

## What if smartphones could help contain COVID-19?

The recent outbreak of respiratory diseases triggered by the new coronavirus poses a challenge to public health worldwide. As governments evaluate how to stop further contagion, what role could smartphone apps play in the overall effort? Can tracking data recorded by smartphones help better understand and stop the spread of the virus?

From its [first appearance in Wuhan](#) in December 2019, the new coronavirus has spread to a majority of countries in the world, including most EU Member States.

The outbreak of this new respiratory ailment poses challenges to our medical systems – and society at large – at many different levels.

On one hand, there is the issue of dealing with [individual patients](#), helping them to recover as quickly as possible, while searching for drugs that can help the recovery process and possibly a vaccine that can protect people at risk in the future.



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On the other hand, there is the challenge of [slowing the spread](#) of the virus into those parts of the population it has not yet reached. This includes getting a better understanding of where and how the virus is actually being transmitted. Appealing to the wider population to increase their personal hygiene effort (washing hands, sneezing into the elbow, etc.) is helpful, as are targeted measures to cancel large gatherings, sporting events, school classes or restrict travel, extending to various levels of confinement. While all these measures can undoubtedly help contain the virus, they are, however, rather unspecific, in the sense that they impose a heavy burden on a large group of people, while possibly not being sufficiently restrictive on those who actually, although unknowingly, are carrying the virus.

In view of halting the further spread of the virus as [efficiently as possible](#), without imposing unnecessary restrictions and disruption on the wider population, it is therefore of key importance for health authorities to [quickly identify](#) all possible contact persons with whom an infected person might have interacted recently, to test those contact persons, and focus monitoring and effective quarantine measures on the contact persons identified.

### Potential impacts and developments

At the early stages of the outbreak, health authorities therefore focussed much of their energy on this process of identification of contact persons. Those who test positive for the coronavirus seem to have generally [cooperated well with the authorities](#), and this made it possible to identify and isolate additional carriers of the virus quickly, preventing them from further spreading the virus. This process of interviewing every single carrier of the virus, and reaching out to all possible contact persons, is, however, time and labour intensive, and carriers might not always remember in great detail all the contacts they have had over the past few days.

What if we used smartphones to make this process faster and more efficient?

In recent years, smartphones have increasingly attracted attention as a [key tool](#) in emergency and disaster situations. Almost all smartphones today are equipped with GPS sensors, and most of them track the location of their owners – places they visited and the times – in great detail. This tracking can be switched off by individual users, but many users keep tracking [enabled](#), to allow the smartphone to deliver a range of useful location services, such as recommending best travel routes and interesting nearby restaurants, or providing feedback on the number of steps walked and other health parameters. Infected patients who share their location history on their smartphones with public health authorities can help them quickly identify the [restaurants, cinemas, parks or other places](#) the patient had frequented, where they could possibly have been infected, or where they may have transmitted the virus to other people. However, it would remain a challenge to identify all the other persons who have recently visited the same places in order to test them for a possible infection.

This is where big data could play a crucial role: comparing the [location history](#) of infected individuals with the location history of all other smartphone users (tested positive or not yet tested) could help health authorities gain a much better understanding of where the transmission might have occurred, and who else should be tested urgently. At the same time, individual smartphone users could obtain an instant assessment of how close they have recently been to potential infection sources, whether they should take measures urgently, or whether there is less reason to worry.

Comparing location histories using such a system could dramatically simplify the task of halting the spread of the novel coronavirus. At the same time, it would also raise a host of serious questions about possible data privacy and digital self-determination issues that merit careful consideration.

### Anticipatory policy-making

Many people feel uncomfortable about sharing their location history, even in the context of a health emergency. It is unlikely that citizens would appreciate being identified as a potentially infected person through online media. They would, however, probably value a system that helps them to better understand the extent of their personal risk of having contracted the virus during a recent holiday or at an event they attended. Citizens would also appreciate more precise information about places they should refrain from visiting to avoid infection.

Individual infected users might not mind if close relatives and friends get automated warnings about the infection, but would not want that information [needlessly divulged](#) to the general public in a personalised form. They might understand the need to share their data with public health authorities, but might be worried to what degree this makes their personal lives [transparent to public authorities](#) in general (despite many people seeming less worried about [sharing data with companies](#) that make profits from that data). Citizens might appreciate having access to a better picture of their own risk status, but would be uncomfortable with this being shared in the future with insurance companies, employers, or for other commercial purposes. Ultimately, policy-makers will have to decide how transparent such a system is to the individual user, the provider collecting the data on the smartphone, and to public authorities.

Generalising the use of big data to assess the individual risk profiles of a large number of people certainly infringes the [right to privacy and informational self-determination](#), but not using this technology and instead imposing more indiscriminate measures on the populations of whole regions or countries also comes with a cost in terms of personal freedoms. The challenge is to reach a broad societal consensus on the right balance between maximising the benefit we can derive in terms of containing the spread and gaining a better understanding of the disease, while minimising the possible infringement of individual rights. [China](#) and [South Korea](#) were swift to use smartphone technology in the current crisis, with some problematic implications. What lessons can we learn from the experience in those countries as [applications](#) begin to be developed in the EU, the [United Kingdom](#) and the [United States of America](#)?