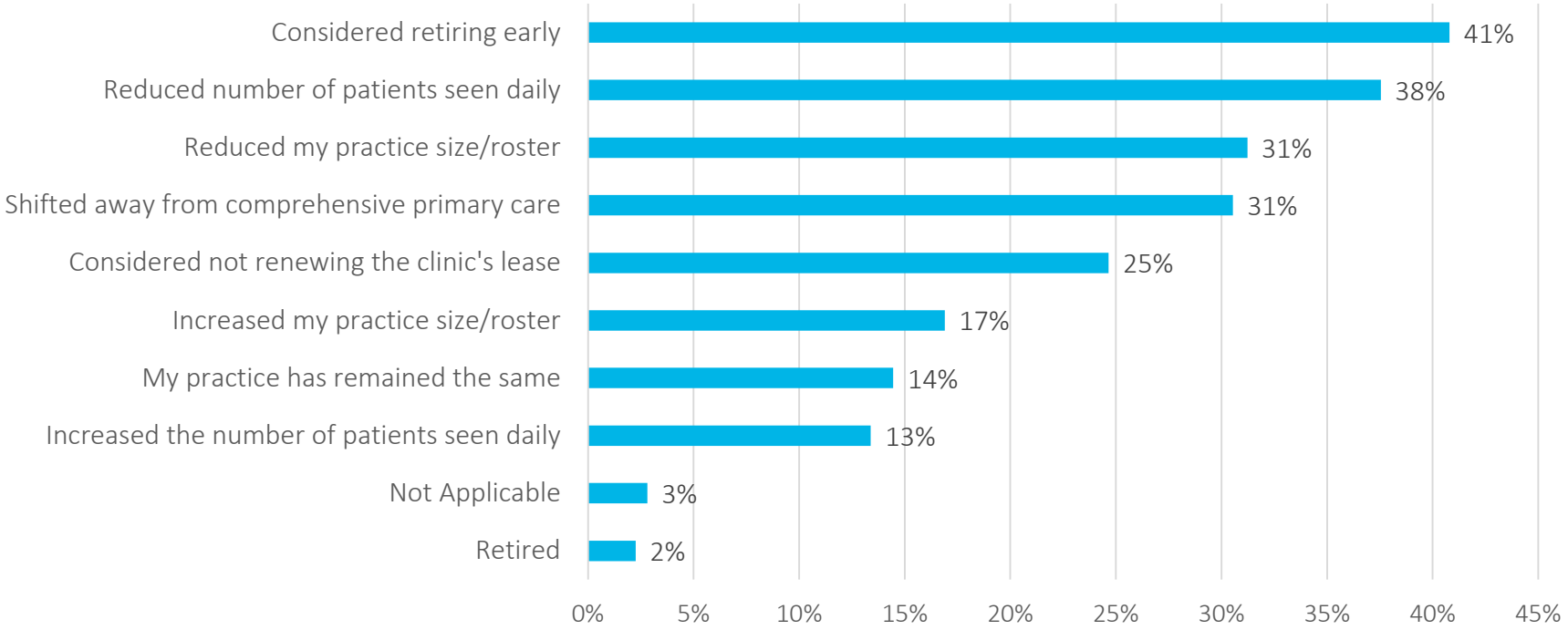
N = 1978



2024 SGFP Tariff Committee Survey for NTF/Arbitration

2. In the past two (2) years I have:
(Select all that apply)

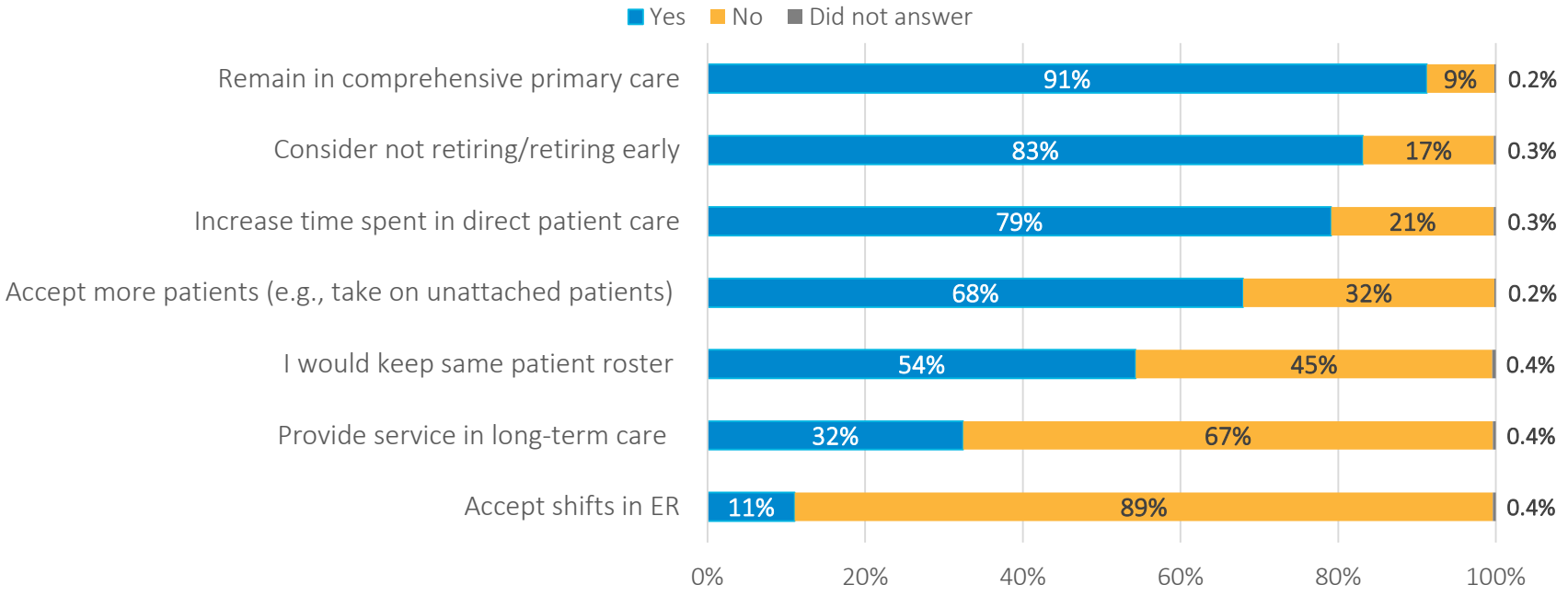
N = 1598



2024 SGFP Tariff Committee Survey for NTF/Arbitration

3. We are acutely aware of issues in managing your practice including increased administrative burden, lengthy wait times for specialist referrals, amongst others. If the current negotiations / arbitration addressed some of these pain points, would you be willing to do any of the following:

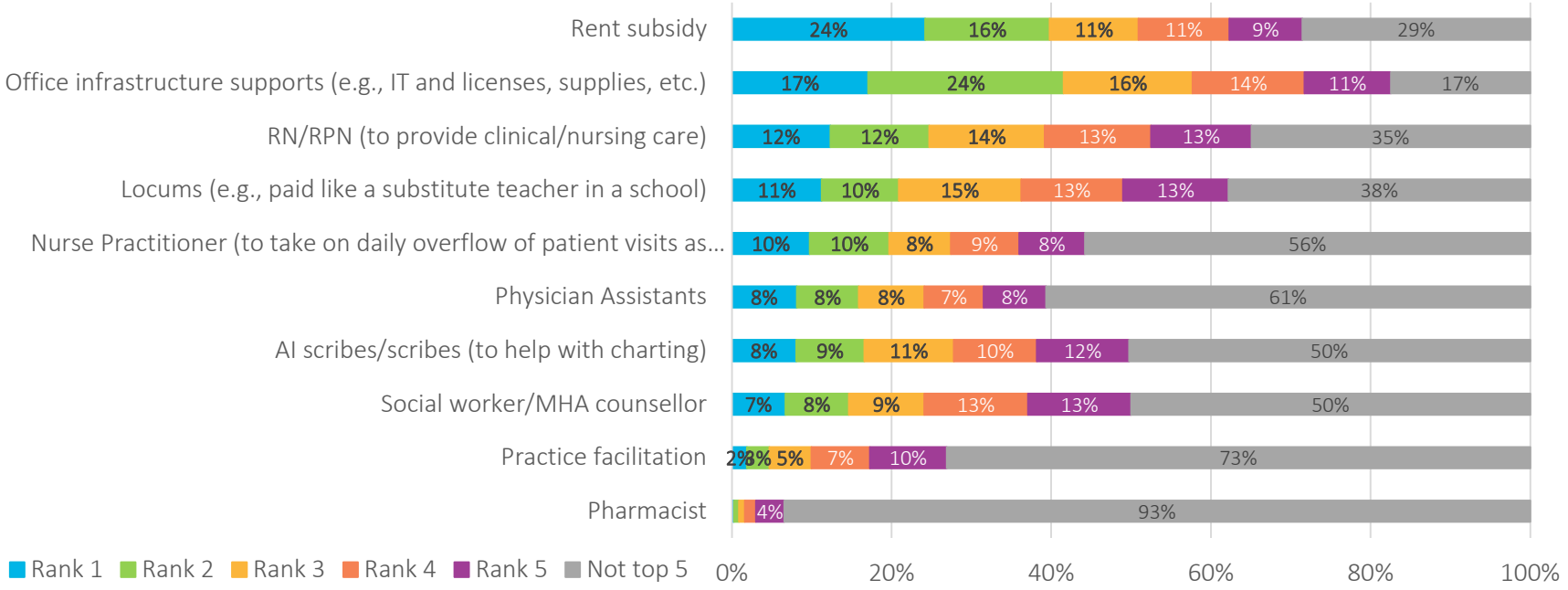
N = 1598



2024 SGFP Tariff Committee Survey for NTF/Arbitration

4. The current costs associated with the running of a practice is unsustainable. Some family doctors have access to funded interprofessional teams. There are several resources and supports that we have heard would be valued. If you had **paid or subsidized supports** for the following, which would be the most important: (*please prioritize the top **five (5) things** that would make a difference in your practice*)

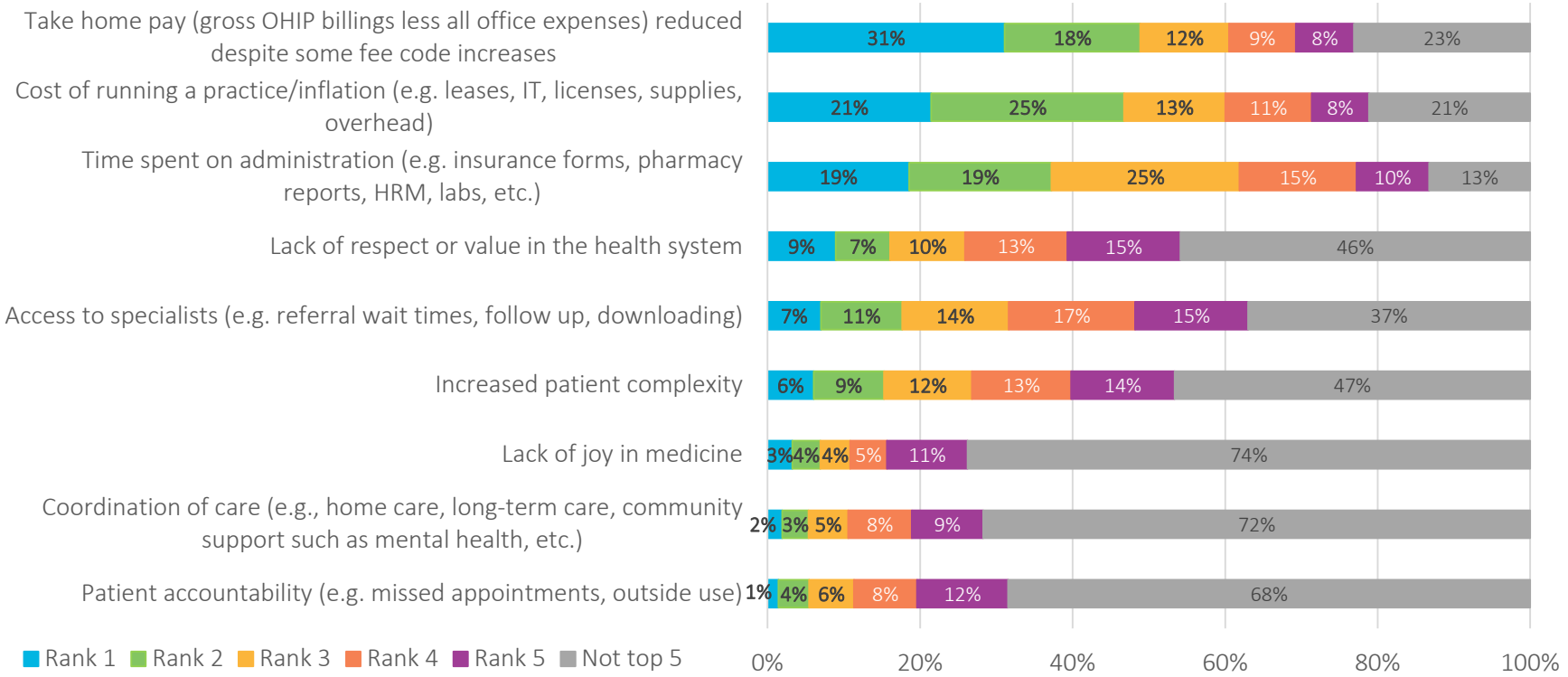
N = 1598



2024 SGFP Tariff Committee Survey for NTF/Arbitration

5. What are your top five (5) **most significant issues that have worsened since the Pandemic?**

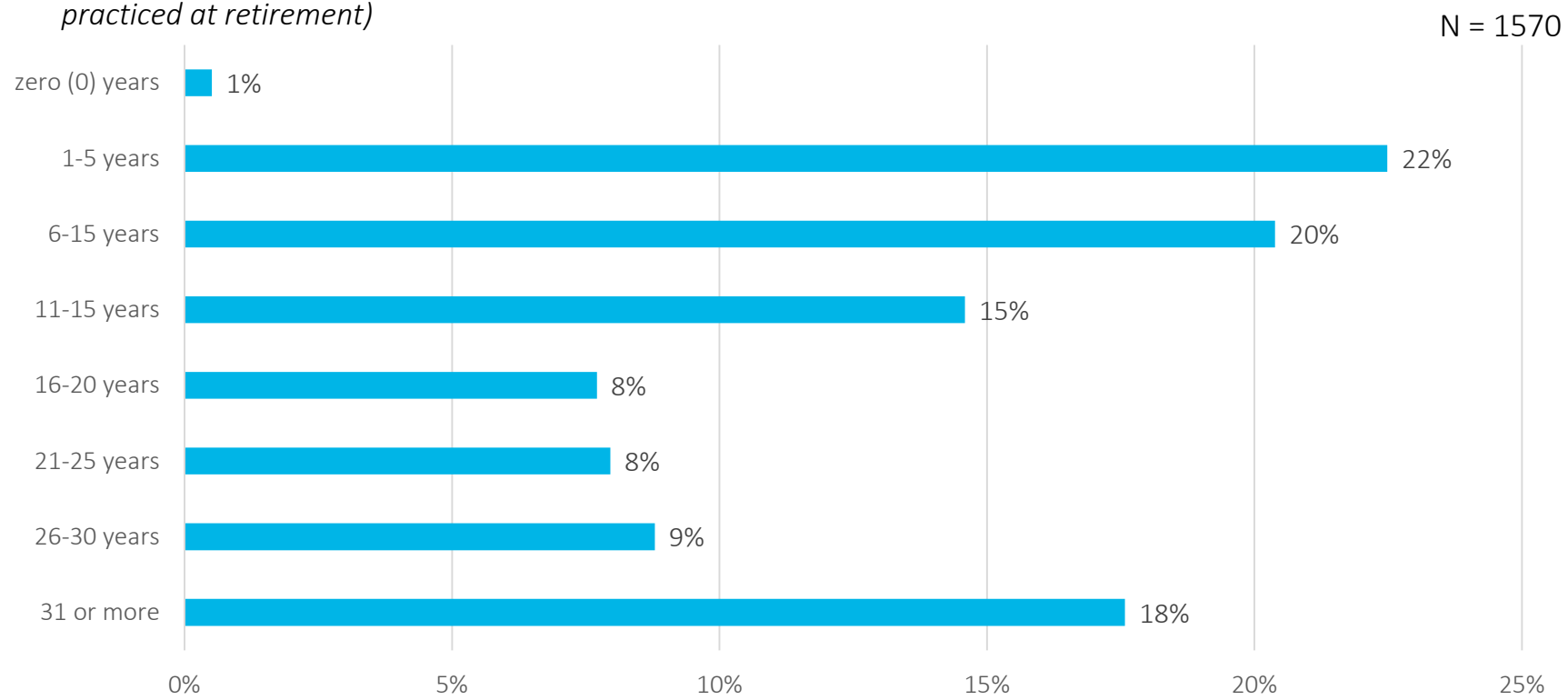
N = 1598



Demographics

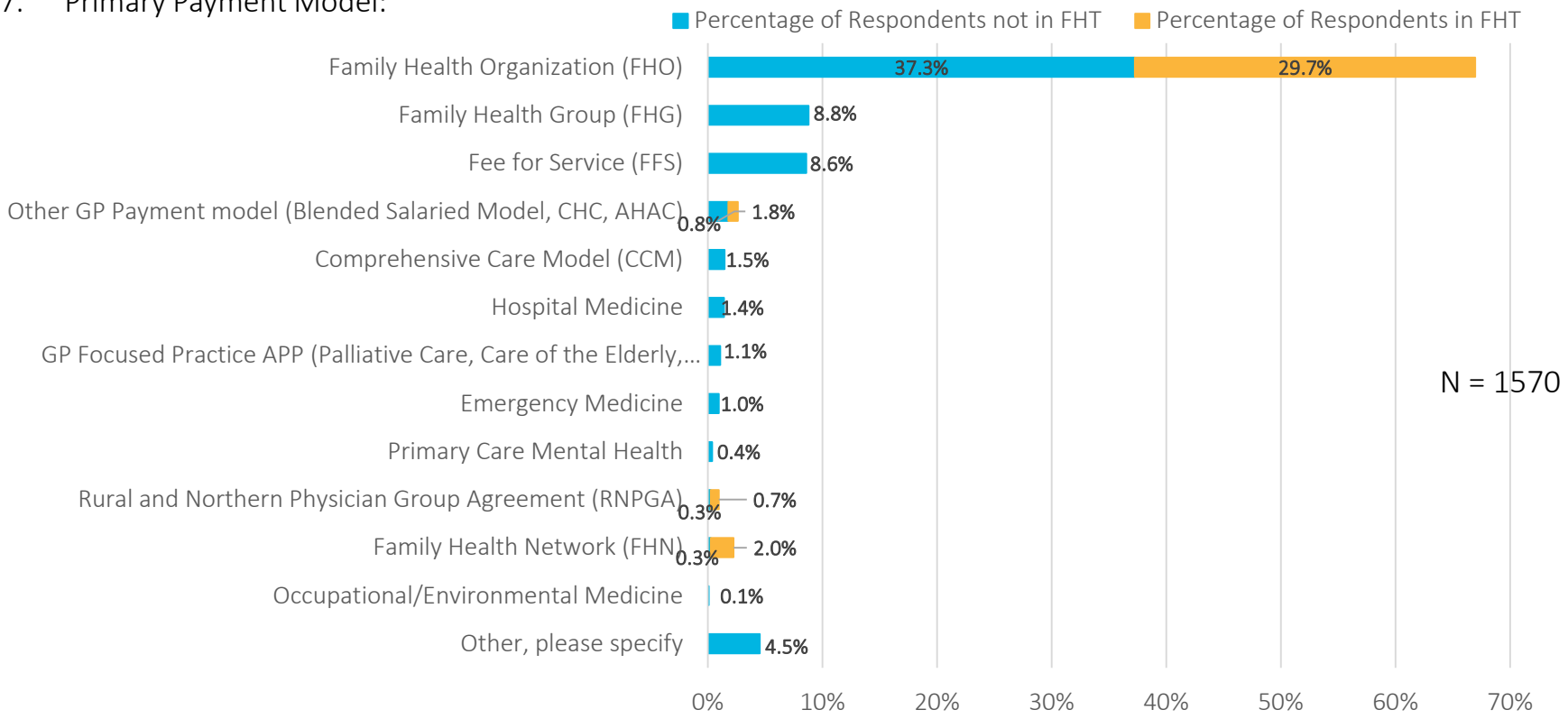
2024 SGFP Tariff Committee Survey for NTF/Arbitration

6. Years in practice: *(Select zero (0) if you are a medical student; or if retired, indicate the number of years practiced at retirement)*



2024 SGFP Tariff Committee Survey for NTF/Arbitration

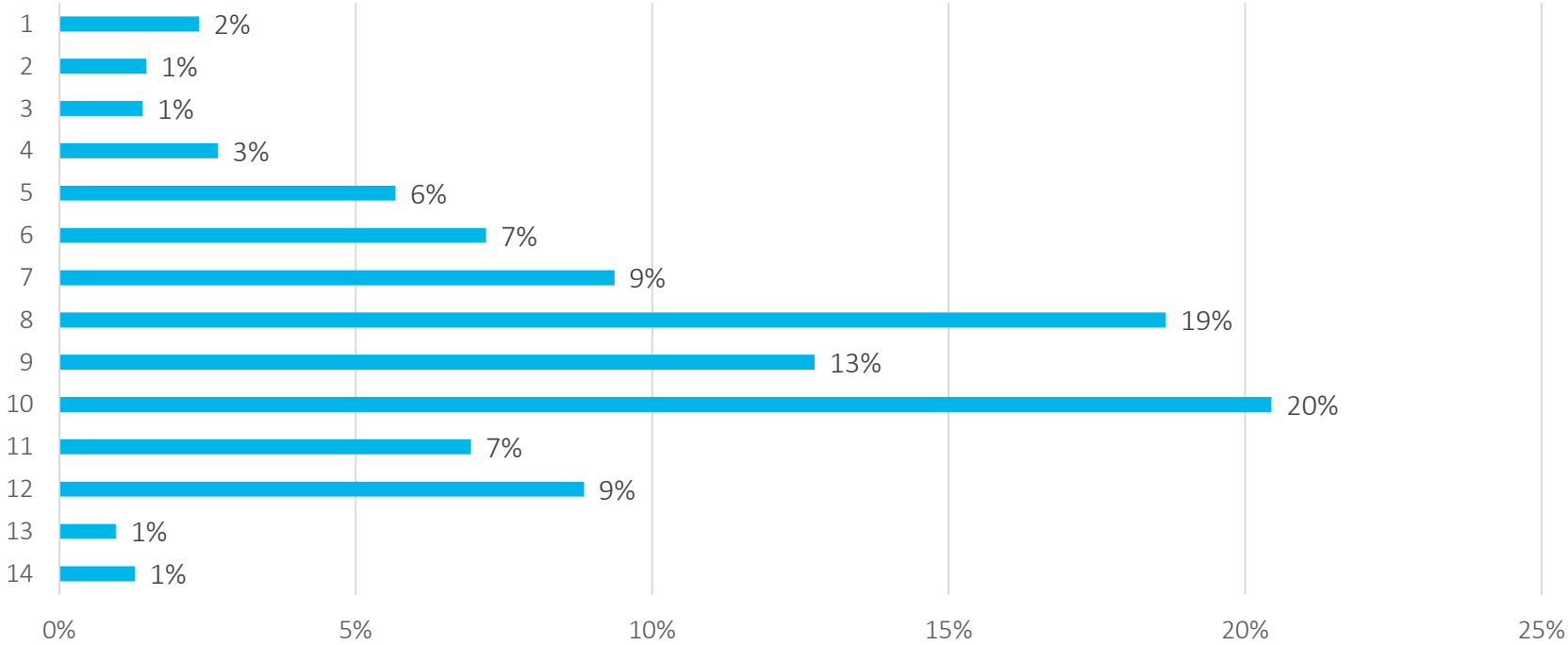
7. Primary Payment Model:



2024 SGFP Tariff Committee Survey for NTF/Arbitration

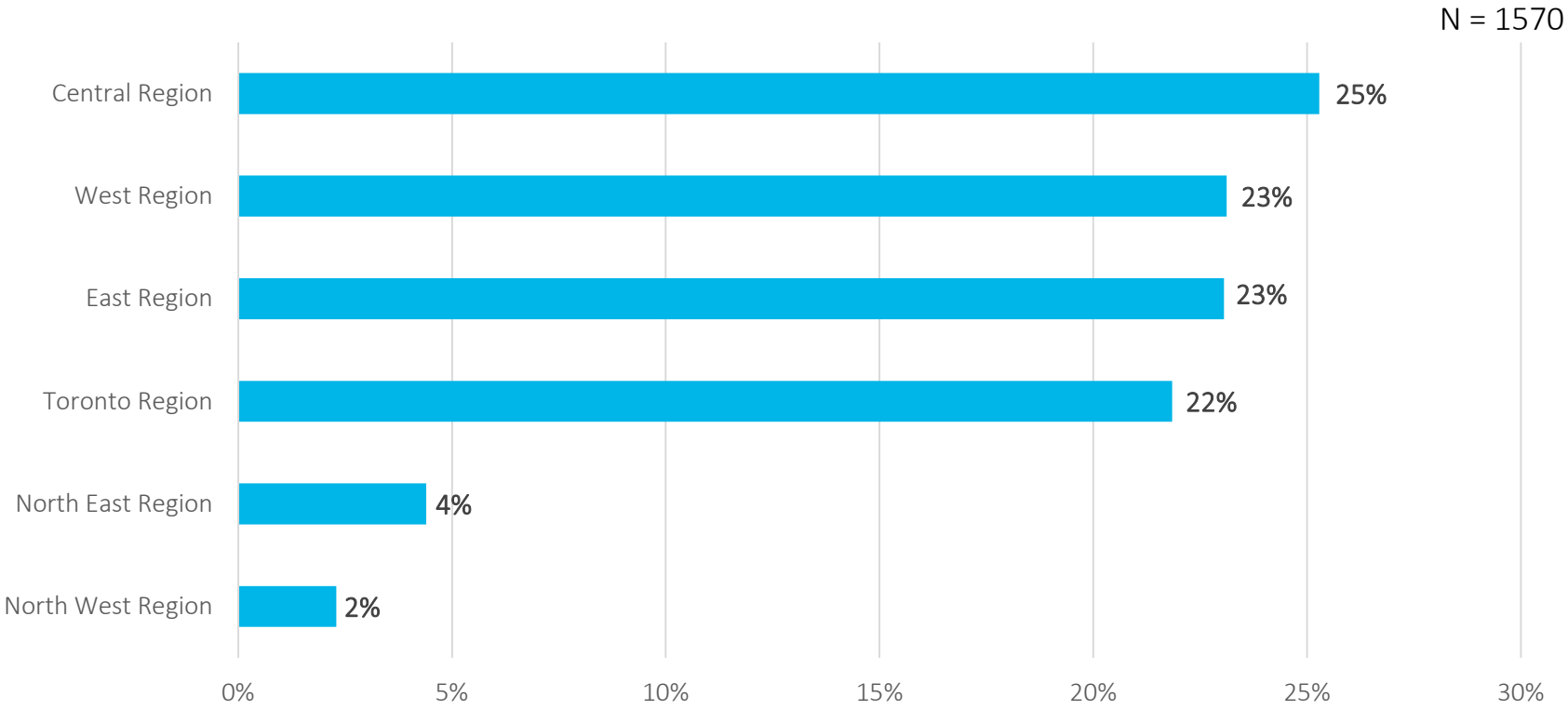
8. On average, how many **half days** do you work per week? *(e.g., if you work on average six days a week, you would select 12 from the drop down menu)*

N = 1570



2024 SGFP Tariff Committee Survey for NTF/Arbitration

9. In which Ontario Health region is your primary practice located?



TAB 28

NBER WORKING PAPER SERIES

THE PRODUCTIVITY OF PROFESSIONS: EVIDENCE FROM THE EMERGENCY DEPARTMENT

David C. Chan Jr
Yiqun Chen

Working Paper 30608
http://www.nber.org/papers/w30608

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
October 2022, Revised June 2023

We are grateful to Ricardo Alonso, Sandy Black, Marika Cabral, David Card, Stuart Craig, Janet Currie, Shooshan Danagoulian, Qing Gong, Joshua Gottlieb, Mitch Hoffman, Tom Hubbard, Bapu Jena, Amanda Kowalski, Brad Larsen, Darren Lubotsky, Bentley MacLeod, Neale Mahoney, David Molitor, Jessica Monnet, Ciaran Phibbs, Maria Polyakova, Julian Reif, Michael Richards, Steve Rivkin, Evan Rose, Susan Schmitt, Molly Schnell, Brad Shapiro, Isaac Sorkin, Chris Walters, and many seminar and conference participants for helpful comments and suggestions. Sam Bock, Noah Boden-Gologorsky, Damien Dong, Akriti Dureja, Jesse Kozler, Matthew Merrigan, Jonatas Prates, Aadit Shah, KeminWang, JustineWeng, SamWylde, and Saam Zahedian provided excellent research assistance. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2022 by David C. Chan Jr and Yiqun Chen. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

The Productivity of Professions: Evidence from the Emergency Department
David C. Chan Jr and Yiqun Chen
NBER Working Paper No. 30608
October 2022, Revised June 2023
JEL No. I11,I18,J24,J44,M53

ABSTRACT

This paper studies the productivity of nurse practitioners (NPs) and physicians, two professions performing overlapping tasks but with stark differences in background, training, and pay. Using quasi-experimental variation in patient assignment to NPs versus physicians in 44 Veterans Health Administration emergency departments, we find that, on average, NPs use more resources but achieve worse patient outcomes relative to physicians. The costs of lower productivity surpass the pay differences between the professions. Yet even larger productivity variation exists within each profession, implying substantial productivity overlap between the two professions. Within professions, wages and assigned patient complexity vary only weakly with productivity.

David C. Chan Jr
Department of Health Policy
117 Encina Commons
Stanford, CA 94305
and NBER
david.c.chan@stanford.edu

Yiqun Chen
Department of Economics
University of Illinois at Chicago
601 South Morgan Street, 708 UH
Chicago, IL 60607
and NBER
yqchen@uic.edu

1 Introduction

Professions play a key role in determining the division of labor and the returns to skilled work (Abbott 2014). In selecting and training future members, professional groups may both restrict the supply of professionals and impact their quality. Professional groups also perform an important function as special interest groups for their members, lobbying policymakers and negotiating with payers. Large differences in pay between professional groups may therefore reflect differences in worker productivity or rents from restricted supply or privileged arrangements (Freidson 1974; Shapiro 1986).

Evidence comparing the productivity of distinct classes of professionals performing overlapping tasks remains scant. Professional groups, by nature, act to exclude outsiders from their jurisdictions (Abbott 2014). While the medical profession provides a well-documented case study of historical exclusion, it now provides an opportunity for study. Recent decades have witnessed an increased demand for health care, outstripping the supply of physicians, and the rise of NPs seeking to perform some of the same tasks that physicians do. The number of NPs has reached about one-third of the number of physicians in the US (Bureau of Labor Statistics 2021a; 2021b), and various states in the US have responded to the shortfall in physicians by granting NPs "scope of practice" to perform tasks traditionally performed by physicians (e.g., McMichael and Markowitz 2022). Yet on the basis of training, income, and social class, the comparison between the two professions of NPs and physicians is stark.

In this paper, we exploit a quasi-experiment in the Veterans Health Administration (VHA) to study the productivity differences between NPs and physicians. In December 2016, the VHA granted full practice authority to NPs, allowing them to practice without physician supervision. We leverage quasi-experimental variation in the availability of physician and NP providers in the emergency department (ED). In a sample of 1.1 million ED visits, our approach compares patients arriving at the same ED and during similar times (i.e., the year, month, day of the week, and hour of the day) that differ in the number of NPs on duty. We show that the number of on-duty physicians declines with the number of on-duty NPs, and the number of NPs on duty strongly predicts whether an arriving patient will be assigned to an NP versus a physician. Under the plausible assumption that patients arrive quasi-randomly within cells of ED stations and time categories, this instrumental variables (IV) design allows us to study the effect of NPs on patient resource utilization and health outcomes.

We find that, on average, NPs use more resources and achieve worse health outcomes than physicians along various measures. Our IV results show that NPs increase patient length of stay by 11 percent and raise the cost of ED care by 7 percent. While we can rule out large effects on inpatient admission and 30-day

mortality in the overall sample, we find that NPs raise 30-day preventable hospitalizations by 20 percent. In contrast to our IV estimates, ordinary least squares (OLS) estimates for the benchmark outcomes of length of stay and ED costs are negative in sign, consistent with the descriptive evidence that NPs treat healthier patients than physicians do.

We undertake several analyses to assess the validity of our IV quasi-experiment. We show that, conditional on the baseline controls, a broad range of patient characteristics that predict outcomes are well balanced across values of our instrument, the number of NPs on duty. Relatedly, our IV estimates are remarkably stable, regardless of the inclusion of a wide set of patient covariates; in contrast, OLS estimates under the full set of covariates are less than half the magnitude (but still opposite-signed relative to IV estimates) of those when only baseline covariates are included. We also assess the validity of the exclusion restriction, that the number of NPs on duty is not correlated with other factors that could drive care delivery or patient outcomes. Specifically, we show that our instrument is conditionally unrelated to the characteristics of on-duty physicians and NPs. We further examine potential spillovers between NPs and physicians and find no evidence suggesting such spillovers.[1] Finally, we show that our results are robust to controlling for a series of other factors that may vary with the instrument, including the total level of available staff, patient volume, and patient wait time.

Next, under various analytical lenses, we uncover mechanisms behind and responses to the lower average productivity of NPs versus physicians. First, we find suggestive evidence that experience matters: The NP-physician gap in some outcomes narrows among providers who have seen more prior patients, both in general and for the diagnosis in question. This indicates that differences in training may play some role in the productivity differences between NPs and physicians. Second, we document differences in clinical decision-making. Compared to physicians, NPs are likelier to gather information from external sources: They are likelier to obtain radiology tests and formal consults. NPs also exhibit prescription patterns consistent with responses to lower skill (Chan, Gentzkow, and Yu 2022): Relative to physicians, NPs are *less* likely to prescribe opioids, which have higher health risks if incorrectly prescribed, but they are *more* likely to prescribe antibiotics, which have higher health risks if incorrectly not prescribed. Third, we examine heterogeneity in the NP-physician gap by patient condition complexity and severity. The NP-physician gap in patient log length of stay, log ED cost, and the probability of inpatient admission grows for patients with more comorbidities and higher severity. Finally, case assignment seems to respond to NPs' relative and

1. Specifically, we examine whether NP presence may affect physician performance. E.g., NPs asking physicians for assistance could slow down physicians. We thus examine whether physicians' treatment outcomes change with the presence of NPs; we find no such evidence. We also examine whether on-duty physician quality impacts NP performance; we find that the outcomes of patients treated by NPs are unrelated to the value-added or experience of the physicians on duty.

absolute disadvantage: On average, NPs are assigned healthier patients of those available for assignment; NPs are also assigned a (modestly) smaller share of patients when the ED is less busy.

We perform two counterfactual analyses to understand the magnitude of the average NP-physician productivity difference in financial terms relative to differences between physician and NP wages. First, we compare the allocation of one quarter of all VHA ED patients to NPs and the counterfactual scenario of staffing the EDs only with physicians. Relative to the counterfactual scenario of no NPs, allocating one quarter of ED patients to NPs increases non-wage spending by $160 million per year to the VHA. Accounting for lower NP wages that are half that of physicians' wages, it still implies a net cost of $92 million per year. Second, we consider the scenario where EDs reduce wait times by hiring additional NPs. Given the lower productivity of NPs relative to physicians, increasing the number of NPs on duty decreases wait times but increases resource utilization and adverse outcomes. Strikingly, we find that the wage costs of hiring additional NPs account for only one-fifth of the total cost of reducing wait times; the lower productivity of NPs accounts for four-fifths of this cost.

Finally, we examine variation in productivity across providers within the professional classes of NPs and physicians. To arrive at provider-specific measures of productivity, we estimate a just-identified IV model, in which we instrument patient assignment to specific providers by indicators for on-duty providers. Using a method developed by Efron (2016) and adapted by Kline, Rose, and Walters (2022), we deconvolve the estimates of provider-specific productivity into underlying productivity distributions for each of the two professional classes. We find strikingly wide variation in productivity within professions and substantial overlap between the productivity distributions of NPs and physicians. The probability that a randomly chosen NP is more productive than a randomly chosen physician can be as large as 38 percent. Within each professional class, the productivity distribution implies a greater medical spending of around $650,000 per year under a provider at the 25th percentile of productivity than under a provider at the 75th percentile—about three times the mean annual spending difference between NPs and physicians.

We extend our distributional analysis of productivity to examine the complexity of cases assigned to and the wages paid to individual providers. While productivity differences are much larger within each profession than the average difference between NPs and physicians, within each profession, a provider's productivity shows a limited relationship with her wages or the complexity of her assigned cases. This starkly contrasts with differences in case assignment and wages between NPs and physicians: EDs assign noticeably less complex cases to NPs—enough to reverse OLS estimates for key outcomes relative to the corresponding IV estimates—and pay NPs half the wages of physicians. In other words, a provider's productivity is far from a sufficient statistic explaining her pay or determining her case assignment; professional class is a much

stronger predictor of both wages and assigned case complexity.

Our findings contribute to several strands of literature. First, given the dramatic rise in the supply of NPs to meet the growing demand for health care, heated debates have arisen around the NP provision of care. A recent body of research has examined the impacts of liberalizing state "scope of practice laws" for NPs.[2] By design, these papers study the general-equilibrium impacts of both allowing NPs greater scope to practice and increasing the supply of providers; results will depend on how labor is reallocated between professions. In contrast, our study sheds light on the effect of assigning patients to NPs versus physicians.[3] Despite the average productivity difference between NPs and physicians, our findings do not imply inefficiency in using NPs within organizations. NPs could provide valuable additional labor supply, and heterogeneity in treatment effects by case complexity and NP experience suggests potential returns to optimal case assignment and further training of NPs.

Perhaps more striking, productivity variation within each of the NP and physician professions is much larger than the average productivity difference between the two professions. This finding puts the prior literature on practice variation (e.g., Epstein and Nicholson 2009; Gowrisankaran, Joiner, and Léger 2023) in context: In our setting, variation within professions leads to productivity differences several-fold larger than the overall productivity difference between two professions with starkly different selection and training processes. In contrast to the assignment of cases between NPs and physicians, in which less-complex cases are, on average, assigned to NPs, we find essentially no matching between case complexity and provider productivity within professions. This suggests substantial informational and organizational barriers to such "skill-task matching" within professions, though professional boundaries may provide a mechanism for this matching between professions (Acemoglu and Autor 2011).

Second, our research relates to the widespread practice of occupational licensing, affecting about a third of all jobs in the US (Kleiner and Krueger 2013). The existing literature suggests that occupational licensing

2. The findings of this literature are varied and somewhat mixed. Perry (2009), Kleiner et al. (2016) and Dillender et al. (2022) find that these laws affect NP earnings. Stange (2014) finds a minimal impact of greater NP supply on utilization, access, or prices but perhaps a moderate impact on primary care utilization. Yet Traczynski and Udalova (2018) find increases in utilization and some evidence of increased quality, and Alexander and Schnell (2019) find evidence of better access and outcomes in mental health.

3. An older medical literature has raised this question, but the generally small numbers of providers and other features of these earlier studies limit inference on systematic differences between the classes of providers. See Laurant et al. (2005) for a systematic review of this literature. The literature features small randomized trials with null results, sometimes comparing a single-digit number of physicians with a single-digit number of NPs in a handful of clinic locations. The studies tend to focus on primary care settings and usually have short follow-up times that may be insufficient to detect meaningful effects. According to Laurant et al. (2005), the null findings of this literature "should be viewed with caution given that only one study was powered to assess equivalence of care, many studies had methodological limitations, and patient follow-up was generally 12 months or less."

Recently, in examining correlations across performance metrics among VHA primary care providers, Currie and Zhang (2021) find that non-physician primary care providers (NPs and physician assistants) are not correlated with worse outcomes than physicians. The paper's study period is mostly before the VHA implementation of NP full practice authority, and the VHA had not allowed physician assistants to practice independently as of 2022, thus placing non-physician providers mostly under physician oversight.

increases the earnings of licensed workers (Kleiner and Krueger 2013; Kleiner et al. 2016; Farronato et al. 2020) but provides little evidence on whether higher earnings arise from restricting the supply of workers or from improving the quality of their work in modern settings (see Farronato et al. 2020 for a review).[4] Studies in this literature compare differences in quality within professions (along the margin of occupational licensing), while ours compares two competing professions differing in their historical origins, social status, income, and selection and training processes, not to mention licensing.

A third related literature is concerned with worker human capital and productivity. These issues have received growing attention in health care (e.g., Doyle, Ewer, and Wagner 2010; Currie and MacLeod 2017; 2020; Chen 2021; Chan, Gentzkow, and Yu 2022) and more broadly (e.g., Gennaioli et al. 2013; Chetty, Friedman, and Rockoff 2014). Our study contributes to this literature by comparing the productivity of two distinct professional classes with human capital differences that may stem from selection and training. In the rich ED setting, we also uncover key mechanisms connecting productivity to human capital along dimensions of experience, information-gathering, decision-making, and case complexity. Our results suggest that professional selection and training may give rise to important productivity implications, though these implications may be small relative to the variation within professions.

Fourth, a broad set of questions concerns the distribution of wealth in society across occupations and strata of educational attainment. In recent decades, societies have witnessed an increased concentration of wealth in occupations associated with high human capital (Smith et al. 2019). Training to reach the highest levels of income has become increasingly competitive among the upper class, while the middle and lower classes are increasingly left behind, characterizing a "meritocracy trap" (Markovits 2020). Interestingly, our results suggest a productivity difference between professions larger than wage differences, at least in our resource-intensive and information-dependent setting within health care. Yet, the lack of relationship between worker-specific productivity and wages within professions suggests frictions in observing or contracting by actual productivity across similar workers (e.g., Acemoglu and Pischke 1998). Entering a profession may represent a costly and imperfect way for workers to distinguish themselves.

The remainder of this paper is organized as follows. Section 2 describes the institutional setting and the data. Section 3 describes our empirical approach and provides evidence for its validity. Section 4 provides our main results. Section 5 presents evidence on mechanisms and responses. Section 6 presents analyses on policy-relevant counterfactual scenarios. Section 7 reports distributions of productivity, case assignment, and wages within professions. Section 8 concludes.

4. Two studies of an earlier, unregulated environment of midwifery, near the beginning of the 20th century, demonstrate meaningful reductions in maternal and infant mortality with the initial implementation of occupational licensing (Lazuka 2018; Anderson et al. 2020).

2 Background and Data

2.1 NPs and Physicians in the US

To understand the physician and NP professions in the US, it is instructive to consider their distinct origins in the American context. According to the landmark work by Starr (1982), "among the professions, medicine is both the paradigmatic and the exceptional case: paradigmatic in the sense that other professions emulate its example; exceptional in that none have been able to achieve its singular degree of economic power and cultural authority." Aided by scientific advances and demographic shifts, the US medical profession in the early twentieth century captured authority by standardizing education and licensing toward a scientific orientation, in the process excluding a large swath of practitioners (Brown 1979; Larson 1979).[5]

The "professionalization" of American nursing began in the 1870s, with the establishment of the first three nursing schools in the US. In contrast to the scientific orientation of the medical profession, the driving force behind the nursing profession was to install (female) staff in hospitals to improve hygiene and cleanliness (Ashley 1976). Hospitals generally employed nurses and subjected them to downward wage pressure (Staiger, Spetz, and Phibbs 2010; Maggs 2016). NPs emerged from the nursing tradition in the 1960s, in the setting of increasing specialization in medicine, worsening access to care in urban and rural areas, and new federal funding from Medicare and Medicaid to increase the training of providers (Fairman 2009; Hallett 2016). Over the next few decades, pressures to contain costs and increase throughput further expanded the boundaries of NP practice in a variety of settings (e.g., primary care, emergency care) (Fairman 2009; Kleinpell, Cook, and Padden 2018). The growth of the NP workforce has been a distinctly American phenomenon.[6]

Present-day NPs and physicians remain starkly different regarding training, income, and social class, despite performing overlapping tasks in many settings. Physicians undergo a highly selective process and long training periods to enter the profession. They comprise the most common profession in the top percentile of the income distribution (Gottlieb et al. 2020). About half of medical students come from families in the top quintile of the income distribution, while only 5 percent come from families in the bottom quintile (Kahn

5. Much of this transformation centered around the Flexner (1910) Report, which strongly advocated for a scientific orientation of medical education and the exclusion of alternative practices (Beck 2004). Following the report, more than half of medical schools closed or consolidated (Patel and Rushefsky 2004). All but two of the historically Black medical schools closed as a result (Sullivan and Suez Mittman 2010); medical schools, which had begun admitting women, reverted to male-only admittance.

6. In a survey of 39 countries, only 11 countries (the Netherlands and 10 English-speaking countries) granted NPs clinical autonomy on seven clinical dimensions and defined educational requirements to become an NP (Maier and Aiken 2016). Of the eight countries studied in greater detail, only the US, Canada, and the Netherlands included NPs in their health care workforce planning (Maier et al. 2018). As of 2016, the US had 175,000 NPs, representing 5.6 percent of nurses, while the next two highest countries, the Netherlands and Canada, had 2,700 and 3,600 NPs, representing 1.5 and 1.3 percent of nurses in these countries, respectively (Maier et al. 2016).

and Sneed 2015). In contrast, the income of NPs is roughly half of that of physicians, and the number of years of training is also roughly half.[7] Admission rates to nursing programs are around 10 times higher than admission rates to medical school, and nursing has been highlighted as a realistic path to the middle class for women of working-class backgrounds (Searcey, Porter, and Gebeloff 2015; Friedman, Laurison, and Macmillan 2017).[8]

2.2 VHA and ED Setting

In December 2016, the VHA granted full practice authority to NPs. The policy enables NPs to practice without requiring physician supervision at VHA facilities. NPs can treat patients as independently as physicians, regardless of state restrictions that would otherwise limit NPs' practice authority.[9]

Several features make the ED a setting well suited to studying provider productivity. First, each patient visit is generally assigned to a single ED provider. Such independence allows us to attribute patient outcomes to individual ED providers. Second, patient flow in the ED is highly unpredictable, while provider schedules are typically set well in advance. Variation in NP availability is thus unrelated to the types of patients arriving. Third, patients present at the ED with a wide spectrum of conditions, ranging in complexity and severity, which provides an opportunity to investigate productivity across a range of tasks. Finally, the ED is an important setting using the NP workforce. Across the nation in 2019, NPs saw 13 percent of ED visits in total and saw 6 percent of ED visits without physician involvement (Cairns and Kang 2022). In the VHA, the share of ED visits seen by NPs has increased to 11 percent in 2019—close to the share of visits seen by NPs in primary care at around 20 percent (Morgan et al. 2012).[10]

In Appendix Table A.1, we report the characteristics of NPs and physicians working at the VHA and non-VHA EDs. NPs in VHA EDs are representative of their non-VHA counterparts in female share (about 80 percent), while they appear to be more experienced (as indicated by age, 51 versus 43 years old). Among ED physicians, those practicing at the VHA are slightly more likely to be female than those outside of the VHA (34 versus 27 percent), but the two groups have a similar average age (48 versus 46 years old). Appendix

7. According to the Association of American Medical Colleges (2020), physicians must complete a four-year undergraduate degree, a four-year Doctor of Medicine (MD) degree, and three to seven years of residency training. According to the American Association of Nurse Practitioners (2020), NPs must complete a four-year Bachelor of Science in Nursing degree and may choose between one to two years in a Master of Science in Nursing degree or three to four years in a Doctor of Nursing Practice degree.

8. We searched https://www.petersons.com/graduate-schools.aspx for admission rates to graduate nursing programs and to medical schools in the following universities: Columbia University, Duke University, Emory University, Johns Hopkins University, the University of North Carolina, the University of Pennsylvania, and the University of Washington. Rates ranged from 25 to 63 percent for graduate nursing programs and from 3 to 7 percent for medical schools.

9. As of 2021, about half of the states in the US have not granted NPs full practice authority (American Association of Nurse Practitioners 2021).

10. We estimate the share of ED visits seen by an NP from the VHA data, which is described in the following section.

Table A.1 also compares NPs practicing at the ED and the overall NP workforce, showing that ED NPs are representative of the NP workforce in age and gender.

2.3 Data

We use administrative health records from the VHA, the largest health care delivery system in the US, serving more than nine million veterans. For each ED visit, the data record the type of provider treating the patient (i.e., NP or physician), resource utilization, and patient health outcomes (e.g., length of stay, mortality). The data also contain detailed information on patient characteristics (e.g., demographics, comorbidities, and vital signs) and provider characteristics (e.g., birthdate, gender). The large sample size, as well as the availability of detailed information (e.g., time stamps for measuring ED length of stay, provider orders), enable a comprehensive analysis of NP- and physician-provided care.

Sample Construction. We restrict our analysis sample in the following ways, summarized in Appendix Table A.2. First, we restrict the sample to ED visits between January 2017 and January 2020, i.e., after full practice authority was granted to NPs at the VHA and before the onset of the COVID pandemic in the US. Second, we include only cases arriving during the daytime (8 a.m. to 6 p.m.), because the data show that few NPs take evening or night shifts.[11] Third, we focus on visits to VHA EDs using NPs to treat patients and in months after the ED adopted the full practice authority policy. Though the VHA granted full practice authority to NPs at all VHA facilities, local facilities varied in when they adopted the policy and whether they used NPs in the ED.[12] Fourth, to examine a single margin between NPs and physicians, we exclude EDs that used non-physician providers other than NPs (mainly physician assistants).[13] Finally, we drop a small number of cases with missing age or gender or aged under 20 or above 99 years old. The final sample contains 1.1 million cases, over 44 EDs.[14]

Outcome Variables. To measure medical resource use, we include two primary outcomes that are frequently

11. One possible explanation is that, since patient volumes are on average much lower in the evening/night than in the daytime (e.g., the average number of cases arriving per hour is 3.6 between 8 a.m. and 6 p.m. versus only 0.9 outside of 8 a.m.-6 p.m.), EDs in our sample often staff only one provider per shift in the evening/night. Our conversations with VHA ED leadership revealed that EDs are required to have at least one physician on duty at all times.

12. We define a VHA ED as having granted full practice authority to NPs and using NPs in a month if it has at least 15 cases treated by NPs in the month. The sample size changes only slightly when we use alternative thresholds: e.g., the sample size is 1.13 and 1.10 million when using a threshold of 10 and 20, respectively, compared to 1.12 million based on a threshold of 15.

13. In addition, unlike NPs, physician assistants had not been granted full practice authority at the VHA as of 2022 nor in any state as of mid-2019. In Section 4.5, we expand the sample to cases in all EDs that use NPs despite the use of physician assistants but exclude cases in ED-day cells with physician assistants to focus on the margin between NPs and physicians. This analysis expands the sample from 1.1 million cases across 44 EDs seen by 1,348 physicians and 156 NPs in our main analysis to 2.2 million cases across 110 EDs seen by 3,499 physicians and 491 NPs. We find similar results in this expanded sample.

14. Appendix Table A.3 shows that EDs included in our sample are a representative set of all VHA EDs, as measured by ED, provider, and patient characteristics. The EDs in our sample include those in large metropolitan areas (e.g., New York City, Los Angeles, the Bay Area) as well as those in smaller areas (e.g., Detroit, Michigan; Madison, Wisconsin).

used in the ED setting: (i) the patient length of stay (i.e., the time between patient assignment to the provider and patient discharge) and (ii) the cost of care during the ED visit (excluding costs due to a resulting hospital admission, measured separately next).[15] We also include hospital admission, a resource-intensive option that indicates the provider's decision to admit the patient for inpatient care. To measure quality of care, we examine two prominent patient outcomes: We use linked death records to construct indicators of patient 30-day mortality and use linked inpatient data to construct indicators of 30-day preventable hospitalization as defined by Agency for Healthcare Research and Quality (2021).[16] We exclude from 30-day preventable hospitalization the inpatient admissions immediately following the ED visit, as they reflect the hospital admission decision described above.

In examining mechanisms behind the effect of NPs, we include the following sets of outcomes: (i) whether the provider orders consults (which are typically from specialists outside of the ED); (ii) whether the provider orders CT scans and X-rays, two primary diagnostics in the ED; and (iii) prescriptions of opioids and antibiotics—two major classes of drugs whose clinical indications for appropriate use are often unclear and may require skill to discern (e.g., Fleming-Dutra et al. 2016; Neuman, Bateman, and Wunsch 2019).

Descriptive Statistics. Table 1 summarizes the characteristics of the cases included in our analysis. In addition to demographics, we measure patient comorbidities as Elixhauser indices (Elixhauser et al. 1998), which are 31 indicators for comorbidities (e.g., cancer, diabetes) based on patient medical histories in the prior 365 days. We also report the average length of stay, average ED spending (inflation-adjusted to 2020 dollars), and 30-day preventable hospitalization rate. Column 1 shows the characteristics of the overall sample. Columns 2 and 3 compare cases treated by NPs with those treated by physicians. Along several dimensions, cases treated by NPs are healthier than those treated by physicians: Cases treated by NPs are younger (60.7 versus 62.5 years old), have fewer Elixhauser comorbidities (3.2 versus 3.7), and have fewer outpatient visits and fewer inpatient stays in the prior 365 days (5.7 versus 6.4 outpatient visits and 0.4 versus 0.7 inpatient stays). Consistent with selection, cases treated by NPs appear to have better outcomes: They have a shorter average length of stay (120 versus 175 minutes), a lower average ED cost ($813 versus $978), and a lower 30-day preventable hospitalization rate (0.8 versus 1.4 percentage points).

15. For length of stay, we use detailed time-stamped data on patient assignment and discharge. For the cost of ED care, we use cost accounting by the VHA that measures resource utilization in each ED visit.

16. Specifically, preventable hospitalizations are defined by the well-set algorithm developed by Agency for Healthcare Research and Quality (2021), which include hospital admissions due to an established set of conditions that are potentially preventable, e.g., hospitalizations due to diabetes with complications, heart failure, and hypertension.

3 Empirical Strategy

An ideal experiment to assess the effect of being treated by NPs would randomly assign cases to NPs and physicians. Lacking random assignment, we use a quasi-experimental approach: We leverage plausibly exogenous variation in the availability of NPs on duty to instrument for whether an NP or a physician treats a case. In this section, we begin by describing our instrumental variables (IV) approach. We then show evidence that supports the validity of our identification strategy.

3.1 Specification

Our empirical specification is a two-stage least squares (2SLS) model that takes the following form:

$$y_i = \delta \mathrm{NP}_i + \mathbf{T}_i\eta + \mathbf{X}_i\beta + \varepsilon_i, \quad (1)$$

$$\mathrm{NP}_i = \lambda Z_i + \mathbf{T}_i\zeta + \mathbf{X}_i\gamma + \nu_i, \quad (2)$$

where i denotes a case, y_i is the outcome of interest, and NP_i indicates whether case i is treated by an NP. We use Z_i to denote the instrument (i.e., the number of NPs on duty between 8 a.m. and 6 p.m., our analysis time window) at the ED on the day that case i visits.[17] The parameter of interest is δ, which represents a local average treatment effect (LATE), i.e., the average causal effect among cases that would have been assigned to a different class of provider under a different number of NPs on duty.

The vector $\mathbf{T}_i$ encodes interactions between indicators for the ED and indicators for time categories of the patient's arrival, specifically, the year, the month, the day of the week, and the hour of the day of the patient's arrival. We condition on $\mathbf{T}_i$ to allow for the sorting of NPs across shift types (e.g., weekdays versus weekends) and EDs, where patient characteristics and ED conditions may be systematically different. Controlling for ED-by-time-category indicators captures these potential systematic differences.[18]

As robustness checks, our specification also includes a vector of patient covariates $\mathbf{X}_i$, including indicators for five-year age bins, marital status, gender, and race (white, Black, and Asian/Pacific Islander, with other racial categories omitted as the reference group); indicators for 31 Elixhauser comorbidities; prior health care use (the number of outpatient visits and the number of inpatient stays in VHA facilities in the prior

17. Since the data do not include direct information on provider scheduling, we measure Z_i as the number of NPs treating cases during the analysis time window in the ED-day cell of case i's visit. We count an NP as on duty if she is observed treating at least two cases between 8 a.m. and 6 p.m. in the ED-day cell. The main analysis includes the index case in calculating Z_i. In Section 4.5, we show the robustness of our estimates to an alternative Z_i that includes NPs with only one case in a shift and to one that leaves out the index case in defining whether an NP is on duty.

18. While fixed effects for ED-by-hour-of-the-day are not necessary to condition on to yield quasi-random variation in the instrument (since the instrument varies at the day instead of hour level), we include them for statistical precision of estimates.

365 days); vital signs (pulse, respiratory rate, blood oxygen level, pain level, body temperature, an indicator for fever, systolic blood pressure, and diastolic blood pressure); and indicators for three-digit ICD-10 code of patient's primary diagnosis of the visit.[19] For each patient covariate with missing values, we add an indicator for missing values and replace the missing values with zero. Finally, ε_i and v_i are error terms. We cluster standard errors by provider. In robustness checks, we also show results under alternative clustering approaches, including clustering by ED-day (the level across which the instrument varies) and, more conservatively, two-way clustering by provider and ED-day, neither of which meaningfully affects our results.

3.2 Identification

To interpret δ as the LATE of being treated by NPs, our IV approach requires four identifying assumptions: relevance, conditional independence, exclusion, and monotonicity. In this section, we summarize empirical evidence supporting the validity of the identifying assumptions.

Relevance. Figure 1 shows the first stage of our IV model, controlling for the baseline controls, i.e., ED-by-time-category indicators, $\mathbf{T}_i$. Panel A shows that the number of physicians on duty declines linearly with the number of NPs on duty. Consequently, Panel B shows that patient probability of being treated by an NP increases with the number of NPs on duty: One more NP on duty increases patient probability of being treated by NPs by 18.6 percent. The increase is highly significant (with an F-statistic of 149.2, even conditioning on $\mathbf{T}_i$) and is close to linear.

To provide context, Appendix Figure A.1 presents a histogram of the number of NPs on duty across ED-day cells. The figure reveals a fair spread in the number of NPs on duty: 38.1, 47.2, and 11.3 percent of ED-days have zero, one, and two NP(s) on duty, respectively; 3.4 percent of ED-days have more than two NPs on duty. A related question is what drives the variation in the number of NPs on duty. NPs are less likely to work on weekends (77 percent of weekday ED-day observations versus 24 percent of weekend ED-day observations have NPs on duty). However, conditional on day-of-the-week and other time-category (year and month) indicators, we still observe large variation in the number of NPs on duty within EDs across days (standard deviation of 0.49; Appendix Figure A.2 shows the distribution of the number of NPs on duty within each day of the week and month). Consultations with VHA ED providers and administrators point to sources of random variation in scheduling:[20] As EDs have long open hours (typically 24/7), EDs rotate providers

19. Since our study period is from January 2017 to January 2020, disease diagnoses are all coded in ICD-10 in the data. A potential question is whether the three-digit diagnoses are endogenous to being treated by NPs. Yet as shown below in Section 4, our estimates are remarkably stable regardless of controlling for three-digit diagnosis indicators or not. In Appendix A.1, we also show that NPs and physicians appear to be similar in their coding of three-digit diagnoses.

20. We spoke with eight ED physicians and NPs about scheduling; we also distributed a survey via the VHA national ED leadership

on duty. Providers' on-duty schedules are generally set months in advance, restricting the possibility of arranging on-duty providers based on specific conditions occurring in the ED on the day. Each ED generally has a staffing model that pre-specifies staffing level in shifts defined by time categories (matching $\mathbf{T}_i$) to meet patient care needs predicted by the time categories. Conditional on the time categories, there is generally no systematic variation in scheduling within EDs.[21] In the empirical evidence below, we show that patient characteristics, as well as on-duty physicians' and NPs' characteristics, are well balanced across the number of NPs on duty (conditional on $\mathbf{T}_i$), consistent with quasi-random variation in the instrument. Otherwise (e.g., if the variation is driven by patient or staffing shocks), we could observe systematic changes in patient and/or on-duty physicians' and NPs' characteristics with the instrument. Appendix Figure A.3 additionally decomposes the variation of NP staffing. We find that conditional on $\mathbf{T}_i$, patient characteristics, on-duty provider characteristics, and other factors that may vary across days (e.g., patient volume) have virtually no explanatory power for the number of NPs on duty.

Conditional Independence. For our instrument to be valid, the number of NPs on duty must be uncorrelated with potential patient outcomes, conditional on baseline controls $\mathbf{T}_i$. The institutional features described above support the conditional independence assumption. Further, two sets of empirical evidence provide strong support for this assumption. First, we show that patient observed characteristics are well balanced across the instrument, conditional on $\mathbf{T}_i$. As shown in Figure 2, patient average characteristics are remarkably stable across the instrument, conditioning on $\mathbf{T}_i$. For completeness, Appendix Figure A.4 reports similar coefficients for the instrument using each of the various patient characteristics included in $\mathbf{X}_i$ as the dependent variable. Despite the fact that these characteristics are strong predictors of patient outcomes (F-statistics around 100 for joint significance, even controlling for ED-by-time-category indicators, see Appendix Figure A.5), there is little significant relationship between our instrument and the broad range of patient characteristics, conditioning on $\mathbf{T}_i$.

As a second set of empirical evidence, we examine the stability of our IV estimates under different sets of controls for patient covariates. Specifically, we divide observable patient characteristics into eight groups and estimate separate regressions that control for each of the $2^8 = 256$ different combinations of patient covariates. We show in the empirical results below that controlling for any combination of patient covariates results in virtually no change in our IV estimates of the NP effect. Following the logic of Altonji, Elder, and Taber (2005), this evidence implies limited selection bias due to either observed or unobserved patient characteristics that predict patient outcomes. In sum, conditional on $\mathbf{T}_i$, there appears to be little relationship

to VHA ED administrators about scheduling and received responses from VHA ED administrators in seven states.

21. There may be revisions to the on-duty schedules, but most often for providers' personal reasons (e.g., family events) that are arguably unrelated to the characteristics of arriving patients; in addition, the revisions have to be done in advance of the shifts.

between NP availability and patient characteristics.

Exclusion. While conditional independence supports a causal interpretation of the reduced-form effect, interpreting the IV estimates as identifying the causal effect of being treated by NPs requires an exclusion restriction. That is, the number of NPs on duty impacts patient outcomes only through the patient's probability of being treated by NPs, not through any other channels. After discussing our main results, we present empirical evidence supporting the validity of the exclusion restriction. We first show that characteristics of both on-duty physicians and on-duty NPs are well balanced across the number of NPs on duty conditional on $\mathbf{T}_i$, consistent with quasi-random variation in the instrument as well as our IV estimates unlikely being driven by different sets of physicians or NPs available across days. Second, we find no evidence of spillovers that NP presence influences physician performance. Third, we investigate a series of alternative explanations, finding no evidence indicating a violation of the exclusion restriction.

Monotonicity. In the presence of heterogeneous treatment effects, we need to assume monotonicity to interpret IV estimates as a LATE, i.e., the average causal effect among cases induced by the instrument into being treated by NPs. In our setting, monotonicity requires that cases treated by NPs on days with fewer NPs on duty would also be treated by NPs on days with more NPs, and vice versa.

We examine a testable implication of the monotonicity assumption: The instrument and the probability of being treated by NPs should be positively correlated for any subsample defined by patient characteristics. We test this implication in Appendix Figure A.6, where we split the sample by patient characteristics and estimate the first-stage effect separately for each subsample. In particular, we divide the sample by patient age, marital status, gender, race, number of Elixhauser comorbidities, and predicted 30-day mortality.[22] Appendix Figure A.6 shows that for all subsamples, the first-stage estimates are positive and statistically different from zero, consistent with the validity of the monotonicity assumption.[23]

4 Main Results

In this section, we present our main findings, showing the effect of NPs on resource use and patient outcomes. We find that, compared to physicians, NPs use more medical resources: They require longer lengths of stay and incur higher costs. Yet they achieve less favorable patient outcomes, as measured by 30-day preventable

22. Predicted 30-day mortality is generated from a linear regression of actual 30-day mortality on the full set of patient characteristics $\mathbf{X}_i$ in Equations (1) and (2).

23. An interesting pattern in Appendix Figure A.6 is that the first-stage estimates appear to be larger for healthier patients: younger patients, those with fewer Elixhauser comorbidities, and those with a lower predicted 30-day mortality. This pattern reflects that compliers are more heavily concentrated among healthy patients. In Section 4.3, we compute the characteristics of compliers and never-takers. We find consistent evidence that compliers are healthier than the overall sample, while never-takers are riskier.

hospitalizations. We also characterize compliers relative to the overall sample, present evidence supporting the exclusion restriction, and consider a series of additional robustness checks.

4.1 Length of Stay and Cost

As summary measures of resource use, we start by examining the effect of NPs on patient length of stay and cost of care during the ED visit. Figure 3 shows the reduced-form effect of the instrument (i.e., the number of NPs on duty) against patient log length of stay and log cost of the ED visit, controlling for our baseline controls, $\mathbf{T}_i$. Log length of stay and log cost increase significantly with the instrument. As a comparison, we also plot in the figure patient predicted log length of stay and predicted log cost, both of which are well balanced across the instrument.[24]

Table 2 reports the OLS and IV estimates of the effect of NPs on patient log length of stay and log cost of the ED visit, along with reduced-form coefficients on the instrument for these outcomes. All regressions control for the full set of controls described in Section 3.1. The OLS estimates (Columns 1 and 4) show that cases treated by NPs have significantly shorter lengths of stay and lower costs, which could reflect that NPs treat healthier and easier cases than physicians, at least in terms of observable characteristics shown in Table 1. Exploiting plausibly quasi-random variation in the patient probability of being treated by NPs, the IV estimates (Columns 3 and 6) suggest that NPs raise patient medical resource use during the ED visit: On average, cases quasi-randomly assigned to NPs have lengths of stay that are 11 percent longer and ED costs that are 7 percent higher. Given sample means, the NP effects equal an 18-minute increase in length of stay and a $66 increase in cost per ED visit.

Figure 4 examines the robustness of our OLS and IV estimates to the inclusion of different combinations of patient controls. Specifically, we divide patient covariates into eight subsets: (i) five-year age-bin indicators; (ii) marital status; (iii) gender; (iv) race indicators; (v) dummies for 31 Elixhauser comorbidities; (vi) vital signs; (vii) prior health care use; and (viii) indicators for three-digit primary diagnosis of the visit. We then estimate separate regressions that control for each of the $2^8 = 256$ combinations of patient covariates for each outcome for both OLS and IV estimations. Figure 4 shows the range of the coefficients across specifications with different patient controls. Each n on the x-axis reports the number of covariate subsets included. For each n, we plot the maximum, mean, and minimum of the estimated coefficients for the effect of NPs using all possible combinations with n (out of eight) subsets of patient covariates.

Figure 4 shows a stark divergence between the OLS and IV estimates. The OLS estimates are negative

24. We form these predictions using linear regressions of actual outcomes on the full set of patient covariates $\mathbf{X}_i$ in Equations (1) and (2).

and decline sizably in magnitude with the addition of patient controls. For example, in the OLS results, conditioning only on baseline controls (i.e., $\mathbf{T}_i$), we find that cases treated by NPs have 30 percent lower costs than cases treated by physicians. When we add the full set of patient controls, the difference attenuates to 10 percent. The lower health risks of cases treated by NPs (Table 1) and the sensitivity of the OLS estimates to patient controls suggest selection bias due to unobservable patient characteristics. In contrast, the IV estimates are remarkably robust to controlling for any combination of patient covariates: Despite any controls, the IV estimates for the effect of NPs on length of stay and cost remain stable at 11 and 7 percent, respectively. Following the logic of Altonji, Elder, and Taber (2005), the stability of the IV estimates implies limited scope for selection on either observable or unobservable patient characteristics that predict potential outcomes, further supporting the validity of our instrument.[25]

4.2 Hospital Admission and Patient Outcomes

Having examined resource use in the ED, we next assess NP effects on hospital admission and downstream patient outcomes, in Table 3. In our overall sample, the hospital admission rate does not differ significantly between NPs and physicians, but we show in Section 5 that NPs increase admissions for severe cases. We find no significant effect of NPs on 30-day mortality for most cases, but we find evidence in Section 5 for increases in mortality for a subset of highly severe cases.[26]

Finally, we find a significant NP effect on increasing patient 30-day preventable hospitalizations: Compared to physicians, NPs raise 30-day preventable hospitalization rate by 0.25 percentage points, which is equivalent to a 20 percent increase compared to the mean of the sample. Appendix Figure A.7 plots actual and predicted outcomes against the instrument for the three outcomes in this subsection; Appendix Figure A.8 shows that the IV estimates for these three outcomes are remarkably robust to the inclusion of $2^8 = 256$ different combinations of patient controls.

Taken together, empirical evidence suggests that NPs and physicians operate on different production

25. Another possible explanation for the divergence between the OLS and IV estimates is heterogeneity in treatment effects, since OLS reports the average effect among the analysis sample, while IV reports the average effect among compliers (i.e., cases on the margin of being treated by NPs). To explore this possibility, we follow the procedure by Bhuller et al. (2020) and reweight the analysis sample to match the sample of compliers using predicted 30-day mortality, i.e., a composite index of all patient observables. The OLS estimates with the reweighting still differ in sign from the IV estimates, suggesting that the difference between the OLS and IV estimates cannot be accounted for by heterogeneity in NP effects, at least not by heterogeneous effects across observables.

26. The 30-day mortality of the overall sample is low at 1.25 percentage points, potentially rendering the IV estimate for mortality effects noisy and uninformative. When focusing on a type of patients with high mortality—those with a sepsis diagnosis (30-day mortality: 11.5 percentage points)—we find a marginally significant and clinically meaningful NP-driven increase in mortality (IV point estimate: 24.5 percentage points, p-value: 0.106). A related question is why cases with severe conditions such as sepsis are assigned to NPs. While the data show a reduced probability of being assigned to NPs among riskier patients, the probability remains positive. A possible explanation is that triage providers may misevaluate severity (Chan and Gruber 2020) and assign to NPs cases that should have been assigned to physicians. Another possible explanation is that when physicians are occupied with earlier cases, it could be more efficient to assign severe cases to available NPs than delaying care.

functions: NPs use more inputs (longer lengths of stay and higher costs) but achieve less favorable patient outcomes (higher 30-day preventable hospitalization rates). In other words, comparing NPs and physicians as two professional classes, NPs, on average, exhibit lower productivity than physicians. Yet note that this evidence may not indicate that we can cut back on care for NPs without compromising patient outcomes. A lower production function may still exhibit positive returns to inputs (Chandra and Staiger 2007; Silver 2021; Chan, Gentzkow, and Yu 2022). That is, higher intensity of care may be allocatively efficient for NPs.

4.3 Complier Characteristics

Our IV estimates represent the LATE, i.e., the average causal effect among complier cases quasi-randomly assigned to NPs versus physicians due to the instrument. To better understand this LATE, we examine complier characteristics relative to the overall sample following the approach developed by Abadie (2003), as described in Appendix A.2. Appendix Table A.4 reports the results. Consistent with NPs treating less severe cases, compliers are healthier than the average case. Compared to the average case, compliers are younger, have fewer Elixhauser comorbidities, have fewer inpatient stays in the prior year, and exhibit lower predicted mortality. Appendix Table A.4 also examines characteristics of never-takers (of NPs), following an approach from Dahl, Kostøl, and Mogstad (2014) that we detail in Appendix A.2. In line with the notion that NPs treat healthier cases than physicians, never-takers are riskier than the average case, and both are riskier than compliers.

4.4 Exclusion Restriction

As discussed in Section 3.2, interpreting the IV estimates as the causal effect of being treated by NPs requires the number of NPs on duty to affect patient outcomes only through the patient probability of being treated by NPs, not through any other channels. In this section, we present evidence supporting the exclusion restriction. We first show that the characteristics of both on-duty physicians and on-duty NPs are well balanced across the number of NPs on duty. Second, we assess and find little support for the possibility of productivity spillovers that NP presence influences physician performance in our setting. Third, we examine a range of factors that may vary across days and find no evidence to suggest these factors are driving our IV estimates.

Balance in Provider Characteristics. To start, we investigate whether on-duty physicians are similar across days with different numbers of NPs. If such a balance does not hold, our IV estimates could be driven by compositional changes of physicians. Figure 5 reports the balance for various physician characteristics. Specifically, we consider an ED-day level analysis that asks whether on-duty physicians'

average characteristics (weighted by the number of cases treated by each physician) are independent of the number of NPs on duty, conditional on ED-by-year, ED-by-month, and ED-by-day-of-the-week indicators.[27]

We examine three sets of physician characteristics: (i) demographics of age and gender; (ii) measures of physician "value-added," reflecting physician risk-adjusted impact on patient 30-day mortality; and (iii) measures of physician "practice style," reflecting a physician's risk-adjusted average input choices in terms of length of stay and ED costs (see Appendix A.3 for construction details). Figure 5 shows that each of these physician characteristics is well balanced across the instrument, conditional on the baseline controls.

We similarly examine whether NP characteristics are systematically different across days with differing numbers of NPs on duty. If such systematic variation exists, our baseline IV strategy may not be able to disentangle the effect of being treated by NPs from that due to the potentially different quality of NPs across days.[28] Following Figure 5, Figure 6 shows that an analogous set of NP characteristics are well balanced across days with different numbers of NPs, conditional on baseline controls.

The balance in on-duty physicians' and NPs' characteristics across the instrument also supports quasi-random variation in the instrument, as with the balance in patient characteristics. Otherwise (e.g., the variation is driven by patient or staffing shocks), we would observe systematic changes in these characteristics with NP staffing.

Assessing Productivity Spillovers. We then consider the possibility of spillovers between NPs and physicians. NP presence may influence physician performance: For example, if NPs ask physicians in the ED for assistance, they could slow down physicians. Alternatively, a change in peers from days without any NP to days with NPs may influence physician performance as, e.g., physicians may come under different degrees of peer pressure that motivate them to work differently (Chan 2016; Silver 2021).

However, we find little empirical evidence to suggest meaningful spillovers between NPs and physicians. First, if NPs ask physicians for assistance, we may expect the outcomes of patients treated by NPs to depend on the quality of physicians on duty. Using value-added measures described in Appendix A.3 and experience measured by age, we find no such relationship in Appendix Table A.5. Second, with spillovers—either

27. The empirical specification takes the form $\overline{y}_{jd} = \tilde{\lambda} Z_{jd} + \tilde{\mathbf{T}}_{jd}\tilde{\eta} + \varepsilon_{jd}$, where $\overline{y}_{jd}$ is the average characteristics of physicians on duty at ED j on day d (weighted by the number of cases treated by each physician), Z_{jd} is the number of NPs on duty, and $\tilde{\mathbf{T}}_{jd}$ includes ED-by-year, ED-by-month, and ED-by-day-of-the-week indicators. We cluster standard errors by ED. Since our main sample has only 44 EDs, a potential question is whether the estimated standard errors are biased given the relatively small number of clusters. While there is currently no clear-cut definition of "small", if anything, such a potential issue would bias us toward rejecting the null hypothesis of physician balance across the instrument (Bertrand, Duflo, and Mullainathan 2004; Cameron and Miller 2015). Nonetheless, as a robustness check, we apply the correction for the small number of clusters using Wild cluster bootstrap as suggested by Cameron and Miller (2015); we find no meaningful change in the standard error estimates.

28. This concern applies to our baseline IV strategy since it uses variation in the number of NPs in addition to whether there is an NP on duty. In Section 4.5, we include alternative estimations using variation in the extensive margin of whether there is any NP on duty and restricting the sample to days with zero or only one NP on duty; results are virtually unchanged.

through assistance or peer pressure, or any other channels by which NP staffing may affect physician performance—outcomes for patients treated by physicians could change with the presence of NPs. Directly regressing outcomes of patients treated by physicians on the NP presence suffers from patient selection since physicians are allocated riskier cases on days with NPs (as healthier cases are assigned to NPs). To circumvent this issue, we look at cases arriving between 5 and 8 a.m., i.e., patients who arrive before the typical start of NP shifts so that they are unlikely to be assigned to NPs, but whose stay overlaps with NP shifts so that their physicians could be subject to spillover effects from NPs.[29] As shown in Appendix Table A.6, Panel A, we find no evidence of spillovers from NP presence on physicians' patients overall; in Panel B, we focus on days with high workloads, when NP spillovers may be more detectable, and again find no evidence of spillovers in this subsample.[30]

Robustness to Additional Factors. Finally, we show the robustness of our IV estimates to factors that may vary across days, including the total number of cases arriving, the total number of physician equivalents on duty, and patient wait times (the time between arrival at the ED and assignment to a treating provider). We control for the total number of physician equivalents on duty to mitigate the concern that the effective level of providers may vary across days with different numbers of NPs on duty.[31] Turning to wait time, since patient wait time is potentially endogenous (healthier cases could be assigned a lower priority and thus wait longer), we instrument for wait time using the average wait time of cases visiting on the same day at the same ED as the index case. While potentially important, the factors listed above do not affect our estimates: Appendix Table A.8 shows that our IV estimates are remarkably robust to controlling for these factors.

We also ask if the estimated NP effect is driven by patient-provider gender mismatch, since the vast majority of patients are male (91 percent), physicians are primarily male (74 percent), and NPs are mostly female (79 percent). Appendix Table A.9 explores this possibility by asking whether the effect of NPs varies by whether the patient's and provider's genders match. The results show little heterogeneity.

29. To restrict further the possibility of patient selection between NPs and physicians, we exclude patients arriving between 5 and 8 a.m. in ED-day cells with any patient assigned to NPs.

30. A potential question is whether the increased average health risk of patients assigned to physicians on days with NPs affects physicians' overall performance, violating an exclusion restriction. To assess this concern, Appendix Table A.7 controls for multiple measures of the average health risk (age, number of Elixhauser comorbidities, and predicted 30-day mortality) of patients assigned to physicians in the ED-day cell. The results show that our IV estimates are remarkably stable, suggesting that the different sets of patients assigned to physicians on days with NPs are unlikely to affect our IV estimates.

31. We calculate the number of physician equivalents on duty as the sum of the number of on-duty physicians and the number of on-duty NPs multiplied by 0.341, where 0.341 is the coefficient reported in Panel A of Figure 1 and assumed to be the extent of substitution between NPs and physicians. As a robustness check, we also apply a more conservative substitution rate of 0.5; the results are stable. We do not directly control for the total number of providers on duty because, conditional on the total number of providers, a higher number of NPs indicates lower staffing (since one NP appears insufficient to substitute for one physician given that NPs take longer to discharge patients but do not handle more patients simultaneously); consequently, the 2SLS estimates for the NP effect conditional on the total number of on-duty providers would be confounded by lower staffing.

4.5 Additional Robustness Checks

Appendix Tables A.10-A.14 report additional robustness checks. Appendix Table A.10 shows that our findings are stable with alternative standard error clustering approaches: clustering by ED-day or two-way clustering by ED-day and provider. The standard errors become smaller when clustering by ED-day compared to the baseline model that clusters by provider, but no conclusion on statistical significance is changed. The standard errors remain stable with two-way clustering by ED-day and provider relative to the baseline model. Panels A and B of Appendix Table A.11 show the robustness of our estimates to, respectively, an alternative count of on-duty NPs that includes any NP with at least one case (instead of two cases) in the analysis time window of an ED-day cell and another count that includes any NP with any case besides the index case.[32] In Appendix Table A.11, Panels C-D, we construct two alternative instruments: the share of cases in the ED-day cell treated by NPs (leaving out the index case) and an indicator for any NP on duty; we show the results are stable. Appendix Table A.12 shows that our results remain similar when looking at the margin between days with no versus only one NP on duty. Appendix Table A.13 shows that our results for hospital admissions in the ED visit and 30-day preventable hospitalizations are robust to considering hospital stays outside of the VHA.[33] Appendix Table A.14 expands the sample to all 110 VHA EDs that use NPs—doubling the number of cases and tripling the number of providers in our sample—and finds the results are similar.[34]

5 Mechanisms and Responses

The evidence in the previous section suggests that NPs have lower productivity than physicians: They use more medical resources and produce less favorable patient outcomes. This section examines mechanisms and responses related to this productivity gap. First, we show that experience may play a role in the NP-physician gap in some (though not all) outcomes. Second, we show NP responses to lower skill in their clinical decision-making, in calling on external resources and setting prescription thresholds; these responses, in turn, manifest as lower productivity. Third, we show that the NP effect is larger for more complex and severe patients, suggesting a comparative disadvantage for NPs in treating these patients. Finally, we show patient assignment responses toward optimality given the NP comparative and absolute disadvantage: NPs receive

32. See Section 3.1 and footnote 17 for explanations for these two robustness checks.

33. Since a share of patients has health insurance coverage in addition to the VHA's (mainly Medicare), we report robustness checks that include hospital stays outside of the VHA for patients who enroll in both the VHA and traditional Medicare. Note that this is likely an upper-bound estimate of the possible bias for our sample since patients without non-VHA health insurance are much less likely to have hospital stays outside of the VHA. Regardless, the estimates are stable.

34. As described in Section 2.3, to focus on a single margin between NPs and physicians, our main analysis focuses on EDs that use only NPs and physicians; in Appendix Table A.14, we include all VHA EDs that use NPs regardless of using physician assistants (but exclude cases in ED-day cells with physician assistants).

healthier patients and take on a lower share of the caseload when the ED is less constrained to meet demand.

5.1 Provider Experience

First, we ask whether experience impacts the magnitude of the performance difference between NPs and physicians. The professions of NPs and physicians entail stark differences in the training that new members undergo and in the selectivity of choosing new members. Whether physicians are more productive than NPs because of their training or innate ability has clear policy relevance. While it is difficult to disentangle these two mechanisms, the extent to which the NP-physician performance gap varies with experience may shed suggestive light on this question. If NPs could be made more productive with more extensive training, we may see that the gap narrows with experience. On the other hand, if the gap derives from lower innate ability, we may see that the gap persists or even widens with experience.

We form measures of both general and specific experience. We measure general experience as the number of cases the provider has treated since the start of the study period to the day before the current case's visit. We measure specific experience as the number of cases with a three-digit primary diagnosis that is the same as the current case the provider has treated since the start of the study period to the day before the current case's visit. For ease of interpretation, we standardize both general and specific experience to have a mean of zero and a standard deviation of one for NPs and physicians separately.

Our empirical model takes the following form:

$$y_i = \delta_1 \text{NP}_i \times \text{Experience}_i + \delta_2 \text{NP}_i + \delta_3 \text{Experience}_i + \mathbf{T}_i\eta + \mathbf{X}_i\beta + \varepsilon_i. \tag{3}$$

Experience_i denotes standardized experience within each provider type.[35] We instrument for NP_i and $\text{NP}_i \times \text{Experience}_i$ using Z_i (i.e., the number of NPs on duty) and $Z_i \times \text{Experience}_i$.

We find that, for some (but not all) outcomes, experience predicts a smaller NP-physician performance gap. Panel A of Table 4 examines the role of specific experience. For length of stay, Column 1 indicates that a one-standard-deviation increase in specific experience among NPs and physicians is associated with a 5.8 percent decline in the performance gap, reducing the gap at the mean experience levels by about half. The NP-physician gap in costs similarly decline with specific experience. Panel B shows that increasing general experience by one standard deviation in both NPs and physicians is associated with a 10 percent decline in the NP-physician gap in length of stay. However, the NP-physician gap in 30-day preventable hospitalizations remains stable despite the level of general or specific experience, suggesting that experience may not be able

35. A one-standard-deviation increase in specific experience equals 108 and 107 cases for NPs and physicians, respectively. A one-standard-deviation increase in general experience equals 1,855 and 1,258 cases for NPs and physicians, respectively.

to fully eliminate the NP-physician performance difference.

We examine alternative measures of experience to address measurement concerns. One concern is that, since we do not observe cases treated by providers since the start of their careers, our measures of experience are imperfect representations of providers' true experience. To mitigate this concern, we restrict the sample to cases visiting in or after 2018, so that our experience measures have at least a one-year look-back window. We also measure experience based on cases seen in the prior year (i.e., 365 days before the day of the current case's visit) so that the estimates precisely represent heterogeneity by prior-year experience.[36] As the effect of experience may decay with time (e.g., Benkard 2000), recent experience could be more important than experience gained in the relatively distant past. A second concern is that the number of cases a provider has seen may capture speed, which may affect productivity independent of experience (e.g., faster providers accumulate more cases and discharge patients earlier). To examine this concern, we include an alternative (general) experience measure—the number of days a provider has worked since the start of our study period to the day before the current case's visit—which is independent of speed. Appendix Tables A.15 to A.17 show that our estimates remain qualitatively similar under these alternative measurements.[37]

5.2 Clinical Decision-Making

Next, we examine clinical decision-making that may respond to the lower human capital, particularly lower diagnostic skill, of NPs. With lower diagnostic skill, providers may draw on more external resources, such as consults and diagnostic tests. They may also adjust treatment thresholds for decisions with asymmetric costs between type I and type II errors (Chan, Gentzkow, and Yu 2022). While these could represent optimal responses to skill differences, they increase the cost of providing care, manifesting in productivity differences.

Informational Resources. Columns 1-3 of Table 5 report the effect of NPs on the use of informational resources, using the 2SLS estimation in Equations (1) and (2). Column 1 shows that, relative to physicians, NPs are more likely to use consults: NPs increase consults by 2.6 percentage points, or 11 percent of the sample mean. Columns 2 and 3 show that, relative to physicians, NPs are more likely to order CT scans and X-rays, the two primary diagnostics in the ED setting. NPs increase CT scan and X-ray ordering by 1.2 and 2.0 percentage points, respectively, or 8.3 and 6.9 percent of the respective sample means.

These results suggest NPs are more likely to collect resource-intensive information from external sources

36. Specifically, we measure general experience as the number of cases the provider treated in the proceeding 365 days; we measure specific experience as the number of cases with the same three-digit ICD-10 primary diagnosis as the current case the provider treated in the proceeding 365 days. We exclude from this estimation cases visiting in the first year of our analysis since we cannot fully observe their providers' experience in the proceeding 365 days.

37. We do not include age as a measure of general experience in this heterogeneity analysis because NPs often practice as registered nurses for varying years before becoming an NP, thus, unlike for physicians, age is a noisy measure of experience for NPs.

than physicians. This could directly increase lengths of stay and medical costs, since consults and diagnostics take time and resources. On the other hand, consults and diagnostics allow lower-skilled providers to improve decision-making by incorporating information from other experts.

Prescription Thresholds. Next, we evaluate skill from the lens of thresholds for prescriptions with asymmetric costs. Specifically, as shown by Chan, Gentzkow, and Yu (2022), provider skill may correlate with treatment thresholds when the costs of false-positive (type I) and false-negative (type II) errors are asymmetric. Compared to higher-skilled providers, lower-skilled providers may (optimally) adjust their treatment thresholds in the face of less information. Specifically, providers with less information may more frequently opt for treatment when false negatives (not treating when a case should have been treated) are costlier than false positives (treating when a case should not have been treated); conversely, lower-skilled providers may less frequently opt for treatment when false positives are costlier than false negatives.

We choose two important prescriptions with different asymmetries in the costs of type I and type II errors: opioids and antibiotics. For both of these prescriptions, the clinical indications for appropriate use are often unclear and require clinical judgment.[38] We estimate the NP-physician difference in prescriptions using the 2SLS estimation specified in Equations (1) and (2). Column 4 of Table 5 shows that, for opioids, which have higher false-positive costs—e.g., addiction and overdose among patients who should not have received opioids compared to continued pain among patients who should have received them—NPs have a lower prescription likelihood relative to physicians: NPs lower opioid prescriptions by 1.8 percentage points, or 20 percent of the sample mean. In contrast, for antibiotics, which have higher false-negative costs—e.g., non-treatment of a potentially life-threatening infection compared to antibiotic resistance—NPs show a higher prescription likelihood relative to physicians: NPs increase antibiotic prescriptions by 4.0 percentage points, 6.3 percent of the sample mean.[39] The joint evidence from prescription thresholds is consistent with NPs responding to lower skill.[40]

5.3 Case Complexity and Severity

In this section, we exploit the wide variety of cases that arrive at the ED to examine heterogeneity in the effects of NPs by case complexity and severity. Following Imbens and Rubin (1997), we estimate complier

38. See, e.g., Fleming-Dutra et al. (2016), Huang et al. (2018), Butler et al. (2019), Neuman, Bateman, and Wunsch (2019).

39. Since opioids apply to a wide range of conditions, we include all patients in examining opioid prescriptions. As antibiotics generally only apply to patients with infections, we restrict the sample to patients with respiratory or genitourinary system infections, i.e., two common types of infections.

40. The different treatment thresholds between NPs and physicians in consults, diagnostic tests, and prescriptions could reflect NPs responding to lower skill, being less confident in their skill, or exhibiting different risk preferences without any difference in skill. While we cannot rule out the latter two explanations, the pattern that NPs achieve less favorable outcomes (as measured by 30-day preventable hospitalizations) despite using more resources supports lower skill of NPs.

potential outcomes under NPs and under physicians. Specifically, we estimate complier potential outcomes under NPs using the following IV regression:

$$y_i \cdot \text{NP}_i = \sum_{g=1}^{G} \mathbf{1}(\text{Group}_i = g) \left[\delta_g \text{NP}_i + \lambda_g\right] + \mathbf{T}_i\eta + \mathbf{X}_i\beta + \varepsilon_i, \tag{4}$$

where $y_i \cdot \text{NP}_i$ is the interaction between patient outcome and the indicator for being treated by an NP, $\mathbf{1}(\text{Group}_i = g)$ is an indicator for case i belonging to group $g \in \{1, \ldots, G\}$ characterizing complexity or severity. As a natural extension of our main IV model, we instrument for the interactions between $\left\{\mathbf{1}(\text{Group}_i = g)\right\}_{g=1}^{G}$ and NP_i by interacting $\left\{\mathbf{1}(\text{Group}_i = g)\right\}_{g=1}^{G}$ with Z_i, where Z_i is the number of NPs on duty. We estimate complier potential outcomes under physicians using an IV regression similar to Equation (4) but with a dependent variable of $y_i \cdot (\text{NP}_i - 1)$.

We consider two partitions of cases. First, we divide cases into quartiles by their number of Elixhauser comorbidities and refer to higher quartiles as more complex cases. Second, we divide cases by whether condition severity measured by 30-day mortality of the three-digit diagnosis is equal to or above the 95th percentile of the sample. The 30-day mortality for this top-severity group is 8.6 percentage points against 1.2 percentage points for the whole sample. Included in this group are cases with relatively severe conditions, such as heart failure and acute kidney failure, potentially requiring higher human capital to manage.[41]

As shown in Figure 7, the effect of NPs on lengths of stay and medical costs grows with case complexity and severity. For example, for cases in the lowest complexity quartile, NPs increase their length of stay by about 5 percent; for cases in the highest complexity quartile, NPs increase their length of stay by around 25 percent. For cases with a condition severity at least as high as the 95th percentile, we find an NP effect that doubles their length of stay. For these cases, NPs also raise their hospital admission rate by about 30 percentage points, nearly a 100 percent increase from the potential admission rate under physicians. Appendix Table A.19 summarizes the heterogeneity in treatment effects.[42] The table further examines the NP effect among four severe conditions: stroke, acute myocardial infarction, sepsis, and heart failure. We consistently find larger NP effects among cases with these severe conditions than others.

41. Appendix Table A.18 summarizes the 10 most common three-digit diagnosis codes in this group. The largest diagnosis category is heart failure, followed by acute kidney failure. The top 10 diagnoses also include acute myocardial infarction, a form of sepsis, and a form of respiratory failure. The 30-day mortality rate ranges between 5 and 17 percentage points. While the data show a reduced probability of NP assignment among riskier patients, the probability remains positive (the share of patients assigned to NPs among patients whose condition severity is below and at least as high as the 95th percentile of the sample are, respectively, 0.24 and 0.11). Possible explanations for why severe cases are assigned to NPs, as described earlier, may be: (i) Triage providers may misevaluate patient severity (Chan and Gruber 2020) and assign severe cases to NPs; (ii) when physicians are occupied with earlier cases, it may be more efficient to assign severe cases to available NPs than delaying care.

42. Results in this table are estimated using Equation (4) with patient outcome y_i as the dependent variable. By construction, this dependent variable is the difference between the dependent variables used to estimate potential outcomes: $y_i = y_i \cdot \text{NP}_i - y_i \cdot (\text{NP}_i - 1)$).

We do not find increasing NP effects on 30-day preventable hospitalizations with case complexity or severity (Column 5 of Appendix Table A.19). If NPs are less skilled at treating more complex or more severe cases, they may obtain worse outcomes for these cases. On the other hand, as NPs increase their intensity of care for these cases, the incremental care could mitigate the NP effect on raising preventable hospitalizations.[43]

The NP-physician performance difference among patients in the bottom two complexity quartiles provides some suggestive support for the generalizability of our findings to less complex settings: While ED patients overall are riskier than primary care patients, ED patients in the bottom two quartiles of complexity have similar mortality risks as the average primary care patient (30-day mortality: 0.56 and 0.53 percentage points, respectively).[44] Yet we also emphasize that the ED setting features more uncertainty than primary care, as providers have less first-hand knowledge of patients' baseline health. Consequently, variation in provider skill could generate larger effects in the ED.

5.4 Patient Assignment

Finally, we examine patient assignment between NPs and physicians. On the whole, the evidence on case heterogeneity in Section 5.3 suggests a comparative disadvantage for NPs in treating complex and severe cases. We do not find a set of cases in which NPs outperform physicians, which suggests that NPs are also at an absolute disadvantage on average, at least in the ED setting. These stylized facts imply a qualitatively optimal assignment of patients to NP versus physician provider classes, in the sense of skill-task matching in organizations (Acemoglu and Autor 2011): Of patients available, NPs should receive the healthier ones, and NPs should receive fewer patients when physicians have bandwidth to see them.

Appendix Figure A.9 provides descriptive insight into patient assignment by exploiting variation in NP staffing (i.e., the instrument) and variation in patient arrivals, conditional on our baseline controls. Panels A-C show that NPs overall are assigned healthier cases, consistent with Table 1. The average complexity and severity of cases assigned to NPs, as measured by patient age, comorbidities, and predicted 30-day mortality, increase with NP staffing, despite the average complexity and severity of all cases remaining stable. The pattern suggests an assignment process in which the first cases assigned to NPs have the lowest health risks; when more NPs (and fewer physicians) are available, cases incrementally assigned to NPs are riskier

43. As shown in Panel A of Appendix Table A.19, NPs sizably increase lengths of stay and medical costs for cases in the highest complexity quartile, without leading to a significant change in 30-day preventable hospitalizations. In contrast, NPs reveal a smaller-magnitude effect on lengths of stay and medical costs for cases in lower complexity quartiles but significantly raise 30-day preventable hospitalizations.

44. We estimate 30-day mortality of primary care patients using the VHA administrative data on primary care visits, between January 2017 and January 2020, i.e., our study period.

compared to those initially assigned to NPs but are still relatively healthy among the remaining cases to be assigned.[45] Panel D of the figure assesses the probability that a patient is assigned to an NP as a function of ED busyness measured by the number of other patients arriving in the analysis time window (i.e., 8 a.m. to 6 p.m.) of the ED-day cell. We find a small but clear trend in which patients are more likely to be assigned to NPs when the ED is busier, consistent with the efficiency of having NPs on standby when physicians are less occupied.[46]

6 Counterfactual Scenarios

In this section, we consider two counterfactual policy scenarios that quantify the average NP-physician productivity difference in financial terms. First, we consider the overall cost implications of substituting physicians with NPs by assigning 25 percent of cases across VHA EDs to NPs, instead of physicians. Second, we consider augmenting the existing supply of physicians with NPs. Overall, these analyses show that productivity differences between classes of workers may have even larger cost implications than the sizable differences in wages.

6.1 Substituting Physicians with NPs

We first perform a simple calculation of the cost of assigning 25 percent of all cases in VHA EDs to NPs—approximately the share of cases treated by NPs in our sample, which consists of EDs that are early adopters of NPs under full practice authority. We assume that the treatment effects of NPs across all EDs would be similar to that in our sample and consider three components of extra costs due to NPs: the costs of ED care (Section 4.1), the costs of hospital admission for severe cases (Section 5.3), and the costs of 30-day preventable hospitalizations (Section 4.2). We find an extra cost of $160 million per year for the VHA.[47]

45. As a result, cases left for physicians become riskier with more NPs. A potential question is whether the increased risk of cases assigned to physicians on days with more NPs affects physicians' performance, violating an exclusion restriction. To assess this concern, Appendix Table A.7 controls for multiple measures of the average health risk (age, comorbidities, and predicted 30-day mortality) of cases assigned to physicians in the ED-day cell. The results show that our IV estimates are highly robust.

46. This relationship is qualitatively the same when further conditioning on the number of NPs and the number of physicians staffing the ED on that day. A related question is whether the increasing NP assignment with ED busyness may affect the estimated NP effects. In contrast to OLS, a correlation between NP assignment and busyness per se would not affect estimates from our IV approach. In Section 4.4, we also show that our IV estimates are highly robust to controlling for the number of patients arriving.

47. To calculate the cost of increased 30-day preventable hospitalizations and hospital admissions in the ED visit, we apply the cost estimate of $19,220 per VHA hospital stay, on the basis of the average length of stay per hospitalization at the VHA and costs per VHA inpatient day reported by the VHA's Health Economics Resource Center (2021). As this cost estimation focuses on preventable hospitalization effects within 30 days of the ED visit, the extra cost estimated can be viewed as that within the 30 days of the ED visit. To the extent that the cost-increasing effect of NPs may accrue over time and extend into other dimensions of post-ED care, the extra spending associated with using NPs may be larger than the estimate reported above. In this cost calculation and the productivity estimation in Section 7 below, we take the societal perspective and view extra medical spending as costs. In practice, hospitals in the US health care system may not fully internalize the societal cost of hiring lower-productivity workers, as they may

This figure is approximately twice the yearly NP wage costs that the VHA would encounter to assign 25 percent of its ED cases to NPs.[48]

The calculation ignores potential changes in provider wage costs, which may be large, as the average NP wage is only half the average physician wage (Bureau of Labor Statistics 2021a; 2021b). If two NPs substitute for one physician, which could be within the possible range given the coefficient reported in Panel A of Figure 1, there may be no wage saving when substituting physicians with NPs. For a conservative estimate, we consider the scenario where one NP may substitute for one physician. Under this scenario, we again arrive at net costs, $92 million per year, for assigning 25 percent of VHA ED cases to NPs.

Using LATEs from our quasi-experiment, this analysis is well suited to assess counterfactual outcomes for compliers, likely to encompass the 25 percent of cases assigned to NPs. Alternatively, we consider a more conservative counterfactual scenario where EDs assign the least complex 25 percent of cases (by the number of Elixhauser comorbidities) to NPs. We note that such an allocation may not always be feasible: For example, in hours when all arriving patients are risky, EDs may need to assign some complex cases to NPs. Applying the estimates for the lowest complexity quartile patients in Appendix Table A.19, we find extra costs of $81 million per year to the VHA. Such extra costs may be reduced to zero through lower NP wages if an NP can substitute for 0.85 physicians.

6.2 Augmenting Provider Supply with NPs

Despite possible extra spending, our findings do not imply that NPs are inefficient to use. When physician capacity is limited, hiring additional NPs to improve throughput and reduce wait times could nevertheless be efficiency-improving. To examine this concept, we consider the trade-off between reducing wait times and increasing resource use—measured by ED length of stay and total cost per case—induced by additional NPs. As overcrowding is a significant issue in EDs, wait time has been an important object of attention for policymakers and ED management alike (e.g., Institute of Medicine 2006; American College of Emergency Physicians 2016).

In this analysis, we ask, holding fixed the number of cases arriving and the number of physicians on duty, how additional NPs may affect patient wait time and downstream outcomes:

be reimbursed for extra utilization and may not bear the costs of downstream outcomes.

48. For this back-of-the-envelope estimation, we divide the total number of cases in the 25 percent set by the average caseload of NPs in our sample, finding that 654 NPs would be needed for treating 25 percent of VHA's ED cases annually. We then multiply the number of NPs needed with the mean NP wage reported by Bureau of Labor Statistics (2021a), yielding a total wage estimate of $74.9 million per year.

$$y_i = \sum_{n=0}^{N} \delta_n \times \mathbf{1}(Z_i = n) + N_i^c \gamma_1 + N_i^p \gamma_2 + \mathbf{T}_i \eta + \mathbf{X}_i \beta + \varepsilon_i . \quad (5)$$

$\mathbf{1}(Z_i = n)$ is an indicator for $n \in \{0, \ldots, 5\}$ NPs being on duty at the ED on the day case i visits.[49] N_i^c and N_i^p are, respectively, the number of cases arriving and the number of physicians on duty at the ED on the day case i visits. We apply Equation (5) to several outcomes of interest: (i) wait time (i.e., the time between patient arrival at the ED and assignment to a provider); (ii) length of stay (i.e., the time between assignment to a provider and discharge from the ED); (iii) cost of ED care; (iv) hospital admission; and (v) 30-day preventable hospitalization.

Figure 8 presents the estimated trade-off based on Equation (5). Panel A shows the trade-off between wait time and length of stay. Each dot plots a pair of δ_n with the estimated δ_n for wait time on the y-axis and the estimated δ_n for length of stay on the x-axis. Panel B similarly plots the trade-off between wait time and total cost per case. To arrive at the latter, we apply a cost estimate of $19,220 per hospital stay, as in Section 6.1, and calculate the sum of the coefficients for the three cost-related outcomes: the cost of ED care, the cost of hospital admission (for high-severity patients), and the cost of 30-day preventable hospitalization.[50]

As implied in Figure 8, decreasing wait time by 30 minutes per case by hiring additional NPs would increase length of stay by 16 minutes per case (Panel A) and increase total medical spending by 15 percent, or about $238 per case, not including the cost of additional NP wages (Panel B).[51] Including the wage costs of additional NPs brings this figure to about $300 per case.[52] That is, roughly four-fifths of the additional spending to reduce wait time by hiring NPs come from the lower productivity of NPs, while only one-fifth comes from additional NP wage costs.

7 Productivity Within Professions

Up to this point, we have focused on estimating the average productivity difference between the professional classes of NPs and physicians. We show that this difference is large, likely even larger than the difference in average wages between the two professions. In this section, motivated by growing evidence of produc-

49. The maximum n is 6, but only a small share of ED-days has 5 or 6 NPs on duty (Appendix Figure A.1). We thus group $n = 5$ and $n = 6$.

50. As shown in Section 5.3, we only observe significant NP effects on raising hospital admissions among severe cases, i.e., cases with a three-digit ICD-10 diagnosis whose 30-day mortality is equal to or above the 95th percentile of the sample; thus, in calculating the extra cost due to increased hospital admission in the ED visit, we include only that incurred by the severe cases.

51. Figure 8 shows that a 34-minute decline in wait time increases length of stay by 18 minutes and total spending by $268 per case (comparing the first and last dot in each panel). We rescale the tradeoff to a 30-minute decline in wait time for ease of interpretation.

52. For this wage cost estimation, we divide the yearly NP wage by the average number of cases an NP treats per year, and then multiply this figure by the number of additional NPs required.

tivity variation across providers (within professions), we measure the distribution of productivity within each profession and ask how this intra-professional variation in productivity compares to the difference in productivity between professions, in the case of NPs versus physicians.[53] Using the detailed administrative data of the VHA, we then evaluate the extent to which productivity within each profession relates to cases assigned and wages paid to individual providers.

7.1 Distribution of Productivity

We first examine the distribution of productivity within each profession. We operationalize this examination by focusing on a measure of the total cost per case. Specifically, for each case, we aggregate the three components of resource utilization in which we find significant NP effects, the same components we previously considered in Section 6: ED costs, hospital admission, and 30-day preventable hospitalizations (we multiply the latter two components by the average cost of a hospital stay, $19,220). We then estimate provider effects on the log of this measure of the total cost of each ED visit, with higher effects indicating *lower* productivity. To account for the provider-specific selection of patients, we use a just-identified IV model that instruments for indicators for treating providers with indicators for on-duty providers in the ED-day cell of the patient's visit. Appendix A.4.1 describes details of the estimation and shows that these instruments are strongly predictive of the treating providers but are independent of arriving patients' characteristics conditional on our baseline controls, supporting the validity of these instruments.

Appendix Table A.20 reports estimates of the variance of provider effects on log total cost of the ED visit defined above. Using a split-sample approach to account for finite-sample estimation error, we find a variance of 0.045 for physicians and 0.048 for NPs (see Appendix A.4.2 for the split-sample approach). These estimates suggest large variation in provider effects: A one-standard-deviation costlier physician and NP increase the total cost of the ED visit by 21 and 22 percent per case, respectively, which are about three times the average NP effect of 6.7 percent from the 2SLS model specified in Equations (1) and (2). Related to the wide variation in provider effects within physician and NP professional classes, Appendix Figure A.10 shows that the NP effect varies considerably across EDs (details in Appendix A.5). Accounting for sampling error, the standard deviation of the ED-specific effects for each outcome is similar in magnitude to the average NP effect reported in Section 4.

We then investigate the full distributions of provider effects on the log total cost per case, applying a

53. Doyle, Ewer, and Wagner (2010) show differences in resource utilization decisions among physician trainees, potentially driven by human capital. Abaluck et al. (2016) documents variation in physician testing thresholds in the context of pulmonary embolism, and Silver (2021) examines returns to time spent on patients by ED physicians and variation in the physicians' productivity. Currie and MacLeod (2017) and Currie and MacLeod (2020) show physician skill variation in the contexts of C-section and depression treatments. Chan, Gentzkow, and Yu (2022) demonstrate important variation in diagnostic skill among radiologists.

non-parametric empirical Bayes deconvolution approach adapted by Kline, Rose, and Walters (2022) from Efron (2016). This approach extracts a flexible empirical Bayes prior distribution of population provider effects, using the estimated provider effects and associated standard errors from the just-identified IV model described above. We apply this procedure separately for NPs and physicians and ensure that the difference between the means of the deconvolved distributions for NPs and physicians equals the NP effect from the 2SLS model in Equations (1) and (2). Panel A of Figure 9 displays the deconvolved density of provider effects. For interpretation, we convert provider effects on log total spending per case on the x-axis to annual spending (excluding provider wages) by incorporating the empirical distribution of log total spending per case and the average number of cases a provider sees per year. Appendix A.4.3 describes details of these estimations. Within each professional class, the productivity distribution implies greater non-wage spending of about $650,000 and $620,000 per year under a provider at the 25th percentile of productivity than under a provider at the 75th percentile for NPs and physicians, respectively—both of which are about three times the mean annual non-wage spending difference between NPs and physicians.

The area under the curve (AUC) corresponding to these two distributions implies that the probability that a randomly drawn NP is costlier than a randomly drawn physician is only 62 percent (details in Appendix A.4.4).[54] The large overlap in productivity suggests that professional class is a highly imperfect proxy for productivity. If provider-specific productivity could be observed and used in hiring, paying, or assigning cases, there could be scope for large efficiency gains beyond policies that depend on professional class alone.

7.2 Relationship with Wages and Case Assignment

Next, we evaluate the distribution of assigned patient risks and paid wages across providers within each professional class. In Panel B of Figure 9, we show the average patient risks, measured by predicted 30-day mortality, across providers in each professional class. While there is considerable overlap in the supports of the distributions for NPs and physicians, the difference in means between the two distributions is clear, as we found in Appendix Figure A.9. In Panel C of Figure 9, we show the distributions of annual wages across providers.[55] Despite substantial wage variation within each profession, there is virtually no overlap

54. This probability is robust to accounting for possible differences in treatment effects between the overall population and compliers. When assuming the average treatment effect is as large as the effect among patients in the highest-complexity quartile, which is twice the LATE estimate, the probability that a randomly drawn NP is costlier than a randomly drawn physician remains limited at 72 percent.

55. For each provider, we access detailed payment records of the full-time equivalents and wages for each pay period between the years 2011 to 2020, inclusive. We convert these data to annualized provider wages by (i) inflation-adjusting payments in any year to corresponding payments in 2020 dollars, (ii) computing a per-hour wage by dividing the sum of (inflation-adjusted) payments by the sum of work hours across all pay periods, where each pay period covers two weeks and considers a number of 80 hours to be one full-time-equivalent, and (iii) multiplying this figure by 26 pay periods and 80 hours per pay period.

between the wage distributions for NPs and physicians. Under the AUC criterion, assigned patient risks are qualitatively more predictive of professional class than productivity is; yearly wages are extremely predictive of professional class (more details in Appendix A.4.4 and Appendix Figure A.11).

Finally, given the potential for large efficiency gains under policies using provider-specific productivity, we explore how our measure of provider productivity (i.e., provider effects on the log total spending per case) relates to assigned patient risks and wages paid to each provider. To account for sampling error, we compute the empirical Bayes posterior mean for each provider's effect on log total spending per case (details in Appendix A.4.5). In contrast to the differences between NPs and physicians, we find that provider productivity within each professional class has little bearing on the average predicted 30-day mortality of cases assigned to each provider (Panel A of Appendix Figure A.12).[56] Similarly, we find that, within each professional class, a provider's productivity shows little positive relationship with her wages (Panel B of Appendix Figure A.12).[57] Taken together, the evidence indicates that organizations make little use of provider productivity within each professional class when assigning cases or setting wages for providers.

8 Conclusion

Professionals perform some of the most important tasks across a variety of economic sectors. In turn, professional groups play a central role in determining the division of professional labor, the selection and training of future members, and the economic returns to working as a professional. However, very little is known empirically about productivity differences between distinct professions performing overlapping tasks and how they compare to within-profession productivity variation, largely because professions exclude other groups from providing tasks within their "jurisdictions" (Abbott 2014).

In this paper, we exploit a unique opportunity to study two starkly different classes of professionals—nurse practitioners (NPs) and physicians. Our empirical setting allows us to study the quasi-experimental assignment of ED patients to NPs versus physicians in the Veterans Health Administration (VHA). Beginning in December 2016, the VHA directed its stations to allow full practice authority to NPs. We use the quasi-random arrival of patients at the ED between times that may differ in the availability of NPs on shift, which drives the probability of being treated by an NP versus a physician. Compared to physicians, NPs incur

56. In an analysis that divides cases into low- versus high-risk by whether predicted 30-day mortality is below versus above the sample median and separately identifies provider effects on low- and high-risk patients, we find that the gap in spending effects between low- and high-productivity providers is greater for riskier patients. This implies that assigning riskier patients to higher-productivity providers could be efficient.

57. For NPs, though Panel B of Appendix Figure A.12 shows a relationship between wages and productivity, the relationship is small in magnitude and only marginally significant. The relationship is also opposite-signed: NPs with higher effects on spending, i.e., NPs who are lower-productivity, are paid higher wages.

greater resource costs to treat patients but achieve worse patient outcomes.

We also shed light on behavioral mechanisms and responses that connect productivity to human capital. We show that experience may play a role in the NP-physician performance gap. We demonstrate clinical decision-making in response to lower human capital: NPs are likelier to call on external information, potentially compensating for less information perceived on their own. NPs are also less likely to prescribe drugs with potentially high errors of commission (opioids), while they are more likely to prescribe drugs with potentially high errors of omission (antibiotics). Finally, the productivity gap between NPs and physicians is higher for complex and severe patients. We show descriptive evidence of patient allocation that responds to NP comparative and absolute disadvantage: On average, NPs receive healthier patients and take on a smaller share of the caseload when the ED is less constrained to meet demand.

Even under conservative assumptions, we find the resource costs implied by the lower productivity of NPs versus physicians likely outweigh salary savings from hiring NPs instead of physicians. However, we also find productivity variation within each profession several-fold larger than the difference between the two professions. The substantial overlap in the distributions of productivity for NPs and physicians suggests that professional class is, at best, a coarse indicator of productivity. While NPs and physicians receive qualitatively different patient risks and starkly different wages, within each profession, tasks and wages bear limited relationships with worker productivity. Thus, despite the average productivity difference between NPs and physicians, our findings need not imply that NPs are inefficient to use: Not only could NPs be valuable in augmenting an inelastic physician supply, the large productivity overlap between the two professions suggests that organizing work solely around professional lines may forego large gains in efficiency.

Considered together, our findings paint a nuanced picture of the role of professions in determining and revealing the productivity, tasks, and wages of workers. The intensive processes of professional selection and training may imply important productivity differences between professional classes that possibly justify sizable wage differences in industries such as health care. Nevertheless, professional institutions are likely more effective at separating wages and organizing tasks between professions than at standardizing productivity within professions. These relationships may derive from frictions in observing or acting on productivity in the labor marketplace (Acemoglu and Pischke 1998), where professions may provide an important function of certifying membership and organizing labor. Professional membership may sometimes be exclusive, as in the case of physicians, but it may nonetheless be a highly imperfect proxy for productivity.

References

Abadie, Alberto. 2003. "Semiparametric Instrumental Variable Estimation of Treatment Response Models." *Journal of Econometrics* 113 (2): 231–263.

Abaluck, Jason, Leila Agha, Chris Kabrhel, Ali Raja, and Arjun Venkatesh. 2016. "The Determinants of Productivity in Medical Testing: Intensity and Allocation of Care." *American Economic Review* 106 (12): 3730–3764.

Abbott, Andrew. 2014. *The System of Professions: An Essay on the Division of Expert Labor.* Chicago: University of Chicago Press.

Acemoglu, Daron, and David Autor. 2011. "Skills, Tasks and Technologies: Implications for Employment and Earnings." In *Handbook of Labor Economics,* edited by David Card and Orley Ashenfelter, vol. 4B, 1043–1171. Amsterdam: Elsevier.

Acemoglu, Daron, and Jörn-Steffen Pischke. 1998. "Why Do Firms Train? Theory and Evidence." *Quarterly Journal of Economics* 113 (1): 79–119.

Agency for Healthcare Research and Quality. 2021. "Prevention Quality Indicators Technical Specifications Updates." Accessed October 12, 2022. https://qualityindicators.ahrq.gov/archive/pqi_techspec/icd10_v2021.

Alexander, Diane, and Molly Schnell. 2019. "Just What the Nurse Practitioner Ordered: Independent Prescriptive Authority and Population Mental Health." *Journal of Health Economics* 66:145–162.

Altonji, Joseph G., Todd E. Elder, and Christopher R. Taber. 2005. "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools." *Journal of Political Economy* 113 (1): 151–184.

American Association of Nurse Practitioners. 2020. "The Path to Becoming a Nurse Practitioner (NP)." Accessed February 23, 2022. https://www.aanp.org/news-feed/explore-the-variety-of-career-paths-for-nurse-practitioners.

———. 2021. "State Practice Environment." Accessed February 23, 2022. https://www.aanp.org/advocacy/state/state-practice-environment.

American College of Emergency Physicians. 2016. "Emergency Department Crowding: High Impact Solutions." Accessed February 20, 2022. https://www.acep.org/globalassets/sites/acep/media/crowding/empc_crowding-ip_092016.pdf.

Anderson, D. Mark, Ryan Brown, Kerwin Kofi Charles, and Daniel I. Rees. 2020. "Occupational Licensing and Maternal Health: Evidence from Early Midwifery Laws." *Journal of Political Economy* 128 (11): 4337–4383.

Ashley, Jo Ann. 1976. *Hospitals, Paternalism, and the Role of the Nurse.* New York: Teachers College Press.

Association of American Medical Colleges. 2020. "The Road to Becoming a Doctor." Accessed February 25, 2022. https://www.aamc.org/system/files/2020-11/aamc-road-to-becoming-doctor-2020.pdf.

Beck, Andrew H. 2004. "The Flexner Report and the Standardization of American Medical Education." *JAMA* 291 (17): 2139–2140.

Benkard, Lanier. 2000. "Learning and Forgetting: The Dynamics of Aircraft Production." *American Economic Review* 90 (4): 1034–1054.

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan. 2004. "How Much Should We Trust Differences-in-Differences Estimates?" *Quarterly Journal of Economics* 119 (1): 249–275.

Bhuller, Manudeep, Gordon B. Dahl, Katrine V. Løken, and Magne Mogstad. 2020. "Incarceration, Recidivism, and Employment." *Journal of Political Economy* 128 (4): 1269–1324.

Brown, E. Richard. 1979. *Rockefeller Medicine Men: Medicine and Capitalism in America.* Berkeley: University of California Press.

Bureau of Labor Statistics. 2021a. "Occupational Employment and Wages, May 2020 (Nurse Practitioners)." Accessed November 10, 2021. https://www.bls.gov/oes/current/oes291171.htm.

———. 2021b. "Occupational Employment and Wages, May 2020 (Physicians, All Other; and Ophthalmologists, Except Pediatric)." Accessed November 10, 2021. https://www.bls.gov/oes/current/oes291228.htm.

Butler, Christopher C., David Gillespie, Patrick White, Janine Bates, Rachel Lowe, Emma Thomas-Jones, Mandy Wootton, Kerenza Hood, Rhiannon Phillips, Hasse Melbye, et al. 2019. "C-Reactive Protein Testing to Guide Antibiotic Prescribing for COPD Exacerbations." *New England Journal of Medicine* 381 (2): 111–120.

Cairns, Christopher, and Kai Kang. 2022. "National Hospital Ambulatory Medical Care Survey: 2019 Emergency Department Summary Tables." Accessed February 3, 2023. https://dx.doi.org/10.15620/cdc:115748.

Cameron, A. Colin, and Douglas L. Miller. 2015. "A Practitioner's Guide to Cluster-Robust Inference." *Journal of Human Resources* 50 (2): 317–372.

Chan, David C. 2016. "Teamwork and Moral Hazard: Evidence from the Emergency Department." *Journal of Political Economy* 124 (3): 734–770.

Chan, David C., Matthew Gentzkow, and Chuan Yu. 2022. "Selection with Variation in Diagnostic Skill: Evidence from Radiologists." *Quarterly Journal of Economics* 137 (2): 729–783.

Chan, David C., and Jonathan Gruber. 2020. "Provider Discretion and Variation in Resource Allocation: The Case of Triage Decisions." *AEA Papers and Proceedings* 110:279–283.

Chandra, Amitabh, and Douglas O. Staiger. 2007. "Productivity Spillovers in Healthcare: Evidence from the Treatment of Heart Attacks." *Journal of Political Economy* 115 (1): 103–140.

Chen, Yiqun. 2021. "Team-Specific Human Capital and Team Performance: Evidence from Doctors." *American Economic Review* 111 (12): 3923–3962.

Chetty, Raj, John N. Friedman, and Jonah E. Rockoff. 2014. "Measuring the Impacts of Teachers I: Evaluating Bias in Teacher Value-Added Estimates." *American Economic Review* 104 (9): 2593–2632.

Currie, Janet, and W. Bentley MacLeod. 2017. "Diagnosing Expertise: Human Capital, Decision Making, and Performance Among Physicians." *Journal of Labor Economics* 35 (1): 1–43.

———. 2020. "Understanding Doctor Decision Making: The Case of Depression Treatment." *Econometrica* 88 (3): 847–878.

Currie, Janet, and Jonathan Zhang. 2021. "Doing More with Less: Predicting Primary Care Provider Effectiveness." NBER Working Paper 28929.

Dahl, Gordon B., Andreas Ravndal Kostøl, and Magne Mogstad. 2014. "Family Welfare Cultures." *Quarterly Journal of Economics* 129 (4): 1711–1752.

Dillender, Marcus, Anthony T Lo Sasso, Brian J Phelan, and Michael R Richards. 2022. "Occupational Licensing and the Healthcare Labor Market." NBER Working Paper 29665.

Doyle, Joseph J., Steven M. Ewer, and Todd H. Wagner. 2010. "Returns to Physician Human Capital: Evidence from Patients Randomized to Physician Teams." *Journal of Health Economics* 29 (6): 866–882.

Efron, Bradley. 2016. "Empirical Bayes Deconvolution Estimates." *Biometrika* 103 (1): 1–20.

Elixhauser, Anne, Claudia Steiner, D. Robert Harris, and Rosanna M. Coffey. 1998. "Comorbidity Measures for Use with Administrative Data." *Medical Care* 36 (1): 8–27.

Epstein, Andrew, and Sean Nicholson. 2009. "The Formation and Evolution of Physician Treatment Styles: An Application to Cesarean Sections." *Journal of Health Economics* 28 (6): 1126–1140.

Fairman, Julie. 2009. *Making Room in the Clinic: Nurse Practitioners and the Evolution of Modern Health Care.* New Brunswick: Rutgers University Press.

Farronato, Chiara, Andrey Fradkin, Bradley Larsen, and Erik Brynjolfsson. 2020. "Consumer Protection in an Online World: An Analysis of Occupational Licensing." NBER Working Paper 26601.

Fleming-Dutra, Katherine E., Adam L. Hersh, Daniel J. Shapiro, Monina Bartoces, Eva A. Enns, Thomas M. File, Jonathan A. Finkelstein, Jeffrey S. Gerber, David Y. Hyun, Jeffrey A. Linder, et al. 2016. "Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulatory Care Visits, 2010-2011." *JAMA* 315 (17): 1864–1873.

Flexner, Abraham. 1910. *Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching.* New York: Carnegie Foundation for the Advancement of Teaching.

Freidson, Eliot. 1974. *Professional Dominance: The Social Structure of Medical Care.* New Brunswick: Transaction Publishers.

Friedman, Sam, Daniel Laurison, and Lindsey Macmillan. 2017. "Social Mobility, the Class Pay Gap and Intergenerational Worklessness: New Insights from The Labour Force Survey." Accessed May 25, 2023. https://www.lse.ac.uk/business/consulting/assets/documents/social-mobility-the-class-pay-gap-and-intergenerational-worklessness.pdf.

Gennaioli, Nicola, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2013. "Human Capital and Regional Development." *Quarterly Journal of Economics* 128 (1): 105–164.

Gottlieb, Joshua D., Maria Polyakova, Kevin Rinz, Hugh Shiplett, and Victoria Udalova. 2020. "Who Values Human Capitalists' Human Capital? Healthcare Spending and Physician Earnings." CES Working Paper CES-20-23.

Gowrisankaran, Gautam, Keith Joiner, and Pierre Thomas Léger. 2023. "Physician Practice Style and Healthcare Costs: Evidence from Emergency Departments." *Management Science* 69 (6): 3202–3219.

Hallett, Christine E., ed. 2016. *The History of Nursing.* Major Themes in Health and Social Welfare. New York: Routledge.

Health Economics Resource Center. 2021. "HERC Inpatient Average Cost Data." Accessed February 23, 2022. https://www.herc.research.va.gov/include/page.asp?id=inpatient.

Huang, David T., Donald M. Yealy, Michael R. Filbin, Aaron M. Brown, Chung-Chou H. Chang, Yohei Doi, Michael W. Donnino, Jonathan Fine, Michael J. Fine, Michelle A. Fischer, et al. 2018. "Procalcitonin-Guided Use of Antibiotics for Lower Respiratory Tract Infection." *New England Journal of Medicine* 379 (3): 236–249.

Imbens, Guido W., and Donald B. Rubin. 1997. "Estimating Outcome Distributions for Compliers in Instrumental Variables Models." *Review of Economic Studies* 64 (4): 555–574.

Institute of Medicine. 2006. *Hospital-Based Emergency Care: At the Breaking Point.* Washington, DC: National Academies Press.

Kahn, Marc J., and Ernest J. Sneed. 2015. "Promoting the Affordability of Medical Education to Groups Underrepresented in the Profession: The Other Side of the Equation." *AMA Journal of Ethics* 17 (2): 172–175.

Kleiner, Morris M., and Alan B. Krueger. 2013. "Analyzing the Extent and Influence of Occupational Licensing on the Labor Market." *Journal of Labor Economics* 31 (2): S173–S202.

Kleiner, Morris M., Allison Marier, Kyoung Won Park, and Coady Wing. 2016. "Relaxing Occupational Licensing Requirements: Analyzing Wages and Prices for a Medical Service." *Journal of Law and Economics* 59 (2): 261–291.

Kleinpell, Ruth, Michelle L Cook, and Diane L Padden. 2018. "American Association of Nurse Practitioners National Nurse Practitioner Sample Survey: Update on Acute Care Nurse Practitioner Practice." *Journal of the American Association of Nurse Practitioners* 30 (3): 140–149.

Kline, Patrick M., Evan K. Rose, and Christopher R. Walters. 2022. "Systemic Discrimination Among Large U.S. Employers." *Quarterly Journal of Economics* 137 (4): 1963–2036.

Larson, Magali S. 1979. *The Rise of Professionalism: A Sociological Analysis.* Berkeley: University of California Press.

Laurant, Miranda, David Reeves, Rosella Hermens, Jose Braspenning, Richard Grol, and Bonnie Sibbald. 2005. "Substitution of Doctors by Nurses in Primary Care." *Cochrane Database of Systematic Reviews* 2.

Lazuka, Volha. 2018. "The Long-Term Health Benefits of Receiving Treatment from Qualified Midwives at Birth." *Journal of Development Economics* 133:415–433.

Maggs, Christopher. 2016. "Profit and Loss and the Hospital Nurse." In *The History of Nursing,* edited by Christine Hallett, 3:83–93. Major Themes in Health and Social Welfare. New York: Routledge.

Maier, Claudia B., and Linda H. Aiken. 2016. "Task Shifting from Physicians to Nurses in Primary Care in 39 Countries: A Cross-Country Comparative Study." *European Journal of Public Health* 26 (6): 927–934.

Maier, Claudia B., Hilary Barnes, Linda H. Aiken, and Reinhard Busse. 2016. "Descriptive, Cross-Country Analysis of the Nurse Practitioner Workforce in Six Countries: Size, Growth, Physician Substitution Potential." *BMJ Open* 6 (9): e011901.

Maier, Claudia B., Ronald Batenburg, Stephen Birch, Britta Zander, Robert Elliott, and Reinhard Busse. 2018. "Health Workforce Planning: Which Countries Include Nurse Practitioners and Physician Assistants and to What Effect?" *Health Policy* 122 (10): 1085–1092.

Markovits, Daniel. 2020. *The Meritocracy Trap: How America's Foundational Myth Feeds Inequality, Dismantles the Middle Class, and Devours the Elite.* New York: Penguin.

McMichael, Benjamin J., and Sara Markowitz. 2022. "Toward a Uniform Classification of Nurse Practitioner Scope of Practice Laws." *Medical Care Research and Review.*

Morgan, Perri A., David H. Abbott, Rebecca B. McNeil, and Deborah A. Fisher. 2012. "Characteristics of Primary Care Office Visits to Nurse Practitioners, Physician Assistants and Physicians in United States Veterans Health Administration Facilities, 2005 to 2010: A Retrospective Cross-Sectional Analysis." *Human Resources for Health* 10 (1): 1–8.

Neuman, Mark D., Brian T. Bateman, and Hannah Wunsch. 2019. "Inappropriate Opioid Prescription After Surgery." *The Lancet* 393 (10180): 1547–1557.

Patel, Kant, and Mark E. Rushefsky. 2004. *The Politics of Public Health in the United States.* Armonk: M.E. Sharpe.

Perry, John J. 2009. "The Rise and Impact of Nurse Practitioners and Physician Assistants on their Own and Cross-Occupation Incomes." *Contemporary Economic Policy* 27 (4): 491–511.

Searcey, Dionne, Eduardo Porter, and Robert Gebeloff. 2015. "Health Care Opens Stable Career Path, Taken Mainly by Women." *New York Times*, February 22. Accessed May 23, 2023. https://www.nytimes.com/2015/02/23/business/economy/health-care-opens-middle-class-path-taken-mainly-by-women.html.

Shapiro, Carl. 1986. "Investment, Moral Hazard, and Occupational Licensing." *Review of Economic Studies* 53 (5): 843–862.

Silver, David. 2021. "Haste or Waste? Peer Pressure and Productivity in the Emergency Department." *Review of Economic Studies* 88 (3): 1385–1417.

Smith, Matthew, Danny Yagan, Owen Zidar, and Eric Zwick. 2019. "Capitalists in the Twenty-First Century." *Quarterly Journal of Economics* 134 (4): 1675–1745.

Staiger, Douglas O., Joanne Spetz, and Ciaran S. Phibbs. 2010. "Is There Monopsony in the Labor Market? Evidence from a Natural Experiment." *Journal of Labor Economics* 28 (2): 211–236.

Stange, Kevin. 2014. "How Does Provider Supply and Regulation Influence Health Care Markets? Evidence from Nurse Practitioners and Physician Assistants." *Journal of Health Economics* 33:1–27.

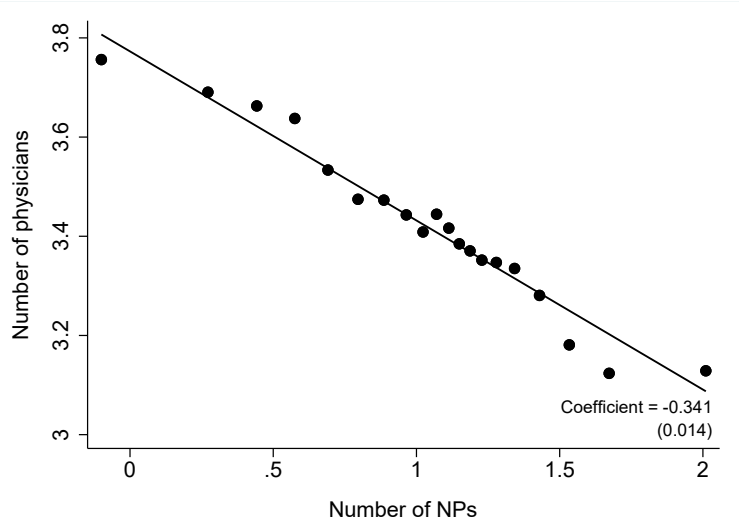
Starr, Paul. 1982. *The Social Transformation of American Medicine: The Rise of a Sovereign Profession and the Making of a Vast Industry.* New York: Basic Books.

Sullivan, Louis W., and Ilana Suez Mittman. 2010. "The State of Diversity in the Health Professions a Century after Flexner." *Academic Medicine: Journal of the Association of American Medical Colleges* 85 (2): 246–253.

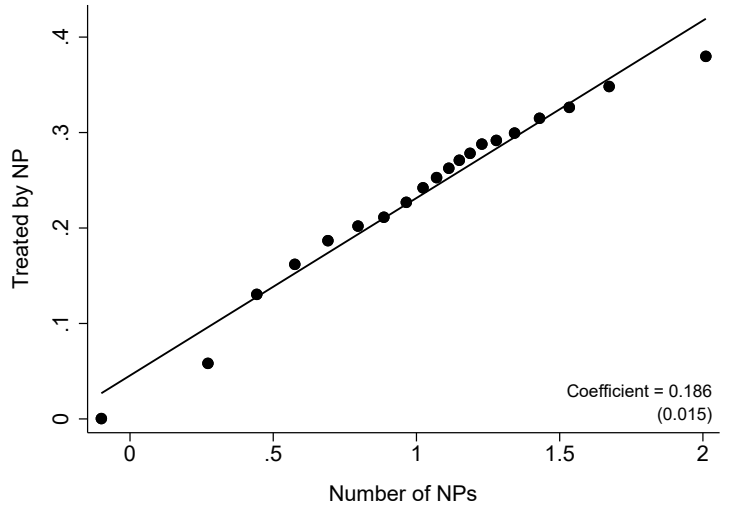
Traczynski, Jeffrey, and Victoria Udalova. 2018. "Nurse Practitioner Independence, Health Care Utilization, and Health Outcomes." *Journal of Health Economics* 58:90–109.

Figure 1: First Stage

A. Number of Physicians

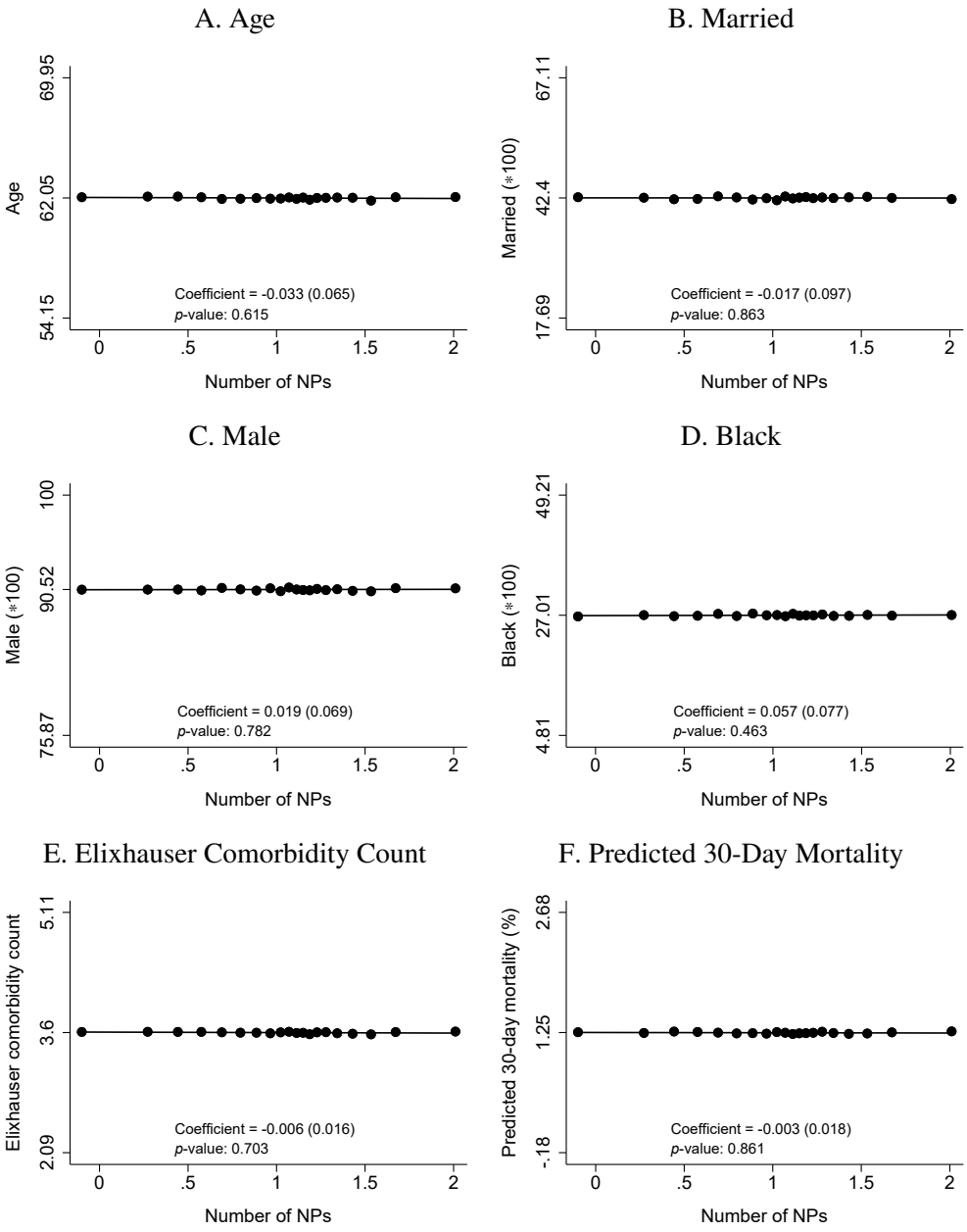


B. Treated by NP



Notes: This figure represents a graphical illustration of the first-stage estimation. Panel A shows a binned scatter plot of the number of physicians on duty versus the number of NPs on duty. Panel B shows a binned scatter plot of whether the case is treated by an NP versus the number of NPs on duty. To construct these binned scatter plots, we first residualize both the *y*-axis and *x*-axis variables with respect to the baseline control vector (i.e., indicators for ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day) and then add means back for ease of interpretation. The coefficients report the estimated slope of the best-fit line between the *y*-axis and *x*-axis variables (conditional on the baseline control vector), with standard errors clustered by provider reported in parentheses.

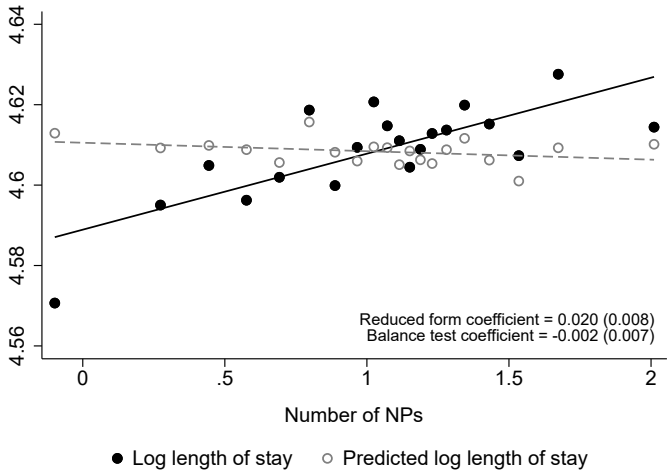
Figure 2: Balance in Patient Characteristics



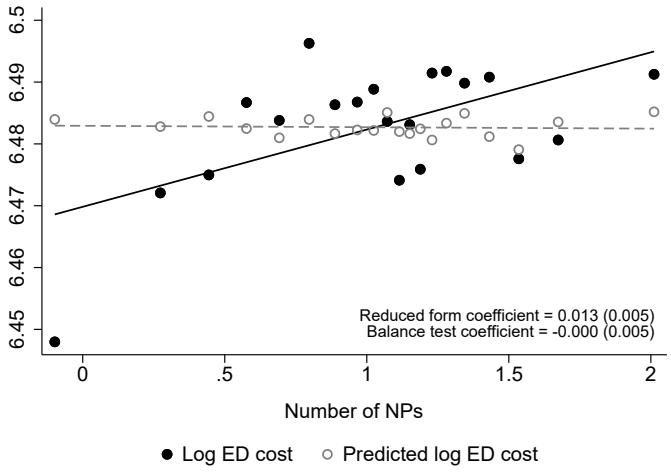
Notes: This figure shows balance in patient characteristics across the number of NPs on duty, conditional on the baseline controls (i.e., indicators for ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day). To construct these binned scatter plots, we first residualize both the y-axis and x-axis variables with respect to the baseline controls and then add means back for ease of interpretation. The middle number on the y-axis of each panel reports the mean of the sample; the top and bottom number report the mean plus and minus a half standard deviation, respectively (except for Panel C which caps the top number at 100 since the mean plus a half standard deviation is beyond the maximum possible). The coefficients report the estimated slope of the best-fit line between the y-axis and x-axis variables (conditional on the baseline controls), with standard errors clustered by provider reported in parentheses. Each panel also reports p-values for the coefficient estimates. For readability of the coefficients, Panels B, C, and D scale up the dependent variable by 100. Predicted 30-day mortality is generated from a linear regression of actual 30-day mortality on patient characteristics $\mathbf{X}_i$ included in Equations (1) and (2), including demographics, comorbidities, prior health care use, vital signs, and three-digit diagnosis indicators.

Figure 3: Reduced-Form and Balance

A. Log Length of Stay



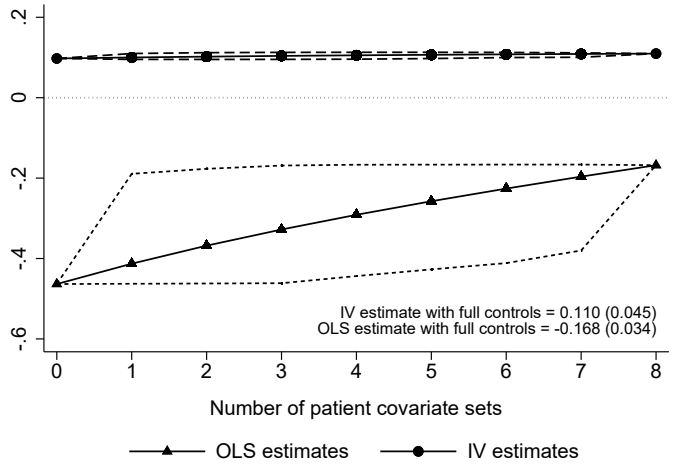
B. Log ED Cost



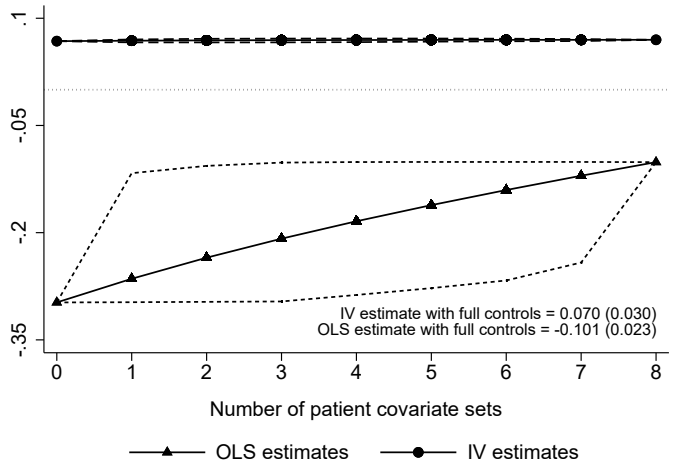
Notes: This figure shows binned scatter plots of patient actual and predicted outcomes on the *y*-axis versus the number of NPs on duty on the *x*-axis, controlling for the baseline control vector (i.e., indicators for ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day). Panel A reports results for log length of stay; Panel B reports results for log cost of the ED visit. The solid circles and lines represent patient actual outcomes. The hollow circles and dashed lines represent patient predicted outcomes generated based on patient characteristics $\mathbf{X}_i$ included in Equations (1) and (2), including patient demographics, comorbidities, prior health care use, vital signs, and three-digit diagnosis indicators. The reduced-form coefficients are estimated using Equation (2), with patient actual outcomes as the dependent variable; the balance-test coefficients are estimated by regressing patient predicted outcomes on the number of NPs on duty, conditional on the baseline control vector. Standard errors clustered by provider are reported in parentheses.

Figure 4: Stability of OLS and IV Estimates

A. Log Length of Stay

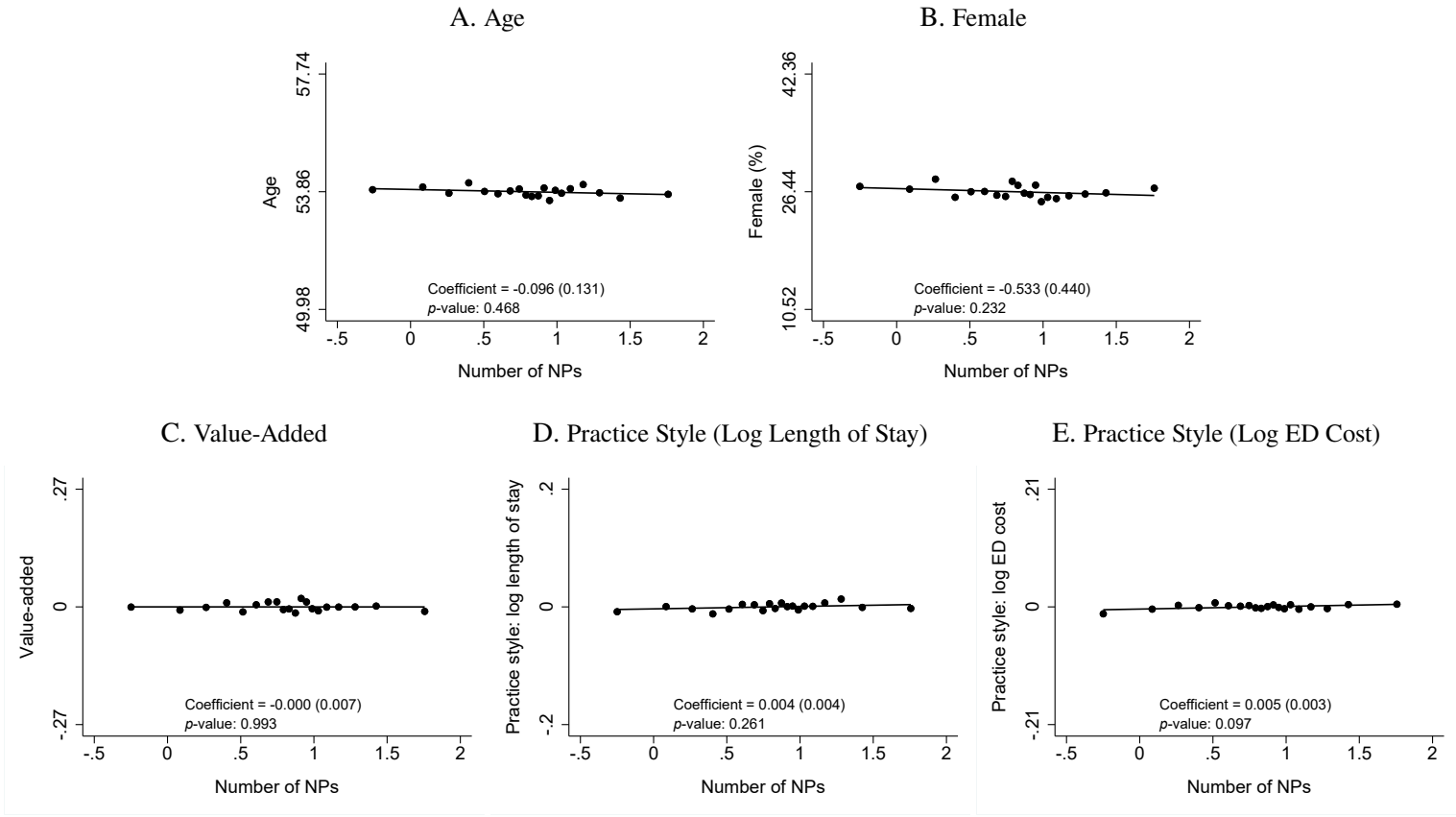


B. Log ED Cost



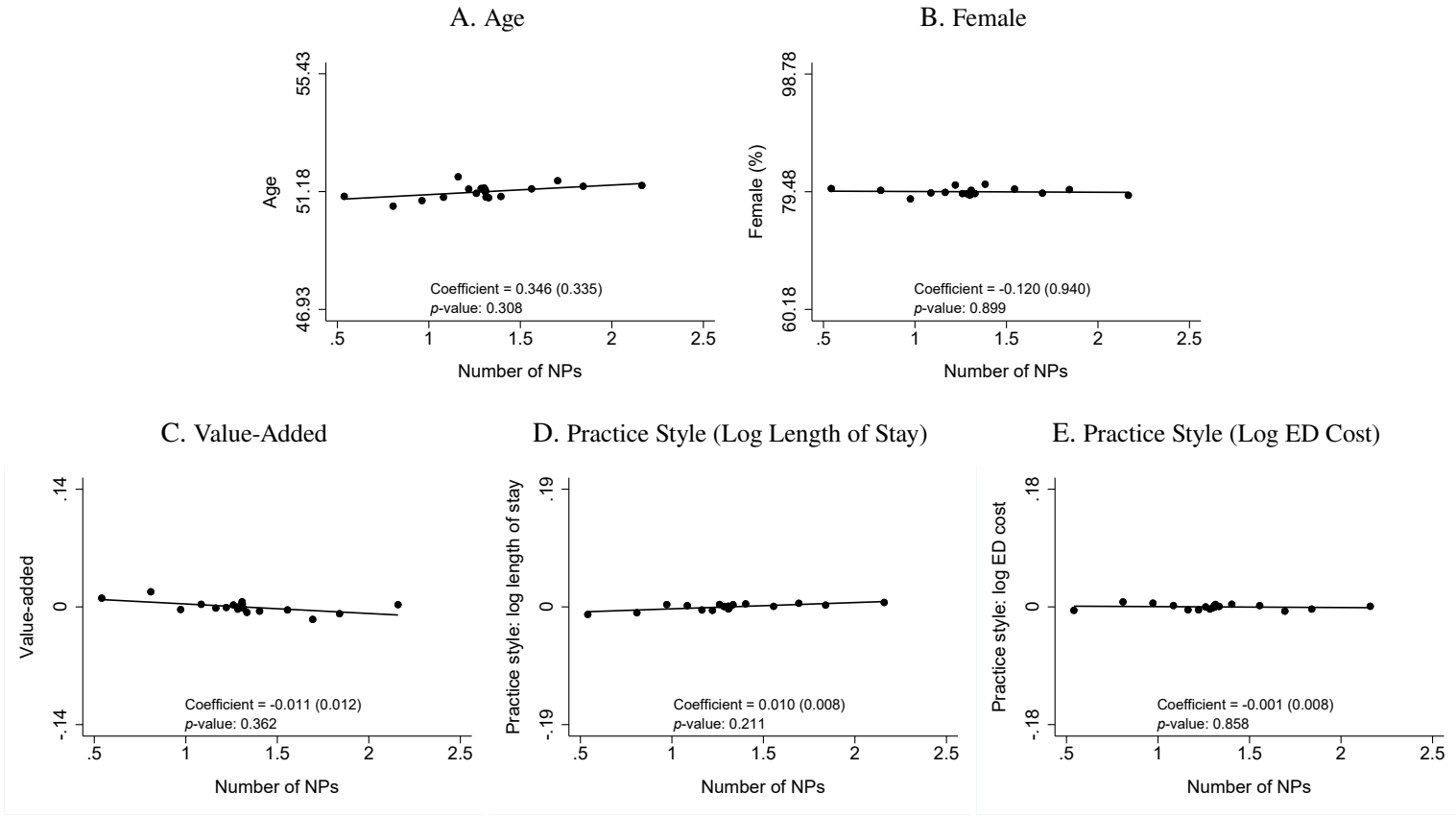
Notes: This figure shows the robustness of our OLS and IV estimates to the inclusion of different sets of patient controls. We divide patient observable characteristics into eight subsets: (i) five-year age-bin indicators; (ii) marital status; (iii) gender; (iv) race indicators; (v) indicators for 31 Elixhauser comorbidities; (vi) vital signs; (vii) prior health care use; and (viii) indicators for three-digit patient primary diagnosis of the visit. We then run separate regressions that control for each of the $2^8 = 256$ different combinations of patient covariates for each outcome. Each n on the x-axis indicates the number of covariate subsets included. For each n, we plot the maximum, mean, and minimum of the estimated coefficients for the effect of NPs using all possible combinations with n (out of eight) subsets of patient covariates. The connected triangles and circles show the mean of the estimated coefficients from OLS and IV regressions, respectively. The dashed lines connect the maximum and minimum of the estimated IV coefficients. The dotted lines connect the maximum and minimum of the estimated OLS coefficients. The coefficients at the bottom of each panel show the IV and OLS estimates with the full set of patient controls, with standard errors reported in parentheses. Panel A reports results for log length of stay. Panel B reports results for log cost of the ED visit.

Figure 5: Balance in Physician Characteristics



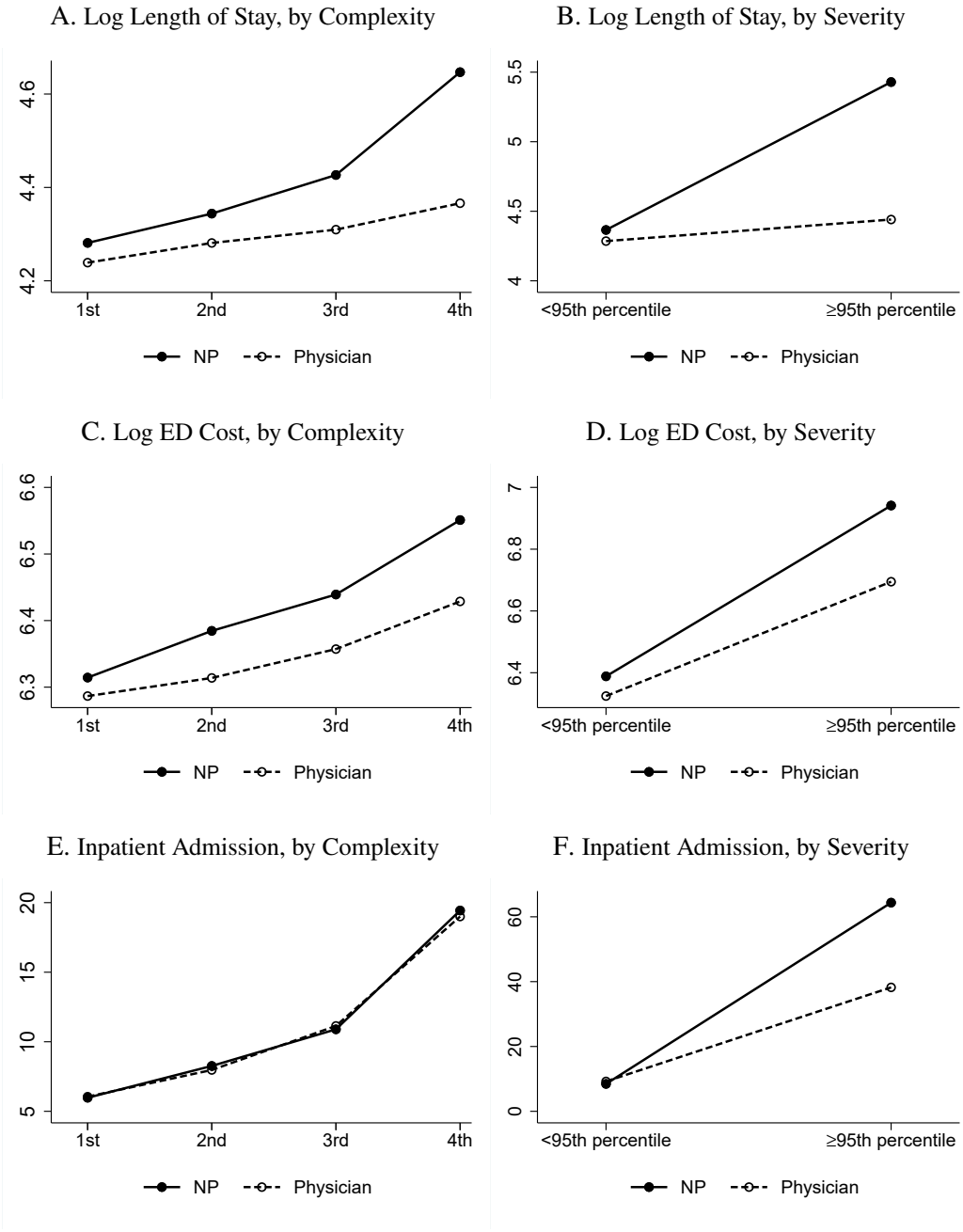
Notes: These panels are graphical representations of the balance-test regression at the ED-day level of physician average characteristics (weighted by the number of cases treated by each physician) on the number of NPs on duty, conditional on ED-by-year, ED-by-month, and ED-by-day-of-the-week indicators. Coefficients from the regressions are reported in each panel, along with standard errors (shown in parentheses) and p-values. To construct the binned scatter plots, we first residualize both the y-axis variable (average characteristics of physicians on duty) and the x-axis variable (the number of NPs on duty) with respect to indicators for ED-by-year, ED-by-month, and ED-by-day-of-the-week, and then add means back to aid in interpretation. The middle number on the y-axis of each panel reports the mean of the sample; the top and bottom number report the mean plus and minus a half standard deviation, respectively. The physician characteristics reported in Panels A-E are, respectively, age, gender, value-added, practice style in terms of patient log length of stay, and practice style in terms of patient log cost of the ED visit. Construction details of value-added and practice style are described in Appendix A.3.

Figure 6: Balance in NP Characteristics



Notes: These panels are graphical representations of the balance-test regression at the ED-day level of NP average characteristics (weighted by the number of cases treated by each NP) on the number of NPs on duty, conditional on ED-by-year, ED-by-month, and ED-by-day-of-the-week indicators. Coefficients from the regressions are reported in each panel, along with standard errors (shown in parentheses) and p-values. To construct the binned scatter plots, we first residualize both the y-axis variable (average characteristics of NPs on duty) and the x-axis variable (the number of NPs on duty) with respect to indicators for ED-by-year, ED-by-month, and ED-by-day-of-the-week, and then add means back to aid in interpretation. The middle number on the y-axis of each panel reports the mean of the sample; the top and bottom number report the mean plus and minus a half standard deviation, respectively. The NP characteristics reported in Panels A-E are, respectively, age, gender, value-added, practice style in terms of patient log length of stay, and practice style in terms of patient log cost of the ED visit. Construction details of value-added and practice style are described in Appendix A.3.

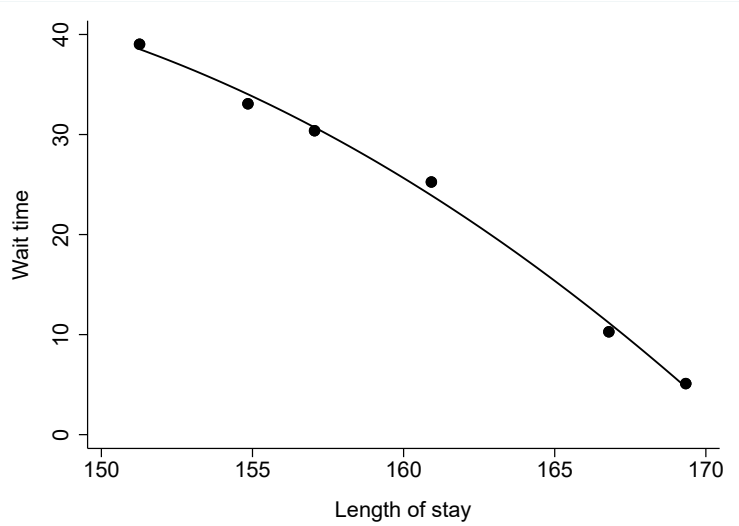
Figure 7: Heterogeneous Effects by Case Complexity and Severity



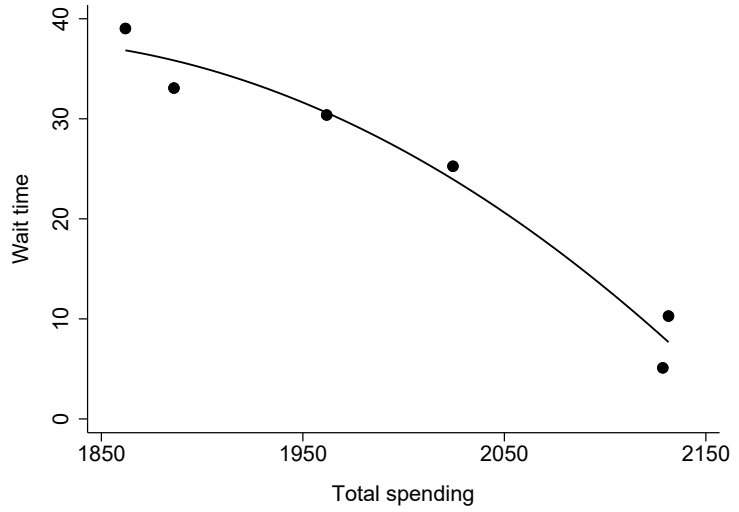
Notes: This figure shows heterogeneous effects of NPs by case complexity and severity. Panels A, C, and E divide cases into quartiles by their total number of Elixhauser comorbidities, with higher quartiles indicating more complex cases. Panels B, D, and F divide cases by whether condition severity measured by 30-day mortality of cases with the same three-digit ICD-10 primary diagnosis is equal to or above the 95th percentile of the sample. The solid and dashed lines show complier potential outcomes if they were treated by NPs and physicians, respectively. We estimate complier potential outcomes under NPs by the IV regression in Equation (4). We estimate complier potential outcomes under physicians by an IV regression similar to Equation (4) but with a dependent variable of $y_i \times (\text{NP}_i - 1)$, i.e., the interaction between patient outcome and the indicator for being treated by an NP minus one. Panels A-B, C-D, and E-F report results for log length of stay, log ED cost, and inpatient admission in the ED visit, respectively.

Figure 8: Trade-Off: Wait Time versus Length of Stay and Total Spending

A. Wait Time versus Length of Stay



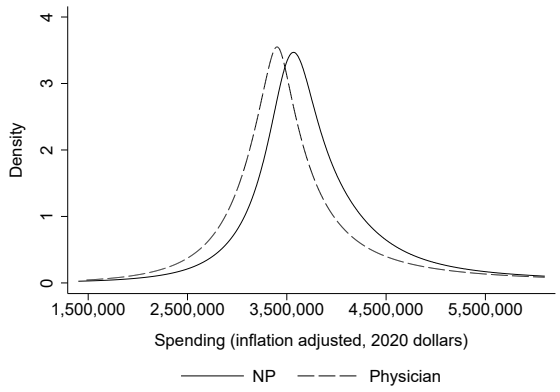
B. Wait Time versus Total Spending



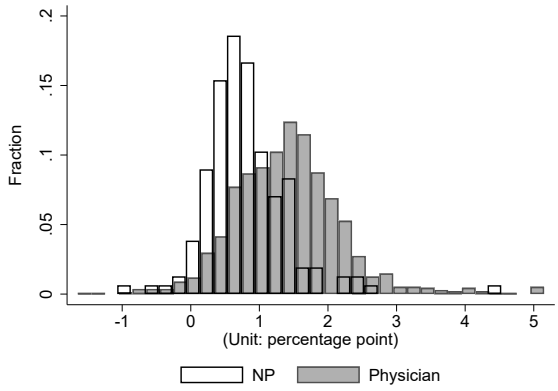
Notes: This figure shows changes in patient average wait time and other outcomes with incremental numbers of NPs on duty, conditional on the number of physicians on duty, the number of cases arriving, and the controls included in the main specification (see details in Equation (5)). Panel A presents the trade-off between wait time and length of stay. Panel B presents the trade-off between wait time and total spending associated with the ED visit, which is the sum of the cost of care at the ED and the cost due to hospital admission in the ED visit and preventable hospitalizations in the 30 days after the ED visit. The solid lines show the quadratic fit estimated on the plotted points.

Figure 9: Distribution of Provider Productivity, Patient Assignments, and Wages

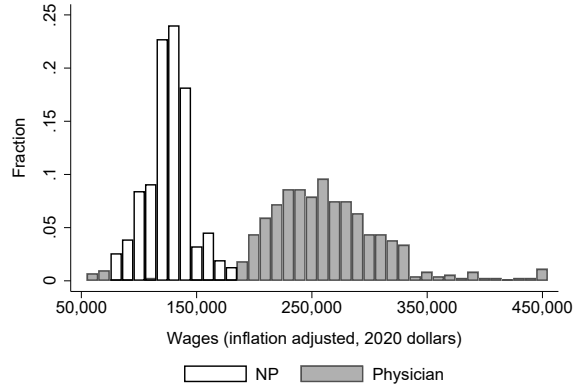
A. Provider Effects on Medical Spending



B. Predicted 30-day Mortality of Assigned Patients



C. Provider Wages



Notes: Panel A reports the deconvolved distributions of provider effects on annual medical spending. See Appendix A.4.3 for details of the estimation. The solid and dashed lines show the deconvolved distributions for NPs and physicians, respectively. Panel B plots histograms of average predicted 30-day mortality of patients assigned to each provider. Predicted 30-day mortality is winsorized at the value of 5 percentage points. Panel C plots histograms of provider wages observed in the VHA data (inflation adjusted to year 2020). Wages are winsorized at the value of $450,000. In Panels B and C, the white and gray bins show results for NPs and physicians, respectively.

Table 1: Characteristics of Baseline Sample

	All	Treated by NP	Treated by physician	p-value
Age	62.05	60.72	62.46	0.00
	[15.80]	[15.87]	[15.75]	
Married	0.424	0.424	0.424	0.80
	[0.494]	[0.494]	[0.494]	
Male	0.905	0.904	0.906	0.00
	[0.293]	[0.295]	[0.292]	
Black	0.270	0.271	0.270	0.12
	[0.444]	[0.445]	[0.444]	
White	0.708	0.705	0.709	0.00
	[0.455]	[0.456]	[0.454]	
Asian/Pacific Islander	0.021	0.021	0.020	0.04
	[0.142]	[0.144]	[0.142]	
Outpatient visits in prior year	6.242	5.658	6.423	0.00
	[7.284]	[6.361]	[7.538]	
Inpatient stays in prior year	0.612	0.431	0.668	0.00
	[1.543]	[1.249]	[1.620]	
Elixhauser comorbidity count	3.599	3.190	3.726	0.00
	[3.018]	[2.772]	[3.079]	
Length of stay (minutes)	162.09	119.53	175.29	0.00
	[172.48]	[131.28]	[181.38]	
ED cost ($, inflation-adjusted to 2020)	939	813	978	0.00
	[1,331]	[1,010]	[1,413]	
Inpatient admission (%)	16.62	7.87	19.34	0.00
	[37.23]	[26.92]	[39.50]	
30-day preventable hospitalization (%)	1.23	0.75	1.39	0.00
	[11.04]	[8.60]	[11.69]	
30-day mortality (%)	1.25	0.63	1.44	0.00
	[11.10]	[7.91]	[11.91]	
Observations	1,118,836	264,789	854,047	

Notes: Column 1 shows average characteristics of all cases in our analysis sample. Columns 2 and 3 show average characteristics of cases treated by NPs and physicians in the sample, respectively. Standard deviations are reported in brackets; p-values of t-tests for the equivalence of means between cases treated by NPs and by physicians are shown in the last column.

Table 2: Effect of NPs on Length of Stay and ED Cost

	Log length of stay			Log ED cost		
	OLS	Reduced form	IV	OLS	Reduced form	IV
	(1)	(2)	(3)	(4)	(5)	(6)
NP assignment	-0.168		0.110	-0.101		0.070
	(0.034)		(0.045)	(0.023)		(0.030)
Number of NPs		0.020			0.013	
		(0.008)			(0.005)	
Full controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.608	4.608	4.608	6.483	6.483	6.483
S.D. dep. var.	1.161	1.161	1.161	0.878	0.878	0.878
Observations	1,110,798	1,110,798	1,110,798	1,108,961	1,108,961	1,108,961

Notes: This table shows OLS, reduced-form, and IV estimates of the effect of NPs on patient log length of stay and log cost of the ED visit. Columns 1 and 4 report the OLS estimates; Columns 2 and 5 report the reduced-form estimates; Columns 3 and 6 report the IV estimates. Sample sizes are smaller than that reported in Column 1 of Table 1 due to missing outcomes for a small number of cases. The set of full controls includes indicators for ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day, and patient characteristics that include five-year age-bin indicators, marital status, gender, race indicators (white, Black, and Asian/Pacific Islanders, with other racial categories omitted as the reference group), indicators for 31 Elixhauser comorbidities, prior health care use (the number of outpatient visits and the number of inpatient stays in VHA facilities in the prior 365 days), vital signs, and indicators for three-digit ICD-10 code of patient primary diagnosis of the visit. Standard errors clustered by provider are shown in parentheses.

Table 3: Effect of NPs on Additional Outcomes

	Dependent variable		
	Admission	30-day mortality	30-day prevent. hosp.
	(1)	(2)	(3)
Reduced form	0.019	-0.021	0.047
	(0.108)	(0.021)	(0.021)
IV estimate	0.103	-0.116	0.252
	(0.585)	(0.115)	(0.120)
Full controls	Yes	Yes	Yes
Mean dep. var.	16.625	1.247	1.234
S.D. dep. var.	37.230	11.099	11.041
Observations	1,118,836	1,118,836	1,118,836

Notes: This table shows reduced-form and IV estimates of the effect of NPs on various outcomes. Inpatient admission is an indicator for whether the patient is admitted to the hospital in the ED visit; 30-day mortality indicates whether the patient dies within 30 days of the ED visit; 30-day preventable hospitalization is defined as having any preventable hospitalization in the 30 days after the ED visit. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are shown in parentheses.

Table 4: Heterogeneous Effects by Provider Experience

	Dependent variable				
	Log length of stay (1)	Log ED cost (2)	Admission (3)	30-day mortality (4)	30-day prevent. hosp. (5)
Panel A: Provider specific experience					
NP assignment	0.101	0.072	0.092	-0.115	0.255
	(0.044)	(0.030)	(0.579)	(0.116)	(0.121)
NP assignment × experience	-0.058	-0.042	-0.504	-0.001	0.016
	(0.025)	(0.019)	(0.331)	(0.041)	(0.030)
Experience	-0.001	0.006	0.238	-0.001	-0.016
	(0.006)	(0.010)	(0.314)	(0.018)	(0.014)
Panel B: Provider general experience					
NP assignment	0.086	0.062	0.089	-0.100	0.255
	(0.043)	(0.029)	(0.608)	(0.116)	(0.121)
NP assignment × experience	-0.103	-0.035	0.340	0.088	0.043
	(0.056)	(0.033)	(1.048)	(0.093)	(0.068)
Experience	-0.036	-0.013	-0.719	-0.012	-0.048
	(0.015)	(0.011)	(0.221)	(0.023)	(0.025)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.608	6.483	16.625	1.247	1.234
S.D. dep. var.	1.161	0.878	37.230	11.099	11.041
Observations	1,110,798	1,108,961	1,118,836	1,118,836	1,118,836

Notes: Panel A shows heterogeneous effects of NPs by provider specific experience in the case's condition, measured as the number of cases with the same three-digit primary diagnosis as the current case the provider has treated since the start of the study period to the day before the current case's visit. Panel B shows heterogeneous effects of NPs by provider general experience, measured as the number of cases (despite diagnoses) the provider has treated since the start of the study period to the day before the current case's visit. For ease of interpretation, both specific and general experience are standardized to have a mean of zero and a standard deviation of one for NPs and physicians separately. The outcome variables in Columns 1-5 are, respectively, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are shown in parentheses.

Table 5: Clinical Decision-Making

	Dependent variable				
	Consult	CT	X-ray	Opioid	Antibiotic
	(1)	(2)	(3)	(4)	(5)
NP assignment	0.026	0.012	0.020	-0.018	0.040
	(0.009)	(0.007)	(0.009)	(0.006)	(0.022)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	0.226	0.145	0.291	0.088	0.639
S.D. dep. var.	0.418	0.352	0.454	0.283	0.480
Observations	1,118,836	1,118,836	1,118,836	1,118,836	123,395

Notes: This table shows IV estimates of the effect of NPs on various measures of clinical decision-making. The outcomes in Columns 1-5 are whether the patient receives in the ED visit, respectively, formal consults, CT scans, X-rays, opioid prescriptions, and antibiotic prescriptions. Since antibiotics generally only apply to patients with infections, Column 5 restricts the sample to patients with respiratory or genitourinary system infections, which are two common types of infections. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are shown in parentheses.

Online Appendix

A.1 Diagnosis Coding: NPs versus Physicians

In this appendix, we explore whether NPs and physicians are significantly different in reporting three-digit ICD-10 diagnoses. All diagnoses in our data are coded in ICD-10 within our study period from January 2017 to January 2020. As OLS estimation is likely to be confounded by patient selection, we leverage IV regressions that instrument for whether a case is treated by an NP using the number of NPs on duty. Specifically, we first create indicators for each of the 836 different three-digit ICD-10 primary diagnoses in our data (including one for the missing category). Then for each diagnosis indicator, we run a separate 2SLS regression as follows to estimate whether NPs and physicians are significantly different in reporting the diagnosis:

$$y_i = \delta \mathrm{NP}_i + \mathbf{T}_i \eta + \varepsilon_i, \tag{A.1}$$

$$\mathrm{NP}_i = \lambda Z_i + \mathbf{T}_i \zeta + v_i, \tag{A.2}$$

where, similar to Equations (1) and (2), NP_i indicates whether case i is treated by an NP and Z_i denotes the instrument (i.e., the number of NPs on duty between 8 a.m. and 6 p.m., our analysis time window, at the ED on the day case i visits). $\mathbf{T}_i$ are indicators for ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day. The coefficient of interest is δ. As with the main specification, we cluster standard errors by provider.

Panel A of Appendix Figure A.13 plots the distribution of t-statistics for the estimated δ coefficients from the 836 separate regressions that use each three-digit diagnosis indicator as the outcome variable. The share of t-statistics indicating a p-value below or equal to 0.05 is only 0.07, close to the null hypothesis of no differential three-digit diagnosis coding between NPs and physicians (i.e., share 0.05 of t-statistics indicating a p-value below or equal to 0.05). Both the Shapiro-Wilk normality test and the test for normality on the basis of skewness and kurtosis suggest that we cannot reject the null hypothesis that the t-statistics are normally distributed, at least at the 10% level. Panel B of Appendix Figure A.13 further plots t-statistics against the prevalence of the three-digit diagnosis among physicians, showing that NPs are not more likely to report diagnoses that are more (or less) common.[1]

The pattern of similar three-digit diagnosis coding between NPs and physicians could arise for the relatively straightforward cases who are compliers. Additional consults and diagnostics (Section 5.2) may also aid NPs to reach the same three-digit diagnosis as physicians. Perhaps also worth noting, VHA ED providers' reimbursements are independent of patient diagnoses, and NPs and physicians are unlikely to have differential financial incentives in diagnosis coding.

1. We measure the prevalence of the diagnosis as the share of cases with the diagnosis among cases treated by physicians on days without any NP, to restrict potential influences of patient sorting between NPs and physicians.

A.2 Characterizing Compliers and Never-Takers

This appendix describes estimation of characteristics of compliers and never-takers. Following the approach developed by Abadie (2003), we characterize compliers by δ estimated through the 2SLS model specified in Equations (A.1) and (A.2), replacing the outcome variable y_i with $x_i \times \text{NP}_i$, i.e., the interaction between each patient characteristic x_i and the indicator for being treated by an NP. Results are discussed in Section 4.3 and shown in Columns 2-3 of Appendix Table A.4.

To estimate characteristics of never-takers, we follow a method by Dahl, Kostøl, and Mogstad (2014). We first collapse the data to the ED-day level. We then residualize the share of cases treated by NPs by indicators for ED-by-year, ED-by-month, and ED-by-day-of-the-week. We define never-takers as cases treated by physicians in ED-day cells with the residual share of cases treated by NPs at least as high as the 90th percentile of ED-days with at least one case treated by NPs. There are no always-takers in our setting since patients cannot be assigned to NPs on days without any NPs on duty.

Columns 4 of Appendix Table A.4 report the average characteristics of never-takers. For each characteristic, we compute the mean of never-takers as well as the ratio between the mean and the overall sample mean. We estimate standard errors for the means by bootstrap, blocking observations by provider with 500 replications. In line with the notion that NPs treat healthier cases than physicians do, Appendix Table A.4 shows that never-takers are the riskiest, followed by the overall sample, and finally, compliers. For example, the total number of Elixhauser comorbidities among never-takers, the overall sample, and compliers are, respectively, 4.0, 3.6, and 3.3; the average predicted 30-day mortality among these three types of cases are, respectively, 1.7, 1.2, and 0.9 percentage points.

A.3 Provider Value-Added and Practice-Style Measures

This appendix describes our construction of measures of provider value-added and practice styles, used to examine the exclusion restriction in Section 4.4. We consider physician value-added as a measure of risk-adjusted mortality outcomes and form these measures using leave-out data. Specifically, for physician p on day d, we measure

$$A_{p,d} = \frac{\sum_{i \in \mathcal{I}_p} \mathbf{1}(d(i) \neq d, Z_i = 0)\tilde{Y}_i}{\sum_{i \in \mathcal{I}_p} \mathbf{1}(d(i) \neq d, Z_i = 0)}, \tag{A.3}$$

where $\tilde{Y}_i$ is risk-adjusted 30-day mortality, or the difference between patient actual and predicted 30-day mortality. To deal with possible finite-sample bias, we leave out cases visiting on day d.[2] We also leave out cases visiting on days with any NPs on duty, to mitigate the concern on patient sorting between NPs and physicians.

Still, since cases are not experimentally assigned among physicians, $A_{p,d}$ may reflect both a physician's effect on patient outcomes and systematic patient-physician sorting under imperfect risk adjustment. As one way to assess the degree of such potential biases, we investigate the robustness of physician value-added

2. Specifically, there may be ED-day level shocks that are correlated with both the number of NPs on duty and the set of patients treated by a specific physician; these shocks can be influential in estimations with a finite sample.

estimates to patient predicted mortality constructed on the basis of different risk adjusters, analogous to the test of student sorting biases in the teacher value-added literature (e.g., Chetty, Friedman, and Rockoff 2014). If patient sorting is important, the estimated physician value-added will change meaningfully with the addition of risk adjusters. Otherwise, our estimates should remain stable. Appendix Figure A.14 shows that physician value-added estimates are stable regardless of patient risk adjusters. We compare physician value-added measures constructed using (i) the most parsimonious set of risk adjusters that includes only age-bin and three-digit primary diagnosis indicators, (ii) the less parsimonious set that adds non-age demographics (gender, race, and marital status), and (iii) the set that further adds dummies for 31 Elixhauser comorbidities, with the baseline physician value-added constructed using the full set of patient covariates (i.e., demographics, Elixhauser comorbidities, prior health care use, vital signs, and three-digit diagnosis indicators). The correlations between measures (i)–(iii) and the baseline measure are all above 0.99. Note that these risk adjusters are important predictors of patient 30-day mortality: They alone explain 7 percent of the variation in 30-day mortality, with an F-statistic of 88 for joint significance.

We consider physician practice styles as measures of physician-chosen inputs to care. Specifically, we define practice style measures by Equation (A.3), but instead set $\tilde{Y}_i$ as the difference between patient actual and predicted log length of stay or log cost of the ED visit. As with value-added, we show the robustness of practice style estimates to different patient risk adjusters in Appendix Figure A.14.

We construct similar measures of value-added and practice style for NPs. As with physicians, we show the robustness of these estimates to different patient risk adjusters. Appendix Figure A.14 shows that NP valued-added and practice-style estimates are highly stable among those constructed using (i) the most parsimonious set of risk adjusters that includes only age-bin and three-digit primary diagnosis indicators, (ii) the less parsimonious set that adds non-age demographics (gender, race, and marital status), (iii) the set that additionally includes dummies for 31 Elixhauser comorbidities, and (iv) the full set that further adds detailed controls for prior health care use and vital signs upon arrival at the ED.

A.4 Distribution of Provider Effects on Total Spending

In this appendix, we estimate the distribution of provider effects on log total spending associated with the ED visit. We start by identifying provider effects using a just-identified IV model. Next, we estimate the variance of provider effects, using a split-sample approach to account for the bias due to sampling error in the estimated provider effects. We then apply an Empirical Bayes deconvolution method, adapted by Kline, Rose, and Walters (2022) from Efron (2016), to recover the underlying population distribution of provider effects. We present the receiver operating characteristic (ROC) curves of provider productivity, case assignments, and wage payments as characteristics that may distinguish NPs and physicians. Finally, we assess the extent to which provider productivity relates to cases assigned and wages paid across individual providers.

A.4.1 Estimating Provider Effects

We generate a measure of total spending associated with the ED visit, as the sum of the three main components of costs for which we find significant NP effects: ED costs, hospital admission, and 30-day preventable hospitalizations (we multiply the latter two components by the average cost of a hospital stay, $19,220).

We then estimate provider effects on total spending associated with the ED visit. To mitigate the effect of extreme values, we take the log of the medical spending. To account for the possibility that the treating provider is endogenous, we instrument for indicators for treating providers with indicators for on-duty providers in the ED-day cell of the patient's visit. The empirical specification is a just-identified 2SLS model as follows:

$$y_i = \sum_j \theta_j \mathbf{1}_{\{j(i)=j\}} + \mathbf{T}_i\eta + \mathbf{X}_i\beta + \varepsilon_i, \tag{A.4}$$

$$\mathbf{1}_{\{j(i)=j\}} = \sum_j \lambda_j \mathbf{1}_{\{j\in\mathcal{I}_i\}} + \mathbf{T}_i\zeta + \mathbf{X}_i\gamma + \nu_i. \tag{A.5}$$

$\mathbf{1}_{\{j(i)=j\}}$ is an indicator for whether case i is treated by provider j, and $\mathcal{I}_i$ is the set of providers on duty in the ED-day cell of case i's visit. The coefficients of interest are θ_j, representing provider effects. Since θ_j is only identified relative to one another for providers within the same ED, we make the natural normalization that the case-weighted mean of θ_j is 0 within each ED, using linear constraints in the 2SLS estimation to yield valid standard errors.[3]

The F-statistics for the joint significance of on-duty provider indicators in the first-stage regressions, i.e., Equation (A.5), have shares of 0.99 and 0.68 above 10 and 100, respectively, suggesting that provider availability is strongly predictive of the treating provider.[4] Appendix Figure A.15 shows that patient characteristics are well balanced across the average characteristics (age, gender, and practice style) of on-duty providers, conditional on the baseline controls, i.e., ED-by-time-category indicators.[5] In addition, the F-statistics for the joint significance of on-duty provider indicators from regressions of patient predicted log length of stay and predicted log cost of the ED visit on on-duty provider indicators conditioning on ED-by-time-category indicators, are 2.4 and 2.1, respectively. These are much smaller than the corresponding F-statistics using the actual log length of stay and log cost of the ED visit as the outcome—which are 10.3 and 9.9, respectively. These results make plausible the assumption that the set of on-duty providers is conditionally independent of the set of patients arriving, supporting the validity of our instruments.

3. We also normalize provider effects to have a case-weighted mean of 0 within ED-provider types. We find the results are very similar: For the (split-sample) variance of provider effects reported below in Appendix A.4.2, the standard deviation of NP effects with normalization by ED and by ED-provider type are 0.22 and 0.19, respectively; the standard deviation of physician effects remains stable at 0.21. For the probability that a randomly selected NP incurs a lower spending than a randomly selected physician (Appendix A.4.3), the number changes slightly from 38 percent to 35 percent.

4. Since $\mathbf{1}_{\{j(i)=j\}}$ is always zero for patients outside of the ED a provider practices, we report F-statistics from the first stage regression in Equation (A.5) using observations in each ED separately.

5. We compute case-weighted average characteristics of on-duty providers, with the index case left out. For practice style examined in this balance test, to deal with the concern on patient sorting between NPs and physicians, we use provider effects on patient log length of stay and log cost of the visit estimated by the 2SLS model in Equations (A.4) and (A.5).

A.4.2 Estimating Variance of Provider Effects

We estimate the variance of provider effects, within each professional class, on log total spending associated with the ED visit. The estimated provider effects $\hat{\theta}_j$ from Appendix A.4.1 yields a case-weighted variance of 0.054 for NPs, and 0.064 for physicians (see Appendix Table A.20).[6] However, these estimates are upward biased, due to sampling error resulting from the fact that provider effects are estimated on a finite sample. To account for such biases, we leverage a split-sample approach, resembling that employed in earlier studies (e.g., Silver 2021). Specifically, we randomly split a provider's patients within each day to two approximately equal-sized partitions. We then estimate the 2SLS model in Equations (A.4) and (A.5) using each partition separately, yielding two fixed effect estimates for each provider $\hat{\theta}_{j,a}$ and $\hat{\theta}_{j,b}$. Suppressing the j subscript for simplicity, we have

$$\hat{\theta}_q = \theta + e_q, q \in \{a,\ b\},$$

where q indicates partitions, and e_q is partition-specific sampling error, such that $\text{Cov}(\theta, e_b) = \text{Cov}(e_a, \theta) = 0$. The random split of patients for each provider-day makes plausible the assumption that e_a and e_b are uncorrelated, i.e., $\text{Cov}(e_a, e_b) = 0$. We therefore can compute the variance of provider effects as the covariance of $\hat{\theta}_a$ and $\hat{\theta}_b$:

$$\begin{aligned}
\text{Cov}(\hat{\theta}_a, \hat{\theta}_b) &= \text{Cov}(\theta + e_a, \theta + e_b) \\
&= \text{Cov}(\theta, \theta) + \text{Cov}(\theta, e_b) + \text{Cov}(e_a, \theta) + \text{Cov}(e_a, e_b) \\
&= \text{Var}(\theta).
\end{aligned}$$

We perform this calculation for NPs and physicians separately.

Appendix Table A.20 reports the case-weighted variance of provider effects from the split-sample approach. The variance for physicians is estimated to be 0.045, about 70 percent of the calculated variance without accounting for the bias due to sampling error. The variance from the split-sample approach suggests that on average, a one-standard-deviation costlier physician raises medical spending by 21 percent per case. For NPs, the split-sample variance estimate is 0.048, suggesting that a one-standard-deviation costlier NP raises spending by 22 percent per case.

A.4.3 The Population Distribution of Provider Effects

We now estimate the distribution of provider effects by applying a non-parametric empirical Bayes deconvolution approach adapted by Kline, Rose, and Walters (2022) from Efron (2016). This approach extracts a flexible estimate of the distribution of population provider effects using provider effects $\hat{\theta}_j$ and their standard errors s_j estimated in Equations (A.4) and (A.5). Assuming provider z-scores $z_j = \hat{\theta}_j / s_j$ are distributed as

$$z_j | c_j \sim \mathcal{N}(c_j, 1),\ c_j \sim G_c,$$

6. Since provider effects are normalized to have a mean of 0 in each ED, the variance is interpretable as the within-ED variance of provider effects.

where $c_j = \theta_j / s_j$ (i.e., the population analogue of z_j), the procedure first applies the Efron (2016) deconvolution procedure to yield a distribution of provider z-scores $\hat{G}_c$ with density function $\hat{g}_c(\cdot)$. The Efron (2016) procedure estimates $\hat{G}_c$ by maximum likelihood of parameters that represent coefficients on a set of splines, with a regularization parameter to tamp down excursions from a flat prior.

Next, assuming that s_j is independent of c_j, we can derive an estimate of the distribution of provider effects $\hat{F}$, with density function $\hat{f}(\cdot)$ for each value θ:

$$\hat{f}(\theta) = \frac{1}{J} \sum_{j=1}^{J} \frac{1}{s_j} \hat{g}_c(\theta / s_j). \tag{A.6}$$

Following Kline, Rose, and Walters (2022), we assess the independence of z_j and s_j by reporting regressions of z_j on s_j. To account for possible correlated estimation errors in z_j and s_j, we also present split-sample versions of these regressions that randomly split cases for each provider into two approximately equal-sized partitions and regress z-scores from one partition on standard errors from the other partition. The results are reported in Appendix Table A.21, which show no significant relationship between z_j and s_j, suggesting that independence between z-scores and standard errors is plausible.

We apply the empirical Bayes deconvolution estimator to NPs and physicians separately.[7] As in Kline, Rose, and Walters (2022), we calibrate the regularization parameter in the maximum likelihood estimation so that the variance of the deconvolved distribution of provider effects matches the corresponding split-sample variance estimates reported in Appendix Table A.20. We demean both the physician and NP distributions to have a mean of zero, and then shift the distribution of NPs to the right by 0.067, where 0.067 is the 2SLS estimate of the NP effect on the log total spending associated with the ED visit obtained by Equations (1) and (2). Panel A of Figure 9 displays the deconvolved density of provider effects for NPs and physicians. For interpretation, we rescale provider effects on log total spending per case on the x-axis into annual spending, as follows: (i) estimating the empirical distribution of log total spending per case, where the log spending is residualized with respect to ED and provider fixed effects, with means added back; (ii) for each provider effect from the deconvolution, adding the provider effect to the spending distribution in (i); (iii) exponentiating the individual values of the distribution in (ii) and integrating over the distribution to calculate the mean total spending per case for each provider effect; and (iv) multiplying the mean in (iii) for each provider effect by the average number of cases a provider sees per year observed in the data.

Finally, using the deconvolved density of NP and physician effects on log total spending per ED case, we estimate the probability that a randomly drawn NP is costlier than a randomly drawn physician by

$$\Pr\left(\theta_j > \theta_{j'} \middle| \, j \in \mathcal{J}_{NP}, j' \in \mathcal{J}_{MD}\right) = \int_0^1 \hat{F}_{MD}(\theta) d\hat{F}_{NP}(\theta), \tag{A.7}$$

where $\hat{F}_{MD}(x)$ and $\hat{F}_{NP}(x)$ are the deconvolved cumulative density functions of physician effects and NP effects, respectively, and $\mathcal{J}_{MD}$ and $\mathcal{J}_{NP}$ are the sets of providers who are physicians and NPs, respectively. We find the probability that a randomly drawn NP is costlier than a randomly drawn physician, in terms of the

7. To restrict the inclusion of noisy δ_j, our deconvolution excludes providers with less than 150 cases. We set the support of provider effects to $[\delta^5 - SD, \delta^{95} + SD]$, where δ^5, δ^{95}, and SD are, respectively, the 5th percentile, 95th percentile, and standard deviation of estimated NP and physician effects for the NP and physician deconvolution, respectively.

total spending associated with the ED visit defined above, is 62 percent. Put differently, the probability that a randomly drawn NP is less costly than a randomly drawn physician is as high as 38 percent. This statistic remains large when we adjust the deconvolved productivity distributions to account for possible differences in treatment effects between the overall population and compliers: When assuming the average treatment effect is as large as that among the highest complexity quartile patients which is twice of the LATE estimate (0.136 versus 0.067), the probability that NPs are less costly remains large at 28 percent.

A.4.4 ROC Curve Representation

The probability in Equation (A.7) is equivalent to the area under the curve (AUC) of a ROC curve. The ROC curve displays the performance of an exercise classifying providers by a certain characteristic. In the case of provider effects on log total spending, the AUC of 0.62 indicates relatively poor performance in classifying providers as NPs versus physicians depending on their (true) provider effects from their respective deconvolved distribution.

We construct ROC curves based on respective provider characteristics of productivity, the riskiness of assigned patients (measured by predicted 30-day mortality), and wages, where we consider physicians as the "positive" class and NPs as the "negative" class. For each characteristic of productivity, assigned patient predicted mortality, and wages, a provider with a higher value of the characteristic is more likely to be a physician (i.e., in the positive class). We define productivity as the additive inverse of the provider effect on log total spending per ED visit: $\mu_j = -\theta_j$. For a given characteristic x, we plot the ROC curve with $1 - \hat{F}^x_{MD}$ (i.e., the true positive rate) on the y-axis and $1 - \hat{F}^x_{NP}$ (i.e., the false positive rate) on the x-axis, where $\hat{F}^x_{MD}$ and $\hat{F}^x_{NP}$ are the empirical cumulative distribution functions of x among NPs and physicians, respectively. For productivity, we use the deconvolved distributions previously described in Appendix A.4.3, noting that $\hat{F}^{\mu}_{MD} = 1 - \hat{F}^{\theta}_{MD}$ and $\hat{F}^{\mu}_{NP} = 1 - \hat{F}^{\theta}_{NP}$. For risks of assigned patients and provider wage payments, since we observe actual patient assignments and provider wages, we do not estimate them in a regression framework or apply deconvolution to obtain a population prior distribution. Rather, we simply apply the empirical cumulative distribution functions of average predicted 30-day mortality of patients assigned to each provider and each provider's annualized full-time-equivalent ("yearly") wage (inflation-adjusted to 2020 dollars).

We show the ROC curves in Appendix Figure A.11. As mentioned above, the AUC based on productivity is 0.62. The AUC based on assigned patient risks and wage payments are 0.75 and 0.99, respectively. Taken together, assigned patient risks are qualitatively more predictive of professional class than is productivity; yearly wages are extremely predictive of professional class.

A.4.5 Case Assignments and Wage Payments versus Productivity

Separately for NPs and physicians, we assess the extent to which case assignments and wages relate to individual provider productivity. As before, we measure productivity as provider effects on log total spending per ED visit (i.e., θ_j), with higher provider effects indicating lower productivity. The empirical specification takes the following form:

$$y_j = \alpha\tilde{\theta}_j + \mathbf{L}_j\pi + \varepsilon_j, \tag{A.8}$$

where y_j is the average risks (measured by predicted 30-day mortality) of cases assigned to provider j or yearly wage of provider j (inflation-adjusted to 2020 dollars). $\mathbf{L}_j$ is a vector of ED indicators since provider effects are only identified relative to one another within EDs. Since provider effects $\hat{\theta}_j$ is estimated with noise, we calculate empirical Bayes posteriors of provider effects as Kline, Rose, and Walters (2022):

$$\tilde{\theta}_j = s_j \times \frac{\int x\varphi(z_j - x)\hat{g}_c(x)dx}{\int \varphi(z_j - x)\hat{g}_c(x)dx}, \tag{A.9}$$

where φ denotes the standard normal density.

A.5 ED-Specific NP Effects

In this appendix, we estimate heterogeneity in the ED-specific NP effect. In separate 2SLS regressions for each ED ℓ, we estimate the NP effect using only cases at that ED:

$$\begin{aligned} y_i &= \delta_\ell \mathrm{NP}_i + \mathbf{t}_i\eta_\ell + \mathbf{X}_i\beta_\ell + \varepsilon_i, \\ \mathrm{NP}_i &= \lambda_\ell Z_i + \mathbf{t}_i\zeta_\ell + \mathbf{X}_i\gamma_\ell + v_i, \end{aligned}$$

where $\mathbf{t}_i$ is a vector of indicators for patient arrival year, month, day of the week, and hour of the day.

In Appendix Figure A.10, we plot the distribution of $\hat{\delta}_\ell$ for all EDs in our sample. We also plot the empirical Bayes posterior mean $\tilde{\delta}_\ell$ for each ED, calculated as

$$\tilde{\delta}_\ell = w_\ell\hat{\delta}_\ell + (1 - w_\ell)\hat{\delta}. \tag{A.10}$$

The shrinkage factor is given by $w_\ell = \frac{\hat{\pi}^2}{s_\ell^2 + \hat{\pi}^2}$, where $\hat{\pi}^2$ and s_ℓ^2 are, respectively, the variance of the prior distribution of $\hat{\delta}_\ell$ and the variance of the sampling error for each $\hat{\delta}_\ell$. We calculate s_ℓ^2 as the square of the standard error of $\hat{\delta}_\ell$. We calculate $\hat{\pi}^2$ as the difference between the case-weighted variance of $\hat{\delta}_\ell$ and the case-weighted mean of s_ℓ^2. Finally, $\hat{\delta}$ is the overall IV estimate of the NP effect in Equations (1) and (2), which is reported in Section 4.

The gray bins in Appendix Figure A.10 plot the empirical Bayes posterior mean $\tilde{\delta}_\ell$ for each ED in our sample.[8] The distribution of posteriors is more compressed than that of the raw estimates of ED-specific effects, reflecting shrinkage due to sampling error in the raw estimates. The results show a fair amount of heterogeneity. Nonetheless, most EDs exhibit positive effects of NPs on raising patient length of stay, cost of the ED visit, and 30-day preventable hospitalization rate.

8. The figure reports results for all EDs in our main analysis sample for log length of stay and log cost (in total 44 such EDs). For 30-day preventable hospitalization, since it is relatively uncommon (occurs in less than 2 percent of the sample), the estimates are relatively imprecise when using observations from a specific ED; we thus include only EDs with at least 25,000 cases in the analysis sample (in total 20 such EDs).

References

Abadie, Alberto. 2003. "Semiparametric Instrumental Variable Estimation of Treatment Response Models." *Journal of Econometrics* 113 (2): 231–263.

Chetty, Raj, John N. Friedman, and Jonah E. Rockoff. 2014. "Measuring the Impacts of Teachers I: Evaluating Bias in Teacher Value-Added Estimates." *American Economic Review* 104 (9): 2593–2632.

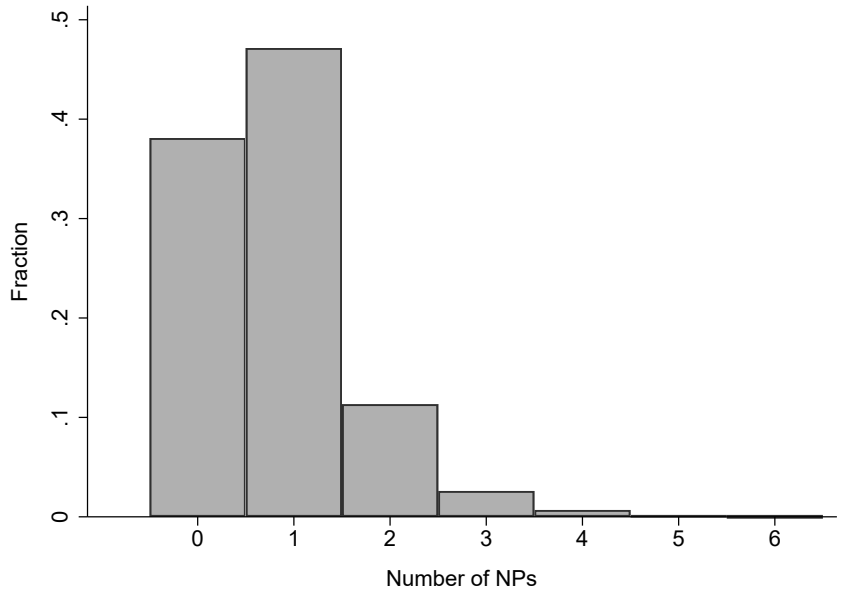
Dahl, Gordon B., Andreas Ravndal Kostøl, and Magne Mogstad. 2014. "Family Welfare Cultures." *Quarterly Journal of Economics* 129 (4): 1711–1752.

Efron, Bradley. 2016. "Empirical Bayes Deconvolution Estimates." *Biometrika* 103 (1): 1–20.

Kline, Patrick M., Evan K. Rose, and Christopher R. Walters. 2022. "Systemic Discrimination Among Large U.S. Employers." *Quarterly Journal of Economics* 137 (4): 1963–2036.

Silver, David. 2021. "Haste or Waste? Peer Pressure and Productivity in the Emergency Department." *Review of Economic Studies* 88 (3): 1385–1417.

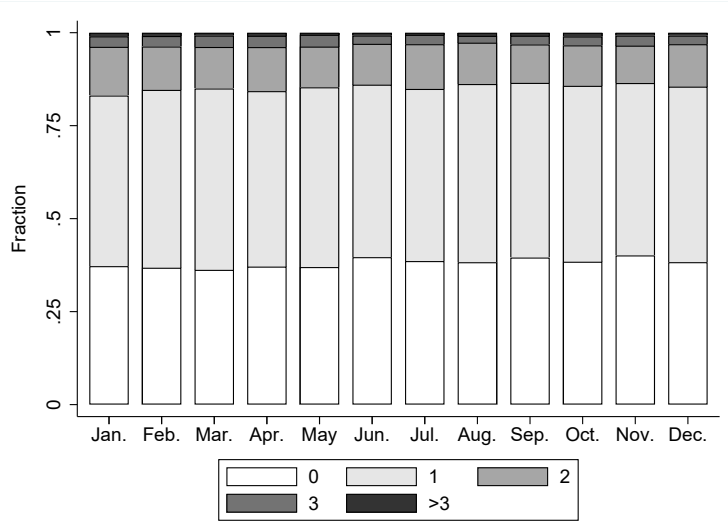
Figure A.1: Number of NPs on Duty



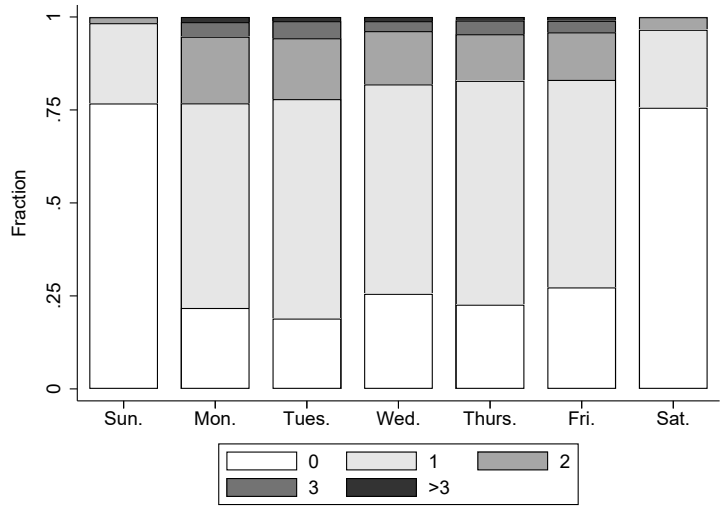
Notes: This figure shows the histogram of the number of NPs on duty in an ED-day cell. The unit of observation is at the ED-day level.

Figure A.2: Number of NPs on Duty by Month and Day of the Week

A. By Month

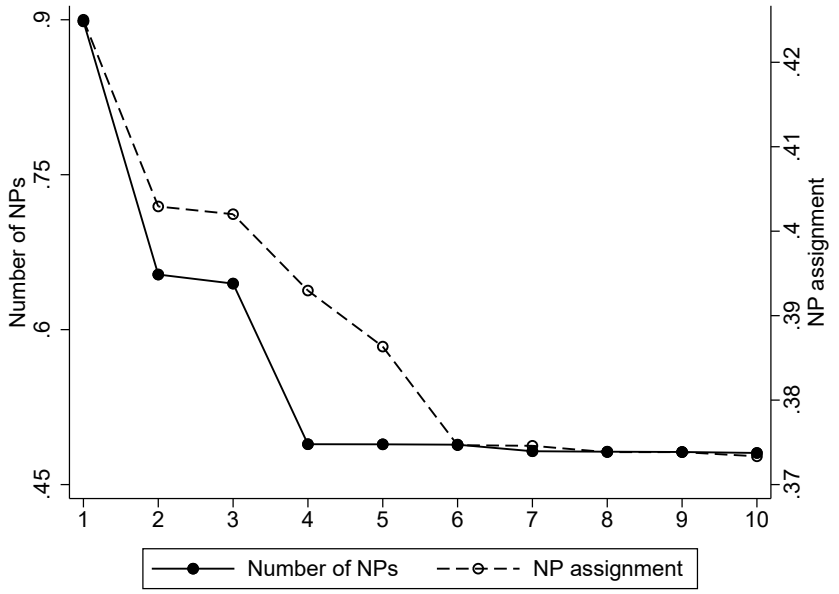


B. By Day of the Week



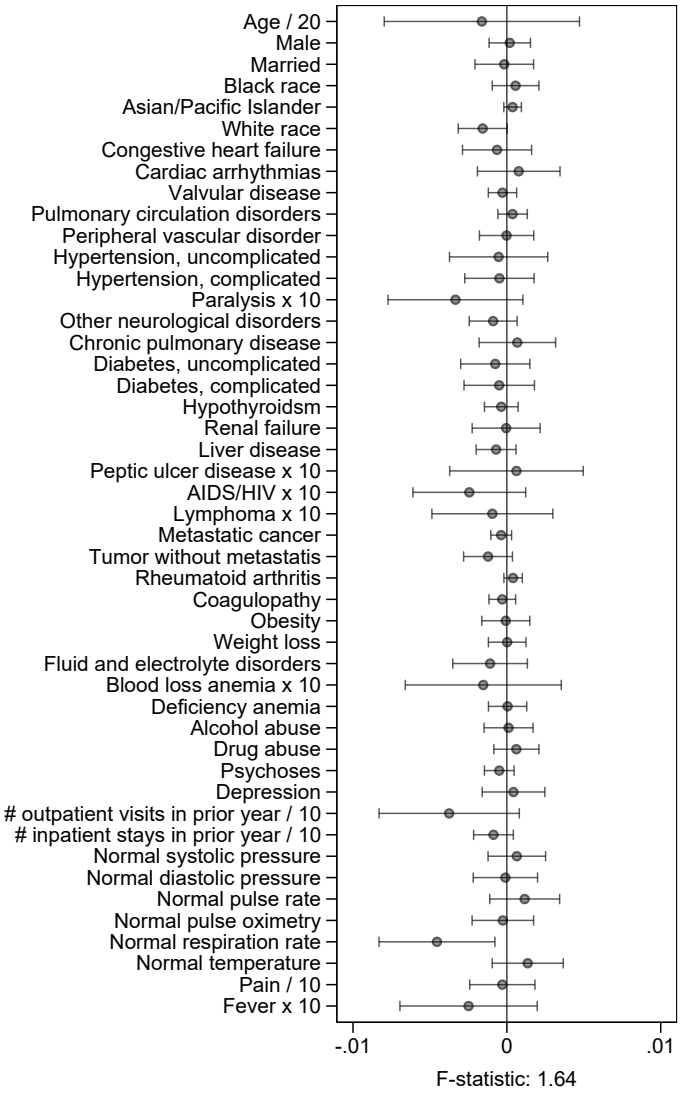
Notes: This figure plots the share of ED-day cells with different numbers of NPs on duty in each month (Panel A) and each day of the week (Panel B). Each color of the stacked bars represents a different number of NPs on duty, with the lightest color at the bottom representing ED-day cells with the lowest number of NPs on duty (i.e., zero) and the darkest color at the top representing ED-day cells with the highest number of NPs on duty (i.e., more than three). Since only a small share of ED-day cells have more than three NPs on duty, this figure groups ED-day cells with more than three NPs to the group ">3".

Figure A.3: Standard Deviation of Number of NPs on Duty and NP Assignment



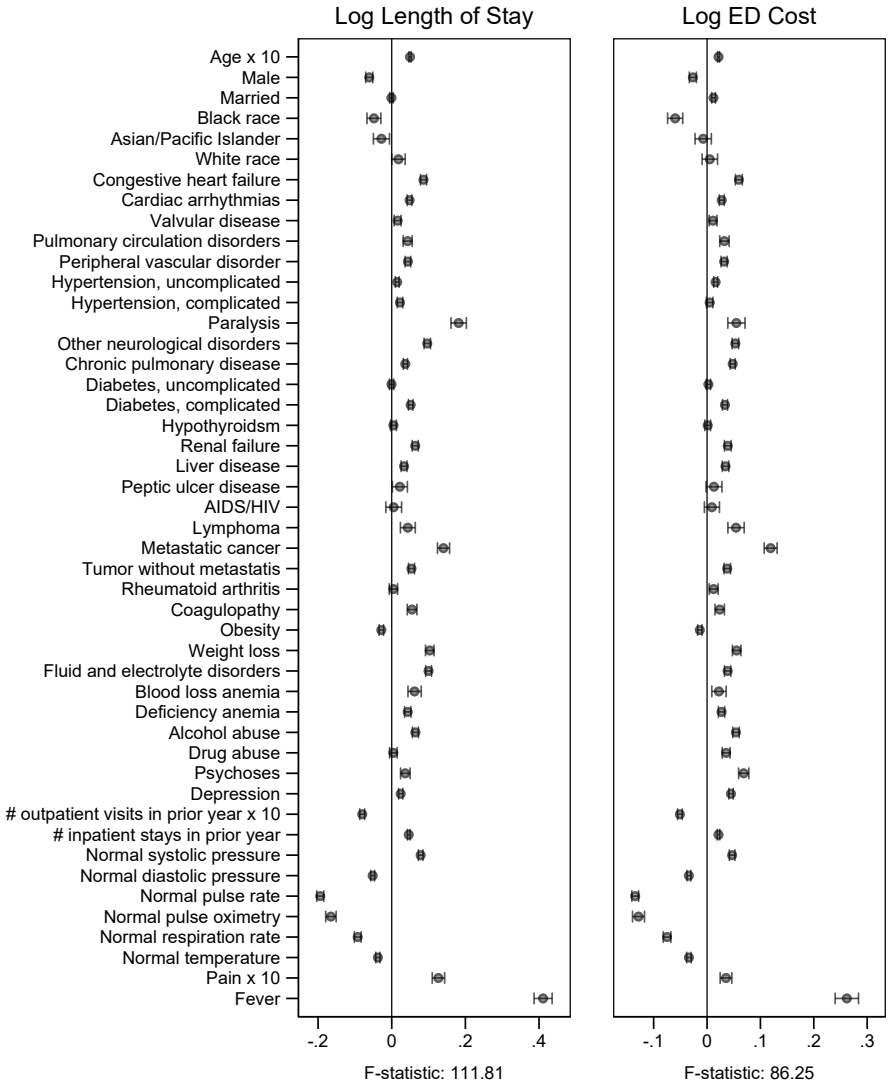
Notes: This figure shows standard deviations of the number of NPs on duty (solid dots) and whether the patient is assigned to NPs (hollow dots). The first dot shows the raw standard deviations without residualizing the number of on-duty NPs or NP assignment by any factors. The second through last dots show the standard deviations of the residualized number of on-duty NPs and NP assignment. The following factors are added to the residualization stepwise (cumulatively) from the second to the last dot: (i) ED-by-year indicators; (ii) ED-by-month indicators; (iii) ED-by-day-of-the-week indicators; (iv) ED-by-hour-of-the-day indicators; (v) patient covariates $\mathbf{X}_i$ in the main specification in Equations (1) and (2); (vi) patient volume in the ED-day cell; (vii) number of doctor equivalents on duty (i.e., the effective staffing level, which is calculated as the sum of the number of on-duty physicians and the number of on-duty NPs multiplied by 0.341, where 0.341 is the coefficient reported in Panel A of Figure 1 and assumed to be the extent of substitution between NPs and physicians); (viii) average wait time of patients in the ED-day cell (leaving out the index patient); and (ix) average characteristics of on-duty physicians (age, gender, value-added, and practice style; see Appendix A.3 for the construction of value-added and practice style). Average characteristics of on-duty NPs are not included in the residualization because by definition these characteristics are missing for the 38 percent of ED-day cells without any NPs on duty.

Figure A.4: Balance in Patient Characteristics



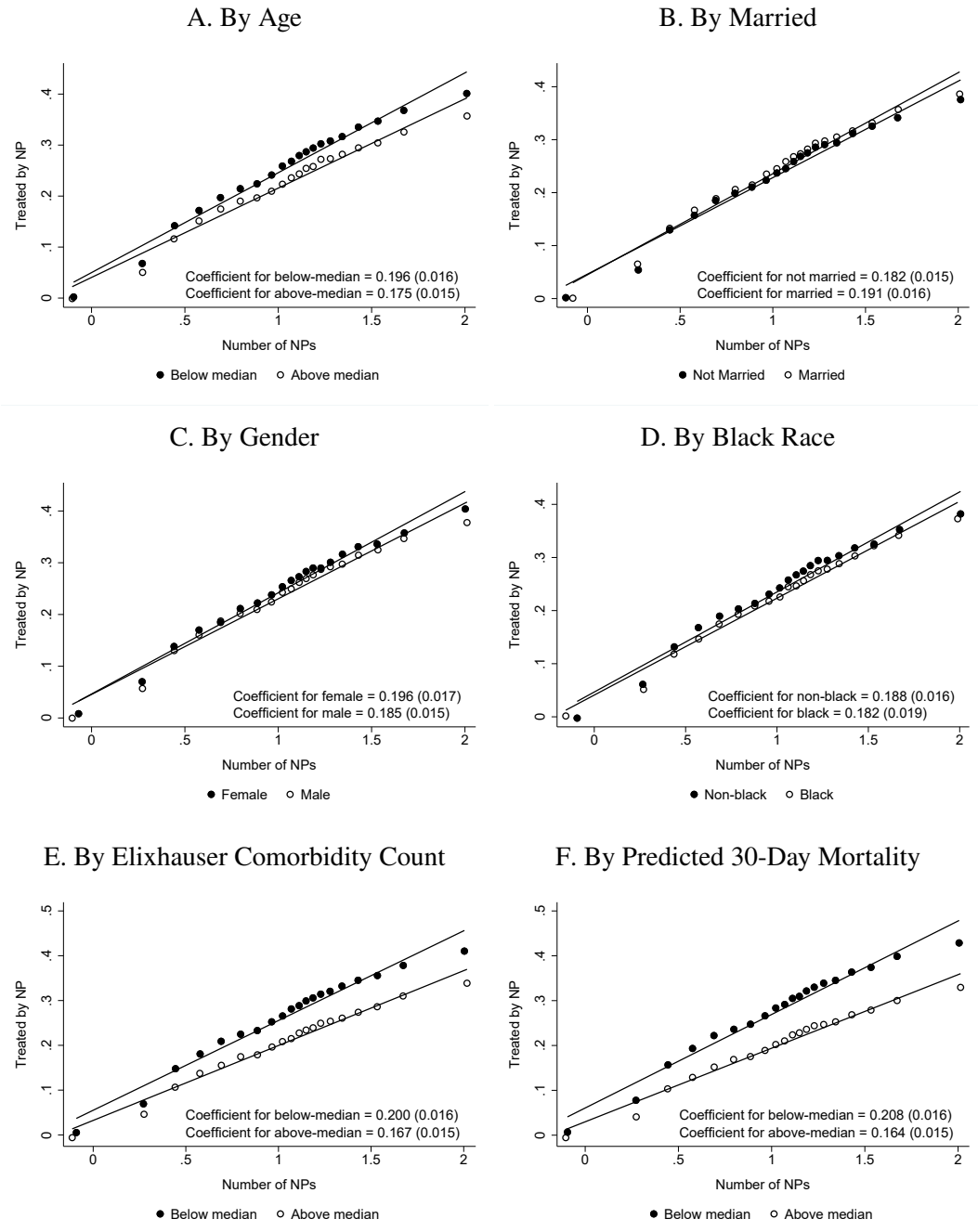
Notes: This figure shows estimated coefficients and 95% confidence intervals from regressions of each patient characteristic listed on the y-axis on the number of NPs on duty, controlling for the baseline control vector (i.e., indicators for ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day). For improved readability, a few coefficients (and their confidence intervals) are scaled up and down by, e.g., 10, as shown by "$\times$ 10" and "/ 10" on the y-axis, respectively. At the bottom of the figure, we report the F-statistic from the joint F-test for all patient characteristics in a reverse regression with the number of NPs on duty as the dependent variable, conditioning on the baseline control vector. Standard errors are clustered by provider.

Figure A.5: Predicting Log Length of Stay and Log ED Cost



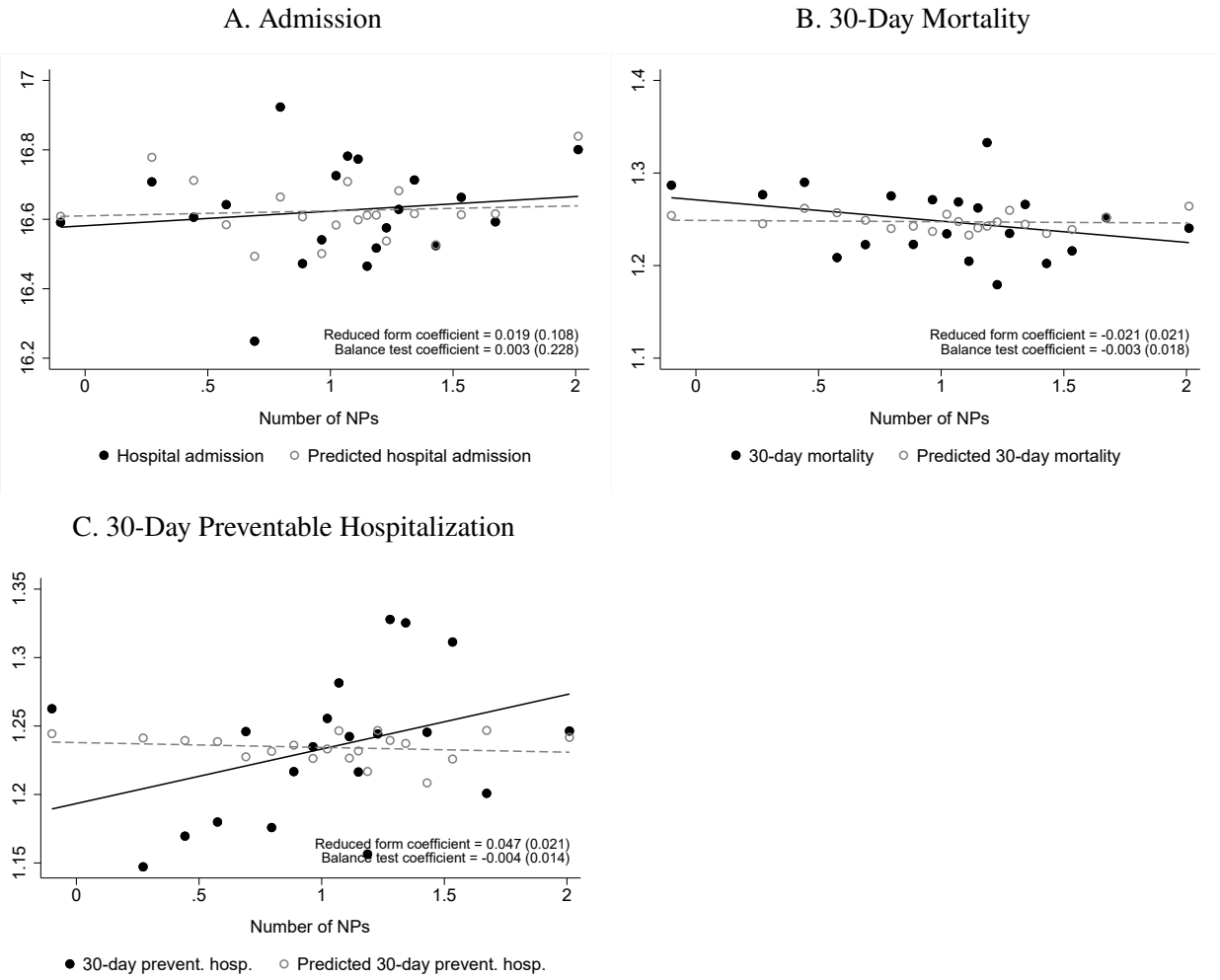
Notes: This figure shows estimated coefficients and 95% confidence intervals from regressions of patient log length of stay (Panel A) and log cost of the ED visit (Panel B) on patient characteristics, controlling for the baseline control vector (i.e., indicators for ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day). For improved readability, a few coefficients (and their confidence intervals) are scaled up by 10, as shown by "$\times$ 10" on the y-axis. The bottom of each panel reports the F-statistic from the joint F-test of all patient characteristics, conditioning on the baseline control vector. Standard errors are clustered by provider.

Figure A.6: Monotonicity Test



Notes: This figure shows the first-stage regression for cases of different characteristics. Panels A-F split the sample by, respectively, age (above versus below the median of the sample), marital status, gender, race (Black versus non-Black), total number of Elixhauser comorbidities (above versus below the median of the sample), and predicted 30-day mortality (above versus below the median of the sample). Predicted 30-day mortality is generated from a linear regression of actual 30-day mortality on patient characteristics $\mathbf{X}_i$ included in Equations (1) and (2), including patient demographics, comorbidities, prior health care use, vital signs, and three-digit diagnosis indicators. To construct these binned scatter plots, we residualize both the *y*-axis and *x*-axis variables with respect to the baseline control vector (i.e., indicators for ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day) within each subsample and then add means back. The coefficients report the first-stage estimates for each subset of patients conditional on the baseline control vector, with standard errors clustered by provider reported in parentheses.

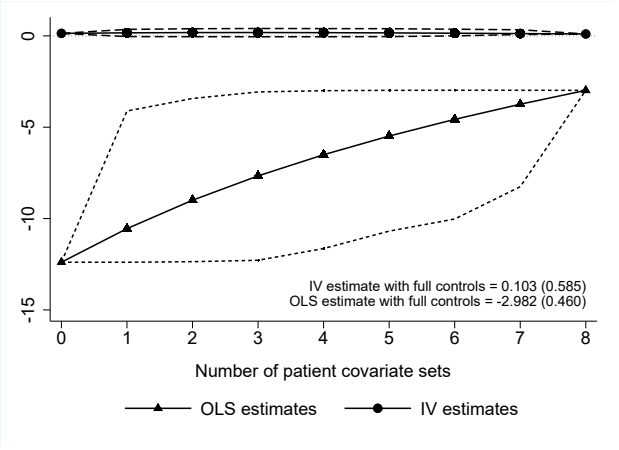
Figure A.7: Reduced-Form and Balance



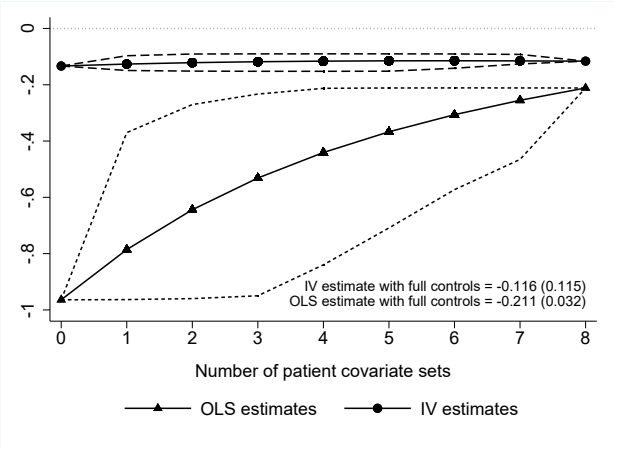
Notes: This figure shows binned scatter plots of patient actual and predicted outcomes on the *y*-axis versus the number of NPs on duty on the *x*-axis, controlling for the baseline control vector (i.e., indicators for ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day). Panels A, B, and C report results for hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization, respectively. The solid circles and lines represent patient actual outcomes. The hollow circles and dashed lines represent patient predicted outcomes generated based on patient characteristics $\mathbf{X}_i$ included in Equations (1) and (2), including patient demographics, comorbidities, prior health care use, vital signs, and three-digit diagnosis indicators. The reduced-form coefficients are estimated using Equation (2), with patient actual outcomes as the dependent variable; the balance-test coefficients are estimated by regressing patient predicted outcomes on the number of NPs on duty, conditional on the baseline control vector. Standard errors clustered by provider are reported in parentheses.

Figure A.8: Stability of OLS and IV Estimates

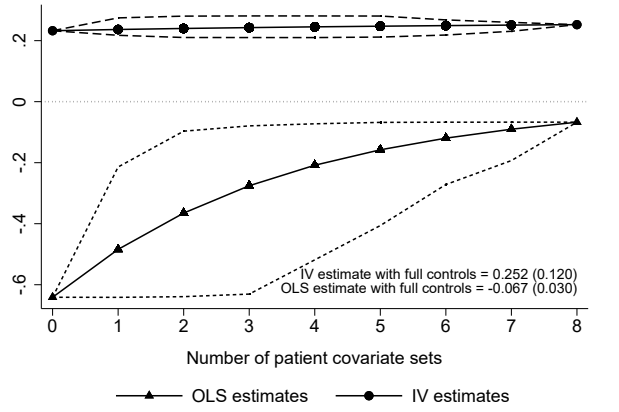
A. Admission



B. 30-Day Mortality

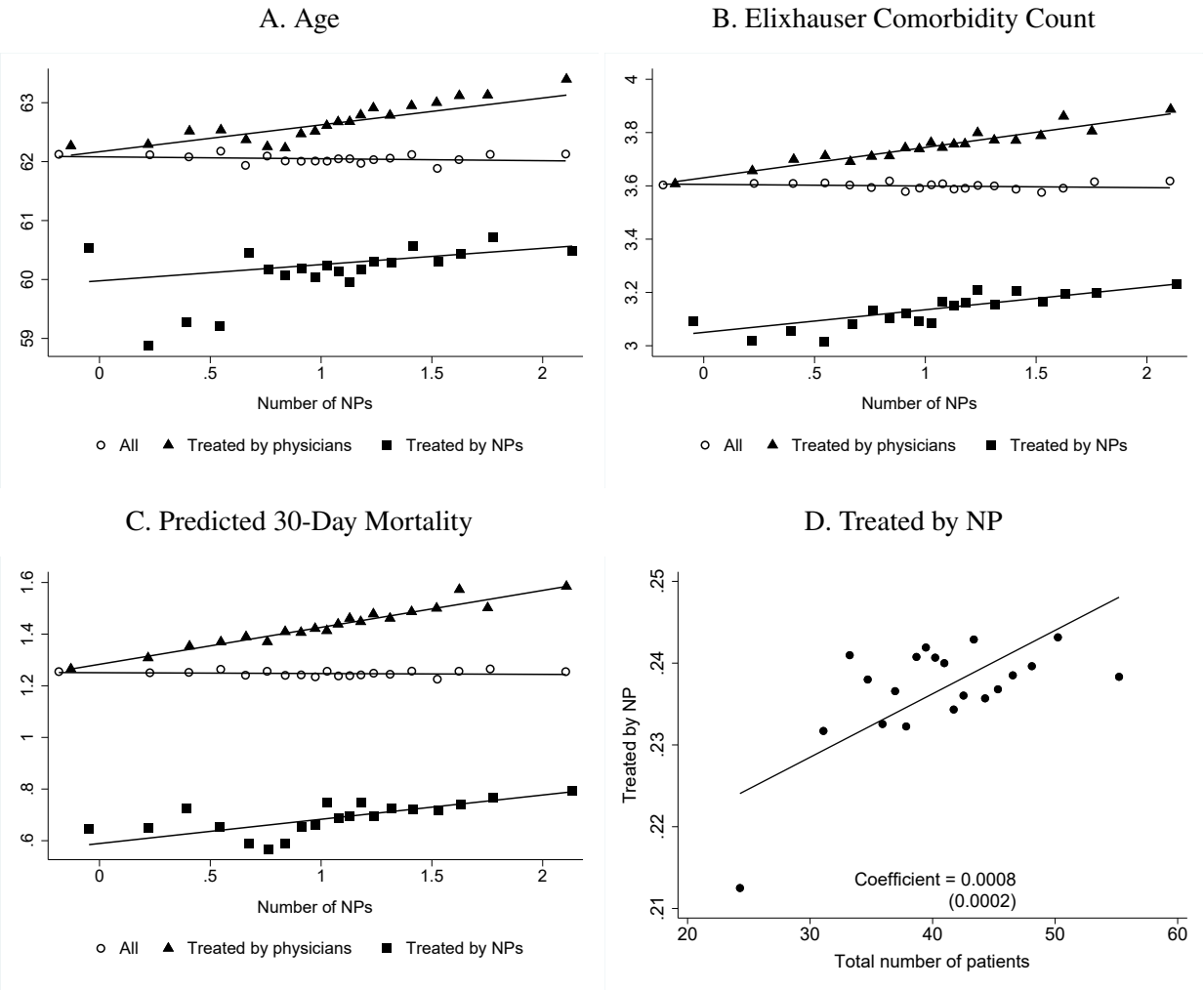


C. 30-Day Preventable Hospitalization



Notes: This figure shows the robustness of our OLS and IV estimates to the inclusion of different sets of patient controls. We divide patient observable characteristics into eight subsets: (i) five-year age-bin indicators; (ii) marital status; (iii) gender; (iv) race indicators; (v) indicators for 31 Elixhauser comorbidities; (vi) vital signs; (vii) prior health care use; and (viii) indicators for three-digit patient primary diagnosis of the visit. We then run separate regressions that control for each of the $2^8 = 256$ different combinations of patient covariates for each outcome. Each n on the x-axis indicates the number of covariate subsets included. For each n, we plot the maximum, mean, and minimum of the estimated coefficients for the effect of NPs using all possible combinations with n (out of eight) subsets of patient covariates. The connected triangles and circles show the mean of the estimated coefficients from OLS and IV regressions, respectively. The dashed lines connect the maximum and minimum of the estimated IV coefficients. The dotted lines connect the maximum and minimum of the estimated OLS coefficients. The coefficients at the bottom of each panel show the IV and OLS estimates with the full set of patient controls, with standard errors reported in parentheses. Panels A, B, and C report results for hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization, respectively.

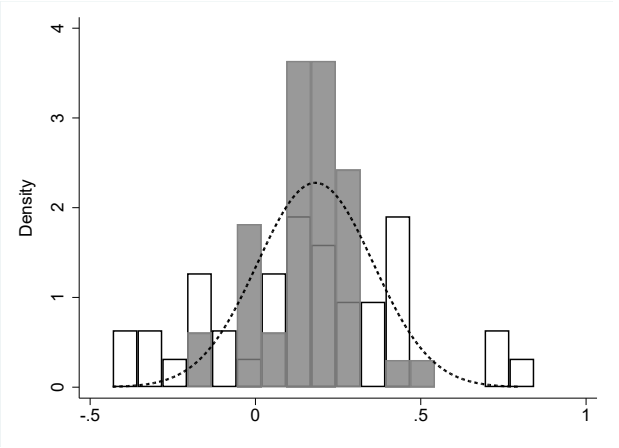
Figure A.9: Patient Assignment



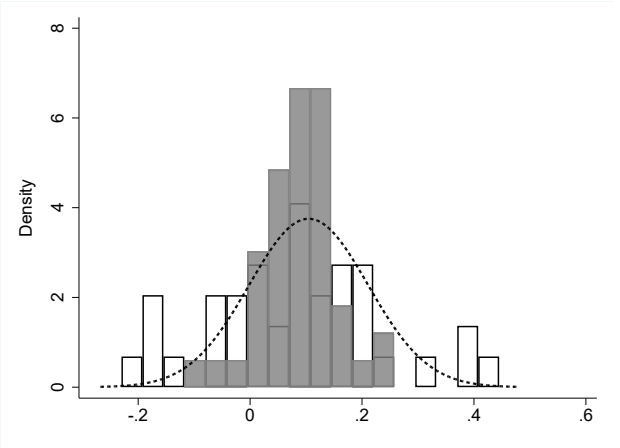
Notes: Panels A-C report patient characteristics (age, total number of Elixhauser comorbidities, and predicted 30-day mortality, respectively) on the *y*-axis against the number of NPs on duty on the *x*-axis. The unit of observation is at the case level. Both the *y*-axis and *x*-axis variables are residualized with respect to the baseline control vector (ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day indicators), with sample means added back to aid in interpretation. The circles, triangles, and squares show binned scatter plots for all cases, cases treated by physicians, and cases treated by NPs, respectively. Panel D plots whether the case is treated by NPs against the number of cases arriving in the analysis time window (i.e., 8 a.m. to 6 p.m.) of the ED-day cell of the case's visit. Both the *y*-axis and *x*-axis variables are residualized with respect to the baseline control vector, with means added back.

Figure A.10: ED-Specific Estimates of NP Effect

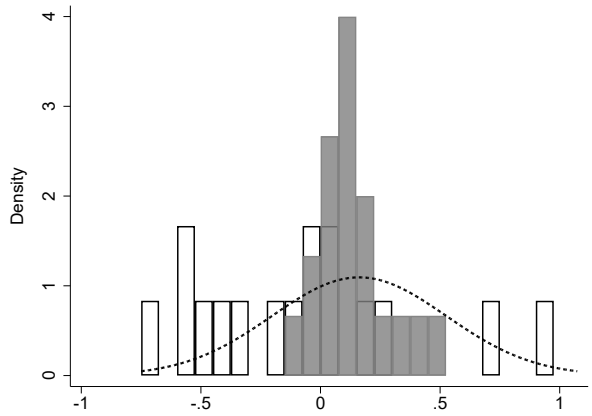
A. Log Length of Stay



B. Log ED Cost

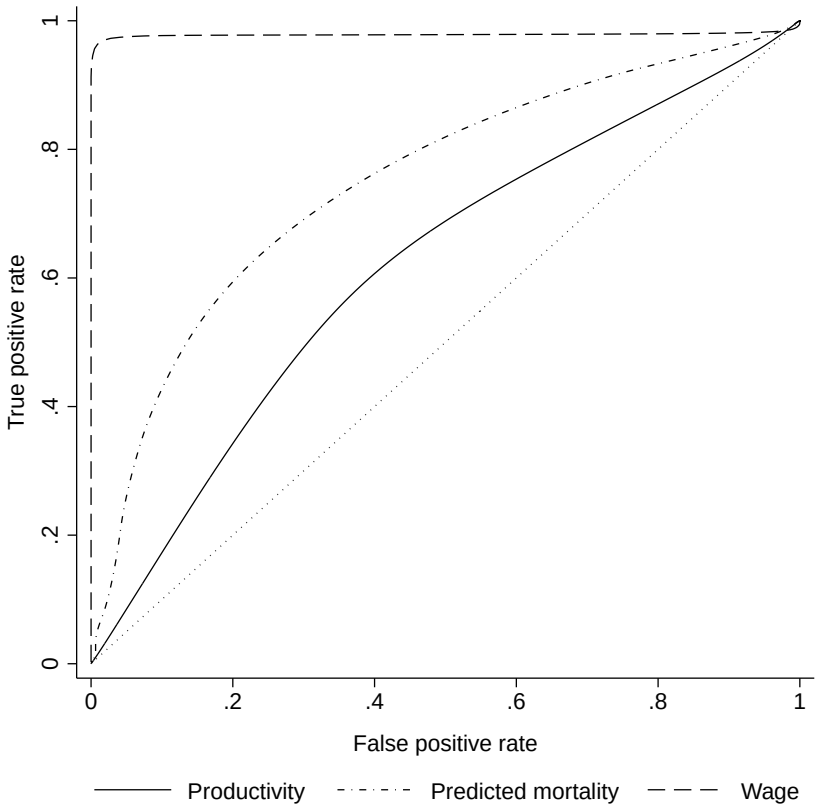


C. 30-day Preventable Hospitalization



Notes: This figure reports the distribution of ED-specific IV estimates of the NP effect. Panels A, B and C report results for the NP effect on log length of stay, log cost of the ED visit, and 30-day preventable hospitalization, respectively. The white bins show the histogram of ED-specific IV estimates without any adjustment to account for estimation noise. The gray bins show the histogram of ED-specific IV estimates with empirical Bayes adjustments (see details in Appendix A.5). The dashed lines show the standard normal density with a variance of the prior distribution of ED-specific IV estimates for each outcome.

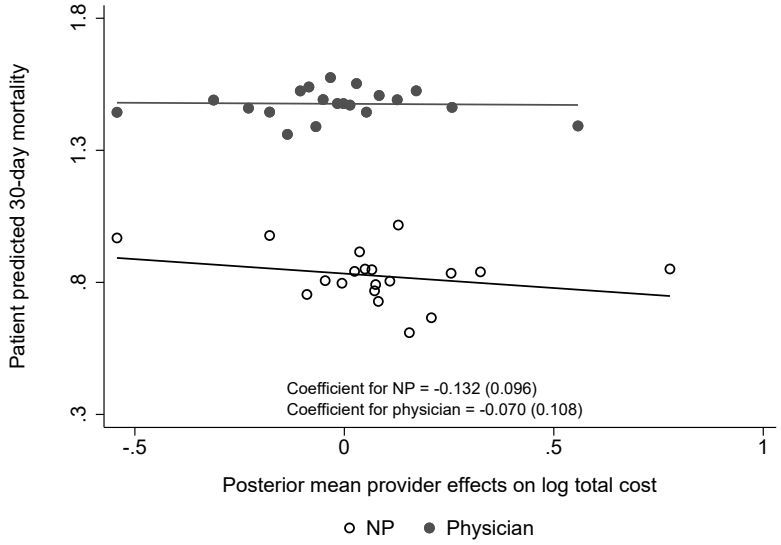
Figure A.11: Receiver Operating Characteristic (ROC) Curves



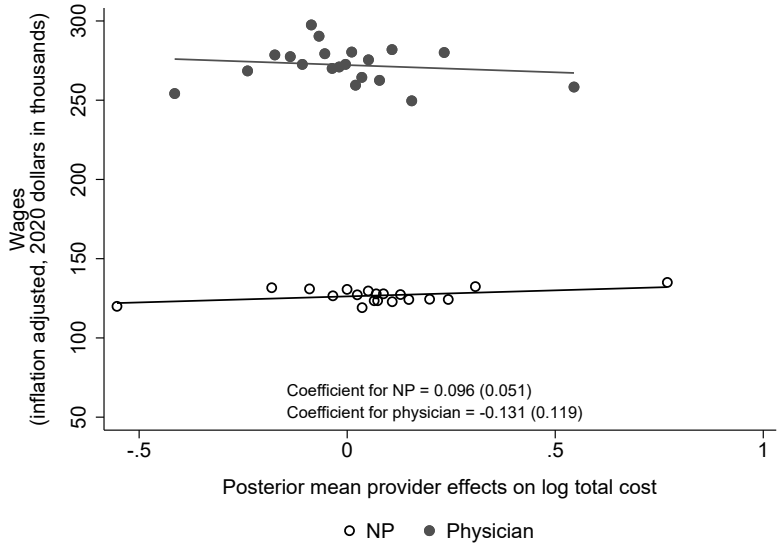
Notes: This figure displays the ROC curves for provider productivity (in the solid line), predicted 30-day mortality of cases assigned to the provider (in the dot-dashed line), and provider wages (in the dashed line). The dotted line plots the 45-degree line. Physicians are defined as the "positive" class and NPs are defined as the "negative" class. See Appendix A.4.4 for details.

Figure A.12: Case Assignment and Wage Payment versus Productivity

A. Predicted 30-Day Mortality of Assigned Cases



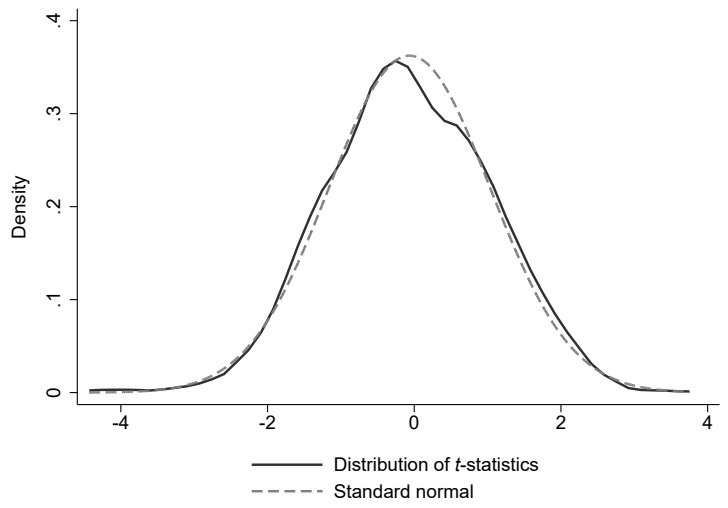
B. Wages



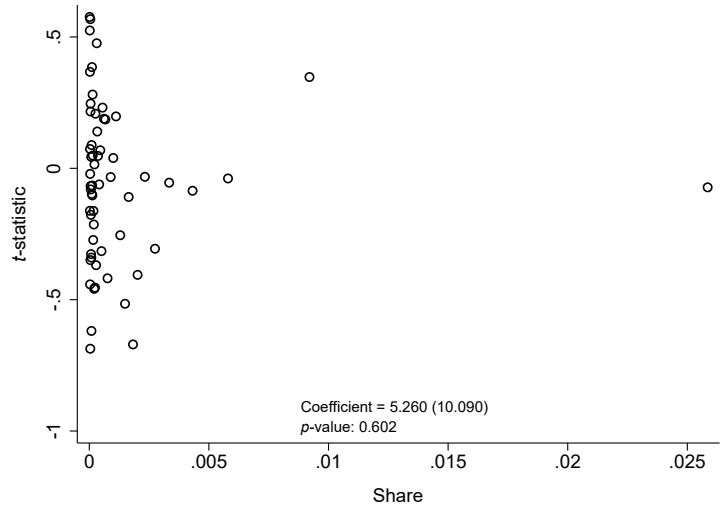
Notes: Panel A shows binned scatter plots of average risks (measured by predicted 30-day mortality) of cases assigned to a provider on the *y*-axis versus posterior mean provider effects on log total cost per ED visit on the *x*-axis. Panel B shows binned scatter plots of provider yearly wage on the *y*-axis versus posterior mean provider effects on log total cost per ED visit on the *x*-axis. Both the *y*-axis and *x*-axis variables are residualized with respect to ED indicators, with means added back for ease of interpretation. Wages are inflation adjusted to year 2020. Coefficients from regressions of wages on posterior mean provider effects controlling for ED indicators are reported, with standard errors clustered by ED shown in parentheses. The hollow circles report results for NPs; the solid circles report results for physicians. See more details in Appendix A.4.5.

Figure A.13: Diagnosis Coding: NPs versus Physicians

A. Distribution of *t*-Statistics

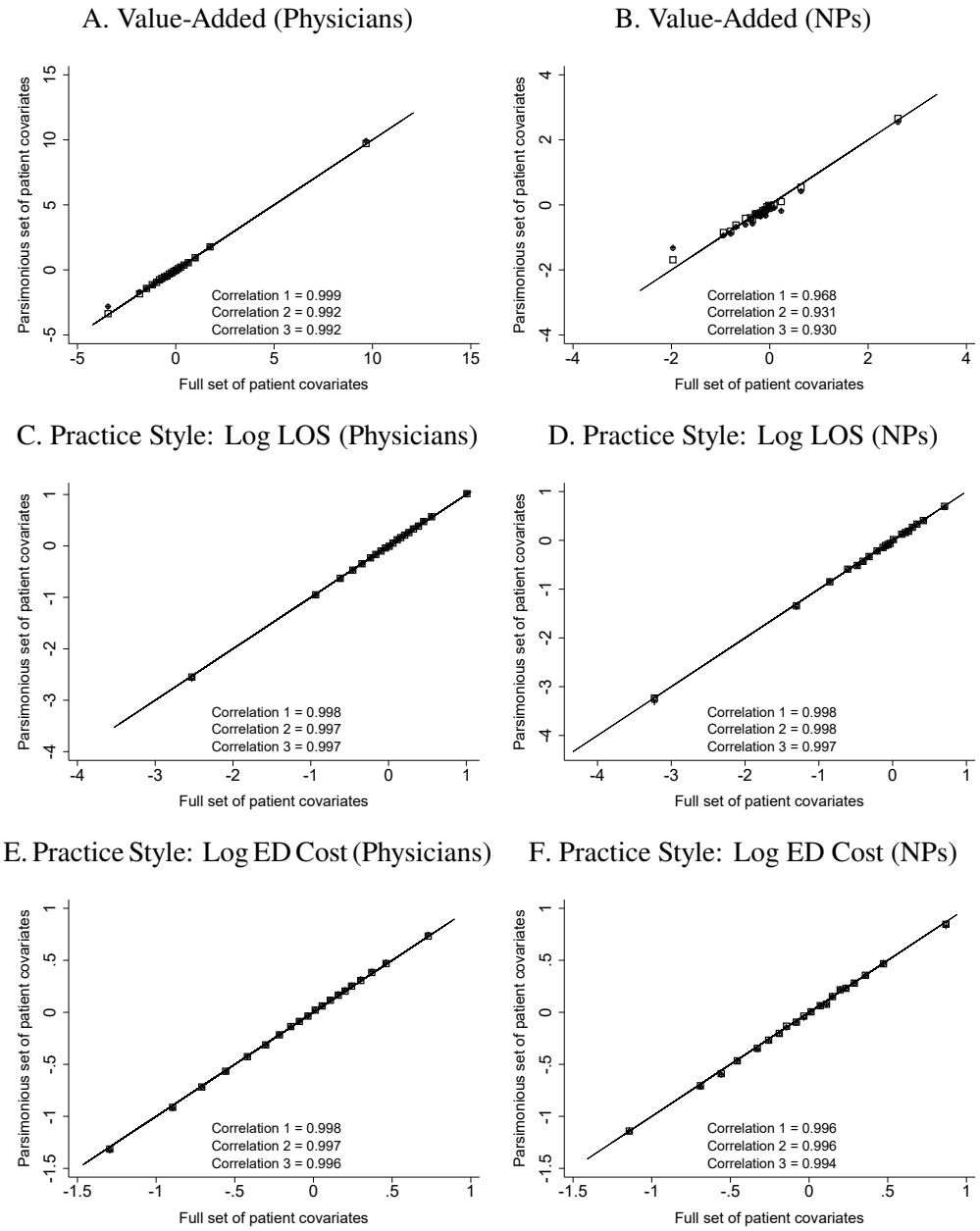


B. *t*-Statistics versus Diagnosis Prevalence



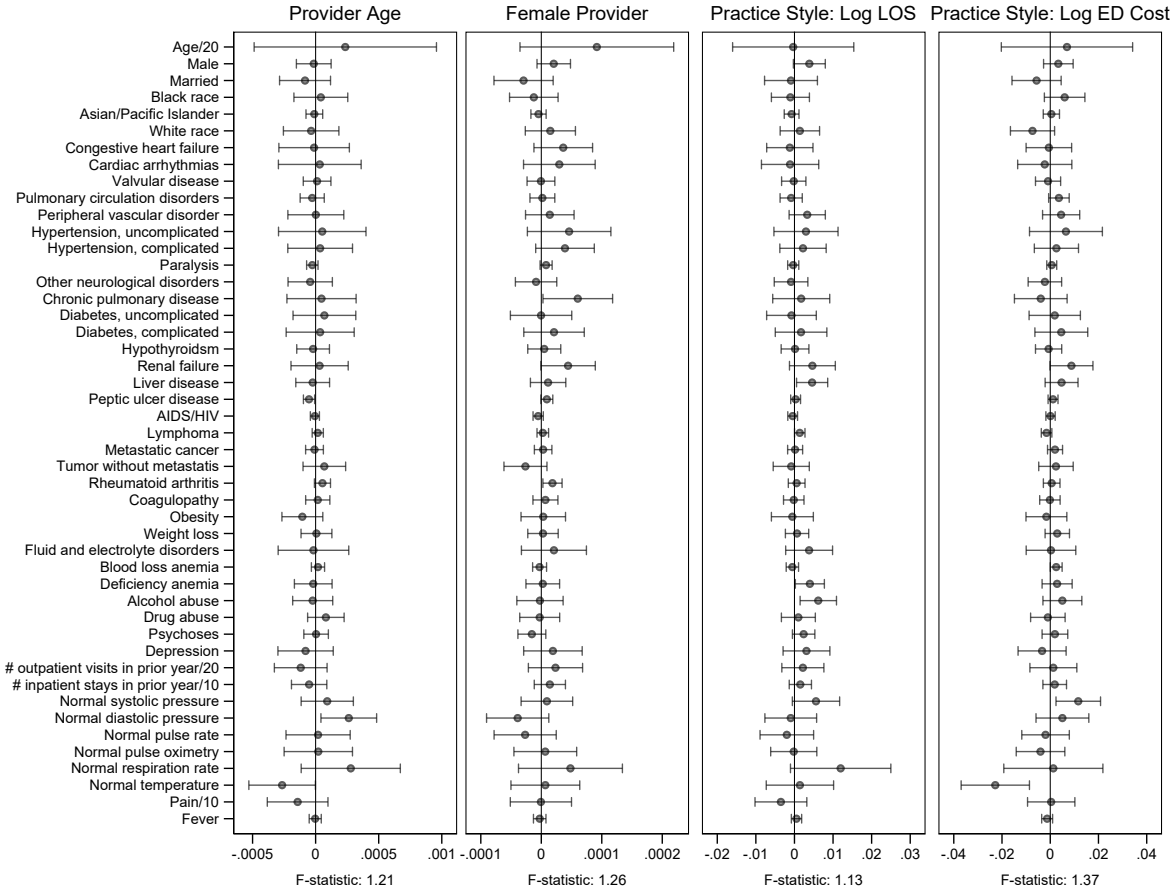
Notes: Panel A plots the distribution of the *t*-statistics on whether NPs and physicians are significantly different in diagnosis coding from 836 separate regressions that use each three-digit diagnosis indicator as the outcome variable. The distribution is estimated using an Epanechnikov kernel with the optimal bandwidth and shown in the solid line. For comparison, the standard normal density is plotted in the dashed line. Panel B shows binned scatter plots of the *t*-statistics against the prevalence of the diagnosis (measured as the share of cases with the diagnosis among cases treated by physicians on days without any NP, to restrict the influence of patient sorting between NPs and physicians). The coefficient from the regression of the *t*-statistics on prevalence is reported in the panel, along with its standard error (shown in parentheses) and *p*-value.

Figure A.14: Stability of Provider Value-Added and Practice Style with Varying Patient Covariates



Notes: This figure shows the stability of provider value-added and practice style estimated using alternative patient covariates. See Appendix A.3 for details. The *x*-axis in each panel reports provider value-added/practice style constructed using the full set of patient covariates, including demographics (five-year age-bin indicators, marital status, gender, and race indicators), indicators for 31 Elixhauser comorbidities, prior health care use (the number of outpatient visits and the number of inpatient stays in VHA facilities in the prior 365 days), vital signs, and indicators for three-digit ICD-10 code of the primary diagnosis of the visit. The *y*-axis reports provider value-added/practice style constructed using alternative sets of patient covariates: Parsimonious set 1 that includes demographics, three-digit diagnosis indicators, and 31 Elixhauser comorbidities; parsimonious set 2 that includes demographics and three-digit diagnosis indicators; parsimonious set 3 that includes five-year age-bin and three-digit diagnosis indicators. Valued-added and practice style constructed using parsimonious sets 1-3 are shown in squares, circles, and "+", respectively. Correlations 1-3 report correlations of value-added/practice style estimated using the full set of patient covariates with those using parsimonious sets 1-3, respectively. The solid lines show the 45-degree line. Panels A, C and E report results for physicians. Panel B, D and F report results for NPs.

Figure A.15: Balance of Patient Characteristics across On-Duty Provider Characteristics



Notes: This figure shows estimated coefficients and 95% confidence intervals from regressions of each patient characteristic listed on the *y*-axis on average characteristics of providers on duty in the ED-day cell of the patient's visit, controlling for baseline controls (i.e., indicators for ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day). All average on-duty provider characteristics are case-weighted, with the index case left out. The average on-duty provider characteristics in Panels A-D are, respectively, age, female, practice style in terms of patient log length of stay, and practice style in terms of patient log cost of care at the ED. For readability, a few coefficients (and their confidence intervals) are scaled down by 10 and 20, as shown by "/10" and "/20" on the *y*-axis, respectively. At the bottom of each panel, we report the F-statistic from the joint F-test for all patient characteristics in a reverse regression with the average on-duty provider characteristic as the dependent variable, conditioning on the baseline control vector. Standard errors are clustered by provider.

Table A.1: Characteristics of NPs and Physicians at VHA and Non-VHA

	VHA (ED)	Non-VHA (ED)	Non-VHA (all)
Panel A. NPs			
Female (%)	81.4	79.1	90.0
Age	51.3	42.9	44.8
Panel B. Physicians			
Female (%)	34.0	27.3	31.0
Age	48.1	45.8	50.4

Notes: Panel A reports summary statistics for NPs; Panel B reports summary statistics for physicians. Column 1 reports summary statistics for NPs/physicians working at the ED in our analysis sample. Column 2 reports summary statistics for NPs/physicians working at the ED observed in the 20 percent Medicare data (with age and gender information obtained from the Medicare Data on Provider Practice and Specialty (MD-PPAS)). To provide a description of providers outside of the ED, Column 3 reports characteristics of all NPs/physicians (regardless of working at the ED) observed in the 20 percent Medicare data. VHA ED NPs' and physicians' mean age and female share reported in Column 1 are slightly different from those reported in Figures 5 and 6 because the latter weight means by the number of ED-days a provider works and patient volume.

Table A.2: Selection of Baseline Sample

Sample step	Description	Cases	Providers		EDs
			NPs	Physicians	
1. Build sample of ED cases from January 1, 2017, to January 31, 2020.	We restrict the sample to cases after the VHA directive granting NPs full practice authority in December 2016 and before COVID pandemic in the US.	7,886,164	547	5,749	146
2. Include only cases visiting during daytime.	Empirically NPs do not work outside of the hours of 8 a.m. to 6 p.m. We drop cases visiting outside of the hours of 8 a.m. to 6 p.m. to focus on cases that could be assigned to an NP.	5,766,296	539	5,665	145
3. Restrict EDs to those with NPs, in months with full practice authority.	We restrict the sample to EDs where NPs work. We restrict to months in which these EDs have granted NPs full practice authority.	3,597,347	521	3,781	111
4. Restrict EDs to those in which NPs and physicians are the only providers.	To focus attention on the margin between NPs and physicians and hold the population of cases seen by an NP or physician fixed, we drop EDs that use other provider types, mainly physician assistants.	1,119,396	156	1,348	44
5. Drop cases with missing demographics or extreme ages.	We drop cases with missing age or gender, or age above 99 or below 20.	1,118,836	156	1,348	44

Notes: This table reports changes in sample size when applying each of the listed sample restrictions. Columns 3-6 report, respectively, the number of cases, NPs, physicians, and EDs remaining at each step.

Table A.3: EDs Included in Main Analysis versus All VHA EDs

	Included	All
Panel A: ED characteristics		
Daily census	30.69	36.06
	(17.58)	(21.34)
Urban location	0.86	0.87
	(0.35)	(0.34)
Panel B: Provider Characteristics		
Physician mean age	52.218	50.962
	(11.288)	(10.979)
Share physicians female	0.286	0.326
	(0.452)	(0.469)
NP mean age	51.245	50.915
	(8.940)	(9.352)
Share NPs female	0.803	0.752
	(0.398)	(0.432)
Panel C: Patient characteristics		
Age	61.987	61.770
	(15.857)	(15.828)
Married	0.416	0.432
	(0.493)	(0.495)
Male	0.905	0.901
	(0.294)	(0.299)
Black	0.275	0.272
	(0.447)	(0.445)
White	0.704	0.709
	(0.456)	(0.454)
Asian/Pacific Islander	0.020	0.018
	(0.140)	(0.133)
Outpatient visits in prior year	6.409	6.552
	(7.697)	(7.717)
Inpatient stays in prior year	0.643	0.689
	(1.612)	(1.684)
Elixhauser comorbidity count	3.626	3.705
	(3.035)	(3.100)
Predicted 30-day mortality (%)	1.200	1.229
	(2.753)	(2.782)

Notes: Columns 1 and 2 report characteristics of EDs that are included in our main analysis sample and of all VHA EDs, respectively. Panel A reports characteristics of the EDs, including daily census in the analysis time window (i.e., 8 a.m. to 6 p.m.) and urban location. Panel B reports characteristics of the physicians and NPs practicing in the EDs. Panel C reports characteristics of patients seen in the EDs. The standard deviation of each characteristic is reported in brackets. Patient and provider characteristics in the included EDs, i.e., Column 1, are slightly different from those reported in Table 1 and Figures 5 and 6 because Column 1 includes observations in the ED in all months between January 2017 and January 2020 regardless of whether the ED had adopted full practice authority for NPs in the month.

Table A.4: Complier and Never-Taker Characteristics

	All	Compliers		Never-takers	
	Mean	Mean	Ratio	Mean	Ratio
Age	62.05	61.11	0.98	63.69	1.03
	(0.15)	(0.31)	[0.98 - 0.99]	(0.17)	[1.02 - 1.03]
Married	0.424	0.424	1.00	0.436	1.03
	(0.004)	(0.008)	[0.97 - 1.04]	(0.007)	[1.00 - 1.06]
Male	0.905	0.905	1.00	0.917	1.01
	(0.002)	(0.003)	[0.99 - 1.01]	(0.002)	[1.01 - 1.02]
Black	0.270	0.262	0.97	0.228	0.84
	(0.011)	(0.019)	[0.83 - 1.11]	(0.015)	[0.73 - 0.95]
White	0.708	0.716	1.01	0.756	1.07
	(0.011)	(0.019)	[0.96 - 1.06]	(0.015)	[1.03 - 1.11]
Asian/Pacific Islander	0.021	0.020	0.95	0.013	0.65
	(0.001)	(0.002)	[0.74 - 1.15]	(0.001)	[0.55 - 0.76]
Outpatient visits in prior year	6.242	5.824	0.93	6.537	1.05
	(0.080)	(0.129)	[0.89 - 0.97]	(0.110)	[1.01 - 1.08]
Inpatient stays in prior year	0.612	0.490	0.80	0.695	1.14
	(0.014)	(0.029)	[0.71 - 0.89]	(0.026)	[1.05 - 1.22]
Elixhauser comorbidity count	3.599	3.324	0.92	3.965	1.10
	(0.030)	(0.066)	[0.89 - 0.96]	(0.041)	[1.08 - 1.12]
Predicted 30-day mortality (%)	1.247	0.902	0.72	1.697	1.36
	(0.032)	(0.067)	[0.62 - 0.83]	(0.049)	[1.28 - 1.44]

Notes: This table reports average characteristics for the overall sample, compliers, and never-takers. Complier characteristics are estimated by 2SLS regressions replacing the outcome variable y_i with $x_i \times \text{NP}_i$, i.e., the interaction between patient characteristic and the indicator for being treated by an NP, controlling for the baseline control vector (i.e., indicators for ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day). Standard errors clustered by provider are reported in parentheses. Never-takers are defined as cases treated by physicians in ED-day cells with the residual share of cases treated by NPs at least as high as the 90th percentile of ED-days with at least one case treated by NPs. Residual shares are constructed by first collapsing the data to ED-days and then residualizing the share of cases treated by NPs by indicators for ED-by-year, ED-by-month and ED-by-day-of-the-week. Standard errors for the overall sample and never-takers are estimated by bootstrap, using 500 replications and blocking observations by provider. For each characteristic, the table reports the mean as well as the ratio between this mean and the overall sample mean. 95% confidence intervals of each ratio are shown in brackets. Predicted 30-day mortality is generated from a linear regression of actual 30-day mortality on patient characteristics $\mathbf{X}_i$ included in Equations (1) and (2), including patient demographics, comorbidities, prior health care use, vital signs, and three-digit diagnosis indicators.

Table A.5: On-Duty Physician Value-Added and Experience and Outcomes of Patients Treated by NPs

	Dependent variable						
	Elixhauser comorbidity count	Predicted 30-day mortality	Log length of stay	Log ED cost	Admission	30-day mortality	30-day prevent. hosp.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Physician value-added							
Physician value-added	-0.006	-0.021	-0.010	-0.005	-0.245	-0.005	-0.023
	(0.013)	(0.014)	(0.008)	(0.005)	(0.199)	(0.075)	(0.044)
Panel B: Physician experience							
Physician experience	-0.050	-0.100	0.000	-0.030	1.050	0.327	-0.103
	(0.087)	(0.072)	(0.051)	(0.044)	(0.801)	(0.224)	(0.244)
Controls	Baseline	Baseline	Full	Full	Full	Full	Full
Mean dep. var.	3.128	0.728	4.302	6.298	7.726	0.633	0.719
S.D. dep. var.	2.711	2.115	1.083	0.870	26.700	7.929	8.446
Observations	147,936	147,936	146,948	146,935	147,936	147,936	147,936

Notes: This table shows the balance in outcomes for cases treated by NPs across the average value-added of physicians on duty (Panel A) and across the average experience (measured by age) of physicians on duty (Panel B). Coefficients in Panel B is scaled up by 100 for readability. See Appendix A.3 for construction details of physician value-added. The outcomes in Columns 1-7 are, respectively, total number of Elixhauser comorbidities, predicted 30-day mortality, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. The sample is restricted to patients treated by NPs on days with one NP on duty and at least one physician on duty. Since Columns 1-2 examine the balance in patient characteristics, the set of controls includes only the baseline control vector (i.e., ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day indicators). The set of full controls in Columns 3-7 is detailed in the notes to Table 2. Standard errors clustered by provider are reported in parentheses.

Table A.6: NP Presence and Outcomes of Patients Treated by Physicians

	Dependent variable						
	Elixhauser comorbidity count	Predicted 30-day mortality	Log length of stay	Log ED cost	Admission	30-day mortality	30-day prevent. hosp.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Baseline results							
NPs on duty	0.012	-0.013	-0.002	0.001	0.004	-0.022	-0.116
	(0.032)	(0.029)	(0.012)	(0.007)	(0.003)	(0.098)	(0.117)
Panel B: By tercile of case count in ED-day cell							
NPs on duty							
× Bottom two terciles	0.027	0.017	0.027	0.009	0.004	0.023	-0.084
	(0.043)	(0.038)	(0.016)	(0.010)	(0.004)	(0.142)	(0.162)
× Top tercile	0.002	-0.035	-0.017	-0.004	0.003	-0.053	-0.134
	(0.039)	(0.034)	(0.014)	(0.009)	(0.004)	(0.114)	(0.146)
Controls	Baseline	Baseline	Full	Full	Full	Full	Full
Mean dep. var.	3.535	1.070	4.545	6.486	0.154	1.051	1.324
S.D. dep. var.	2.996	2.758	1.276	0.836	0.361	10.200	11.432
Observations	68,863	68,863	68,214	68,208	68,863	68,863	68,863

Notes: This table shows balance in outcomes of patients treated by physicians against the presence of NPs. The sample is restricted to patients arriving between 5 and 8 a.m. in ED-day cells with all patients arriving between 5 and 8 a.m. being assigned to physicians. Panel A shows baseline results. The empirical specification takes the form $y_i = \gamma \mathbf{1}(Z_i > 0) + \mathbf{T}_i\eta + \mathbf{X}_i\beta + \varepsilon_i$, where $\mathbf{1}(Z_i > 0)$ is an indicator for whether there are NPs on duty during 8 a.m.-12 p.m of the ED-day cell of the patient's visit. Panel B shows heterogeneous effects by whether the total number of cases in the ED-day cell is in the top tercile of all ED-days. The empirical specification takes the form $y_i = \sum_{g=1}^{G} \mathbf{1}(\text{Group}_i = g) \left[\gamma_g \mathbf{1}(Z_i > 0) + \lambda_g\right] + \mathbf{T}_i\eta + \mathbf{X}_i\beta + \varepsilon_i$, where $\mathbf{1}(\text{Group}_i = g)$ is an indicator for whether the ED-day cell has a number of cases arriving between 5 and 8 a.m. in the top or bottom two tercile(s) of all ED-days. The outcomes in Columns 1-7 are, respectively, total number of Elixhauser comorbidities, predicted 30-day mortality, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. Since Columns 1-2 examine balance in patient characteristics, the set of controls includes only the baseline control vector (i.e., ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day indicators). The set of full controls in Columns 3-7 is detailed in the notes to Table 2. Standard errors clustered by provider are reported in parentheses.

Table A.7: Robustness to Controlling for Average Risks of Patients Assigned to Physicians

	Dependent variable				
	Log length of stay (1)	Log ED cost (2)	Admission (3)	30-day mortality (4)	30-day prevent. hosp. (5)
Panel A: Baseline					
NP assignment	0.110	0.070	0.103	-0.116	0.252
	(0.045)	(0.030)	(0.585)	(0.115)	(0.120)
Panel B: Control for age					
NP assignment	0.107	0.070	0.101	-0.125	0.254
	(0.045)	(0.030)	(0.590)	(0.116)	(0.122)
Panel C: Control for Elixhauser comorbidity count					
NP assignment	0.106	0.069	0.117	-0.136	0.238
	(0.045)	(0.030)	(0.592)	(0.116)	(0.122)
Panel D: Control for predicted 30-day mortality					
NP assignment	0.100	0.068	0.191	-0.114	0.258
	(0.044)	(0.030)	(0.596)	(0.117)	(0.124)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.608	6.483	16.625	1.247	1.234
S.D. dep. var.	1.161	0.878	37.230	11.099	11.041
Observations	1,110,798	1,108,961	1,118,836	1,118,836	1,118,836

Notes: This table shows robustness of the estimates to controlling for the average health risks of cases (age, total number of Elixhauser comorbidities, and predicted 30-day mortality in Panels B, C, and D, respectively) assigned to physicians in the ED-day cell (leaving out the index case). For comparison, Panel A repeats our baseline estimates reported in Tables 2 and 3. The outcomes in Columns 1-5 are, respectively, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are reported in parentheses.

Table A.8: Robustness to Additional Controls

	Dependent variable				
	Log length of stay (1)	Log ED cost (2)	Admission (3)	30-day mortality (4)	30-day prevent. hosp. (5)
Panel A: Baseline					
NP assignment	0.110	0.070	0.103	-0.116	0.252
	(0.045)	(0.030)	(0.585)	(0.115)	(0.120)
Panel B: Control for patient volume (linear controls)					
NP assignment	0.095	0.081	0.597	-0.082	0.237
	(0.045)	(0.030)	(0.606)	(0.116)	(0.118)
Panel C: Control for patient volume (linear splines)					
NP assignment	0.096	0.081	0.602	-0.080	0.239
	(0.045)	(0.030)	(0.606)	(0.116)	(0.118)
Panel D: Control for patient volume (restricted cubic splines)					
NP assignment	0.096	0.081	0.602	-0.080	0.238
	(0.045)	(0.030)	(0.606)	(0.116)	(0.118)
Panel E: Control for doctor equivalents (1 NP = 0.341 physicians)					
NP assignment	0.110	0.070	0.103	-0.116	0.252
	(0.044)	(0.029)	(0.584)	(0.115)	(0.120)
Panel F: Control for doctor equivalents (1 NP = 0.5 physicians)					
NP assignment	0.085	0.061	-0.019	-0.104	0.245
	(0.043)	(0.029)	(0.574)	(0.113)	(0.117)
Panel G: Control for wait time					
NP assignment	0.109	0.069	0.317	-0.074	0.250
	(0.045)	(0.030)	(0.594)	(0.124)	(0.121)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.608	6.483	16.625	1.247	1.234
S.D. dep. var.	1.161	0.878	37.230	11.099	11.041
Observations	1,110,798	1,108,961	1,118,836	1,118,836	1,118,836

Notes: Panel A repeats the baseline estimates reported in Tables 2 and 3. Panels B, C, and D add controls for patient volume in the analysis time window (i.e., 8 a.m. to 6 p.m.) of the ED-day cell of the patient's visit, with patient volume controlled linearly, as linear splines, and as restricted cubic splines, respectively. Panels E and F add a control for the total number of doctor equivalents on duty at the ED on the day the patient visits. Panels E and F assume a substitution rate of 0.341 and 0.5 between NPs and physicians, respectively. Panel G adds a control for patient wait time. As wait time is potentially endogenous (healthier cases could be assigned a lower priority and hence wait longer), we add an instrument for wait time: the average wait time of cases visiting on the same day at the same ED as the index case. The outcomes in Columns 1-5 are, respectively, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are reported in parentheses.

Table A.9: Patient-Provider Gender Match

	Dependent variable						
	Elixhauser comorbidity count	Predicted 30-day mortality	Log length of stay	Log ED cost	Admission	30-day mortality	30-day prevent. hosp.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female NP × male patient	0.007	-0.065	0.027	-0.012	0.355	0.062	-0.058
	(0.103)	(0.100)	(0.017)	(0.015)	(0.593)	(0.085)	(0.093)
Female NP	0.029	0.062	0.006	0.191	1.327	0.027	-0.015
	(0.153)	(0.153)	(0.133)	(0.081)	(1.886)	(0.091)	(0.091)
Male patient	0.743	0.745	-0.051	-0.016	0.262	0.042	0.103
	(0.092)	(0.092)	(0.014)	(0.013)	(0.508)	(0.080)	(0.078)
Controls	Baseline	Baseline	Full	Full	Full	Full	Full
Mean dep. var.	3.190	0.743	4.304	6.341	7.866	0.630	0.745
S.D. dep. var.	2.772	2.145	1.137	0.856	26.921	7.910	8.598
Observations	264,772	264,772	262,960	263,045	264,772	264,772	264,772

Notes: This table examines whether NPs treat patients of the opposite gender differently compared to the same gender. We restrict the sample to patients treated by NPs, and regress each outcome on the interaction between the indicator for female NPs and the indicator for male patients, the indicator for female NPs, and the indicator for male patients. Columns 1-2 examine the balance in patient characteristics and add controls for the baseline control vector (i.e., ED-by-year, ED-by-month, ED-by-day-of-the-week, and ED-by-hour-of-the-day indicators). Columns 3-7 add the full set of controls described in the notes to Table 2. The outcomes in Columns 1-7 are, respectively, total number of Elixhauser comorbidities, predicted 30-day mortality, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. Standard errors clustered by provider are reported in parentheses.

Table A.10: Alternative Standard Error Clustering

	Dependent variable				
	Log length of stay (1)	Log ED cost (2)	Admission (3)	30-day mortality (4)	30-day prevent. hosp. (5)
Panel A: Clustering by provider					
NP assignment	0.110	0.070	0.103	-0.116	0.252
	(0.045)	(0.030)	(0.585)	(0.115)	(0.120)
Panel B: Clustering by ED-day					
NP assignment	0.110	0.070	0.103	-0.116	0.252
	(0.015)	(0.010)	(0.348)	(0.113)	(0.112)
Panel C: Two-way clustering by ED-day and provider					
NP assignment	0.110	0.070	0.103	-0.116	0.252
	(0.045)	(0.030)	(0.581)	(0.113)	(0.119)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.608	6.483	16.625	1.247	1.234
S.D. dep. var.	1.161	0.878	37.230	11.099	11.041
Observations	1,110,798	1,108,961	1,118,836	1,118,836	1,118,836

Notes: This table reports the robustness of our estimates to alternative standard error clustering approaches. Panel A repeats our baseline estimates that cluster standard errors by provider. Panel B clusters standard errors by ED-day. Panel C clusters standard errors using two-way clustering by ED-day and provider. The outcomes in Columns 1-5 are, respectively, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. All estimations include the full set of controls described in the notes to Table 2.

Table A.11: Alternative Instruments

	Dependent variable				
	Log length of stay (1)	Log ED cost (2)	Admission (3)	30-day mortality (4)	30-day prevent. hosp. (5)
Panel A: Include NPs with only one case					
NP assignment	0.102	0.076	-0.011	-0.127	0.285
	(0.045)	(0.030)	(0.594)	(0.116)	(0.125)
Panel B: Leave out the index case					
NP assignment	0.123	0.074	0.198	-0.110	0.260
	(0.046)	(0.031)	(0.605)	(0.121)	(0.126)
Panel C: Leave-out share of cases treated by NPs					
NP assignment	0.117	0.069	0.926	-0.033	0.208
	(0.052)	(0.032)	(0.628)	(0.118)	(0.121)
Panel D: Indicator for any NP on duty					
NP assignment	0.108	0.080	0.185	-0.048	0.211
	(0.049)	(0.030)	(0.643)	(0.121)	(0.130)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.608	6.483	16.625	1.247	1.234
S.D. dep. var.	1.161	0.878	37.230	11.099	11.041
Observations	1,110,798	1,108,961	1,118,836	1,118,836	1,118,836

Notes: Panel A reports results using an alternative measure of the number of NPs on duty as the instrument, which includes NPs with only one case in the analysis time window of an ED-day cell. Panel B reports results leaving out the index case in measuring the number of NPs on duty. Panels C uses the share of cases treated by NPs in the ED-day cell (leaving out the index case in calculating the share) as the instrument. Panel D uses an indicator for any NP on duty as the instrument. The outcomes in Columns 1-5 are, respectively, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are shown in parentheses.

Table A.12: Sample Restricted to ED-Days with Zero or One NP

	Dependent variable				
	Log length of stay (1)	Log ED cost (2)	Admission (3)	30-day mortality (4)	30-day prevent. hosp. (5)
NP assignment	0.109	0.084	0.146	-0.042	0.219
	(0.052)	(0.032)	(0.686)	(0.128)	(0.140)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.594	6.445	16.301	1.241	1.235
S.D. dep. var.	1.147	0.887	36.937	11.069	11.045
Observations	862,416	860,798	868,930	868,930	868,930

Notes: This table shows results using only patients in ED-day cells with zero or one NP on duty. The outcomes in Columns 1-5 are, respectively, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are shown in parentheses.

Table A.13: Hospital Admissions and Preventable Hospitalizations Outside VHA

	Dependent variable			
	Admission		30-day prevent. hosp.	
	(1)	(2)	(3)	(4)
	VHA only	VHA+Medicare	VHA only	VHA+Medicare
NP assignment	0.806	0.806	0.485	0.371
	(0.798)	(0.794)	(0.205)	(0.222)
Full controls	Yes	Yes	Yes	Yes
Mean dep. var.	20.054	20.267	1.704	2.166
S.D. dep. var.	40.040	40.199	12.941	14.556
Observations	545,791	545,791	543,253	543,253

Notes: This table shows the robustness of our results to including hospital admissions and 30-day preventable hospitalizations outside of the VHA by examining patients who enroll in both the VHA and traditional Medicare. The VHA provides linked Medicare claims for beneficiaries who are traditional Medicare enrollees. Columns 1 and 2 show the robustness of results for hospital admissions during the ED visit. Column 1 measures only hospital admissions in the VHA; Column 2 adds hospital admissions in the Medicare claims. To obtain full observation of hospital admissions in non-VHA hospitals, Columns 1 and 2 restrict the sample to patients who enroll in traditional Medicare in the month of the ED visit. Columns 3 and 4 show the robustness of results for 30-day preventable hospitalizations. Column 3 measures 30-day preventable hospitalizations in the VHA; Column 4 adds 30-day preventable hospitalizations in the Medicare claims. To obtain full observation of 30-day preventable hospitalizations in non-VHA hospitals, Columns 3 and 4 restrict the sample to patients who enroll in traditional Medicare in both the month of the ED visit and the month that follows. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are shown in parentheses.

Table A.14: Including All EDs Using NPs

	Dependent variable				
	Log length of stay (1)	Log ED cost (2)	Admission (3)	30-day mortality (4)	30-day prevent. hosp. (5)
NP assignment	0.107	0.047	-0.003	-0.087	0.141
	(0.030)	(0.018)	(0.004)	(0.076)	(0.083)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.600	6.522	0.171	1.216	1.268
S.D. dep. var.	1.151	0.869	0.377	10.958	11.190
Observations	2,167,104	2,166,520	2,184,032	2,184,032	2,184,032

Notes: This table shows the results that include cases in all VHA EDs that use NPs regardless of whether the ED uses physician assistants (but exclude cases in ED-day cells with physician assistants to focus on the margin between NPs and physicians). This table expands the analysis sample from 1.1 million cases across 44 EDs in our main analysis to 2.2 million cases across 110 EDs. The outcomes in Columns 1-5 are, respectively, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are shown in parentheses.

Table A.15: Heterogeneous Effects by Provider Experience (Cases in 2018-)

	Dependent variable				
	Log length of stay (1)	Log ED cost (2)	Admission (3)	30-day mortality (4)	30-day prevent. hosp. (5)
Panel A: Provider specific experience					
NP assignment	0.081	0.077	-0.268	-0.222	0.335
	(0.046)	(0.032)	(0.646)	(0.142)	(0.149)
NP assignment × experience	-0.060	-0.050	-0.677	0.011	-0.012
	(0.025)	(0.021)	(0.308)	(0.044)	(0.033)
Experience	-0.006	0.004	0.204	-0.008	-0.018
	(0.005)	(0.009)	(0.303)	(0.017)	(0.012)
Panel B: Provider general experience					
NP assignment	0.104	0.089	-0.356	-0.238	0.347
	(0.048)	(0.034)	(0.700)	(0.146)	(0.152)
NP assignment × experience	-0.130	-0.069	0.249	0.108	-0.029
	(0.067)	(0.040)	(1.337)	(0.114)	(0.077)
Experience	-0.034	-0.009	-0.721	-0.017	-0.039
	(0.015)	(0.011)	(0.230)	(0.024)	(0.025)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.637	6.529	16.304	1.251	1.226
S.D. dep. var.	1.133	0.887	36.940	11.114	11.005
Observations	742,968	741,027	747,510	747,510	747,510

Notes: This table reports heterogeneous effects of NPs by provider experience using cases visiting in 2018 or after. Panel A shows heterogeneity by provider specific experience in the case's condition, measured as the number of cases with the same three-digit primary diagnosis as the current case the provider has treated since the start of the study period to the day before the current case's visit. Panel B shows heterogeneity by provider general experience, measured as the number of cases (despite diagnoses) the provider has treated since the start of the study period to the day before the current case's visit. For ease of interpretation, both specific and general experience are standardized to have a mean of zero and a standard deviation of one for NPs and physicians separately. The outcome variables in Columns 1-5 are, respectively, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are shown in parentheses.

Table A.16: Heterogeneous Effects by Provider Experience (Prior-Year Experience)

	Dependent variable				
	Log length of stay (1)	Log ED cost (2)	Admission (3)	30-day mortality (4)	30-day prevent. hosp. (5)
Panel A: Provider specific experience					
NP assignment	0.078	0.074	-0.295	-0.221	0.333
	(0.046)	(0.031)	(0.641)	(0.141)	(0.148)
NP assignment × experience	-0.053	-0.055	-0.646	0.016	-0.017
	(0.027)	(0.023)	(0.307)	(0.049)	(0.035)
Experience	-0.009	0.009	0.260	-0.012	-0.012
	(0.006)	(0.011)	(0.327)	(0.018)	(0.014)
Panel B: Provider general experience					
NP assignment	0.089	0.081	-0.331	-0.222	0.350
	(0.046)	(0.033)	(0.662)	(0.143)	(0.150)
NP assignment × experience	-0.120	-0.063	-0.142	0.040	-0.117
	(0.088)	(0.044)	(1.162)	(0.091)	(0.085)
Experience	-0.040	-0.002	-0.732	-0.008	-0.008
	(0.017)	(0.012)	(0.235)	(0.026)	(0.026)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.637	6.529	16.304	1.251	1.226
S.D. dep. var.	1.133	0.887	36.940	11.114	11.005
Observations	742,968	741,027	747,510	747,510	747,510

Notes: This table reports heterogeneous effects of NPs by provider experience in the prior year. Panel A shows heterogeneity by provider specific experience in the case's condition, measured as the number of cases with the same three-digit primary diagnosis as the current case the provider has treated in the 365 days prior to the day of the current case's visit. Panel B shows heterogeneity by provider general experience, measured as the number of cases (despite diagnoses) the provider has treated in the 365 days prior to the day of the current case's visit. The sample is restricted to cases visiting in 2018 or after, to allow for at least a one-year look-back window for measuring experience in the prior 365 days. For ease of interpretation, both specific and general experience are standardized to have a mean of zero and a standard deviation of one for NPs and physicians separately. The outcome variables in Columns 1-5 are, respectively, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are shown in parentheses.

Table A.17: Heterogeneous Effects by Provider Experience (Measured in Days)

	Dependent variable				
	Log length of stay (1)	Log ED cost (2)	Admission (3)	30-day mortality (4)	30-day prevent. hosp. (5)
NP assignment	0.105	0.065	0.225	-0.100	0.263
	(0.045)	(0.029)	(0.623)	(0.117)	(0.123)
NP assignment × experience	-0.031	-0.036	1.098	0.126	0.101
	(0.068)	(0.037)	(1.157)	(0.111)	(0.080)
Experience	-0.015	-0.002	-0.403	-0.022	-0.053
	(0.014)	(0.009)	(0.227)	(0.024)	(0.026)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.608	6.483	16.625	1.247	1.234
S.D. dep. var.	1.161	0.878	37.230	11.099	11.041
Observations	1,110,798	1,108,961	1,118,836	1,118,836	1,118,836

Notes: This table reports heterogeneous effects of NPs by provider general experience measured by the number of days the provider has worked since the start of the study period to the day before the current case's visit. For ease of interpretation, the experience measure is standardized to have a mean of zero and a standard deviation of one for NPs and physicians separately. The outcome variables in Columns 1-5 are, respectively, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are shown in parentheses.

Table A.18: Ten Most Common High-Mortality Diagnoses

ICD code	Description	30-day mortality (%)	Cases	Share
I50	Heart failure	5.56	12,637	0.221
N17	Acute kidney failure	6.47	4,278	0.075
R41	Other symptoms and signs involving cognitive functions and awareness	7.59	3,872	0.068
D64	Other anemias	5.01	3,634	0.064
I21	Acute myocardial infarction	7.50	3,162	0.055
A41	Other sepsis	11.51	2,754	0.048
J15	Bacterial pneumonia, not elsewhere classified	5.12	2,715	0.047
J96	Respiratory failure, not elsewhere classified	12.99	2,548	0.045
F03	Unspecified dementia	5.40	1,427	0.025
R62	Lack of expected normal physiological development in childhood and adults	16.55	1,033	0.018

Notes: This table summarizes the 10 most common three-digit diagnosis codes in the group of diagnoses with a 30-day mortality rate equal to or above the 95th percentile of the sample. The columns report, from the leftmost to the rightmost, the three-digit ICD-10 code, description of the code, 30-day mortality rate of cases with the diagnosis code, number of cases in the analysis sample with the diagnosis code, and share of cases with the diagnosis code among all cases with a three-digit diagnosis whose 30-day mortality is equal to or above the 95th percentile of the sample.

Table A.19: Heterogeneous Effects by Patient Characteristics

	Dependent variable				
	Log length of stay (1)	Log ED cost (2)	Admission (3)	30-day mortality (4)	30-day prevent. hosp. (5)
Panel A: Elixhauser comorbidity count					
1st quartile	0.042	0.028	-0.077	-0.147	0.555
	(0.045)	(0.032)	(0.636)	(0.120)	(0.119)
2nd quartile	0.063	0.071	0.291	-0.041	0.438
	(0.044)	(0.030)	(0.642)	(0.126)	(0.132)
3rd quartile	0.117	0.082	-0.245	-0.099	0.250
	(0.048)	(0.031)	(0.761)	(0.178)	(0.186)
4th quartile	0.281	0.122	0.435	-0.203	-0.513
	(0.066)	(0.041)	(1.476)	(0.340)	(0.347)
Panel B: Diagnosis predicted 30-day mortality					
$<$ 95th percentile	0.080	0.064	-0.768	-0.077	0.361
	(0.044)	(0.029)	(0.573)	(0.110)	(0.118)
$\geq$ 95th percentile	0.988	0.247	26.140	-1.253	-2.989
	(0.239)	(0.115)	(7.829)	(2.127)	(1.492)
Panel C: Diagnosis category					
Stroke	1.863	0.651	72.609	3.373	-0.062
	(0.677)	(0.311)	(31.758)	(6.038)	(2.379)
AMI	0.806	1.780	123.007	-11.517	-3.219
	(0.562)	(0.655)	(62.695)	(9.684)	(7.593)
Sepsis	1.480	0.095	44.880	24.533	11.117
	(0.609)	(0.329)	(24.114)	(15.169)	(7.961)
Heart failure	1.125	0.088	20.263	1.262	-11.469
	(0.292)	(0.177)	(8.921)	(3.011)	(5.265)
Other	0.097	0.067	-0.343	-0.147	0.332
	(0.045)	(0.029)	(0.578)	(0.112)	(0.122)
Full controls	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	4.608	6.483	16.625	1.247	1.234
S.D. dep. var.	1.161	0.878	37.230	11.099	11.041
Observations	1,110,798	1,108,961	1,118,836	1,118,836	1,118,836

Notes: This table shows heterogeneous effects of NPs by patient characteristics described in Section 5.3. Panel A divides cases into quartiles by their total number of Elixhauser comorbidities, with higher quartiles indicating more complex cases. Panel B divides cases by whether condition severity measured by 30-day mortality of cases with the same three-digit ICD-10 primary diagnosis is equal to or above the 95th percentile of the sample. Panel C divides cases by their condition. The outcomes in Columns 1-5 are, respectively, log length of stay, log cost of the ED visit, hospital admission in the ED visit, 30-day mortality, and 30-day preventable hospitalization. All estimations include the full set of controls described in the notes to Table 2. Standard errors clustered by provider are shown in parentheses.

Table A.20: Variance of Provider Effects on Medical Spending

	NPs	Physicians
Basic estimates	0.0537	0.0643
Split-sample estimates	0.0476	0.0445

Notes: This table reports variance of provider effects on log total spending associated with the ED visit. Total spending associated with the ED visit is computed as the sum of the three main components of costs for which we find significant NP effects: the cost of care at the ED, hospital admission, and 30-day preventable hospitalizations (we multiply the latter two components by the average cost of a hospital stay, $19,220). Row 1 reports variance of provider effects $\hat{\theta}_j$ estimated using Equations (A.4) and (A.5). To account for biases due to estimation noise in $\hat{\theta}_j$, Row 2 reports variance using a split-sample approach (details in Appendix A.4.2). Column 1 reports variance for NPs. Column 2 reports variance for physicians.

Table A.21: Relationship Between z-scores and Standard Errors

	Dependent variable: provider z-score			
	(1)	(2)	(3)	(4)
Provider std. error	0.166	0.203	-0.456	0.085
	(0.434)	(0.348)	(0.385)	(0.471)
Estimation sample	Full	Full	Split	Split
Provider group	NPs	Physicians	NPs	Physicians
Mean dep. var.	0.018	-0.137	0.071	-0.056
S.D. dep. var.	1.332	1.681	1.227	1.537
Mean std. error	0.307	0.226	0.283	0.202
S.D. std. error	0.515	0.206	0.365	0.124
Providers	75	644	64	474
Observations	75	644	128	948

Notes: This table reports coefficients from regressions of provider-specific z-scores on associated standard errors. Columns 1 and 2 report results using z-scores and standard errors estimated in the full sample. Columns 3 and 4 randomly split cases for each provider into two approximately equal-sized partitions and regress z-scores from one partition on standard errors from the other partition, stacking the two partitions in the regressions. Columns 1 and 3 report results for NPs. Columns 2 and 4 report results for physicians. Standard errors clustered by ED are reported in parentheses. The number of unique providers in Columns 1 and 2 are smaller than those reported in Section 2.3 because our deconvolution includes only providers with at least 150 cases (to restrict the inclusion of nosiy provider effect estimates). Columns 3 and 4 have smaller numbers of providers than those in Columns 1 and 2, respectively, because Columns 3 and 4 further drop providers with less than 150 cases in each split sample.

TAB 29

Physicians in Ontario (PIO) Annual Report

Since 1992, The Ontario Physician Reporting Centre (OPRC) has compiled and provided to the Ontario Ministry of Health (MoH) an annual dataset of all actively licensed physicians practicing in Ontario, known as the Physicians In Ontario (PIO) Minimum Dataset or Active Physician Registry (APR). This dataset is designed to be the most accurate and comprehensive source of physician information in Ontario. Using these data OPRC produces reports including the Physicians in Ontario (PIO) Annual

The data in the PIO Annual Report are based on the College of Physicians and Surgeons of Ontario (CPSO) data as of the census date of December 31. Based on this date, physicians who have ceased practice or left the province are removed, new physicians are added, physicians who have returned to practice are flagged, and updated physician location and specialty are integrated from the most reliable and accurate sources for each data element.

Each year OPRC publishes the PIO Annual Report on our website for public access.

Notes about the 2022 Physicians in Ontario Annual Report

Notes for revised 2022 PIO Annual Report (April 2024):

This revised 2022 PIO Annual Report follows a thorough review by our team after internally identifying a data quality issue in December 2023. The PIO team conducted an audit to address inaccuracies and enhance the reliability of the PIO dataset. Process changes have been implemented to prevent similar issues from arising in the future. These measures ensure the integrity of our data moving forward.

In the revised 2022 PIO Annual Report, we have included 488 additional physicians with no alterations to the 33,694 physicians previously reported. For clarification, 715 physicians have been newly included and 227 previously included physicians were removed (715 - 227 = 488).

The revised PIO 2022 report also includes changes to align with certified Royal College of Physicians and Surgeons of Canada specialties:

1. The addition of 'Interventional Radiology', resulting in the recategorization of 28 physicians formerly reported with the specialty 'Diagnostic Radiology'.
2. The renaming of 'Medical Genetics' to 'Medical Genetics and Genomics'.

In an effort to improve access to the data OPRC has made changes to its public reports. Starting with the 2021 Physicians in Ontario Annual Report, we moved from publishing the data in a static, PDF format to interactive Excel workbooks where users can filter and extract aggregated data by Physician gender, age range, specialty and legacy LHIN.

For the 2022 Physicians in Ontario Annual Report we have made improvements on the design of the report tables and added new tables reporting on data grouped using the six Ontario Health (OH) Regions. NOTE: These report tables represent the current aligned Ontario Health (OH) Regions (effective April 1, 2023) in which the OH Toronto, OH Central and OH East Regions were aligned to the City of Toronto municipal boundaries. Data aggregated using these realigned OH Regions are not directly comparable to those based on the legacy OH Regions in place prior to April 1, 2023, or to data aggregated by legacy Local Health

Additional changes to the Report format and content are outlined below.

Active Physician Counts:

Active physicians are identified as currently licensed physicians providing patient care in Ontario for the equivalent of at least 50 days/year for that calendar year.

Active Physician demographic (gender, age range) data split by specialty and legacy LHIN can now be found in Table 2.0 (previously found in sections 1-4 of the PIO Annual Reports). Data split by OH Region can be found be in Table 1.0.

Number of Physicians per 100,000 (PhysPer100K):

The population figures for Physicians by Local Health Integration Network (legacy LHIN) in Ontario 2022 are estimates based on the 2018 Statistics Canada Census Data. At the time of publication population figures for Ontario Health (OH) Regions were not available.

The number of Physicians per 100,000 split by specialty and legacy LHIN can now be found in Table 2.0, these data were previously found in section 5 of the PIO Annual Reports.

Additions and Attritions:

Additions and attritions are determined by comparing the records of individual physicians appearing in the current year and previous year's PIO. Physicians added to the current dataset are those described as "additions" and physicians from the previous year's dataset who are no longer in the current dataset are described as "attritions".

Reasons for Physician Additions and Attritions split by specialty and legacy LHIN can be found in Table 2.1. Demographic data (gender, age range) split by specialty and legacy LHIN for Physician Additions can now be found in Table 2.2, and for Physician Attritions in Table 2.3. These data were previously found in section 6 of the PIO Annual Reports. Data split by OH Region can be found be in Tables 1.1, 1.2, and 1.3.

Specialty Numbers by Census Subdivision:

This report displays the number of Active Physicians (Family Medicine; Specialist) in Ontario split by by Census Division and Census Subdivision.

Previously published as a supplementary report, these data can be found in Table 3.0.

Data Sources

Sources for information used in the PIO Annual Report include the following:

College of Physicians and Surgeons of Ontario (CPSO)
Ontario Health Insurance Plan (OHIP)
OPRC Physician Surveys
OPRC Postgraduate Registry
Previous year's PIO Annual Report
Ontario Ministry of Health Postal Code Conversion File Crosswalk (MoH PCCF Crosswalk file)
OPRC Physician Hospital Appointment Listing (PHAL)
Scott's Medical Database (SMDB)

Stringent agreements covering the confidentiality and use of data are negotiated through Data Sharing Agreements with source organizations. OPRC compiles the Active Physician Registry (APR), which provides the source data for the PIO Annual Reports. OPRC is solely responsible for the content.

OPRC Physician Surveys

The OPRC Physician Survey is a key factor in determining physician activity status, activity type, practice location and functional specialty. Highlighted below are the factors that contribute to which physicians are phoned in any given year.

Annual Surveys: physicians previously on Maternity/Parental leave, Leave of absence, Age 85+, or Semi-retired.
Routine Surveys: physician groups identified for survey every 3 years.
Transition Surveys: new physicians and postgraduate trainees that meet the criteria to be included in PIO.
Discrepancy Surveys: physicians with discrepancies among various data sources.
Target Surveys: physicians needing to be surveyed based on last surveyed date, gender, age group and specialty.

How to cite: Ontario Physician Reporting Centre, 2022 Physicians in Ontario Annual Report - Hamilton, ON: OPRC; revised

Report Index

About PIO Annual Report
About OPRC
Key Data Elements

Data Tables

Ontario Health Regions

1.0 Number of Active Physicians in Ontario by Specialty split by Gender, Age Range, and Ontario Health Region
1.1 Additions and Attritions Reasons by Specialty split by Ontario Health Region
1.2 Additions to the Number of Active Physicians in Ontario by Specialty split by Gender, Age Range, and Ontario Health Region
1.3 Attritions from the Number of Active Physicians in Ontario by Specialty split by Gender, Age Range, and Ontario Health Region

Local Health Integrated Network (legacy LHIN)

2.0 Number of Active Physicians in Ontario by Specialty split by Gender, Age Range, and legacy LHIN
2.1 Additions and Attritions Reasons by Specialty split by LHIN
2.2 Additions to the Number of Active Physicians in Ontario by Specialty split by Gender, Age Range, and legacy LHIN
2.3 Attritions from the Number of Active Physicians in Ontario by Specialty split by Gender, Age Range, and legacy LHIN

Census Sub Division and Census Division

3.0 Number of Active Physicians in Ontario by Specialty Type, Census Division, and Census Subdivision (CSD)

Variable Tables

Specialty
Gender
Age Range
Additions
Attritions
OH Regions
LHIN

TAB 20

NEWS RELEASE

Ontario Helping Family Doctors Put Patients before Paperwork

Initiatives will save doctors 95,000 hours that can now be spent caring for people

April 24, 2024

Health

Public and Business Service Delivery

Labour, Immigration, Training and Skills Development

TORONTO —The Ontario government is taking further action to help family doctors and other primary care providers spend more time with their patients and less time on paperwork.

“Our government is making common sense changes that will reduce the administrative burden on family doctors so that they can spend more time caring for patients instead of doing duplicative or unnecessary paperwork,” said Sylvia Jones, Deputy Premier and Minister of Health.

The government will allow primary care providers to spend more time with patients by making changes that encourage employers to use other tools instead of sick notes, such as attestations, that will help maintain accountability as employees request time off sick. The province is also expanding an innovative program to more than 150 primary care providers that safely uses artificial intelligence to automatically summarise or transcribe conversations with patients who consent into electronic medical notes. This will result in a better patient experience and more accurate records.

These initiatives, in addition to other changes aimed at putting patients over paperwork, will free up to 95,000 hours annually for physicians to put back into their practices caring for patients, including:

- **“Axe the fax”** to replace fax machines over the next few years to speed up diagnosis, referrals and treatments while improving the privacy of patient’s health information.
- **Expanding eServices** to digitize more referral and consultation forms so they can be conveniently shared electronically in a timely manner to obtain specialist

advice, often eliminating the need for an in-person specialist visit entirely.
- **Improving the eForms platform** to use more digital tools that make it convenient for providers to autofill and share forms.
- Working with the Ontario Medical Association (OMA) to streamline and simplify **12 key government medical forms** that are burdensome, as well as digitizing and integrating more forms into electronic medical records.
- Accelerating the expansion of the **centralized waitlist program** for surgical and diagnostic services that will take the guesswork out of the referral process and provide faster access to care for patients.

Cutting unnecessary paperwork like sick notes and streamlining note taking during patient appointments are more ways that the Ontario government, through Your Health: A Plan For Connected and Convenient Care, is making it easier and faster for people to connect to the care they need, where and when they need it.

Quick Facts

- AI scribes will only be used during a visit if the patient gives their consent, and the privacy of patient health information will continue to be protected under the *Personal Health Information Protection Act, 2004*.
- Research shows using medical scribes reduced the time doctors spent on after-hours documentation by up to 50 per cent and helped clinicians see an additional 12 patients per month.
- Across government and in collaboration with the Ontario Medical Association, the government is reviewing key forms to streamline and simplify them, minimize any duplication, and identify opportunities for digital solutions.
- According to the Ontario Medical Association, family doctors spend 19 hours per week on administrative tasks, including four hours writing notes or completing forms for patients.
- Most employees have the right to take up to three days of unpaid job-protected sick leave each calendar year due to a personal illness, injury or medical emergency. Proposed changes would prohibit employers from requiring sick notes from a qualified health practitioner in order for employees to take their entitled leave. Employers maintain the ability to require reasonable evidence from an employee that they were sick, such as an attestation or declaration.

Quotes

"OntarioMD is very proud to be leading this innovative evaluation of AI scribe technology. It is critical that we test new technologies to make sure they meet the needs of Ontario patients and doctors. Artificial Intelligence based technology has tremendous potential to support our healthcare system and this study will review the clinical, legal and privacy implications to ensure it best addresses system needs."

- Dr. David Daien

OntarioMD & Primary Care Doctor at Summerville Family Health Team

"The OCFP welcomes the government's commitments to reduce administrative burden through ongoing efforts, including piloting AI scribes and eliminating sick notes. Eliminating unnecessary sick notes is an important change for which the Ontario College of Family Physicians has advocated. While we know that much more needs to be done to address the administrative issues that take up to 19 hours a week, this is an important step to ensure that more Ontarians can see their family doctor. We remain committed to continuing to work with the Ontario government on solutions to ensure that family doctors have the support they need to help ensure every Ontarian has access to a family doctor."

- Dr. Mekalai Kumanan

President, Ontario College of Family Physicians

"Using an AI Scribe has allowed me to focus more on listening to a patient's concerns and working collaboratively to develop a management plan. It has significantly reduced the burden of documentation so I can serve my patients better. Primary Care Providers need these types of supports so they can spend more time with patients."

- Mohamed Alarakhia

Family Physician and CEO of the eHealth Centre of Excellence

"Our government is putting patients before paperwork and tackling the red tape burden for healthcare workers by proposing legislation to prohibit employers from requiring a sick note for a worker's job-protected sick leave. This will complement the Workplace Safety and Insurance Board's efforts to collaborate with health sector organizations as they explore additional measures to reduce the administrative burden for sick or injured workers and healthcare professionals."

- David Piccini

Minister of Labour, Immigration, Training and Skills Development

"AI has the potential to transform vital programs and services to better serve the people of Ontario. We are leading the way in strengthening the guidance for using AI responsibly across the government and broader public sector to protect privacy and personal information and enhance online security."

- Todd McCarthy

Minister of Public and Business Service Delivery

"Reducing the administrative burden of Ontario's physicians is critical in improving our health-care system, and today's announcement is a positive step forward. We encourage government to continue taking action, making the investments necessary and working with OMA every step of the way, to build the health-care system Ontarians deserve."

- Dr. Andrew Park

Ontario Medical Association

Additional Resources

- Your Health: A Plan for Connected and Convenient Care
- Your Health, Your Results
- Guide to the Employment Standards Act: Sick Leave
- Ontario Continues to Cut Red Tape to Improve Services and Save Businesses Time and Money

Related Topics

Government

Learn about the government services available to you and how government works. Learn more

Health and Wellness

Get help navigating Ontario's health care system and connecting with the programs or services you're looking for. Learn more

Media Contacts

Hannah Jensen
Minister Jones' Office
Hannah.R.Jensen@ontario.ca

Anna Miller
Communications Branch
media.moh@ontario.ca
416-314-6197

Accessibility

Privacy

© King's Printer for Ontario, 2012-2024

TAB 31

Work absence of full-time employees by public and private sector, annual[1, 2, 3]

Frequency: Annual

Table: 14-10-0196-01 (formerly CANSIM 279-0035)

Release date: 2024-01-05

Geography: Canada

Help

Save my customizations

▼ Customize table

Sex : Both sexes

Work absence statistics :

Total days lost per worker in a year

Reference period

From: 2015

To: 2023

Apply

Add/Remove data

Download options

Showing 2 records

Filter

Reset

Sex	Both sexes								
Work absence statistics	Total days lost per worker in a year[4]								
Geography[5]	Canada (map)								
Public and private sector	2015	2016	2017	2018	2019	2020	2021	2022	2023
	Days								
Public sector[6]	13.0	13.8	13.9	15.1	14.7	15.3	14.8	16.7	
Private sector[7]	8.0	8.6	8.7	9.0	9.1	10.5	9.9	10.9	

How to cite: Statistics Canada. Table 14-10-0196-01 Work absence of full-time employees by public and private sector, annual
DOI: https://doi.org/10.25318/1410019601-eng

TAB 32

Population Grouping Methodology

Open section menu +

CIHI's Population Grouping Methodology (POP Grouper) builds clinical and demographic profiles for each person in a population. These profiles help predict the population's health care needs and costs.

Overview of the methodology

The POP Grouper, launched in 2016, was developed by CIHI using Canadian clinical and cost data from a range of health care services to meet the needs of Canada's health care systems.

The POP Grouper contains a case-mix classification that profiles each person in the population using person-level demographic and clinical information. These profiles are then used to help predict the population's health care needs and costs. All persons in the population over a given time period, including healthy persons and persons who have not used the health system, are represented in the POP Grouper. Find out more about the POP Grouper, including its software and input data requirements:

- POP Grouper (video)
- POP Grouper overview (PDF)
- POP Grouper condensed methodology notes (PDF)

Accessing the methodology

The POP Grouper product consists of methodology notes, computer software that applies the methodology, a user guide for running the computer software and a licence agreement outlining how the software can be used. The POP Grouper is updated as needed to reflect changes to Canada's health care systems and tools used to collect health information. For more information, including how to access the methodology and client support, please write to casemix@cihi.ca (mailto:casemix@cihi.ca).

Methodology in action

Since its inception in 2016, the POP Grouper has been used in most jurisdictions in Canada to support health system decision-making. Health system planners at the provincial/territorial, regional and facility levels can use the POP Grouper to

- Monitor population health and diseases across time and geography
- Predict future health care costs and use of health services to inform service and health human resources planning
- Identify, profile and better understand high-cost users
- Explore multi-morbidity and its impact on future service needs
- Explain variations in health care resource use by any segment imaginable, including age/sex, socio-demographic variations, geography and disease cohort

Find out more about the POP Grouper's outputs and its potential applications:

- POP Grouper in Action (PDF)

Education materials

- CIHI's Population Grouping Methodology — From the Nuts and Bolts to Applying the Outputs

Contact us

Contact us at this email address:

casemix@cihi.ca (mailto:casemix@cihi.ca)

How to cite:

Canadian Institute for Health Information. Population Grouping Methodology (/en/submit-data-and-view-standards/methodologies-and-decision-support-tools/case-mix/population). Accessed May 29, 2024.

TAB 33

American Society of Anesthesiologists®

Statement on ASA Physical Status Classification System

Developed By: *Committee on Economics*
Last Amended: *December 13, 2020 (original approval: October 15, 2014)*

The ASA Physical Status Classification System has been in use for over 60 years. The purpose of the system is to assess and communicate a patient's pre-anesthesia medical co-morbidities. The classification system alone does not predict the perioperative risks, but used with other factors (eg, type of surgery, frailty, level of deconditioning), it can be helpful in predicting perioperative risks.

The definitions and examples shown in the table below are guidelines for the clinician. To improve communication and assessments at a specific institution, anesthesiology departments may choose to develop institutional-specific examples to supplement the ASA-approved examples.

Patient physical status at a glance.

For more than 60 years, the ASA Physical Status Classification System has helped guide clear communication and better patient care. Gain access to the full range of ASA resources and help advocate for improved patident safety.

JOIN ASA TODAY ›

Assigning a Physical Status classification level is a clinical decision based on multiple factors. While the Physical Status classification may initially be determined at various times during the

preoperative assessment of the patient, the final assignment of Physical Status classification is made on the day of anesthesia care by the anesthesiologist after evaluating the patient.

Current Definitions and ASA-Approved Examples

ASA PS Classification	Definition	Adult Examples, Including, but not Limited to:	Pediatric Examples, Including but not Limited to:	Obstetric Examples, Including but not Limited to:
ASA I	A normal healthy patient	Healthy, non-smoking, no or minimal alcohol use	Healthy (no acute or chronic disease), normal BMI percentile for age	
ASA II	A patient with mild systemic disease	Mild diseases only without substantive functional limitations. Current smoker, social alcohol drinker, pregnancy, obesity (30<BMI<40), well-controlled DM/HTN, mild lung disease	Asymptomatic congenital cardiac disease, well controlled dysrhythmias, asthma without exacerbation, well controlled epilepsy, non-insulin dependent diabetes mellitus, abnormal BMI percentile for age, mild/moderate OSA, oncologic state in remission, autism with mild limitations	Normal pregnancy*, well controlled gestational HTN, controlled preeclampsia without severe features, diet-controlled gestational DM.
ASA III	A patient with severe systemic disease	Substantive functional limitations; One or more moderate to severe diseases. Poorly controlled DM or HTN, COPD, morbid obesity (BMI ≥40), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of ejection fraction, ESRD undergoing regularly scheduled dialysis, history (>3 months) of MI, CVA, TIA, or CAD/stents.	Uncorrected stable congenital cardiac abnormality, asthma with exacerbation, poorly controlled epilepsy, insulin dependent diabetes mellitus, morbid obesity, malnutrition, severe OSA, oncologic state, renal failure, muscular dystrophy, cystic fibrosis, history of organ transplantation, brain/spinal cord malformation, symptomatic hydrocephalus, premature infant PCA <60 weeks, autism with severe limitations, metabolic disease, difficult airway, long term parenteral nutrition. Full term infants <6 weeks of age.	Preeclampsia with severe features, gestational DM with complications or high insulin requirements, a thrombophilic disease requiring anticoagulation.
ASA IV	A patient with severe systemic disease that is a constant threat to life	Recent (<3 months) MI, CVA, TIA or CAD/stents, ongoing cardiac ischemia or severe valve dysfunction, severe reduction of ejection fraction, shock, sepsis, DIC, ARD or ESRD not undergoing regularly scheduled dialysis	Symptomatic congenital cardiac abnormality, congestive heart failure, active sequelae of prematurity, acute hypoxic-ischemic encephalopathy, shock, sepsis, disseminated intravascular coagulation, automatic implantable cardioverter-defibrillator, ventilator dependence, endocrinopathy, severe trauma, severe respiratory distress, advanced oncologic state.	Preeclampsia with severe features complicated by HELLP or other adverse event, peripartum cardiomyopathy with EF <40, uncorrected/decompensated heart disease, acquired or congenital.

ASA V	A moribund patient who is not expected to survive without the operation	Ruptured abdominal/thoracic aneurysm, massive trauma, intracranial bleed with mass effect, ischemic bowel in the face of significant cardiac pathology or multiple organ/system dysfunction	Massive trauma, intracranial hemorrhage with mass effect, patient requiring ECMO, respiratory failure or arrest, malignant hypertension, decompensated congestive heart failure, hepatic encephalopathy, ischemic bowel or multiple organ/system dysfunction.	Uterine rupture.
ASA VI	A declared brain-dead patient whose organs are being removed for donor purposes			

** Although pregnancy is not a disease, the parturient' s physiologic state is significantly altered from when the woman is not pregnant, hence the assignment of ASA 2 for a woman with uncomplicated pregnancy.*
***The addition of "E" denotes Emergency surgery: (An emergency is defined as existing when delay in treatment of the patient would lead to a significant increase in the threat to life or body part)*

References

For more information on the ASA Physical Status Classification system and the use of examples, the following publications are helpful. Additionally, in the reference section of each of the articles, one can find additional publications on this topic.

1. Abouleish AE, Leib ML, Cohen NH. ASA provides examples to each ASA physical status class. *ASA Monitor* 2015; 79:38-9 http://monitor.pubs.asahq.org/article.aspx?articleid=2434536
2. Hurwitz EE, Simon M, Vinta SR, et al. Adding examples to the ASA-Physical Status classification improves correct assignments to patients. *Anesthesiology* 2017; 126:614-22
3. Mayhew D, Mendonca V, Murthy BVS. A review of ASA physical status – historical perspectives and modern developments. Anaesthesia 2019; 74:373-9
4. Leahy I, Berry JG, Johnson C, Crofton C, Staffa S, Ferrari LR. Does the Current ASA Physical Status Classification Represent the Chronic Disease Burden in Children Undergoing General Anesthesia? Anesthesia & Analgesia, October 2019;129(4):1175-1180
5. Ferrari L, Leahy I, Staffa S, Johnson C, Crofton C, Methot C, Berry J. One Size Does Not Fit All: A Perspective on the American Society of Anesthesiologists Physical Status Classification for Pediatric Patients. Anesthesia & Analgesia, June 2020;130(6):1685-1692
6. Ferrari LR, Leahy I, Staffa SJ, Berry JG. The Pediatric Specific American Society of Anesthesiologists Physical Status Score: A Multi-center Study. Anesth Analg 2021 March; 132:807-817. PMID: 32665468

Last updated by: Governance

Date of last update: December 13, 2020

TAB 34

RESEARCH PAPER

Productivity Decline or Administrative Avalanche? Examining Factors That Shape Changing Workloads in Primary Care

Baisse de productivité ou avalanche administrative? Examen des facteurs qui façonnent l'évolution des charges de travail en soins primaires

RUTH LAVERGNE, PhD
Associate Professor
Tier II Canada Research Chair in Primary Care
Department of Family Medicine
Dalhousie University
Halifax, NS

SANDRA PETERSON, MSc
Research Analyst
Centre for Health Services and Policy Research
University of British Columbia
Vancouver, BC

DAVID RUDOLER, PhD
Associate Professor
Faculty of Health Sciences
Ontario Tech University
Oshawa, ON
Associate Professor
Ontario Shores Centre for Mental Health Sciences
Whitby, ON

IAN SCOTT, MBCHB, MSc
Professor
Department of Family Practice
University of British Columbia
Director
Centre for Health Education Scholarship
Vancouver, BC

RITA McCRACKEN, MD, PhD
Assistant Professor
Department of Family Practice
University of British Columbia
Vancouver, BC

GOLDIS MITRA, MD
Clinical Assistant Professor
Department of Family Practice
University of British Columbia
Vancouver, BC

ALAN KATZ, MBCHB, MSc
Professor
Department of Family Medicine
University of Manitoba
Professor
Department of Community Health Sciences
University of Manitoba
Winnipeg, MB

Abstract

Background: In Canada, family physicians (FPs) per capita have increased but so have access challenges. We explored changes in population characteristics, service delivery and FP practice that may help understand these trends.

Methods: We used linked administrative data in British Columbia to describe changes in patient ages and comorbidities, hospitalizations and receipt of services that may require FP coordination, review and/or follow-up: prescriptions dispensed, laboratory tests, diagnostic imaging (radiology and ultrasound), specialist visits and emergency department visits. We estimate the number of FPs delivering community-based comprehensive care and report changes in service volume per community-based FP visit.

Results: Between 1999/2000 and 2017/2018, people experienced fewer days in hospital, but the number of treated comorbidities, day surgeries and other services requiring FP coordination increased over and above the expected levels attributed to population aging. While the total number of FPs per capita have increased, numbers in community-based care have not and visits per physician have fallen. Increases in services that may involve FP coordination per community-based FP visit ranged from 32.2% for diagnostic radiology to 122.1% for lab tests.

Conclusion: Findings suggest substantially increased coordination workload per FP visit. Ongoing impacts of population aging and changing service delivery on primary care workload require further examination.

Résumé

Contexte : Au Canada, le nombre de médecins de famille (MF) par habitant a augmenté, mais il y a des problèmes d'accès. Nous avons examiné les changements dans les caractéristiques de la population, la prestation des services et les pratiques des MF qui pourraient aider à comprendre ces tendances.

Méthode : Nous avons utilisé des données administratives couplées en Colombie-Britannique pour décrire les changements dans l'âge et la comorbidité des patients, les hospitalisations et les services qui peuvent nécessiter une coordination, un examen ou un suivi de la part du MF, à savoir, les ordonnances, les tests de laboratoire, l'imagerie diagnostique (radiologie et échographie), les consultations auprès des spécialistes et les visites aux urgences. Nous estimons le nombre de MF qui offrent des soins communautaires complets et signalons les changements dans le volume de services par visite chez le MF communautaire.

Résultats : Entre 1999/2000 et 2017/2018, les personnes ont passé moins de jours à l'hôpital, mais le nombre de comorbidités traitées, de chirurgies d'un jour et d'autres services qui nécessitent une coordination de la part du MF a augmenté au-delà des niveaux prévus attribués au vieillissement de la population. Bien que le nombre total de MF par habitant ait augmenté, la quantité de soins communautaires n'a pas augmenté et le nombre de visites par médecin a

diminué. L'augmentation des services pouvant nécessiter une coordination de la part du MF communautaire allait de 32,2 % pour la radiologie diagnostique à 122,1 % pour les tests de laboratoire.
Conclusion : Les constatations indiquent une augmentation substantielle de la charge de travail de coordination par visite chez le MF. Les répercussions continues du vieillissement de la population et de l'évolution de la prestation des services sur la charge de travail des soins primaires nécessitent un examen plus approfondi.

Introduction

Family physicians (FPs) and other primary care providers offer first-contact access to care and coordinate services received elsewhere. Despite an increasing per capita supply of FPs (CIHI 2021a), access to primary care remains a challenge for many patients (CIHI 2021b). This is, in part, explained by declining patient visits from FPs across all career stages (Rudoler et al. 2022). Declining visit volume has been observed in other specialties as well (Lee et al. 2021) and may reflect occupational and personal factors including changes in compensation, job satisfaction and responsibilities outside medicine. Yet, FPs are also reporting high levels of workplace stress (Sovran et al. 2020). Changes in the demands on FPs from patients and due to system factors could also be contributing to declining visits.

Population aging has been a topic of decades-long discussion in health services planning (Chappell and Hollander 2011). Due to the gradual nature of changes in population age, compression of morbidity and changes in care provision that reduce the length of resource-intensive hospital stays, it has largely been accepted that the impact of aging on health system demand may be modest relative to impacts of technologies and increased medical interventions (Barer et al. 1995; CIHI 2011; Chappell and Hollander 2011). However, a shift in services from hospital to the community may mean aging impacts primary care differently from the acute sector. While some related work has been done in other countries (Colwill et al. 2008; Petterson et al. 2012), there is a substantial gap in Canadian health workforce planning (Watson et al. 2005). In addition, changes in the medical management of chronic conditions that are more common in older ages may mean that the time and care processes (e.g., laboratory testing, prescribing, imaging and referrals) required to manage these chronic conditions have increased due to both aging and the increasing care interventions available for these chronic conditions (Adams et al. 2002; Korownyk et al. 2017; Mangin et al. 2007; Millar et al. 2018). Finally, FPs are playing new and needed roles within the health system, such as delivering hospitalist care, managing treatment for substance use disorders, working with mental health teams and filling other niches of focused practice (Kabir et al. 2021). These expanded roles for FPs outside of community-based comprehensive care have not yet been factored into primary care workforce planning.

The impact of population aging, complexity, the shift in care between hospital and the community, requirements for care coordination and new FP roles on visit volume at the

population level have not been explored in previous analyses of changing physician practice patterns (Lee et al. 2021; Rudoler et al. 2022). To better understand observations of declining visit volume, we conducted this secondary analysis as part of a broader study of changing physician practice patterns (Lavergne et al. 2019; Rudoler et al. 2022). We use population-based linked data to describe aging, the complexity of care and changes in patterns of service use within age groups over time. Our goal is to understand how these factors may affect the availability of patient visits with FPs offering comprehensive care. We focus on changes in service volume between hospital and community and the processes of care that require coordination, review and/or administration on the part of FPs. These indirect patient care activities require actions or reviewing the actions of other providers in the service of care and include managing prescriptions, lab tests, specialist visits and emergency department (ED) visits (Lee et al. 2021). We then describe the FP population, estimate the number of FPs likely to be delivering community-based comprehensive care and report on changes in service volume per community-based FP visit.

Methods

Study setting

We used primary care administrative data in the province of British Columbia (BC). Though there have been efforts to include more nurse practitioners in primary care, over the study period, primary care was almost exclusively delivered by FPs. In 2017/2018, a total of 327 nurse practitioners submitted shadow billings, which may reflect activity in primary care, representing only 1.15% of recorded patient contacts. Unlike other provinces, remuneration to physicians in BC remains almost entirely fee for service, with a small number of practices on alternate payment plans required to submit complete shadow-billing information. It is also possible to track prescriptions dispensed and lab tests performed in the community, for the complete population. BC, therefore, offers a unique opportunity to explore factors that may be driving changes in primary care workload.

Data

We use linked data accessed through Population Data BC covering all people registered for BC's provincial health insurance (Medical Services Plan [MSP]) and all FPs who submitted claims to MSP in 1999/2000 and 2017/2018. This includes data on all people registered for provincial health insurance (BC Ministry of Health 2019a); MSP payments to primary care physicians and specialists (including laboratory tests) (BC Ministry of Health 2019b); records of hospitalizations (CIHI 2019a) and ED visits (CIHI 2019b); and records of all prescriptions dispensed (BC Ministry of Health 2019c). Physician demographic and training information were obtained from the College of Physicians and Surgeons of BC (BC Ministry of Health 2018). Access to data provided by the data steward(s) is subject to approval but can be requested for research projects through the data steward(s) or their designated service

providers. All inferences, opinions and conclusions drawn in this publication are those of the author(s) and do not reflect the opinions or policies of the data steward(s).

Study population

We included all patients registered for MSP in the study years and all FPs licensed to bill under MSP. To include only fully trained FPs in active practice, we excluded those with fewer than 100 patient contacts within the year, who billed on fewer than 50 days, who had a missing year of graduation or who were less than two years from completing an MD.

PATIENT CHARACTERISTICS

Age was obtained from the BC MSP registration file. We used the Charlson Comorbidity Index (CCI) to measure the number of comorbidities (e.g., diabetes, heart failure, chronic obstructive pulmonary disease, liver disease, stroke, dementia) patients were treated for within each year. The CCI was generated using International Classification of Diseases [ICD]-9 and -10 CA codes from both outpatient and in-patient service use (Quan et al. 2011).

SERVICE USE

- *Hospitalizations*: We counted the number of discharges recorded in the discharge abstract database within each year for each patient, not counting hospital transfers. We also counted the number of days in hospital and the number of day surgery procedures.
- *Number of prescriptions dispensed*: We counted the number of different drugs dispensed per year, at the level of the first five digits of the Anatomical Therapeutic Chemical code. We excluded vaccines (J07), vitamins (A11), mineral supplements (A12), tonics (A13) and various (V) categories. We considered reporting both total prescriptions and only those ordered by FPs. We reported the total as FPs have a role in managing all prescriptions.
- *Laboratory tests*: We counted the lab tests ordered per patient (unique combinations of patient, fee item, date and ordering physician), excluding base fees, payable in addition to individual lab tests (MSP fee items 91000, 91005, 91010). As with prescriptions, we reported all laboratory tests as FPs have a role in monitoring results.
- *Imaging*: We counted imaging services per patient (unique combinations of patient, fee item and date) corresponding to diagnostic radiology (service code 90 excluding interventional radiology) and diagnostic ultrasound (service code 91). We excluded fee items billed on the same day as records of day surgeries. Imaging is not recorded in billing records if performed on in-patients.
- *Specialist physician visits*: We counted specialist visits as unique combinations of patient, provider and date, regardless of the number of fee items billed. We distinguish medical and surgical specialist visits based on claim specialty.
- *ED visits*: We counted MSP claims with a service location in the ED or corresponding to

fee items billed only in the ED (Peterson et al. 2021) or where a patient was hospitalized with entry via ED.

- *Ambulatory primary care visits*: We counted primary care visits as unique combinations of patient, provider and date, regardless of the number of fee items billed. We included visits in physicians' offices, homes, long-term care and synchronous virtual visits (available in BC since 2014). We excluded visits that took place in the ED or hospital, as well as visits related to opiate agonist treatment (fee item 00039) as these are high-frequency billings, and guidelines changed over the study period.

PHYSICIAN CHARACTERISTICS

We sought to distinguish between physicians in comprehensive community-based practice and those who practice mainly in other settings or focused practice areas. We classified physicians who had 80% or more of their visits in hospital or the ED or in specific service areas (surgical assistance, anesthesiology, perinatal care, mental health and substance use, cancer care and musculoskeletal/sports medicine) as *not* in comprehensive community practice. These physicians are described in the Appendix 1: Table A1 (available online at longwoods.com/content/27152). The choice of 80% was intended to reflect that FPs structure practice in different ways, and 80% allows for the situations where physicians practise a day or more per week in comprehensive care while doing other activities. To confirm this choice, we explored physician characteristics based on different thresholds (Appendix 1: Tables A2 and A3, available online at longwoods.com/content/27152). The majority of physicians classified as not in comprehensive community practice in our analysis actually have 90–100% of contacts in a focused practice setting or areas. This means changes in the threshold would not substantially change findings.

We described the characteristics of these two groups using data from the College of Physicians and Surgeons of BC and MSP billing data. Physician age, self-identified gender (though only binary options are provided), years since MD and location of MD training (Canadian vs. International Medical Graduate) were obtained from the College of Physicians and Surgeons of BC. An urban/rural practice setting was assigned based on the Statistics Canada metropolitan influence zone of residence for patients seen by an FP. Physicians are categorized as practising in an urban setting if the majority of their patient contacts were with patients from "zones 1–3" and in a "rural" setting if most contacts occurred in "zones 4–7" (Statistics Canada 2018).

ANALYSIS

We present mean services used and percentage changes between 1999/2000 and 2017/2018 by patient age group and summarize descriptive characteristics of community-based and other FPs in both years, reporting *n* (%) and mean (SD) as appropriate. We report changes in total service use across the whole population per capita and per community-based FP visit.

Results

The population has grown most rapidly in older age groups, with the percentage of the population ages 60 and older increasing by over 80% between 1999/2000 and 2017/2018 (Table 1). The average number of CCI comorbidities people are treated for increased over time in all age groups except for the age group of 0–19 years. The largest increase was among people aged 60–79 years (26.6%) and 80 years and older (58.7%). Both the number of hospitalizations and days in hospital declined over time across all age groups (Table 1).

TABLE 1. Percentage change in population and mean CCI comorbidities, hospitalizations and day surgeries between 1999/2000 and 2017/018 by age group

Population characteristics and service use	0–19	20–39	40–59	60–79	80+	Total
Population (*n*, %)						
1999/2000	1,059,509 (26.3)	1,172,139 (29.1)	1,108,947 (27.6)	554,617 (13.8)	126,217 (3.1)	4,021,429
2017/2018	1,060,012 (20.9)	1,378,338 (27.2)	1,401,213 (27.6)	1,007,383 (19.8)	228,405 (4.5)	5,075,351
Change %	0.0474%	17.6%	26.4%	81.6%	81.0%	26.2%
Comorbidities						
1999/2000	0.103	0.118	0.218	0.532	0.804	0.229
2017/2018	0.080	0.119	0.290	0.674	1.276	0.346
Change %	-21.8%	0.7%	33.0%	26.6%	58.7%	51.2%
Hospitalizations						
1999/2000	0.074	0.081	0.070	0.188	0.350	0.099
2017/2018	0.065	0.061	0.052	0.124	0.310	0.083
Change %	-12.3%	-24.7%	-24.9%	-33.8%	-11.4%	-16.1%
Days in hospital						
1999/2000	0.260	0.337	0.430	1.762	5.074	0.688
2017/2018	0.240	0.261	0.357	1.083	3.746	0.603
Change %	-7.5%	-22.8%	-17.2%	-38.6%	-26.2%	-12.3%
Day surgeries						
1999/2000	0.025	0.045	0.072	0.154	0.144	0.065
2017/2018	0.019	0.036	0.093	0.210	0.163	0.088
Change %	-21.5%	-19.8%	30.2%	35.7%	12.7%	35.8%

CCI = Charlson Comorbidity Index.

Day surgeries and prescriptions increased over time among people aged 40 years and older but declined among younger age groups (Table 2). Lab tests increased across all age groups but notably by 72.1% among people aged 40–59 years, 65.1% among people aged 60–79 years and 87.0% among people aged 80 years and older. Diagnostic radiology fell among people under 60 years, but increased by 33.8% among people aged 80 years and older. Diagnostic ultrasound increased among all age groups, but the greatest increases were among people aged 80 years and over (61.8%). Surgical specialist visits increased over time among people aged 40 years and older, and medical specialist and ED visits increased across all ages. Primary care visits have declined among all age groups, with the smallest declines among people aged 80 years and older (-3.7%).

TABLE 2. Mean service use and percentage change between 1999/2000 and 2017/2018 by age group

Service use	0–19	20–39	40–59	60–79	80+	Total
Prescriptions						
1999/2000	1.172	1.894	2.591	4.564	5.780	2.386
2017/2018	0.958	1.743	2.810	4.830	6.772	2.713
Change %	-18.3%	-8.0%	8.5%	5.8%	17.2%	13.7%
Lab tests						
1999/2000	1.338	3.665	5.487	10.234	10.446	4.673
2017/2018	1.787	5.624	9.441	16.897	19.536	8.740
Change %	33.6%	53.4%	72.1%	65.1%	87.0%	87.0%
Diagnostic radiology						
1999/2000	0.174	0.273	0.517	0.895	0.813	0.417
2017/2018	0.142	0.214	0.505	0.948	1.088	0.464
Change %	-18.8%	-21.6%	-2.4%	6.0%	33.8%	11.3%
Diagnostic ultrasound						
1999/2000	0.037	0.160	0.156	0.279	0.243	0.146
2017/2018	0.053	0.221	0.241	0.382	0.393	0.231
Change %	40.9%	38.1%	54.5%	36.7%	61.8%	58.6%
Medical specialist visits						
1999/2000	0.578	0.594	0.997	2.057	2.471	0.962
2017/2018	0.701	0.696	1.180	2.175	2.987	1.227
Change %	21.4%	17.1%	18.4%	5.7%	20.9%	27.7%
Surgical specialist visits						
1999/2000	0.280	0.614	0.786	1.777	2.041	0.779
2017/2018	0.242	0.581	0.858	1.933	2.415	0.938
Change %	-13.8%	-5.4%	9.1%	8.8%	18.3%	20.4%
ED visits						
1999/2000	0.320	0.287	0.229	0.336	0.677	0.299
2017/2018	0.339	0.361	0.341	0.444	0.860	0.390
Change %	6.0%	25.9%	48.7%	32.1%	27.1%	30.5%
FP visits						
1999/2000	3.131	4.158	4.635	7.033	8.246	4.544
2017/2018	2.150	2.967	3.847	5.706	7.945	3.807
Change %	-31.3%	-28.7%	-17.0%	-18.9%	-3.7%	-16.2%

ED = emergency department; FP = family physicians.

We identified a total of 4,330 FPs licensed to bill under MSP in 1999/2000 and 6,219 in 2017/2018. We excluded 529 in 1999/2000 (12.2%) and 578 (9.3%) in 2017/2018 because of exclusion criteria (low volume/missing year of graduation). Between 1999/2000 and 2017/2018, the total number of FPs per capita grew from 9.5 to 11.1 per 10,000 people in BC (Table 3).

TABLE 3. Characteristics of the BC FP workforce in 1999/2000 and 2017/2018

	Community-based physicians		Other FPs	
FP characteristics	**1999/2000**	**2017/2018**	**1999/2000**	**2017/2018**
Number of physicians (percentage of total within a year)	3,573 (94.0)	4,686 (83.1)	228 (6.0)	955 (16.9)
Physicians per 10,000 population	8.9	9.2	0.6	1.9
Physician characteristics (*n*, %)				
Years in practice				
<10	1,000 (28.0)	1,168 (24.9)	68 (29.8)	271 (28.4)
10–19	1,160 (32.5)	975 (20.8)	71 (31.1)	244 (25.5)
20–29	969 (27.1)	1,263 (27.0)	48 (21.1)	260 (27.2)
30+	444 (12.4)	1,280 (27.3)	41 (18.0)	180 (18.8)
Gender				
Women	1,081 (30.3)	2,072 (44.2)	43 (18.9)	336 (35.2)
Men	2,492 (69.7)	2,614 (55.8)	185 (81.1)	619 (64.8)
Urban/rural				
Urban (MIZ 1–3)	3,125 (87.5)	4,051 (86.4)	216 (94.7)	909 (95.2)
Rural (MIZ 4–7)	448 (12.5)	635 (13.6)	12 (5.3)	46 (4.8)
Location of MD				
Canada	2,675 (74.9)	2,939 (62.7)	188 (82.5)	778 (81.5)
International	837 (23.4)	1,635 (34.9)	33 (14.5)	154 (16.1)
Unknown location of MD	61 (1.7)	112 (2.4)	7 (3.1)	23 (2.4)
Service volume within year (mean [SD])				
Days billed	231.9 (64.3)	193.8 (62.7)	169.0 (60.8)	142.4 (47.6)
Unique patients seen in community	1,762.8 (1,086.0)	1,567.3 (1,196.1)	174.4 (328.9)	92.8 (265.4)
Community patient contacts	4,991.1 (2,679.8)	4,047.3 (2,752.5)	347.1 (959.6)	192.9 (662.7)
Community contacts per day billed*	23.0 (8.2)	21.5 (9.3)	5.3 (6.5)	7.9 (8.5)

BC = British Columbia; FP = family physician.
* Only days with community billings are included in the denominator.
Note: 69 other FPs in 1999/2000 and 555 other FPs in 2017/2018 have no days billed in the community and so are not included in this measure.

The number of comprehensive community-based physicians per capita increased only from 8.9 to 9.2 (as the percentage of total FPs fell from 94.0 to 83.1) (Table 3). The age distribution of FPs not working in comprehensive community-based practice also changed. In 2017/2018, a higher percentage of physicians who had been in practice for 20–29 years were not working in community-based practice, compared to 1999/2000. A higher percentage of physicians not in comprehensive community-based practice are men, though differences by physician gender narrowed over time as the percentage of women has increased in both

groups. Over time, higher percentages of physicians in comprehensive community-based practice have had international medical degrees. The percentage of physicians in rural settings has been largely stable. Between 1999/2000 and 2017/2018, the number of days billed fell for both physician groups, as did contacts and patients seen in the community for community-based physicians (Table 3).

Over the period from 1999/2000 to 2017/2018, the number of prescriptions, lab tests, imaging, specialist visits and ED visits per capita have all increased (Table 4). This ranged from an 11.3% increase for diagnostic radiology to an 87.0% increase for lab tests. This corresponds to increases in the volume of care processes requiring coordination per visit with FPs in comprehensive community-based practice ranging from 32.2% for diagnostic radiology to 122.1% for lab tests.

TABLE 4. Changes in service use requiring FP coordination between 1999/2000 and 2017/2018

Service use	Per capita	Per community-based FP visit
Prescriptions		
1999/2000	2.39	0.54
2017/2018	2.71	0.73
Change %	13.7	35.0
Lab tests		
1999/2000	4.67	1.05
2017/2018	8.74	2.34
Change %	87.0	122.1
Diagnostic radiology		
1999/2000	0.417	0.094
2017/2018	0.464	0.124
Change %	11.3	32.2
Diagnostic ultrasound		
1999/2000	0.146	0.033
2017/2018	0.231	0.062
Change %	58.6	88.4
Medical specialist visits		
1999/2000	0.96	0.22
2017/2018	1.23	0.33
Change %	27.6	51.6
Surgical specialist visits		
1999/2000	0.78	0.18
2017/2018	0.94	0.25
Change %	20.4	42.9
ED visits		
1999/2000	0.30	0.07
2017/2018	0.39	0.10
Change %	30.5	55.0

ED = emergency department; FP = family physician.

Discussion

The present study found that, over two decades, the population in BC aged and was treated for more comorbid conditions, while all community-based services requiring FP coordination, such as prescriptions, diagnostic imaging, lab testing and specialist visits, increased. While FPs per capita grew, the proportion in community-based practice fell and measures of service volume decreased. This is consistent with observations of reduced service volume among Canadian physicians documented elsewhere (Lee et al. 2021).

Our observation that adults are being treated for more chronic conditions may be driven by multiple factors. Whether increases in the prevalence of chronic conditions treated reflect changes in true prevalence or health status is unclear (McGrail et al. 2016). It may also reflect that treatments are now available for conditions that were not previously actively managed in primary care (e.g., attention deficit/hyperactivity disorder, hepatitis C), care options have become more numerous and complex (e.g., diabetes care) or there is less stigma in seeking care and, therefore, increased treated prevalence of disease (e.g., mental health disorders) (Childs 2005; McGrail et al. 2016). It is also possible that codes for chronic conditions are being more consistently reported as financial incentives tied to them have been introduced (Lavergne et al. 2016, 2018; McGrail et al. 2016). In addition, our findings underscore a reorientation of the healthcare system toward outpatient care, with hospitalizations falling across all ages and medical specialist visits, ultrasound and ED visits increasing across all ages.

Our findings are also consistent with the phenomenon of increased medicalization of aging as people aged 80 years and older are being treated for over 50% more conditions and have experienced the largest increases in prescription drugs dispensed, lab tests, imaging and specialist visits that are consistent with earlier findings (McGrail et al. 2011). Day surgeries, prescriptions, lab tests and surgical specialist visits increased among people aged 40 years and older, which is also the fastest growing age group within the population. This increased service use is over and above expected levels attributed to population aging and must be considered in planning for system capacity.

Regardless of the drivers of changing service use, increases in services delivered within the community that require FP coordination, oversight or monitoring would be consistent with an increase in FP time spent on both direct and indirect patient care per visit (Ladouceur 2022). The time required for indirect patient care may also be changing. For example, electronic medical records (EMRs) are associated with increased patient care quality and safety, but they have also added data entry tasks for clinicians and increased time spent on indirect patient care (Lee et al. 2021; Payne et al. 2015).

Over the same period, the physician workforce has changed. The number of FPs in community-based practice has plateaued, and the number of FP visits per capita has fallen. Examining physician practice patterns more closely, between 1999/2000 and 2017/2018, the number of days billed fell for both physician groups (Table 3). This may reflect choosing to work fewer days. It may also reflect time spent in other roles, including administration, leadership and research, which would not be reflected in billing data. Community contacts

billed per day increased slightly for physicians not in community practice, but this represents a small fraction of community contacts overall and likely reflects focused rather than comprehensive service delivery. We also note that the number of FPs in active practice based on our data (with 100+ patient contacts and 50+ billing days) is lower than the 6,721 FPs reported to be in BC according to data from the Canadian Institute for Health Information in 2018 (CIHI 2021a). This underscores the importance of analysis like this, which looks at the activity of FPs beyond head counts alone.

Falling visit volumes have previously been interpreted as declining productivity, pointing to evidence of a reverse wage-productivity gap because increasing compensation means physicians reduce service volume as they work to a target income (Lee et al. 2021). Our findings offer an additional explanation as changes in the population, patterns of service use and the FP workforce are consistent with increases in workload per primary care visit, including time spent on indirect patient care. Both explanations may operate simultaneously and are consistent with a shortage of primary care capacity.

Findings point to policy directions in the domains of primary care policy and workforce planning. Firstly, findings reinforce the need for primary care policies that ensure that capacity is aligned with population needs. This may include training more primary care providers, including FPs and nurse practitioners, but could also include organizational reforms that expand the implementation of team-based care models and interventions to streamline the administrative workload for primary care providers (The College of Family Physicians of Canada 2017). Of note, in BC, as in other jurisdictions, reforms described as team-based care include added additional providers (e.g., pharmacists or mental health service providers who can be referred to) within models where an FP still sees the patient, refers and receives reports (McKay et al. 2022). This may expand access to specific services, such as medication reviews or mental health services, but may not change the increasing work of indirect patient care or coordination within primary care. Models of care delivery that include team resources for coordination and indirect patient care are needed (Contandriopoulos et al. 2018). Others have also documented challenges in communication and patient information exchange with sites and providers outside their practices (Sovran et al. 2020). Strategies to both reduce workloads associated with patient coordination (i.e., streamlining specialist referrals and reporting of laboratory results) and develop systems of care where additional personnel support coordination work should be considered.

Secondly, findings underscore a need for more proactive and nuanced workforce planning that includes population aging, patient complexity and changing intensity of service use (over and above expected levels attributed to population aging) alongside physician practice patterns and workforce demographics to provide more accurate estimates of future need and capacity. Projections on the impact of population aging that do not take into account changing patterns of service use among older adults may dramatically underestimate future needs (Colwill et al. 2008; Madsen et al. 2002). The findings also point to the need to include information on the range of roles FPs are playing within health systems,

beyond community-based services. Many physicians may be working as hospitalists, in EDs or in providing care related to mental health and substance use, which respond to system and population needs. Redeploying this workforce would have consequences elsewhere, but these roles for FPs need to be planned proactively. This study complements other research pointing to the need to consider workforce demographics in planning (Rudoler et al. 2022). Taken together, the findings reinforce that provider-to-population ratios alone, particularly when limited to specialty designation without information on the type of practice, are flawed measures of workforce capacity.

A central limitation in this work is that we have no measures for hours worked related to coordination or indirect patient care or for other administrative processes, including practice management and documentation in EMRs. Regardless of the ability to measure time directly, given the substantial increase in the volume of these care processes, our findings underscore the point that strategies that streamline processes and reduce the time required for these activities will likely positively impact the time available for other primary care services. While we only examine two points in time, research examining shifts in visit volume reported elsewhere shows stable and consistent changes over this period (Rudoler et al. 2022). Changes in the compensation model recently announced in BC include an hourly payment, which if applied judiciously, offers new opportunities for future research that examines both work hours and visit volume.

Our data are limited to BC. However, the factors explored, notably population aging, changing comorbidity and changes in how medical care is delivered between hospital and community are not unique to BC. We expect findings to be transferrable to other jurisdictions in Canada and internationally. Our data do not include the COVID-19 pandemic and the accompanying widespread shift to virtual care. These have further strained primary care resources, and future research should examine workload changes in the context of the COVID-19 pandemic and ongoing mitigation. Our data include only FPs as nurse practitioners had limited roles in BC primary care within the study period. As findings describe changes in total primary care workload, they likely also apply to primary care providers without an FP designation. An 80% threshold for identifying physicians in community practice is arbitrary but is consistently applied in both years and does not impact observations of changes over time. This work does not directly estimate likely shortfalls in workforce capacity. Further research should explore how physician demographics, the range of roles FPs now play and changes to population service use can be included in health workforce planning.

Conclusion

Although visits per FP are falling, our observations of an aging population and a shift in service delivery from hospital to the community are consistent with increased workload per FP visit. Efforts to improve the efficiency of coordination work are needed. The future impacts of population aging on primary care workload may be substantial and require further examination.

Correspondence may be directed to Ruth Lavergne by e-mail at ruth.lavergne@dal.ca.

References

Adams, W.L., H.E. McIlvain, N.L. Lacy, H. Magsi, B.F. Crabtree, S.K. Yenny et al. 2002. Primary Care for Elderly People: Why Do Doctors Find It So Hard? *The Gerontologist* 42(6): 835–42. doi:10.1093/geront/42.6.835.

Barer, M.L., R. Evans and C. Hertzman. 1995. Avalanche or Glacier?: Health Care and the Demographic Rhetoric. *Canadian Journal on Aging/La Revue canadienne du vieillissement* 14(2): 193–224. doi:10.1017/S0714980800011818.

British Columbia (BC) Ministry of Health [creator]. 2018. Medical Services Plan Practitioner File. V2. Population Data BC [publisher]. Data Extract. College of Physicians and Surgeons of BC (2019). <http://www.popdata.bc.ca/data>.

British Columbia (BC) Ministry of Health [creator]. 2019a. Consolidation File (MSP Registration & Premium Billing). V2. Population Data BC [publisher]. Data Extract. MOH (2019). <http://www.popdata.bc.ca/data>.

British Columbia (BC) Ministry of Health [creator]. 2019b. Medical Services Plan (MSP) Payment Information File. V2. Population Data BC [publisher]. Data Extract. MOH (2019). <http://www.popdata.bc.ca/data>.

British Columbia (BC) Ministry of Health [creator]. 2019c. PharmaNet. V2. Population Data BC [publisher]. Data Extract. Data Stewardship Committee (2019). <http://www.popdata.bc.ca/data>.

Canadian Institute for Health Information (CIHI). 2011. *Health Care in Canada, 2011: A Focus on Seniors and Aging*. Retrieved July 20, 2023. <https://publications.gc.ca/collections/collection_2011/icis-cihi/H115-15-2011-eng.pdf>.

Canadian Institute for Health Information (CIHI) [creator]. 2019a. Discharge Abstract Database (Hospital Separations). V2. Population Data BC [publisher]. Data Extract. MOH (2019).

Canadian Institute for Health Information (CIHI) [creator]. 2019b. National Ambulatory Care Reporting System. V2. Population Data BC [publisher]. Data Extract. MOH (2019).

Canadian Institute for Health Information (CIHI). 2021a. Supply, Distribution and Migration of Physicians in Canada, 2021—Data Tables.

Canadian Institute for Health Information (CIHI). 2021b. *How Canada Compares: Results from the Commonwealth Fund's 2020 International Health Policy Survey of the General Population in 11 Countries*. Retrieved July 20, 2023. <https://www.cihi.ca/sites/default/files/document/how-canada-compares-cmwf-survey-2020-meth-note-en.pdf>.

Chappell, N.L. and M.J. Hollander. 2011. An Evidence-Based Policy Prescription for an Aging Population. *HealthcarePapers* 11(1): 8–18. doi:10.12927/hcpap.2011.22246.

Childs, B.P. 2005. The Complexity of Diabetes Care. *Diabetes Spectrum* 18(3): 130–31. doi:10.2337/diaspect.18.3.130.

The College of Family Physicians of Canada. 2017, July. *Best Advice – Team-Based Care in the Patient's Medical Home*. Retrieved July 20, 2023. <https://patientsmedicalhome.ca/files/uploads/BAG_TeamBasedCare_ENG-1.pdf>.

Colwill, J.M., J.M. Cultice and R.L. Kruse. 2008. Will Generalist Physician Supply Meet Demands of an Increasing and Aging Population? *Health Affairs* 27: w232–41. doi:10.1377/hlthaff.27.3.w232.

Contandriopoulos, D., M. Perroux, A. Cockenpot, A. Duhoux and E. Jean. 2018. Analytical Typology of Multiprofessional Primary Care Models. *BMC Family Practice* 19(1): 44. doi:10.1186/s12875-018-0731-8.

Kabir, M., E. Randall, G. Mitra, M.R. Lavergne, I. Scott, D. Snadden et al. 2021. Resident and Early-Career Family Physicians' Focused Practice Choices in Canada: A Qualitative Study. *British Journal of General Practice* 72(718): e334–41. doi:10.3399/BJGP.2021.0512.

Korownyk, C., J. McCormack, M.R. Kolber, S. Garrison and G.M. Allan. 2017. Competing Demands and Opportunities in Primary Care. *Canadian Family Physician* 63(9): 664–68.

Ladouceur, R. 2022. Paperwork and Medical Certificates. *Canadian Family Physician* 68(5): 319. doi:10.46747/cfp.6805319.

Lavergne, M.R., M.R. Law, S. Peterson, S. Garrison, J. Hurley, L. Cheng et al. 2016. A Population-Based Analysis of Incentive Payments to Primary Care Physicians for the Care of Patients with Complex Disease. *CMAJ* 188(15): E375–83. doi:10.1503/cmaj.150858.

Lavergne, M.R., M.R. Law, S. Peterson, S. Garrison, J. Hurley, L. Cheng et al. 2018. Effect of Incentive Payments on Chronic Disease Management and Health Services Use in British Columbia, Canada: Interrupted Time Series Analysis. *Health Policy* 122(2): 157–64. doi:10.1016/j.healthpol.2017.11.001.

Lavergne, M.R., L.J. Goldsmith, A. Grudniewwicz, D. Rudoler, E.G. Marshall, M. Ahuja et al. 2019. Practice Patterns among Early-Career Primary Care (ECPC) Physicians and Workforce Planning Implications: Protocol for a Mixed Methods Study. *BMJ Open* 9(9): e030477. doi:10.1136/ bmjopen-2019-030477.

Lee, S.K., S.K. Mahl and B.H. Rowe. 2021. The Induced Productivity Decline Hypothesis: More Physicians, Higher Compensation and Fewer Services. *Healthcare Policy* 17(2): 90–104. doi:10.12927/hcpol.2021.26655.

Madsen, J., N. Serup-Hansen, J. Kragstrup and I.S. Kristiansen. 2002. Ageing May Have Limited Impact on Future Costs of Primary Care Providers. *Scandinavian Journal of Primary Health Care* 20(3): 169–73. doi:10.1080/028134302760234636.

Mangin, D., K. Sweeney and I. Heath. 2007. Preventive Health Care in Elderly People Needs Rethinking. *BMJ* 335(7614): 285–87. doi:10.1136/bmj.39241.630741.BE1.

McGrail, K., R. Lavergne and S. Lewis. 2016. The Chronic Disease Explosion: Artificial Bang or Empirical Whimper? *BMJ* 352: i1312. doi:10.1136/bmj.i1312.

McGrail, K.M., R.G. Evans, M.L. Barer, K.J. Kerluke and R. McKendry. 2011. Diagnosing Senescence: Contributions to Physician Expenditure Increases in British Columbia, 1996/97 to 2005/06. *Healthcare Policy* 7(1): 41–54.

McKay, M., M.R. Lavergne, A.P. Lea, M. Le, A. Grudniewicz, D. Blackie et al. 2022. Government Policies Targeting Primary Care Physician Practice from 1998–2018 in Three Canadian Provinces: A Jurisdictional Scan. *Health Policy* 126(6): 565–75. doi:10.1016/j.healthpol.2022.03.006.

Millar, E., J. Stanley, J. Gurney, J. Stairmand, C. Davies, K. Semper et al. 2018. Effect of Multimorbidity on Health Service Utilisation and Health Care Experiences. *Journal of Primary Health Care* 10(1): 44–53. doi:10.1071/HC17074.

Payne, T.H., S. Corley, T.A. Cullen, T.K. Gandhi, L. Harrington, G.J. Kuperman et al. 2015. Report of the AMIA EHRI–2020 Task Force on the Status and Future Direction of EHRs. *Journal of the American Medical Informatics Association* 22(5): 1102–10. doi:10.1093/jamia/ocv066.

Peterson, S., M. Wickham, R. Lavergne, J. Beaumier, M. Ahuja, D. Mooney et al. 2021, January. *Methods to Comprehensively Identify Emergency Department Visits Using Administrative Data in British Columbia*. UBC Centre for Health Services and Policy Research. Retrieved July 20, 2023. <http://chspr.sites.olt.ubc.ca/files/2021/02/CHSPR-ED-Report-2021.pdf>.

Petterson, S.M., W.R. Liaw, R.L. Phillips, Jr., D.L. Rabin, D.S. Meyers and A.W. Bazemore. 2012. Projecting US Primary Care Physician Workforce Needs: 2010–2025. *The Annals of Family Medicine* 10(6): 503–09. doi:10.1370/afm.1431.

Quan, H., B. Li, C.M. Couris, K. Fushimi, P. Graham, P. Hider et al. 2011. Updating and Validating the Charlson Comorbidity Index and Score for Risk Adjustment in Hospital Discharge Abstracts Using Data from 6 Countries. *American Journal of Epidemiology* 173(6): 676–82. doi:10.1093/aje/kwq433.

Rudoler, D., S. Peterson, D. Stock, C. Taylor, D. Wilton, D. Blackie et al. 2022. Changes Over Time in Patient Visits and Continuity of Care among Graduating Cohorts of Family Physicians in 4 Canadian Provinces. *CMAJ* 194(48): E1639–46. doi:10.1503/cmaj.220439.

Sovran, V., A. Ytsma, L. Husak and and T. Johnson. 2020. Coordination of Care Could Improve: Canadian Results from the Commonwealth Fund International Health Policy Survey of Primary Care Physicians. *Healthcare Quarterly* 23(2): 6–8. doi:10.12927/hcq.2020.26283.

Statistics Canada. 2018, September 17. Statistical Area Classification (SAC) [Archived]. Retrieved January 21, 2022. <https://www150.statcan.gc.ca/n1/pub/92-195-x/2011001/other-autre/sac-css/sac-css-eng.htm>.

Watson, D.E., R. Reid, N. Roos and P. Heppner. 2005. Growing Old Together: The Influence of Population and Workforce Aging on Supply and Use of Family Physicians. *Canadian Journal on Aging / La Revue canadienne du vieillissement* 24(S1): 37–45. doi:10.1353/cja.2005.0058.

TAB 35

Laparoscopic colectomy: trends in implementation in Canada and globally

Marius Hoogerboord, MB ChB, MSc
James Ellsmere, MD, MS
Antonio Caycedo-Marulanda, MD, MSc
Carl Brown, MD, MSc
Shiva Jayaraman, MD, MESc
David Urbach, MD, MSc
Sean Cleary, MD, MSc, MPH

Accepted May 18, 2018

Correspondence to:
S. Cleary
Department of Surgery, Mayo 12-11D
Mayo Clinic
200 First St SW
Rochester MN 55905
cleary.sean@mayo.edu

DOI: 10.1503/cjs.003118

Summary

Comparisons with other high-income countries suggest that Canada has been slower to adopt laparoscopic colectomy (LC). The Canadian Association of General Surgeons sought to evaluate the barriers to adoption of laparoscopic colon surgery and to propose potential intervention strategies to enhance the use of the procedure. Given the clinical benefits of laparoscopic surgery for patients, the increasing needs for surgical care and the desire of Canadian general surgeons to advance their specialty and enhance the care of their patients, it is an important priority to improve the utilization of LC.

The first study of laparoscopic colectomy (LC) was published in 1991.[1] Throughout the 1990s, adoption of the technique was hampered by concerns regarding oncologic safety and effectiveness.[2,3] This concern led to further studies and, by 2004, randomized controlled trial evidence clearly showed that LC accelerated patients' postoperative recovery and reduced length of hospital stay (LOS) while providing equivalent oncologic outcomes compared with open colectomy (OC).[4] Fewer postoperative complications and shorter LOS imply cost savings to the health care system, which is of considerable importance in an era of rising health care expenditures across all of Canada.[5]

Comparisons with other high-income countries suggest a lower adoption rate of LC in Canada.[6–9] The Canadian Association of General Surgeons (CAGS) formed a task force to evaluate the barriers to adoption of laparoscopic colon surgery and to propose potential intervention strategies to enhance the use of the procedure. As an initial step, the task force was asked to complete a literature review of existing publications on this topic to identify patterns of implementation and barriers to adoption in Canada and other countries.

Uptake of laparoscopic colectomy in Canada

Population-based data from Ontario show that between 2002 and 2009, the proportion of elective LC increased from 13% to 37%.[10] In British Columbia, the proportion of patients with colon cancer undergoing LC increased from 2% to 25% between 2003 and 2008.[11] Using population-level data, Hoogerboord and colleagues[12] showed that from 2004 to 2014, the pan-Canadian rate of LC for elective surgeries increased from 9% to 52%. Provincial utilization rates ranged from 11% in Newfoundland to 60% in British Columbia.[12] The rate of LC in Canada was lower than in South Korea, the Netherlands and the United States, but higher than in the United Kingdom, Norway and Sweden (Fig. 1).[6–9]

Predictors of uptake of laparoscopic colectomy

Compared with OC, the laparoscopic approach is technically more difficult because of the absence of tactile feedback, operating with 2-dimensional vision, and limited degrees of manoeuvrability of instruments. The number of cases required to complete the learning curve for LC varies between 30

© 2019 Joule Inc. or its licensors

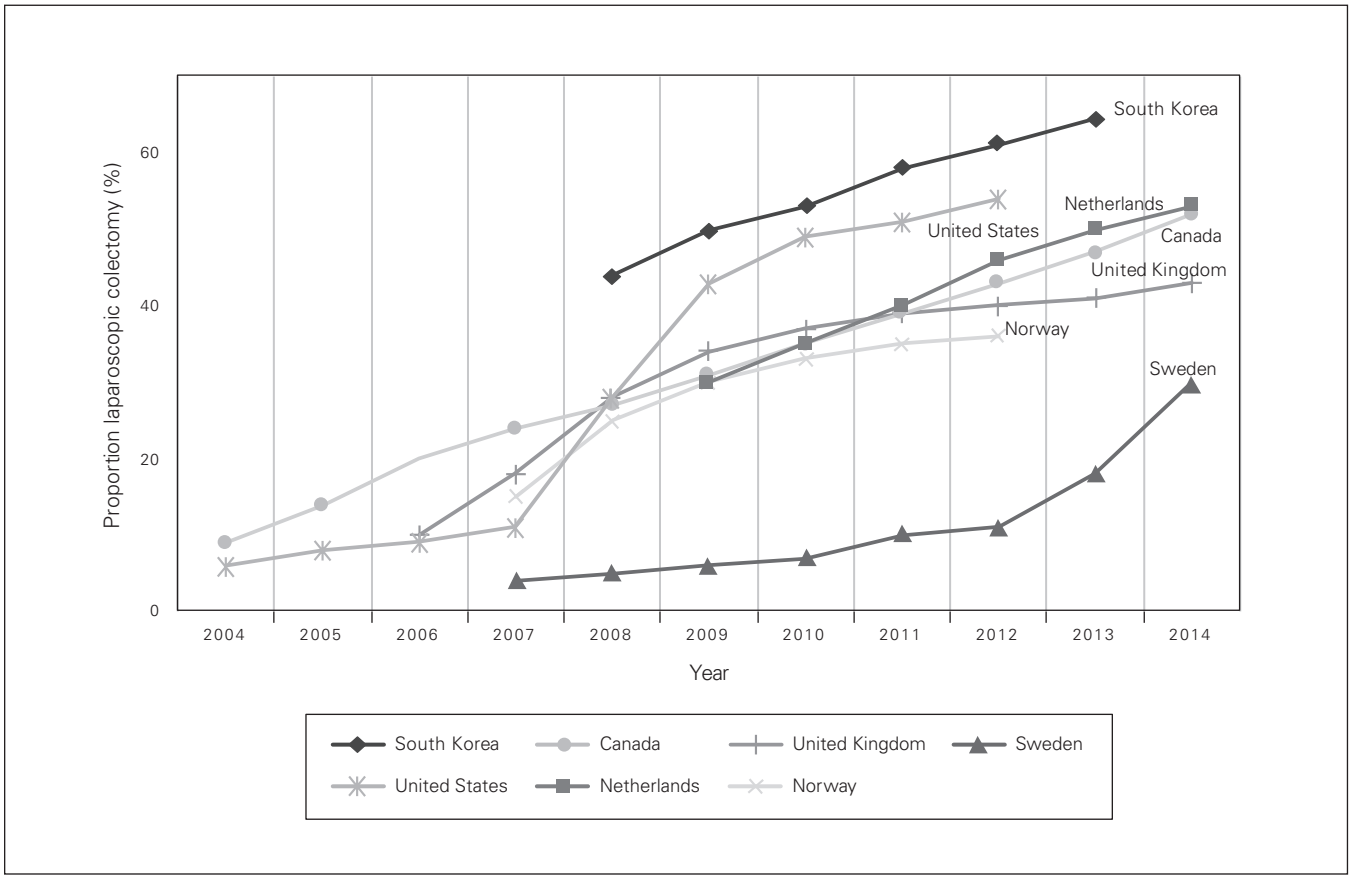


Fig. 1. Proportion of laparoscopic colectomy in Canada compared with other high-income countries.

and 70 and depends on the extent of formal training in laparoscopic surgery, exposure to other advanced laparoscopic techniques, dexterity and ability to perform delicate manoeuvres with 2-dimensional vision.[13]

The Canadian health care system can present unique challenges to the adoption of new technology and minimally invasive surgical techniques. In the survey by Moloo and colleagues,[14] limitations in operating room time allocation were cited by 55% of surgeons as a barrier to LC. Since most hospitals in Canada function with a global operating budget and volume-based and/or quality-based hospital reimbursement is limited in extent and impact, the introduction of new technology and equipment into Canadian operating rooms has been much slower than in other countries. Restrictions in capital and operating budgets have limited investments in permanent and single-use laparoscopic equipment. Approximately 25% of Canadian surgeons felt that they did not have adequate laparoscopic equipment to perform LC at their hospitals.[14]

Potential strategies to increase the use of laparoscopic colectomy

Effective strategies to increase use of LC may include greater emphasis on advanced laparoscopic training during residency, more minimally invasive surgery fellowships, and intensive hands-on training courses and mentorship programs for established surgeons (Box 1).[14–16] Also, dissemination of practice guidelines and consensus statements, practice audits and feedback, and the development of care algorithms and clinical care guidelines have been shown to positively affect change in surgical practice and institutional culture.[17]

Several methods for teaching advanced laparoscopic techniques to established surgeons exist, including short (weekend) courses, comprehensive programs consisting of didactic sessions, cadaver laboratories, and observation of live surgeries and simulation platforms (e.g., minimally invasive surgery trainer).[16] The optimal model for training and dissemination of advanced laparoscopic surgery into community practice has not been established. However,

Box 1: Strategies to increase use of laparoscopic colectomy in Canada

Resident training
- Increase exposure to advanced laparoscopic procedures

Fellowship training
- Increase number of minimally invasive surgery fellowship programs

Practising surgeons
- Intensive hands-on courses
- Postcourse mentorship programs

adoption is enhanced when mentorship by laparoscopic experts forms part of a training program.[18] A team-based approach, where training also includes operating room nurses, has been shown to be more effective in establishing successful laparoscopic programs.[19]

Conclusion

The rate of LC in Canada appears to be lower than in other comparable high-income countries, including South Korea, the Netherlands and the United States, with significant variability across the country. This variability in use of LC indicates a variety of barriers, some of which may be specific to the Canadian health care environment; a review of the literature includes surgeon-related factors (e.g., completing a steep learning curve, access to training and mentorship) and regional health system factors (e.g., financial constraints, operating room time and resource limitations, hospital and physician reimbursement models, and access to technology). Given the clinical benefits of laparoscopic surgery for patients, the increasing needs for surgical care and the desire of Canadian general surgeons to advance their specialty and enhance the care of their patients, it is an important priority to improve the utilization of LC. Given the complexities of these issues and the importance to patients and the profession, the Canadian Association of General Surgeons has assembled a task force to study the barriers to LC and propose priorities and initiatives to address the identified barriers and increase the use of LC across the country.

Affiliations: From the Division of General Surgery, Department of Surgery, Dalhousie University, Halifax, NS (Hoogerboord, Ellsmere); the Division of General Surgery, Department of Surgery, Northern Ontario School of Medicine, Sudbury, Ont. (Caycedo-Marulanda); the Division of General Surgery, Department of Surgery, University of British Columbia, Vancouver, BC (Brown); the Division of General Surgery, Department of Surgery, University of Toronto, Toronto, Ont. (Jayaraman, Urbach); the Department of Surgery, St. Joseph's Health Centre, Toronto, Ont. (Jayaraman); the Department of Surgery, Women's College Hospital, Toronto, Ont. (Urbach); and the Department of Surgery, Mayo Clinic, Rochester, MN (Cleary).

Competing interests: S. Jayaraman declares consulting and speaker fees from Ethicon, Olympus and Baxter; consulting fees from IPSEN, Pendopharm and Pfizer; and speaker fees from Celgene, outside the submitted work. S. Cleary declares honoraria for consulting activities from Ethicon, Erbe and Olympus as well as steering committee activities for AstraZeneca, outside the submitted work. No other competing interests declared.

Contributors: All authors contributed substantially to the conception, writing and revision of this article and approved the final version for publication.

References

1. Jacobs M, Verdeja JC, Goldstein HS. Minimally invasive colon resection (laparoscopic colectomy). *Surg Laparosc Endosc* 1991; 1:144-50.
2. Alexander RJ, Jaques BC, Mitchell KG. Laparoscopically assisted colectomy and wound recurrence. *Lancet* 1993;341:249-50.
3. O'Rourke N, Price PM, Kelly S, et al. Tumour inoculation during laparoscopy. *Lancet* 1993;342:368.
4. Nelson H, Sargent D, Wieand HS, et al.; Clinical Outcomes of Surgical Therapy Study Group. A comparison of laparoscopically assisted and open colectomy for colon cancer. *N Engl J Med* 2004;350:2050-9.
5. National Health Expenditure Trends. 1975-2015. Ottawa, Ontario: Canadian Institute for Health Information; 2015.
6. Moghadamyeghaneh Z, Carmichael JC, Mills S, et al. Variations in laparoscopic colectomy utilization in the United States. *Dis Colon Rectum* 2015;58:950-6.
7. Taylor EF, Thomas JD, Whitehouse LE, et al. Population-based study of laparoscopic colorectal cancer surgery 2006-2008. *Br J Surg* 2013;100:553-60.
8. Kolfschoten NE, van Leersum NJ, Gooiker GA, et al. Successful and safe introduction of laparoscopic colorectal cancer surgery in Dutch hospitals. *Ann Surg* 2013;257:916-21.
9. Park SJ, Lee KY, Lee S. Laparoscopic surgery for colorectal cancer in Korea: nationwide data from 2008-2013. *J Minim Invasive Surg* 2015;18:39-43.
10. Chan BP, Gomes T, Musselman RP, et al. Trends in colon cancer surgery in Ontario: 2002-2009. *Colorectal Dis* 2012;14:e708-12.
11. Aslani N, Lobo-Prabhu K, Heidary B, et al. Outcomes of laparoscopic colon cancer surgery in a population-based cohort in British Columbia: Are they as good as the clinical trials? *Am J Surg* 2012;204:411-5.
12. Hoogerboord CM, Levy AR, Hu M, et al. Uptake of elective laparoscopic colectomy for colon cancer in Canada from 2004/05 to 2014/15: a descriptive analysis. *CMAJ Open* 2018;6:E384-90.
13. Schlachta CM, Mamazza J, Seshadri PA, et al. Defining a learning curve for laparoscopic colorectal resections. *Dis Colon Rectum* 2001; 44:217-22.
14. Moloo H, Haggar F, Martel G, et al. The adoption of laparoscopic colorectal surgery: a national survey of general surgeons. *Can J Surg* 2009;52:455-62.
15. Dominguez EP, Barrat C, Shaffer L, et al. Minimally invasive surgery adoption into an established surgical practice: impact of a fellowship-trained colleague. *Surg Endosc* 2013;27:1267-72.
16. Birch DW, Sample C, Gupta R. The impact of a comprehensive course in advanced minimal access surgery on surgeon practice. *Can J Surg* 2007;50:9-12.
17. Urbach DR. Closing in on surgical practice variations. *Ann Surg* 2014;259:628-9.
18. Birch DW, Bonjer HJ, Crossley C, et al. Canadian consensus conference on the development of training and practice standards in advanced minimally invasive surgery: Edmonton, Alta., Jun. 1, 2007. *Can J Surg* 2009;52:321-7.
19. Birch DW, Misra M, Farrokhyar F. The feasibility of introducing advanced minimally invasive surgery into surgical practice. *Can J Surg* 2007;50:256-60.

TAB 36

https://www.thestar.com/news/canada/patients-are-routinely-being-diagnosed-with-cancer-in-busy-canadian-emergency-rooms-doctors-warn/article_a4cdc152-0e4d-11ef-92bc-6becb5917432.html

FOR SUBSCRIBERS CANADA

Patients are 'routinely' being diagnosed with cancer in busy Canadian emergency rooms, doctors warn

"The emergency department is a terrible place to receive this type of diagnosis," said Dr. Keerat Grewal.

Updated May 16, 2024 at 11:40 a.m. | May 13, 2024

"It's not just a local issue," said Dr. Keerat Grewal, an emergency medicine physician at Mount Sinai Hospital. "My colleagues across Canada are seeing this as well."

Nick Lachance/Toronto Star

By **Megan Ogilvie** Health Reporter

On a recent 12-hour shift, Dr. Kyle Vojdani diagnosed three patients with cancer.

Like most evenings, it was busy in Michael Garron Hospital's emergency department: A crowd of patients waiting to be seen. Physicians and nurses rushing between cases. Sick patients, some critical, waiting in hallways for a hospital bed.

Amid the bustle, Vojdani, chief and medical director of the department, had to find the time — and the words — to tell each of the three that their tests pointed to cancer.

One of the patients, a man who had no family doctor and who could no longer wait to get care for his symptoms, had metastatic disease — the cancer had already spread to other parts of his body.

"You're looking at the CT scan and it doesn't say somebody has a treatable diagnosis like appendicitis," Vojdani said. "Then you're thinking, 'How do I sit down with this person and their family in this unbelievably busy space and provide them with a life-altering diagnosis.'"

Across Canada, doctors are reporting a similar troubling trend, saying an increasing number of patients are receiving a cancer diagnosis in emergency departments in yet another symptom of a health system under pressure. Patients, they say, are forced to go to emergency departments for help because a family doctor shortage means they cannot easily get care anywhere else.

"We know the emergency department is a terrible place to receive this type of diagnosis," said Dr. Keerat Grewal, lead author of an editorial published Monday in the Canadian Medical Association Journal (CMAJ) that highlights the emerging trend.

Overcrowding in emergency departments is leading to long waits, with patients being treated in waiting areas and hallways, said Grewal, an emergency medicine physician at Mount Sinai Hospital in Toronto. A patient getting a new cancer diagnosis in that kind of environment is distressing — for both patients and providers, she said.

"It's not just a local issue, where we're routinely now seeing patients who are diagnosed with cancer in the emergency department," she said. "My colleagues across Canada are seeing this as well."

The proportion of patients facing a cancer diagnosis in an emergency department appears to have increased since the start of the COVID-19 pandemic, said Grewal, who has received funding to investigate this issue in Ontario.

She said the family medicine crisis that's left one in five Canadians without regular access to primary care, is likely one of the reasons for the concerning trend. In Ontario, an estimated 2.3 million people don't have a family doctor, a number that's projected to grow to 4.4 million by 2026, according to the Ontario College of Family Physicians.

"How do I sit down with this person and their family in this unbelievably busy space and provide them with a life-altering diagnosis?" asks Dr. Kyle Vojdani.

Kevin Holm/Michael Garron Hospital Photo

Without a family doctor or primary care provider to offer screening or assess potential symptoms, cancers can progress beyond an early stage until patients are forced to seek care at their local emergency department, said Grewal, also a clinician-scientist at Sinai Health's Schwartz/Reisman Emergency Medicine Institute.

Even among patients who do have a family doctor, it can be hard to get timely appointments, she said, noting long wait times for specialists and diagnostic imaging can also compel people to go to the emergency department to expedite their care.

“They might be waiting with signs and symptoms of a cancer, and now it’s progressed to a point where they need urgent attention. And their only route is to come to the emergency department.”

More cancer patients, and more deaths

A large study on cancer trends in Canada, also published Monday in the CMAJ, found that the country’s growing and aging population will lead to an expected increase in cancer cases and deaths in 2024, putting additional pressure on an already strained health system.

This year will see an estimated 247,100 new cancer diagnoses and 88,100 cancer deaths — up from 239,100 cases and 86,700 deaths in 2023, according to the study, a collaboration between the Canadian Cancer Society, Statistics Canada and the Public Health Agency of Canada.

However, when adjusted for age, rates of people getting a cancer diagnosis and dying of the disease will decrease slightly compared to previous years, said the study’s lead author, Darren Brenner, an epidemiologist and associate professor at the Cumming School of Medicine, University of Calgary.

He said screening programs, health policies, such as those for tobacco control and cessation, and advances in treatments are helping to drive down cancer rates at a population level, especially for the most common ones, such as lung and breast cancers. Still, the top four cancers — lung, breast, prostate and colorectal — are projected to make up almost half of all new cases in 2024.

While the data shows Canada is making progress, Brenner said cancer remains the leading cause of death in the country, highlighting the need to boost screening rates, improve prevention efforts and fund research to help advance treatments, especially for less common cancers. The report shows the incidence rates of liver, kidney and head and neck cancers are rising, a trend also seen for melanoma and non-Hodgkin lymphoma.

Brenner noted a 2022 study that found more people are surviving cancer and that an estimated 1.5 million Canadians “are living with and beyond cancer” 25 years after their diagnosis.

“That translates into an increasing impact on our system, and the need to have appropriate care to manage people and help them through their journeys with cancer,” Brenner said.

> **“The emergency department is a terrible place to receive this type of diagnosis.” — Dr. Keerat Grewal.**

‘The emergency department is the only release valve’

Grewal agrees the cancer trends data highlights the importance of bolstering health systems to better serve patients, from expanding primary care to pouring more resources into emergency departments.

The editorial — titled, “The emergency department is no place to be told you have cancer” — argues for solutions, such as streamlining pathways for cancer diagnoses, so that patients have seamless followup care, including further diagnostic testing, being referred for a biopsy and co-ordination for treatments.

While some regions in Ontario have such programs — called Diagnostic Assessment Program (DAP) clinics — Grewal said they are often only for common cancers. This leaves emergency physicians struggling to find followup cancer care for patients, especially for those without a family physician, she said, noting the challenge is even more pronounced in rural and northern parts of the province.

“Patients leave the emergency department with all these uncertainties. They don’t know when they’re going to be seen, they don’t know by whom they’re going to be seen, they don’t know what their prognosis is, they don’t know what potential treatments are.”

Vojdani, who has practised emergency medicine for almost two decades, said in the past diagnosing a patient with cancer would happen once or maybe twice a month. Now, he said, it’s much more frequent.

In addition to system-wide solutions, Vojdani said governments need to better fund and resource emergency departments in the short term to help care for cancer patients who have nowhere else to go.

“We have to recognize the emergency department is the only release valve in our current environment,” he said, noting emergency medicine provides the “safety net for patients” receiving a devastating cancer diagnosis. “But we’d like to be able to do it better, to do it well.”

Megan Ogilvie *is a Toronto-based health reporter for the Star. Follow her on Twitter:* **@megan_ogilvie** *or reach her via email:* ***mogilvie@thestar.ca****.*

TAB 37

Appendix A. Modeling Assumptions

Province	Visit Fee	Hourly Rate	Cap Rate	Other
Nova Scotia	$14.80	$92.70	$103	$0
BC	$25.61	$130.00	$35.00	$0
NFLD	$12.75		$180.97	$10,000
Alberta	$71.74			$50,000
Manitoba	$38.66	$171.04	$92.70	$3,600
Saskatchewan	$49.26		$73.39	$0

Ontario	$23.00	0	$200.00	$50,000