

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

Public health surveillance for COVID-19

Interim guidance
14 February 2022



Key points

The objectives of COVID-19 surveillance are to:

- monitor SARS-CoV-2 incidence and COVID-19 morbidity and mortality among different age groups and population groups at higher risk for developing severe disease and death
- track potential epidemiological changes over time
- detect and contain outbreaks of new SARS-CoV-2 variants and continue monitoring the trends of existing variants
- guide the implementation and adjustment of COVID-19 control measures including isolation of cases, contact tracing and quarantine of contacts, while enabling safe resumption of economic and social activities
- evaluate the impact of the pandemic on health care systems and society
- contribute to the understanding of the co-circulation of SARS-CoV-2, influenza, other respiratory viruses and other pathogens.

Key actions for comprehensive COVID-19 surveillance are to:

- use, adapt and strengthen existing surveillance systems (including influenza-like illness/severe acute respiratory infection systems and sentinel sites)
- 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.

Testing

- Nucleic acid amplification test (NAAT) testing is the reference standard method to identify SARS-CoV-2 infection. If other diagnostic methods are used, the number of tests conducted and infections confirmed by each diagnostic method used should be recorded and reported.
- Antigen-detecting rapid diagnostic tests (Ag-RDTs) rely on direct detection of SARS-CoV-2 viral proteins, are much faster and simpler to perform, and offer rapid, inexpensive, and early detection of the most infectious SARS-CoV-2 infections in places where NAAT testing is not available. The case definitions include Ag-RDT as a confirmation method.
- It is also important to collect information on testing criteria and document changes in the testing strategy and the denominators for SARS-CoV-2 testing to provide context for analyses

COVID-19 surveillance reporting recommendations from Member States to WHO-IHO

- daily cases and deaths, as per IHR regulations
- required weekly reporting to WHO of detailed surveillance variables:
 - age and gender of cases and deaths, (probable and confirmed)
 - cases and deaths among health and care workers,
 - number of cases hospitalized, and discharged,
 - number of persons tested with NAAT and other testing methods.
- vaccination: doses administered, number of persons fully vaccinated.

What is new in this version

This version has been developed through a structured process of which the inception pre-dates the emergence of the variant of concern Omicron. Consequently, several recommendations retained from the prior version of this guidance may be challenging to implement in the current context. However, because several important amendments are introduced here, this guidance is being issued while the process has already begun to adapt the next version to the evolving epidemiological and societal context of the COVID-19 pandemic. New elements include:

- update of contact definitions, in line with latest contact tracing guidance
- definitions of Variant of Concern and Variant of Interest, in line with latest statements from the Technical Advisory Group for Virus Evolution
- surveillance of variants: referencing to Interim Guidance for surveillance of SARS-CoV-2 variants published on 9 August 2021

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Public health surveillance for COVID-19

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Key points

Surveillance for COVID-19 remains critical to ending the COVID-19 emergency worldwide and informing public health actions to limit the spread of SARS-CoV-2 and reduce morbidity, mortality and impact.

The World Health Organization (WHO) continues to recommend maintaining and strengthening surveillance to achieve the core surveillance objectives for COVID-19. This should include:

- early warning for changes in epidemiological patterns
- monitoring trends in morbidity and mortality
- monitoring burden of disease on health care capacity (health and care workers, hospitalizations and intensive care unit 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.

In addition, WHO continues to recommend Member States with the capacity to carry out enhanced surveillance activities and conduct special studies to:

- describe and monitor SARS-CoV-2 infection in high-risk groups who continue to be at the highest risk of exposure or severe disease
- characterize new variants, including aspects of their 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.

WHO recommends that the following remain priority groups and settings for SARS-CoV-2 surveillance:

- priority groups: Individuals older than 60 years, individuals with immunocompromising diseases or taking immunosuppressive medications, people with multiple co-morbidities, pregnant women and unvaccinated individuals
- priority settings: environments where there is a higher chance that people belonging to priority groups might stay for extended periods of time in close proximity with each other, such as in closed settings, long-term care facilities and nursing homes.

COVID-19 surveillance reporting variables from Member States to WHO include:

- daily cases and deaths, as per International Health Regulations (IHR 2005) requirements
- required weekly reporting to WHO of detailed surveillance variables
 - age and sex of probable and confirmed cases and deaths
 - cases and deaths among health and care workers
 - number of new cases admitted for hospitalization and to an intensive care unit (ICU)
 - number of persons tested with a nucleic acid amplification test (NAAT) and other testing methods.
- variants of concern (VOCs) and variants of interest (VOIs): date of detection of first case and weekly relative prevalence (based on representative sampling)
- vaccination: doses administered; number of persons vaccinated with a primary series and booster.

What is new in this version:

- updated WHO case definitions (see the Annex), contact definitions, priority groups and settings in line with the latest contact tracing and quarantine guidance
- updates of core and enhanced surveillance objectives and methods in various settings, including environmental and animal surveillance
- updated guidance on surveillance of SARS-CoV-2 variants, including the integration of sampling for genomic surveillance in SARS-CoV-2 testing strategies
- updates of COVID-19 surveillance reporting requirements to WHO, which includes the addition of new ICU admissions for COVID-19 treatment.

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Updated interim guidance: Public health surveillance for COVID-19

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 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.

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**

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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.

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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

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WHO COVID-19: Case Definitions

Updated in Public health surveillance for COVID-19, 22 July 2022



Case Definitions

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/fatigue¹, 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**.²
- 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**.³

¹ Signs separated with slash (/) are to be counted as one sign.

² A group of symptomatic individuals linked by time, geographic location and common exposures, containing at least **one NAAT-confirmed** case or at least **two** epidemiologically linked, symptomatic (meeting clinical criteria of Suspect case definition A or B) persons with **positive professional use OR self-test Ag-RDT** (based on $\geq 97\%$ specificity of test and desired $>99.9\%$ probability of at least one positive result being a true positive)

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.

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**²
- 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**²

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**.³

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 EUL-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 EUL-approved Ag-RDT in which sample collection, test performance and result interpretation are done by individuals by themselves.

Available at: [WHO COVID-19 Case definition](#)

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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/fatigue¹, 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**.²

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**.³

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

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- 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**.³

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[Available at: WHO COVID-19 Case definition](#)

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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

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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.

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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.

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Core surveillance for COVID-19 : Methods

- Early warning

System Site/ Context	Early warning active surveillance methods				
	Mandatory notifiable disease screening and reporting	Cluster investigations	Community-based surveillance	Environmental surveillance	Pharmaceutical vigilance
Community		X	X	X	
Primary care sites	X	X			X
Pharmacies					X
Hospitals	X	X			X
Laboratories	X				
Sentinel ILI/ARI/SARI sites	X				X
Closed settings*	X	X	X	X	X
Humanitarian settings	X	X	X	X	X
Travelers at points of entry	X	X		X	
International conveyance wastewater		X		X	

*Including but not limited to long-term care facilities, prisons and dormitories.

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Core surveillance for COVID-19 : Methods

- Monitoring trends in morbidity and mortality

System site/ Context	Surveillance indicators/methods for trend monitoring			
	Mandatory notifiable disease routine reporting	Hospitalization/ICU admissions	Routine mortality surveillance	Routine environmental surveillance
Community			X	X
Primary care sites	X			
Hospitals	X	X	X	
Sentinel ILI/ARI/SARI sites	X	✗	✗	
Laboratories	X			
Closed settings*	X		X	X
Humanitarian settings	X		X	X
Civil registration and vital statistics			X	
Financial/billing datasets		X		

*Including but not limited to long-term care facilities, prisons and dormitories.

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.

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Core surveillance for COVID-19 : Methods

- Health care facility occupancy- health care capacity

System Site/ Context	Health care capacity indicators		
	Health care worker absenteeism	Number (or percent) of beds dedicated/available for COVID treatment	Oxygen supply
Primary Care sites	X		
Pharmacies	X		
Hospitals	X	X	X
ICU	X	X	X
Private clinics	X	X	X
Sentinel SARI sites	X	X	X
Closed settings*	X		
Humanitarian settings	X		X

*Including but not limited to long-term care facilities, prisons and dormitories.

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.

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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

Context	Methods for genomic surveillance			
	Routine representative sampling	Targeted (immuno-compromised, travellers)	Outbreak and unusual clusters	Environmental genomic surveillance
Community	X		X	X
Primary care sites	X	X	X	
Hospitals	X	X	X	
Sentinel ILI/ARI/ SARI sites	X	X		
Closed settings*	X	X	X	X
Humanitarian settings	X	X	X	X
Travelers at points of entry		X		X
International conveyance wastewater				X
Human-animal interface	X	X	X	X

*Including but not limited to long-term care facilities, prisons and dormitories.

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Core surveillance for COVID-19 : Methods

- Genomic surveillance

Indicators	Alert trigger
Cases	Increase / departure from trend
Age-disaggregated cases	Increase in specific age groups (under 18, under 60; to be determined locally)
Cases among health and care workers	Increase / departure from trend
Case fatality ratio	Increase / departure from trend
Age disaggregated deaths	Increase in specific age groups
Hospitalizations/ICU admissions or bed occupancy rate	Increase in specific age groups
Test positivity rate	Increase / departure from trend

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Core surveillance for COVID-19 : Methods

- Examples

Surveillance data source/ system/setting	Core Surveillance Objective			
	Early warning	Morbidity and mortality trend monitoring	Health care capacity	Genomic surveillance
Community	X	X		
Primary Care sites	X	X	X	
Pharmacies	X	X		
Laboratories	X	X		X
Hospitals	X	X	X	
Private clinics		X	X	
Financial/billing datasets		X		
Civil registration and vital statistics		X		
Sentinel ILI/ARI/ SARI sites		X	X	X
Closed settings*	X	X	X	X
Humanitarian settings	X	X	X	X
Travelers at points of entry	X			X
International conveyance wastewater	X			X
Environmental surveillance of community wastewater	X			X
Human-animal interface	X			X

*Including but not limited to long-term care facilities, prisons and dormitories.

Enhanced surveillance

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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

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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

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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.

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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

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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

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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:

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