Maintaining surveillance of influenza and monitoring SARS-CoV-2
adapting Global Influenza Surveillance and Response System (GISRS) and sentinel systems during the COVID-19 pandemic

INTERIM GUIDANCE

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Overview

This document is an update of the interim guidance entitled Operational considerations for COVID-19 surveillance using GISRS, published on 26 March 2020, and of the interim guidance Preparing GISRS for the upcoming influenza seasons during the COVID-19 pandemic – practical considerations, published on 26 May 2020. The document incorporates additional considerations for assessing and addressing disruptions in influenza sentinel surveillance systems and for extending influenza sentinel surveillance to COVID-19. It also includes the updated algorithms for surveillance testing of influenza and SARS-CoV-2, which would enable the monitoring of the potential co-circulation of these respiratory viruses during the upcoming influenza season 2020/2021 and the detection of co-infections with SARS-CoV-2 and influenza or other respiratory viruses. This version is based on the most recent published evidence and country lessons learnt for leveraging the Global Influenza Surveillance and Response System (GISRS) for COVID-19 surveillance compiled before and during a virtual consultation in October 2020.

KEY POINTS

- The threat of influenza epidemics and pandemics persists. It is imperative for the GISRS to maintain meaningful surveillance of influenza worldwide and for countries to remain vigilant while adapting to meet COVID-19 surveillance objectives.
- Countries are advised to first assess and address disruptions to the influenza sentinel surveillance systems when implementing sentinel surveillance of COVID-19.
- Specimens from sentinel sites should be tested for both influenza and SARS-CoV-2 viruses. If possible, multiplex PCR assays for the simultaneous detection of influenza and SARS-CoV-2 viruses should be selected for efficient use of reagents, consumables and hands-on time.
- It is important to ship timely representative influenza viruses and/or clinical specimens from positive specimens to WHO Collaborating Centres, according to existing WHO guidance.
- Reporting of weekly aggregated sentinel surveillance is a critical component of surveillance.
- Despite its great challenges, the COVID-19 pandemic provides an opportunity to strengthen core surveillance capacities that can deliver public health benefits during and well beyond this emergency.
Despite its great challenges, the COVID-19 pandemic provides an opportunity to strengthen core surveillance capacities that can deliver public health benefits during and well beyond this emergency.
Introduction

This document is intended for public health professionals involved in disease and laboratory surveillance at the national level. It is also a guide for WHO staff involved in influenza and COVID-19 pandemic surveillance and response. It provides interim guidance for adapting and sustaining influenza sentinel surveillance systems that ensure continued influenza surveillance and complement COVID-19 surveillance wherever possible during the ongoing pandemic.

Background

Since the emergence of SARS-CoV-2, the Global Influenza Surveillance and Response System (GISRS) (1) and its network of public health laboratories (National Influenza Centers (NICs), WHO H5 Reference Laboratories, WHO Collaborating Centers) in 125 countries have been at the forefront of a concerted global and national response for the detection and containment of SARS-CoV-2 transmission. A survey conducted by GISRS in May 2020 indicated that more than 90% of NICs, WHO H5 reference laboratories and other public health laboratories in the GISRS network are conducting testing for SARS-CoV-2. Existing GISRS influenza reporting systems have become the primary platforms for sharing COVID-19 data at regional and global levels.

A rapid global external quality assessment programme for COVID-19 was built on the influenza mechanism of GISRS with 164 countries (233 labs) participating in the programme. Sharing of genetic sequence data of SARS-COV-2 rapidly took place globally through a publicly accessible database in GISAID (2). The GISRS infectious substance shipping mechanism was used for the shipping of SARS-CoV-2 virus materials to WHO COVID-19 reference laboratories. Furthermore, since March 2020, countries have started sentinel surveillance of COVID-19, through testing of sentinel samples for SARS-CoV-2 from influenza surveillance systems to monitor community transmission, following WHO guidance on operational considerations for leveraging influenza surveillance systems to incorporate COVID-19 testing (3).

However, while responding to the exponential surge in demand for COVID-19 testing, influenza surveillance systems have been overwhelmed and faced significant disruptions and resource challenges due to the changes in healthcare seeking behavior and delivery. In many countries, weekly reporting of influenza surveillance data has been delayed, infrequent or ceased altogether. In those countries that were able to test and report, influenza activity was low and below the epidemic threshold during the 2020 southern hemisphere season compared to past years. It is essential for countries to continue vigilance for the emergence of non-seasonal influenza viruses of pandemic potential and prepare for the upcoming 2020/2021 northern hemisphere influenza season during the ongoing COVID-19 pandemic.

WHO supports country readiness and response by providing evidence-based guidance for active case finding, care and isolation, contact tracing and quarantine (4). As part of the response efforts, the Emergency Committee of the International Health Regulations (IHR 2005) advised WHO to provide guidance on monitoring disease trends using severe acute respiratory infection (SARI) and influenza-like illness (ILI) surveillance systems in anticipation of the co-circulation of influenza and SARS-CoV-2 viruses. It continues to advise State Parties to share with WHO all data (including SARI and ILI where available) necessary to conduct global risk assessments through data platforms, such as the GISRS and the IHR mechanism (5, 6).
Despite the challenges, the COVID-19 pandemic provides an opportunity to strengthen core surveillance capacities that can deliver public health benefits during and well beyond this emergency. Surveillance capacities built by countries during the pandemic would serve as a basis for resilient systems that can respond more effectively and rapidly to public health threats in the future.

**Extending objectives of influenza sentinel surveillance to COVID-19**

Surveillance systems should be based on clear objectives, which guide what kind of data should be collected and the selection of sites for surveillance that will provide the most appropriate data. The objectives of routine influenza sentinel surveillance are to provide timely and high-quality epidemiological data and viral isolates to describe the seasonality, signal the start and end of the influenza season, provide candidate viruses for vaccine production, monitor the antigenic and genetic evolution of circulating viruses, monitor groups at high risk of severe disease, assess severity, estimate disease burden, monitor antiviral susceptibility and detect unusual and unexpected events and outbreaks. The approach of routine influenza sentinel surveillance system is not to capture all suspected cases of influenza but only a systematic subset of influenza cases. Early detection of cases for isolation, testing, contact tracing, quarantine and rapid control of clusters and outbreaks are not the primary objectives of sentinel surveillance systems for seasonal influenza (7).

Existing influenza surveillance systems, using global standards and approaches and coordinated through the GISRS system are in a unique position to contribute to pandemic surveillance and monitoring, especially considering the likely co-circulation of influenza and SARS-CoV-2 viruses. The potential of the existing sentinel systems meeting the following objectives is, however, dependent on the evolving SARS-CoV-2 transmission situation in the country.

- **COVID-19 objectives that are likely to be addressed through influenza sentinel systems:**
  - Monitoring long term epidemiological trends and evolution of SARS-CoV-2 viruses
  - Detecting the co-circulation of influenza and SARS-CoV-2 viruses.

- **COVID-19 objectives that influenza sentinel surveillance can likely contribute to include:**
  - Early detection of community transmission of SARS-CoV-2
  - Evaluation of the impact of COVID-19 on healthcare systems
  - Informing the implementation and adjustment of targeted public health and social measures.

- **COVID-19 objectives that are unlikely to be addressed include:**
  - Early detection and containment of COVID-19 outbreaks.

The strengths and limitations of primary care-based (ILI/ARI) and hospital-based (SARI) sentinel surveillance systems for addressing COVID-19 objectives are described in Annex 1. Several countries are using other surveillance systems to monitor trends for influenza, such as universal monitoring of ICD 10 codes for acute respiratory diseases, excess mortality surveillance and participatory surveillance. These systems are not discussed in this document but should also be leveraged in the context of COVID surveillance (8).
Influenza surveillance case definitions for COVID-19

Determining optimal thresholds for sensitivity and specificity for a case definition is always a balance based on needs and objectives of surveillance for influenza, COVID-19 and other respiratory infections with similar and non-discriminatory clinical characteristics (9). A non-sensitive case definition could result in the failure to detect activity early enough or incorrectly estimate disease severity. By contrast, an overly sensitive case definition may signal false alerts for the onset of the epidemic due to a higher number of false positives from other causes, and consequently demand more resources (10).

ILI, ARI and SARI for influenza

ILI and SARI case definitions, as defined in the WHO global influenza surveillance standards, are commonly used by national influenza surveillance systems globally, though sometimes with minor adaptations (Box 1). Acute respiratory infection (ARI) case definition is also used in some countries for influenza and other respiratory virus surveillance and is included in the WHO Regional Office for Europe guidance for influenza surveillance in humans (11).

The ILI case definition (Table 1) has a high specificity (85 – 95%) but lower sensitivity (45 – 55%) for detecting influenza in primary care consultations (12). By contrast, the broader ARI case definition is more sensitive (94%) but less specific (27%) for influenza than the ILI case definition. Similarly, the SARI case definition has a specificity and sensitivity that ranges between 45 and 70% (13, 14).

ILI, ARI and SARI for COVID-19

WHO has regularly updated the case definitions for COVID-19 to integrate increasing knowledge on the most common and predictive symptoms, clinical and radiographic signs and known transmission dynamics (supplementary Table S1) (15).

Part A of the suspected COVID-19 case definition requires acute onset fever and cough (same as for ILI and SARI) or acute onset of at least three of a range of symptoms that are broader (gastro-intestinal, altered mental status, myalgia, general weakness/fatigue, headache) than that required for any case definition for influenza. Part B of the suspected COVID-19 case definition requires acute onset of fever (measured or reported), cough and hospitalization and are the same as for the SARI case definition for influenza. The epidemiological link required for a COVID-19 case (e.g., contact with a known COVID-19 case, history of travel to COVID-19 affected areas) is relevant when a country is not yet in a community transmission phase.
A recent systematic review on the clinical characteristics of COVID-19 commissioned by WHO in September 2020 found fever (83%) and cough (60%) as the most common symptoms associated with COVID-19 in persons with illness, followed by loss of smell or taste (41%), fatigue (31%) and loss of appetite (30%) (16). The review was mainly based on symptoms in hospitalized cases, and it is therefore possible that community or primary cases would have milder symptom profiles. Little is known about the prevalence of ILI, ARI or SARI among COVID-19 cases from published literature and meta-analysis of patient-level data from different geographical and severity settings. It would be necessary to explore the different combinations of symptoms to optimally capture COVID-19 cases. SARS-CoV-2 positivity in ILI / ARI and SARI surveillance ranged between 1.8% and 25.6% and was highest in the elderly and lowest in children (17-19). A review of seven ecological studies found positive correlation between excess ILI / ARI and COVID-19 cases or influenza-negative cases, indirectly supporting the use of ILI, ARI and SARI case definitions for COVID-19 surveillance (16, 20). Supplementary tables S2-S5 describe the source and heterogeneity of data and results from countries that have contributed to the WHO assessment of ILI, ARI and SARI case definitions performance for COVID-19.

Further in-depth analysis is needed on extensive data sourced from different geographic and population settings, and different stages of the COVID-19 pandemic.

In the interim, influenza surveillance systems should continue to use existing WHO ILI and SARI case definitions to test for influenza and wherever possible, for COVID-19. Countries with high testing capacities may continue to use the more sensitive but less specific ARI case definition.
Rapid situation assessment of the status of the sentinel surveillance system

Well-established influenza surveillance uses a network of sentinel sites for the collection of clinical specimens from suitable patients according to the case definitions. These sites include public and private medical offices and clinics as well as hospitals. The current situation has had variable effects on routine influenza surveillance systems. Some aspects of influenza surveillance have benefited from the rapid capacity building and training efforts during the response to COVID-19. Other parts of the surveillance system have been disrupted, affecting routine influenza surveillance activities.

Within a country, the type and degree of disruptions may vary between regions and sentinel sites and over time with fluctuations in SARS-CoV-2 and influenza transmission intensities affecting national and local capacities. Disruptions to existing sentinel influenza surveillance systems may be the result of changes in healthcare delivery (including resource limitations and changing priorities) and healthcare seeking behaviour and can influence the utility of the surveillance system in meeting its objectives.

Disruptions can disproportionally affect one sentinel system over another (e.g. outpatient surveillance may be more severely disrupted compared to inpatient surveillance systems). Additional survey methods can be considered for a detailed assessment of changes in healthcare seeking behaviour.

Rapid situation assessment

The rapid situation assessment described below is a quick approach to documenting and describing the potential opportunities for and disruptions to sentinel surveillance for influenza to inform possible interventions in the context of the COVID-19 pandemic. The assessment does not replace recommended regular in-depth scored evaluations or routine monitoring. A rapid assessment is meant to be used when limited time and resources make a broad evaluation difficult and when interventions need to be considered immediately.

The rapid assessment aims to achieve the following objectives:

- To identify strengths, challenges and gaps in surveillance program implementation, as well as opportunities and threats relevant to sustaining influenza surveillance and incorporating the surveillance of COVID-19 in the sentinel system.
- To use the assessment findings to assess the degree of disruptions and take appropriate, targeted actions for sustaining influenza surveillance and incorporating the surveillance of COVID-19 in the sentinel system.

Consider including the following activities:

- Collect information on sentinel site attributes, focusing on changes in trends, policies, system processes and data quality that may have taken place in the context of the COVID-19 pandemic response. Example questions are given in Annex 2 but should be adapted for the national situation. Sources of information may include in-depth interviews with key sentinel site and laboratory personnel, direct observation and desk review of key documents.
- Summarize the findings and prepare a brief report on the degree of disruptions to the sentinel surveillance system, including specific disruptions and affected attributes. The report can also include interim recommendations on actions for improvement if needed to sustain influenza sentinel surveillance.
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Evaluate changes in healthcare seeking behaviour

To better understand changes in healthcare seeking behavior and how this affects the data and interpretation, the information below could be useful:

- Policy documents
  - Are patients with respiratory symptoms redirected to special screening centers?
  - Are patients with SARI referred to designated hospitals?
- A cross-sectional survey of participants identified through random or systematic sampling, who self-complete a tool that collects data including sociodemographic information
- Participatory surveillance systems for influenza and influenza-like illness
- Subjective anecdotal information from clinical networks.

Addressing disruptions in influenza sentinel surveillance systems

If there are major disruptions, determine what influenza objectives should be prioritized realistically for the next 6-12 months and what resources and capacity are available in order to make adaptations to meet these priority objectives.

Priority objectives would include:

- understanding when, where and in whom (e.g. age groups) influenza activity is occurring to inform clinical management recommendations and public health response activities at national and subnational levels
- submitting representative samples to inform the global vaccine composition selection decision
- contributing to the understanding of trends and impact at subnational, national, regional and global levels

If some disruptions are identified in the rapid assessment, address the specific disruptions to maintain influenza surveillance. Consider adding SARS-CoV-2 as a virus under surveillance in the existing system. If resources allow, test all samples collected in sentinel sites for influenza and SARS-CoV-2.

If no disruptions are noted, consider adding SARS-CoV-2 as a virus under surveillance in the existing system. If resources allow, test all samples collected in sentinel sites for influenza and SARS-COV-2.

Addressing specific disruptions

Disruptions to existing influenza sentinel surveillance systems may vary by country, and the underlying reasons are diverse. They may occur as a result of changes in healthcare delivery, especially primary care health services including telephone first policies, teleconsultations, redirection of patients to specialized triage / testing / treatment clinics or centres and changes to sentinel sites and staff (repurposed for the COVID-19 response) and case definitions (e.g. from ILI to ARI). Detailed considerations for sustaining influenza surveillance are provided in Annex 3 (syndromic surveillance) and Annex 4 (virologic surveillance) with associated opportunities and constraints. Any changes made to sentinel surveillance should be recorded and monitored closely to understand if they have addressed the issues identified.
Practical considerations for extending influenza sentinel surveillance to COVID-19

Countries should consider the following before implementing sentinel surveillance for COVID-19 in the influenza surveillance systems:

- presence of a national or subnational surveillance system governed by national health authorities
- results of the surveillance system evaluation and the assessment of the degree of disruption to the system
- potential (if there is capacity in place) to pilot sentinel surveillance of COVID-19 at a select proportion of well-functioning sentinel sites in the surveillance systems at initial stages
- logistics of sample transport from sentinel sites to national reference laboratories
- reporting of SARS-CoV-2 results: to whom and how to trigger response actions such as contact tracing and IHR reporting.

Countries should consider implementing syndromic surveillance for SARI combined with laboratory confirmation to capture the impact of both influenza and COVID-19 on healthcare systems. Countries already collecting information on laboratory-confirmed hospitalizations might consider implementing SARI surveillance with laboratory-confirmation of both influenza and COVID-19 to understand the combined impact on hospital systems.

Expansion of the sentinel system

Expansion of the sentinel system should not compromise the surveillance standards, including quality of specimens and epidemiological information. Good quality specimens and data with timely reporting, even from fewer sites, are more useful than a large volume of poor-quality specimens and failure to report data in a timely manner. It is important, before establishing more sites, to consider whether they can be effectively managed, monitored and sustained.

Following an evaluation of the sentinel system, if it is decided to expand the sentinel sites, consideration should be given to increasing the geographical representativeness of the surveillance system, with the goal of improving detection and monitoring of community transmission of COVID-19 in those areas not yet covered in the sentinel surveillance system.

Case detection and data collection at sentinel sites

- Case detection: It is recommended to continue using the existing case definitions for influenza surveillance for case detection and sampling.

- Data collection:
  - Additional variables could be incorporated into the individual case reporting forms in use at sentinel sites.
  - The benefits of adding new variables or data to collect should be balanced against the potentially increased burden on sentinel site staff when making the decision to change the sentinel site case reporting form. Data collection should be designed to meet information needs of public health decision makers, the public, and health workers.
  - The information collected from these case reporting forms is for use at national level for analyses; not all information needs to be reported to regional and global levels.
The fields to be reported to regional and global levels in either case-based data or aggregated data reporting is determined by the country and region. At WHO global level, only aggregated data from sentinel surveillance is reported (see “Data reporting, analysis and interpretation”).

- Avoid duplication of efforts (multiple case report forms, databases, etc.) wherever possible, by adding COVID-19 / ARI / ILI / SARI case definitions to the case reporting and specimen submission form so that there is one form in use to indicate which test should be performed and allow separation by case definition. Collecting information on which case definitions the patient fits would also be useful for retrospective analyses. If one case reporting form is used, ensure that all variables required for weekly aggregated reporting on COVID-19 surveillance to the global level are included.

A list of potential variables to consider adding (if not already included in existing case reporting forms) is given in Annex 5.

**Sampling strategy and sample size considerations**

In the context of the COVID-19 pandemic, which has changed healthcare seeking behavior, influenza sentinel networks may need to adapt to ensure that adequate numbers of appropriate specimens and complete clinical and epidemiological information are available to GISRS laboratories for virologic surveillance of influenza. Furthermore, countries that have implemented robust physical distancing policies to control the spread of SARS-CoV-2 are likely to find a decrease in influenza circulation. Therefore, influenza sampling strategies will need to be adapted to ensure an appropriate supply of specimens for virologic surveillance. GISRS should continue to rely on primary care providers, emergency rooms, outpatient clinics, and hospital wards, including intensive care units that continue to serve patients with ILI/ARI and SARI as potential sources of well documented specimens for influenza and SARS-CoV-2 sentinel surveillance.

To generate meaningful surveillance output, it is recommended to test at least 50 to 100 sentinel specimens, ideally 150 specimens per week per National Influenza Centre (NIC) or national reference laboratory for influenza and SARS-CoV-2. Specimens should cover all age groups and geographic regions of the country.

*If the minimum quota of 50-100 specimens tested per week cannot be obtained from sentinel surveillance, consider (in no particular order):*

- Selecting a subset of SARS-CoV-2 negative specimens to test for influenza.
- Prioritize those samples where there is information indicating symptoms, age, presence of risk factors and geographic location.
  - Among those, select specimens from patients that meet ILI and SARI case definition to ensure disease severity spectrum is represented.
  - Among those, select specimens representing different age groups, risk factors, outcomes and geographic locations.
- Select the remaining specimens needed from non-sentinel surveillance.
Laboratory considerations – sentinel surveillance specimens

*Clinical specimens*

**Types of clinical specimens recommended for the detection of influenza viruses include:**
- Nasal swabs
- Nasopharyngeal swabs
- Combined nose (nasal) and throat (oropharyngeal) swabs
- Nasal washes
- Nasopharyngeal aspirates
- Endotracheal aspirates (for lower tract respiratory infections)
- Bronchoalveolar lavage (for lower tract respiratory infections).

Generally, upper respiratory tract specimens have been shown to be suitable for the molecular detection of influenza and SARS-CoV-2 viruses. Indeed, nasopharyngeal and oropharyngeal swabs placed into a collection vial or directly into centrifuge tube containing 2–3 ml virus transport medium remain the specimen types of choice for influenza and SARS-CoV-2 detection (21, 22). Although current peer-reviewed literature indicates that lower respiratory specimens may be best for the molecular detection of SARS-CoV-2 (23), the sample collection procedure tends to be invasive for patients and may also generate aerosols, as is the case with bronchoalveolar lavages, and difficult for patients to produce, like sputum (24-26).

Due to concerns over global paucity of supplies, reagents, and personal protective equipment for specimen collection, saliva, oral fluid, and sputum samples have also been explored as alternative samples for the detection of SARS-CoV-2 (27-30). However, the suitability of these alternative sample types for the detection of influenza (and SARS-CoV-2) remains uncertain, and further research is needed into alternative sampling strategies. At this time, WHO does not recommend the use of saliva as the sole specimen type for SARS-CoV-2 diagnostics. The clinical utility of saliva for the PCR detection of influenza is not known. SARS-CoV-2 has also been detected by reverse transcription chain reaction (PCR) in non-respiratory faecal specimens such as stools and rectal swabs. Until convincing scientific information is available, alternative respiratory and non-respiratory samples should not routinely be used for the surveillance of influenza. If nonstandard collection method is intended to be used, it needs to pass the appropriate validation procedure.

Current literature suggests that collecting more than one sample type from each patient may increase the likelihood of SARS-CoV-2 detection by PCR; however, shortages in laboratory testing kits and reagents make this impractical. In the interest of preserving RNA extraction reagents and avoiding increased personnel workload, specimens for influenza testing should be the same ones for used to detect SARS-CoV-2, and vice versa (31).

**Storage of clinical specimens at the sentinel site**

If specimens cannot be transported immediately to the laboratory, they can be stored at refrigerator temperature (4°C) for up to 72 hours. If longer storage periods are necessary, specimens should be kept frozen at -70°C or below. Note: DO NOT store clinical specimens at -20°C. Where possible, specimens should not be repeatedly frozen and thawed, because this results in degradation of the virus, reducing detectability and viability for further isolation/characterization.

**Transport of clinical specimens to the laboratory**

Transportation of clinical specimens to the laboratory follows national and international transport regulations. WHO recommends (32, 33) authorities to transport patient specimens that potentially may contain human seasonal influenza viruses or SARS-CoV-2 as UN 3373, Biological substance, Category B.
Handling of clinical specimens in the laboratory

Aside from standard practices in handing influenza clinical specimens, special precautions need to be taken when handling such specimens in the laboratory (34), since respiratory specimens may also contain SARS-CoV-2 and zoonotic influenza viruses. For culture of influenza viruses, please see the section “Biosafety and Biosecurity”. Efforts must be made to confirm the absence of SARS-CoV-2 and zoonotic influenza viruses in specimens intended for influenza virus culture. Isolation and passage of samples containing SARS-CoV-2 and zoonotic influenza viruses must currently be done in a biosafety level 3 (BSL3) laboratory with BSL3 procedures or equivalent.

Algorithms for surveillance testing of influenza and SARS-CoV-2

During the ongoing COVID-19 pandemic, national authorities in many countries have requested their GISRS laboratories to serve as SARS-CoV-2 testing sites, for primary clinical diagnosis, national reference laboratory service or surveillance. This has presented challenges to many laboratories on technical and programmatic fronts. These challenges include SARS-CoV-2 specific tests to be established and validated; overwhelming numbers of clinical specimens to be tested and reported; logistical problems in acquiring reagents; sourcing consumables and reagents; equipment procurement and use; hiring and training of additional staff; specimens coming from outside the sentinel network built for influenza surveillance; specimens with incomplete background information about the patient; building additional IT capacity for data registration and reporting of results.

Despite the pressure from the COVID-19 pandemic, it is imperative for the GISRS to maintain meaningful surveillance of influenza worldwide and to remain vigilant of the influenza threat, both epidemic and pandemic. To address the need for both influenza and COVID-19, in a straightforward strategy is 1) to ensure optimal quantity and quality of all sentinel specimens from ILI/ARI, and SARI patients, and 2) to test these specimens for both influenza and SARS-CoV-2.

Current strides are being made on the development of reliable and time-saving multiplex assays for the simultaneous detection of influenza and SARS-CoV-2 in one PCR reaction. However, for the next 3 to 6 months, single-plex assays may be the only option for molecular detection of influenza or SARS-CoV-2 in most countries. Ideally, single-plex assays for influenza and SARS-CoV-2 should be run in parallel, though this may not always be possible. Therefore, GISRS laboratories in many countries must decide the sequence of testing: either influenza viruses or SARS-CoV-2 as first line, depending on the national testing strategy.

The testing algorithms below are for two situations: with influenza as the first testing preference (Figure 1A), or with SARS-CoV-2 as first preference (Figure 1B). The decision on the first preference should be made based on the epidemiological situation for COVID-19, available resources and relevant national guidance.

The testing algorithms enable the monitoring of the potential co-circulation of these respiratory viruses during the influenza season 2020/2021 in the Northern Hemisphere, and the detection of co-infections with SARS-CoV-2 and influenza or other respiratory viruses. Some SARS-CoV-2 infected individuals shed virus or viral RNA over extended periods. Therefore, test results must be carefully interpreted, and clinical history combined with laboratory results may help to determine specific etiology.
Figure 1A shows a flow-chart for testing clinical specimens, primarily for influenza viruses and then for SARS-CoV-2. It is recommended that multiplex PCR assays for the simultaneous detection of influenza A and B viruses and SARS-CoV-2 be used if they are available (green boxes) and that influenza positive samples are passed on to WHO Collaborating Centres (CCs) for further characterization as a standard GISRS function. If resources allow, advance along dashed line under green boxes. When multiplex PCR assays are not available, then single-plex assays for influenza A and for influenza B (yellow boxes) are used and followed up with single-plex for SARS-CoV-2.

Figure 1A. Testing algorithm for laboratories that test for influenza viruses as a first preference

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1. Specimens from the sentinel surveillance site meeting specific surveillance case definition (ILI/ARI/ SARI). Nasal swabs, throat swabs, combined nasal and throat swabs, nasopharyngeal aspirates are suitable clinical specimens for the detection of both influenza viruses and SARS-CoV-2 in clinical specimens.

2. The dashed line indicates that influenza-positive specimens should, if resources allow, be shown to be SARS-CoV-2 negative prior to submitting to a WHO CC.

3. Follow the operational guidance on sharing seasonal Influenza viruses with WHO CCs under the GISRS.

4. The summary results of testing should be shared with WHO through the global database FluNet or through WHO regional databases linked with FluNet.
Maintaining surveillance of influenza and SARS-CoV-2 – interim guidance

Figure 1B shows a flow-chart for the testing of clinical specimens primarily, for SARS-CoV-2 first and then for influenza A and B viruses. It is recommended that multiplex PCR assays for the simultaneous detection of influenza A and B viruses and SARS-CoV-2 be used if available (green boxes) and that influenza positive samples are passed on to WHO CCs for further characterization as standard GISRS function; if resources allow, advance along the dashed line under green boxes. If multiplex PCR assays are not available, then single-plex assays for SARS-COV-2 (yellow boxes) are used followed up with single-plex for influenza A subtypes and B.

Figure 1B. Testing algorithm for laboratories that test for SARS-CoV-2 as a first preference

1 Specimens from the sentinel surveillance site meeting specific surveillance case definition (ILI/ARI/SARI). Nasal swabs, throat swabs, combined nasal and throat swabs, nasopharyngeal aspirates are suitable clinical specimens for the detection of both influenza viruses and SARS-CoV-2 in clinical specimens.

2 Follow the operational guidance on sharing seasonal influenza viruses with WHO CCs under the GISRS

3 The summary results of testing should be shared with WHO through the global database FluNet or through WHO regional databases linked with FluNet.
Selection of influenza positive clinical specimens and virus isolates to forward to a WHO CC

With the continued circulation of SARS-CoV-2, the WHO CCs of GISRS would highly prefer to receive influenza-positive clinical specimens that are negative by RT-PCR for SARS-CoV-2 from NICs and other laboratories, and influenza virus isolates derived from clinical specimens that are negative by real-time reverse transcription PCR (RT-PCR) for SARS-CoV-2. It is suggested that influenza isolates be grown only from influenza virus-positive samples that are negative for SARS-CoV-2. For SARS-CoV-2-positive specimens that require laboratory confirmation, WHO has established a network of COVID-19 reference laboratories providing confirmatory testing for COVID-19.

If it is not possible for a laboratory to screen influenza positive samples for SARS-CoV-2 before shipping to a WHO GISRS CC, the submission sheet should indicate that these samples have NOT been screened for SARS-CoV-2, which should also be noted in corresponding emails with the WHO CC receiving the samples.

It is critical to GISRS function to share in a timely manner influenza isolates or clinical specimens that are positive for influenza. Follow the operational guidance on sharing seasonal Influenza viruses with WHO CCs under the GISRS. Select a subset of recently collected viruses or specimens representing both currently circulating subtypes of influenza A viruses and both lineages of influenza B viruses. If an influenza A virus cannot be subtyped as either H1pdm09 or H3, alert a WHO CC without delay and send the samples as soon as possible.

GISRS laboratories need to be reminded that the selection of influenza vaccine viruses is dependent on the availability of virus isolates, and they are encouraged to continue sending influenza isolates or original clinical specimens to WHO CCs for culture and full characterization of influenza viruses.

Laboratory techniques for the detection of influenza and SARS-CoV-2

Real-time reverse transcription PCR (rRT-PCR) is the gold standard for detection of influenza viruses in GISRS laboratories. PCR is a highly sensitive and specific method for the detection of pathogens in clinical specimens. Primers and probes can quickly be adapted when mutations in critical sites of the pathogens’ nucleic acid are recognized; required reagents are available in high quality from many different sources; and the procedure for extracting viral nucleic acids will inactivate viruses in clinical specimens, which allows for their safe use for other tests. For GISRS laboratories, the International Reagent Resource (IRR) of the WHO CC for the Surveillance, Epidemiology and Control of Influenza at the United States Centers for Disease Control and Prevention (US CDC) has been the primary source for influenza PCR reagents and kits.

Rapid sharing of sequence data following the emergence of SARS-CoV-2 allowed the design of suitable primers and probes for the specific detection of this novel virus. Suggested protocols for molecular detection of SARS-CoV-2 were published on the WHO website. Multiplex assays for the identification of more than one pathogen in the same PCR reaction allows for a more resourceful use of reagents, consumables and hands-on time. Multiplex PCR formats for the simultaneous detection of influenza A and B viruses have been available for several years, and for many GISRS laboratories these are the primary methods for influenza surveillance.

At the time of writing this document, the US CDC has developed a multiplex rRT-PCR assay for the simultaneous detection of influenza viruses and SARS-CoV-2. However, this test will only be available to a limited number of GISRS laboratories in the next 3 to 6 months in a kit format due to limitations of production capacity. The US CDC multiplex assay’s instructions for use and the sequence information for primers and probes are publicly available for reference in the development of a diagnostic test based on the CDC design.
In addition to the multiplex assay developed by US CDC, other test formats, including several commercial tests, are available and have been described elsewhere (43).

Whatever test format is to be used for influenza and SARS-CoV-2 surveillance, it is of utmost importance to ensure highest sensitivity and specificity for the targeted pathogens. Also, well-characterized positive and negative controls must be included in each test run. To assess their performance, laboratories should regularly participate in external quality assessment programs provided by the WHO Global Influenza Programme (GIP) and other sources (e.g. Quality Control for Molecular Diagnostics or Royal College of Pathologists of Australasia Quality Assurance Programs).

**Biosafety and Biosecurity**

The diagnosis of respiratory virus infection can rarely be established based only on clinical symptoms. Many respiratory pathogens can cause similar symptoms. Patients presenting with ILI or SARI may be infected with an influenza virus, SARS-CoV-2, one of many other respiratory viruses, bacteria or a novel virus or could be simultaneously infected with two or more pathogens. Health workers are at a high risk for contracting infections in clinical settings. Doctors, nurses and other staff who interact with suspected influenza or COVID-19 patients are at especially high risk.

Health workers interacting with suspected influenza or COVID-19 patients, as well as laboratory workers handling clinical specimens from such patients, must be protected with appropriate training, and adequate personal protective equipment (PPE) based on thorough risk assessment. Every year, health care workers should be firmly encouraged to take the seasonal influenza vaccine. Health care workers and laboratory workers must be immediately tested for influenza and SARS-CoV-2 if respiratory symptoms occur.

Biosafety practices recommended for seasonal or zoonotic influenza virus isolation are described in the WHO Manual for the laboratory diagnosis and virologic surveillance of influenza. Biosafety practices and guidelines for handling SARS-CoV-2 infectious material are described in several publications. For each work step, from collecting clinical specimens to transport to the laboratory to all procedures in the laboratory, a careful risk assessment must be conducted. All laboratory workers must be properly trained in the use of PPE and the required safety procedures (22, 34).

If laboratories are attempting to culture influenza viruses, clinical specimens should be tested for SARS-CoV-2; and SARS-CoV-2 negative samples that are influenza A(H1)pdm09 or A(H3)/B positive can be considered for virus isolation. Although it cannot be completely excluded, it is unlikely that SARS-CoV-2 will replicate in cell lines or embryonated hens’ eggs commonly used for the isolation of influenza viruses (44). For attempts to culture SARS-CoV-2, strict biosafety level 3 (BSL3) conditions must be observed. A “sequence first” approach could be used to determine which specimens are selected for culture and would be particularly useful in the case of influenza and SARS-CoV-2 co-infections where culture at BSL3 could be restricted to specimens that warranted further investigation.

All clinical specimens are regarded as potentially infectious until proven otherwise. Material potentially containing SARS-CoV-2 must be handled and stored in areas with restricted access.
Data reporting, analysis and interpretation

Data reporting and analysis at the national level
Regular analysis and reporting of national sentinel surveillance data helps to ensure that the information is available to policy makers, healthcare providers, and the public and will also improve the consistency of reporting from sentinel sites. Whenever feasible, such reports should be available to the public on the national surveillance website. Reports should include a summary interpretation with graphs, if possible, to support the interpretation.

For COVID-19 data obtained using existing sentinel surveillance systems, additional reporting considerations include establishment of:
- procedures for routinely reporting the analysis results to authorities managing the overall COVID-19 response and determining the recipients of reports, the frequency of reporting and what data should be included in the reports
- procedures and actions when a SARS-CoV-2 positive result is detected in a sentinel sample, depending on the response strategy in the country; and if it would be reported (e.g., to general practitioner, COVID task force / other authorities responsible) for contact tracing or other actions

Data reporting to regional and global levels
Many countries are already familiar with reporting routine influenza surveillance to FLUNET (virological data) and FluID (epidemiological data) global databases, either directly or via the WHO regional platforms. FluMart (45), the global data reporting platform which houses the FLUNET and FLUID datasets, allows the uploading of any user-defined data files in their own format and transforms them into standardized data. FluMart was configured to collect COVID-19 early in the pandemic and to add this data to FLUNET and FLUID datasets. COVID-19 information should be included as additional variables in the same data file as influenza data when reporting directly to FluMart.

What to report:
- **Influenza testing data**: continue reporting aggregated influenza surveillance data on a weekly basis to regional and global levels. At a minimum, this should be the number of samples from all sources processed for influenza testing, the number of samples positive for influenza and the number of samples tested and/or samples negative for influenza. Wherever possible, this data should be disaggregated by source (sentinel and non-sentinel).
- **COVID-19 testing data**: countries are requested to report weekly-aggregated COVID-19 results in the same format and frequency as they have been reporting influenza surveillance data. Virologic data (such as the number of samples testing positive and negative for COVID-19) from cases sampled in existing sentinel and non-sentinel or syndromic surveillance systems should be reported on a weekly basis to regional and global levels.
- **Co-infections with influenza and SARS-CoV-2**: Reporting the detection of co-infections with SARS-CoV-2 and influenza or other respiratory viruses is possible. If reporting to FLUNET is done with an excel file upload, modifications to the routine reporting template would allow the reporting of the number of co-infections per week by combination of viruses detected (e.g. influenza/SARS-CoV-2 or influenza A/SARS-CoV-2). Contact flumart@who.int for further instructions on reporting co-infections.
- **Syndromic surveillance data**: continue reporting the ILI and SARI data with age breakdown and where possible by influenza type with the denominators. Where established, ARI or pneumonia data should continuously be reported.
How to report:

- For countries uploading data directly to FLUMART, please contact flumart@who.int for assistance in modifying the routine reporting influenza template to include COVID-19 data and for assistance in uploading.
- For countries reporting influenza and COVID-19 testing data to regional platforms, this should be done through existing regional platforms and WHO regional contact persons. Please include flumart@who.int in all messages.

When to report: Routine reporting of influenza and COVID-19 data should continue on a weekly basis. For direct reporting to global platforms, data should be reported by Thursday of the following week. Deadlines for reporting to regional platforms may differ.

See Annex 7 for more information on how and what to report.

Monitoring and evaluation

Regular monitoring of the surveillance system should be done to detect and address disruptions that arise during the course of surveillance. Periodic, thorough surveillance system evaluations could be considered when time and resources allow.

Actions to consider:

- Involve additional stakeholders in the monitoring and evaluation, such as members of incident management team (see below) or national COVID-19 task force.
- Document any changes in resources / governance of existing surveillance systems during -19 pandemic.
- Document and understand changes in information flow between sentinel sites, laboratories and national surveillance units.
- Document any changes in healthcare delivery in primary and hospital-based facilities during the COVID-19 pandemic.
- If adding SARS-CoV-2 as another respiratory pathogen under surveillance in an existing system, monitor the results of the surveillance system evaluation, especially attributes such as timeliness of sample transport and processing, completeness and representativeness of the sentinel system.

More information on how, why and when to conduct monitoring and evaluation can be found in Annex 8.

Translating evidence to policy

National COVID-19 responses usually involve establishing an incident management team (IMT). A designated focal point for respiratory disease surveillance should be a member of this IMT and act as a liaison with routine respiratory disease surveillance programs. Information from the routine respiratory disease sentinel surveillance programs should be integrated into the overall assessment of the situation of acute respiratory infections in the country. Routine influenza sentinel surveillance should be seen as one (but not exclusive) important set of information to analyse and assess the situation.

Influenza surveillance data should continue to be used in pandemic influenza severity assessments (PISA), recognizing that changes to the surveillance system may alter baselines and interpretations. Information coming from all surveillance systems should be assessed to inform clinical management, risk communication (46) and non-pharmaceutical interventions (47, 48) such as scaling up of response activities, including maintaining essential health services, increasing the number of critical care beds, restricting non-essential travel, implementing school measures, recommending social distancing measures or mandating mask use.
Extensive guidance on surveillance during an influenza pandemic is available, and much of the content in that guidance is relevant in the current situation. See https://apps.who.int/iris/bitstream/handle/10665/259886/9789241513333-eng.pdf?sequence=1 for more information and background.

For more information on the Pandemic Influenza Severity Assessment, see the WHO guidance: https://www.who.int/influenza/surveillance_monitoring/pisa/en/.

More information on implementing SARI surveillance is included in the WHO Global Epidemiological Surveillance Standards for Influenza: https://apps.who.int/iris/handle/10665/311268

Detailed guidance on monitoring and evaluation of sentinel surveillance systems for influenza is included in the Global Epidemiological Surveillance Standards for Influenza:

- https://apps.who.int/iris/handle/10665/311268, and
References


44. Barr IG, Rynehart, C., Whitney, P. SARS-CoV-2 does not replicate in embryonated hen's eggs or in MDCK cell lines. Eurosurveill. 2020;25(25).


<table>
<thead>
<tr>
<th>DEFINITION</th>
<th>SOURCE</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ILI</strong></td>
<td>WHO (2013)</td>
<td>Fever + cough</td>
</tr>
<tr>
<td><strong>ILI</strong></td>
<td>CDC</td>
<td>Fever (37.8°C) + cough and/or sore throat</td>
</tr>
<tr>
<td><strong>ARI</strong></td>
<td>WHO Regional Office for Europe / ECDC</td>
<td>At least ONE of the following: Cough, sore throat, shortness of breath, runny nose (note – fever not required)</td>
</tr>
<tr>
<td><strong>ARI</strong></td>
<td>US CDC</td>
<td>At least TWO of the following: Fever, cough, runny nose or nasal congestion, sore throat</td>
</tr>
<tr>
<td><strong>ARI for RSV</strong></td>
<td>WHO</td>
<td>At least ONE of the following: Cough, sore throat, shortness of breath or runny nose</td>
</tr>
<tr>
<td><strong>SARI</strong></td>
<td>WHO</td>
<td>Fever (measured or reported) + cough or shortness of breath + hospitalization</td>
</tr>
<tr>
<td><strong>Suspected COVID-19</strong></td>
<td>WHO (7 Aug 2020)</td>
<td><strong>Part A:</strong> A person who meets the clinical and epidemiological criteria: Clinical criteria: Acute onset fever and cough OR at least THREE of the following: Fever, cough, general weakness/fatigue, headache, myalgia, sore throat, coryza, dyspnoea, anorexia/nausea/vomiting, diarrhoea, altered mental status AND Epidemiological criteria: Residing or working in an area with high risk of transmission of virus: closed residential settings, humanitarian settings such as camp and camp-like settings for displaced persons; any time within the 14 days prior to symptom onset; OR Residing or travel to an area with community transmission any time within the 14 days prior to symptom onset; OR Working in any health care setting, including within health facilities or within the community any time within the 14 days prior of symptom onset. <strong>Part B:</strong> Fever (measured or reported) + cough or shortness of breath + hospitalization</td>
</tr>
<tr>
<td><strong>COVID-19-like illness (CLI)</strong></td>
<td>US CDC (5 Aug 2020)</td>
<td>At least TWO of the following: Fever (measured or reported), chills, rigours, myalgia, headache, sore throat, nausea or vomiting, diarrhoea, fatigue, congestion or runny nose OR At least ONE of the following: Cough, shortness of breath, difficulty breathing, new loss of smell, new loss of taste OR At least ONE of the following: Pneumonia (clinical or x-ray), ARDS</td>
</tr>
<tr>
<td><strong>COVID-19-like illness – combination-1</strong></td>
<td>US CSTE (Council of State and Territorial Epidemiologists)</td>
<td>At least ONE of the following: Cough, shortness of breath or discomfort breathing OR At least TWO of the following: Fever, myalgia, headache, chills, loss of taste or smell, sore throat</td>
</tr>
<tr>
<td><strong>COVID-19-like illness – combination-2</strong></td>
<td>US CSTE (Council of State and Territorial Epidemiologists)</td>
<td>At least ONE of the following: Cough, shortness of breath, discomfort breathing, new olfactory disorder, new taste disorder OR At least two of the following: Fever, chills, rigors, myalgia, headache, sore throat, nausea or vomiting, diarrhoea, fatigue, congestion or runny nose</td>
</tr>
</tbody>
</table>

1 For the case definition of probable and confirmed COVID-19 case please visit https://www.who.int/publications/i/item/WHO-2019-nCoV-Surveillance_Case_Definition-2020.1
## Supplementary Table S2: Source and heterogeneity of data analysed to estimate performance characteristics for ILI, ARI and SARI case definitions for COVID-19

<table>
<thead>
<tr>
<th>CHILE¹</th>
<th>COSTA RICA²</th>
<th>PARAGUAY³</th>
<th>SOUTH AFRICA⁴</th>
<th>TESSy⁵</th>
<th>UK⁶</th>
<th>USA⁷</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data source</strong></td>
<td>SARI surveillance</td>
<td>ILI / SARI surveillance</td>
<td>ILI / SARI surveillance</td>
<td>Pneumonia surveillance</td>
<td>ILI / ARI / SARI surveillance</td>
<td>- COVID-19 tracker app; - FF100 / FluWatch</td>
</tr>
<tr>
<td><strong>Type of surveillance</strong></td>
<td>Sentinel; (SARS-CoV-2 testing in 5 of 6 hospitals)</td>
<td>Sentinel</td>
<td>Sentinel</td>
<td>Sentinel</td>
<td>Comprehensive COVID-19</td>
<td>Non-sentinel</td>
</tr>
<tr>
<td><strong>Patients source</strong></td>
<td>6 SARI hospitals</td>
<td>9 ILI centers; 18 hospitals</td>
<td>5 ILI sites; 10 SARI hospitals</td>
<td>9 sentinel hospitals</td>
<td>Primary care; Hospitals</td>
<td>Community</td>
</tr>
<tr>
<td><strong>Total patients</strong></td>
<td>SARI (2,199)</td>
<td>ILI (14,528); SARI (2,577)</td>
<td>ILI (2,075); SARI (4,090)</td>
<td>ARI (1,538); SARI (835)</td>
<td>ILI (64,885); ARI (205,481); SARI (13,398)</td>
<td>- COVID-19 tracker app (2700 positives, 14,309 negatives); - FF100 (301 cases); - FluWatch (1637 non-COVID-19 cases)</td>
</tr>
<tr>
<td><strong>Specimens</strong></td>
<td>Nasopharyngeal swabs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NP swab, self-swab</td>
</tr>
<tr>
<td><strong>Diagnostic</strong></td>
<td>RT-PCR</td>
<td>RT-PCR</td>
<td>RT-PCR</td>
<td>RT-PCR</td>
<td></td>
<td>RT-PCR</td>
</tr>
<tr>
<td><strong>Symptoms evaluated</strong></td>
<td></td>
<td></td>
<td>Any fever, cough, sore throat, difficulty of breathing</td>
<td>ARI (ECDC), ILI / SARI (WHO) case definition</td>
<td>Cough, fever, shortness of breath, gastrointestinal symptoms, general symptoms</td>
<td>Runny nose, sore throat, cough, chest pain, shortness of breath, discomfort while breathing, wheezing, headache, new loss of smell or taste, fever/chills, fatigue, muscle ache, diarrhoea, abdominal pain, nausea/vomiting</td>
</tr>
</tbody>
</table>

*continued...*
### Supplementary Table S2: Heterogeneity of unpublished data from countries analyzed to estimate performance characteristics for ILI, ARI and SARI case definitions for COVID-19

<table>
<thead>
<tr>
<th>Age Group</th>
<th>CHILE¹</th>
<th>COSTA RICA²</th>
<th>PARAGUAY³</th>
<th>SOUTH AFRICA⁴</th>
<th>TESSy⁵</th>
<th>UK⁶</th>
<th>USA⁷</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14 years</td>
<td>5%</td>
<td>ILI (9%, 54%), SARI (14%, 33%, 29%, 24%)</td>
<td>ILI (4%, 63%), SARI (19%, 16%, 24%, 40%)</td>
<td>ARI (41%, 19%, 27, 13%); SARI (44%, 19%, 26%, 12%)</td>
<td>ILI (17%, 24%, 30%, 28%); ARI (49%, 36%, 42%, 17%); SARI (26, 42%, 45%, 31%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-39 years</td>
<td>11%</td>
<td>ILI (51%); SARI (53%)</td>
<td>ILI (43%); SARI (55%)</td>
<td>ARI (49%); SARI (51%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-64 years</td>
<td>37%</td>
<td>COVID-19 case definition modified many times</td>
<td>- Specificity high for ILI - Sensitivity and specificity low for SARI</td>
<td>- Specificity low for ILI - Acceptable performance for SARI</td>
<td>- Sensitivity high for ARI</td>
<td>- Sensitivity high for ARI - Sensitivity low for ILI and SARI especially for younger age-groups</td>
<td>- Marginal increase in sensitivity by extending case definitions but at cost of marked increase in false positives - Adding delirium in older adults helps</td>
</tr>
<tr>
<td>65+y years</td>
<td>46%</td>
<td>- Few SARI cases in children</td>
<td>- Sensitivity low for ILI - Sensitivity and specificity low for SARI</td>
<td>- Sensitivity low for ILI - Acceptable performance for SARI</td>
<td>- Sensitivity high for ARI - Specificity low for ARI - Acceptable performance for SARI</td>
<td>- ILI was highly specific - ARI was highly sensitive - Sensitivity low in children</td>
<td>Predictive values dependent on disease prevalence (30% secondary transmission rate in households)</td>
</tr>
</tbody>
</table>

**Summary conclusion**

- Specificity high in elderly
- Sensitivity high in young adults
- Sensitivity low for ILI
- Sensitivity and specificity low for SARI

**Limitations**

- Few SARI cases in children
- COVID-19 case definition modified many times

**Abbreviations:** ARI, acute respiratory infection; ILI, influenza like illness; SARI, severe acute respiratory infection; USA, United States of America; UK, United Kingdom of Great Britain and Northern Ireland

¹ Departamento de Epidemiología de la División de Planificaci Sanitaria del Ministerio de Salud de Chile, Hospitales Centineles para la vigilancia de IRAG y el Instituto de Salud Pública, unpublished data, 23 September 2020
² Ministerio de Salud de Costa Rica, INCIENSA, CCSS, unpublished data, 23 September 2020
³ Ministerio de Salud Pública de Paraguay, unpublished data, 23 September 2020
⁴ Centre for Respiratory Diseases and Meningitis, National Institute for Communicable Diseases of the National Health Laboratory Service, South Africa, unpublished data, 23 September 2020
⁵ Gianfranco Spiteri, European Center for Disease Prevention and Control, personal communication, 23 September 2020. TESSy data includes 8 countries (Czechia, Germany, Estonia, Malta, Poland, Portugal, Slovakia, United Kingdom)
⁶ Andrew Hayward, Institute of Epidemiology and Health Care, University College London, personal communication, 23 September 2020
**Supplementary Table S3: Influenza like illness (ILI) performance characteristics for COVID-19**

<table>
<thead>
<tr>
<th>Country</th>
<th>Sensitivity (95% CI)</th>
<th>Specificity (95% CI)</th>
<th>PPV (95% CI)</th>
<th>NPV (95% CI)</th>
<th>AUC (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All ages</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>28.4 (27.6 - 29.2)</td>
<td>71.8 (70.0 - 73.6)</td>
<td>82.6 (81.4 - 83.7)</td>
<td>17.6 (16.8 - 18.3)</td>
<td></td>
</tr>
<tr>
<td>Paraguay</td>
<td>38.8 (35.3 - 42.7)</td>
<td>61.7 (59.0 - 64.3)</td>
<td>36.5 (33.2 - 39.9)</td>
<td>64</td>
<td>84</td>
</tr>
<tr>
<td>USA</td>
<td>51</td>
<td>90</td>
<td>64</td>
<td>5.3 (4.2 - 6.7)</td>
<td>95.1 (94.8 - 95.4)</td>
</tr>
<tr>
<td>UK</td>
<td>19.7 (15.3 - 24.7)</td>
<td>81.6 (79.9 - 83.3)</td>
<td>5.3 (4.2 - 6.7)</td>
<td>84</td>
<td>95.1 (94.8 - 95.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>17.6 (16.8 - 18.3)</td>
<td>84</td>
<td>95.1 (94.8 - 95.4)</td>
</tr>
<tr>
<td><strong>0 - 14 years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>27.1 (24.5 - 29.9)</td>
<td>63.6 (57.3 - 69.5)</td>
<td>76 (71.4 - 80.2)</td>
<td>17 (14.7 - 19.6)</td>
<td>77.7 (64.4 - 87.9)</td>
</tr>
<tr>
<td>Paraguay</td>
<td>20.0 (4.3 - 48.0)</td>
<td>56.0 (44.0 - 67.4)</td>
<td>8.3 (1.7 - 22.4)</td>
<td>77.7 (64.4 - 87.9)</td>
<td>0.507 (0.482 - 0.531)</td>
</tr>
<tr>
<td>USA</td>
<td>43</td>
<td>96</td>
<td>3.9 (0.7 - 18.1)</td>
<td>94.5 (90.6 - 96.8)</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>25.0 (0.6 - 80.6)</td>
<td>67.3 (63.1 - 71.4)</td>
<td>94.5 (90.6 - 96.8)</td>
<td>0.507 (0.482 - 0.531)</td>
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<tr>
<td><strong>15 - 39 years</strong></td>
<td></td>
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<td></td>
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<tr>
<td>Costa Rica</td>
<td>27.8 (26.7 - 28.9)</td>
<td>73.6 (71.2 - 76)</td>
<td>84 (82.3 - 85.5)</td>
<td>17 (16 - 18)</td>
<td>60.8 (57.4 - 64.2)</td>
</tr>
<tr>
<td>Paraguay</td>
<td>36.7 (32.6 - 41.4)</td>
<td>62.7 (59.3 - 66.1)</td>
<td>38.6 (34.3 - 43.1)</td>
<td>17 (16 - 18)</td>
<td>60.8 (57.4 - 64.2)</td>
</tr>
<tr>
<td>USA</td>
<td>86</td>
<td>55</td>
<td>6.2 (4.0 - 9.4)</td>
<td>95.2 (94.7 - 95.7)</td>
<td>0.462 (0.216 - 0.707)</td>
</tr>
<tr>
<td>UK</td>
<td>20.0 (12.7 - 29.2)</td>
<td>84 (79.8 - 87.6)</td>
<td>95.2 (94.7 - 95.7)</td>
<td>0.462 (0.216 - 0.707)</td>
<td></td>
</tr>
<tr>
<td><strong>40 - 64 years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>29.5 (28 - 31)</td>
<td>70.2 (66.8 - 73.4)</td>
<td>82.3 (80.1 - 84.3)</td>
<td>17.5 (16.2 - 18.9)</td>
<td></td>
</tr>
<tr>
<td>Paraguay</td>
<td>45.5 (38.6 - 52.6)</td>
<td>59.7 (54.6 - 64.7)</td>
<td>37.6 (31.5 - 44.0)</td>
<td>67.3 (62.0 - 72.3)</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>19.1 (13.2 - 26.2)</td>
<td>86.3 (83.8 - 88.4)</td>
<td>6.8 (4.8 - 9.5)</td>
<td>95.3 (94.9 - 95.6)</td>
<td>0.527 (0.493 - 0.56)</td>
</tr>
<tr>
<td><strong>&gt;65 years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>30.0 (26.7 - 33.5)</td>
<td>77.3 (70.9 - 82.9)</td>
<td>82.6 (77.5 - 87)</td>
<td>23.5 (20.4 - 26.9)</td>
<td></td>
</tr>
<tr>
<td>Paraguay</td>
<td>38.1 (18.1 - 61.5)</td>
<td>66.6 (53.9 - 77.8)</td>
<td>26.6 (12.2 - 45.8)</td>
<td>77.1 (64.1 - 87.2)</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>21.1 (9.55 - 37.3)</td>
<td>89.8 (85.6 - 93.1)</td>
<td>9.8 (5.1 - 18.1)</td>
<td>95.6 (94.8 - 96.2)</td>
<td>0.554 (0.486 - 0.622)</td>
</tr>
</tbody>
</table>

Abbreviations: AUC, area under the curve; CI, confidence interval; NPV, negative predictive value; PPV, positive predictive value; USA, United States of America; UK, United Kingdom of Great Britain and Northern Ireland

1 Ministerio de Salud de Costa Rica, INCENSA, CCSS, unpublished data, 23 September 2020
2 Ministerio de Salud Pública de Paraguay, unpublished data, 23 September 2020
3 Andrew Hayward, Institute of Epidemiology and Health Care, University College London, personal communication, 23 September 2020
5 PPV and NPV estimated at 5% prevalence
### Supplementary Table S4: ARI\(^1\) performance characteristics for COVID-19

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>SENSITIVITY (95% CI)</th>
<th>SPECIFICITY (95% CI)</th>
<th>PPV (95% CI)</th>
<th>NPV (95% CI)</th>
<th>AUC (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ages</td>
<td>South Africa(^2)</td>
<td>86.5 (82.8 - 89.8)</td>
<td>22.7 (20.6 - 24.8)</td>
<td>22.2 (20.1 - 24.3)</td>
<td>86.9 (83.2 - 90.0)</td>
</tr>
<tr>
<td>0 - 14 years</td>
<td></td>
<td>85.2 (66.3 - 95.8)</td>
<td>13.3 (10.8 - 16.0)</td>
<td>3.6 (2.3 - 5.4)</td>
<td>95.9 (89.9 - 98.9)</td>
</tr>
<tr>
<td>15 - 39 years</td>
<td></td>
<td>90.7 (82.5 - 95.9)</td>
<td>30.1 (24.9 - 35.6)</td>
<td>27.4 (22.3 - 32.9)</td>
<td>91.8 (84.4 - 96.4)</td>
</tr>
<tr>
<td>40 - 64 years</td>
<td></td>
<td>85.1 (79.4 - 89.7)</td>
<td>33.3 (28.5 - 38.4)</td>
<td>41.2 (36.4 - 46.1)</td>
<td>80.3 (73.0 - 86.3)</td>
</tr>
<tr>
<td>&gt;65 years</td>
<td></td>
<td>86.3 (76.6 - 92.9)</td>
<td>26.0 (19.7 - 33.1)</td>
<td>34.5 (27.9 - 41.5)</td>
<td>80.7 (68.1 - 90.0)</td>
</tr>
</tbody>
</table>

Abbreviations: ARI, acute respiratory infection; AUC, area under the curve; CI, confidence interval; NPV, negative predictive value; PPV, positive predictive value.

\(^1\) ARI defined as at least ONE of the following: cough, sore throat, shortness of breath or runny nose AND symptoms ≤ 10 days; denominator is hospitalized LRTI irrespective of symptom duration

\(^2\) Centre for Respiratory Diseases and Meningitis, National Institute for Communicable Diseases of the National Health Laboratory Service, South Africa, unpublished data, 23 September 2020
### Supplementary Table S5: SARI performance characteristics for COVID-19

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>SENSITIVITY (95% CI)</th>
<th>SPECIFICITY (95% CI)</th>
<th>PPV (95% CI)</th>
<th>NPV (95% CI)</th>
<th>AUC (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All ages</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>49.0 (46.2 - 51.9)</td>
<td>50.2 (47.0 - 53.3)</td>
<td>54.8 (51.8 - 57.8)</td>
<td>44.3 (41.4 - 47.3)</td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>39.5 (37.3 - 41.6)</td>
<td>32.9 (29.0 - 37.0)</td>
<td>68.2 (65.5 - 70.9)</td>
<td>13.0 (11.2 - 14.8)</td>
<td></td>
</tr>
<tr>
<td>Paraguay</td>
<td>55.4 (51.9 - 58.8)</td>
<td>60.4 (58.7 - 62.0)</td>
<td>25.9 (23.9 - 28.0)</td>
<td>84.4 (82.8 - 85.8)</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>51.0 (46.1 - 56.1)</td>
<td>59.0 (56.5 - 61.5)</td>
<td>24.1 (21.2 - 27.1)</td>
<td>82.8 (80.2 - 84.8)</td>
<td>0.6 (0.5 - 0.6)</td>
</tr>
<tr>
<td><strong>0 - 14 years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>14.2 (0.3 - 57.8)</td>
<td>31.5 (23.0 - 41.0)</td>
<td>1.3 (0.03 - 7.0)</td>
<td>85.3 (70.8 - 94.4)</td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>47.2 (38.3 - 56.3)</td>
<td>32.7 (26.5 - 38.6)</td>
<td>26.9 (21.2 - 33.2)</td>
<td>53.7 (45.3 - 62.1)</td>
<td></td>
</tr>
<tr>
<td>Paraguay</td>
<td>44.4 (21.5 - 69.2)</td>
<td>54.6 (51.0 - 58.1)</td>
<td>2.2 (0.97 - 4.4)</td>
<td>97.6 (95.7 - 98.8)</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>51.9 (31.9 - 71.3)</td>
<td>50.2 (46.5 - 54.0)</td>
<td>3.8 (2.1 - 6.3)</td>
<td>96.5 (94.1 - 98.1)</td>
<td></td>
</tr>
<tr>
<td><strong>15 - 39 years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>58.3 (48.9 - 67.2)</td>
<td>31.4 (23.4 - 40.4)</td>
<td>45.1 (37.1 - 53.3)</td>
<td>43.8 (33.3 - 54.7)</td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>35.8 (32.4 - 39.3)</td>
<td>34.1 (23.8 - 45.7)</td>
<td>84.2 (77.9 - 88)</td>
<td>5.1 (3.4 - 7.3)</td>
<td></td>
</tr>
<tr>
<td>Paraguay</td>
<td>66.6 (57.2 - 74.8)</td>
<td>51.3 (46.9 - 55.6)</td>
<td>24.4 (20.0 - 29.4)</td>
<td>86.6 (82.4 - 90.2)</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>54.7 (43.5 - 65.4)</td>
<td>62.2 (56.4 - 67.7)</td>
<td>29.6 (22.6 - 37.3)</td>
<td>82.5 (76.9 - 87.3)</td>
<td>0.5 (0.4 - 0.7)</td>
</tr>
<tr>
<td><strong>40 - 64 years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>55.2 (50.8 - 59.5)</td>
<td>46.2 (40.6 - 52.0)</td>
<td>63.1 (58.5 - 67.6)</td>
<td>38.2 (33.2 - 43.3)</td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>38.8 (35 - 42.7)</td>
<td>34 (24.7 - 44.3)</td>
<td>79.6 (74.7 - 83.9)</td>
<td>7.7 (5.3 - 10.6)</td>
<td></td>
</tr>
<tr>
<td>Paraguay</td>
<td>60.3 (55.1 - 65.5)</td>
<td>59.5 (55.6 - 63.4)</td>
<td>46.1 (41.5 - 50.7)</td>
<td>72.4 (68.3 - 76.2)</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>48.8 (41.7 - 55.9)</td>
<td>68.6 (63.6 - 73.3)</td>
<td>46.0 (39.2 - 53.0)</td>
<td>70.9 (65.9 - 75.6)</td>
<td>0.6 (0.5 - 0.6)</td>
</tr>
<tr>
<td><strong>&gt;65 years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>41.9 (37.8 - 46.1)</td>
<td>62.9 (58.2 - 67.4)</td>
<td>59.5 (54.5 - 64.3)</td>
<td>45.4 (41.4 - 49.5)</td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>44.6 (40 - 49.2)</td>
<td>32.6 (24.8 - 41.1)</td>
<td>69.4 (63.8 - 74.5)</td>
<td>14.6 (10.9 - 19.1)</td>
<td></td>
</tr>
<tr>
<td>Paraguay</td>
<td>46.0 (40.5 - 51.7)</td>
<td>67.7 (65.1 - 70.2)</td>
<td>25.2 (21.7 - 28.9)</td>
<td>84.1 (81.8 - 86.2)</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>52.5 (41.0 - 63.8)</td>
<td>69.5 (62.1 - 76.2)</td>
<td>43.8 (33.6 - 54.3)</td>
<td>76.4 (69.1 - 82.7)</td>
<td>0.6 (0.5 - 0.7)</td>
</tr>
</tbody>
</table>

Abbreviations: AUC, area under the curve; CI, confidence interval; NPV, negative predictive value; PPV, positive predictive value; SARI, severe acute respiratory infection

1 Departamento de Epidemiología de la División de Planificació Sanitaria del Ministerio de Salud de Chile, Hospitales Centineles para la vigilancia de IRAG y el Instituto de Salud Pública, unpublished data, 23 September 2020
2 Ministerio de Salud de Costa Rica, INCIENSA, CCSS, unpublished data, 23 September 2020
3 Ministerio de Salud Pública de Paraguay, unpublished data, 23 September 2020
4 Centre for Respiratory Diseases and Meningitis, National Institute for Communicable Diseases of the National Health Laboratory Service, South Africa, unpublished data, 23 September 2020
5 SARI defined as acute onset fever and cough within past 10 days and hospitalization; denominator is hospitalized LRTI respective of symptom
# Monitor longer term epidemiologic trends and evolution of SARS-CoV-2 virus

<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>PROS</th>
<th>CONS/LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatient surveillance (ARI or ILI) with laboratory confirmation of all or a subset.</td>
<td>Sentinel syndromic and virologic approach uses a systematic case detection strategy. If sentinel virologic surveillance follows a consistent sampling strategy, the resulting percent positivity for SARS-CoV-2 may be a more accurate reflection of virus circulation than that from universal testing, where the strategy varies over time and place. Proportion of symptomatic patients among all outpatients or admissions or population-based rates can be calculated if the denominator information is often available. Trends of COVID-19 percent positivity among patients meeting the ILI case definition and presenting to outpatient sentinel sites could be one indicator for determining if community transmission is occurring and complementary to universal surveillance and reporting schemes.</td>
<td>Captures trends in symptomatic persons seeking healthcare and meeting the specific case definition for surveillance. Depends on sustained sentinel syndromic surveillance with consistent and complete reporting. Need laboratory confirmation of all or a subset of samples from syndromic surveillance to determine trends of COVID-19. The COVID percent positivity is dependent on what else is circulating that manifests as ILI. Depends on lab algorithm, testing priorities, use of single versus multiplex assays, NPIs in place, capacities, resources, political issues, etc. Not meant to replace but complement comprehensive COVID-19 surveillance designed to allow contact tracing. Surveillance does not imply monitoring for changes in relation to intensity thresholds as there is little historical data available for threshold determination for COVID positivity among patients meeting sentinel surveillance case definitions. Data from continued sentinel syndromic surveillance could be compared to historical data if no major disruptions to surveillance occurred. Timeliness: General lag of about 2 weeks between symptom onset and reporting. Geographical representativeness: data reflects situation in population served by sentinel sites and may not be granular enough or represent the general population at the national level. Demographic representativeness: data reflects situation in population served by sentinel sites and may not reflect the general population. Validity depends on whether symptomatic COVID-19 cases seek care at sentinel outpatient sites.</td>
</tr>
</tbody>
</table>
Annex 1. Strengths and limitations of ILI / ARI / SARI surveillance to address COVID-19 objectives

<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>PROS</th>
<th>CONS/LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatient surveillance (ARI or ILI) with laboratory confirmation of all or a subset.</td>
<td>If age is collected and reported by sentinel sites, trends by age group could be determined. Baselines and thresholds may be available for syndromic data.</td>
<td>The proportion of ILI among all outpatients may fluctuate with changes in outpatient health care delivery with factors affecting both the numerator and the denominator. If only influenza-negative samples are tested for SARS-CoV-2, the resulting SARS-CoV-2 percent positivity will be among influenza negative medically attended ARI or ILI population and may be difficult to interpret. Inter-country comparisons may not be possible because of different case definitions in use (ARI, ILI, or suspect COVID-19) and differing changes in healthcare delivery and COVID-19 responses. Younger age groups may be over-represented and middle-aged groups may be under-represented in ILI surveillance.</td>
</tr>
<tr>
<td>Inpatient surveillance (SARI or pneumonia) with laboratory confirmation</td>
<td>Trends of COVID-19 percent positivity among inpatients meeting the SARI case definition and presenting to sentinel sites, by age and risk groups. Further detail on COVID-19 among ICU admissions possible if this data is collected and reported consistently.</td>
<td>Validity and representativeness depend on whether symptomatic COVID-19 cases needing hospitalization are seen at SARI sentinel sites, as well as which health facilities and wards are involved in SARI surveillance. The COVID percent positivity is dependent on what else is circulating that manifests as SARI. The proportion of ILI among all outpatients may fluctuate with changes in outpatient health care delivery with factors affecting both the numerator and the denominator. Inter-country and intra-country comparisons may not be possible because of differential changes in healthcare delivery and COVID-19 responses, including admission criteria for suspect COVID-19 cases and hospital capacity. Younger age groups may be over-represented in SARI surveillance.</td>
</tr>
</tbody>
</table>
### Monitor longer term epidemiologic trends and evolution of SARS-CoV-2 virus

<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>PROS</th>
<th>CONS/LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentinel virologic surveillance</td>
<td>GISRS network could provide an efficient system for movement of specimens/viruses for genetic characterization.</td>
<td>Competing priorities with influenza surveillance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Competing with national reference lab and network for coronavirus lab surveillance where existing. Lab capacity could quickly be overwhelmed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Systematic and continued testing of samples from sentinel surveillance with reporting of denominator information and epi information (case definition) could improve understanding of transmission dynamics and inform preparedness and response measures in the short term.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not all surveillance systems test for respiratory pathogens other than influenza and not all samples are tested for all respiratory viral pathogens.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depends on testing algorithm and systematic and continued testing of samples from sentinel surveillance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inter-country comparisons may not be possible due to differing priorities and testing algorithms.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Targeted research studies may be more appropriate to reach this objective.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transmission dynamics could change over time.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transmission dynamics will vary by age, severity and risk group so unless this epi information is lined up with virologic information it may be difficult to interpret.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Laboratory algorithms and global reporting platforms allow for the detection of co-infections with SARS-CoV-2 and influenza or other respiratory viruses and reporting of aggregated information.</td>
</tr>
</tbody>
</table>
### Annex 1. Strengths and limitations of ILI / ARI / SARI surveillance to address COVID-19 objectives

<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>PROS</th>
<th>CONS/LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatient surveillance (ARI or ILI) with laboratory confirmation of all or a subset.</td>
<td>Guide the implementation and adjustment of targeted control measures, while enabling safe resumption of economic and social activities.</td>
<td>Similar to those included in trends objective. Establishing baseline and intensity thresholds may be difficult, unless data from earlier waves of activity can be used.</td>
</tr>
<tr>
<td>Inpatient surveillance (SARI or pneumonia) with laboratory confirmation</td>
<td>Evaluate the impact of the pandemic on health-care systems.</td>
<td>Similar to those included in trends objective. Establishing baseline and intensity thresholds may be difficult.</td>
</tr>
<tr>
<td>Inpatient surveillance (SARI) with laboratory confirmation, with or without outcome information.</td>
<td>Detect and contain clusters and outbreaks, especially in vulnerable populations. Enable rapid detection, isolation, testing, and contact tracing</td>
<td>Evaluation of COVID-19 impact on healthcare system relative to long-term influenza trends may be complicated due to changed or differing surveillance objectives or testing strategies and other aspects of the response.</td>
</tr>
<tr>
<td>Inpatient surveillance (SARI) with laboratory confirmation, with or without outcome information.</td>
<td>Evaluation of COVID-19 impact on health-care system relative to short-term trends may be possible.</td>
<td>Same as above. Evaluation of the overall impact on the healthcare system relative to long-term trends possible if quality historical data is available. Understanding and capturing surge capacity for ICU and hospitalization needs to be further explored in order to more accurately monitor the impact on the healthcare system by both influenza and COVID-19.</td>
</tr>
</tbody>
</table>
### Annex 2. Rapid situation assessment of surveillance system attributes and example questions

<table>
<thead>
<tr>
<th>Surveillance system attribute</th>
<th>Sample questions</th>
</tr>
</thead>
</table>
| **Context and policies**     | Because of changes in healthcare delivery, are patients with respiratory symptoms:  
   - referred to seek care at sites other than routine outpatient sites /general practitioners, and since when has this policy been in place?  
   - admitted to designated COVID-19 hospitals as SARI patients?  
   - referred to special screening centres (and since when has this policy been in place)?  
   Have there been changes in healthcare-seeking behaviour?  
   Have there been changes to sentinel sites and staff, and what proportion of sentinel sites and staff have been repurposed to COVID-19 response? |
| **IT infrastructure**        | Have there been improvements in the IT infrastructure for data collection and management and reporting that could be leveraged for sentinel syndromic surveillance? |
| **Systems and processes**    | Have there been changes the systems and processes to collect and report data on ILI/ARI/SARI and lab results?  
   How are the data aggregated and reported and to whom? |
| **Data quality**             | |
| **Accuracy**                 | Do the data being collected and reported reflect the true observed situation?  
   Are numbers of ILI/SARI/ARI consultations/admissions abnormally low? Which of the systems best reflected the situation in the country? |
| **Completeness**             | Are case reporting forms filled out completely?  
   Are there specific data elements that are most frequently left incomplete/blank?  
   What percentage of sentinel sites continue to report syndromic surveillance data to national level at each reporting interval?  
   What percentage of sentinel sites continue to collect and ship samples for symptomatic patients to the laboratory?  
   Have there been changes in the number of samples received by the labs?  
   Have there been changes in the number of samples processed by the labs? |
| **Consistency**              | Has the case definition for monitoring respiratory syndromes changed?  
   Has the sampling strategy of patients meeting the case definition changed?  
   How many of the sentinel sites have been reporting every week? |
| **Timeliness**               | Are data reported in a timely fashion? Are specific data elements barriers to timely collection and reporting?  
   What percentage of sentinel sites report syndromic surveillance data on time each reporting interval?  
   What percentage of sentinel sites ship samples to the laboratory by the target number of days after sample collection?  
   What percentage of samples are processed within the target time frame? |
## Annex 3. Addressing disruptions in sentinel syndromic surveillance for influenza

<table>
<thead>
<tr>
<th>ISSUE</th>
<th>CONSIDERATION</th>
<th>OPPORTUNITIES</th>
<th>CONSTRAINTS/LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competing priorities and limited resources leading to decreased support of routine sentinel surveillance for influenza.</td>
<td>Reassess influenza surveillance priorities. Understand which sentinel system is most useful for reaching priority influenza surveillance objectives. Try to sustain where possible the existing surveillance systems but consider alternative data sources that could aid in meeting some influenza surveillance objectives.</td>
<td>Additional data sources on hospital and ICU capacity could be useful for monitoring trends in severe cases and impact on health system. Samples from these systems could be tested for influenza.</td>
<td>If surveillance objectives include the spectrum of influenza-associated disease or understanding the relationship of virus strains to disease severity or detecting unusual and unexpected events such as outbreaks of influenza outside the typical season, multiple surveillance systems may be needed.</td>
</tr>
<tr>
<td>Changes to sentinel sites and staff; facilities cease participating in surveillance system and / or reporting.</td>
<td>Scale up number, diversity and geographic representation of sentinel sites, including designating COVID-19 specific consultation centers as sentinel sites for ARI / ILI / SARI syndromic surveillance.</td>
<td>Increased awareness about and opportunity for respiratory disease surveillance, capacity building, better tools and integrated IT infrastructure (electronic reporting) may enable expansion of the primary care and hospital-based sentinel surveillance system. Additional sites and increased diversity in sites may increase representativeness of data. Inclusion of specialized COVID-19 centers may capture symptomatic patients who may be diverted from GPs to these specialized centers. Increased case detection and enrolment may increase sample yield for virologic surveillance. Increasing duration of surveillance (from seasonal to year-round) may allow for monitoring syndromic illness and respiratory viral pathogens year-round, including SARS-CoV-2.</td>
<td>Financial and human resource constraints: cost/sustainability on surveillance program and sentinel sites and lab capacity; need to recruit staff at sentinel sites to collect data and samples and report. Staff at sentinel sites could be quickly overwhelmed leading to poor data quality. Knowledge constraints: training would be needed for additional sentinel site staff. Infrastructure constraints: sentinel sites participating in virologic surveillance need to be able to process, store and transport samples correctly to laboratories. Limitations on data quality and interpretation: Changing denominator (population under surveillance) may affect interpretation and introduce different biases to data. Population-based rates may not be accurate / catchment area difficult to determine. May affect historical comparison. Should not consider sentinel surveillance as an equivalent to comprehensive COVID-19 case detection/universal surveillance.</td>
</tr>
</tbody>
</table>
### Annex 3. Addressing disruptions in sentinel syndromic surveillance for influenza (continued ...)

<table>
<thead>
<tr>
<th>ISSUE</th>
<th>CONSIDERATION</th>
<th>OPPORTUNITIES</th>
<th>CONSTRAINTS/LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes to primary health care delivery (e.g. referral to patient</td>
<td>Include patient triage calls to primary care providers from patients meeting</td>
<td>If triage calls included, will increase case counts of ARI / ILI.</td>
<td>Adherence to case definition may be an issue, if patient triage is done by staff not</td>
</tr>
<tr>
<td>triage centers)</td>
<td>ARI or ILI case definition in weekly ARI / ILI count reporting.</td>
<td>Might be useful to follow trends of ILI/ARI in that season.</td>
<td>trained in sentinel surveillance.</td>
</tr>
<tr>
<td></td>
<td>Monitor triage calls for ARI / ILI as a proxy for visits.</td>
<td></td>
<td>No realistic denominator.</td>
</tr>
<tr>
<td>Changes to primary healthcare delivery: increased use of primary</td>
<td>Include teleconsultations from patients meeting ARI or ILI case definition in</td>
<td>Same as above</td>
<td>Other biases to data are introduced.</td>
</tr>
<tr>
<td>care teleconsultations/telemedicine/remote delivery.</td>
<td>weekly ILI count reporting and include all teleconsultations in weekly total</td>
<td></td>
<td>Human resource constraints (burden on primary care staff).</td>
</tr>
<tr>
<td></td>
<td>outpatient count reporting.</td>
<td></td>
<td>Further delays in reporting possible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No possibility of virologic diagnosis.</td>
</tr>
<tr>
<td>Changes to primary healthcare delivery: policies direct patients</td>
<td>Capture this information and use for syndromic surveillance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>away from primary care entirely and instead to self-assessment using</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>online tools, hotlines or directly to specialized COVID-19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>consultation centres.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes to primary healthcare delivery: changes in patient</td>
<td>Consider how these changes affect case detection and sampling strategies.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>scheduling, triage and screening at outpatient sites.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Issue: Change in case definition from ILI to ARI (or COVID-19 case definitions) for syndromic surveillance at outpatient sites.

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Opportunities</th>
<th>Constraints/Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary care providers report weekly counts of both ARI and ILI (include the option to select one or both on the case reporting form) National surveillance units could collect data on ARI and ILI post-hoc if case-based data (with symptoms included) are reported. Introduce the collection of symptoms in case reporting forms to facilitate post-hoc analyses by different case definitions.</td>
<td>Would allow for restricting the analysis to patients meeting the ILI case definition for better comparability with past data.</td>
<td>Consider benefits with added burden on primary care providers/sentinel site staff/surveillance units. For influenza surveillance, the ARI case definition is more generally more sensitive and thus will capture more cases and necessitate more laboratory testing.</td>
</tr>
</tbody>
</table>

### Issue: Additional efforts to comprehensively monitor hospitalizations/ICU admissions and healthcare capacities due to COVID-19

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Opportunities</th>
<th>Constraints/Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capture this information and assess utility for monitoring impact of influenza as well.</td>
<td>Capitalize on the development of new methods and systems for comprehensive monitoring of hospital capacity and use this for monitoring impact on the health system as part of the severity assessment for influenza. If the use of ICD-coding as a proxy for monitoring SARI admissions has been improved, this may be useful for monitoring as part of influenza surveillance.</td>
<td></td>
</tr>
</tbody>
</table>

---

**Annex 3. Addressing disruptions in sentinel syndromic surveillance for influenza** [continued ...]
## Annex 4. Addressing disruptions in sentinel virologic surveillance for influenza

As a result of possible disruptions to sample collection, there may be a need to consider alternative sample collection methods in order to ensure continued laboratory-confirmation of all or a subset of symptomatic patients seeking healthcare at a facility involved in sentinel respiratory virus surveillance.

<table>
<thead>
<tr>
<th>ISSUE</th>
<th>CONSIDERATION</th>
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<th>CONSTRAINTS/LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVID testing is priority and resources are limited to test all SARS-CoV-2 samples for influenza.</td>
<td>Test a subset of samples received for SARS-COV-2 testing for influenza and other respiratory pathogens.</td>
<td>If any epidemiological information is linked to the sample, test those samples from cases meeting the ARI/ILI/SARI case definitions. May yield some influenza-positive samples for characterization if influenza is circulating. May be useful to monitor trends over time. Prioritize SARS-CoV-2 negative samples.</td>
<td>If no epidemiological information is linked to the samples, the influenza positivity among those fitting a case definition will not be possible. This would serve the objective of situational awareness but none of the other objectives. But this should be the minimum if nothing else can be done. If no systematic testing is done (no case definitions in use), then interpreting trends over time will be difficult.</td>
</tr>
<tr>
<td>Testing for SARS-CoV-2 is done at labs other than NICs or labs with capacity for influenza testing.</td>
<td>NICs obtain a subset of samples from specialized testing centers and test SARS-CoV-2 negative samples for influenza.</td>
<td>As above</td>
<td>As above Additionally, there are potential data and sample transfer issues. Could contribute to testing and reporting delays.</td>
</tr>
<tr>
<td>Infection prevention and control concerns / PPE availability at primary care facilities.</td>
<td>Implement changes to sample collection methods, such as supervised and / or unsupervised self-swabbing. Training on appropriate use of PPE at sentinel sites (droplet versus contact precautions).</td>
<td>May yield some influenza-positive samples for characterization if influenza is circulating.</td>
<td>May introduce biases in case selection and sampling.</td>
</tr>
</tbody>
</table>
### Annex 4. Addressing disruptions in sentinel virologic surveillance for influenza

<table>
<thead>
<tr>
<th>ISSUE</th>
<th>CONSIDERATION</th>
<th>OPPORTUNITIES</th>
<th>CONSTRAINTS/LIMITATIONS</th>
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</thead>
<tbody>
<tr>
<td>Decreased enrolment in surveillance/patient compliance with swabbing/not meeting sample quotas.</td>
<td>Increase number of sentinel primary care providers participating in virologic surveillance, if not all participate. Adapt systematic sampling strategies to increase sample yield to meet quotas.</td>
<td>Potentially increased yield of samples for influenza and SARS-CoV-2 testing.</td>
<td>Financial and human resource constraints: cost/sustainability on surveillance program and sentinel sites and lab capacity; need to recruit staff at sentinel sites to collect data and samples and report. Staff at sentinel sites could be quickly overwhelmed leading to poor data quality. Knowledge constraints: training would be needed for additional sentinel site staff in sample collection. Infrastructure constraints: sentinel sites participating in virologic surveillance need be able to process, store and transport samples correctly to laboratories. Burden on labs / increased cost. Samples from suspect COVID-19 cases may go to a lab other than an NIC.</td>
</tr>
<tr>
<td>Changes in swabbing case definition</td>
<td>Sample all outpatient cases meeting COVID-19 case definitions and test for SARS-CoV-2 and influenza. Sample all outpatient cases meeting ARI case definition and test for COVID-19 and/or flu depending on algorithm and objectives.</td>
<td>Simpler protocol. Helpful for clinical management / diagnostic purposes as well. May yield some flu positive samples for characterization. Consider changing data collection form to include symptoms for retrospective analyses.</td>
<td>Will not be able to determine proportion of ILI/ARI/SARI with COVID or influenza, or compare to historical data. Even without changes, historical comparisons may be problematic anyway due to disruptions in the collection of syndromic surveillance data. Confusion around case definitions and need for clinical management for COVID-19 surveillance. If change from ILI to ARI, will lose historical context. SARS-CoV-2 positive results will need to be rapidly communicated back to the physician and patient for clinical management and public health response actions.</td>
</tr>
</tbody>
</table>
### Annex 5. Changes to sentinel site case reporting form and reasons for inclusion

<table>
<thead>
<tr>
<th>CHANGES TO CONSIDER, IF NOT ALREADY INCLUDED</th>
<th>REASON FOR INCLUSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVID-19 testing data to lab results section</td>
<td>Essential for the objective of monitoring COVID-19 trends among patients detected at sentinel site meeting existing influenza surveillance case definitions and for understanding the co-circulation of SARS-CoV-2 virus, influenza and other respiratory viruses, and other pathogens. This information informs indicators such as number of ILI or SARI patients tested for SARS-CoV-2 and number of ILI or SARI patients positive for SARS-CoV-2. If age and gender are included in case reporting forms, then trends can be stratified accordingly. This information would be reported at national level and to regional and global levels to inform regional and global responses, either in aggregated or case-based format, depending on regional and global guidance.</td>
</tr>
<tr>
<td>Additional variables for SARI reporting forms, such as ICU admission / mechanical ventilation / oxygen use / outcome.</td>
<td>Essential for the objective of monitoring the overall impact on the health system and monitoring trends in deaths and for guiding the implementation and adjustment of targeted control measures. If this information is included with information on laboratory testing (for influenza and SARS-CoV-2), weekly indicators such as number of SARI cases admitted to ICUs, number of SARI cases requiring mechanical ventilation or oxygen use or number of SARI deaths could be stratified for influenza and SARS-CoV-2. These indicators (either with or without associated lab testing information, and especially with denominator information), may be useful for monitoring the severity of the influenza epidemic and the COVID-19 pandemic, as described in the Pandemic Influenza Severity Assessment (PISA) guidance.</td>
</tr>
<tr>
<td>Additional variables for SARI reporting forms such as risk factors and/or co-morbidities.</td>
<td>Essential for the objective of monitoring COVID-19 trends among potential risk groups detected at sentinel site meeting existing influenza surveillance case definitions. This information would inform analyses at national level but would not be reported to regional and global levels.</td>
</tr>
</tbody>
</table>
### Annex 5. Changes to sentinel site case reporting form and reasons for inclusion

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</thead>
<tbody>
<tr>
<td>Travel and/or contact history.</td>
<td>Consider if the case reporting form will also serve as an investigation form for suspect COVID-19 cases and to trigger associated public health responses.</td>
</tr>
<tr>
<td>Additional symptoms (COVID-19 related, non-respiratory symptoms)</td>
<td>Consider if the case reporting form will also serve as an investigation form for suspect COVID-19 cases and to trigger associated public health responses.</td>
</tr>
<tr>
<td>Applicable case definition(s)</td>
<td>If syndromic surveillance case definition has changed from ILI to ARI, consider adding to the form if the case meets the ARI and ILI case definition. This would allow for analysis on cases meeting one or the other case definition.</td>
</tr>
</tbody>
</table>

### Annex 6. Influenza surveillance data and objectives and limitations to interpretation

<table>
<thead>
<tr>
<th>AVAILABLE DATA</th>
<th>OBJECTIVES FOR INFLUENZA</th>
<th>OBJECTIVES FOR COVID-19</th>
<th>LIMITATIONS TO INTERPRETATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILI cases by catchment population and/or outpatients visits by week</td>
<td>Monitor when and where influenza-like illness activity is occurring, monitor intensity of transmission in relation to previous seasons, by age group if available.</td>
<td>Possible complementary source of data to guide the implementation and adjustment of targeted public health and social measures</td>
<td>Need lab-confirmation of all or a subset to understand virus-specific causes of changing trends in syndromic surveillance data. For influenza, comparison to previous years possible only if no major disruptions to system and changes in healthcare seeking behavior, as baselines and thresholds may not apply. Consider geographical representativeness of sentinel sites who are reporting. Consider timeliness and completeness of data. Consider if syndromic data from sentinel sites is capturing COVID-19 cases/activity (ideally need lab confirmation of all or a subset for SARS-CoV-2 as well). Understand laboratory testing algorithm and priorities. Understand biases in numerator and denominator.</td>
</tr>
</tbody>
</table>
## Available Data

<table>
<thead>
<tr>
<th>SARI cases by catchment population and/or total hospitalizations by week.</th>
<th>Monitoring and assessing the impact of influenza on high-risk populations and the healthcare system, and the severity of seasonal outbreaks in relation to previous seasons; assessing burden of influenza hospitalizations; determine and monitor underlying risk conditions that are associated with severe disease; by age group if possible.</th>
<th>Possible complementary source of data to guide the implementation and adjustment of targeted public health and social measures.</th>
<th>Understand biases in numerator and denominator. Same as above plus: Consider changes in admission criteria, if sentinel sites are admitting COVID-19 cases or not, which may make historical comparisons difficult. If risk factor information is no longer collected, this objective will not be achieved.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SARI cases admitted to ICU by total ICU admissions or SARI fatalities, by week.</td>
<td>Monitoring and assessing the impact of influenza on high-risk populations and the health system and the severity of seasonal outbreaks in relation to previous seasons.</td>
<td>Possible complementary source of data to guide the implementation and adjustment of targeted public health and social measures.</td>
<td>Same as above plus: Consider changes in ICU admission criteria, including whether ICU wards at sentinel sites are admitting COVID-19 cases or not, which may make historical comparisons difficult.</td>
</tr>
<tr>
<td>Number of SARI/ILI patients from whom samples were laboratory tested and the proportion testing positive.</td>
<td>Same as above</td>
<td>Monitoring long term epidemiological trends and evolution of SARS-CoV-2 virus; Detecting the co-circulation of influenza and SARS-CoV-2 viruses; Evaluation of the impact of COVID-19 on health systems (from SARI surveillance); Possible complementary source of data to guide the implementation and adjustment of targeted public health and social measures.</td>
<td>Consider any changes to sampling strategies. Determining the percent positivity for influenza requires collecting the total samples processed or the total samples testing negative. This positivity is dependent on what else is circulating that manifests as ILI/SARI. For COVID-19 positivity, comparison to previous similar data possible but need to consider alternative threshold setting methods (short term average or levels reached during peak SARS-CoV-2 transmission). Cannot use non-disease specific ILI/SARI or influenza-positive thresholds for comparison.</td>
</tr>
</tbody>
</table>

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### Available Data

<table>
<thead>
<tr>
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<th>OBJECTIVES FOR COVID-19</th>
<th>LIMITATIONS TO INTERPRETATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of samples from sentinel sites processed; number of samples positive; percent positivity among sentinel samples.</td>
<td>Monitor when and where influenza activity is occurring, monitor intensity of transmission in relation to previous seasons; by type, subtype/lineage, if possible.</td>
<td>Monitor when and where COVID activity is occurring, monitor intensity of transmission in comparison with previous weeks.</td>
<td>Same as above</td>
</tr>
<tr>
<td>Number of samples from all sources processed; number of samples positive; percent positivity for among samples received from all sources.</td>
<td>Monitor when and where influenza activity is occurring, monitor intensity of transmission in relation to previous seasons.</td>
<td>Monitoring when and where COVID-19 activity is occurring.</td>
<td>Same as above</td>
</tr>
<tr>
<td>Non-sentinel samples come from a variety of sources and are not collected using a systematic testing approach.</td>
<td>Detecting the co-circulation of influenza and SARS-CoV-2 viruses. Possible complementary source of data to guide the implementation and adjustment of targeted public health and social measures.</td>
<td>Detecting the co-circulation of influenza and SARS-CoV-2 viruses.</td>
<td>The resulting data may be biased towards reflecting influenza activity in certain populations other than the general community and may not be comparable to historical trends.</td>
</tr>
</tbody>
</table>

What to report to FLUNET dataset (virological data from laboratories)

*Depending on the data collected in the country, the following different data can be reported on a weekly basis:*

- Number of samples tested for influenza (from sentinel sites)
- Number of samples tested for influenza (from non-sentinel sites)
- Number of samples tested for SARS-CoV2 (from sentinel sites)
- Number of samples tested for SARS-CoV2 (from non-sentinel sites)
- Number of samples positive for influenza, SARS-CoV2, RSV and others if available (from sentinel sites)
- Number of samples positive for influenza, SARS-CoV2, RSV and others if available (from non-sentinel sites)
- Number of co-infections from sentinel sites (please contact flumart@who.int for further instructions on reporting co-infections)
- Number of co-infections from non-sentinel sites (please contact flumart@who.int for further instructions on reporting co-infections).

- The number of specimens with an indeterminate result can also be reported if available.

**Comment field:** Please note which specimens are being tested for COVID-19 (e.g. all specimens received for respiratory virus testing or only influenza-negative specimens or a subset of influenza-negative specimens) as this may change over time.

What to report to FLUID dataset (epidemiological data)

*Depending on the data collected in the country, the following different data can be reported on a weekly basis:*

- Data from ILI sentinel sites (outpatient facilities)
- Data from ARI sentinel sites (outpatient facilities)
- Data from SARI sentinel sites (inpatient facilities)
- Data from pneumonia sentinel sites (inpatient facilities)
- Mortality (all cause mortality or pneumonia and influenza (PNI) mortality)
- Number of ILI specimens tested for influenza and number of those positive
- Number of ARI specimens tested for influenza and number of those positive
- Number of SARI specimens tested for influenza and number of those positive
- Number of pneumonia cases tested for influenza and number of those positive
- Number of ICU admissions tested for influenza and number of those positive
- Number of deaths among people tested for influenza and number of those positive
- Number of ILI specimens tested for COVID-19 and number of those positive
- Number of ARI specimens tested for COVID-19 and number of those positive
- Number of SARI specimens tested for COVID-19 and number of those positive
- Number of pneumonia cases tested for COVID-19 and number of those positive
- Number of patients admitted to the ICU tested for COVID-19 and number of those positive
- Number of deaths among people tested for COVID-19 and number of those positive.

- Any of the above can be done by age groups, and the denominator can be reported either by population or by outpatient visits or inpatients.

**Comments:** please note any changes to your case definition, sample collection, or other changes to your routine surveillance.
Already reporting weekly data to regional platforms or FLUNET (virologic data) and/or FLUID?

- YES
  - Ready to add weekly COVID testing data for sentinel and non-sentinel samples in additional to influenza data?
    - YES
      - Reporting to regional platform?
        - Contact regional focal point for instructions on including COVID-19 testing data in routine reporting
    - NO
      - Issues in uploading excel files to FLUMART?
        - YES
          - Contact flumart@who.int for immediate assistance
        - NO
          - Ready to start reporting influenza and/or COVID-19 testing detections and/or epidemiologic data on a weekly basis to FLUNET/FLUID?
            - YES
              - Contact flumart@who.int for assistance in initiating reporting
            - NO
              - Uploading excel file(s) directly to FLUMART?
                - YES
                  - Contact flumart@who.int for assistance in modifying excel template to include COVID-19 fields in routine reporting files
                - NO
              Contact flumart@who.int for assistance in modifying excel template to include COVID-19 fields in routine reporting files
### Annex 8. Monitoring and evaluation of influenza sentinel surveillance systems

<table>
<thead>
<tr>
<th>WHAT</th>
<th>HOW</th>
<th>WHY</th>
<th>WHEN</th>
<th>INDICATORS</th>
</tr>
</thead>
</table>
| **Monitoring** | Ongoing review of the data entered into the system for completeness, timeliness, and aberrations or unexpected patterns should be performed at all levels of the surveillance system. | Assess the functioning of the system during the season or period under evaluation and identify disruptions that could be quickly addressed during the surveillance period. | Develop monitoring plan before start of surveillance and then perform weekly to biweekly. | Timeliness, completeness and aberrations in data, such as:  
- Number of sentinel sites reporting ILI/SARI/ARI data to national level by week and timeliness  
- Number of sentinel sites providing samples to the lab by week and timeliness  
- Number of samples received in the lab  
- Number of samples processed in the lab  
- Number of samples processed in the lab in timely manner  
Are lab samples correctly identified as coming from sentinel vs non-sentinel sources?  
Are the numbers of ILI/SARI/ARI consultations/admissions abnormally low?  
Do the current data reflect the situation in the country?  
Which of the systems best reflects the situation in the country? |
| **Evaluation** | All parts of the surveillance system (including each sentinel site) are thoroughly examined and checked for performance in achieving objectives. | Assess the functioning of the system since the start of the COVID-19 pandemic, what disruptions may be affecting the system and where the system might benefit from adaptations. | A thorough surveillance system should be considered on a regular basis when time and resources allow and may be valuable to review changes implemented in the system. In an urgent situation, a rapid assessment may be more convenient to assess short-term opportunities and disruptions. | Follow the sentinel surveillance system evaluation guidance on attributes to evaluate.  
For evaluation after changes are implemented, additional indicators to consider include: sentinel surveillance samples tested for SARS-CoV-2 (completeness), achieving defined COVID-19 surveillance objectives (utility), survey of sentinel site staff on changes (acceptability). |
Maintaining surveillance of influenza and monitoring SARS-CoV-2
adapting Global Influenza surveillance and Response System (GISRS) and sentinel systems during the COVID-19 pandemic

INTERIM GUIDANCE