Public health surveillance for COVID-19

WHO Interim guidance - July 2022

PAHO COVID-19 IMST
July 2022
Updated interim guidance: Public health surveillance for COVID-19

HEALTH EMERGENCIES department

Public health surveillance for COVID-19

Interim guidance
14 February 2022

Key points

The objective of COVID-19 surveillance are to:
- monitor SARS-CoV-2 incidence and COVID-19 mortality and morbidity among different age groups and populations to determine higher risk for developing severe disease and death.
- monitor trends in epidemiology and estimate the burden of disease.
- guide implementation and adjustment of COVID-19 control measures including isolation of cases, contact tracing and quarantine of contacts, while monitoring and evaluating the impact of preventive public health interventions.
- evaluate the impact of the pandemic on health care systems and societies.
- contribute to the understanding of the co-occurrence of SARS-CoV-2, influenza, other respiratory viruses and other pathogens.

New trends in comparable COVID-19 surveillance are to:
- test, adapt and optimize existing surveillance systems (including influenza-like illness/severe acute respiratory infection systems and surveillance)
- strengthen laboratory and testing capacities, particularly at sub-national levels.
- mobilize the public health workforce to carry out case finding, contact tracing, as per WHO guidance, and testing.

Themes
- Nuclear and amplification test (NAT) testing is the reference standard method to identify SARS-CoV-2 infection. If other diagnostic methods are used, the number of tests conducted and results confirmed by each diagnostic method should be recorded and reported.
- Antigen-detecting rapid Diagnostic Test (RDT) on direct detection of SARS-CoV-2 in body fluids, may be faster and easier to perform in a public, and early diagnosis of the most effective SARS-CoV-2 infections is still the best NAT testing is not reliable. The case definitions include Ag-RDT as a confirmation methods.
- It is also important to gather information on testing efforts and changes in the testing strategy and the dissemination for SARS-CoV-2 testing to provide context for analysis.

COVID-19 surveillance guidelines from Member States to WHO-RCO

- daily cases and deaths, as per WHO data;
- weekly reporting to WHO of all surveillance variables;
- number of cases and deaths; severity, severity surveillance;
- case and deaths among health care and non-health care;
- number of cases hospitalised and discharged;
- number of persons tested with NAT and other testing methods.

When to use this version

This version has been developed through a transparent process of which the incorporation data the emergence of the variant of concern disease. Consequently, several surveillance protocols from the previous version of the guidelines may be challenging to implement in some countries. Therefore, this version should be used while the virus has certainly begun to adapt to the new variants to the evolving epidemiological and societal context of the COVID-19 pandemic. New elements include:
- updates of contact definitions, to keep with latest contact tracing guidance;
- definitions of Variants of Concern and Variants of Interest, to keep with latest recommendations from the Technical Advisory Group for Virus Evolution;
- surveillance of variants, referring to latest guidance for surveillance of SARS-CoV-2 variants published on 9 August 2021.

14 February 2022

July 2022
KEY POINTS

Core surveillance objectives, to be maintained and strengthened

• Early warning for changes in epidemiological patterns
• Monitoring trends in morbidity and mortality
• Monitoring burden of disease on healthcare capacity (HCW, Hospitalization, ICU admissions)
• Incorporating strategic and geographically representative genomic surveillance to monitor circulation of known variants of concern (VOCs) and allow for early detection of new variants of concern, circulation of SARS-CoV-2 in potential animal reservoirs and changes in virological patterns.

Enhanced surveillance and special studies recommended to member States according to capacity

• Describe and monitor infection in high-risk groups who continue to be at the highest risk of exposure or severe disease
• Characterize new variants (severity, transmissibility, immune escape and the impact of countermeasures)
• Better understand post COVID-19 condition (long COVID), including the role of immunity and risk factors
• Estimate vaccine effectiveness and the level of population immunity
KEY POINTS

• It is important to maintain routine syndromic surveillance for other infectious diseases, especially those caused by respiratory pathogens (such as influenza and respiratory syncytial virus) through surveillance for influenza-like-illness (ILI), severe acute respiratory infection (SARI) and acute respiratory infections (ARI), with sampling and laboratory testing of all or a subset of cases through sentinel surveillance sites.

• Universal/national reporting of clusters of unusual or unexplained respiratory syndromes is also vital.

• Both are critical for understanding trends in other diseases with similar presentations to guide appropriate public health preparedness and clinical management.
Updated interim guidance: Public health surveillance for COVID-19

What is new in this version:

- Update of **case definition**
- Update of **contact definitions**, 
- Update of **core surveillance methods**
- Update of **enhanced surveillance methods**
- Surveillance of variants: **integration of sampling for genomic surveillance** in COVID-19 testing strategies
- Update of COVID-19 surveillance **reporting requirements to WHO** (+ICU for COVID-19 treatment)
Updated definitions
WHO COVID-19: Case Definitions
Updated in Public health surveillance for COVID-19, 22 July 2022

Suspected case of SARS-CoV-2 infection (3 options)

A person who meets the clinical OR epidemiological criteria:

Clinical criteria:
- acute onset of fever AND cough (LU)
OR
- acute onset of ANY THREE OR MORE of the following signs or symptoms: fever, cough, general weakness/fatigue\(^1\), headache, myalgia, sore throat, coryza, dyspnoea, nausea/diarrhoea/anorexia

Epidemiological criteria:
- contact of a probable or confirmed case, or linked to a COVID-19 cluster\(^2\)

B A patient with severe acute respiratory illness
(SARI: acute respiratory infection with history of fever or measured fever of \(\geq38\) °C, and cough; with onset within the last 10 days; and requires hospitalization)

C A person with no clinical or epidemiological criteria

Probable case of SARS-CoV-2 infection (2 options)

A patient who meets clinical criteria AND is a contact of a probable or confirmed case, or linked to a COVID-19 cluster\(^2\)

Death, not otherwise explained, in an adult with respiratory distress preceding death AND who was a contact of a probable or confirmed case or linked to a COVID-19 cluster\(^2\)

Confirmed case of SARS-CoV-2 infection (2 options)

A person with a positive Nucleic Acid Amplification Test (NAAT), regardless of clinical criteria OR epidemiological criteria

A person meeting clinical criteria AND/OR epidemiological criteria (suspect case A) with a positive professional-use or self-test SARS-CoV-2 Antigen RDT\(^3\)

Ag RDT antigen-detection rapid diagnostic tests (Ag RDT) are available for use by trained professionals or for self-testing by individuals:

- Professional-use SARS-CoV-2 antigen RDT: WHO EU-approved Ag RDT, in which sample collection, test performance and result interpretation are done by a trained operator
- Self-test SARS-CoV-2 antigen RDT: WHO EU-approved Ag RDT in which sample collection, test performance and result interpretation are done by individuals by themselves.

Note: Clinical and public health judgment should be used to determine the need for further investigation in patients who do not strictly meet the clinical or epidemiological criteria. Surveillance case definitions should not be used as the sole basis for guiding clinical management.

Available at: WHO COVID-19 Case definition
Updated interim guidance: Public health surveillance for COVID-19

Suspected case of SARS-CoV-2 infection (3 options)

A. A person who meets the clinical OR epidemiological criteria:
   Clinical criteria:
   - acute onset of fever AND cough (ILI)
   OR
   - acute onset of ANY THREE OR MORE of the following signs or symptoms: fever, cough, general weakness/fatigue, headache, myalgia, sore throat, coryza, dyspnoea, nausea/diarrhoea/anorexia
   OR
   Epidemiological criteria:
   - contact of a probable or confirmed case, or linked to a COVID-19 cluster.

B. A patient with severe acute respiratory illness
   (SARI: acute respiratory infection with history of fever or measured fever of ≥38 °C; and cough; with onset within the last 10 days; and requires hospitalization)

C. A person with no clinical signs or symptoms OR meeting epidemiologic criteria
   with a positive professional-use or self-test SARS-CoV-2 Antigen-RDT.

Available at: WHO COVID-19 Case definition
Updated interim guidance: Public health surveillance for COVID-19

Probable case of SARS-CoV-2 infection (2 options)

A. A patient who meets clinical criteria AND is a contact of a probable or confirmed case, or linked to a COVID-19 cluster

B. Death, not otherwise explained, in an adult with respiratory distress preceding death AND who was a contact of a probable or confirmed case or linked to a COVID-19 cluster

Confirmed case of SARS-CoV-2 infection (2 options)

A. A person with a positive Nucleic Acid Amplification Test (NAAT), regardless of clinical criteria OR epidemiological criteria

B. A person meeting clinical criteria AND/OR epidemiological criteria (suspect case A) with a positive professional-use or self-test SARS-CoV-2 Antigen-RDT.

Available at: WHO COVID-19 Case definition
Updated interim guidance: Public health surveillance for COVID-19

Contact definition

A contact is a person who has had any one of the following exposures to a probable or confirmed case:

- face-to-face contact with a probable or confirmed case within 1 meter and for at least 15 minutes;
- direct physical contact with a probable or confirmed case;
- direct care for a patient with probable or confirmed COVID-19 disease without the use of recommended personal protective equipment; or
- other situations as indicated by local risk assessments.

Exposure must have occurred during the infectious period of the case, and defined as follows:

- Exposure to a symptomatic case: 2 days before and 10 days after symptom onset of the case plus 3 days without symptoms or 3 days with improving symptoms, for a minimum period of 13 days after symptoms onset.
- Exposure to an asymptomatic case: 2 days before and 10 days after the date on which the sample that led to confirmation was taken.
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Contact definition

**Priority groups** are people that have higher chances of developing severe disease if infected through a contact with a case. They include (but are not limited to): Individuals older than 60 years, individuals with immunocompromising diseases or taking immunosuppressive medications, people with multiple co-morbidities, pregnant women and those informed by a medical professional that they are at high risk.

Unvaccinated or partially vaccinated contacts, especially if belonging to the above high-risk groups, are more likely to experience severe disease, requiring hospitalisation, and/or resulting in death when compared with vaccinated contacts, therefore, they should receive special attention from contact tracing activities.

**Priority settings** are environments where there is a higher chance that people belonging to the priority groups might stay for extended periods of time in close proximity with each other, and therefore have a higher chance of becoming infected and developing severe disease if they develop COVID-19 after contact with a case. Examples of high priority settings are health care facilities including nursing homes and long-term care facilities.

**Priority situations** are circumstances such as the emergence of a new variant for which characteristics of immune escape and disease severity are unknown, or any other circumstances determined by public health authorities as priority.
Recommended COVID-19 surveillance for Member States
Core surveillance
Updated interim guidance: Public health surveillance for COVID-19

Core surveillance objectives, to be maintained and strengthened

- Early warning for changes in epidemiological patterns
- Monitoring trends in morbidity and mortality
- Monitoring burden of disease on health care capacity (HCW, Hospitalization, ICU admissions)
- Incorporating strategic and geographically representative genomic surveillance to monitor circulation of known variants of concern (VOCs) and allow for early detection of new variants of concern, circulation of SARS-CoV-2 in potential animal reservoirs and changes in virological patterns.
Core surveillance for COVID-19: Methods

- Early warning

The objective of an early warning system is to strike a balance between sensitivity and specificity:
- sensitivity to any signal indicative of increased risk (transmissibility, severity)
- specificity: investigation for additional evidence to confirm the risk
- shortest timeframe possible between the detection of the signal and the confirmation/dismissal of the alert

This implies
- triangulation of signal sources
- strong Rapid Response and investigation resources and procedures, as well as coordination between stakeholders.
Updated interim guidance: Public health surveillance for COVID-19

Core surveillance for COVID-19 : Methods

- Early warning

<table>
<thead>
<tr>
<th>System/Site/Context</th>
<th>Mandatory notifiable disease screening and reporting</th>
<th>Cluster investigations</th>
<th>Community-based surveillance</th>
<th>Environmental surveillance</th>
<th>Pharmaceutical vigilance</th>
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*Including but not limited to long-term care facilities, prisons and dormitories.
Core surveillance for COVID-19: Methods

• Monitoring trends in morbidity and mortality

<table>
<thead>
<tr>
<th>System/site/Context</th>
<th>Mandatory notifiable disease routine reporting</th>
<th>Hospitalization/ICU admissions</th>
<th>Routine mortality surveillance</th>
<th>Routine environmental surveillance</th>
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The aim is to produce reliable and stable time series for relevant epidemiological indicators, in order to analyze patterns and identify timely departures in trends. The key principles are stability, regularity and reliability of data.

Weekly analysis and reporting are recommended.
Updated interim guidance: Public health surveillance for COVID-19

Core surveillance for COVID-19: Methods

- Health care facility occupancy - health care capacity

<table>
<thead>
<tr>
<th>System Site/Context</th>
<th>Health care worker absenteeism</th>
<th>Number (or percent) of beds dedicated/available for COVID treatment</th>
<th>Oxygen supply</th>
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Settings where SARI sentinel sites are already actively reporting should be included in health care capacity monitoring. Health care capacity trends should be monitored closely with other indicators to anticipate overwhelmed capacity, identify alert thresholds for surge measures and escalate potential public health and social measures (PHSM) in a timely manner to allow for rapid adaptation of resources.

Same data flow as the patient surveillance data, especially in hospital settings, and acquiring this data in a stable and timely manner can require adjustments in dataflow systems.
Updated interim guidance: Public health surveillance for COVID-19

Core surveillance for COVID-19: Methods

• Genomic surveillance

**Randomized representative sampling**

Randomized representative sampling can be defined as a **selection of a subset of a given target population, representative** of the target population situation. Samples should be obtained across a distribution of age, sex, clinical spectrum and geographical location at minimum. **Routine randomized representative** sampling for genomic sequencing should be included in testing strategies, with a clear methodology, data flow and workflow defined to randomly selected samples from testing sites and channel them for genomic sequencing.

**Targeted sampling**

Some variants have **phenotypic characteristics** that are **potentially concerning** due to their ability to spread more easily from person to person, cause **more severe disease**, or **dampen the impact** of available public health and social **measures** (PHSMs), **diagnostics**, **therapeutics** and **vaccines**. **Targeted sequencing** of **specimens** with a higher pre-test probability of being a VOI or VOC might be beneficial in addition to the above strategies. Number of samples sequenced from such specimens should be focused on the **first few cases**, or the few cases with most recent onset of symptoms, should be targeted for sampling.
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Core surveillance for COVID-19: Methods

- Genomic surveillance

<table>
<thead>
<tr>
<th>Context</th>
<th>Routine representative sampling</th>
<th>Targeted (immuno-compromised, travellers)</th>
<th>Outbreak and unusual clusters</th>
<th>Environmental genomic surveillance</th>
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*Including but not limited to long-term care facilities, prisons and dormitories.
## Updated interim guidance: Public health surveillance for COVID-19

### Core surveillance for COVID-19: Methods

- Genomic surveillance

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Alert trigger</th>
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<tr>
<td>Cases</td>
<td>Increase / departure from trend</td>
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<tr>
<td>Age-disaggregated cases</td>
<td>Increase in specific age groups (under 18, under 60; to be determined locally)</td>
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<tr>
<td>Cases among health and care workers</td>
<td>Increase / departure from trend</td>
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<tr>
<td>Case fatality ratio</td>
<td>Increase / departure from trend</td>
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<tr>
<td>Age disaggregated deaths</td>
<td>Increase in specific age groups</td>
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<tr>
<td>Hospitalizations/ICU admissions or bed occupancy rate</td>
<td>Increase in specific age groups</td>
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<tr>
<td>Test positivity rate</td>
<td>Increase / departure from trend</td>
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Core surveillance for COVID-19: Methods

- Examples

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<tr>
<th>Surveillance data source/system/setting</th>
<th>Core Surveillance Objective</th>
<th>Morbidity and mortality trend monitoring</th>
<th>Health care capacity</th>
<th>Genomic surveillance</th>
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Enhanced surveillance
Updated interim guidance: Public health surveillance for COVID-19

Enhanced surveillance for COVID-19: for member States according to capacity

- **Describe** and **monitor infection** in **high-risk groups** who continue to be at the highest risk of exposure or severe disease
- **Characterize new variants** (severity, transmissibility, immune escape and the impact of countermeasures)
- Better understand **post COVID-19 condition** (long COVID), including the role of immunity and risk factors
- **Estimate vaccine effectiveness** and the level of **population immunity**

These objectives require more stringent methodologies to collect health information in controlled settings and populations on a longer-term basis and thus require more resources. The aim of these studies is to provide more granular, reliable data to assess risk factors for infection, severity, transmissibility, immune evasion, post COVID-19 condition and other disease characteristics. Various methodologies can be used: observational, case control, cohort and test-negative design.
Updated interim guidance: Public health surveillance for COVID-19

Enhanced surveillance for COVID-19: Methods

- Special studies
  - COVID-19 prevalence studies
  - UNITY studies: early warning protocols
    - FFX
    - Household transmission studies
    - Assessment of risk factors for COVID-19 in health workers

- Enhanced clinical metadata
- Serological surveys
- Vaccination effectiveness and impact
- Surveillance of reinfection
- Participatory surveillance/self-reporting
Variables for national surveillance
Updated interim guidance: Public health surveillance for COVID-19

Variables for national surveillance:

Transmission
- ILI/ARI/SARI and pneumonia trends from influenza sentinel sites, GISRS networks and national influenza centres
- Testing:
  - testing strategies: screening, targeting of testing for high-risk populations, sampling for sequencing
  - testing activities, including monitoring of self-tests use and results reporting
  - test positivity rate
  - sampling for sequencing integrated to testing strategies: geographical and demographic coverage of sampling
- Health workers: frequent monitoring of transmission in populations with high occupational risk of exposure
- Reinfection: incidence, mean time between episodes, vaccine status of reinfections
- Human-animal interface: detection and circulation of SARS-CoV-2 animal handlers
- Wildlife and farm-reared animals: detection and circulation of SARS-CoV-2.
Updated interim guidance: Public health surveillance for COVID-19

Variables for national surveillance:

Severity

- Admissions to hospital and ICU for COVID-19 treatment
- Severity ratios: ICU/hospitalization ratio
- Vaccination status of hospitalized and ICU admissions for COVID-19
- Case fatality rates for hospitalization and ICU admissions.

Impact

- Health care resources, including bed occupancy, health worker absenteeism, continuity of care for other emergency and non-emergency medical care
- Post COVID-19 condition: incidence, length of condition, risk factors
- Excess mortality from all causes and due to COVID-19.
Reporting COVID-19 surveillance data to PAHO/WHO
Updated interim guidance: Public health surveillance for COVID-19

International Health Regulations

WHO requests that Member States report daily counts of cases and deaths and weekly aggregate counts of cases and deaths at different levels of aggregation, as per IHR requirements.

Daily counts of SARS-CoV-2 infections/COVID-19 cases and deaths are compiled by WHO Regional Offices, which in turn receive data either directly from Member States or through extraction from official government public sources (e.g. Ministry of Health websites). Member States are thus encouraged to continue making these daily counts publicly available. Whatever surveillance strategy is employed – exhaustive testing of suspected SARS-CoV-2 infections, or only a subset – the resulting data are requested to be reported..

Data available at covid19.who.int
Updated interim guidance: Public health surveillance for COVID-19

Weekly aggregated reporting to PAHO/WHO

Countries with **sentinel surveillance** of respiratory viruses including SARS-CoV-2 can report through FluNet & FluID if all variables are collected.

Those without sentinel surveillance continue reporting **universal surveillance data**: through linelist or weekly aggregated reporting data can be reported via Excel using the form "Global Surveillance of COVID-19: WHO process for reporting aggregated data-V2".

Number of:
- confirmed cases
- probable cases
- confirmed deaths
- probable deaths
- new admissions to hospital for COVID-19 treatment
- new admissions to ICU for COVID-19 treatment
- health and care workers infected (confirmed + probable)

- health and care workers who died from covid-19 (confirmed + probable) as a subset of total death count
- persons tested (NAAT or Ag-RDT)
- persons tested by NAAT
- confirmed + probable cases by age group and sex (see below)
- confirmed + probable deaths by age group and sex (see below).

*The following age categories (in years) are requested: 0-4, 5-9, 10-14, 15-19, 20-29, 30-39, 40-49, 50-59, 60-64, 65-69, 70-74, 75-79, 80+.*

Variables included in FluID template
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Next steps PAHO

To assess the severity of the disease caused by SARS-CoV-2 information related to hospital and ICU admission, vaccination status and final outcome of the episode are needed.

Severity

- Admissions to hospital and ICU for COVID-19 treatment
- Severity ratios: ICU/hospitalization ratio
- Vaccination status of hospitalized and ICU admissions for COVID-19
- Case fatality rates for hospitalization and ICU admissions.

- A hub for severity assessments of SARS-CoV-2, influenza and OVR is in progress.
- Case-based data will be requested for SARI cases.
Thank you

For additional information please contact: covid@paho.org flu@paho.org