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Cellphone apps designed to track covid-19 spread struggle worldwide amid privacy concerns

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Widely touted initiatives to introduce privacy-friendly, voluntary smartphone apps have not had a demonstrable impact on the pandemic, researchers and public health officials say, despite a partnership between Silicon Valley rivals Google and Apple to make such technology work across different types of smartphones. Apps based on this partnership have been introduced in 14 countries, as well as in Northern Ireland and Gibraltar.

Virginia earlier this month released the first statewide app in the United States based on the Google-Apple technology, which has been under development since April, and Alabama launched a limited pilot version. Though there is no overall national effort to build such an app in the United States, Google says there are initiatives underway in 20 states and territories covering nearly half of the national population.

But public health experts monitoring such efforts across the globe have grown discouraged at a time when the coronavirus is surging in the United States and other nations, with confirmed new cases worldwide now measured in the hundreds of thousands each day.

"It's kind of a mess," said Jeffrey Kahn, director of the Johns Hopkins Berman Institute of Bioethics. "So far nothing has been consequential. … We don't really know if it's working or not working."

Most of the coronavirus apps work by using Bluetooth technology to detect when a user has prolonged and close contact, typically at least 15 minutes and within about six feet, with another person who also is using such an app. If one of the users later reports to the app that they have tested positive for the coronavirus, those logged contacts get alerts on their smartphones saying they may have been exposed and should seek a test or quarantine themselves.

But the alerted people do not learn where, when and by whom they might have been exposed through the apps based on the Google-Apple technology, despite requests from some public health officials to make this information available. Such limits were designed to protect the privacy of sick people but can leave those who receive alerts without the information necessary to evaluate the risk.

Critics argue such decisions have hobbled the effectiveness of the resulting apps.

A bigger problem may well be simple distrust or, perhaps, disinterest. Many researchers say about two-thirds of a state or nation's population must use a coronavirus smartphone app for it to report a useful number of contacts between infected and uninfected people. Few nations have gotten beyond 1 in 5 residents downloading the apps, though some researchers say even small percentages might have some value.

Even countries that boast millions of downloads don't begin to approach the two-thirds standard: Ireland's reported 1.3 million downloads, out of nearly 5 million residents is a rate of 26 percent, and Switzerland's 2 million downloads out of 8.5 million residents, is just over 23 percent. But in most nations using the Google-Apple software, the percentages are lower.

In the first three weeks after the June launch of France's StopCovid app, for example, only 68 people used it to report a positive test for the coronavirus. They had come into contact with just 14 others who were using the app. France's coronavirus infection rate has zoomed in the past month; on Sunday, the country's public health agency reported a second day in a row with more than 3,000 new cases.

As of midnight Sunday, Virginia's app has been downloaded 356,777 times, slightly more than 8 percent of Virginians 18 to 65 with a smartphone, according to Julie Grimes, the public information officer for the Virginia Department of Health. Virginia's total population is 8.6 million.

"People are starting to realize that an app is not enough. It's not going to fight the virus," said Olivier Blazy, a computer science professor at France's University of Limoges who has been critical of the apps. "If you are going to invade my privacy, at least I'd like to see results."

Patrick Larscheid, head of the health department in the Berlin district of Reinickendorf, said he has not even downloaded Germany's "Corona-Warn-App." No one has called his district's hotline to say they have received a notification through the app. But even if they did, the health staff would not be able to advise them to quarantine since the app provides no details about the nature of the contact.

"If you are sitting in a restaurant and someone was sitting at another table with their back to you, the app would say it's a dangerous contact," Larscheid said. "Or if you are sitting inside and someone else is sitting outside and leaning on the same window."

Larscheid called the app "useless."

After months of frustration and delay, a very basic version of a coronavirus app from Britain's National Health Service was launched for pilot testing this month. It won't yet perform the main function originally promised, letting people know if they've been in close contact with a person who's tested positive. Instead, the simple 1.0 version will inform users of infection levels in their postal code and help them book a coronavirus test if they feel the need. A cutting-edge app is likely months away.

Mixed reaction to the apps

High-tech approaches still have their advocates, especially for the broader purpose of tracking the spread of the coronavirus through a population and spurring government action — even if the individual apps have not yet proven to be effective.

"I haven't given up hope," said Alain Labrique, an associate professor of international health who studies new health technologies at Johns Hopkins. "Three to four months in the technology innovation space is not a long time."

Excitement about high-tech solutions to the pandemic was perhaps strongest when Google and Apple announced their initiative in April. The partnership, between two of Silicon Valley's most successful companies and ones that compete on several fronts, raised hopes that by having alert technology built directly into the operating systems of Android devices and iPhones, there would be wide enough adoption to make the resulting apps effective.

But there was concern about the privacy implications from the outset. Some widely publicized security problems, in nations such as South Korea and the United Kingdom that weren't using the Google-Apple technology, intensified worries.

The world's public health authorities, meanwhile, struggled to build the types of apps they said would be most helpful in slowing the spread of the coronavirus. Apple, which controls how much of the iPhone's hardware developers can access when they build software, objected to several key requests, according to public health officials. In order to most effectively trace contacts using Bluetooth, a technology considered a major drain on device battery life, an app needs to activate that antenna more often than is currently allowed by Apple.

Some people who have used the apps have found them frustrating. Phillip Meyer, 33, a teacher from Hamburg in northern Germany, downloaded Germany's app as soon as it came out in June. He said he had been careful in following the social distancing rules throughout the last months. After he had installed the app and had been on holiday in the countryside with almost no physical contact, he felt "clean enough" to visit his elderly in-laws.

Then, the app alerted him about a risky encounter that had happened five days earlier. But that was all the information the app shared.

"To be honest, in that moment, I wished that there would have been a more precise way of tracking," Meyer said. The alert to him felt like a "step back into the lockdown feeling; I am the red one, the possible super-spreader eating cake with my over-80-year-old grandmother."

When Meyer called the health authorities, a doctor came to his apartment within 35 minutes to administer a test, he said. After two days, his test result was online: negative.

Where nations used more aggressive tactics

Nations such as Kuwait and Bahrain have used tracking based on smartphones or digital bracelets to enforce orders that people quarantine themselves after traveling or having a potential exposure to an infected person. China's coronavirus app uses digital records to analyze risk and, when someone is deemed in danger of spreading the virus, they can be ordered to isolate themselves.

South Korean officials managed one of the world's leading success stories against the pandemic by deploying tactics both traditional — such as masks and contact tracing — and high-tech. This included gathering credit card records, examining video footage and collecting troves of location data kept by cellphone companies on their customers.

Following a mass outbreak at a nightlife district in Seoul in May, South Korean officials identified thousands of clubgoers by reviewing guest entries and credit card transaction records at venues. But complicating the search was stigma related to the largely gay clientele among nightlife establishments in the Itaewon neighborhood.

As authorities struggled to identify connections among people infected with the coronavirus, they analyzed cellphone location data for people who had been near the virus hot spots. Under South Korea's infectious diseases law, contact tracing officers can obtain personal information such as phone location data from telecom operators and transaction records from credit card companies without an individual's consent.

"Patients often share inaccurate information with contact tracing officers, either because they don't want to share sensitive details or simply because of bad memories," said Na Baeg-ju, former director general of Seoul City's Civil Health Bureau who led the city's coronavirus response. "The obtained data serve as essential backup to verify and supplement the firsthand accounts."

While evidence remains sparse that these tactics were crucial to the government's wide-ranging response, South Korea was able to drive its new infection rate sharply downward without imposing the kind of wide-scale economic shutdowns common in the United States, Europe and many other parts of the world.

A team of researchers recently singled out the aggressive efforts as effective. Their paper, "The Cost of Privacy," used modeling of human movements to conclude that the South Korean approach convinced people to avoid neighborhoods with the highest risks for transmission.

The key, though, was the government's reliance on location data to indicate where infections occurred — something many apps in Western countries, including those based on the disease-surveillance initiative by Google and Apple, don't include.

Economist David O. Argente said widespread shutdowns of national economies were very costly and also, perhaps, could have been avoided if more targeted data allowed ordinary people to know what spots to avoid. Koreans got texts showing that infections had occurred, for example, in a particular coffee shop.

"Nobody went to that coffee shop. It was clear that people were responding to that information," said Argente, an assistant professor at Pennsylvania State University. "Location was crucial there."

Still no support from privacy advocates

But privacy advocates are skeptical that such intrusive approaches offer enough benefit to justify the expansion in government power. This debate has played out with particular intensity in Israel, which has tried both heavy-handed government surveillance and a more privacy-friendly, voluntary app. (It is not based on the Google-Apple technology).

Israel in March had its top security agency develop a way to capture almost every cellphone in the country in a digital dragnet. No user could opt out.

The agency, Shin Bet, normally responsible for combating terrorism, combined geolocation information from commercial cell networks with classified data analysis techniques. When a phone was detected as being close to one belonging to a person known to be infected with the virus, agents alerted the Ministry of Health. Tens of thousands of Israelis have received subsequent text messages, mandating two weeks of home isolation.

But civil rights advocates soon mounted legal challenges against the approach, imposed as an emergency measure by Prime Minister Benjamin Netanyahu. Israel's Supreme Court ordered it stopped

in April until it gained parliamentary approval. A Knesset committee voted for it to continue with time limits.

Advocates and some lawmakers questioned the system's accuracy, and many

phone subscribers disputed the findings that forced them into quarantine, contending they had not been in the suspect area or the phone hadn't been in their possession. By early June, as Israel was emerging from lockdown, the program was allowed to lapse after more than 100,000 Israelis received the messages it generated.

But on July 1, in the midst of a resurgence of coronavirus infections, officials scrambled to resume the program for a 21-day period. Almost 30,000 phone users were contacted over the first weekend after the program restarted, and on July 20, the Knesset provisionally authorized it to continue into January.

Meanwhile, a voluntary tracking app developed by the Ministry of Health has failed to gain widespread usage. Fewer than 2 million Israelis have downloaded the app, according to recent testimony in the Knesset, and only about 800,000 have actively used it, with usage declining markedly after the lockdown ended.

Hendrix reported from Jerusalem, Kim from Seoul and Weber-Steinhaus from Hamburg. Michael Birnbaum in Riga, Latvia, Loveday Morris in Berlin, William Booth in London, and Reed Albergotti and Geoffrey Fowler in San Francisco contributed to this report.