



FEATURE

Q&A

Covid-19 contact tracing: a briefing

The UK has plunged into a new programme of contact tracing—three months after it abandoned its original test and trace strategy for covid-19. **Chris Baraniuk** explains what we know about current global efforts and why they are crucial during a pandemic

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What is contact tracing?

By finding out who has had close contact with an infected person, contact tracing can determine who should be tested or asked to self-isolate. If done swiftly, this can contain outbreaks within a small population. Even when a disease has become widespread, contact tracing can still help to curtail transmission. And it can reveal useful data on where and how the disease is spreading.

Contact tracing has previously been used successfully to control outbreaks of Ebola¹ and various sexually transmitted infections.² But particularly with covid-19, contact tracing needs to be combined with widespread testing of the public to identify new outbreaks as they happen, says David McCoy, professor of global public health at Queen Mary University of London. “The point is that you’re trying to detect people early on in the infection, not when they’ve become symptomatic,” he told *The BMJ*.

What does it involve?

A substantial proportion of contact tracing comprises telephone interviews with an infected person’s recent contacts—people who have been within 2 metres for 15 minutes or more,³ as suggested by the European Centre for Disease Prevention and Control. The centre also recommends that covid-19 contact tracers classify an infected person’s contacts as “high risk” or “low risk,”⁴ depending on the level of contact they report. It advises that tracers follow up with contacts to see if their infection status changes.

In some countries, like South Korea, contact tracing has also involved detective work such as scouring CCTV footage, GPS location data from smartphones, and even credit card transaction records to find out who came into contact with whom.

Is it still effective when there is widespread infection?

Even by the 31 March, contact tracers in the US reported that they were overwhelmed with the amount of work they were facing.⁵ At that time, the country already had more than 160 000 confirmed cases of covid-19. Now it has more than 1.3 million.

In the UK, the fact that thousands of local outbreaks are happening is even more reason to focus contact tracing efforts, says Allyson Pollock, clinical professor of public health at Newcastle University. “You need locally responsive teams to put out the fire, but the government has unfortunately destroyed and decimated that,” she says, pointing to a decade of austerity and the dismantling of local health infrastructure. Pollock says that local teams would be able to decide for themselves how to deploy contact tracers because they have a clear understanding of what parts of the local community are most vulnerable. McCoy agrees: “The centralisation of contact tracing is, in my view, a mistake.”

How have different countries implemented contact tracing?

South Korea famously contained two worrisome outbreaks of covid-19 in Daegu and Cheongdo and has recorded just 250 or so deaths to date. Jonathan Kennedy, of Queen Mary University of London, describes in an online article how contact tracing was a major element of South Korea’s covid-19 strategy.⁶ But he says it’s not possible to simply copy the country’s approach in the UK.

“South Korea spent years preparing for this [and] seems to have a very well functioning public health system. You can’t just magic that up after 10 years of austerity and build all that from scratch,” he says. Plus, contact tracers in South Korea had access

to CCTV footage, data from mobile phones and cars, and credit card records. That would be considered “far too intrusive” here, says Pollock.

In Europe, most countries are working to expand the manual contact tracing workforce.⁷ Staff in the Republic of Ireland are making 2000 calls a day, and this is set to rise to 5000 a day. Belgian authorities plan to recruit 2000 tracers who will be based in regional offices—a markedly different strategy from the UK, which favours a centralised approach.

Around the world, different countries face different challenges. In Liberia, which has dealt with Ebola outbreaks in recent years, there is considerable stigma and mistrust around infectious diseases and even those who are trying to combat them, such as contact tracers. The country has attempted to assign contact tracers within their own communities to help mitigate this.⁸

Can smartphone apps help?

App based tracing leverages the fact that in many countries, including the UK,⁹ most of the population owns a smartphone. These devices can be configured to communicate with one another and to keep a record of when two phones come into proximity. When someone reports through the app that they are feeling unwell, the app can provide information about how that person can get a covid-19 test. Should the user later notify the app that they have tested positive, the software can automatically send an alert to other phones that were nearby in recent days.

The “manual” approach, by contrast, means that tracers have to ask people who have tested positive for the virus to tell them who they might have been in contact with and then follow up those people by telephone. The European Centre for Disease Prevention and Control notes that calls with each contact can take around 20 minutes. The manual process is “too slow,” given the transmissibility of covid-19, according to researchers at the University of Oxford.¹⁰

That said, researchers from the covid-19 working group at the Centre for the Mathematical Modelling of Infectious Diseases recently shared a preprint that compared app based contact tracing to manual tracing.¹¹ The app based strategy achieved a 44% reduction in transmission, whereas manual tracing reduced transmission by 61%. This assessment was based on the assumption that 53% of the population would download and use the contact tracing app.

In addition, manual tracing allows for a human voice that can be comforting when breaking bad news of a positive result, and it also reaches people that might not use or be comfortable with smartphones or electronic data sharing. In practice, a contact tracing programme might rely on both automatic and manual approaches.

How do contact tracing apps work in practice?

One major stumbling block for these apps is that they require a large proportion of people in a population to download and use them. In the UK, experts advising the NHS say that 80% of smartphone users—roughly 56% of the total population, or 37 million people—would need to use the app for it to be effective.¹²

There have also been disagreements over the technical details of apps developed in various countries. Some nations have opted for a decentralised approach, in which records of device interactions are stored locally on the smartphone itself rather than in the cloud, on centralised servers owned by companies

or governments. This is the method preferred by Apple and Google, the companies behind the two most popular smartphone operating systems, iOS and Android. In the UK and France, however, the official apps gather data and send it to a centralised system.

What is the UK’s contact tracing strategy?

The UK had been conducting contact tracing until the government decided to stop this on 12 March when it moved testing capacity exclusively to patients admitted to hospital. The reasons for this were not disclosed at the time, but the government has implied that it was due to a lack of capacity in the face of skyrocketing cases. By 12 March, 30 000 people had been tested in the UK.¹³ KK Cheng, a professor of public health and primary care at the University of Birmingham, says that the UK abandoned contact tracing “way too soon.”

Full details of the new contact tracing programme have not been made public. But we do know that the government has committed to hiring 18 000 people, including 3000 healthcare staff, to handle phone calls. All are to be appointed by the week beginning 18 May. *The Times* reported that thousands of these workers will be recruited through private companies,¹⁴ and *The BMJ* has seen one recruitment advertisement for covid-19 contact tracers posted online by outsourcing firm go-centric. Matt Hancock, the health secretary, announced at a press conference on 4 May that “thousands” of people had already been hired.

A spokesperson for the Department of Health and Social Care told *The BMJ* that they were “confident” that the hiring target would be met by the deadline. They declined to say what questions call handlers will ask and what advice they will give to people who are suspected to have caught covid-19. “Further details will be set out in due course,” they said.

But Cheng says that more staff might be needed. The 18 000 mooted is “probably an underestimate” for how many will actually be required, he told *The BMJ*, adding that there was little point in setting arbitrary targets. “If you find 18 000 is not enough, then give them 36 000,” he says.

The UK has also launched an app to gather data for contact tracing. Currently, it is being evaluated on a small scale on the Isle of Wight.

Will the UK app work, and will people’s data be safe?

Besides the fact that many people will need to use it, the app, which was developed by private firm VMWare, has faced criticism because of technical limitations.

Cybersecurity news site *The Register* reported that the iOS version of the app will only allow new connections to be made via the wireless technology Bluetooth when the app is running in the foreground—in other words, on screen on an unlocked phone.¹⁵ Android phones also restrict Bluetooth connectivity for apps that are running in the background or not presently on screen.

Tests are needed to find out exactly how limited the app is, but the worry is that in some situations it will not be able to detect phones when devices are locked and sitting on a table or in people’s pockets, for example. That could drastically reduce the app’s usefulness.

Because the software has been designed to send data to a central location for storage, rather than keeping it on people’s phones, the app will also not be able to use the new system developed

jointly by Apple and Google that makes Bluetooth connections easier.¹⁶ The developers have indicated that centralising the data will provide more information about the spread of covid-19.¹⁷

Matt Hancock has hit back at suggestions that the app will not keep people's data sufficiently safe. It was "completely wrong" to suggest the app was a threat to civil liberties, he said, insisting that people would remain anonymous.¹⁸

Despite some reports stating that data on the app will be deleted after 28 days, MPs have heard that, if shared with the NHS, the data might in fact be kept for research purposes.¹⁹ Michael Veale, lecturer in digital rights and regulation at UCL, argued on Twitter²⁰ that the app's method of anonymising data does not meet the UK's own legal definition of anonymisation. This is partly why some critics are concerned that data gathered by the app could, with some effort, be linked back to individuals in the NHS or other records.

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