

Guidance on Integration of COVID-19 in Existing Acute Febrile Illness (AFI) Surveillance Systems

Background

Key actions to reduce transmission of COVID-19, include active case finding, care and isolation, contact tracing, and quarantine. Acute Febrile Illness (AFI) surveillance systems are typically used to better understand common causes of fever. They may also be effectively leveraged to monitor activity associated with SARS-CoV-2 virus infection as fever may be part of the clinical presentation of COVID-19. In addition, AFI is an umbrella syndrome that, depending on the case definition in use, can envelop a sub-set of the surveillance population presenting with influenza-like illness (ILI) or severe acute respiratory infection (SARI), two syndromes traditionally associated with surveillance of respiratory diseases similar to COVID-19. Even in situations where AFI surveillance systems enroll patients based on an undifferentiated fever (UF) with a case definition that excludes persons with respiratory symptoms, there may still be an opportunity to detect cases who meet the SARI or ILI case definition during the screening or AFI enrollment process that occurs prior to the enrollment of UF cases.

Purpose of the document

This document summarizes CDC's interim guidance for the surveillance of COVID-19 and infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) using existing AFI surveillance systems. The document draws on surveillance recommendations published by WHO and CDC, which outline case definitions for COVID-19 and available reporting mechanisms. It is intended to complement efforts to leverage existing national and sub-national influenza surveillance systems, notably through the [Global Influenza Surveillance and Response System \(GISRS\)](#) for efficient and cost-effective implementation of COVID-19 surveillance.

The integration of COVID-19 in existing AFI surveillance systems is intended to:

- 1) Complement, not replace, ongoing ILI and SARI or COVID-19 surveillance activities.
- 2) Leverage existing AFI surveillance systems for efficient and cost-effective implementation of COVID-19 surveillance.
- 3) Support emergency and high-priority investigations through the sharing of available staff, material, supplies, reagents, or testing processes.

CDC does not recommend the establishment of new surveillance systems during this public health emergency.

Please refer to [World Health Organization](#) (WHO) and [CDC](#) websites for further information about COVID-19 and SARS-CoV-2. As the COVID-19 pandemic is evolving, and WHO updates [global surveillance recommendations for COVID-19](#) and guidance for GISRS partners, CDC guidance will reflect those revisions in its guidelines.

Surveillance Objectives when Leveraging AFI Surveillance Systems for COVID-19

The overall aim is to use existing AFI surveillance systems for epidemiological and virologic surveillance for COVID-19. Depending on the existing systems, one or more of the following objectives can be addressed:

- Primary Objectives
 - To monitor community spread and intensity of COVID-19 activity
 - Where do we identify disease activity?
 - What is the percentage of SARS-CoV-2 positive specimens from AFI cases meeting the SARI/ILI case definition, and is it increasing or decreasing over time?
 - To understand disease severity and spectrum of illness

- What is the ratio of outpatient to inpatient cases of COVID-19 illness?
 - To understand risk factors for severe disease and transmission
 - What age groups are most affected? What fraction of COVID-19 cases have underlying illness or other high-risk conditions?
 - What risk factors are associated with risk of exposure (for example, health care practitioners)?
 - To monitor for changes in virus properties
 - Are SARS-CoV-2 genetic sequences or virologic characteristics changing in ways that might affect transmission, severity, immune correlates of protection, or vaccine development?
- Secondary Objectives
 - To assess the proportion of febrile patients without respiratory symptoms who test positive for SARS-CoV-2 virus
 - To conduct future studies of patients with AFI, including serologic investigations to assess immune response to SARS-CoV-2 infection
 - To evaluate new SARS-CoV-2 diagnostic or serologic tests

Approach

Testing of specimens for SARS-CoV-2 collected through existing AFI surveillance will help monitor the progression and impact of COVID-19 illness. This activity is separate from, but complementary to, efforts to identify COVID-19 cases using the person under investigation or suspect case definitions used by CDC and WHO, respectively. Surveillance systems may be employed for situational awareness, public health action, and to understand the impact of disease, as well as for characterizing COVID-19 illness in the inpatient and outpatient settings.

Relationship to ongoing AFI surveillance activities

Countries that conduct AFI surveillance should continue to do so without interruption or alteration to the case definition being used to trigger enrollment in surveillance and sample collection. Regardless of whether the system enrolls and tests patients using a broad AFI case definition or a more specific UF case definition, CDC suggests the integration of SARS-CoV-2 RT-PCR testing into existing laboratory testing algorithms used for AFI surveillance. The SARS-CoV-2 RT-PCR diagnostic approach should follow the same biosafety, specimen management and testing guidelines as described in the CDC [Guidance on integration of COVID-19 in existing influenza-like illness \(ILI\) or severe acute respiratory infection \(SARI\) sentinel surveillance](#) and the WHO's [Operational considerations for COVID-19 surveillance using GISRS](#)

Considerations for the Interplay between Existing AFI Surveillance & SARI/ILI Surveillance

As previously mentioned, this guidance is intended to complement ongoing efforts to leverage existing ILI/SARI surveillance systems for COVID-19 surveillance. The complementary role of AFI surveillance systems in this regard may vary among countries.

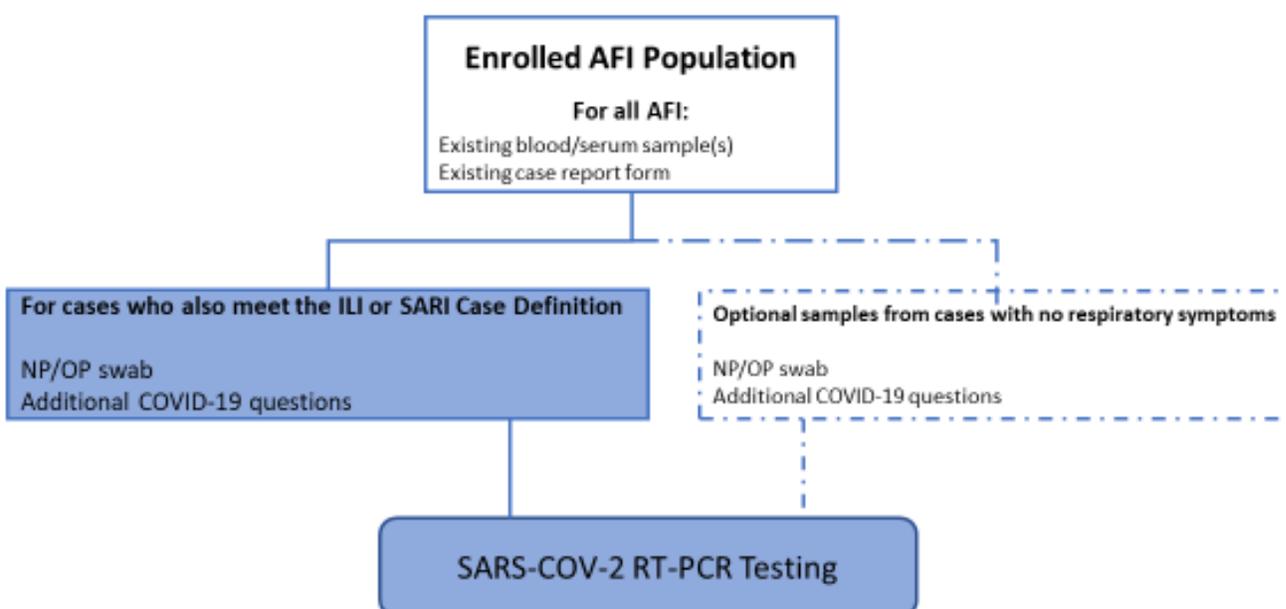
- In countries with deficient or no ILI/SARI surveillance, AFI surveillance platforms may provide an opportunity for establishing COVID-19 surveillance.
- In countries with existing ILI/SARI surveillance that can effectively be leveraged for COVID-19 surveillance, AFI surveillance systems may be similarly leveraged in a complementary fashion in order to:

- Expand the coverage of surveillance to geographical areas or populations not covered by ILI/SARI surveillance
- Answer different surveillance questions of national or international importance
- Provide access to additional testing equipment and resources

Adaptation of Specimen Collection Procedures in AFI Surveillance

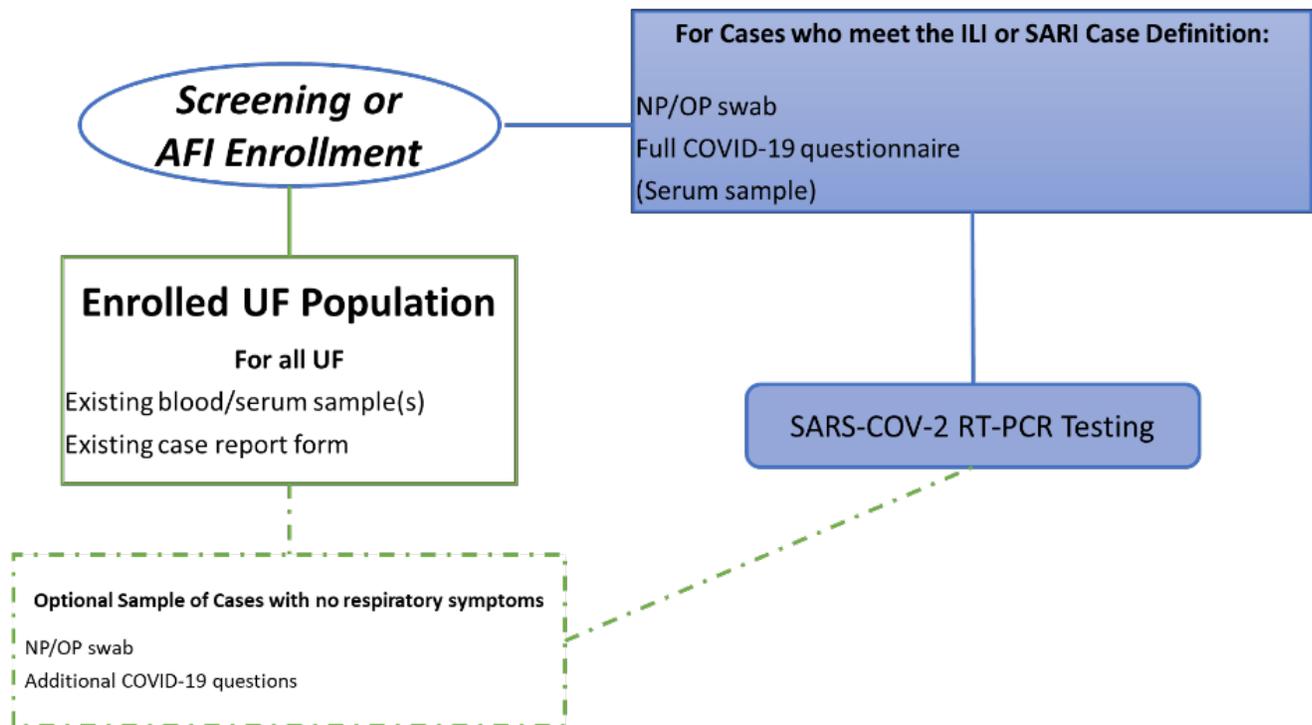
Depending on the specifics of AFI enrollment and existing sample collection, the adaptation of AFI surveillance systems for this purpose may take one of three forms:

- If NP and oropharyngeal (OP) swabs are already being collected from enrolled AFI cases, then this activity should continue, and these samples can form the basis of SARS-CoV-2 RT-PCR testing.
- If NP/OP swabs are not already being collected and the surveillance system currently enrolls and tests AFI cases on the basis of a broad AFI case definition¹, then NP/OP swabs should be collected from the subset of enrolled AFI cases meeting the ILI or SARI case definitions, depending on whether they are outpatients or inpatients (see Appendix 1).



- If NP/OP swabs are not already being collected and the surveillance system currently enrolls and tests AFI cases on the basis of a UF case definition that excludes persons with respiratory symptoms, then appropriate patients meeting the ILI or SARI case definitions should be identified upstream during screening procedures. At that point, NP/OP swabs should be collected from individuals meeting the ILI or SARI case definitions.

¹ Generally reported or measured fever of a certain duration with certain exclusions to rule out specific, non-infectious causes of fever



AFI surveillance also allows for the possibility of detecting SARS-CoV-2 among patients who do not present with respiratory symptoms. In all scenarios laid out above, the collection of NP/OP swabs for SARS-CoV-2 RT-PCR testing from a sample of AFI or UF cases with no respiratory symptoms may also be considered in order to assess the proportion of febrile patients without respiratory symptoms who test positive for SARS-CoV-2.

Suggested Sampling Procedures

Testing capacity may vary depending upon local resources, but countries should consider testing a minimum of 35-50 samples per week or up to 100 samples per week, as test kits permit. In situations where testing resources are limited, there should ideally be an *a priori* allocation of test kits and other laboratory supplies for surveillance activities during a certain time period. In this scenario, the number of eligible samples during the given time period can be divided by the number of available tests, in order to calculate a sampling interval which can be used to make a systematic selection of samples to test.

If SARS-CoV-2 is detected during an initial phase of testing, expanding testing to a larger sample or to all specimens may be considered, as resources allow, to further evaluate the frequency of detection.

Specimen Collection, Packaging and Transport

All procedures outlined in the CDC *Guidance on integration of COVID-19 in existing influenza-like illness (ILI) or severe acute respiratory infection (SARI) sentinel surveillance* or the WHO's *Operational considerations for COVID-19 surveillance using GISRS* should be followed for the safe collection, packaging and transport of NP/OP swabs collected through AFI surveillance systems.

Laboratory Testing

WHO recommends using reverse transcription polymerase chain reaction (RT-PCR) for laboratory confirmation of SARS-CoV-2 in respiratory specimens. All procedures outlined in the CDC ***Guidance on integration of COVID-19 in existing influenza-like illness (ILI) or severe acute respiratory infection (SARI) sentinel surveillance*** or the WHO's ***Operational considerations for COVID-19 surveillance using GISRS*** should be followed for SARS-CoV-2 RT-PCR testing.

Epidemiological Data Collection

Case investigation forms used in existing AFI surveillance should be modified to include COVID-19- specific questions. Much of the information included on the [WHO COVID-19 case investigation form](#) is similar to that collected in existing AFI surveillance. The minimum data variables are outlined in the CDC ***Guidance on integration of COVID-19 in existing influenza-like illness (ILI) or severe acute respiratory infection (SARI) sentinel surveillance*** and WHO's ***Operational considerations for COVID-19 surveillance using GISRS***

At a minimum, data should include the date of symptom onset, date of health care visits, and date of laboratory confirmation. These data will help countries characterize and monitor COVID-19 activity over time. Critical demographic information to understand the populations at greatest risk include age and gender, co-morbidities, pregnancy status, and other factors that may impact severity of disease. Health status at the time of reporting and clinical course should include information about admission to the intensive care unit (ICU) and the need for O₂ and ventilation. When possible, outcomes (e.g., recovered, died) should be collected as well. All case report forms should include a unique case identifier, and the laboratory specimen should include the same unique identifier, as is standard practice in AFI surveillance.

Additional variables specific to COVID-19 may be added to existing country case report forms. Where possible, CDC does not recommend creating different forms for COVID-19 surveillance where appropriate forms for AFI surveillance exist. However, additional COVID-19-specific questions may need to be administered to AFI patients enrolled for COVID-19 testing. In addition, there may be a need to have a full COVID-19 specific questionnaire used for patients where UF cases are being enrolled and no data is currently being collected from the patients with respiratory symptoms.

Weekly Aggregate Reporting

Regular aggregate reporting to national, regional (e.g., Africa CDC) and international (e.g., WHO) should occur according to established mechanisms. One option for countries with SARI/ILI surveillance systems, as outlined in the CDC ***Guidance on integration of COVID-19 in existing influenza-like illness (ILI) or severe acute respiratory infection (SARI) sentinel surveillance***, is to submit weekly aggregate report to WHO FluMart, as recommended by WHO. WHO has incorporated reporting for COVID-19 into the FluMart platform, and requests that GISRS partners share data on testing for SARS-CoV-2. Questions regarding reporting in FluNet or FluID may be directed to flumart@who.int. Other reporting channels may vary depending on the country and the reporting systems available.

Weekly aggregate reports should at minimum include the number of AFI specimens tested for COVID-19 and the number of those that test positive by the week of sample collection (the numbers of specimens with negative and inconclusive results can also be reported if available). Each week, it is important to track which specimens are being tested (e.g., all specimens from cases meeting the ILI/SARI case definitions, specimens from cases without respiratory symptoms, only influenza-negative samples, or a subset of either). The number of specimens tested and the associated results can also be broken down by case definition (e.g., ILI, SARI, others), disease severity or outcome.

Opportunities for Future Testing in AFI Surveillance

As more is learned about COVID-19 and new diagnostic technologies are developed, future opportunities for additional testing of samples collected through AFI surveillance systems should be considered.

The pre-existing procedures to collect blood and/or serum through AFI surveillance systems present an opportunity for serological testing, which can help to evaluate the proportion of the population that has been exposed to SARS-CoV-2 and answer other basic surveillance questions. Serological tests can look for the presence of specific antibodies, typically IgM or IgG, made in response to infection. The antibodies detected by the serological test can indicate whether PCR positive patients had an immune response to SARS-CoV-2, or if asymptomatic patients have antibodies indicating a past or recent infection. If procedures are not already in place to do so, AFI surveillance programs interested in conducting serological studies in the future may consider biobanking blood and/or serum specimens for future use. As necessary, existing AFI protocols and patient consent forms should be amended to include simple, flexible language that would allow for the storage and future testing of specimens.

AFI surveillance systems might also be used to evaluate novel diagnostics. These could include serological assays, additional molecular assays, and point-of-care rapid tests.

Monitoring the Implementation of these Guidelines

These guidelines will continue to be refined as more is learned about COVID-19 and SARS-CoV-2. Monitoring their implementation and incorporating lessons learned will also be important in this effort. All countries implementing these guidelines are asked to consult with CDC's Epidemiology, Informatics, Surveillance, and Laboratory Branch in the Division of Global Health Protection of the Center for Global Health (POC: Olga Henao, dot8@cdc.gov) for coordination of technical assistance requests and collection of relevant information for monitoring implementation of activities.

Other Resources

[WHO Coronavirus hub](#)

[WHO Technical Guidance](#)

[CDC Coronavirus hub](#)

[CDC Situation Updates](#)

[Johns Hopkins University update map](#)

Appendix 1

Case Definitions for SARI and ILI

Inpatient Surveillance	Outpatient Surveillance
SARI Acute respiratory infection with: <ul style="list-style-type: none">- history of fever or measured fever of 38° C or more, AND- cough- with acute onset within past 10 days AND- requires hospitalization	ILI Acute respiratory infection with: <ul style="list-style-type: none">- measured fever of 38° C or more, AND- cough- with onset within past 10 days