



ADVANCED SYMBOLICS INC.

**ONTARIO MEDICAL ASSOCIATION - Topic Discovery on vaccine
hesitancy within the Ontario general population**

January 18, 2021

Overview

ASI conducted an initial high-level investigation into the topic of vaccine hesitancy within the Ontario population. The findings presented within this report were derived using topic discovery and represent initial qualitative findings. Overall, ASI did find that misinformation and doubt about the vaccine can be seen throughout social media, specifically during the study period in question and within the active sample of the Ontario population. While this is seen at some point throughout all investigated age groups, there seems to be more doubt about the vaccine within the <25 and 25-34 audiences, upon initial review. Examples of key themes of misinformation being propagated were doubts about the robustness of the testing of the vaccine, various conspiracy theories, and fear of vaccine side effects. As well, expressions of anger and dissatisfaction with the government could be seen throughout most of the age groups. There is some discussion about dissatisfaction of Ford's government, and this is seen specifically with the shutdown of vaccinations for the holidays.

Topic Discovery

The under 25s audience: Within this audience there is a circulation of doubt about the vaccine and an emphasis on the vaccine being “untested”. Within some conversations, an almost aggressive narrative of “it's not your business whether I get the vaccine or not” is seen. As well, there is some concern that this vaccine might be dangerous because some members within this audience appear to consider the vaccines in market now as “largely experimental”. For members of this audience that are more open and accepting of the vaccine, there is a somewhat negative sentiment to following COVID regulations. There is a narrative that assumes that if one follows the regulations set in place, they are considered more low-risk and will unfortunately have to wait longer to get a vaccine, as it will likely be provided to high-risk areas first.

The 25-34 audience: Some propagation of conspiracy theories can be seen within this audience, and a strong need for choice and autonomy. An example of a conspiracy theory seen within this audience is the assumption that COVID is a genetically engineered virus, and this theory seems to breed distrust in any vaccine created to combat this virus. As well, some members of this audience are outspoken about refusing to have any sort of “mandatory health tag” to prove they have been vaccinated. There is support in making sure human rights are respected during this period. Lastly, there is a circulation of questions about employers' abilities to force employees to get the vaccine.

The 35-44 audience: Overall, not as much circulation of misinformation is seen within this audience. This audience seems to be supportive of a vaccine. Some negativity is expressed towards the way the government has acted thus far in terms of the vaccine rollout, especially with the shutdowns over the holidays. This

audience seems to be looking for a “proactive response” by the government and to “really step on the COVID vaccine roll out”. One large narrative seen within the conversations of this audience is regarding vaccine safety, and the attempt to educate anyone who is expressing vaccine hesitancy. There is a call from this group that now is the time to roll out public health campaigns and address vaccine hesitancy. One sub-narrative that should be noted within this audience is the expression of a need for more information about the vaccine in terms of effects on pregnancy.

The 45 to over 65 audience: In the older generations there seems to be less distrust of the vaccine, but more expressions of frustration at the Canadian government. While there are still some within this audience who are spreading misinformation, it seems that this audience is also using their social media platforms to voice their opinions on government actions. Many within this audience are frustrated at the slow roll out of the vaccine by the Canadian government and express that that would like to see a better task force in place. As well, there is a large need for clarification on where the vaccines have gone and a call for more transparency about what the next steps will be with the vaccine rollout. As well, there is a sub-narrative of needing a more aggressive COVID-19 vaccination campaign in place.

Methodology

The study period was from **December 1st, 2020 to January 11th, 2021**. The sample was a representative sample of the **Ontario general population** and the active sample size was **65,522**.

A random sample of people online is collected using Conditional Independence Coupling (CIC). CIC is an algorithm that crawls online networks and creates a sample of people that is representative of the overall population. The sample produced is mathematically proven to converge to the stationary distribution of the population. In all statistical respects, the sample generated by CIC is identical to Random Digit Dialing used in traditional polling, with one important exception — the sample produced is many tens of thousands to hundreds of thousands of people. CIC can be adjusted to sample from a geographic location, like a country, state or province, and municipality. This is done by restricting the network CIC is crawling to people that reside in the desired geography. Two points of information are used by CIC determines a person’s geography: geo location information and self-reported location. If geo location information is present for the online person, this is used to determine their geography. Geo location information is recorded for every post a person makes. The multiple geo location points are clustered using a k-means algorithm. The cluster with the most points is taken to be the person’s geography. If geo location information is missing, the self-reported location is

used to determine the person's geography. The location information is often a city and state or province and sometimes it can be an actual address. A reverse address search provided by Microsoft's Bing Maps is used to resolve the self-reported location to a geography. In some cases, CIC is unable to assign a geography to an individual due to lack of geo location or a self-reported location. These individuals are considered to be NOT in the geography. The CIC sample produced is representative of the population without needing to weight the sample based on demographics.

Topic discovery is a qualitative method that utilizes AI technology to give insight into conversations and a spotlight on the topics that members of our sample are discussing. Topic discovery uses the same context sensitive algorithm found within topic modelling, which works to flag additional concepts relevant to the research that have not yet been investigated. The key advantage of topic discovery is that researchers can uncover topics of interest or concern to populations without prior knowledge. Whereas in a traditional survey, one only uncovers information about those topics one thought to inquire about, with topic discovery, the items of top concern in the sample are revealed even if the researcher wasn't aware that they existed.