

# Improving Case and Contact Tracing During the COVID-19 Pandemic

Series | COVID-19 & response strategy

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[ This is the eleventh document in a series of discussion notes addressing fundamental questions about the COVID-19 crisis and response strategies. These documents are based on the best scientific information available and may be updated as new information comes to light. ]

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“Testing, isolation and contact tracing” are “the backbone of the response” to the COVID-19 epidemic, according to Tedros Adhanom, Director General of the World Health Organisation (WHO)<sup>1</sup>. Since the novel coronavirus outbreak began in China,<sup>2</sup> the WHO has been urging countries to rapidly scale up their systems for detecting and isolating cases and tracing and quarantining contacts—the key elements in response and control efforts. The European Centre for Disease Prevention and Control (ECDC) has also emphasised the need for contact tracing from the outset<sup>3</sup>. **While physical distancing and hygiene measures help to reduce the risk of infection, to break the chain of transmission it is essential to identify and isolate all cases and quarantine their contacts.**

Most of the countries that managed to avoid a steep epidemic curve (South Korea, Singapore, China, Albania, New Zealand, etc.) did so by starting contact tracing early in the outbreak. **Confinement measures are useful, but they have a heavy impact on people, communities and the economy and are not sustainable in the long term.** Contact tracing allows for more selective—and therefore more rational and sustainable—confinement measures ●

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<sup>1</sup> WHO Director-General’s opening remarks at the media briefing on COVID-19, 16 March 2020.

<sup>2</sup> Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV).

<sup>3</sup> Contact tracing: Public health management of persons, including healthcare workers, having had contact with COVID-19 cases in the European Union.

**Table 1. Characteristics of COVID-19 to Consider in Case Monitoring and Contact Tracing.**

- **Short incubation period (1-14 days)<sup>4</sup>** → Contacts must be identified quickly to stop them from infecting other people.
- **People without symptoms can spread the disease** → Contact tracing is necessary in asymptomatic cases.
- **Transmission can occur up to 48 hours before the onset of symptoms** → Close contacts of the infected person during that period must be identified<sup>4</sup>.
- **High transmissibility + large volume of cases and contacts** → Contact tracing systems must be flexible and adequately resourced (staff and technology).
- **Viral spread will continue until an effective vaccine is developed, so new waves of infection and pressure on the health care system are likely** → Surveillance and contact tracing will have to continue for some time, even after the last local case is reported.

# 1. Case Identification: Automated Information Systems for Fast and Exhaustive Reporting

**“In the case of COVID-19, prompt reporting is essential. Any delay in reporting can lead to delays in contact tracing, which in turn allows contacts to spread the disease before they can be isolated.”**

Each country has its own surveillance system responsible for managing cases of notifiable diseases, including COVID-19. Surveillance systems typically rely on case reports from health care facilities and diagnostic testing laboratories to identify (and, if required, isolate) cases and detect outbreaks and epidemics.

In Spain, notification is not always done via electronic health information systems. In other words, the cases recorded in a health information system are not automatically sent to the surveillance network; manual (non-automated) reporting must be done in parallel. Consequently, when the number of cases increases, reporting may be delayed. In the case of COVID-19, **prompt reporting is essential**. Any delay in reporting can lead to delays in contact tracing, which in turn allows contacts to spread the disease before they can be isolated.

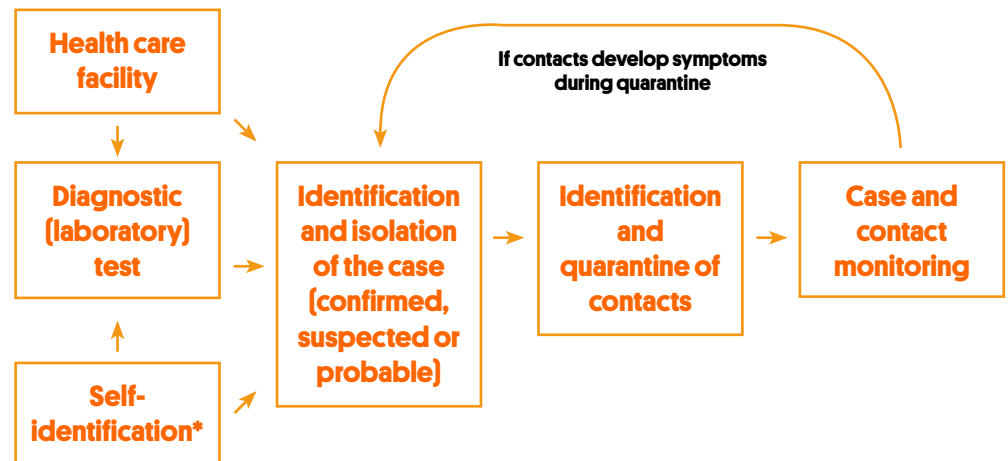
Notifiable disease reporting has been practised for decades, but the COVID-19 epidemic presents an opportunity to strengthen and improve the system. Advances

in health information systems, including electronic health records, make it possible to standardise the reporting of cases of COVID-19 (and, ideally, other notifiable diseases). Under a standardised reporting system, **cases are automatically reported** as soon as the patient comes into contact with the health system. Standardised reporting also helps surveillance systems to operate more smoothly, ensuring fast and exhaustive identification of cases.

All confirmed cases of COVID-19 should be **reported and isolated**. **Probable cases** (patients diagnosed on the basis of symptoms and radiology) and **suspected cases** (patients diagnosed on the basis of symptoms only) should also be reported and isolated if diagnostic testing is not an option for whatever reason. Contact tracing should begin immediately when a case has been identified and the patient isolated (*Figure 1*) •

<sup>4</sup> Du Z, Xu X, Wu Y, Wang L, Cowling BJ, Meyers LA. Serial interval of COVID-19 among publicly reported confirmed cases. *Emerging Infectious Diseases*. 2020;26(6).

**Figure 1. Elements of a Contact Tracing and Monitoring System.**



\*If notification via mobile app, website or emergency telephone number is possible.

## 2. Contact Identification: Bluetooth and Geolocation Technologies Are No Substitute for Traditional Contact Tracing

**“Technologies could be useful as a complement to traditional contact tracing, but they should not be relied on exclusively. They can help to identify all of the infected person’s close contacts—both known and unknown—thereby increasing the reach and impact of contact tracing.”**

The first step in contact tracing is to identify people who have been in close contact with the infected person any time after **48 hours before the onset of symptoms** (or, in the case of asymptomatic cases, any time after 48 hours before the diagnostic test was performed). Anyone who has been less than 2 metres away from the infected person for 15 minutes or more is considered a close contact. In addition, anyone who has shared a closed environment with the infected person—e.g. a home, a meeting room, or an aircraft (within two seats in any direction)—for 15 minutes or more is also considered a close contact.

### How should contacts be managed?

- It is **important to identify contacts as quickly as possible** so that they can go into quarantine immediately and avoid infecting other people. In traditional contact tracing, a health professional conducts a case interview by telephone to ascertain the infected person’s close contacts and collect the necessary epidemiological information to reconstruct the chain of

transmission. To minimise the time spent on telephone calls, patients may be asked to provide their personal details and identify their contacts (including a list of names and telephone numbers) by filling in an online questionnaire. A contact tracer then calls each contact to inform them that they must go into quarantine for 14 days (in their own homes or, failing that, in a specially designated quarantine facility).

- **Active monitoring of contacts throughout the 14-day period increases adherence** to quarantine. Monitoring can take the form of a daily telephone call from a contact tracer. It can also be semi-automated: daily text messages asking the contact to record their temperature and symptoms via an online questionnaire or notifications from a mobile application (app) that the contact can use to provide this information. Contacts who develop symptoms are classified as probable cases. Ideally, probable cases should be referred for diagnostic testing (if available).
- To facilitate the isolation and quarantine of cases and contacts, legal protections

for workers must be in place and **companies should encourage teleworking**. In cases where teleworking is not possible, workers should be **granted medical leave**. Communication with the public is also critical, since the concepts of *contact*, *quarantine* and *isolation* need to be widely understood. It is important to communicate the value of contact tracing and cultivate public support to encourage adherence to quarantine and isolation.

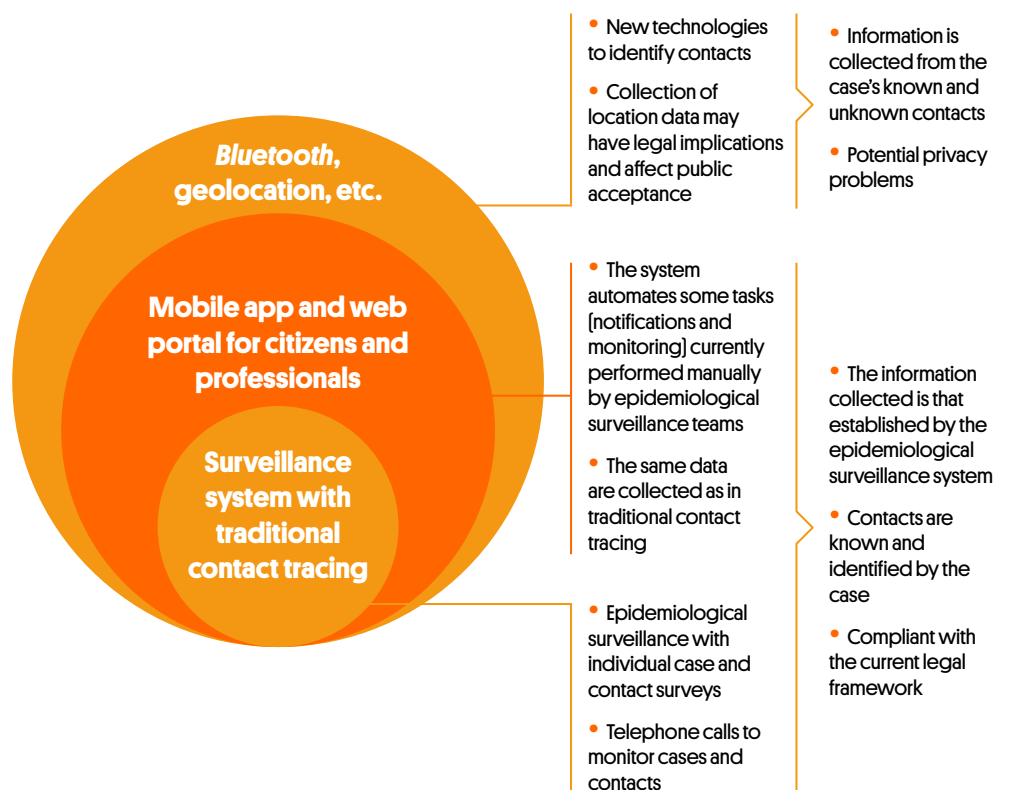
**New technologies**, such as Bluetooth- and geolocation-based mobile telephone tracking, can help to identify contacts and could be used in tandem with traditional contact tracing. In the traditional system, it is usually impossible to identify strangers who have been in close proximity to the infected person in public spaces. New technologies make it possible to identify all of the infected person's close contacts—both known and unknown—thereby increasing the reach and impact of contact tracing.

However, these technologies also have many **limitations**. First, it is not always

possible to reliably calculate the distances between people (or, for example, to determine whether or not there was a wall between them). Second, the use of these tools may have legal implications, particularly with regard to data protection. Finally, these technologies are more useful when used by a large number of people, which requires a high level of public acceptance. If all data were anonymised, it would be easier to gain public acceptance and comply with regulations, but it would be impossible to confirm that the contacts identified by mobile technology were in fact close contacts of known cases.

If legal protection and acceptance could be guaranteed, **these technologies could be useful as a complement to traditional contact tracing, but they should not be relied on exclusively**. *Figure 2* summarises the functional relationship between the various elements that can be used in contact tracing ●

**Figure 2. Functional Relationship Between the Technologies That Can Be Used in the Contact Tracing System.**



# 3. Resources Needed for Contact Tracing

**“In order for contact tracing to be carried out in all confirmed and suspected cases, surveillance services must be assigned additional full-time staff and technical resources so that assistance can be provided and surveillance can be carried out even when the virus is spreading rapidly.”**

In order for contact tracing to be carried out in all confirmed and suspected cases, **surveillance services must be assigned additional full-time staff and technical resources** so that assistance can be provided and surveillance can be carried out even when the virus is spreading rapidly. The system needs to be flexible and capable of increasing and decreasing its staff according to needs in different phases of the epidemic.

To coordinate everyone working in the contact tracing system, case and contact data should be **centralised** and a dashboard showing task lists (including calls scheduled each day) should be remotely accessible.

The **semi-automation of some communications** (online surveys, mobile apps, text messages, etc.) reduces staffing needs. Nevertheless, **certain communications**—cases interviews to identify known contacts and initial communications with contacts—do not lend themselves to automation and should always be done by telephone. Moreover, there will always be a certain percentage of the population that lacks access to new technologies or does not know how to use them.

According to the most recent staffing estimates published by ECDC<sup>5</sup>, an **initial case interview takes about 45 minutes and each call to contacts takes about 10 minutes**. For every 10 new cases reported each day, three to seven full-time contact tracers are needed for case interviews and initial calls to each contact. An additional 10 to 21 contact tracers are needed to perform active daily follow-up. If an automated notification and follow-up system is available, staffing needs decrease by half ●

<sup>5</sup> <https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-Contract-tracing-scale-up.pdf>.



# 4. Requirements for an Efficient Surveillance and Contact Tracing System

**“It is important to detect cases as early as possible by testing all symptomatic individuals. If diagnostic tests are in short supply, anyone who develops symptoms should be considered a possible case and self-reporting of symptoms should be encouraged.”**

In conclusion, the requirements for an **efficient** surveillance and contact tracing system that minimises the amount of manual work are as follows:

- **Early and exhaustive case detection.** It is important to detect cases as early as possible by testing all symptomatic individuals. If diagnostic tests are in short supply, anyone who develops symptoms should be considered a possible case and self-reporting of symptoms should be encouraged.
- **Reporting of cases in (almost) real time.** It is essential to minimise the time between the identification of a case and the start of contact tracing. Rapid reporting of suspected, probable and confirmed cases—ideally via existing health information systems—can help to achieve this goal. It is also necessary to identify and eliminate duplicates entering the system by different routes (e.g. detection in primary care and by laboratory testing).
- **Planning of human and technical resources for the contact tracing system,** with the **flexibility** to add more staff as case volume increases.
- **Rapid identification and quarantining of contacts, supported by online surveys.** The use of online surveys to identify contacts plays a critical role in expediting the process. The data collected are subsequently confirmed by the contact tracing team.
- **Semi-automated active monitoring of contacts.** Automated communications via text message, email or mobile app (where possible) can speed up the process and drastically reduce the number of telephone calls.
- **Centralised dashboard** to coordinate the teams responsible for different tasks (case interviews, follow-up with contacts, etc.).

- **Visualisation of transmission chains and control panel.** By mapping the links between known cases and their contacts and identifying the date and place of contact, it is possible to represent transmission chains visually and detect “hotspots” where numerous contacts occur.

- **Resources to facilitate isolation and quarantine.** To ensure that cases and contacts are able to go into isolation or quarantine, it may be necessary to provide relocation assistance, financial support and welfare aid.

- **Inclusive communication campaigns** that incorporate the citizen’s perspective, build public trust and clarify the key concepts of contact tracing.

These requirements emphasise the **use of technology to reduce the time** between the detection of a case and the quarantining of known contacts, the **optimisation of human resources** and the creation of a **system that can be adapted to different epidemic scenarios** (during control or mitigation, during surveillance phases with sporadic cases, and with or without testing). They do not include the identification of contacts using Bluetooth- or geolocation-based mobile technology, but these methods could be added if they were deemed effective in a particular epidemic scenario, possible from a data protection standpoint, and acceptable to the public •


## TO LEARN MORE

- [Contact tracing: public health management of persons, including healthcare workers, having had contact with COVID-19 cases in the European Union – second update](#). European Centre for Disease Prevention and Control (ECDC). 8 April 2020.
- [Contact tracing for COVID-19: current evidence, options for scale-up and an assessment of resources needed](#). European Centre for Disease Prevention and Control (ECDC). 8 April 2020.
- [Public health workforce. A checklist for establishing a scaled-up public health workforce for COVID-19 contact tracing](#). Resolve to Save Lives.
- [COVID-19 Contact Tracing](#). Coursera course, Johns Hopkins Bloomberg School of Health.

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