



**Special Communication to City of Burlington  
Emergency Operations Center and Mayor  
Regarding COVID-19**

**To:** Brian Lowe

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**RE:** Contact Tracing Strategies

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Contact tracing is a targeted intervention proven to reduce transmission and curb an infectious disease outbreak. By identifying possible exposures of an index case, the exposed individuals can be tested and isolated in the event that they are also infected.

**Key Messages:**

- **Vermont** has a team of about 50 people implementing contact tracing at the Department of Health, and is expanding that capability with 40 – 45 law enforcement officers from around the state.
- Contact tracing has traditionally involved interviews and detective work to figure out who has been exposed to an infected person, it can **take 3 days for each new case**, and it has been estimated to require **one investigator for every 1,000 residents**.
- Cell phone applications in Singapore, China and South Korea have been used to automate this process, using either GPS location or Bluetooth to measure proximity, however privacy issues with these types of apps may likely prevent their widespread use in Western countries.
- Several contact tracing applications are starting being deployed in the US.
  - [SafePaths](#), an app and web application out of the MIT Media Lab, is still in beta form but directly addresses privacy issues by keeping location and contact data private from both the public and government agencies.
  - [Dimagi](#), an app used during the Ebola outbreak, will be used in San Francisco both for identifying contacts and monitoring symptoms of people in quarantine.
- Contact tracing works in conjunction with testing, both to find initial cases and to allow contacts to end quarantines.
- After identification and notification, close contacts will need to quarantine. The city and state should consider ways to support those in quarantine to ease burden and encourage compliance.

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## Key Resources

- [A National Plan to Enable Comprehensive COVID-19 Case Finding and Contact Tracing in the US](#)
- [The Technology That Could Free America From Quarantine, The Atlantic](#)
- [COVID-19 Situation report, Joshua Sharfstein, Johns Hopkins Bloomberg School of Health](#)

## Summary of Research

**Contact tracing targets surveillance resources and testing at individuals most likely to be positive**, and also serves to test individuals early in the course of illness when isolation is most effective at reducing transmission. Testing exposed individuals may also identify asymptomatic infections that would otherwise have gone undetected. The process is sandwiched between widespread testing to find cases, and effective monitoring or isolation to limit the possibility that those contacts infect others.

Closely watching people after exposure to an infected person will help those people potentially exposed to get care and treatment, and can prevent further transmission of the virus. This monitoring process is called contact tracing, which can be broken down into 3 basic steps:

1. **Contact identification:** Once someone is confirmed as infected with a virus, contacts are identified by asking about the person's activities and the activities and roles of the people around them since onset of illness. Contacts can be anyone who has been in contact with an infected person: family members, work colleagues, friends, or health care providers.
2. **Contact listing:** All persons considered to have contact with the infected person should be listed as contacts. Efforts should be made to identify every listed contact and to inform them of their contact status, what it means, the actions that will follow, and the importance of receiving early care if they develop symptoms. Contacts should also be provided with information about prevention of the disease. In some cases, quarantine or isolation is required for high risk contacts, either at home, or in hospital.
3. **Contact follow-up:** Regular follow-up should be conducted with all contacts to monitor for symptoms and test for signs of infection.

## Manual (Interviewing)

Traditionally, contact tracing is done by extensive interviewing of an initial patient after testing positive. Due to the intensity of this method, it is usually reserved for early stages of an epidemic, when containment is possible. As Vermont moves beyond the peak number of new cases, contact tracing will continue to limit the possibility of a second wave of infections. **Manual tracing takes about three days for each new case**, though social distancing measures could simplify the number of contacts. Tom Friedan, director of the CDC under Obama, estimates that it would take **around 1 investigator for every 1,000 residents**, or 40 people dedicated to Burlington alone.

Limitations:

- Takes time to find and notify contacts, during which the virus can spread.
- Requires significant resources in the form of trained investigators.
- Relies on memory and can be inaccurate.

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## Automatic (Phone apps)

Phone apps allow the process of contact tracing to be automated, which is both less expensive but also faster. If days pass between a positive test and close contact quarantining, more people can be infected along the way. If instead a positive test automatically sends out a message warning of exposure, the chain can be broken.

Phone apps have been used in South Korea, Singapore and China, but they raised significant privacy concerns. In South Korea, the last name, profession and age of an infected person is released publicly, leading to reported cases of harassment. Any qualms around privacy would also likely translate to reduced uptake, leading to a less effective product. Any automatic contact tracing app in the US will rely on people willingly downloading an app and allowing it to track their movement and contacts.

There are a number of apps that are in development, SafePaths and Dmiagi seem to be the most fully developed and likely to be used in the U.S.

- [SafePaths](#) and the smartphone enabled app **Private Kit** is a open source technology out of MIT which uses an app to track individuals by location and proximity to other phones, but purposefully limiting the personal identifying information available to either the public or to government officials. Yesterday [Reuters](#) reported that three local governments will sign deals to adopt the app.
- [Dimagi](#) has released a COVID-19 contact tracing app. A free template application which implements the full World Health Organization's (WHO) FFX protocol for case reporting and contact tracing. Was used for Ebola reporting and tracing broadly by the WHO and USAID. San Francisco Department of Public Health will deploy Dimagi for contact tracing.
- [NextTrace](#) plans to create an automated reporting system where anyone who tests positive for Covid-19 could register anonymously. It would then use both GPS and Bluetooth proximity from other people who have opted in to notify them of contact.
- [TraceTogether \(Singapore\)](#) uses Bluetooth to keep a log of phones in close proximity, a user who tests positive can upload that data to a central agency which then notifies close contacts.
- [Apple & Google](#) are reportedly teaming up to release a software tool that enable smartphones to tell people if they were recently in contact with an individual who tested positive.

Limitations:

- Apps are only useful if they are widely adopted by the community.
- Privacy concerns could limit uptake.

## Follow up – Monitoring and Quarantine

After contacts have been identified and notified there are more questions that follow. In China close contacts were required to quarantine, often in public quarantine facilities. While voluntary quarantine facilities may be an option in the U.S., the level of enforcement of any recommended quarantine or isolation is still to be determined. The public benefit of ensuring compliance to quarantine should be balanced with the adverse incentives to testing positive – that is, if people will be forced to quarantine upon a positive test, they may be hesitant to be tested at all.

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Instead of negative consequences to breaking quarantine, the city should consider ways to ease the burden of those in quarantine, including active monitoring as well as ease of accessing testing. Dr. Sharfstein and Dr. Frieden made some suggestions for incentivizing isolation and quarantine [here](#). These incentives include care packages, core resources, and financial support.

### State Approaches to Contact Monitoring

- **Vermont** has a team of 48 people implementing contact tracing at the Department of Health, and is expanding that capability with 40 – 45 law enforcement officers from around the state. “Daltry said the department continually evaluates whether they have adequate staff to conduct contact tracing, with the goal of interviewing people within 24 hours of their positive Covid-19 test result coming back.” ([source](#))
- **Rhode Island’s** [governor](#) [asked residents](#) to keep a log of contacts to give to investigators in case they test positive, to improve their efforts at contact tracing.
- **Massachusetts** is hiring 1,000 people to augment contact tracing efforts.
  - Using public health college students to augment contact tracing efforts, in collaboration with Partners in Health.
  - *“[Massachusetts](#) will be the only state in the country conducting widespread contract tracing, according to Baker.”*
- **California** In one of the first such efforts in the country, [San Francisco](#) is assembling a task force to interview and trace the interactions of all people who test positive for covid-19. The San Francisco task force will use an online and phone-based contact tracing application developed by [Dimagi](#), based in Cambridge, Massachusetts, to manage cases and ongoing care. Among other things, it will send daily text messages to potentially exposed people, asking if they’ve developed symptoms. If so, it’ll flag workers to follow up and provide additional guidance.

[Iceland and New Zealand](#) have found success with aggressive contact tracing using a combination of direct interviews and complementary technology, including the use of health databases for contact information and a GPS tracking app in Iceland.

### Sources

[World Health Organization’s \(WHO\) Cases and contact investigation protocol for COVID-19](#)

[Covid-19 spreads too fast for traditional contact tracing. New digital tools could help, Stat](#)

[How San Francisco plans to trace every coronavirus case and contact](#)

[Opening cities will require an army of 300,000 contact tracers, expert says](#)

[“There’s no choice but to act now” - WHO Contact Tracing template app available today](#)

[‘It’s just impossible’: tracing contacts takes backseat as virus spreads](#)

[Roadmap to Recovery](#)

[NPR: How The Painstaking Work Of Contact Tracing Can Slow The Spread Of An Outbreak](#)

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[KFF: Is Contact Tracing Getting Enough Attention in U.S. Coronavirus Response?](#)

[New blood tests for antibodies could show true scale of coronavirus pandemic](#)

[VTDigger: States ramps up contact tracing teams to contain Covid-19](#)

[BI: Here's what it sounds like when a contact tracer calls to tell you that you might have been exposed to the coronavirus](#)

[WP: A plan to defeat coronavirus finally emerges, but it's not from the White House](#)

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