

Surveillance strategies for COVID-19 human infection

Interim guidance
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Background

COVID-19 has spread rapidly around the world, affecting every community directly or indirectly. Stringent public health and social measures (PHSM) have been put in place by all countries to slow the spread of COVID-19. These include limitations on domestic and international travel; stay-at-home orders; closing of schools, shops, and religious centers; among other measures. As public health authorities consider the lifting some of these measures, it is critical that robust surveillance is in place or put in place to control the spread of COVID-19 and guide ongoing implementation of control measures.

The aim of surveillance for COVID-19 is to limit the spread of disease, enable public health authorities to manage the risk of COVID-19, and thereby enable economic and social activity to resume to the extent possible. Surveillance is also necessary to monitor the longer-term trends of COVID-19 transmission and the changes in the virus.

This guidance should be read in conjunction with WHO's guidance on preparedness, readiness and response actions.¹

Purpose of the document

This document provides an overview of surveillance strategies that Member States should consider as part of comprehensive national surveillance for COVID-19. This document emphasises the need to adapt and reinforce existing national systems where appropriate and to scale-up surveillance capacities as needed.

WHO previously published a guidance document for the "Global Surveillance for COVID-19 caused by human Infection with COVID-19 virus" that includes recommendations and tools for international reporting (accessible [here](#)). When reviewing national strategies for surveillance, Member States should provide sufficient capacity to report to WHO for global surveillance of COVID-19.

Aims and objectives of surveillance for COVID-19

The aim of surveillance for COVID-19 is to limit the spread of disease, enable public health authorities to manage the risk

of COVID-19, and thereby enable economic and social activity to resume to the extent possible.

The objectives of COVID-19 surveillance include:

- enable rapid detection, isolation, testing, and management of suspected cases
- identify and follow up contacts
- guide the implementation of control measures
- detect and contain outbreaks among vulnerable populations
- evaluate the impact of the pandemic on health-care systems and society
- monitor longer term epidemiologic trends and evolution of COVID-19 virus
- understand the co-circulation of COVID-19 virus, influenza and other respiratory viruses

Case definitions for surveillance of COVID-19

See the most up-to-date WHO COVID-19 case definitions at: [Global Surveillance for human infection with coronavirus disease \(COVID-19\)](#).

ILI and SARI case definitions can be found at:

[\(https://www.who.int/influenza/surveillance_monitoring/ili_sari_surveillance_case_definition/en/\)](https://www.who.int/influenza/surveillance_monitoring/ili_sari_surveillance_case_definition/en/)

General considerations

Most countries will need to significantly strengthen surveillance capacities to rapidly identify cases of COVID-19, follow-up their contacts, and to monitor disease trends over time. Comprehensive national surveillance for COVID-19 will require the adaptation and reinforcement of existing national systems where appropriate and the scale-up of additional surveillance capacities as needed. Digital technologies for rapid reporting, data management, and analysis will be helpful. Robust comprehensive surveillance once in place, should be maintained even in areas where there are few or no cases; it is critical that new cases and clusters of COVID-19 are detected rapidly and before widespread disease transmission occurs. Ongoing surveillance for COVID-19 is also important to understand longer-term trends in the disease and the evolution of the virus.

It is important to maintain surveillance for other respiratory disease through existing surveillance systems for influenza-

like-illness (ILI), severe acute respiratory infection (SARI), atypical pneumonia, and other such syndromes. Understanding trends in other respiratory diseases within a population is needed for clinicians and health services managers to ensure that the appropriate resources are in place to diagnose and manage patients with other respiratory infections.

Key considerations for comprehensive COVID-19 surveillance include:

- Use, adapt and strengthen existing surveillance systems
- Include COVID-19 as a mandatory notifiable disease
- Implement immediate reporting where feasible
- Conduct surveillance at different levels of the health care system
- Establish population denominators to aid in data interpretation
- Establish laboratory testing denominators

- Ensure that existing surveillance of respiratory disease such as ILI/SARI are maintained.

Essential surveillance for COVID-19

Considering the potential for rapid exponential growth of COVID-19 cases in populations, new cases should be identified, reported, and data included in epidemiological analysis within 24 hours. National authorities should consider including COVID-19 as a mandatory notifiable disease with requirements for immediate reporting.

Surveillance systems should be geographically comprehensive and include all persons and communities at risk. Surveillance for vulnerable or high-risk populations should be enhanced. This will require a combination of surveillance systems including contact tracing in the entire health care system, at the community level, as well as in closed residential settings and for vulnerable groups.

Table 1 shows how surveillance systems can be combined across different sites to collect data comprehensively.

Table 1. Type of Surveillance and Surveillance Sites for COVID-19

Type of Surveillance	Surveillance Sites					
	Individuals in the Community	Primary Care Sites (non-sentinel ILI/SARI)	Hospitals (non-sentinel ILI/SARI)	Sentinel ILI/SARI Site	Residential Facilities and Vulnerable Groups	Vital Statistics Offices
Immediate Case notification system	X	X	X	X	X	
Contact Tracing System	X					
Sentinel virus surveillance			X	X		
Sentinel case surveillance			X	X		
Cluster investigations	X	X	X	X	X	
Special settings			X		X	
Mortality	X		X	X	X	X

Individuals in the community

Individuals in the community can play an important role in the surveillance of COVID-19. Where possible, individuals who have signs and symptoms of COVID-19 should be able to access testing at the primary care level. Where testing at the primary level is not possible, community-based surveillance, whereby the community participates monitors and reports health events to local authorities, may be helpful for identifying clusters of COVID-19.

Participation in contact tracing and cluster investigations are other important ways in which individuals and communities contribute to the surveillance of COVID-19. Contact tracing is the identification of all persons who may have had contact with an individual with COVID-19. By following such contacts daily for up to 14 days since they had contact with the source case, it is possible to identify individuals who are at high risk of being infectious and/or ill and to isolate them before they transmit the infection to others. Contact tracing can be combined with door-to-door case-finding or systematic testing in closed settings, such as residential facilities, or with routine testing for occupational groups. See [Contact tracing guidelines for COVID-19](#).

Surveillance at the primary care level

Surveillance in primary care is needed to detect cases and clusters in the community. Where possible, testing should be available at primary care clinics; a complementary option is to establish dedicated COVID-19 community testing facilities, such as drive-through sites or fixed sites in community buildings. Patients with probable and confirmed COVID-19 cases should be notified within 24 hours of identification. Fast data reporting and analysis is critical to detect new cases and clusters. Therefore, only the minimum number of data variables should be collected (e.g., age, sex, date of illness onset, date of sample taken, test result, location of testing site). Data reporting to local or national public health authorities could be done online, through a mobile phone app, via SMS text message, or over the telephone. Daily zero reporting by all sites at the primary care level – the reporting of zero cases when none are detected – is crucial to verifying that the surveillance system is continuously functioning.

Hospital-based surveillance

Patients with probable or confirmed COVID-19 diagnoses in hospitals should be notified within 24 hours of identification. All COVID-19 deaths should be reported within 24 hours of death. Additional guidance for reporting COVID-19 deaths is available [here](#).

The minimum essential data from hospital settings should include:

- age, sex/gender and place of residence
- date of onset, date of sample collection, date of admission
- laboratory test result
- severity on admission: admitted to intensive care unit (ICU), treated with ventilation
- if case is a health care worker
- outcome (discharge or death) – usually requiring a follow-up report, as outcome is generally not known within 24 hours of identification of case identification.

Sentinel surveillance using the existing Global Influenza Surveillance and Response System (GISRS)

Existing sentinel surveillance of influenza-like illness (ILI) or acute respiratory infection (ARI) are useful to monitor trends in community transmission of the COVID-19 virus and to ensure that other priority respiratory diseases are being detected. Integration of COVID-19 with the Global Influenza Surveillance and Response System (GISRS) is described in Operational considerations for COVID-19 surveillance using GISRS.²

Virologic sentinel surveillance of COVID-19 can be conducted using clinical specimens obtained through sentinel surveillance of ILI, ARI and SARI ((severe acute respiratory infection (SARI). Integrated epidemiological and virological surveillance will play a significant role in monitoring the spread and evolution of COVID-19 virus; understanding the co-circulation of COVID-19 virus, influenza and other respiratory viruses, and subsequent interpretation of respiratory epidemiological and disease observations in relation to COVID-19; and supporting the update of diagnostic tests. Representative isolates should be selected for sequencing. Genetic sequence data should be deposited in a publicly accessible sequence database (e.g., GISAID, GenBank.).

Enhanced Surveillance for Residential Facilities and Vulnerable Groups

Dedicated enhanced surveillance for some high-risk groups is necessary to ensure the prompt detection of cases and clusters, faster than through primary-care or hospital-based surveillance. People who live in closed environments, such as prisons, or residential facilities, such as retirement communities or care homes for persons with disabilities, can be especially vulnerable because they may not be able to seek help themselves. Vulnerable groups may also live in settings where the probability of transmission is higher than in the general population or have health conditions or predisposing factors that increase their risk of severe illness. Enhanced surveillance includes the use of active case finding, as through daily screening of signs and symptoms, including

daily temperature monitoring, and daily zero-reporting for all individuals in high-risk groups under surveillance.

In countries where reporting of hospital acquired (nosocomial) infection is mandatory, COVID-19 should be included as a priority condition for immediate reporting. All clusters must be investigated and documented in terms of source and transmission patterns to allow rapid control. Infections in health workers should, at a minimum, be systematically integrated into the national surveillance system. Ideally, specific systematic data collection for health workers can be implemented. A protocol for assessment of potential risk factors for COVID-19 infection among health care workers in a health care setting can be accessed [here](#).

In refugee camps and among displaced population and other humanitarian or low-resource settings, additional considerations are warranted. See additional guidance [here](#).

Mortality Surveillance

The number of COVID-19 deaths due to COVID-19 in hospitals should be reported on a daily basis. The number of deaths due to COVID-19 occurring in the community should ideally be reported daily or at least weekly. It may be helpful to also monitor death due to non-specific respiratory causes (un-specified pneumonia). For both hospital and community deaths, the age, sex, and location of death should be reported for all persons who die from COVID-19. A medical death certificate of death for COVID-19 deaths should be issued as described in [International guidelines for certification and classification \(coding\) of COVID-19 as cause of death](#) and reported to vital statistic offices as normally required. In communities where death registration and reporting are limited, other approaches for mortality surveillance may be considered, such as reports from religious centres or burial sites. Mortality surveys are not suitable for ongoing mortality surveillance due to COVID-19 but such surveys may be helpful for retrospectively estimating the total mortality burden due to COVID-19.

Laboratory testing data

Data on the number of tests conducted for SARS-CoV-2 should be collected from all relevant laboratories. While surveillance systems will typically capture the number of COVID-19 cases, it is also important to collect information on the total number of laboratory tests conducted for COVID-19 virus. Knowing the testing denominator can indicate the level of surveillance activity and the proportion of tests positive can indicate the intensity of transmission among symptomatic individuals. At the time of writing, polymerase chain reaction (PCR) testing is the most common laboratory diagnostic method. If other diagnostic methods are used, the number of tests conducted and cases confirmed by different laboratory diagnostic methods used need to be recorded.

Reporting and analysis of surveillance data

The essential surveillance data for COVID-19 described above should be reported, compiled, and analysed daily, with zero reporting when there are no cases. Data should be compiled either nationally or at an appropriate government administrative level (e.g., district, province, prefecture). More in-depth analyses on age, sex-gender, testing patterns, comorbidities and risk factors, symptomatology and severity, etc. should also be analysed on a periodic basis. Routine analysis reports should be distributed to every reporting site in the surveillance system and ideally made publicly available via a government website. Many national and local public health agencies have developed online dashboards to report daily surveillance data. Relevant data should be reported to the World Health Organization in line with the global surveillance guidance available [here](#). For sentinel surveillance using the GISRS system, weekly aggregated data should report to FluNet and FluID as described in the [Operational considerations for COVID-19 surveillance using GISRS](#).

Annex: Additional surveillance approaches for COVID-19

There are other existing surveillance approaches that could be used along with the essential elements of comprehensive surveillance for COVID-19. Surveillance approaches such as the use of serologic testing and surveillance of environmental samples from waste water are being explored.

Event-based surveillance

The capacity to rapidly detect any changes in the overall COVID-19 situation can be further strengthened through robust event-based surveillance (EBS) mechanisms. EBS captures unstructured information from formal and informal channels such as online content, radio broadcasts and print media across all relevant sectors, to complement conventional public health surveillance efforts. Successful EBS implementation requires dedicated human resources and clear processes to sift through large volumes of information to filter, triage, verify, compare, assess and communicate relevant content. Numerous web-based systems have been developed over the years to support EBS activities, many of which converge through the WHO-led [Epidemic Intelligence from Open Sources](#) (EIOS) initiative. It is equally important to monitor for other potential events that may emerge in parallel, further impacting lives and compromising COVID-19 response efforts. Further guidance on EBS can be found [here](#) and [here](#).

Participatory Surveillance

Participatory disease surveillance enables members of the public to self-report signs or symptoms, without laboratory

testing or assessment by a health care provider. Participatory disease surveillance relies on voluntary reporting and is frequently facilitated by dedicated smart phone applications. While this type of surveillance may not be very specific for identifying cases of COVID-19, the analysis of trends of self-reported illness by members of the public can indicate communities where early disease spread may be occurring. Data collected from participatory surveillance can also give indications of changes in healthcare seeking behaviour, which are important to understand when interpreting facility-based surveillance data.

Telephone hotlines

Telephone hotlines made available to the public for advice and referral to health care services may provide an early indication of disease spread in a community. Effectively running a telephone hotline service requires dedicated resources and trained staff to triage calls and appropriately refer callers to the relevant healthcare or other service.

References

1. World Health Organization. Critical preparedness, readiness and response actions for COVID-19 (Interim Guidance) (<https://www.who.int/publications-detail/critical-preparedness-readiness-and-response-actions-for-covid-19>, accessed 19 March 2020)
2. World Health Organization. Operational considerations for COVID-19 surveillance using GISRS (Interim Guidance) (<https://www.who.int/publications-detail/operational-considerations-for-covid-19-surveillance-using-gisrs-interim-guidance>, accessed 26 March)

WHO continues to monitor the situation closely for any changes that may affect this interim guidance. Should any factors change, WHO will issue a further update. Otherwise, this interim guidance document will expire 2 years after the date of publication

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