CCST EXPERT BRIEFING

Digital Contact Tracing to Reduce the Spread of COVID-19

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One Pager

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BACKGROUND

The COVID-19 pandemic has shocked nearly all aspects of our way of life.

Robust contact tracing—the effort to identify people who may have been exposed to COVID-19 by coming into contact with a person who has tested positive for the contagious disease—is a significant part of California's strategy to limit the spread of COVID-19.

Recently, digital contact tracing has emerged as a potential supplement to traditional methods, especially as tech companies have released application programming interfaces (APIs) to support apps to be developed by public health officials.

While potentially helpful, novel technological solutions, if not implemented carefully and deliberately, can introduce new threats to privacy or exacerbate existing inequities.

CONTACT TRACING IS AN ESTABLISHED METHOD FOR REDUCING THE SPREAD OF DISEASE

USING DIGITAL APPS

Given the majority of people carry a smartphone,[1] digital contact tracing, facilitated by smartphone apps, has been proposed as a potential technological solution to help limit the spread of COVID-19. Contact tracing apps can be designed in a number of different ways, such as using GPS to track the movements of individuals and large groups to identify potential outbreak hot spots.

One such implementation uses the Bluetooth signals that allow phones to wirelessly communicate with other nearby devices in order to track contacts between people. In the event an individual tests positive for COVID-19, the app could notify others of potential exposure based on which Bluetooth signals their device was in close proximity with.

Aspects of Contact Tracing

1. **Interview** people who have tested positive to identify people they have had contact with while infectious
2. **Provide** resources to assist those who have tested positive in obtaining testing, treatment, and support in self-isolating
3. **Notify** contacts that they may have been exposed and provide them access to testing
4. **Monitor** contacts to see if they develop symptoms
5. **Connect** contacts with services to support self-isolating

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SELECT EXPERTS

The following experts can advise on digital contact tracing:

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In May, Google and Apple jointly released an API that allows for Bluetooth detections between Android and iOS devices, allowing public health officials to develop apps to track potential exposure. In a recent update, the API was expanded to allow public health agencies to use it without developing a custom app.

BLUETOOTH-BASED CONTACT TRACING

Bluetooth is a low-energy, wireless radio protocol that mobile devices can use to communicate with one another. The strength of a detected Bluetooth signal can be used to estimate the distance between nearby devices.[2] These distance estimates can be used to detect instances when two people get within about six feet of each other, or close enough to risk spreading COVID-19.

Each time two phones using the app get this close to one another—a contact event—a random identification number is generated. A list of all contact events is then stored on the device for a certain amount of time. These numbers are not linked to personal information and cannot be used to identify individual users.

This list of contact events can be used in two ways by Bluetooth-based contact tracing apps, depending on the type of data storage:

1. **In a centralized model:** anonymized data is collected by individual devices and uploaded to a remote server to analyze contact events.

2. **In a decentralized model:** contact data is stored locally on each device and only compared to the contact identification numbers of those who test positive

In a decentralized model (such as those released earlier this year by Google and Apple), when an individual tests positive, their anonymized contact identification numbers are published to a database that all app users have access to. Each device then compares their contact ID numbers to the database to determine if there was a potential exposure event. When a match is found, the smartphone user is sent an exposure notification and may follow up with testing, self-quarantine, or other responses. ■

[1] As of 2019, 81% of Americans owned a smartphone, according to the Pew Research Center.

[2] This signal can be reduced by obstructions such as walls, in addition to distance.

WHAT DOES A SUCCESSFUL DIGITAL CONTACT TRACING SOLUTION LOOK LIKE?

Given the novelty of digital contact tracing and lack of robust data from past implementations, potential adoption of new technology raises a number of questions for public health, cybersecurity, and privacy experts.

From Public Health Officials:

- What data (if any) are contact tracing apps collecting and are they available to public health officials?
- How might developing and deploying digital contact tracing apps impact resources also needed by traditional contact tracing and support services?
- Does a smartphone-based app exacerbate existing inequities or create new ones?

From Cybersecurity Experts:

- What mechanisms should be in place to defend against malicious users that may want to create fake infection events?
- If contact tracing varies from county to county, how do apps deal with roaming users that move between counties?

From Privacy Experts:

- What procedures are in place to determine who has access to data generated by contact tracing apps?
- Could security breaches in apps exacerbate existing government mistrust, undermining other contact tracing efforts?
- Can employers or schools require you to download an app?

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