**COVID-19**  CADTH BRIEFING NOTE

# Use of Contact Tracing Apps to Help Contain COVID-19

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To produce this report, CADTH used a modified approach to the selection, appraisal, and synthesis of the evidence to meet decision-making needs during the COVID-19 pandemic. Care has been taken to ensure the information is accurate and complete, but it should be noted that international scientific evidence about COVID-19 is changing and growing rapidly.

## Issue and Purpose

The severity of the COVID-19 pandemic and the scale at which it has spread has prompted public health responses by all levels of government. As decisions to ease restrictions on movements and activities across regions in Canada are being made by public officials, there has been interest in the use of digital contact tracing applications (apps) to contain and limit the transmission of COVID-19. This briefing note addresses the following questions pertaining to the promise and challenges associated with the utilization of contact tracing apps:

- What resources are required to support the successful implementation of contact tracing apps?
- What privacy considerations are necessary in the collection, use, and disclosure of personal information gathered using contact tracing apps?

## Background

Traditional Form of Manual Contact Tracing

- Contact tracing is a public health measure used to control the spread of infectious diseases.[1] It is a process that consists of:
  o identifying a person who may have been exposed to an infectious disease as a result of being in physical contact with an infected person
  o tracing and then communicating with these identified contacts, and providing information about suitable infection control measures, symptoms monitoring, and other precautionary measures such as the need for quarantine
  o monitoring the contacts regularly for symptoms.
- Historically, contact tracing has been a key tool employed by governments worldwide in the fight against communicable diseases such as smallpox, SARS, and the Ebola virus.[2-4] Limiting the spread of these diseases involved the use of manual contact tracing methods that require public health service employees or volunteers to identify, trace, communicate, and monitor contacts on a daily basis.[4] This manual approach, also relied on a patient's recollection of their movements, actions, and contacts.[3]
- Experts claim that contact tracing is most effective when two interventions are followed: isolation of symptomatic individuals, and tracing the contacts of symptomatic cases and quarantining them.[5] These conditions are dependent on the assumption that all cases are symptomatic and, that the presence of symptoms is perfectly correlated with the risk of transmitting to others.[6]
- The effectiveness of manual contact tracing alone is limited in reducing COVID-19 transmission as research suggests that the disease can be spread through people who never develop symptoms (asymptomatic transmission), which is estimated to be between 8% and 50% of the people testing positive for the virus,[7] and by those who have not yet developed symptoms (presymptomatic transmission).[8]
- Experts have suggested that the use of contact tracing apps provide promise in identifying infected cases, as the apps have the ability to build a memory of proximity contacts and immediately notify contacts of positive cases.[4]

## Contact Tracing Apps and Their Implications of Limiting the Spread of COVID-19 Transmission

- Contact tracing apps work by using technologies in smartphone devices to determine where the users have been or with whom they have been in contact. There are several approaches to contact tracing apps that have emerged. These include:
  - The use of Wi-Fi and/or GPS data to track a person's location.[4]
  - The use of Bluetooth technology to detect and log other phones that come within a phone's degree and duration of proximity.[9]
- However, as highlighted in CADTH's [Contact Tracing Apps to Identify Potential Exposure to SARS-CoV-2](#), "[the use of digital contact tracing apps], are not intended to replace existing methods of contact tracing, nor are they to be used in the absence of these methods. Rather, the apps are designed to augment the ability of public health officials to identify potential cases of COVID-19 and take appropriate follow-up actions to prevent further spread of the disease."[10]
- While countries such as China and New Zealand have reported success in the use of digital and manual contact tracing efforts to reduce the spread of the disease, experts assert that the actual effect of contact tracing is difficult to quantify as it is accompanied by other control measures like physical distancing, banning of public gatherings, avoidance of non-essential travel, limited contact with people, and stay-at-home measures.[11]

## What Resources Are Required to Support the Successful Implementation of Contact Tracing Apps?

### Contact Tracer Workforce

- A study released by Johns Hopkins University estimates the US needs at least 100,000 additional contact investigators to rapidly identify, contain, support, and re-test individuals who are infected and who have been exposed.[12] Similar estimates for Canada are not publicly available; however, authors of the study highlight that in developing these estimates, considerations for size of the geographical area, access to rapid diagnostic tests, widespread use of serological testing, and ability to trace all contacts of reported cases, remain critical factors. Other countries have also released similar workforce estimates, for instance:
  - In Wuhan, China, a city of 11 million people, 1,800 epidemiologists were needed before the city reopened. This represents approximately one investigator for every 1,200 individuals. These teams reportedly traced tens of thousands of contacts per day and followed up often with both cases and contacts.[13]
  - New Zealand has developed a contact tracing centre that comprises 190 Ministry of Health staff, called the National Close Contact Service (NCCS).[14]
- The European Centre for Disease Prevention and Control's March 2020 guidance on resource estimation for contact tracing provides an indication of staff time required for various containment activities.[11]
- In April 2020, Health Canada began efforts to establish a national database of volunteers that provinces and territories can use to collect case data and track down people who have been in contact with positive cases.[15] Although official numbers have not been released, a *Global News* article reports that as of April 10, 2020, 27,000 volunteers registered to be included in this national database.[16]

## Skills and Training Development for Contact Tracing

- On May 10, 2020, WHO released a document called *Contact Tracing in the Context of COVID-19: Interim Guidance*. This document outlines steps in undertaking contact tracing; how to inform, manage, and monitor contacts; as well as key indicators to monitor tracing efforts.[17]
  - The guidance document also specifies the skills necessary to assess symptoms, investigate and follow-up with contacts, the knowledge required of the public health system and health care resources, and to verify that those individuals conducting the contact tracing undergo cultural sensitivity training.[17] Similar guidance documents have also been developed by the US Centers for Disease Control and Prevention.[18]
- Many organizations have developed training tools and guidelines for contact tracers. These tools have been developed for contact tracers with limited public health care knowledge. Some examples include:
  - The Johns Hopkins Bloomberg School of Public Health recently launched an online course to train contact tracers to help slow the spread of COVID-19 within the US. The course covers basic information on the virus, fundamentals and ethics of contact tracing, skills for effective communication, and steps involved in investigating cases.[19]
  - Australia's National Centre for Epidemiology and Population Health (NCEPH) has also developed materials to support organizations in contact tracing efforts, including a standard operating procedure for pre/post interview checklists, interview scripts, and email templates.[20]

## Case Management Tools

- The utilization of case management tools in contact tracing efforts plays a significant role in organizing and managing case information. WHO has produced an investigation tool for field data called Go.Data. "This tool includes functionality for case investigation, contact follow-up, and visualization of chains of transmission including secure data exchange."[21] Limited evidence exists to support the effectiveness and potential limitations of this software.
- Within Canada, existing and new case management tools are being used for contact tracing efforts.
  - On April 16, 2020, the City of Toronto announced that its Coronavirus Rapid Entry Case and Contact Management System is ready for use. This web-based secure system allows Toronto Public Health officials to quickly and easily document each individual case investigation efficiently and share data with the Ontario Ministry of Health.[22]
  - In the province of British Columbia, local reporting of COVID-19 cases are submitted to the BC Centre for Disease Control through Panorama, the province's public health information system. This system is connected to the provinces Primary Access Regional Information System (PARIS) interface that reports communicable disease and immunization information from Vancouver Coastal Health and Fraser Health Authority.[23]

## Efficient Testing Capacity

- The capacity to test at the population level for COVID-19 has been touted by WHO as a key requirement for countries that are considering the loosening of physical distancing measures.[17] As contact tracing begins when an individual tests positive for COVID-19, accessible, widespread, and fast testing remains a fundamental requirement for all contact tracing efforts.[5] While some jurisdictions within Canada have begun resuming

elective procedures and surgeries, ensuring that testing labs have the capacity needed to keep up with the demand for COVID-19 testing may be challenging.

- o Ensuring a sufficient supply of diagnostic tests may help relieve the burden on laboratory test centres.[24]

## Flexibility of Funding Models

- Flexible funding models may be needed to support the scalability of contact tracing efforts. For instance, in the US, Massachusetts has involved experienced nongovernment organizations to work with state governments and local health departments to perform these functions and deliver contact tracing initiatives.[12]

- Options for direct funding of partners could expedite some efforts. Incorporation of community leaders, faith leaders, and Indigenous partners in the planning and discussion of contact tracing efforts may also aid the ability of local governments to support contact tracing at the community level.[12]

## What Privacy Considerations Are Necessary in the Collection, Use, and Disclosure of Personal Information Gathered Using Contact Tracing Apps?

- The deployment of any contact tracing apps should respect the privacy principles set out in the Privacy Commissioner of Canada's Framework to Assess Privacy-Impactful Initiatives in Response to COVID-19, some of which include necessity and proportionality, openness, time limitation, and transparency.[25] These apps should also ensure compliance with other provincial and territorial health information privacy laws.

- In addition, data privacy experts suggest that privacy considerations for contact tracing apps should be balanced with current as well as possible future risks associated with the potential use of personally identifiable data.[26]

## Data Storage and Sharing

- There are two approaches to personal data storage and sharing that are being considered in the use of contact tracing apps. These include apps that use centralized versus decentralized data storage systems.

- o In decentralized data storage systems, all of the data are locally stored on the app users' phone. This model is supported by the joint Google and Apple exposure notification API system that uses decentralized Privacy-Preserving Proximity Tracing (DP-3T) that allows users to voluntarily opt in to share their phone number in order to pass epidemiologically useful data to public health officials, but not location.[27] Lack of geodata has been viewed as a significant limitation by public health authorities to aid in contact tracing efforts.[28] However, supporters of the decentralized approach suggest that it provides users with a higher degree of privacy and more control over their information by keeping it on their phone and limiting the potential for hackers or state misuse.[28]

- o In a centralized data storage system, data about app registrants and their contacts are stored on a central server accessible to public health authorities. Generally, this approach has been favoured by governments for easier access to information; however, several concerns pertaining to the risk of function creep and state surveillance have been expressed by privacy experts.[28] To minimize privacy concerns, some places

such as the Canadian province of Alberta as well as the country of Australia have introduced mechanisms to reduce liability by requiring their users to express consent before uploading their data to central storage.[29] In addition, centralized data storage systems that use Bluetooth on iPhone's are facing significant barriers as the device needs to be unlocked with the app running in the foreground in order for Bluetooth exchanges to occur.[30] Both Germany and the province of Alberta have come across this limitation in the usability of their apps.[30,31]

- The collection, use, and disclosure of data aggregated from contact tracing apps require significant regulatory oversight mechanisms to minimize privacy intrusions, and to ensure a high standard of data security and protection. Existing legislations such as the *Personal Information Protection and Electronic Documents Act*[32] may need to be adapted to account for the use of personal health information by non-public health care workers, proximity data collection, and alignment with other provincial privacy legislations.

  o A recent article published by the *Canadian Medical Association Journal* suggests that contact tracing apps should incorporate features to protect privacy that include the "encryption of all personal data, explanations in plain language and user consent for data storage and use, restrictions on the use of the data outside the public health responses to COVID-19, automatic deletion of data, and the option to delete data at any time."[24]

  o The April 2020, Expert Advisory Group Report on Society, Technology and Ethics in a Pandemic, commissioned by the Canadian Institute for Advanced Research suggests additional accountability and oversight mechanisms that governments may consider in deploying contact tracing apps. These include the role of intergovernmental committees of public health experts in sharing information about the effectiveness of the technology and the capacity of legislative committees and privacy commissioners' offices in providing ongoing oversight in the deployment of the technology.[33]

## Data Governance

- Data governance mechanisms can be employed to ensure that processes associated with accessing, retrieving, reporting, and managing data are governed with the public interest in mind. Data trusts may be explored as one tool to govern the development of technology used in COVID-19 responses. A data trust is "a legal structure that provides independent third-party stewardship of the data [under evaluation]."[34] The trust acts as a legal entity managed by a board of trustees who will have the power to revoke access to the trust's data and take legal action to safeguard the public's interest, as specified under a charter.[34]

  o This approach was also considered by Canada's Federal Standing Committee on Access to Information, Privacy and Ethics in mid-2019 in the study of ethical aspects of artificial intelligence and algorithms.[35]

  o The perceived benefit of a trust-like structure involves the promotion of transparency with respect to responsible data practices, and consequently, enhanced trust in the use of data by governments and third parties.[34] However, further evidence on the development of data trusts to safeguard public health data is required to better understand its implications within the context of contact tracing apps.

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