More than 95% of Canadians think it is important that the health care system makes use of digital health tools and capabilities, according to a 2013 survey commissioned by Canada Health Infoway. This level of support for digital tools reflects the high degree of integration of mobile devices such as smartphones and tablet computers into everyday life, and the rapid growth of the digital health market.

Today, there are about 100,000 health and wellness apps available on the iPhone, Android and Blackberry platforms. The uptake of medical apps and mobile devices among physicians has gone up: as of 2012, 67% of Canadian family physicians own a smartphone, and of these, 82% use them for drug references and 50% for clinical decision support. Following is a review of the benefits and uses of apps in clinical practice, as well as some of the potential pitfalls.

Apps As Clinical Tools

Techopedia describes apps as “a type of application software designed to run on a mobile device, such as a smartphone or tablet computer” with specific functionality that allows “consumers to hand-pick what their devices are able to do.” Improvements in technology and connectivity have also enhanced the complexity and relevance of smartphone apps compared with earlier versions for personal digital assistants (PDAs).

Today’s medical apps offer a broad range of functionalities as clinical tools. These can be grouped into four major categories: reference, patient-centred, clinician-centred, and education tools.

- Reference apps — perform information gathering tasks such as disease and drug references or medical literature searches.
- Patient-centred apps — include uses for health promotion, patient health tracking and medication reminders.
- Clinician-centred apps — can be utilized for functions such as electronic prescribing, accessing electronic health records (EHRs), medical calculation, clinical decision-making, and productivity improvement (e.g., data storage).
- Education apps — are typically used to access content and tools relating to general and continuing medical education in medicine.

1, 2 Canada Health Infoway. 2014. Emerging Technology Series: Mobile Health Computing Between Clinicians and Patients.
Implications For Clinical Practice

As with other professions, clinical practice today has become increasingly mobile, with workflows requiring physicians to be on the move while delivering care. In this environment, the use of mobile devices and apps has been described by Canada Health Infoway as an important enabler that “can address several of the key challenges facing health care systems, such as the need for greater cost and process efficiencies and for the delivery of care in lower-cost settings.”

At the practice level, these tools have been associated with benefits such as faster processes and more rapid decision-making with lower error rates, avoidance of duplication, enhanced data management and accessibility. Another study of physicians practising in hospital settings suggested that about two in three experienced what they perceived as increased productivity with the use of mobile apps. The evidence is mixed on the impact of mobile devices and apps on patient outcomes. A systematic review of mobile interventions found modest clinical benefits in areas such as smoking cessation, and enhancements in administrative functions such as appointment reminders, but did not demonstrate improvements in behavioural interventions.

The Role Of Regulation

Under the current Health Canada guidance, apps are regulated as medical devices when they replace a diagnostic or treatment decision made by physicians. The U.S. Food and Drug Administration (FDA) guidelines indicate that it will evaluate apps that are “used as an accessory to a regulated medical device; or transform a mobile platform to a regulated medical device,” but will only exercise “enforcement discretion” for apps that pose less risk.

Indeed, regulation may not be the right approach for all apps, given the rapid evolution and complexity of the mobile landscape.

“Regulation has the potential to stifle innovation — it has to be balanced against the benefit that new apps and technology could bring to practice,” says Dr. Darren Larsen, Medical Advisor, OMA Engagement and Program Delivery.

There have been attempts made to explore certification of medical/clinical apps. For instance, Happtique, a subsidiary of the Greater New York Hospital Association (GNYHA)’s for-profit arm, GNYHA Ventures, recently introduced an app certification program, but this was suspended after security flaws were identified in some apps that cleared the process.

Such challenges highlight the importance of “app literacy,” says Dr. Larsen. “Physicians need to be empowered to ask the right questions when considering the use of apps, instead of assuming that this work will be done for them.” (See Tips on App Use below.)

Dr. Larsen points out that physicians will readily use tools that offer the potential to improve the delivery of care, even if they are not perfect.

“For instance, physicians are comfortable with ordering and relying on mammograms as a screening tool for breast cancer, even though there is a margin of error with reporting,” he says.

A caveat emptor approach needs to be taken toward the use of apps, and thought given to their limitations, advises Dr. Larsen, particularly with regard to:

- Privacy and security — app security can be threatened by mobile malware and confidential data leakage. Security risk assessments on hardware and software, including apps, programs, mobile devices and computers, backup servers, Internet routers and wireless encryption, can help address this issue. Updates on the mobile device operating systems also protect the secure operation of the app. Users should check an app’s privacy policy and be aware that information shared may be provided to third parties.
- Data quality — there is wide variability among app developers, and studies have demonstrated that some medical apps use information without appropriate citations of supporting evidence. Other problems include medical apps developed without input from medical professionals. Thus, buyer beware: for instance, a physician relying on a medical app for stopping smoking and breast cancer screening was found to be unable to rely on the accuracy of the information presented in the app.

without input from medical professionals. Thus, buyer beware: for instance, a physician relying on a medical calculator app could, on first use, also check the reference equations supporting the calculations, says Dr. Larsen. Peer reviews will offer a proxy indication of the app’s data quality.

**Selecting And Using Apps**

Given the overwhelming proliferation of apps, how can physicians proceed to identify the most appropriate tools for their practice? According to a recent article on this subject, there is no easy answer: “Discovery is one of the most challenging aspects associated with the medical app ecosystem especially given the wide variation in quality, price and overall clinical utility.” Nonetheless, two different approaches to identifying apps were proposed:

- **Online marketplaces** — clinicians can select apps by navigating online marketplaces such as the Apple iTunes Appstore or the Google Android Play Store on their smartphones. Apps targeted at medical professionals are usually categorized in the “Medical” section, with the most frequently downloaded apps listed in the “Top Free” and “Top Paid” sections. Users can further screen apps by performing a search using topic-related search terms, however, this approach is fraught with challenges. The frequency of downloads is not a reliable indicator of the quality of the app. Furthermore, the search option is not always efficient, as apps are classified based on the app’s name or key description provided by the developer, not based on their purpose.

- **Peer-reviewed recommendations** — in response to such difficulties, third-party organizations have emerged to offer peer-reviewed recommendations on apps. For instance, the physician-edited iMedicalApps (www.imedicalapps.com) offers a search tool that provides unbiased peer evaluations of apps according to specialty, platform and key words. Medical App Journal (www.medicalappjournal.com) was created by medical professionals to provide unbiased peer reviews of apps. The peer-reviewed Journal of Medical Internet Research (www.jmir.org) evaluates app effectiveness as well. Apps can also be selected based on information from resources such as online news sites (e.g., www.mobihealthnews.com), professional conferences (e.g., the Mobile Healthcare Summit), recommendations by health delivery organizations (e.g., the UK National Health Service), and word-of-mouth recommendations from trusted sources.

---

**Tips For Physicians On App Use**

Dr. Darren Larsen, Medical Advisor, OMA Engagement and Program Delivery, suggests that physicians ask the following questions when considering a medical app:

1. **Does it fulfill a clinical need?** Mobile apps can significantly improve access to point-of-care tools and simplify work processes. However, all apps are not created equal, and some can be more readily integrated into a clinical practice workflow than others. Physicians should critically consider the usefulness of an app and whether it is a sensible replacement of existing tools.

2. **Does it work?** Barriers to entry for app development are relatively low, as a result, it is important to consider the reliability of the information within the app as well as its stability and support system. Peer reviews, ratings and recommendations are useful resources that help physicians decide on the quality of the app. Apps used for patient management should be evaluated for accuracy of content — always take a “buyer beware” approach.

3. **Is patient information being captured?** Physicians should be cautious in evaluating the security features of all apps, but especially so when personal health information is captured. Data should not be stored on the native device; passwords and encryption are essential features to protect against potential data breaches. Just as important, users should capture the right amount of information on the app — avoid data dumps.

4. **Is it free?** Cost is a common criterion in the selection of apps, however, don’t be afraid to pay. Free apps often require an in-app purchase or subscription payment before full functionality is provided. Also, developers who provide apps for free may be selling user data to generate advertising revenue.

---

App Use Among Medical Students

Reports suggest that medical students turn to smartphone apps on a regular basis, with about 40% of U.S. students indicating that smartphone apps were their first choice of reference. Anecdotal reports provided to the OMA Business Development and Partnerships Department suggests the following apps are commonly used among medical students:

- MD on Call
- Pedi STAT
- MedRef
- UpToDate
- Diagnosaurus

Conclusion

Mobile platforms for health delivery have been described as the way of the future; the ubiquity of mobile use has been associated with a corresponding uptake in the use of mobile health technologies. While the regulation of medical apps remains a grey area, physicians will need to elevate their “app literacy” and rely on peer reviews, web resources and published literature to assess the appropriateness of app use.

Disclaimer: This article is written for informational purposes only. The OMA does not endorse any website or app and assumes no liability for any inaccurate, delayed or incomplete information, nor for any actions taken in reliance thereon.

OMA Practice Management & Education (PME) resources aim to help physicians maintain a successful medical practice, including skills development, usable tools, and medical billing support. Additional resources on these and other topics are available at www.oma.org. For more information, contact PME at practicemanagement@oma.org or 1.800.268.7215 / 416.599.2580.

This article was written by Yen Yen Yip, and originally published in the September 2014 Issue of the Ontario Medical Review.