

WHO Regional Office for Europe guidance for sentinel influenza surveillance in humans

Updated--May 2011

Keywords

INFLUENZA, HUMANS – epidemiology
POPULATION SURVEILLANCE – methods
SENTINEL SURVEILLANCE
DISEASE OUTBREAKS – prevention and control
HEALTH POLICY
GUIDELINES
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List of Acronyms

ARI – Acute respiratory infection
BSL – Biosafety level
CDC – Centers for Disease Control and Prevention, USA
CPE – Cytopathic effect
ECDC – European Centre for Disease Prevention and Control
EEA – European Economic Area
EISS – European Influenza Surveillance Scheme
ELISA – Enzyme-Linked ImmunoSorbent Assay
EU – European Union
EURO – (WHO) Regional Office for Europe
EuroFlu – WHO Europe platform for influenza surveillance
FLU-ID – WHO global platform for epidemiological influenza surveillance
FluNet – WHO global platform for virological influenza surveillance
GISN – Global Influenza Surveillance Network
HAI – Haemagglutination inhibition assay
HUS – Health Utilization Survey
IFA – Immunofluorescent assay
IHR – International Health Regulations
ILI – Influenza-like illness
IMCI – Integrated Management of Childhood Illness
LRT – Lower respiratory tract
MDCK – Madin-Darby canine kidney cells
NIC – WHO-recognized National Influenza Centre
OB-GYN – Obstetrics and gynecology
PCR – Polymerase chain reaction
PPE – Personal protective equipment
RT-PCR – Reverse transcription polymerase chain reaction
SARI – Severe acute respiratory infection
TESSy – The European Surveillance System of the ECDC
URT – Upper respiratory tract
VTM – Viral transport media/medium
WHO – World Health Organization
WHO CC – WHO Collaborating Centre for Reference and Research on Influenza
WPRO – (WHO) Regional Office for the Western Pacific

Executive Summary

Recent international mandates and the global experiences with pandemic (H1N1) 2009 virus in human populations call for strengthening influenza surveillance to better target seasonal influenza control programs, to monitor severe disease and to support pandemic preparedness. This document is an update of the *WHO Regional Office for Europe guidance for influenza surveillance in humans* that was released in August 2009.

A case definition for Severe Acute Respiratory Infection (SARI) is provided as a standard to enumerate severe respiratory infections (including those caused by influenza) leading to hospitalization. Case definitions of Influenza-like-Illness (ILI) and Acute Respiratory Infection (ARI) are included for the surveillance of primary care/outpatient illness related to less severe influenza and other respiratory pathogens.

All chapters of this guidance document, including the chapter on case definitions, have been updated to draw on Member State experiences in sentinel surveillance during the past two influenza seasons. Several other areas of the document have been strengthened based on a survey of Member States' perspectives on the *WHO Regional Office for Europe guidance for influenza surveillance in humans* (August 2009 document) that was undertaken at the WHO/Europe annual surveillance meeting held in Brasov, Romania from 21 to 23 September 2010. A few of the more noteworthy updates that may be found in this document include the following:

- The introduction and scope (Chapter 1) has been edited to reflect that we have now moved past the 'pandemic' influenza season of 2009/2010 and draws on the pandemic experience to highlight gaps that need to be addressed by sentinel surveillance systems.
- Modifications have been made to the ILI and SARI case definitions. The update also includes the rationale for these changes, based on data presented at the WHO Global Consultation on Influenza Surveillance, 8-10 March 2011 in Geneva, Switzerland, as well as recent Member State experiences with surveillance implementation.
- The chapter on selection and location of sentinel sites (Chapter 3) has been expanded.
- A new annex (Annex 4) has been added on planning and determination of the appropriate scale of SARI surveillance systems that includes examples of more basic and advanced systems.
- The chapter on minimum data elements and templates for weekly reporting (Chapter 6) has been re-written, drawing on the experiences of the 2009/2010 and 2010/2011 influenza seasons.
- The chapter on routine system monitoring and performance indicators (Chapter 9) has been expanded, and surveillance review tools that can assist national surveillance authorities in a systematic, standardized review of influenza sentinel site surveillance have been added as an annex (Annex 3).

WHO/Europe will continue to work with Member States to identify best practices in influenza surveillance. As they are identified, these concepts will be incorporated into future updates of this document.

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1. Introduction and scope of guidance

For more than 50 years the process by which an effective influenza vaccine is developed and manufactured has relied on the international cooperation of a wide range of public health partners brought together under the coordination of the World Health Organization (WHO) in the Global Influenza Surveillance Network (GISN). Through the GISN, global influenza surveillance has historically been focused on the objectives of:

- monitoring types and subtypes, as well as antigenic and genetic characteristics, of locally circulating influenza viruses for annual vaccine strain selection;
- providing representative viruses for vaccine strain production; and
- monitoring locally circulating viruses for antiviral sensitivity.

While there is a growing awareness that influenza produces a significant but largely undocumented burden of respiratory hospitalizations,^{1,2,3} sentinel influenza surveillance systems have typically been simple syndromic systems that have included very limited epidemiologic data collection or few mechanisms for the routine monitoring of severe disease caused by influenza.⁴ The recent global experience with the pandemic of 2009/2010 has further emphasized the growing need for sentinel surveillance systems to better:

- monitor the timing and severity of an influenza season in a way that is comparable with previous seasons;
- monitor viruses that are specifically associated with severe clinical presentations;
- provide a standard mechanism to monitor underlying risk conditions that are associated with severe illness;
- provide annual data to policy-makers on the impact or burden of influenza; and
- provide laboratory and epidemiological support for pandemic early warning systems and general preparedness.

Several international initiatives have identified strengthening influenza surveillance as a priority activity. The World Health Organization's "2002 Global Agenda on Influenza Surveillance and Control"⁵ highlighted several priority activities, including strengthening disease and virologic surveillance, increasing knowledge of the burden of influenza, increasing global influenza vaccine use and accelerating pandemic preparedness. More recently, the IHR (2005) included several "core capacity requirements for surveillance and response", including surveillance systems that can support capacity for identification of influenza caused by a new subtype and the development of laboratory capacity to detect novel influenza viruses.⁶

To address these needs, the surveillance system components that are described in this guidance are intended to provide a platform for the health care service-based sentinel surveillance of primary care/outpatient and hospitalized disease caused by influenza and possibly other respiratory pathogens. Case definitions of influenza-like illness (ILI) and acute respiratory infection (ARI) are suggested for the surveillance of primary care/outpatient illness

related to influenza and other respiratory pathogens. A case definition for severe acute respiratory infection (SARI) is provided as a standard to enumerate influenza infections leading to hospitalization. This guidance is supported by examples of good practice, which are included throughout the document.

This guidance is not intended to require countries to dramatically alter existing sentinel respiratory disease surveillance systems but to provide models that will enable a more standardized approach for inpatient and primary care/outpatient respiratory disease surveillance data collection, analysis and reporting. For Member States with existing primary care or outpatient respiratory disease surveillance, the suggested expansion to include systematic collection of viruses and epidemiological data on hospitalized respiratory disease will help to establish a baseline for severe disease over time, provide a description of the factors that place the most vulnerable persons in the population at risk for complications of influenza and may allow for an estimation of the burden of severe influenza in their populations. Taken together, these data will facilitate the targeting of limited intervention resources to priority groups. Existing systems that do not use internationally accepted standard case definitions or procedures are encouraged to adopt these standards as described in this document.

Sentinel SARI surveillance is presented in this guidance as one option for surveillance in the hospital setting. Examples included in this document suggest that it can be a useful approach to establish a standard for comparisons of trends in severe disease, and the viruses associated with hospitalizations, between countries. However future updates to this guidance document may include suggestions for additional methodologies for severe disease surveillance that can be used in countries where sentinel SARI surveillance is not currently feasible.

1.1. Target audience

The target audience for this document includes: national surveillance institutes; communicable disease epidemiologists; laboratory specialists and clinicians responsible for influenza surveillance; and persons at sentinel sites conducting the surveillance described in this document.

1.2. Objectives of this sentinel surveillance

The objectives of sentinel surveillance for ILI/ARI and SARI include the following:

- provide data to better inform international, national and local influenza prevention and control efforts, including vaccination campaigns:
 - comparative virology of mild and severe influenza
 - a routine description of the demographic and underlying conditions (e.g. possible risk factors) that are most commonly observed among persons with hospitalizations and possibly other severe outcomes due to laboratory-confirmed influenza;

- provide influenza virus isolates for monitoring genetic mutations or re-assortments that could reduce the match of circulating viruses with the vaccine strain, the intrinsic severity of the virus or antiviral susceptibility;
- provide a mechanism to establish baseline thresholds and reliable trend data for both mild and severe disease associated with influenza;
- provide a platform for surveillance that includes additional common respiratory pathogens that may be of national interest; and
- provide data that can contribute to the estimation of the burden of severe respiratory disease associated with influenza and other respiratory pathogens.

The objectives of sentinel surveillance listed above more broadly include those pertaining to **1)** monitoring influenza viruses, disease trends and risk factors, and **2)** estimating the burden of disease. While a sentinel surveillance system may be designed to address each of these sets of objectives to some degree, countries should consider the relative importance of each of these objectives to national policy-making before establishing sentinel surveillance and selecting sentinel sites. As will be described further in Chapter 3, while many types of facilities may provide the opportunity to monitor disease trends, only some facilities may make ideal candidates for disease burden estimation.

Sentinel site surveillance can also provide a support function to pandemic preparedness by:

- providing country-specific data necessary for pandemic planning;
- supporting laboratory and epidemiological infrastructure needed for pandemic alert and response activities; and
- providing a pre-established means to monitor the severity, intensity and progression of a pandemic relative to prior influenza seasons.

Sentinel surveillance for ILI, ARI and SARI has the added value of supporting or supplementing more universally-focused pandemic early warning systems that are designed to meet the IHR (2005) core capacity requirements for surveillance and response. However sentinel surveillance systems for ILI, ARI or SARI, by definition, do not meet these requirements by themselves. Methodologies to establish broader early warning systems are described elsewhere.⁷

The objectives of sentinel surveillance for influenza in humans, and associated public health benefits, are further summarized in Table 1.

Table 1: Objectives of sentinel surveillance for influenza in humans, and possible public health benefits.

Objective	Potential public health benefits
Provide influenza viruses collected from sentinel primary care/outpatient and hospitalized patients with respiratory disease	<ul style="list-style-type: none"> • Inform global vaccine strain selection, including identification of viruses specifically associated with severe disease • Enhance laboratory infrastructure needed for pandemic alert and response activities
Provide influenza virus isolates to national influenza laboratories and WHO Collaborating Centres for Reference and Research on Influenza	<ul style="list-style-type: none"> • Monitor mutations or genetic re-assortments that could affect the response to the vaccine strain, the intrinsic severity of the virus or antiviral susceptibility in order to inform recommendations for prevention and control • Monitor for viruses of pandemic potential
Establish baseline thresholds and reliable national and international trend data for ILI/ARI and SARI	<ul style="list-style-type: none"> • Detect the start of influenza season to inform local prevention and treatment strategies • Provide data on influenza seasonality to inform the timing of interventions • Provide data to policy-makers that allows for a comparison of the relative severity of different influenza seasons • Provide a pre-established means to monitor the severity, intensity and progression of a pandemic relative to prior influenza seasons
Describe the demographic and underlying conditions (e.g. possible risk factors) that are most commonly observed among persons with hospitalizations and other severe outcomes due to laboratory-confirmed influenza	<ul style="list-style-type: none"> • Can provide data to recommend priority groups that should be offered vaccination and antivirals, when available • Support epidemiological infrastructure needed for pandemic response activities
Provide data that can contribute to the estimation of the burden of severe respiratory disease associated with influenza and other respiratory pathogens	<ul style="list-style-type: none"> • Provides data on national morbidity and mortality, and potentially health care costs associated with influenza, in order to appropriately assess the cost-effectiveness of influenza vaccination and other interventions • Provides data to recommend priority groups that should be offered vaccination and antivirals, when available • Provides country-specific data necessary for pandemic planning
Provide a platform for surveillance that includes additional common respiratory pathogens that may be of national interest	<ul style="list-style-type: none"> • Integrates influenza surveillance, prevention and control into a broader approach to reduce the morbidity and mortality associated with respiratory disease

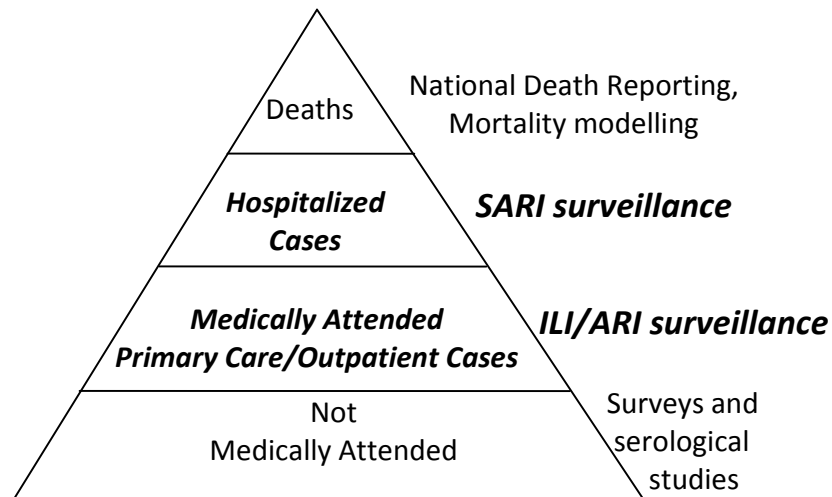
1.3. Guiding principles

The development of this document was guided by the following principles.

- The sentinel surveillance systems described in this document should be integrated into national systems and operate within existing national and international guidelines for respiratory disease detection, reporting and response. This system should be a partnership between a national influenza laboratory and a national surveillance unit, and it should operate under the auspices of, and supported by, the national public health authorities.
- Limited amounts of high quality data from representative sentinel sites are sufficient to understand the epidemiology and circulation of seasonal influenza.
- Standard case definitions should be used to allow for the data to be compared across time, within a country and between countries.
- The sentinel methodologies described within this document can also be applied when there are outbreaks of severe respiratory infection in non-sentinel hospitals.
- The sentinel surveillance systems described in this document provide a mechanism to routinely monitor outpatient illness and hospitalizations due to influenza. They are not designed to detect the index cases or the first clusters of an outbreak. While representativeness (e.g. the degree to which data from the cases detected in the surveillance system reflect all cases in the population under surveillance) of sentinel systems is important, sentinel systems should *not be overextended* in an effort to make them universal systems for pandemic early warning purposes. Overextension of sentinel surveillance systems can increase the amount but reduce the quality of data and make data from the system more difficult to interpret.
- The limited amount of routine data collected in a sustainable sentinel surveillance system is *not* intended to replace the detailed data that must be collected during outbreak investigations, such as those that must be undertaken early in a pandemic. Routine data collection in a sentinel surveillance system should also not be over-extended for this purpose.

1.4. Sentinel surveillance systems and the spectrum of influenza illness

Fig. 1. The spectrum of influenza virus infections in a population and respective methods of surveillance



As denoted by the italicized text in Fig. 1, the scope of this document is limited to the methodologies that can be used to implement sentinel ILI or ARI surveillance in the primary care/outpatient setting, or SARI surveillance in sentinel hospitals. However this section further describes the contributions that sentinel ILI/ARI and SARI surveillance can make within broader influenza surveillance activities, and pandemic early warning systems.

- *Non-medically attended illness.* Many persons with influenza virus infections do not seek care for their illness.^{8,9} These persons account for the largest number of influenza infections but are difficult to monitor through routine surveillance. Population-based rates of symptomatic influenza virus infections can be estimated through population surveys and internet-based self-reporting.¹⁰ Rates of symptomatic and asymptomatic infections may also be estimated through surveys combined with serological studies.
- *Primary care/outpatient illness.* A smaller but still sizable number of cases have severe enough signs or symptoms to seek outpatient care for their illness. These are the cases that are generally targeted by routine ILI or ARI surveillance systems. Sentinel surveillance for ILI and ARI continues to play a critical role: in the detection of the start and end of influenza season; in monitoring antigenic and genetic characteristics of influenza that causes less-severe disease; and in monitoring the intensity of influenza seasons. These data have been used to inform treatment decisions, such as initiation of empiric antiviral use at the start of influenza season, and ILI/ARI surveillance has benefited the surveillance of other respiratory pathogens (such as RSV). However sentinel ILI and ARI surveillance systems do have limitations. They, by definition, do not contribute virologic data for severe cases, cannot inform policy-makers about those most at risk for severe outcomes (e.g. elderly population and persons with underlying

chronic conditions who may be at risk of complications of influenza) and cannot provide an annual baseline for severe disease caused by influenza. Factors other than the prevalence of influenza in the population may also influence clinical consultation rates for ILI or ARI. For example, as we observed during the 2009/2010 influenza season, public anxiety surrounding influenza can substantially increase ILI or ARI rates relative to historical trends.

- *Hospitalized illness.* An even smaller percentage of influenza infections will lead to more severe disease that requires the infected persons to be hospitalized. Sentinel surveillance for hospitalized severe acute respiratory infections (SARI) supplements existing primary care/outpatient surveillance systems by: providing a mechanism to monitor trends in relatively severe disease caused by influenza virus infections; to identify high risk groups, in a standard way, that should be prioritized for prevention and treatment; to monitor antigenic and genetic characteristics of viruses that are associated with severe cases; and to establish a platform to measure of the burden of severe disease caused by influenza and other respiratory pathogens. However SARI surveillance also poses some challenges. It is a relatively new concept compared to ILI/ARI surveillance and it requires commitment of hospital authorities and participation of hospital staff that may not be used to participating in routine influenza surveillance activities. Denominators for sentinel hospital data can also be difficult to ascertain when compared to many ILI and ARI surveillance systems that are based in general practices with well-defined patient lists.
- *Mortality.* While deaths that can be directly attributed to influenza through laboratory confirmation are certainly of public health importance, they are difficult to monitor because they often occur in a diversity of health care and non-health care settings and are frequently attributed to other causes. Laboratory-confirmed deaths *attributable* to influenza were nationally reported in many countries during the 2009/2010 pandemic. However these estimates of mortality were not comparable to modelled estimates of seasonal influenza-associated excess deaths from prior years. This is because many influenza-related deaths occur weeks after a person's initial infection, either because the person may develop a secondary bacterial co-infection (such as bacterial pneumonia) or because influenza can aggravate an existing chronic illness (such as congestive heart failure or chronic obstructive pulmonary disease). Also, most people who die from seasonal influenza-related complications are not tested for influenza or they seek medical care later in their illness when influenza can no longer be detected from respiratory samples.^{11,12} Several countries in the European Region continue to estimate the larger number of influenza-associated deaths indirectly (e.g. without laboratory confirmation) through modelling using national vital statistics data, for example through projects such as the European Mortality Modelling Project (EuroMoMo).¹³ This influenza mortality modelling can be a valuable supplement to sentinel surveillance systems.
- *The role of sentinel surveillance in pandemic early warning.* Unlike sentinel surveillance systems, pandemic early warning systems make use of approaches to recognize "signal

events” that must be reported by all clinicians (not just those working at sentinel sites) immediately, whenever and wherever they occur.¹⁴ Signal events are unusual cases or events that elevate the index of suspicion of a possible human case of novel influenza or which signal the emergence of a new pandemic influenza virus or another respiratory pathogen of concern. A pandemic early warning system should have a well-known reporting mechanism that is cost-free and widely available to all clinicians, a central coordination unit that undertakes a rapid risk assessment and should be integrated with an established mechanism to produce a timely response that is proportional to the assessed risk. Pandemic early warning systems should also be included within broader “all-hazards” approaches to event detection, as suggested under IHR (2005). Guidance to establish such systems is beyond the scope of this document. However sentinel ILI/ARI and SARI systems can support pandemic early warning systems by: i) identifying a subset of clinicians that may be trained to also identify signal events; ii) enhancing a laboratory network that can quickly identify novel influenza viruses (including those detected within the sentinel surveillance system); and iii) establishing logistic mechanisms for timely specimen collection, transport and testing. These sentinel systems are now described in more detail in the following chapters.

2. Case definitions

There are three case definitions in this guidance document. Case definitions for ILI (Influenza-like Illness) and ARI (Acute Respiratory Infection) are for milder disease managed in the primary care/outpatient setting. The case definition for SARI (Severe Acute Respiratory Infection) is provided for use in inpatient hospital settings.

Sentinel SARI surveillance is increasingly becoming a recognized international standard for monitoring hospitalized severe respiratory disease related to influenza and other pathogens.^{15,16,17, 18} SARI surveillance may be used as the core component of influenza surveillance in countries who are initially establishing sentinel systems for influenza. It should also be considered as an additional surveillance mechanism to monitor severe disease in countries with existing sentinel outpatient (ILI/ARI) surveillance.

The combination of data from ILI and SARI patients should provide a description of a broad range of medically-attended influenza cases. The additional primary care/outpatient case definition of ARI may be useful to programs that also aim to describe a broader range of non-influenza viral pathogens, such as RSV, in cases presenting in the primary care/outpatient setting. However the absence of a fever requirement in the ARI case definition will also result in a significant increase in resource demand (due to much higher rates of ARI than ILI per 100,000 population¹⁹) and will have a lower specificity for influenza.

Box 1. Prioritizing the Focus of the Surveillance System

This guidance document suggests three types of surveillance systems that may be established, depending on available resources and surveillance infrastructure:

Basic model: Sentinel surveillance for Severe Acute Respiratory Infection (SARI) should be considered the minimum standard in this situation. This should include epidemiologic data and respiratory specimen collection from SARI cases at a small number of well-run sentinel sites based in hospitals. Member States who are not currently using international standards for influenza surveillance as described in this guidance should consider implementation of SARI sentinel surveillance as their first step in developing an influenza and respiratory disease surveillance system.

Intermediate model: Sentinel surveillance for SARI and for ILI among outpatients should be implemented. Surveillance for ARI may also be used in the outpatient setting. Consideration should be given to the relative strengths and weaknesses of the ILI and ARI case definitions (described below).

Advanced model: Sentinel surveillance for SARI, ILI and ARI should be implemented. Sentinel surveillance for both ILI and ARI is only useful if the objective is to establish a surveillance system that will also test specimens for additional non-influenza viral respiratory pathogens in the primary care/outpatient setting.

2.1. Case definition for SARI

An acute respiratory illness with onset during the previous 7 days requiring overnight hospitalization that includes:

- history of fever or measured fever of $\geq 38^{\circ}\text{C}$, AND
- cough, AND
- shortness of breath or difficulty breathing.

Notes:

- The requirement of “overnight hospitalization” is meant to imply that in the judgment of a treating clinician the patient has an illness that is severe enough to require inpatient medical care.
- “Shortness of breath or difficulty breathing” is intended to capture dyspnea or air hunger. This *does not* refer to nasal congestion or other upper airway obstruction.
- “History of fever” does not require a history of documented fever and may include a patient’s subjective report of having a fever or feeling “feverish”.
- SARI may reflect a new illness superimposed on an underlying condition or older illness.
- SARI is not equivalent to classic pneumonia and would not always present as pneumonia. It is expected that much of the severe respiratory disease associated with influenza would be due to exacerbations of chronic lung disease or heart disease, for example, and would not include an admitting diagnosis of pneumonia.

2.1.1. Changes from the previous SARI case definition

The following changes were made to the SARI case definition in this update of this guidance document. These changes draw on the experiences and comments of WHO/Europe Member States throughout the past two influenza seasons, and on the data presented at the WHO Global Consultation on Influenza Surveillance, 8-10 March in Geneva, Switzerland.

Table 2: Changes to the SARI case definition and their rationale

Change to SARI case definition	Rationale
Fever > 38°C changed to “history of fever or measured fever of ≥ 38°C”	Several Member States reported concerns that a significant number of SARI patients may have taken antipyretics and suppressed their fever at time of hospital admission. For other adults the illness may have progressed beyond the febrile stage by the time of hospital admission. A measured fever may be absent in older adults.
Measured fever component of >38°C changed to ≥38°C	Many clinicians and record keepers round down to 38 degrees, therefore cases with temperature of 38.2, for example, were not counted using previous case definition.
Dropped “sore throat”	Dropping this term improves specificity for influenza based on data presented at the Global Consultation on Influenza Surveillance in Geneva, 8-10 March. Sore throat is also difficult to assess among infants.
The IMCI case definitions for pneumonia and severe pneumonia have been dropped for children < age 5 years. There is a single SARI case definition for all age groups.	This simplifies the case definition substantially. There have been multiple suggestions to WHO/Europe staff and there was a general consensus at the Global Consultation on Influenza Surveillance that the IMCI case definitions are a clinical management tool and not suitable to be a surveillance case definition. In addition, the IMCI definitions are used by primary care providers in outpatient departments and are not familiar to clinicians who admit to hospitals. The IMCI also does not include infants under 2 months of age.

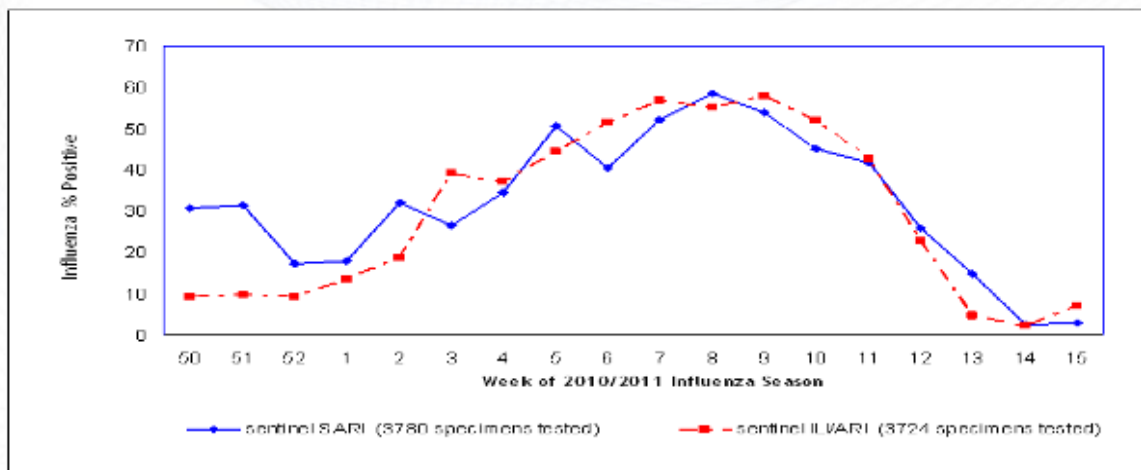
Box 2. Experiences with SARI Surveillance in the WHO European Region

As of May 2011, WHO/Europe receives regular reports of sentinel surveillance data on hospitalized SARI from eleven countries (Albania, Armenia, Georgia, Kazakhstan, Kyrgyzstan, Malta, Romania, the Republic of Moldova, the Russian Federation, Serbia and Ukraine). These countries have their data presented on the WHO/Europe influenza surveillance platform (EuroFlu) because they have SARI sentinel surveillance systems that meet the following two criteria:

- Hospitalized patients meeting a syndromic SARI case definition are routinely monitored, tested for influenza and reported to the national level on a weekly basis from a standard and generally stable number of sentinel hospitals.
- There has been consistent weekly reporting of epidemiological and virological data from the sentinel SARI system to regional surveillance platforms during the 2010/2011 influenza season.

SARI surveillance is currently in the early stages of implementation, however, the data from these countries (as well as from Member States in five other WHO regions) suggest that surveillance using the SARI case definition yields annual influenza positivity rates that are comparable to those from ILI surveillance. For example, during weeks 3 through 9/2011 (the peak of influenza season in the eastern part of the WHO European Region), 2 055 sentinel specimens from hospitalized patients meeting the SARI case definition were tested by RT-PCR in seven countries (Georgia, Kazakhstan, Kyrgyzstan, the Republic of Moldova, Romania, the Russian Federation and Ukraine). Of these 2 055 sentinel specimens, 912 (44%) tested positive for influenza. In these same countries, 2 261 specimens from sentinel outpatients with ILI or ARI were also tested, of which 1 085 (48%) also tested positive for influenza. A graph of the per cent of sentinel ILI/ARI and SARI specimens testing positive for influenza during the broader period of influenza activity (week 50/2010 – week 15/2011) for these countries is also presented below:

Per cent of sentinel ILI/ARI and SARI specimens testing positive for influenza, week 50/2010 – week 15/2011 (GEO, KAZ, KGZ, MDA, ROM, RUS, UKR)



This data suggests that routine surveillance for SARI will not only help to achieve the traditional virologic objectives of seasonal influenza surveillance but will also provide epidemiologic and virologic data on more severe influenza infections. This will provide a basis for the monitoring of severe respiratory disease not only during a pandemic, but also annually. In addition, sentinel surveillance for SARI may ultimately be used as a surveillance platform from which to assess the contribution of multiple viral respiratory pathogens to hospitalized respiratory disease burden.

2.2. Case definitions of ILI and ARI

2.2.1 The case definition for Influenza-like-illness (ILI) is:

An acute respiratory illness with onset during the last 7 days with:

- measured temperature $\geq 38^{\circ}\text{C}$, AND
- cough.

2.2.2 Changes from the previous ILI case definition

The following changes were made to the ILI case definition in this update of this guidance document. These changes draw on the experiences and comments of WHO/Europe Member States throughout the past two influenza seasons and on the data presented at the WHO Global Consultation on Influenza Surveillance, 8-10 March 8-10 in Geneva, Switzerland.

Table 3: Changes to the ILI case definition and their rationale.

Change to ILI case definition	Rationale
Changed “sudden onset of fever...” to “acute respiratory illness”	This encompasses a broad, well-known diagnosis and relates the definition to a clinically recognized condition.
Measured fever component of $>38^{\circ}\text{C}$ changed to $\geq 38^{\circ}\text{C}$	Many clinicians and record keepers round down to 38 degrees, therefore cases with temperature of 38.2, for example, were not counted using previous case definition.
Dropped “sore throat”	Dropping this term improves specificity for influenza based on data presented at the Global Consultation on Influenza Surveillance in Geneva, 8-10 March. Sore throat is also difficult to assess among infants.

2.2.3 The case definition for Acute Respiratory Infection (ARI) is:

Acute onset of at least one of the following four respiratory symptoms:

- cough
- sore throat
- shortness of breath
- coryza

AND

- a clinician's judgment that the illness is due to an infection.

Notes:

- ARI may present with or without fever.

3. Selection and location of sentinel sites

3.1. Key definitions

Sentinel surveillance systems. A sentinel surveillance system is formed by one or more designated health care facilities or providers that routinely and consistently collect epidemiologic information and laboratory specimens from patients presenting with an illness consistent with a specified case definition. Sentinel surveillance systems provide an efficient way to obtain high-quality data on relatively common conditions from a manageable number of locations.²⁰ In this way, the objectives of influenza surveillance can be met more easily, and at lower cost, than with universal surveillance. Each sentinel site should include facilities that together represent the population under surveillance.

Population under surveillance. Prior to the selection of sentinel sites, the surveillance system objectives and the priority populations under surveillance should be clearly specified so that sites can be chosen to adequately represent persons of highest priority. In general, the persons under surveillance at sentinel sites should represent the demographic characteristics (e.g. age and socio-economic status) of the national population. However, in addition to this, national authorities may want to place a particular emphasis on oversampling priority sub-populations. For example, if monitoring morbidity and mortality in the elderly is a priority, but older persons are less likely to seek care for their illnesses, then oversampling this age group may be necessary to assure that older age groups are represented well enough to allow for surveillance data to be meaningfully stratified by age groups. Similarly, if it is a national priority to monitor trends and underlying risk characteristics in certain ethnic or indigenous sub-populations, military populations or other specific groups, then efforts should be made to ensure that those sub-populations might be well-represented in the sentinel surveillance.

3.2. Attributes to consider when selecting facilities to participate as sentinel sites

The number of primary care/outpatient or hospital-based sentinel sites will vary by country. In western Europe, ILI or ARI surveillance systems have typically included 1-5% of physicians working in the country or region, but this may not be applicable to the full range of health systems in the WHO European Region.²¹ In addition, the percentage of physicians that are included in a sentinel system cannot be meaningfully interpreted if geographic representation of sentinel sites and/or representation of priority demographic subpopulations was not considered during sentinel site selection.²² With regard to SARI surveillance, there is also no “ideal” number of sentinel sites that can be specified to be appropriate for all countries, nor is there a single algorithm to use when determining an appropriate initial number of sentinel sites (e.g. “1 site per xx million persons”) that can be applied across a diverse set of countries. This is because of the high degree of variability in national population sizes, national thresholds for hospitalization, the geographic distribution of populations and resources available to devote to hospital-based sentinel surveillance (see Annex 4 for more detail on scaling implementation of SARI surveillance). *However in all situations the quality of data, in particular the ability to*

reliably and routinely ascertain all cases meeting the surveillance case definition(s) at every sentinel site, should be prioritized. All sentinel systems should ideally begin by establishing only 1-3 sentinel sites and then expand only after the initial sentinel sites are evaluated and high quality data is assured.

The ideal attributes of facilities that are selected to be sentinel sites will also, to a degree, depend on the objectives of the surveillance system. The following attributes should be taken into consideration when *selecting* individual facilities (i.e. primary care/outpatient facilities for ILI/ARI surveillance or hospitals for SARI surveillance) as sentinel sites:

- *Feasibility.* The feasibility of a facility to participate in a sentinel system should be considered the most important criteria to consider when selecting a sentinel site, regardless of surveillance objectives. Feasibility may be considered the degree to which a facility under consideration has the following attributes:
 - ongoing commitment to sentinel surveillance by hospital administrators;
 - local staff are motivated to participate in surveillance by adhering to case definitions, and collecting all necessary data and respiratory specimens;
 - logistic feasibility to routinely collect and transport clinical specimens;
 - ease of access to appropriate denominator data;
 - ability to routinely manage and report surveillance data;
 - the relative cost of surveillance operations is low compared to other possible sites; and
 - the number of patients is sufficient to permit meaningful analysis of surveillance data.

Any assessment of feasibility should consider both the available technical resources to assure high quality data collection and reporting, as well as the commitment by the hospital administration to implementing and sustaining surveillance. In this regard, it is desirable that a facility participating in sentinel surveillance include a “champion” within its administration that will routinely advocate for high quality surveillance operations.

If the initial facilities that comprise sentinel sites are not located in places where local staff and administrators support participation in the system, or where basic adherence to case definitions or collection of data may not be maintained, the system may fail. Even if the initial sentinel sites are not fully representative of the population under surveillance they can produce a successful demonstration of the sentinel surveillance concept—but only if they have motivated and trained staff and suitable infrastructure. Representativeness can be improved over time with the careful addition of new sentinel sites, and this will be made possible only if the system is demonstrated to work at the initial sentinel site(s).

It is also important to consider the technical and infrastructural resources available to reliably ascertain the numerator of all cases meeting the surveillance case definition in the facilities/wards participating in surveillance. Even if only a subset of these patients will be tested for influenza, a complete ascertainment of all cases meeting the case definition is critical

to being able to reliably monitor epidemiological trends in outpatient ILI/ARI or hospitalized SARI over time and to use the surveillance system to make some assessment of disease burden.

The establishment of electronic data entry and transfer methods at a facility is a benefit to sentinel surveillance. Efficient mechanisms for electronic data transfer will reduce the need for redundant form completion and data entry, reduce costs on staff time, increase timeliness and reduce data-entry error. Electronic data collection systems also increase the feasibility of including patient outcome data for SARI cases as a component of the surveillance system as it becomes available. This patient outcome information permits data on underlying risk factors and virological data to be stratified by severity of disease.

- *Patient representativeness.* Sentinel sites should include facilities that will represent all ILI/ARI or SARI cases within the population of interest:
 - When selecting ILI/ARI sentinel sites, general primary care/outpatient clinics or acute care facilities are often appropriate choices. Specialty outpatient clinics, such as obstetrical–gynaecological (OB-GYN) or diabetes clinics, do not usually represent the wider patient range within the population under surveillance. If a specialty clinic is being considered in order to oversample a particular priority group, records should be examined at the facility prior to inclusion in order to assess its utility to represent that group.
 - When selecting SARI sentinel sites, general or community hospitals are often more representative of the population under surveillance than specialty care hospitals.
 - As complications of influenza may also disproportionately occur among persons with pre-existing chronic and underlying illnesses, SARI surveillance should also detect hospitalized SARI patients that may have acute respiratory infections superimposed on other chronic medical conditions. This may necessitate undertaking SARI surveillance not only in wards that treat pneumonia, but also those that admit persons with chronic diseases (e.g. persons with chronic respiratory diseases, heart diseases, diabetes etc.).
- *Availability of denominators.* Population-based clinical consultation rates for ILI or ARI, and rates or percentages of hospitalizations due to SARI (and SARI confirmed as influenza), can be calculated from sentinel surveillance data if appropriate denominators are obtained from sentinel sites.
 - In ILI or ARI surveillance systems, the presence of lists of patients assigned to specific general practitioners or facilities can assist in the calculation of consultation rates. These clinical consultation rates (per 100 000 population) are a standard indicator for monitoring influenza activity at the national and subnational level. However if a known patient denominator is unavailable the percentage of ILI cases among all primary care/outpatient encounters on the days of surveillance can serve as an alternative monitoring indicator for influenza intensity. Thus the total number of primary care/outpatient encounters to a

- sentinel site on the days of surveillance can be considered an alternative denominator to patients served by the outpatient facility. The feasibility to obtain one or both of these denominators should be considered when evaluating an outpatient facility to be a sentinel site.
- In the case of SARI surveillance, the most obtainable denominator is often the total all-cause overnight hospital admissions in the wards under surveillance. This denominator should only reflect persons being screened for SARI in order to assure that all persons in the denominator are eligible for inclusion in the numerator, thereby producing a preliminary estimate of influenza and SARI “burden”. The ease of obtaining this denominator data routinely is an important consideration, as the percentage of SARI cases among total admissions at the sentinel sites can serve as a basic indicator to regularly monitor trends in the intensity of severe respiratory disease over time, and also may provide a very basic estimation of the burden of SARI and hospitalized influenza to policy-makers.
 - In lieu of a denominator, weekly counts of SARI cases can still be useful for monitoring trends in SARI – if a stable number of hospitals reports data every week and if there is a complete ascertainment of cases meeting the SARI case definition at each sentinel site. *However numerator data alone will not allow the surveillance system to provide any estimates of influenza disease burden and will not allow a meaningful comparison of data between seasons.*
 - If a principle objective of the sentinel surveillance system is to estimate population-based incidence rates of hospitalized SARI and influenza from sentinel surveillance data, then a priority should be placed on selecting sentinel sites where it may be possible to estimate a population denominator. Methods to do this have been described elsewhere.^{23,24} When compared to the percentage of total admissions that are due to SARI, incidence rates (if accurately estimated) provide a better indication of disease burden and may also be a more stable monitoring indicator of severe respiratory disease in a population because they will not be influenced by fluctuations in the number of weekly hospital admissions not attributable to SARI.
 - *Adequate patient volume (for SARI sites).* Any facility or group of facilities that are under consideration to become a sentinel site should undergo a retrospective record review to determine that during influenza season there will be a sufficient number of hospitalized patients with respiratory disease to allow for meaningful monitoring of respiratory disease trends in priority populations.
 - The size of a facility or group of facilities that comprise a sentinel site should strike a balance between having enough cases to meaningfully monitor trends, viruses and needed epidemiological data in priority populations, with the feasibility of routinely detecting all cases that meet the surveillance case definition.

- When reviewing hospital records to determine whether a possible sentinel site may detect enough severe cases of influenza to reliably monitor trends in the population under surveillance one might assume that 15% of all SARI (or hospitalized severe respiratory disease) cases during an influenza season (weeks 40 – 20) and 30-50% of SARI cases during the peak month of influenza season might test positive by RT-PCR for influenza.^{25,26}
- Ideally, sentinel SARI surveillance sites should have adequate patient volume to monitor hospitalized patients with less severe (e.g. not admitted to ICU) and more severe (e.g. admitted to ICU) illness. Thus it may be desirable for sentinel sites to include facilities with ICUs. This will facilitate comparison of risk factor data between hospitalized persons that were admitted to intensive care and those who were not admitted to intensive care.
- Large referral hospitals may provide excellent patient volume for monitoring purposes in SARI surveillance and have the added value of being located in the primary urban centres of a country, often with highly trained and motivated staff. However these facilities should only be selected to be included in a sentinel surveillance system if it is feasible to record all SARI cases that are admitted to the facility, to obtain reliable all-cause hospitalization denominator data from the wards under surveillance and if referral patterns do not over-represent patients with specific but rare conditions (which can bias risk factor estimation, if that is a primary objective of surveillance). If the objectives of the system also include estimating population-based incidence rates of hospitalized SARI and influenza, the nature of a referral hospital will also make it very difficult, if not impossible, to estimate a hospital catchment area.

3.3. Attributes to consider in the location of sentinel sites

The following attributes should be considered in the *location* of sentinel sites.

- *Demographic representativeness.* The population served by the sentinel sites should be representative of the target age and socioeconomic groups in the population under surveillance. If only a single sentinel site is being established, consideration should be given to placing this site in the primary population centre of the country. When multiple sentinel sites are being placed, consideration should be given to representing additional population centres, each of which may have unique demographic and socio-economic characteristics.
 - Socio-economic representativeness is an important sub-component of demographic representativeness. For example, if public and private hospitals serve populations of different socio-economic statuses, then efforts should be made to include both types of hospitals in the sentinel surveillance system.
- *Geographic representativeness.* Influenza season has been shown to frequently have a west-to-east or south-to-north pattern of progression in parts of the European Region.²⁷ In larger countries consideration should be given to including sentinel sites within population centres that are located in different parts of the country, but only if

this is logistically feasible at each site and there is commitment to include each site from the perspective of hospital administrators and national surveillance authorities. This can allow the sentinel surveillance system to identify specific regions of the country where an influenza season (or epidemic) is starting or intensifying (see Box 3 below).

- *Climatic representativeness.* Influenza virus activity varies with climate.²⁸ In countries that include population centres at different altitudes or climatic zones it may, therefore, also be desirable to consider their representation in the sentinel surveillance system.

3.4. Integration of sentinel sites within existing national clinical reporting systems

As stated earlier, sentinel surveillance systems are an efficient way to collect high quality data on common conditions. For this reason they are a recommended method to collect data on relatively common syndromes such as SARI and ILI/ARI. However, *universal*, non-sentinel reporting of clinician-defined “ARI” is already part of the national disease surveillance systems of several European Region Member States. These universal systems provide subnational resolution of clinician-reported respiratory disease activity. In such systems, consideration may be given to establishing a smaller number of sentinel sites within the broader universal reporting system. It is this subset of sentinel sites that might also contribute sentinel respiratory specimens into the national surveillance system, allowing for improved interpretation of the national ARI data in relationship to influenza. These “nested” sentinel sites would then receive more intensive training and oversight, compared to the rest of the facilities, in order to assure high quality data collection and adherence to case definitions.

3.5. Expansion of the system

When establishing a system it is important to not establish more sites than can be effectively trained, and then closely monitored, in order to assure that a manageable amount of high quality data is produced. *Once a sentinel system has been initially established (with 1-3 sentinel sites), further expansion of the system to include additional sentinel sites should not take place until existing sites undergo a thorough evaluation in order to determine that the data are of adequate quality, completeness, and timeliness to meet the surveillance objectives.* See Chapter 9 (and Annex 3) for more information on the routine monitoring and evaluation of sentinel sites.

Box 3. An example of selecting and placing sentinel sites: Ukraine

Sentinel SARI surveillance was initiated in Ukraine in 2007. SARI surveillance is undertaken year-round and data are reported to a central level on a weekly basis. Ukraine selected 10 hospitals that are located in Kiev, Odessa, Khmelnytsky and Dnipropetrovsk to participate in SARI surveillance. The surveillance sites within each city represent adult infectious disease hospitals, adult pulmonology hospitals, children's infectious disease hospitals and general hospitals. The sentinel reporting units within the selected hospitals are represented by intensive care units and infectious wards of the selected hospitals. Sentinel hospitals were selected primarily based on the commitment of local authorities and hospital staff to the surveillance objectives and the logistical feasibility of specimen transport to the National Influenza Centre. However the sentinel hospitals also represent adult and paediatric patient populations in four different geographic areas of the country. A standard monitoring indicator that is used on a weekly basis is the percentage of all cause admissions that are due to SARI in the hospital wards under surveillance. The per cent of tested SARI cases that are confirmed as influenza is also tracked weekly as a monitoring indicator of the "burden" of influenza. Aggregate data from all 10 hospitals are reported to the WHO EuroFlu surveillance platform on a weekly basis and the age groups 0-4, 5-14, 15-29, 30-64 and 65+ years are represented. Currently, specimens are taken from the first 4-6 patients per week meeting the SARI case definition in each of the selected hospitals.



4. Selection of sentinel SARI and ILI/ARI cases for respiratory specimen collection

In general, clinical specimens and epidemiological data should be collected in a manner that minimizes bias and best represents the population under surveillance. However the total number of patients sampled for laboratory testing will depend on the ability of the health care facility to process, store and ship specimens, as well as the capacity of the laboratory to process, store and test the samples in a timely manner.

4.1. Rationale for suggested surveillance procedures

This guidance acknowledges that influenza-associated severe illness is likely to be perceived as a higher public health priority than that presenting with mild disease. Countries often prioritize severe illness when allocating resources for disease control and prevention. Also, factors associated with severe outcomes often have a greater influence on vaccine policy and resource allocation decisions for countries. This highlights the importance of data quality and of ensuring that adequate cases are captured in order to provide meaningful descriptive epidemiology of hospitalized cases.

When using PCR techniques there is no substantial decline in rates of influenza positivity for up to seven days after symptom onset.²⁹ For the purposes of surveillance, cases should be considered eligible for respiratory specimen collection up to seven days after symptom onset. However, in order to ensure virus isolation, specimens should ideally be collected within three days of symptom onset.

4.2. Selection of SARI cases for respiratory specimen collection

As described in Chapter 5, all hospitalized SARI cases that are admitted to the sentinel hospitals or wards under surveillance should be reported on a weekly basis to national authorities. Where feasible, respiratory specimens for laboratory analysis would also be collected from every SARI case admitted to the sentinel sites. However the number of SARI specimens that are to be tested for influenza depends on laboratory capacity, the number of specimens being tested for sentinel ILI/ARI and the number of non-sentinel specimens (e.g. for clinical diagnostic purposes or outbreak investigations) that are routinely tested.

- If testing all SARI cases is not feasible then a random selection of cases for testing should be implemented. However, achieving true randomness may be difficult and may not be practical in a non-research setting.
- A systematic sampling method may be used as an alternative method of sampling where the random selection of cases for testing is not feasible. This may be accomplished in a

different ways:

- The systematic method with least inherent bias would be the testing of every “nth” number of SARI cases, with “n” being equal to the number of weekly SARI hospitalizations seen by the facility divided by the maximum number of specimens a surveillance laboratory could process weekly. For example, if SARI sentinel sites admit 80 SARI patients weekly during the peak of the influenza season, and if the maximum weekly number of specimens that the laboratory can process is 20, then a suitable systematic sampling strategy for use during the peak of the influenza season would be every fourth (4th) SARI case. The most appropriate sampling interval should, thus, be determined at the national level and can be undertaken through a review of existing medical records in the wards under surveillance following an assessment of national laboratory capacity to support SARI surveillance.
- A second systematic sampling method that might be used would be to test and collect data from all of the patients seen on specific days of the week. For example, a site might test every SARI case admitted on Tuesdays and Thursdays. This has some potential for bias depending on referral patterns and health seeking behaviours of the community. However this may simplify logistical issues surrounding the timely transportation of respiratory specimens to a laboratory and would also allow the system to capture SARI cases admitted to the hospital at any time of day or night. The days of sampling can also possibly be rotated to minimize any potential biases.

4.3. Selection of ILI and/or ARI cases for respiratory specimen collection

As described in section 3 of Chapter 5, all ILI/ARI consultations should be reported on a weekly basis to national authorities. However as the number of ILI/ARI cases presenting to primary care/outpatient sentinel sites is likely to be large, selecting all ILI and/or ARI cases for respiratory specimen collection and virological analyses will not be feasible.

- As with SARI surveillance, the systematic method with least inherent bias would be the testing of every “nth” number of ILI/ARI cases, with “n” being equal to the number of weekly ILI/ARI hospitalizations seen by the facility divided by the maximum number of specimens a surveillance laboratory could process weekly. However, this system may be logistically difficult to support.
- Another approach to selecting ILI/ARI patients for respiratory specimen collection involves testing the first “n” cases attending a sentinel primary care/outpatient facility daily, or on specific days of surveillance. As with SARI surveillance, “n” should be based on available laboratory capacity to support surveillance. If this method is used, the selection protocol should take into account local health seeking behaviours such as differential use of evening or weekend clinics. This sampling method is simple, but will introduce bias if patients seeking health care at a particular time are different than

those seeking care at another time (e.g. days close to the weekend or holidays). Notwithstanding, experience in the Region suggests that the virologic data derived from this type of a sampling method are adequate to determine timing and geographic spread of influenza activity in a country. It is also an efficient means for collecting isolates from less severe cases for virologic analysis. *However if an objective of an influenza surveillance system is to further compare virological and epidemiological data collected from ILI/ARI cases to data collected from hospitalized SARI cases, then a more systematic sampling method (similar to those described above for SARI) should be adopted for ILI/ARI surveillance, as well.*

5. Epidemiologic data collection

Epidemiologic and virologic data collected from the sentinel sites should be reported to the national health authorities on a weekly basis. At a minimum, data collection should be completed during the influenza season, which typically occurs between October and March in the temperate zones of the northern hemisphere (between weeks 40 and 20). Testing of cases outside of the normal influenza season should also be considered, especially if the surveillance system intends to capture cases of illness due to non-influenza respiratory pathogens.

5.1. Case-based data reporting

There are two suggested case-based data collection templates included in this guidance:

- *SARI swab form.* The SARI swab form, or SARI data collection form, should be completed for all SARI cases being tested for influenza. This form should be completed as soon as possible after the admission of a SARI case to a sentinel hospital.
- *Primary care/outpatient swab form.* The primary care/outpatient swab form should be completed for all ILI and/or ARI cases that are tested for influenza. This form should be completed as soon as possible after selection of a case for laboratory testing.

Ideally, electronic data collection mechanisms would eliminate the need for paper copies of these forms to be generated. The information from these forms should be received by the confirmatory laboratory, with a unique identifier that can link the data to the individual respiratory specimen(s) from the patients. The data from these forms should also be received by the national surveillance centre or appropriate authorities.

In order to ensure that complete and accurate data are collected, all forms should be filled out to the extent possible while the patient is in the health care facility.

5.1.1. Sentinel SARI data

As can be seen in the SARI swab form, a minimum amount of data should be collected for every SARI patient that is selected for respiratory specimen collection. These data will be used to understand the epidemiology of SARI caused by influenza. The minimum data elements to be collected on a SARI case investigation form should include patient demographics, standard data on chronic medical conditions, as well as data on recent influenza vaccination and anti-viral use. Beyond these minimal data elements, the SARI surveillance system can be adapted to meet local and national data needs.

The pre-defined set of chronic medical conditions on the SARI swab form is intended to allow countries to calculate and report in a standard manner the percentage of severe cases that have a chronic medical condition. Several conditions that increase the risk of severe disease have been described for influenza.³⁰ These risk factors are grouped into three categories:

- chronic medical illnesses
- pregnancy
- extremes of age (see age groups below)

The “Other Conditions” section of the SARI swab form may be used for additional risk factors of interest to guide national or local policies. For example, certain medical conditions may be included in this section of the form because they have a high prevalence and take on particular importance only in some countries, such as tuberculosis and malnutrition. Similarly conditions such as obesity were identified as potential risk factors for severe disease during the 2009/2010 pandemic.³¹ While these conditions may possibly increase risk of severe outcomes for influenza, few data exist to support this suspicion or guide policy decisions. Reporting of risk factor data is also hampered and sometimes made rather confusing by the inclusion of other common chronic medical conditions that have not been associated with severe disease, such as hypertension in the absence of associated heart disease, smoking in the absence of associated lung disease and hyperlipidemia in the absence of associated cardiovascular disease. Although available data do not support their association with poor outcomes, these conditions can also be included in the section “Other Conditions” if they are of priority to national authorities.

SARI Swab Form

SARI Swab Form

ID Number:	Date of Symptom Onset:	Date of Form Completion:	Date of First Presentation to Health Care System:	Date of Specimen Collection:
			Date of Hospitalization:	Hospital name:

IDENTIFICATION

Patient Unique Identification Number:		Sex: Male <input type="checkbox"/> Female <input type="checkbox"/>
OR		If Female:
Patient's First Name:	Patient's Last Name:	<input type="checkbox"/> Pregnant
		<input type="checkbox"/> Post-partum (up to 6 weeks)
		<input type="checkbox"/> Not Pregnant or Post-partum
Date of Birth:	or	Age: Years _____ Months (1-12) _____
Address:		Contact Telephone Number:

CHRONIC MEDICAL CONDITIONS

- Chronic respiratory disease
 Asthma
 Diabetes
 Chronic cardiac disease
 Chronic renal disease
 Chronic liver disease
 Chronic neurological impairment
 Immune compromised
 Unknown
 None

OTHER CONDITIONS (Optional - may be locally defined based on priorities)

- Obese (BMI > 30 or judged to be obese clinically)
 Other condition 1
 Other condition 2
 Other condition 3

VACCINES AND ANTIVIRALS

- Have you taken influenza antiviral drugs for this illness?
 Yes
 No
 Date: _____
 If Yes, name of antiviral:
 Oseltamivir
 Zanamivir
 Other _____
 Were you vaccinated for influenza in the current season?
 Yes
 No
 Unknown
 Date: _____

SARI CASE CRITERIA (Optional - may be useful for monitoring adherence to case definition and virus detection rates by presence of a measured fever).

- Measured fever of ≥ 38 degrees?
 Yes
 No
 Unknown
 Method of fever measurement:
 oral
 axillary
 other _____
 Reported history of fever or feverishness?
 Yes
 No
 Unknown
 Cough?
 Yes
 No
 Unknown
 Shortness of breath or difficulty breathing?
 Yes
 No
 Unknown
 Requiring overnight hospitalization?
 Yes
 No
 Unknown

PATIENT OUTCOME (Optional, if included as a component of the surveillance system)

- Patient outcome:
 Discharged alive
 Died
 Unknown
 Was the patient admitted to the ICU?
 Yes
 No
 Unknown
 No ICU in hospital
 Did patient require mechanical ventilation during this hospitalization?
 Yes
 No
 Unknown

LABORATORY RESULTS (if applicable, to be completed by confirmatory laboratory)

- Type of specimen collected:
 nasal swab
 throat swab
 other _____
 Laboratory confirmation method:
 PCT/RT-PCR
 Viral culture
 Immunofluorescence (IFA)
 other _____
 Test result:
 Influenza A/H1
 Influenza A/H1(2009)
 Influenza A (H3)
 Influenza A (not subtyped)
 Influenza A (not able to determine subtype)
 Influenza B
 Other influenza subtype _____
 Other respiratory pathogen _____
 Date of testing: _____
 Name/ID of person collecting specimen: _____

Table 4 Defining underlying medical conditions on the SARI Swab Form

Risk Condition	Examples, definitions:
Chronic respiratory disease	<ul style="list-style-type: none"> Chronic obstructive pulmonary disease (COPD) including chronic bronchitis and emphysema; bronchiectasis, cystic fibrosis, interstitial lung fibrosis, pneumoconiosis and bronchopulmonary dysplasia (BPD)
Asthma	<ul style="list-style-type: none"> Asthma that requires continuous or repeated use of bronchodilators, inhaled or systemic corticosteroids, or with previous exacerbation requiring hospital admission.
Diabetes	<ul style="list-style-type: none"> Type 1 diabetes Type 2 diabetes requiring insulin or oral hypoglycemic drugs
Chronic cardiac disease	<p>Conditions that require regular medications and/or follow-up including:</p> <ul style="list-style-type: none"> Congenital heart disease Cardiomyopathy as the result of prolonged hypertension (hypertension alone in the absence of associated heart disease is <u>not</u> considered a risk factor for severe outcome) Chronic heart failure Individuals requiring regular medication and/or follow-up for ischaemic heart disease
Chronic renal disease	<ul style="list-style-type: none"> Chronic renal failure Nephrotic syndrome Renal transplantation
Chronic liver disease	<ul style="list-style-type: none"> Cirrhosis Biliary atresia Chronic hepatitis
Chronic neurological impairment	<ul style="list-style-type: none"> Stroke Neuromuscular diseases that lead to impaired respiratory function or aspiration risk such as cerebral palsy or myasthenia gravis
Immune compromise (through disease or treatment)	<ul style="list-style-type: none"> Immunodeficiencies related to use of immunosuppressive drugs (e.g. chemotherapy) or systemic steroids Asplenia or splenic dysfunction (sickle cell anemia) Human Immunodeficiency Virus infection (HIV) and Acquired Immune Deficiency Syndrome (AIDS).
Obesity parameter, Body Mass Index (BMI)	<ul style="list-style-type: none"> BMI is calculated as body weight in kilograms divided by the square of the height in meters (kg/m^2). WHO defines obesity as a BMI of $> 30 \text{ kg}/\text{m}^2$. A commonly used definition for extreme or morbid obesity is a BMI $> 40 \text{ kg}/\text{m}^2$

5.1.2. Sentinel ILI/ARI data

The primary objectives of sentinel ILI/ARI surveillance are to monitor influenza seasonality, the intensity of influenza activity and circulating influenza viruses causing outpatient illness. As a result, fewer case-based data generally need to be collected from sentinel ILI/ARI patients. The minimum case-based data elements include a unique identifier to link laboratory and epidemiological data, patient age and basic data on recent vaccine and antiviral use. In some circumstances, data on underlying medical conditions may be added to the ILI/ARI swab form. However this should only be undertaken if an unbiased sampling strategy will be implemented in the primary care/outpatient setting, and ILI cases confirmed to have influenza will be compared to a another group of patients, such as SARI cases confirmed to have influenza.

Primary care/outpatient swab form

CASE CLASSIFICATION: <input type="checkbox"/> ARI <input type="checkbox"/> ILI (Surveillance sites may wish to modify this form for only ILI surveillance or only ARI surveillance as necessary)			
ID Number:	Date of Symptom Onset:	Date of Form Completion:	Date of Specimen Collection:
Site Name/ID:		Date of Medical Visit:	
IDENTIFICATION			
Patient Unique Identification Number:		Sex: Male <input type="checkbox"/> Female <input type="checkbox"/>	
OR			
Patient's First Name:	Patient's Last Name:		
Date of Birth:	or	Age: Years _____	Months (1-12) _____
VACCINES AND ANTIVIRALS			
Have you taken influenza antiviral drugs for this illness? <input type="checkbox"/> Yes Date: _____ <input type="checkbox"/> No			
If Yes, name of antiviral: <input type="checkbox"/> Oseltamivir <input type="checkbox"/> Zanamivir <input type="checkbox"/> Other _____			
Were you vaccinated for influenza in the current season? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown Date: _____			
ILI CASE CRITERIA (Optional - may be useful for monitoring adherence to case definition)			
Measured fever of >= 38 degrees? Method of fever measurement:	<input type="checkbox"/> Yes <input type="checkbox"/> oral	<input type="checkbox"/> No <input type="checkbox"/> axillary	<input type="checkbox"/> Unknown <input type="checkbox"/> other _____
Cough?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
LABORATORY RESULTS (if applicable, to be completed by confirmatory laboratory)			
Type of specimen collected: <input type="checkbox"/> nasal swab <input type="checkbox"/> throat swab <input type="checkbox"/> other _____ Date: _____			
Laboratory confirmation method: <input type="checkbox"/> PCT/RT-PCR <input type="checkbox"/> Viral culture <input type="checkbox"/> Immunofluoresence (IFA) <input type="checkbox"/> other _____			
Test result: <input type="checkbox"/> Influenza A/H1 <input type="checkbox"/> Influenza A (not subtyped) <input type="checkbox"/> Influenza A/H1(2009) <input type="checkbox"/> Influenza A (H3) <input type="checkbox"/> Influenza A (not able to determine subtype) <input type="checkbox"/> Influenza B <input type="checkbox"/> Other influenza subtype _____ <input type="checkbox"/> Other respiratory pathogen _____			
Date of testing: _____ Name/ID of person collecting specimen: _____			

5.2. Assigning unique ID numbers

It is necessary to assign a unique identification number to cases in order to link laboratory and epidemiologic information. The system for assigning unique ID numbers should be standardized throughout the country. The unique ID number will be assigned to the case at the time when the SARI and Primary care/outpatient swab forms are filled out and will go on any forms or specimens sent to the national surveillance centre and the laboratory.

Box 4. An example of assigning unique identification numbers:

The first three numbers specify the sentinel site.

The sentinel site code is followed by a two digit number that indicates the year of symptom onset.

This is followed by one number that indicates whether the case is SARI, ILI or ARI (e.g. 1=SARI, 2=ILI, 3=ARI).

The last four digits is the case number. This is assigned as SARI, ILI and/or ARI cases are found at each sentinel site. The case number should begin at the number 1 at the start of each influenza season at each sentinel site.

(Sentinel Site)		(Year)		(SARI, ILI, or ARI)		(Case Number)
001	/	09	/	1	/	0001

5.3. Aggregate data reporting

The SARI and primary care/outpatient aggregate data forms should also be completed by sentinel sites and submitted via paper or electronically to the national surveillance centre on a weekly basis:

- *SARI aggregate data form.* This form includes an aggregate tally of all SARI cases reporting to the facility during the week, the SARI cases that were tested for influenza and total number of hospitalizations seen in the wards under surveillance for each epidemiologic week, by age group. This form should include a tally of all SARI cases reporting to the sentinel facility during the week, even if SARI cases are only tested for influenza on specific days of the week.
- *Primary care/outpatient aggregate data form.* This form includes an aggregate tally of all ILI or ARI cases, the ILI/ARI cases tested for influenza and the total number of outpatients seen at the surveillance site during the days of surveillance for each epidemiologic week, by age group. This form should include a tally of all ILI/ARI cases reporting to the sentinel facility during the week, even if cases are only tested for influenza on specific days of the week.

Sentinel SARI Surveillance: Aggregate Data Form - Week #__, Year ____

ID Number of Sentinel Site:

Age Group in Years	0-4 Years*	5-14 Years	15-29 Years	30-64 Years	> 65 Years	Total
Number of new SARI hospitalizations selected for influenza testing during week						
Total number of new SARI hospitalizations during week						
Total number of new all-cause overnight hospitalizations to the wards under surveillance during week						

ID Number of Sentinel Site Focal Point:

* NOTE: Consideration might be given to further separating this category into infants/children aged 0-1 years and those aged 2-4 years.

Sentinel ILI/ARI Surveillance: Aggregate Data Form - Week # __, Year ____

ID Number of Sentinel Site: _____

Days of the week the practice was open (check all): M Tu W Th F Sat Sun

Age Group in Years	0-4 Years *	5-14 Years	15-29 Years	30-64 Years	> 65 Years	Total
Number of new ILI/ARI consultations selected for influenza testing during week						
Total number of new ILI/ARI consultations during week						
Total number of new all-cause primary care/outpatient consultations during week						

ID Number of Sentinel Site Focal Point: _____

* NOTE: Consideration might be given to further separating this category into infants/children aged 0-1 years and those aged 2-4 years.

5.4. Age stratification of data

Weekly data on ILI/ARI and SARI should be reported from sentinel sites to the national level by age groups. Establishing uniform age groups for regional and global reporting will facilitate comparison and pooling of data from different countries. Sentinel surveillance systems are encouraged to use the following age categories as a minimum for reporting to the national level:

- 0-4 years
- 5-14 years
- 15-29 years
- 30-64 years
- ≥ 65 years

These age groups were chosen so that narrower age patterns for influenza infection could be defined and followed. Some additional rationale for these age breakdowns include the following:

- Children < 5 have a relatively high rate of hospitalization and complications from influenza compared to older children and young adults. Among children < 5 years of age, incidence of complications has been shown to be higher in children < 2 years of age. The risk for severe complications from influenza is also highest among those aged younger than 2 years.³² Thus, national authorities may also choose to monitor neonates and infants as a separate age group (age < 2 , age 2-4) in order to inform maternal and child vaccination strategies.^{33,34}
- Persons aged 15-64 years are disproportionately impacted by the influenza A (H1N1) 2009 virus, in contrast to other circulating influenza viruses. The cut-off point of age 15 has been a standard for surveillance in the European Region for many years. Within this age group, people age 50-64 are at slightly higher risk for severe disease, even in developed countries, where they are more likely to have comorbid conditions that put them at risk.^{2,35}
- While the elderly people (≥ 65) are less likely to become infected, they have a high risk for morbidity and mortality from seasonal influenza.^{2,3}

6. Data analysis and reports

6.1. Rationale

Regular dissemination of surveillance data reports can lead to the creation of a cadre of informed, committed local professionals who by use of timely data can act as powerful advocates for influenza vaccination and other interventions within the framework of national recommendations. As a result, influenza surveillance reports should regularly be disseminated to public health officials, health care professionals, policymakers and the general public in order to increase public awareness of influenza and compliance with recommended measures of prevention and control.

All influenza surveillance data collected at the national or international level should also be regularly analysed and reported back to the sentinel site clinicians in order to:

- allow for monitoring of the influenza season;
- guide appropriate public health action; and
- sustain reporting incentive and interest.

Box 5. An example of using surveillance data: prescribing antiviral agents in the United Kingdom (England)

The Department of Health, England, in discussion with the Health Protection Agency and the Royal College of General Practitioners, issues guidance each year to doctors to advise on when they should begin to prescribe antiviral agents to ILI patients. For England, the trigger point is reached when sentinel GP consultation rates for ILI rise above the baseline of 30 per 100 000 population and influenza virus is isolated from clinical specimens. In this way, national surveillance data has been used routinely as an indication of when to prescribe antiviral agents for persons with illness thought to be due to influenza virus infection.

6.2. Frequency of production of national surveillance reports

During the influenza season, reporting of data at weekly intervals has proven a good compromise between feasibility and usefulness and is commonly used around the world. At a minimum, influenza reports in Member States of the European Region should be published during weeks 40 to 20, the period of known influenza circulation in much of the European Region. If virologic surveillance is conducted between influenza seasons (weeks 21–39), countries may wish to report this data at a lower frequency, e.g. biweekly.

In order to improve the understanding of the epidemiology of influenza, the timing and impact of influenza seasons, and to monitor trends in circulating strains, participation in European Regional surveillance activities and the publication of surveillance results is vital. Postseason submission of annual summary reports or of special surveillance studies to peer-reviewed scientific journals can be used to complement the weekly reporting. Published routine analyses

and studies looking at the epidemiology of influenza will better inform national, European and global influenza control efforts by building an evidence base of local data.

6.3. Key indicators

6.3.1. Incidence rates

Definition: The number of new primary care/outpatient ILI/ARI or hospitalized SARI cases per 100 000 population per time unit.

Incidence rates of ILI/ARI or hospitalized SARI are the best measure to estimate influenza disease burden. Incidence rates allow for the easy estimation of age-specific burden of disease in the general population. In addition, many European Member States have adopted the calculation of rates of ILI and ARI consultations per 100 000 population per time specified as a standard for reporting to international surveillance platforms. However if the catchment area or specific population served by a sentinel site is not known, then incidence rates cannot confidently be calculated without additional studies to define the population denominator. This is a particular challenge for sentinel SARI surveillance where the catchment populations served by hospitals that comprise a sentinel site may have to be determined.

6.3.2. Proportional morbidity

Definition: The percentage of total consultations due to ILI/ARI or the percentage of total all-cause hospitalizations due to SARI at sentinel sites.

If incidence rates cannot confidently be calculated then this alternative approach uses the total number of patients seen per time unit at the sentinel facilities as a denominator. While this allows for influenza trend monitoring in a country, the burden of disease in the general population cannot be inferred. Age-stratified analysis also requires an additional effort from the sentinel site staff who must report their weekly number of patient encounters or hospitalizations by age group.

6.3.3. Percentage of tested cases positive for influenza

Definition: Percentage of sentinel ILI/ARI or SARI specimens that test positive for influenza.

This is the backbone of virologic influenza surveillance. Coupled with typing and subtyping of isolates, it allows national health authorities to quantify the percentage of respiratory cases caused by influenza and to monitor which influenza viruses are circulating. Data from the EuroFlu surveillance platform demonstrate that the percentage of sentinel samples testing positive for influenza has been shown to generally correlate well with ILI and SARI consultation rates. If the sampling is done strictly according to an unbiased protocol, this can be especially important as an indicator for monitoring the season at sites in countries where the population denominator is not known.

6.4. Minimal analyses and reports at the national level

This section provides examples of weekly data analysis formats, as well as those that may be used to produce summaries of annual surveillance data. Where appropriate, examples are taken from publicly available graphs on the WHO/Europe EuroFlu Weekly Influenza Surveillance Bulletin (www.euroflu.org) and the ECDC Weekly Influenza Surveillance Overview (http://ecdc.europa.eu/en/publications/surveillance_reports/influenza/Pages/weekly_influenza_surveillance_overview.aspx).

6.4.1. Sentinel ILI/ARI data

Sentinel ILI/ARI surveillance systems should aim to provide the following data on a weekly basis:

- ILI/ARI clinical consultation rates (or ILI/ARI proportional morbidity), by week, for the current influenza season (Figures 2 and 3):
 - Overall presentation for the sentinel surveillance system should be:
 - stratified by age/target group and
 - compared to previous seasons.
 - In countries where five or more years of historical data exist, presentation of clinical consultation rates should be presented in relation to a seasonal baseline threshold value (see Annex 1).

Fig. 2: ILI/ARI consultations per 100 000 population, Switzerland, 2010/2011 influenza season (from EuroFlu Weekly Influenza Surveillance Bulletin)

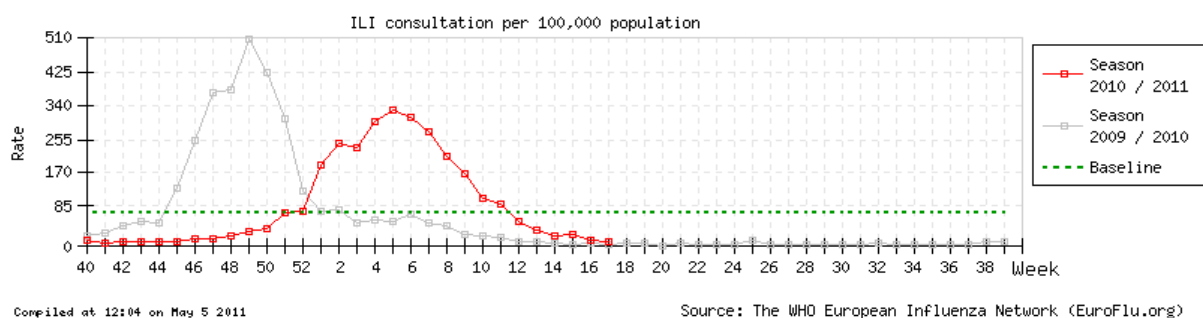
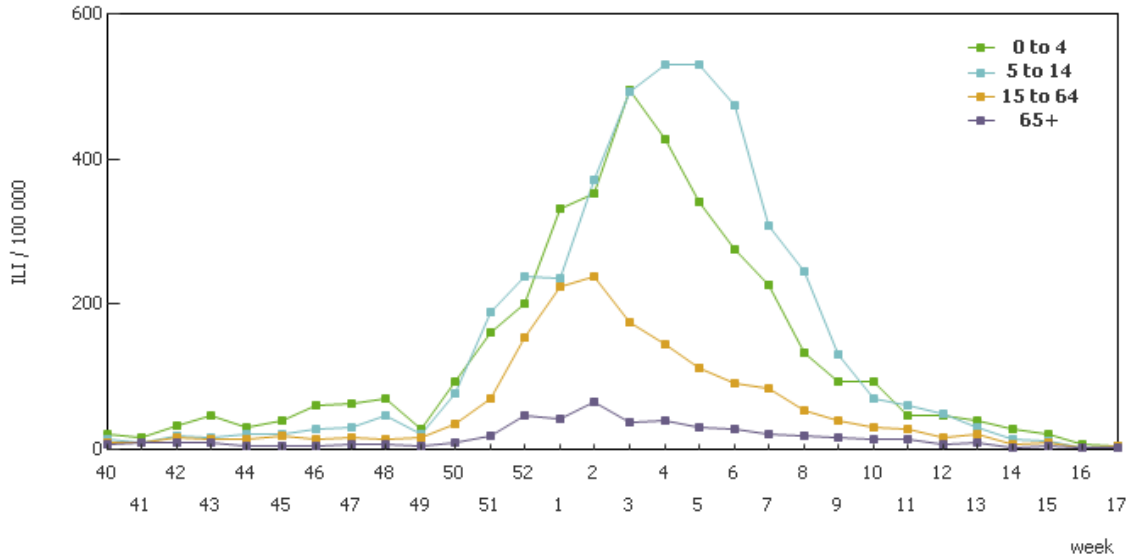


Fig. 3: ILI consultations per 100 000 population, by age group, Spain, 2010/2011 influenza season (from ECDC, Weekly Influenza Surveillance Overview)



- The weekly number and percentage of sentinel ILI/ARI specimens testing positive for influenza (Figures 4 and 5):
 - Overall for the surveillance system and
 - by influenza type and subtype

Fig. 4: Number of weekly ILI sentinel specimens that are positive for influenza, by influenza type, Estonia, 2010/2011 influenza season (from ECDC, Weekly Influenza Surveillance Overview)

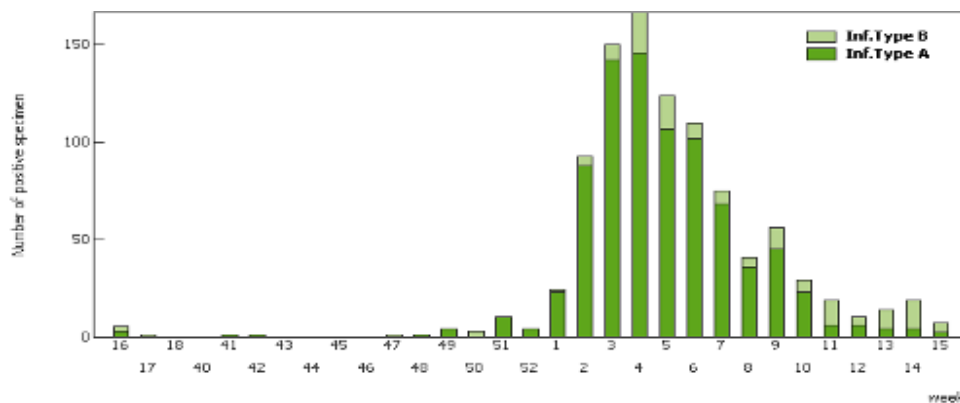
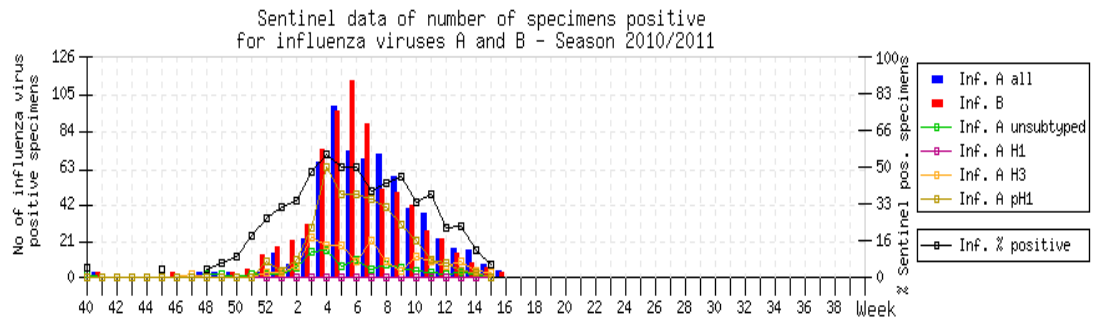


Fig. 5: Number and per cent of weekly ILI sentinel specimens that are positive for influenza, by influenza type and subtype, Turkey, 2010/2011 influenza season (from

EuroFlu Weekly Influenza Surveillance Bulletin)



Compiled at 12:08 on May 5 2011

Source: The WHO European Influenza Network (EuroFlu.org)

- A cumulative summary of the percentage of sentinel ILI/ARI specimens testing positive for influenza (Table 5):
 - Overall for the surveillance system and
 - by influenza type and subtype

Table 5: Type and sub-type of influenza viruses collected from sentinel ILI/ARI patients, by month, Country X

Depending on available sample sizes, the table above might be routinely stratified by sentinel

	October	November	December	January	TOTAL
Number of sentinel specimens tested for influenza	346	409	430	304	1489
Number and percentage of tested specimens positive for influenza	0 (0.0%)	6 (1.5%)	25 (5.8%)	84 (27.6%)	115 (7.7%)
Number (%) of all influenza positive for influenza A	0 (0.0%)	4 (66.7%)	7(28.0%)	55 (65.5%)	66 (57.4%)
Number of influenza A viruses sub-typed	0	3	6	44	53
Number (%) of subtyped A positive for pandemic influenza A (H1) 2009	0 (0.0%)	1 (33.3%)	2 (33.3%)	42 (95.5%)	45 (84.9%)
Number (%) of subtyped A positive for influenza A (H3)	0 (0.0%)	2 (66.7%)	4 (66.7%)	2 (4.5%)	8 (15.1%)
Number (%) of subtyped A positive for influenza A (H1)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Number (%) of all influenza positive for influenza B	0 (0.0%)	2 (33.3%)	18 (72.0%)	29 (34.5%)	49 (42.6%)

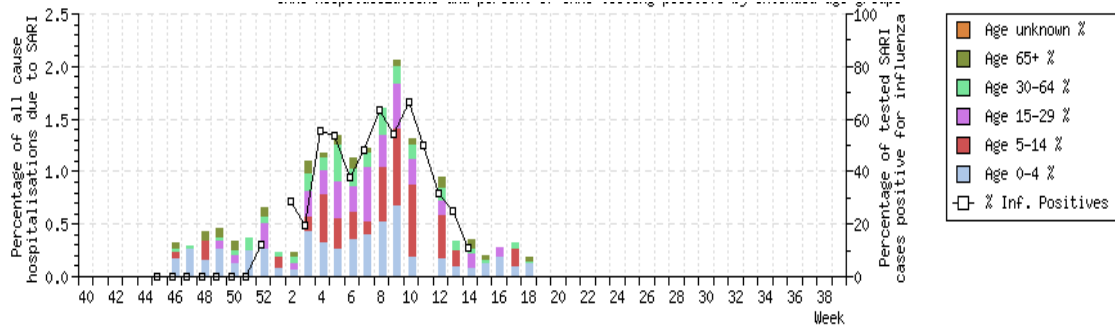
sites, age groups or other priority target groups of interest. Additional examples of weekly data displays can be found in both the WHO EuroFlu Weekly Influenza Surveillance Bulletin³⁶ and in the ECDC Weekly Influenza Surveillance Overview.³⁷

6.4.2. Sentinel SARI data

Sentinel SARI surveillance systems should aim to provide the following data on a weekly basis:

- The incidence rate per 100 000 population of sentinel SARI hospitalizations (or, alternatively, the percentage of total all-cause hospitalizations due to SARI can be used), by week, for the current influenza season (Fig. 6):
 - Overall for the sentinel surveillance system and
 - by age/target group
- The weekly number and percentage of sentinel SARI specimens testing positive for influenza

Fig. 6: Per cent of all-cause hospitalizations due to SARI at sentinel sites and the per cent of sentinel SARI specimens that are positive for influenza, Romania, 2010/2011 influenza season (from EuroFlu Weekly Influenza Surveillance Bulletin)



- A cumulative summary of the percentage of sentinel SARI specimens testing positive for influenza (Table 6):
 - Overall for the surveillance system and
 - by influenza type and subtype

Table 6: Type and sub-type of influenza viruses collected from hospitalized SARI patients, week 40/year to (current week)/year, Country X (NOTE: Numbers in table are not real and for example only)

	(current week)	Cumulative, week 40/2010 to (current week)
Number of sentinel SARI specimens tested for influenza	233	1766
Number and percentage of tested SARI specimens positive for influenza	46 (19.7%)	272 (15.4%)
Number (%) of all influenza positive for influenza A	29 (63%)	79 (29%)
Number of influenza A viruses sub-typed	24	65
Number (%) of subtyped A positive for pandemic influenza A (H1) 2009	23 (96%)	57 (86%)
Number (%) of subtyped A positive for influenza A (H3)	1 (4%)	8 (14%)
Number (%) of subtyped A positive for influenza A (H1)	0 (0%)	0 (0%)
Number (%) of all influenza positive for influenza B	17 (37%)	193 (71%)

Depending on available sample sizes, the table above may be routinely stratified by sentinel sites, age groups or other priority target groups of interest.

- An epidemiological description of new and cumulative hospitalized SARI patients with laboratory-confirmed influenza, by influenza type and subtype, should be produced routinely during influenza season (two options for this description are presented below in Tables 7 and 8).

Table 7 compares SARI cases with laboratory-confirmed influenza with those cases whose respiratory specimens test negative. Confidence limits and tests for statistical significance for these comparisons can be added, as appropriate. In addition, if there is a relative co-dominance of multiple influenza types and subtypes in circulation, strong consideration should be given to stratifying the table by these different influenza types and subtypes. This table can be used in combination with routine surveillance data to provide a regular update to stakeholders of the groups most impacted by influenza. If testing for other pathogens is performed – then additional columns could be added to compare SARI cases associated with influenza to SARI cases associated with infections caused by other viral respiratory pathogens

**Table 7: Clinical and epidemiological comparison of hospitalized SARI patients with and without laboratory-confirmed influenza week 40/year to (current week)/year, Country X
(NOTE: Numbers in table are not real and for example only)**

Characteristics	Per cent of influenza-negative SARI hospitalizations with selected demographic and epidemiological characteristics	Per cent of SARI hospitalizations confirmed as influenza with selected demographic and epidemiological characteristics
Sex	Information available for N = 100	Information available for N = 50
Male	54/100 (54%)	27/50 (54%)
Female	46/100 (46%)	23/50 (46%)
Sex unknown	0	0
Chronic Medical Illnesses	Information available for N = 98	Information available for N = 48
Number of cases with at least one of the chronic medical illness listed below*	30/98 (31%)	28/48 (58%)
<i>Chronic respiratory disease</i>	15/98 (15%)	20/48 (42%)
<i>Asthma</i>	15/98 (15%)	10/48 (21%)
<i>Diabetes</i>	11/98 (11%)	11/48 (23%)
<i>Chronic cardiac disease</i>	5/98 (5%)	5/48 (10%)
<i>Chronic renal disease</i>	3/98 (3%)	3/48 (6%)
<i>Chronic liver disease</i>	4/98 (4%)	4/48 (8%)
<i>Chronic neurological impairment</i>	7/98 (7%)	6/48 (13%)
<i>Immune-compromised</i>	0/98 (0%)	1/48 (2%)
Number of cases without any of the above chronic medical illnesses	68/98 (69%)	20/48 (42%)
Unknown if risk factors present	N=2	N=2
Pregnancy status	Information available for N = 50 women	Information available for N = 23 women
Pregnancy in any trimester	11/50 (22%)	8/23 (35%)
Not-pregnant	39/50 (78%)	15/23 (65%)
Pregnancy status unknown	N=0	N=0
Obesity (or other conditions as determined by national priorities)	Information available for N = 90	Information available for N = 35
Obese (BMI>30 or judged obese clinically)	25/90 (28%)	15/35 (42%)
Not obese (BMI<30 or not clinically judged obese)	65/90 (72%)	20/35 (58%)
Obesity status unknown	10	15
Age-groups (years)	Information available for N = 100	Information available for N = 48
0-1	40/100(40%)	10/48 (21%)
2-4	25/100(25%)	8/48 (17%)
5-14	10/100 (10%)	10/48 (21%)
15-29	5/100 (5%)	11/48 (23%)
30-64	5/100 (5%)	8/48 (16%)
65+	15/100 (15%)	1/48 (2%)
Age unknown	N=0	N=2
Vaccination Status	Information available for N = 98	Information available for N = 40
Received monovalent or trivalent vaccine during the current influenza season	40/98 (41%)	2/40 (5%)
Did not receive monovalent or trivalent vaccine during the current influenza season	58/98 (59%)	38/40 (95%)
Vaccination status unknown	N=2	N=10
Oseltamivir/zanamivir (Tamiflu/Relenza) Use	Information available for N = 100	Information available for N = 44
Received oseltamivir/zanamivir within 48 hours of symptom onset	10/100 (10%)	8/44 (18%)
Did not receive oseltamivir/zanamivir within 48 hours of symptom onset	90/100 (90%)	36/44 (82%)
Oseltamivir use unknown	N=0	N=6
Median days from symptom onset to hospital admission	4.0 days	4.5 days

* Some patients might have two or more chronic medical conditions and they will be counted in the row of each chronic medical condition listed below, but they should be only counted once in this field.

- *The value of outcome data from sentinel SARI cases:* Depending on available data and the complexity of sentinel SARI surveillance in a country, these analyses can be enhanced by stratifying the data in columns by patient outcome (e.g. laboratory-confirmed hospitalized non-ICU SARI cases with influenza compared to those admitted to ICU and/or who died) (Table 8). This would provide virological and epidemiological information on a routine basis about persons at risk for severe outcomes as sample sizes of severe cases grow to sufficient numbers. Again, tests for statistical significance for these comparisons may be added, as appropriate, and strong consideration should be given to stratifying this analysis by different influenza types and sub-types.

Table 8: Clinical and epidemiological description of hospitalized SARI patients with laboratory-confirmed influenza, by outcome status, week 40/year to (current week)/year, Country X (NOTE: Numbers in table are not real and for example only)

Characteristics	Hospitalized SARI cases with laboratory-confirmed influenza (<i>by sub-type</i>)	
	Per cent of hospitalized (non-ICU) cases with selected demographic and epidemiological characteristics	Per cent of severe (admitted to ICU and/or died) cases with selected demographic and epidemiological characteristics
Sex	Information available for N = 100	Information available for N = 30
Male	54/100 (54%)	15/30 (50%)
Female	46/100 (46%)	15/30 (50%)
Sex unknown	0	0
Chronic Medical Illnesses	Information available for N = 98	Information available for N = 28
Number of cases with at least one of the chronic medical illness listed below *	30/98 (31%)	19/28 (58%)
<i>Chronic respiratory disease</i>	25/98 (25%)	20/28 (71%)
<i>Asthma</i>	15/98 (15%)	4/28 (14%)
<i>Diabetes</i>	11/98 (11%)	5/28 (23%)
<i>Chronic cardiac disease</i>	5/98 (5%)	5/28 (18%)
<i>Chronic renal disease</i>	3/98 (3%)	3/28 (11%)
<i>Chronic liver disease</i>	0/98 (0%)	4/28 (14%)
<i>Chronic neurological impairment</i>	3/98 (3%)	7/28 (25%)
<i>Immune-compromised</i>	0/98 (0%)	1/28 (4%)
Number of cases without any of the above chronic medical illnesses	68/98 (69%)	9/28 (42%)
Unknown if risk factors present	N=2	N=2
Pregnancy status	Information available for N = 50 women	Information available for N = 15 women
Pregnancy in any trimester	11/50 (22%)	10/15(67%)
Not-pregnant	39/50 (78%)	5/15 (33%)
Pregnancy status unknown	N=0	N=0
Obesity (or other conditions as determined by national priorities)	Information available for N = 90	Information available for N = 28
Obese (BMI>30 or judged obese clinically)	23/90 (26%)	19/28 (68%)
Not obese (BMI<30 or not clinically judged obese)	66/90 (73%)	9/28 (32%)
Obesity status unknown	10	2
Age-groups (years)	Information available for N = 100	Information available for N = 30
0-1	35/100(35%)	5/30 (17%)
2-4	30/100(30%)	2/30 (6%)
5-14	10/100 (10%)	5/30 (17%)
15-29	4/100 (4%)	3/30 (10%)
30-64	6/100 (6%)	10/30 (33%)
65+	15/100 (15%)	5/30 (17%)
Age unknown	N=0	N=0
Vaccination Status	Information available for N = 98	Information available for N = 30
Received monovalent or trivalent vaccine during the current influenza season	20/98 (20%)	2/30 (7%)
Did not receive monovalent or trivalent vaccine during the current influenza season	78/98 (80%)	28/30 (93%)
Vaccination status unknown	N=2	N=0
Oseltamivir/zanamivir (Tamiflu/Relenza) Use	Information available for N = 100	Information available for N = 27
Received oseltamivir/zanamivir within 48 hours of symptom onset	15/100 (15%)	2/27 (7%)
Did not receive oseltamivir/zanamivir within 48 hours of symptom onset	85/100 (85%)	25/27 (93%)
Oseltamivir use unknown	N=0	N=3
Median days from symptom onset to hospital admission	3.5 days	7.5 days

6.5. Additional regular analyses and reports

Member States in which antiviral resistance testing is conducted routinely should collect, analyse and report the numbers of viruses tested and the percentages that are sensitive to specific antiviral medications, stratified by antiviral drug. Antiviral resistance testing results from countries experiencing early influenza activity may have implications for the choice of prophylaxis or treatment in countries that do not have the laboratory capacity to carry out antiviral resistance testing.

Antigenic and genetic characterization of influenza viruses is important for the surveillance of strain distribution, vaccine match, and antigenic drift and shift. These analyses should be done particularly at the start and end of the influenza season.

6.6. Data analysis and reporting at the European level

During each influenza season (weeks 40-20), ECDC and WHO/Europe jointly collect weekly epidemiologic and virologic influenza surveillance data from 53 countries in the WHO European Region. Between seasons (weeks 21-39), virologic data for ILI/ARI and SARI should be collected and reported to regional surveillance platforms biweekly, while epidemiologic surveillance is usually suspended. This allows the surveillance systems to detect noteworthy increases in out-of-season influenza activity while minimizing the out-of-season work load on surveillance focal persons within the Member States. However those Member States who wish to continue reporting epidemiological data on a biweekly basis will have their data presented in regional surveillance bulletins. The specific procedures for reporting to the regional surveillance platforms are beyond the scope of this document, but are available elsewhere.³⁸

The epidemiologic and virologic influenza surveillance data is uploaded electronically by nominated contact points in each country to the ECDC/TESSy (EU/EEA Member States) and to EuroFlu, which can be accessed through a common web-based entry point. Data from EU/EEA Member States is transferred simultaneously to EuroFlu. After analysing their respective datasets, ECDC and WHO/Europe publish the Weekly Influenza Surveillance Overview and the EuroFlu weekly influenza surveillance bulletin, respectively. Mutual review of drafts between the two editorial teams ensures consistency of data and interpretations. Both weekly electronic bulletins provide detailed epidemiologic and virologic data for each country and for the EU and EEA/the European Region as a whole. Countries must report their influenza surveillance data by Thursday 10:00 CET of a given week to be included in these weekly updates, so it is important to establish a good reporting mechanism at national level.

7. Laboratory specimen processing

***Disclaimer:** Although the names of vendors or manufacturers are provided as examples of suitable product sources, their inclusion does not imply endorsement by the World Health Organization.*

Laboratory specimens should accompany the epidemiologic data collection described previously. Countries may have existing protocols for laboratory specimen collection, packaging, storage, transport and testing and should follow their usual procedures. Below are guidelines on laboratory specimen processing, which may be referred to by countries conducting sentinel site surveillance.

7.1. Collection

Respiratory virus detection depends on the collection of high-quality specimens, their rapid transport to the laboratory and appropriate storage before laboratory testing. Specimens for the direct detection of viral antigens or nucleic acids and virus isolation in cell cultures should be taken no later than seven days after the onset of clinical symptoms, and preferably within three days. Specimens should preferably be taken before commencement of anti-viral chemotherapy. The time between the onset of illness and specimen collection should be recorded on the data collection form.

Although informed consent from the patient is not considered necessary for routine surveillance, a verbal explanation of the reason for specimen collection, as well as how the specimen will be used, should be given to each patient.

Instructions for the correct collection of specimens are provided in Annex 2. Instructions may also be included on the back of the SARI and Outpatient Swab Forms.

The following are examples of specimens from the upper respiratory tract (URT) which may be collected for the detection of influenza and other respiratory viruses:

- Nasal swab
- Throat swab
- Nasopharyngeal (NP) swab
- Nasopharyngeal aspirates or washes
- Nasal wash

Nasopharyngeal swabs, aspirates and washes are the best specimens for virus isolation and PCR. However, these specimens can be technically difficult to obtain and unpleasant for the patient. An acceptable alternative is to collect a nasal *and* a throat swab and then combine them in a single vial of virus transport medium (VTM; this can be obtained commercially or be prepared in the laboratory as described in Box 6). If VTM is not available, swabs placed in a dry tube can be used for PCR detection. The nasal swab will allow detection of seasonal influenza

viruses while the throat swab allows detection of both seasonal influenza viruses and, potentially, novel influenza A viruses that demonstrate a proclivity for lower respiratory receptor sites.

Before taking any specimens, mark all specimen tubes with the patient unique identifier, the specimen date, the type of specimen in the tube (e.g. nasal swab, throat swab, etc.) and appropriate hazard labelling according to local policy.

The equipment below is described in detail for the collection of respiratory specimens in Annex 2 and should be made available by the responsible unit (e.g. the national influenza laboratory) in sufficient quantities at sentinel sites to collect specimens from SARI and ILI/ARI cases:

- personal protective equipment (PPE);
 - The use of PPE will depend on the setting (outpatient versus hospital) and on the severity of symptoms; outpatient physicians may wear only gloves to take a swab from an ARI or ILI patient while a hospital physician taking a swab from a SARI patient may wear gloves, gown and a surgical mask.
- swabs;
- tongue depressors;
- plastic vials, such as cryovials, containing 2-3 ml of virus transport medium (VTM) stored at 4°C (supplied by the NIC);
- tubes for collecting blood, alcohol, gauze, non-heparin treated needles, etc. (these supplies are only needed if serum is to be collected);
- alcohol and/or bleach to disinfect specimen tubes before transport; and
- packaging materials for transport *in country*.

7.2. Storage and Transport

Successful recovery of viruses from clinical specimens depends on the quality of material received for inoculation onto cells or eggs. Many viruses are susceptible to drying, adverse pH and varying osmotic potential. For this reason samples should be placed in VTM immediately after they have been collected and stored at 4°C at the sentinel site. Ideally, specimens for direct detection of viral antigens by immunofluorescence staining of infected cells should be refrigerated and processed within 1–2 hours. The maximum storage time at 4°C is 24 hours. Specimens for virus isolation should be refrigerated immediately after collection and inoculated into susceptible cell cultures as soon as possible. If specimens cannot be processed within 48–72 hours, they should be kept frozen at or below -70°C. Ideally all respiratory swabs should be transported refrigerated, and without prior freezing, together with the swab forms, to the laboratory in VTM within 24 to 48 hours of collection. However, if this is not possible, they should be stored in a -70°C freezer or in liquid nitrogen and thawed prior to processing.

Each specimen may be divided into aliquots for additional testing, re-testing or archiving prior to freezing at -70°C for long-term storage. The number of freeze-thaw cycles should be minimized, as freezing and thawing can ruin the specimen. Do not store specimens in standard

household freezers (-20°C) with a freeze-thaw (“defrost”) cycle; it is better to keep a sample on ice, even for as long as a week, than to allow the sample to freeze and thaw repeatedly.

Blood for serology testing may be stored at room temperature overnight or incubated at 56°C for 30 minutes to allow the blood to clot. The serum should be removed to a new tube by mechanical pipette in a biosafety cabinet and either stored at 4°C for up to one week or immediately put into long term storage at -20°C.

Box 6. Laboratory preparation of VTM suitable for use in collection and storage of swabs from human patients:

1. Add 10g veal infusion broth and 2g bovine albumin fraction V to 400 ml sterile distilled water.
2. Add 0.8 ml gentamicin sulfate solution (50 mg/ml) and 3.2 ml amphotericin B (250 µg/ml).
3. Sterilize by filtration.
4. VTM prepared in this way can be stored unopened in the dark at room temperature for up to one year.

Compliance with national postal and courier transportation regulations for the transport of specimens is essential. Specimens should be packed in three layers of packaging that complies with P650 packaging requirements for infectious substances in United Nations 3373 category B, to protect them from damage during transport and to protect the safety of personnel responsible for transport and for receiving/unpacking the specimens (for details see the WHO *Guidance on regulations for the Transport of Infectious Substances 2009-2010*).³⁹

The first layer of three layer P650 packaging systems is the watertight specimen tube, the second layer is a watertight container (this can be a zip-lock bag or a hard plastic container) and the third layer is a rigid outer packaging (this can be a cardboard box, polystyrene box or a coolbox). Absorbent material sufficient to absorb the whole volume of the specimens should be placed between the tubes and the second watertight layer. There should be no more than 500mL of liquid in the specimen collection containers. Depending on external temperatures in your country and whether the specimens are to be transported refrigerated or frozen, packaging may need to include ice packs or dry ice.

An example of a P650 packaging system, which can be sent by the regular post (not refrigerated) provided it is used in combination with external packaging, such as a ziplock bag, and absorbent tube holders, is shown below.⁴⁰



7.3. Testing

All specimens suspected of containing an infectious agent should be handled and processed in a laboratory that functions according to biosafety level (BSL) 2 as described in the WHO Laboratory Biosafety Manual.⁴¹ Note that the Newly Independent States maintain a different biosafety nomenclature compared to WHO terminology. WHO BSL 1-4 corresponds to an ascending level of containment, with BSL4 being the highest containment level, whereas BSL 1-4 in NIS corresponds to a descending level of containment, with BSL1 being the highest containment level.

A detailed description of practices for the laboratory diagnosis and virological surveillance can be found in the “Manual for the laboratory diagnosis and virological surveillance of influenza”.⁴²

Laboratory procedures that may give rise to infectious aerosols must be conducted in a class II microbiological safety cabinet. For manipulations involving seasonal influenza, disposable gloves and gown should be worn at all times. For specimens suspected of containing avian influenza, other novel influenza A viruses or other pathogens causing severe respiratory disease like SARS, specimen handling and processing should occur at a minimum of BSL2 containment and using BSL3 practices. Otherwise specimen handling and processing in a BSL3 laboratory is recommended.

Laboratory testing for the detection and subtyping of influenza viruses in respiratory specimens has relied for decades upon the isolation of influenza viruses in eggs and later cell culture followed by haemagglutination inhibition assay (HAI) using the WHO CDC reagent kit supplied annually to all NICs. This has the advantage that many viruses are available to WHO for vaccine strain selection. During the past decade, the majority of laboratories started to use molecular detection techniques to detect and subtype influenza viruses. Most widely used is RT-PCR on real-time PCR platforms and many laboratories gained important experience during the 2009/2010 pandemic. Studies comparing virus isolation, IFA and RT-PCR for the detection of

seasonal influenza in respiratory specimens have shown RT-PCR to be more sensitive than the other techniques.^{43,44,45} Other advantages of using RT-PCR for influenza detection include:

- **Biosafety:** RT-PCR can be used to detect low amounts of influenza virus in clinical specimens; this high sensitivity allows virus isolation to be performed only on those specimens for which the influenza type and subtype has been determined. This means that clinical testing of specimens suspected of containing avian influenza A(H5N1) or other novel influenza viruses can be performed in a BSL2 laboratory using BSL3 practices and reduces the chance that laboratories will attempt to isolate novel influenza viruses under BSL2 conditions.
- **Timeliness:** The strategy for testing each specimen should aim to diagnose influenza A and B virus infections rapidly and exclude other common respiratory infections. Real-time RT-PCR and conventional PCR provide results within 24 hours.
- The WHO case definitions for human infections with influenza A(H5N1) virus⁴⁶ include RT-PCR as the only rapid diagnostic test for which a positive result is accepted as confirmation.

It is therefore recommended that RT-PCR is used as the confirmatory laboratory test to determine influenza type and subtype in clinical specimens collected in the national sentinel influenza surveillance system and as a criterion to select specimens for virus isolation.

In order to ensure that a sufficient number of viruses that represent circulating strains in countries are shared with WHO, it is important that national influenza laboratories continue to isolate viruses from a selection of positive specimens according to WHO guidance.⁴⁷

RT-PCR assays for the detection of influenza viruses can be developed locally or can be obtained commercially. Assays for typing influenza A and B target conserved genes, usually matrix (M) and nucleoprotein (NP). Assays for subtyping influenza A target the HA and NA genes, which are constantly changing through a process known as antigenic drift and assay reagents (primers and probes) must be validated at least once a year for their specificity to currently circulating influenza viruses. Real-time RT-PCR is preferred above conventional RT-PCR because it is quicker and less susceptible to contamination when “one-step” RT-PCR strategies are used, due to the decreased number of pipetting steps required.

Box 7. WHO kits and protocols for real time RT-PCR detection of influenza

The WHO CC at CDC provides kits for real-time RT-PCR detection of seasonal influenza viruses to WHO-recognized NIC and national influenza laboratories. Kits can be obtained by placing an order at cdcFluOrder@cdc.gov. Questions related to the kits can be sent to contact@influenzareagentresource.org.

Real time RT-PCR protocols for the detection of seasonal and pandemic (H1N1) 2009 can be found in the library of EuroFlu accessible in the password-protected area.

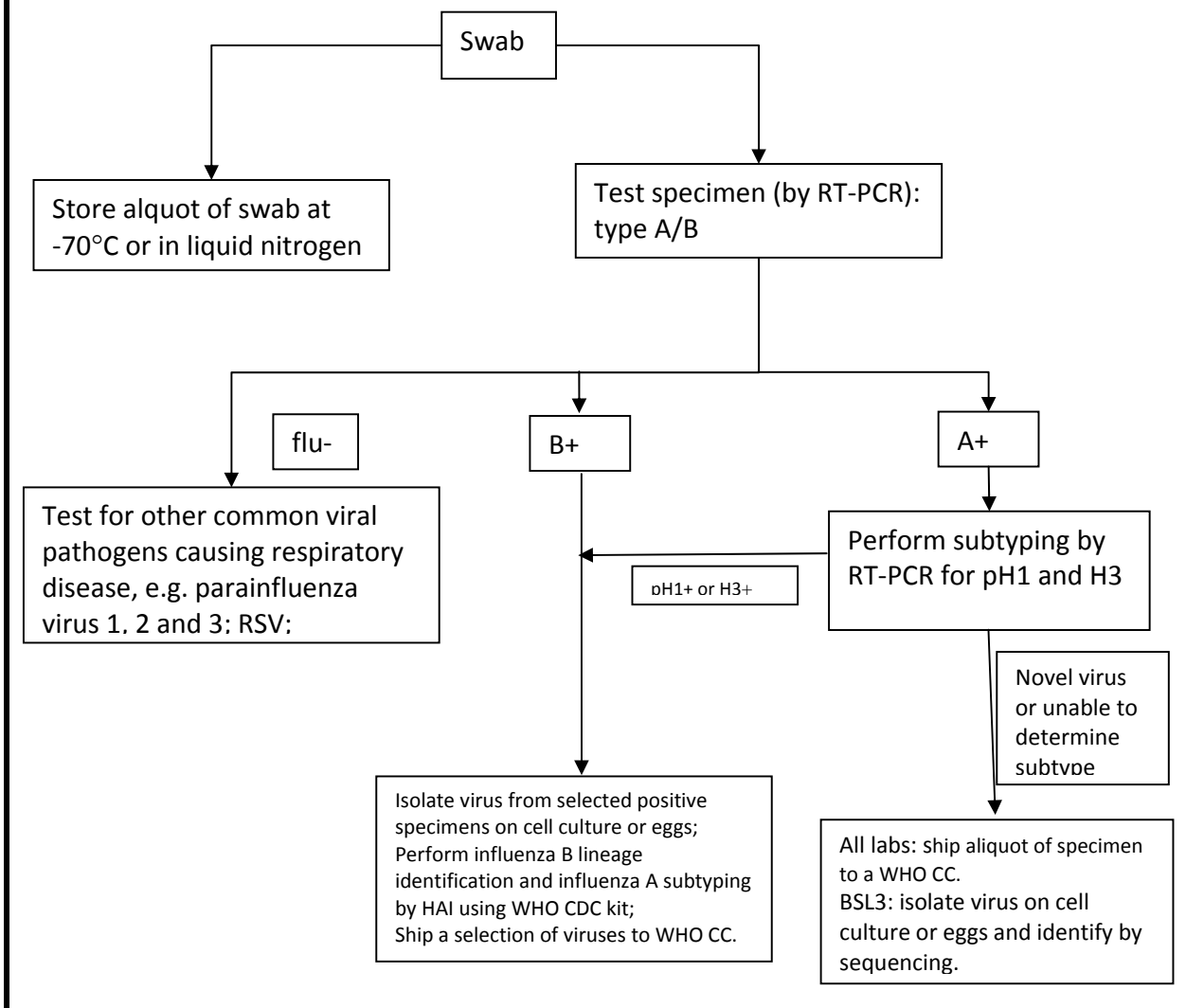
Virus isolation by cell or egg culture on RT-PCR positive specimens will provide results in 2–10 days. Both shell-vial and standard cell culture methods may be used to detect influenza viruses.⁴⁸ The preferred cell line for isolation of human influenza viruses from clinical specimens is Madin-Darby canine kidney, available through the ATCC.⁴⁹ Egg culture may also be used specifically to detect and isolate influenza A and B viruses. Successful isolation of the virus will result in a cytopathic effect (CPE). This can be confirmed by IFA for type (influenza A or B), by RT-PCR for typing and subtyping or by HAI using the WHO CDC reagent kit for influenza diagnostics.⁵⁰

Isolation of influenza viruses for which the influenza subtype has been determined by RT-PCR will ensure that this occurs under appropriate biosafety conditions, as isolation of novel influenza viruses such as avian influenza A(H5N1) or of viruses for which influenza A is confirmed but the subtype could not be identified should occur in BSL3 conditions. Clinical specimens that are negative for influenza A and B by RT-PCR may be tested for the presence of other common respiratory viruses such as RSV and adenovirus by a rapid test or inoculation onto cells to isolate the virus.

As described above, in most laboratories clinical specimens collected from ARI/ILI or SARI patients are tested for the presence of influenza by RT-PCR. Testing algorithms should be developed according to the prevalence of circulating viruses and to the resources and capacities of the laboratory. For example, during the 2010/2011 season, testing algorithms aimed to detect seasonal influenza A(H3N2), the pandemic (H1N1) 2009 virus and influenza B. Typing and subtyping by RT-PCR may be done in a single step or in two consecutive steps, i.e. determine the presence of influenza A or B and perform subtyping on influenza A positive specimens. Specimens that are influenza A positive but negative for A(H3N2) and (H1N1) 2009 should be tested for seasonal A(H1N1) and, if indicated by epidemiological information on the patient, for A(H5N1) and/or other novel influenza viruses.

Virus may be isolated from all specimens positive for seasonal influenza or from a selection thereof; this will depend on the number of specimens taken, number of positive specimens, prevalence of different viruses, unusual events, such as the emergence of antiviral resistant virus strains, etc.⁵¹ Chicken embryo culture in eggs is the traditional gold standard for virus isolation and should be performed on at least a sample of specimens to provide material for antigenic determination and potential vaccine production.

Box 8. Suggested testing Algorithm for Specimens Collected from Cases of SARI, ILI and/or ARI at Sentinel Sites:



7.4. Shipment of specimens and viruses to a WHO Collaborating Centre for influenza

NIC have the responsibility to ship seasonal influenza viruses and novel viruses such as A(H5N1), to a WHO CC or WHO H5 Reference Laboratory of their choice. In the European Region, there is a WHO CC in the United Kingdom and two WHO H5 Reference Laboratories, one in France and the other in the Russian Federation.⁵² For guidance on which specimens and viruses to select for shipment please see the document “Selection of clinical specimens for virus isolation and of viruses for shipment from National Influenza Centres to WHO Collaborating Centres” – revised 6 December 2010.⁵³

WHO provides funding and logistical support for the shipment of specimens and viruses through the WHO Global Shipment Project.⁵⁴ The project covers two to three shipments of

seasonal influenza viruses to a WHO CC per season and shipments of novel influenza viruses as necessary. The project uses World Courier or a World Courier agent. In those countries in which World Courier is not operating, an alternative courier may be used. The procedure is described in the box below. The booking form to accompany World Courier Shipments can be found in Annex 5.

For transport by air, the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* published by the International Civil Aviation Organization (ICAO) is the legally binding international regulations. The International Air Transport Association (IATA) publishes Dangerous Goods Regulations (DGR) that incorporates the ICAO provisions and may add further restrictions. These regulations, as well as a detailed description of how to package and ship specimens and viruses, can be found in the WHO *Guidance on regulations for the Transport of Infectious Substances 2009-2010*.

To ensure safe shipment of specimens and viruses to a WHO CC or to a WHO H5 Reference Laboratory, shipment should preferably be performed by a person trained according to current international regulations. In 2007, 2008 and 2011, WHO provided IATA-certified training on the shipment of infectious substances to NIC staff of all European Member States. NIC staff who do not currently hold an IATA certificate are still eligible to ship Biological substances UN3373, category B, if dry ice is not included. This includes seasonal influenza virus clinical specimens and isolates, as well as clinical specimens containing influenza A(H5N1).

Box 9. Procedure and Documentation for World Courier Shipment

1. For each shipment, NIC are requested to complete the booking form (see Annex 5) and forward by e-mail or fax to World Courier, Switzerland and to WHO Global Influenza Programme.
2. A World Courier local agent will then contact the NIC concerned in order to arrange collection of the shipment within a maximum period of one week, or immediately for pandemic or other novel viruses. The World Courier agent will provide all relevant packaging, labelling and paperwork required to comply with international regulations (see Infectious Substance Category). Dry ice will also be provided should the NIC request "Frozen" shipment on the Booking Form when shipping clinical specimens and frozen virus isolates.
3. The NIC will be required to complete the following paperwork before the World Courier agent can accept the package for shipment:
 - i. A House Airway Bill (HWB)
 - ii. A Declaration of Dangerous Goods (only for category A infectious substances, i.e. not for seasonal influenza virus isolates or clinical specimens containing pandemic (H1N1) 2009 or influenza A(H5N1))
 - iii. An export permit for the originating country, as relevant, and preferably valid for multiple shipments
 - iv. An import permit for the recipient country, as relevant
 - v. A packing list/invoice indicating the recipient's address, number of packages and detail of contents, including weight and value (the value of the shipment should be zero for clinical material)
4. As soon as the shipment has been dispatched, the NIC is requested to forward shipment details to WHO by entering the details into the password protected database, FluNet <http://www.who.int/flunet>, following the procedure below:
 - i. Select "FluNet" under "Data Entry" in the left frame of the screen.
 - ii. Select "Shipment data."
 - iii. Choose the year and week number when the shipment is made, then select "Go."
 - iv. On the new screen, select "Insert" to enter new data, "Update" to revise existing data, or "Delete" to delete existing data.
 - v. On the data entry/revision screen, inside box "Using WHO shipment funds," select "yes", "no" or "unknown" and enter the costs and all other required information concerning the contents of the shipment.

In the event that a new user account and password for data entry to FluNet are required, the NIC is requested to contact the WHO Global Influenza Programme by e-mail at whoinfluenza@who.int.

Specimens should be shipped frozen. Isolated influenza viruses can be shipped on ice packs providing:

- these are fresh isolates that have not been frozen;
- the vials containing the isolates are insulated (e.g. by a thick layer of paper to prevent freezing to the ice packs); and
- delivery will be within 48 hours or refrigeration at 4°C along the way is ensured.

Viruses that have been frozen should be shipped frozen on dry ice to avoid multiple freezing and thawing. Viruses should be accompanied by the appropriate ILI/ARI or SARI swab form and by an itemized list of contents enclosed between the secondary packaging and the outer (third layer) packaging.

Feedback from the WHO CC or the WHO H5 Reference Laboratory to the NIC will occur as soon as results are available in the case of novel influenza viruses and within one month in the case of seasonal influenza viruses. Results of analyses should be entered on the Tessy or EuroFlu platform. The NIC also receives the WHO CC annual and interim influenza reports. The WHO CC at the National Institute for Medical Research in London produces these reports every March and September.⁵⁵

8. Roles and responsibilities in sentinel surveillance

This section describes general functions and responsibilities of the core staff within the national sentinel surveillance system. Any country implementing sentinel surveillance for influenza should have **1)** sentinel sites with a designated focal point at each sentinel site **2)** a national surveillance centre (or similar structure) that coordinates the epidemiologic and virologic data collection and timely analyses for the sentinel surveillance system and **3)** a national influenza laboratory that will oversee the virologic aspects of the surveillance system, including quality control at subnational laboratories. Close coordination between these three entities is essential for an efficiently functioning influenza surveillance system and would also support investigations of unusual outbreaks of influenza, including those due to pandemic (H1N1) 2009, avian influenza A(H5N1) or other novel influenza viruses. While intermediate levels of function and coordination may exist within the surveillance system in larger countries, this section describes only the *basic* roles and responsibilities of these three core surveillance entities. For any surveillance system to function successfully, strong communication and collaboration across all levels of the surveillance system should be emphasized.

8.1. Sentinel sites

Each sentinel site should have a **sentinel site focal point** that may be a person or persons responsible for the routine surveillance operations at that sentinel site. The sentinel site focal point(s) should assure that:

- case definitions are known and adhered to;
- any sampling strategies are being adhered to in as unbiased a manner as possible;
- respiratory specimens are collected appropriately from patients meeting the case definitions and are packaged, stored and transported to the designated confirmatory laboratory according to national guidelines;
- all respiratory specimens and corresponding swab forms are assigned a unique ID number;
- all data collection forms are filled out completely and accurately;
- epidemiologic data are appropriately managed and transmitted from the sentinel site to appropriate authorities (national surveillance centre or an intermediate level);
- sentinel sites accurately track the daily number of SARI and ILI/ARI cases selected for laboratory testing, the total number of ILI/ARI cases presenting to sentinel facilities, the total number of SARI hospitalizations to the wards under surveillance and denominators of total encounters and/or total all-cause overnight hospital admissions;
- data reporting, specimen collection and specimen transport at the sentinel site are occurring in a timely way and according to the indicators outlined in the System Monitoring Section (see Chapter 9);
- regular monitoring of surveillance resources is undertaken to maintain adequate supplies for sustaining the routine functions of surveillance; and
- timely feedback and updates of the current influenza situation are provided to clinicians and other staff participating in surveillance at the sentinel site.

8.2. National surveillance centre

The national surveillance centre is a generic name for an organizational entity assigned to coordinate influenza surveillance in a country. This national surveillance centre is normally located within the Ministry of Health or a national institute of public health, is closely affiliated with the national influenza laboratory and should have a **national surveillance focal point** that may be a person or persons responsible for the implementation and coordination of the national influenza sentinel site surveillance system. The national surveillance focal point(s) should be responsible for:

- selection of appropriate sentinel sites;
- decisions to maintain or discontinue specific sentinel sites;
- decisions about ILI, ARI and SARI sampling strategies, techniques and epidemiologic data collection;
- assuring that sentinel sites have the necessary epidemiologic data collection instruments and that mechanisms for routine transmission of these forms (whether electronic or paper-based) are available to, and well understood by, the sentinel site focal points;
- maintaining a national surveillance database and assuring linkage between epidemiological and virological data;
- assuring that the data collected from the sentinel sites is analysed in a timely and appropriate manner;
- preparing and disseminating a weekly influenza report to stakeholders such as national and international governmental partners, participating sentinel sites and to other public officials;
- reporting weekly national surveillance data to WHO through regional influenza surveillance platforms during the influenza season;
- providing initial and refresher training to the sentinel sites including:
 - training on adherence to case definitions and laboratory specimen collection
 - training on appropriate infection control measures and PPE usage, specimen storage and transport, epidemiologic data collection, data reporting procedures and practical uses of surveillance data
- assuring that sentinel sites receive influenza weekly reports in a timely manner; and
- developing and implementing a process to routinely monitor the sentinel surveillance system, including the development of performance indicators and a plan for regular auditing through site visits.

8.3. National influenza laboratory

The national influenza laboratory should include a **virological focal point** that should be responsible for:

- providing technical support and guidance to sentinel sites on appropriate specimen collection, packaging, storage and transport;

- assuring that sentinel sites have appropriate sample collection materials, PPE and lab supplies to collect, store and transport specimens;
- receiving, registering and storing specimens from cases of SARI and ILI/ARI from sentinel sites and any other sites;
- performing the following analyses on influenza viruses from sentinel site specimens and on viruses received from other laboratories:
 - virus typing and subtyping, preferably by molecular (RT-PCR) methods
 - virus isolation on a representative sample of influenza positive specimens and subtyping using the WHO CDC reagents kit
 - prompt submission of any unsubtypeable samples to a WHO CC
 - where possible, conducting antigenic and genetic characterization of circulating viruses and sharing characterization data in a publicly accessible database
 - where possible, conducting antiviral susceptibility testing on influenza viruses
- maintaining a database of specimens with timely entry of laboratory results, which includes:
 - maintaining the linkage between the unique ID numbers assigned by the sentinel site and the specimen identification number assigned by the laboratory
- archiving and storing original clinical specimens at -70°C or in liquid nitrogen for at least one year;
- sharing with the WHO CCs a representative sample of seasonal and pandemic influenza virus isolates;
 - If the laboratory is not performing virus isolation then clinical specimens from a subset of PCR positive specimens should be shared with a WHO CC or with a national influenza centre in a neighbouring country, or the same subregion with which there is an agreement, during the beginning, peak and end of influenza season.
 - All isolates that react poorly with the WHO CDC reagents kit and all novel viruses detected are immediately shipped to a WHO CC.
- consolidating and analysing national laboratory data for weekly reports;
- reporting weekly national surveillance data into regional and global influenza surveillance platforms during the influenza season;
- where RT-PCR is performed, participating in the WHO Global External Quality Assessment Project for the molecular detection of influenza viruses,⁵⁶ as well as in regional programmes when available;
- where resources permit, developing national diagnostic standards and assays that are periodically validated, providing training in their use by other laboratories and organizing routine quality assurance programs (proficiency testing);
- monitoring specimen quality and timeliness associated with sample submission and provision of feedback to sentinel sites to improve specimen quality; and
- conducting annual reviews of laboratory surveillance system for quality improvement.

9. Monitoring, review, and evaluation of the surveillance system

Sentinel site focal points and national surveillance authorities should routinely monitor surveillance data on an ongoing basis throughout influenza season in order to quickly detect and address problems with data quality. A more formal annual review of surveillance systems should also take place to ensure that data collected is of consistent quality and that the system is meeting its stated objectives. An annual review plan for the system should be designed at the outset of surveillance activities. Annex 3 includes three review tools that may be used to assess sentinel site functioning on an annual basis. There is a national-level review tool that can be used for an external review of ILI and SARI sentinel systems. There are also two sentinel site review tools (one for ILI sentinel sites and another for SARI sentinel sites) that may be used by national authorities to perform annual reviews of sentinel sites.

A comprehensive full system evaluation to identify major problems or shortcomings in the system should also be undertaken every few years. This type of comprehensive system evaluation *should also take place before any expansion of the sentinel system occurs*. Such an evaluation should follow a standard set of guidelines⁵⁷ (which are beyond the scope of this document), allowing for the systematic identification of areas where the system may be strengthened so that a set of solutions can be applied to the system as a whole.

9.1. Routine monitoring of data

Surveillance data should be subject to routine or regular monitoring at both the sentinel site level and at the national level.

At the national level, where data from all sentinel sites is collected, a good deal of control exists over data quality and consistency. Having one database for use by all participants in the surveillance system is advantageous, in that it can allow for data cleaning, standardizing and built-in checks for consistency and quality. Surveillance staff at the national level should also be aware of gaps in data or lags in timeliness of submission from sites when assembling, analysing and reporting weekly data. This regular monitoring of the data allows the surveillance focal points to determine if the surveillance system is meeting its objectives and if the system is maintaining a satisfactory level of performance. Most importantly, routine monitoring of the system at the national level allows surveillance authorities to understand the data well enough to detect aberrations from what are “normal” data patterns over time. Abnormal data may then be checked with sentinel sites responsible for submitting data.

Routine and ongoing monitoring of data should also be undertaken by staff at the sentinel sites, under the auspices of the sentinel site focal point. Sentinel site staff should be trained in the objectives of the surveillance system and be familiar with data standards, minimum data requirements and timelines for reporting and other relevant elements of the data collection process. The job description and training of surveillance sentinel site staff should include awareness of the need for completeness and consistency, and approaches to monitor data for abnormalities. The sentinel site focal point should use this information to routinely provide feedback to surveillance staff.

9.2. Annual review of the sentinel system

An annual review of the surveillance system provides users with a more detailed understanding of how well the system is functioning, whether all sites are functioning in a satisfactory manner and where the system might benefit from updated training, data management and analysis support, or other activities. Annual reviews should be undertaken at the national level, as well as at the site level (see Annex 3), and should involve a review of the data produced by the system, adherence of staff to surveillance operating procedures developed by national authorities, completeness of data, timeliness of reporting and laboratory practices. Some standard indicators may be used to evaluate the success of a surveillance system on an annual basis. These indicators should reflect as many steps as possible in the routine surveillance process (Fig. 7). Specific, measurable surveillance targets may be created for each indicator at the national level in order to facilitate annual monitoring. For example, a national public health authority may determine that the indicator “per cent of reported SARI patients that meet the SARI case definition” should have an associated target of “90% of all SARI cases meet the SARI case definition” for the purposes of annual monitoring and quality improvement. Some additional suggestions of monitoring indicators and possible targets are presented in Table 9.

Figure 7. Basic steps in the sentinel surveillance process

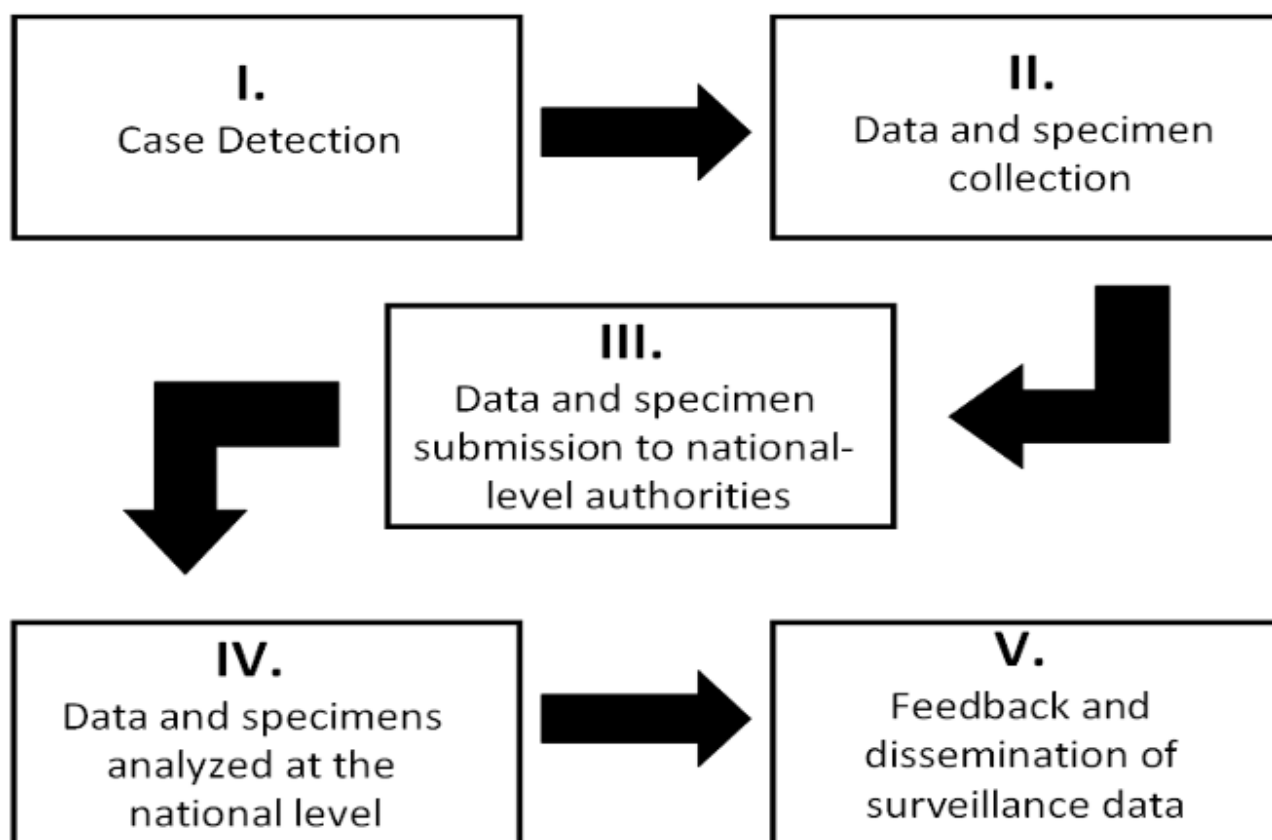


Table 9. Sentinel surveillance annual monitoring indicators and example surveillance targets.

Step in the surveillance process (see Fig. 7)	Indicator	Example target
I	Per cent of tested cases that meet the surveillance case definition in the sentinel system	At all sentinel sites over 90 per cent of reported SARI and ILI/ARI cases meet the case definition.
I	Per cent of hospitalized SARI cases detected by the sentinel surveillance system NOTE: This indicator involves a record review and may only be part of a more comprehensive review.	At all sentinel sites over 80 per cent of SARI cases identified in medical record reviews are also captured by the surveillance system.
I – II	Time from detection of ILI/ARI and SARI cases to respiratory specimen collection	Over 90 per cent of tested ILI/ARI and SARI specimens have respiratory specimens collected on the same day that they are detected by the surveillance system.
I – II	Time from detection of ILI/ARI and SARI cases to case-based data collection	Over 90 per cent of tested ILI/ARI and SARI specimens have case-based data collected within 24 hours of presentation/admission.
II	Per cent of weeks that sentinel sites properly adhere to sampling protocols for respiratory specimen collection	During 90 per cent of weeks the number of respiratory specimens received at the national laboratory meets or exceeds the number of reported SARI/ILI/ARI cases that should have been swabbed (according to surveillance operating procedures /sampling strategies).
II	Per cent of case-based data collection forms that are fully completed	At all sentinel sites, over 80 per cent of tested cases have fully completed swab forms.
II – III	Per cent of sentinel specimens shipped on time	Over 80 per cent of sentinel specimens are submitted on time according to standard operating procedures /national shipment protocols.
III	Per cent of weeks that aggregate data are received at national level during influenza season	During 90 per cent of weeks aggregate data collection forms are received at the national level from every sentinel site during influenza season.
III	Per cent aggregate data collection forms that are complete	At each sentinel site, over 90 per cent of submitted aggregate data report forms are complete.
III	Number of months that case-based data are received at the national level during influenza season	During each month of influenza season, case-based data are received at the national level from every sentinel site.
III – IV	Per cent of sentinel specimens received in good condition according to the confirmatory laboratories	<p>Over 90 per cent of sentinel specimens received at the responsible laboratories are received in good condition and in appropriate packaging.</p> <p>Over 90 per cent of sentinel specimens tested by PCR have a positive internal control (RNaseP (RNP) primer and probe set which targets the human RNase P gene and thus serves as an internal positive control for human nucleic acid).</p>
III – IV	Time from specimen collection to laboratory confirmation	The median time from specimen collection to obtaining PCR results is 7 days or less.
III – IV	Timeliness of data presented in weekly influenza surveillance reports	<p>Aggregate data from sentinel sites appear in the weekly surveillance bulletin during the same surveillance week that they are received at the national level.</p> <p>PCR results from sentinel surveillance appear in the weekly surveillance bulletin during the same surveillance week that the results are available from the national influenza laboratory.</p>

IV	Per cent of weeks where a national weekly surveillance bulletin is produced during influenza season	Not more than one week is missed in the production of a national weekly influenza surveillance bulletin during influenza season (weeks 40 – 20).
IV	Timeliness of a national weekly surveillance bulletin during influenza season	In over 90 per cent of weeks the weekly bulletin is produced by a stated weekly deadline.
IV	Timeliness of analysis of case-based data from SARI swab form for laboratory-confirmed influenza cases	At least two times per season case-based data for laboratory-confirmed influenza cases are analysed descriptively.
IV	Annual influenza report produced	An annual summary of combined epidemiological and virological sentinel surveillance data is produced by week 25 of every year.
IV–V	Timeliness of receipt of electronic weekly influenza surveillance bulletins by clinicians at sentinel sites	Over 90 per cent of weekly bulletins received by clinical and surveillance staff at sentinel sites are received within one week of national publication.
V	Per cent of weeks that national sentinel surveillance data are reported to a regional influenza surveillance platform	The national surveillance centre does not miss more than a single week of epidemiological data submission to the regional influenza surveillance platform during influenza season. The national influenza laboratory does not miss more than a single week of virological data submission to the regional influenza surveillance platform during influenza season.
V	Per cent of weeks that sentinel sites receive a national weekly surveillance bulletin during influenza season	Not more than one week is missed in the receipt of a national weekly influenza surveillance bulletin by sentinel sites during influenza season (weeks 40 – 20).
V	Dissemination of annual influenza surveillance report to vaccine policy-makers	The annual influenza summary, highlighting priority risk groups and impacted ages, is presented to national immunization technical advisory groups and other policy-makers by the national surveillance focal point on an annual basis.

9.3 Evaluating the surveillance system

A more comprehensive surveillance system evaluation should be done one to two years after initial implementation of the surveillance system and then prior to any system expansion. Tools for evaluating public health surveillance systems are available publicly.⁵⁸

Annex 1. Establishing epidemic thresholds

Influenza virus circulation varies by region and climate. In temperate regions there are clear seasonal variations in the occurrence of influenza, with a peak in the winter months. In the tropics seasonality is less defined, as there may be multiple peaks in influenza activity and a variable background of influenza activity throughout the year.

Influenza winter baseline (or pre-epidemic) and epidemic threshold levels have been established by some countries with sentinel influenza surveillance systems. The influenza winter baseline has been defined as the level of influenza activity that is typically seen during the influenza epidemic season (weeks 40 to 20) but outside of the epidemic period. The epidemic threshold is a value that signals a substantial increase in activity beyond winter baseline levels. Most epidemic periods within the influenza season last 6–12 weeks in a given country. Occasionally, perhaps 1 in 10 winters, influenza activity does not exceed the epidemic threshold.

When observed influenza activity rises above the epidemic threshold, this indicates that the seasonal epidemic has started. An epidemic threshold is important as it provides an alert to indicate the onset of the influenza season. This alert can trigger public health action, such as the timely initiation of precautionary measures in vulnerable populations, and can stimulate case detection, clinical diagnosis and timely treatment with antiviral medications. The epidemic threshold is intended to be conservative as the objective is to be sure that the influenza epidemic has started when this information is communicated to the health professionals and the public.

Methods for establishing epidemic thresholds in influenza surveillance are diverse and vary between simple methods such as 'eye-balling' (i.e. drawing a line on the graph of ILI/ARI activity over time based on historical observations) and more sophisticated mathematical models or Serfling regression models.⁵⁹ Most of these models are based in time-series methods and they use either virus isolations or other subjective criteria (manual removing) to establish epidemic threshold values.

To improve harmonization of data reporting, a standard method to calculate the epidemic threshold is useful. For countries in Europe, a method has been developed by Vega and Lozano et al. This method has been used since 2003 in Spain with reliable results. A modified approach named "Moving Epidemic Method (MEM)" has been suggested to implement for systematic use in European countries.^{60,61} Countries in Europe generally have robust data from integrated clinical and virological surveillance. For the MEM weekly ILI or ARI rates, preferably 5–10 years of historical data are used. Rates can be provided by per 100 000 population or 10 000 population or by percentage of encounters.

The MEM basically consists of three steps:

First, each influenza season is mathematically divided into a pre-epidemic (winter baseline), epidemic and a post-epidemic period (see Box A-1 below).

Second, the proposed epidemic threshold is calculated. A conservative epidemic threshold is the upper 95% confidence limit of the arithmetic mean of the peak pre-epidemic values (e.g. a total of 25-30 values are included when data are available for five seasons, using a total of five to six values for each of the seasons).

Third, a typical influenza curve of ILI/ARI cases over time is estimated based on the historical curves. This estimation is performed separately from the abovementioned steps and its main purpose is to present a visual summary of the historical curves in one graph. Complementary epidemic intensity could be determined by the geometric mean confidence intervals at different levels (50, 90, 95, 99%) using the standard deviation of the epidemic weekly rates of all selected historical seasons.

These calculations can be automated. This particular method is developed in such a way that it can be applied to different countries, irrespective of their reporting weeks (e.g. not all countries report over weeks 40-20 in the temperate regions of the northern hemisphere) or whether they report ILI or ARI. The method can also accommodate some missing rates across seasons. The MEM program was made available in November 2010 as an R package and details can be found in the CRAN (Comprehensive R Archive Network) library on: <http://cran.r-project.org/web/packages/mem/mem.pdf>. More information can also be provided by the developers in Spain (Vegaloto@jcyl.es).

Box A-1. Key terms used in baseline and epidemic threshold calculation:

- **Winter Baseline:** a reference value reflecting the weekly ILI/ARI consultation rates that are typically seen within the influenza season, but outside the epidemic period – It is defined as the arithmetic mean of the highest pre-epidemic weekly rates from each historical season.
- **Pre-epidemic (winter baseline) period:** the weeks within the influenza season before the epidemic
- **Epidemic threshold:** a value that demarcates the start of the influenza epidemic – As soon as a weekly rate is higher than this threshold, the epidemic is considered to have started. It is defined as the upper limit of a one tailed confidence interval of the baseline.
- **Epidemic period:** the weeks within the influenza season in which the epidemic occurs (i.e. the weekly consultation rates are above the ‘epidemic threshold’)
- **Incidence rates:** the number of ILI/ARI consultations or episodes (i.e. an episode of one person can consist of more than one consultation for ILI/ARI) per 100 000 per week)
- **The influenza season:** The calendar weeks during which influenza is most likely to circulate at detectable levels (by sentinel surveillance systems) based on historical knowledge – For countries in the temperate zones of the northern hemisphere this means the period from week 40 through week 20 in the next calendar year.
- **Post-epidemic period:** the weeks within the influenza season after the epidemic period (i.e. the weekly consultation rates decrease below ‘epidemic threshold’)

Countries may choose to use additional methods to define baseline and epidemic thresholds at the national level. However to improve harmonization and presentation of data on the regional

or global level the MEM will be used to calculate a standard epidemic threshold for presentation on regional surveillance platforms.

Annex 2. Method for collection of respiratory specimens

Materials required:

1. Personal protective equipment (PPE):
 - PPE should be used according to national or local guidelines and will depend on the clinical setting and whether cases of SARI or ILI/ARI are being sampled.
2. Swabs:
 - Use only sterile dacron or rayon swabs with plastic shafts (see picture below).
 - Calcium alginate or cotton swabs, or swabs with wooden sticks, should not be used because they may contain substances that inactivate some viruses and inhibit PCR testing.



example of
a swab

3. Tongue depressor (for the collection of throat swabs)



Example of a tongue
depressor

4. Plastic vials:
 - e.g. cryovial able to accommodate 2-3 ml of VTM
 - should be able to withstand temperatures of -70°C to -180°C (liquid nitrogen)
5. Viral Transport Media (VTM):
 - Plastic vials containing 2–3 ml of VTM should be purchased ready made or prepared by the national influenza laboratory.
 - These should be readily available and be pre-positioned at sentinel hospitals and outpatient facilities for the collection of specimens from cases of SARI and ILI or ARI, respectively.
 - VTM can be obtained commercially (e.g. Minimum Essential Medium Eagle).⁶²
 - Alternatively, VTM can be prepared by the lab. A suitable VTM for use in collecting throat and nasal swabs from human patients is prepared as follows:
 - Add 10g veal infusion broth and 2g bovine albumin fraction V to 400 ml sterile distilled water.
 - Add 0.8 ml gentamicin sulfate solution (50 mg/ml) and 3.2 ml amphotericin B (250 $\mu\text{g}/\text{ml}$).

- Sterilize by filtration.
- VTM prepared in this way can be stored unopened in the dark at room temperature for up to one year.

6. Indelible and alcohol resistant marker pen.

Collection of nasal and throat swabs:

Standard precautions should always be followed (i.e. hand hygiene and barrier protections applied if appropriate – see above). When taking nasal or throat swabs, the swabs must be held correctly. They should be held between the thumb and the first and second fingers with the shaft protruding beyond the web of the thumb (like a pencil) (Fig. A-1) and not between the thumb and forefinger with the base in the palm of the hand (Fig. A-2). The main reason for this is that if the patient makes a movement in reaction to the swabbing, the swab will slide out of harms way if held the first way (Fig. A-3 with the patient represented by the open gloved hand of the operator) but not if held in the second way (Fig. A-4). In this case discomfort would be caused and the patient could be injured. In addition, control over the swab is much greater if it is held correctly.

Fig. A-1. Swab held correctly



Fig. A-2. Swab held incorrectly



Fig. A-3. Correctly held swab can slide out of harms way



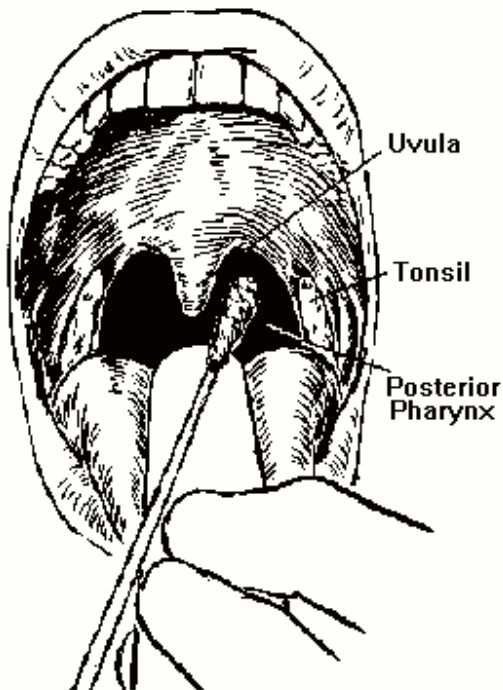
Fig. A-4. Incorrectly held swab can injure the patient



Collection of posterior pharyngeal swabs (throat swabs):

1. Hold the swab and with a sweeping motion, swab the posterior pharyngeal wall and tonsillar pillars (Fig. A-5).
 - Have the subject say “aahh” to elevate the uvula.
 - Hold the tongue out of the way with a tongue depressor (N.B. this procedure can induce the gag reflex).
 - Avoid swabbing the soft palate and do not touch the tongue with the swab tip.
2. Place the swab immediately into a sterile vial containing VTM.
3. Break the applicator stick off near the tip to permit closure of the lid. Plastic swab handles usually have a weak point in them to allow them to be broken off for insertion into a specimen tube. Others have a handle made of a brittle plastic that will snap easily. If the shaft cannot easily be broken off so that it is short enough to fit into a small tube, such as a cryovial, it will have to be cut. To do this:
 - Cut the shaft with scissors, taking care not to touch the tip.
 - Allow the tip to slide into the VTM and then cap the tube (do not let cut portions of the bag or wrap fall into the tube).
 - Sterilize the cutting edge of the scissors by the use of flame (e.g. by the use of a spirit burner, a Bunsen burner or another suitable heat source).
 - Allow scissors to cool before reuse.
4. Label the specimen container (the cap should not be marked, as it may get switched during handling) with:
 - the unique identifier
 - the specimen date
 - the type of specimen in the tube (e.g. nasal swab, throat swab etc.).

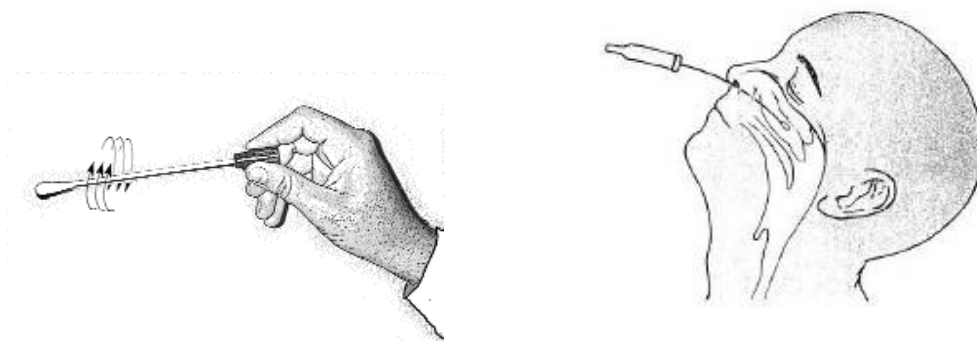
Fig. A-5. Throat swab collection:



Collection of anterior nasal swab:

1. Use the same type of rigid swab as for sampling from the throat. Advance the swab tip past the vestibule (anterior nares) to the nasal mucosa (approximately 2–3 cm from the nostrils in adults) and gently rotate to collect nasal secretions from the anterior portions of the turbinate and septal mucosa (Fig. A-6).
2. Insert a swab into the nostril parallel to the palate.
3. Leave the swab in place for a few seconds to absorb secretions.
4. Swab both nostrils with the same swab.
5. Place the swab immediately into the sterile vial containing VTM and the throat swab.
6. Break the applicator stick off near the tip to permit tightening of the cap (see above).

Fig. A-6. Nasal swab collection



Annex 3. Sentinel surveillance system review tools

As an attachment to this guidance please find sentinel site review tools for national surveillance administrators.

Purpose of the tool: This goal of these surveillance review tools are to assist in the systematic, standardized review of influenza sentinel site surveillance systems and to provide a guide for identifying problems and designing solutions to provide support. The specific objectives of these tools include:

- to provide a guide to epidemiologists, as well as other national counterparts, for conducting site visits and assessing surveillance operations;
- to obtain a clear understanding of the structure of the surveillance system as developed, while identifying both strengths and opportunities for improvement; and
- to assess basic performance indicators in order to provide quality technical assistance, feedback, and recommendations for changes in order to achieve system goals.

Application and administration: These tools include a tool that can provide an overview of influenza-related surveillance systems at the national level. This includes a cursory review of laboratory systems but is not intended as a tool to comprehensively evaluate laboratory capacity. Also included are ILI/ARI and SARI sentinel site visit tools. Administration of the tools does not require question-by-question adherence, but all applicable questions should be answered in the course of a review. These tools were designed for use in many different countries and not all questions will be applicable in all situations. They are meant to be used at all levels of a surveillance system, from an assessment of the national surveillance administration and oversight, to an assessment of the site-level functionality.

**INFLUENZA SURVEILLANCE REVIEW
NATIONAL OVERVIEW**

1. Country: _____
- a. Date of interview: _____
- b. Name of interviewer: _____
- c. Organization: _____
- d. Person(s) interviewed: (Name/Institute/Position or Area of responsibility):

General Information

2. What kind of influenza/respiratory disease surveillance systems are currently operating, for how long, and who is responsible for their operation and oversight?

Type of surveillance system	System in operation? (Y N UNKNOWN)	Year started	List ministry/group responsible for activities
a. ILI sentinel site		h.	o.
b. ILI non-sentinel		i.	p.
c. ARI sentinel site		j.	q.
d. ARI non-sentinel		k.	r.
e. SARI sentinel site		l.	s.
f. Event-based or outbreak		m.	t.
g. Other:		n.	u.

3. Please list the main central/national level focal point for operation of each system?

Type of surveillance system	Focal point
a. ILI sentinel site	
b. ILI non-sentinel	
c. ARI sentinel site	
d. ARI non-sentinel	
e. SARI sentinel site	
f. Event-based or outbreak	
g. Other:	

4. Do the surveillance systems share their data and at least some of the specimens with the influenza national laboratory and epidemiological unit responsible for the national influenza program?

Type of surveillance system	Share clinical/epidemiological data? (Y N UNKNOWN)	Share laboratory data? (Y N UNKNOWN)
a. ILI sentinel site		h.
b. ILI non-sentinel		i.
c. ARI sentinel site		j.
d. ARI non-sentinel		k.
e. SARI sentinel site		l.
f. Event-based or outbreak		m.
g. Other:		n.

- o. Do all of the systems above share some or all of their specimens with national surveillance laboratory?*

Circle one: Y N UNKNOWN

- p. Do all of the systems above share clinical and/or epidemiologic data with national surveillance staff?*

Circle one: Y N UNKNOWN

5. Can epidemiologic data, specimens and test results be tracked separately for ILI, ARI and SARI?

Circle one: Y N UNKNOWN

- a. *If no – please explain why not:*

National Data Aggregation & Analysis

6. Are data from different surveillance systems maintained in different databases?

Circle one: Y N UNKNOWN

- a. *If no – how are the databases structured?*

7. How frequently are site-level data compiled and analysed at the national level?

Circle one: Never Weekly Monthly Yearly Other: _____

- a. Who analyses the data?

8. Is a report describing national influenza activity produced at the national (central) office using data received from participating sites?

Circle one: Y N UNKNOWN (If No or UNKNOWN, go to question 11)

a. <i>If yes, with whom is this report shared?</i>
--

9. In which form(s) is this report published?

Format	Y N UNKNOWN	
a. Web site		f. <i>Web site url:</i>
b. E-mail newsletter		g.
c. E-mail listserv		h.
d. Paper reports by post		i.
e. Other		j. <i>list:</i>

10. Which of the following analyses/charts are included in this report?

(If a report is available, please request a copy)

Analyses/Charts	Y N UNKNOWN	Comment:
a. SARI admissions/all-cause hospital admissions		l.
b. SARI admissions/100,000 population		m.
c. Flu (+) SARI specimens/Total SARI specimens tested		n.
d. ILI consultations/100,000 population		o.
e. ILI consultations/all out-patient consultations		p.
f. ARI consultations/100,000 population		q.
g. ARI consultations/all out-patient consultations		r.
h. Flu (+) ILI specimens/Total ILI specimens tested		s.
i. Flu (+) specimens by type & sub-type		t.
j. Any of the data listed above by age group		u.
k. Other?		v. <i>Please specify:</i>

w. How frequently is this report prepared?

Circle one: Weekly Monthly Yearly Other: _____

11. Has the national surveillance system calculated a baseline threshold for ILI?

Circle one: Y N UNKNOWN

a. *If yes, how is this baseline calculated?*

12. Has the national surveillance system calculated a baseline threshold for ARI?

Circle one: Y N UNKNOWN

a. *If yes, how is this baseline calculated?*

13. Has the national surveillance system calculated a baseline threshold for SARI?

Circle one: Y N UNKNOWN

a. *If yes, how is this baseline calculated?*

14. Do members of the national surveillance staff use a set of any other indicators to identify abnormal influenza activity based on data (ILI/ARI and/or SARI) submitted by participating sites?

Circle one: Y N UNKNOWN

a. *If yes, what are these indicators and how are they calculated?*

15. Is the surveillance data used to determine the start of the influenza season?

Circle one: Y N UNKNOWN

a. *If yes, how is this determined?*

16. Is the surveillance data used to determine the intensity of influenza activity for EuroFlu?

Circle one: Y N UNKNOWN

a. *If yes, how is this determined?*

17. Is the surveillance data used to determine the geographic spread of influenza activity for EuroFlu?

Circle one: Y N UNKNOWN

a. *If yes, how is this determined?*

18. Is the surveillance data used to determine the impact of severe hospitalized influenza for EuroFlu?

Circle one: Y N UNKNOWN

a. *If yes, how is this determined?*

19. Are there any other routine uses of the surveillance data?

Circle one: Y N UNKNOWN

a. *If yes, please describe?*

20. Is there a mechanism to notify senior leadership if abnormal activity is noted by the surveillance system?

Circle one: Y N UNKNOWN

a. *If yes, please describe?*

**SARI OR HOSPITALIZED SEVERE INFLUENZA
NATIONAL OVERVIEW**

Please complete if different from details provided on page 1):

1. Name of interviewer _____
- a. Date of interview: _____
- b. Organization: _____
- c. Person(s) interviewed: (Name/Institute/Position or Area of responsibility):

General Information

2. How many sentinel SARI sites are currently functioning? In what type of facilities are these sites located?

Type of facility	No of sites	Level of care 1°, 2°, 3°	Public or Private
a. Paediatric hospital		g.	m.
b. General hospital		h.	n.
c. Infectious disease hospital		i.	o.
d. Chest clinic/respiratory disease hospital		j.	p.
e. Specialty clinic/referral facility		k.	q.
f. Other: <i>(please describe)</i>		l.	r.

s. What were the criteria used for selecting these sites?

3. Do these sites provide a nationally representative sampling of the following:

Criteria	Y N UNKNOWN	Please explain:
a. Age		g.
b. Sex		h.
c. Ethnicity		i.
d. Socio-economic status		j.
e. Risk factors/chronic disease		k.
f. Geography		l.

m. Is participation in the sentinel surveillance program voluntary for each site?

Circle one: Y N UNKNOWN

n. Are any incentives provided from the national level to the site for undertaking surveillance activities?

Circle one: Y N UNKNOWN

o. *If yes, please describe?*

4. Does each site have surveillance focal points/staff to oversee surveillance activities?

Circle one: Y N UNKNOWN

a. *If yes, please describe their duties and responsibilities:*

b. Are the surveillance staff members given an incentive by the surveillance program?

Circle one: Y N UNKNOWN

c. *If yes, what are those incentives? (e.g. salary, stipend, training materials)*

5. Has a national protocol for SARI surveillance or a set of standard operating procedures (SOPs) been developed?

Circle one: Y N UNKNOWN

a. *If yes, when was it last updated?*

b. Does the protocol include defined objectives for the surveillance system?

Circle one: Y N UNKNOWN

c. *If yes, what are the objectives:*

d. Has a copy of the protocol been implemented at each sentinel surveillance site?

Circle one: Y N UNKNOWN

e. Have the staff members at all sites been trained in implementation of the protocol?

Circle one: Y N UNKNOWN

6. How frequently does the protocol stipulate that the site-level staff members are trained in each of the following: (e.g. one time, annually, bi-annually, etc.):

Training type	Frequency	Training in last 12 months? Y/N
a. Application of standard SARI case definition & identification of cases		f.
b. Case sampling & enrollment procedures		g.
c. Specimen collection, storage and shipment		h.
d. Completion of specimen collection and clinical/epidemiologic data forms		i.
e. Recording & reporting of aggregate weekly hospital admissions, SARI admissions, patient enrollment, etc.		j.

Standards for SARI Case Detection

7. What is the case definition in use for SARI?

a. Adults:

b. Children:

c. Does the case definition specify a period of symptom onset?

Circle one: Y N UNKNOWN

d. *If yes, what is that time period?*

e. Are any other exclusion criteria in use?

Circle one: Y N UNKNOWN

f. *If yes, what are they?*

8. Please describe the method for screening of SARI cases?

- a. Does this method detect only patients who present with SARI upon admission (e.g. would exclude patients that develop SARI after admission)?
Circle one: Y N UNKNOWN

Standards for Epidemiologic Data Collection

9. Does the protocol indicate that ALL SARI cases should have a specimen collected?
Circle one: Y N UNKNOWN

- a. If not all cases are enrolled, does the protocol include a standard sampling scheme?
Circle one: Y N UNKNOWN

b. *If yes (a standard sampling scheme is used), please describe the sampling scheme:*

- c. *Given this information: is the sampling scheme random?*
Circle one: Y N UNKNOWN

d. *If no, please describe how this sampling scheme might bias the data collected:*

10. Does the protocol include a standard SARI case-based report form?
Circle one: Y N UNKNOWN
If available, please obtain a copy of that form.

11. Does the protocol include a standard aggregate SARI reporting form?
Circle one: Y N UNKNOWN

12. Does the protocol specify each site should keep a log/record of all SARI cases detected?
Circle one: Y N UNKNOWN

13. Does the protocol specify that sites should keep a log/record of all hospital admissions?
Circle one: Y N UNKNOWN

14. Does the standard method of recording SARI data include outcome (discharged, death, ventilation)?
Circle one: Y N UNKNOWN

Standards for Respiratory Specimen Collection, Storage and Transport

15. Does the protocol include a standard laboratory specimen collection form to be used at all surveillance sites?
Circle one: Y N UNKNOWN

If available, please obtain a copy of that form.

16. Does the protocol include standard operating procedures (SOPs) requirements for the following task (*circle one*):

- a. Specimen collection Y N UNKNOWN
- b. Specimen packaging Y N UNKNOWN
- c. Specimen storage Y N UNKNOWN
- d. Specimen transport Y N UNKNOWN

e. If yes to any of the above, how frequently are site level staff members trained in these methods?

Circle one: Never 2-4 times/ year Yearly Other _____

17. Please describe the specimen collection, storage and transport SOPs outlined in the national protocol.

18. How often are sites required to send specimens to the national laboratory for testing?

Circle one:

≥2X/Week Weekly Bi-Weekly Monthly Other _____

19. Are sites required to keep a log of total specimens collected?

Circle one: Y N UNKNOWN

Standards for Data Management, Analysis and Quality

20. Does the national protocol include standard methods for linking laboratory specimens to case-based data forms?

Circle one: Y N UNKNOWN

21. Please describe the method used to merge laboratory results with case-based data at the national level?

22. Please list who is responsible for SARI data management at the national level?

Name / Position or Title / Institute or Organization

23. How frequently are SARI data collected at the sites submitted to the national level?

Circle one:

≥2X/Week Weekly Bi-Weekly Monthly Other _____

- d. Are those documents shared with sites?
Circle one: Y N UNKNOWN

32. Do the national surveillance staff members monitor the quality and completeness of epidemiologic data received from each of the sites?
Circle one: Y N UNKNOWN
If no – skip to question 33.

a. Please explain how the epidemiologic data quality is monitored?

b. How frequently is quality/completeness monitored?

c. How frequently are those quality findings/comments reported back to sites?

- d. Is an indicator checklist used to monitor quality and completeness?
Circle one: Y N UNKNOWN
(If yes, please obtain a copy of the checklist)

- e. Are feedback and recommendations from these findings given to sites individually?
Circle one: Y N UNKNOWN

f. If so, how frequently are such feedback and recommendations provided?

33. Do national surveillance staff members follow up with sites when timely submissions of aggregate data are not received?
Circle one: Y N UNKNOWN

34. On average, what proportion of SARI sites submits surveillance data by the due date on a weekly basis?

35. Do national laboratory staff members follow up with sites when specimens are not received on a timely basis?
Circle one: Y N UNKNOWN

36. On average, what proportion of SARI sites submits their respiratory specimens by the due date on a weekly basis?

ILI NATIONAL OVERVIEW

General Information

1. How many sentinel ILI sites have been established and in what type of facilities?

Type of facility	No of sites	Public or Private
a. Polyclinics		h.
b. General practitioner clinics		i.
c. Paediatric hospital OPD		j.
d. General hospital OPD		k.
e. Infectious disease hospital OPD		l.
f. Paediatric Outpatient Clinic		m.
g. Other: <i>(please describe)</i>		n.

o. What were the criteria used for selecting these sites?

Do these sites provide a nationally representative sampling of the following:

Criteria	Y N UNKNOWN	Please explain:
p. Age		v.
q. Sex		w.
r. Ethnicity		x.
s. Socio-economic status		y.
t. Risk factors/chronic disease		z.
u. Geography		aa.

bb. Are any incentives provided by the surveillance program for undertaking surveillance activities at the site level?

Circle one: Y N UNKNOWN

cc. <i>If yes, what are those incentives?</i>

2. Does each site have surveillance focal points/staff to oversee surveillance activities?

Circle one: Y N UNKNOWN

a. Are those surveillance staff members given an incentive by the surveillance program?

Circle one: Y N UNKNOWN

b. *If yes, what are those incentives? (e.g. salary, stipend, training material)*

c. *Please list the position/titles and qualifications of the staff members overseeing surveillance activities:*

d. *Please describe the duties and responsibilities of site surveillance staff:*

3. Has a national protocol for ILI surveillance or a set of standard operating procedures (SOPs) been developed?

Circle one: Y N UNKNOWN

a. *If yes, when was it last updated?*

b. Does the protocol include defined objectives for the surveillance system?

Circle one: Y N UNKNOWN

c. *If yes, what are the objectives:*

d. Has a copy of the protocol been implemented at each sentinel surveillance site?

Circle one: Y N UNKNOWN

e. Have the staff members at all sites been trained in implementation of the protocol?

Circle one: Y N UNKNOWN

4. How frequently does the protocol stipulate that the site-level staff members be trained in each of the following: (e.g. one time, annually, bi-annually, etc.):

Training type	Frequency	Training in last 12 months? Y/N
a. Application of standard ILI case definition & identification of cases		f.
b. Case sampling & enrollment procedures		g.
c. Specimen collection, storage and shipment		h.
d. Completion of specimen collection and clinical/epidemiologic data forms		i.
e. Recording & reporting of aggregate weekly number of ILI patients, total clinic visits/consultations, etc.		j.

Standards for ILI Case Detection

5. What is the case definition in use for ILI?

- a. Does the case definition specify a period of symptom onset?

Circle one: Y N UNKNOWN

- b. *If yes, what is that time period?*

- c. Are any other exclusion criteria in use?

Circle one: Y N UNKNOWN

- d. *If yes, what are they?*

6. Does the protocol define a sampling method for the enrollment of ILI cases and collection of specimens?

Circle one: Y N UNKNOWN

- a. *If yes, please describe this sampling method?*

b. Given this information: is the sampling scheme random?

Circle one: Y N UNKNOWN

c. If no, please describe how this sampling scheme might bias the data collected:

Standards for Epidemiologic Data Collection

7. Does the protocol include a standard ILI case report form to be used at every site?

Circle one: Y N UNKNOWN

If available, please obtain a copy of that form.

8. Does the protocol specify that sites keep a log/record of all ILI cases detected?

Circle one: Y N UNKNOWN

a. Does the protocol specify that sites keep a log/record of all ILI specimens collected?

Circle one: Y N UNKNOWN

b. Does the protocol specify that sites keep a log/record of all clinic visits?

Circle one: Y N UNKNOWN

9. Does the protocol include a standard aggregate ILI reporting form?

Circle one: Y N UNKNOWN

If available, please obtain a copy of the form

10. Does the protocol specify that sites keep a log/record of all ILI cases detected

Circle one: Y N UNKNOWN

Standards for Respiratory Specimen Collection, Storage and Transport

11. Does the protocol include a standardized swab collection form to be used at all sentinel surveillance sites?

Circle one: Y N UNKNOWN

If available, please obtain a copy of the form.

12. Does that protocol include standard operating procedures (SOPs) for the following:

Circle one:

a. Specimen collection Y N UNKNOWN

b. Specimen packaging Y N UNKNOWN

c. Specimen storage Y N UNKNOWN

d. Specimen transport Y N UNKNOWN

e. If yes to any of the above, how frequently are site level staff members trained in these methods?

Circle one: Never 2-4 times/ year Yearly Other _____

13. Please describe the specimen collection, storage and transport SOPs outlined in the national ILI protocol:

14. How often are sites required to send ILI specimens to the national laboratory for testing?

Circle one:

≥2X/Week Weekly Bi-weekly Monthly Other _____

15. How many total ILI specimens is the surveillance system designed to handle per day/week during the influenza season?

Standards for Data Management, Analysis and Quality

16. Does the national protocol include standard methods for linking laboratory specimens to case-based data forms?

Circle one: Y N UNKNOWN

17. Are laboratory results merged with case-based data at the national level?

Circle one: Y N UNKNOWN

a. If yes, please describe the method used to merge laboratory results with case-based data at the national level? (e.g. what is the unique identifier)

18. Please list who is responsible for ILI data management at the national level? (Name / Position or Title / Institute or Organization)

19. How frequently are ILI data summarized at the sites and submitted to the national level?

Circle one:

≥2X/Week Weekly Bi-weekly Monthly Other _____

20. Please indicate how frequently (e.g. not performed, weekly, bi-weekly, monthly, etc.) the following data are summarized at the national level and summarized by the sites?

Data type	National level	By site
a. All ILI consultations		e.
b. All sampled ILI consultations		f.
c. All clinic consultations		g.

d. Flu +ve ILI specimens		h.
--------------------------	--	----

- a. Are the data stratified by age?
Circle one: Y N UNKNOWN

b. *If yes, please describe the age groups:*

Note if these are different from EUROFLU

21. Please indicate the frequency the following analyses are performed at the national level and by site (e.g. not performed, weekly, bi-weekly, monthly, etc.)?

Data type	National level	By site
a. Population based rate ILI consultations		g.
b. Population based rate Flu (+) ILI cases		h.
c. % ILI/All clinic consultations		i.
d. % Flu (+) ILI/ILI consultations		j.
e. Graph ILI cases by week		k.
f. Graph Flu (+) ILI cases by week		l.

22. Are the national ILI trends routinely observed and interpreted?

Circle one: Y N UNKNOWN

a. *If yes, please describe the method used:*

23. Is there a method for identifying aberrations in ILI data at the:

Circle one:

- a. Level of the sentinel site: Y N UNKNOWN
b. National level: Y N UNKNOWN

c. *If yes, please describe the method used:*

National Data Reporting

24. Is a national report on ILI prepared by the national office?

Circle one: Y N UNKNOWN

a. If yes, with what frequency is that report prepared?

Circle one:

Weekly Bi-weekly Monthly Annually Other _____

If yes, do you share this ILI report with the following agency or group:

- | | | | |
|----------------------------------|---|---|---------|
| b. Sentinel Sites | Y | N | UNKNOWN |
| c. Ministry of Health leadership | Y | N | UNKNOWN |
| d. WHO Geneva | Y | N | UNKNOWN |
| e. WHO Europe/EUROFLU | Y | N | UNKNOWN |
| f. WHO Country Office | Y | N | UNKNOWN |
| g. ECDC | Y | N | UNKNOWN |
| h. CDC | Y | N | UNKNOWN |
| i. Animal health authorities | Y | N | UNKNOWN |
| j. Other | Y | N | UNKNOWN |

k. If other, please describe:

National Monitoring of ILI Sentinel Sites

25. Is monitoring and evaluation of ILI sentinel sites included in the national surveillance protocol?

Circle one: Y N UNKNOWN

26. How frequently do national surveillance staff members visit each sentinel site for evaluation, quality control or assessments?

Circle one:

Never Monthly Quarterly Annually Other _____

If site visits are not performed – skip to question 27.

a. Please briefly describe the activities performed on these visits?

b. Are clinic visit records/logbooks examined on site visits to verify that all ILI cases are being identified and documented?

Circle one: Y N UNKNOWN

c. Are feedback and recommendations from these visits documented?

Circle one: Y N UNKNOWN

d. Are those documents shared with sites?

Circle one: Y N UNKNOWN

27. Does national surveillance staff monitor the quality and completeness of epidemiologic data received from each of the sites?

Circle one: Y N UNKNOWN

If no – skip to question 28.

a. Please explain how the epidemiologic data quality is monitored?

b. How frequently is the quality/completeness monitored?

c. How frequently are those quality findings/comments reported back to sites?

d. Is an indicator checklist used to monitor quality and completeness?

Circle one: Y N UNKNOWN

(If yes, please obtain a copy of the checklist)

e. Are feedback and recommendations from these findings given to sites individually?

Circle one: Y N UNKNOWN

f. If so, how frequently are such feedback and recommendations provided?

28. Do national surveillance staff members follow up with sites when timely submissions of aggregate data are not received?

Circle one: Y N UNKNOWN

a. If yes, when does the follow-up occur? (e.g. what is the lag time)

29. On average, what proportion of ILI sites submits surveillance data by the due date on a weekly basis?

30. Do national laboratory staff members follow up with sites when specimens are not received on a timely basis?

Circle one: Y N UNKNOWN

31. On average, what proportion of ILI sites submits their respiratory specimens by the due date on a weekly basis?

**INFLUENZA SURVEILLANCE REVIEW
ILI SITE VISIT**

1. Name of ILI Site/facility: _____
 - a. Date of Interview: _____
 - b. Name and position of staff interviewed: _____

 - c. Name of interviewer and organization: _____

General Information

2. Where is this facility located?
 - a. Country: _____
 - b. Province: _____
 - c. City/Town/Village: _____

3. What year did the site begin to collect data on ILI?

a. When is ILI data collected?

Circle one: All year During the influenza season Other: _____

4. Who is responsible for coordinating surveillance at this site (name/position)?

a. How many surveillance staff members are present at this site?

b. Have these staff members received training in surveillance data and specimen collection from the national level?

Circle one: Y N UNKNOWN

c. *If yes, did they receive training in the last 12 months?*

Circle one: Y N UNKNOWN

d. Are these staff members given an incentive to participate?

Circle one: Y N UNKNOWN

e. *If yes, what is the incentive?*

f. Please describe the surveillance duties assigned to designated surveillance staff:

5. Is the facility?

Circle one: Public Private Other _____

a. What type of facility is this?

Please check one:

- Outpatient clinic/general practitioner
- Polyclinic
- Paediatric clinic
- Infectious Disease Hospital Outpatient Department
- General Hospital Outpatient Department
- Other- _____

6. How many patients does this facility typically see on a weekly basis?

7. Using the information collected, the interviewer should decide if this site likely provides a representative sampling of the following?

Circle one for each criteria and explain your answer:

Criteria	Y N UNKNOWN	Please explain:
a. Age		
b. Sex		
c. Ethnicity		
d. Socio-economic status		
e. Risk factors/chronic disease		

9. Please describe the standard procedure used to screen ILI cases?

a. Does ILI screening occur at all times (24 hrs per day/everyday)?

Circle one: Y N UNKNOWN

b. If no, when are patients screened?

Day	Y N UNKNOWN	Time of day (e.g. morning, afternoon, all day, etc)
1. Monday	c.	j.
2. Tuesday	d.	k.
3. Wednesday	e.	l.
4. Thursday	f.	m.
5. Friday	g.	n.
6. Saturday	h.	o.
7. Sunday	i.	p.

q. Please provide an interpretation of whether the screening procedure might bias the surveillance data collected, including whether there any measures in place to minimize this bias?

10. What is the sampling scheme in use for the collection of ILI specimens?

a. Please provide an interpretation of whether the sampling procedure might bias the surveillance data collected, including whether there any measures in place to minimize this bias?

11. What is the maximum number of specimens that can be handled at this site on one day?

12. What is the maximum number of specimens that can be handled at this site in one week?

13. Does the site have a standard individual report form(s) to record the epidemiological and specimen information (type of specimen collected, laboratory confirmation method, test results) for each ILI case printed, accessible and in use? *(If possible, please obtain a copy of this form(s).)*

Circle one: Y N UNKNOWN

a. *If yes, is the individual case data and specimen data combined on the same form or separate forms?*

Check one: Combined form
 Separate: *Epidemiologic Form and Specimen Form*

14. Does the site have standard aggregate (weekly/monthly, etc.) ILI forms printed, accessible and in use?

Circle one: Y N UNKNOWN

15. Please indicate which of the following items are included on these form(s):

- | | |
|---|-------------|
| a. Case Classification (ARI or ILI) | Y N UNKNOWN |
| b. ID Number | Y N UNKNOWN |
| c. Date of symptom onset | Y N UNKNOWN |
| d. Date of form completion | Y N UNKNOWN |
| e. Date of specimen collection | Y N UNKNOWN |
| f. Patient Unique Identifier | Y N UNKNOWN |
| g. Patient name | Y N UNKNOWN |
| h. Sex | Y N UNKNOWN |
| i. Date of birth or Age (years, months if under 1 year) | Y N UNKNOWN |

VACCINES AND ANITIVIRALS

- | | |
|--|-------------|
| j. Antiviral use in the previous 14 days | Y N UNKNOWN |
| k. Osteltamivir | Y N UNKNOWN |
| l. Zanamivir | Y N UNKNOWN |
| m. Other | Y N UNKNOWN |

n. *Please list other antivirals listed on form:*

- | | |
|---|-------------|
| o. Influenza vaccination for the current season | Y N UNKNOWN |
|---|-------------|

ILI CASE CRITERIA

- | | |
|-------------------------------------|-------------|
| p. Measured fever $\geq 38^{\circ}$ | Y N UNKNOWN |
| q. Cough | Y N UNKNOWN |

LABORATORY SPECIMEN COLLECTED:

r. Nasal swab	Y	N	UNKNOWN
s. Throat swab	Y	N	UNKNOWN
t. Nasopharyngeal swab	Y	N	UNKNOWN
u. Other	Y	N	UNKNOWN
v. Date of receipt at laboratory	Y	N	UNKNOWN

LABORATORY CONFIRMATION METHOD:

w. PCT/RT-PCR	Y	N	UNKNOWN
x. Viral culture	Y	N	UNKNOWN
y. Immunofluorescence (IFA)	Y	N	UNKNOWN
z. Other (test)	Y	N	UNKNOWN

aa. *Please list any other tests listed on the form:*

LABORATORY TEST RESULTS:

bb. Influenza A/H1	Y	N	UNKNOWN
cc. Influenza A/H1(2009)	Y	N	UNKNOWN
dd. Influenza A (H3)	Y	N	UNKNOWN
ee. Influenza A (unsubtyped)	Y	N	UNKNOWN
ff. Influenza A (not subtyped)	Y	N	UNKNOWN
gg. Influenza B	Y	N	UNKNOWN
hh. Other Influenza _____	Y	N	UNKNOWN
ii. Other respiratory pathogens	Y	N	UNKNOWN
jj. Date of testing	Y	N	UNKNOWN

kk. *Please list any other criteria on the form:*

16. Are records/logbooks kept of total clinic visits/consultations?

Circle one: Y N UNKNOWN

17. Are records/logbook kept of ALL patients meeting the criteria for ILI?

Circle one: Y N UNKNOWN

If possible, ask to see a clinic visit logbook with diagnoses.

a. *If yes, is temperature recorded for ALL patients recorded as ILI?*

Circle one: Y N UNKNOWN

b. *Is this record maintained by age or age group?*

Circle one: Y N UNKNOWN

18. Please list some of the common admitting diagnoses for ILI cases (e.g. if facility uses different diagnosis than "ILI", i.e. ICD10 code):

Respiratory Specimen Collection, Packaging, Storage, and Shipment

SAMPLE COLLECTION

19. Are total numbers of specimens collected being recorded?

Circle one: Y N UNKNOWN

20. What types of respiratory specimens are collected in this hospital:

- | | | | |
|------------------------|---|---|---------|
| a. Nasal swab | Y | N | UNKNOWN |
| b. Throat swab | Y | N | UNKNOWN |
| c. Nasopharyngeal swab | Y | N | UNKNOWN |
| d. Other | Y | N | UNKNOWN |

e. Please describe:

21. What staff members are responsible for specimen collection (e.g. nurse, clinician, laboratory technician)?

22. How frequently are these staff members trained in specimen collection and storage methods?

Circle one: Annually Every 6 months Quarterly Other _____

a. When was the last training?

23. Does the site have standard operating procedures for specimen collection, written, accessible and in use? Circle one: Y N UNKNOWN

a. If no, please describe the process used for standardization of the procedures:

24. Does the site have standard specimen collection forms available and in use?

Circle one: Y N UNKNOWN

25. Is this a standard form provided by the national surveillance office/coordinator?

Circle one: Y N UNKNOWN

Personal Protective Equipment (PPE) and Respiratory Sampling Techniques

Ask staff members to demonstrate how respiratory samples are collected at the site and observe whether hand hygiene is performed, etc. If there are no patients to swab, ask staff to describe, step-by-step, the procedure for specimen collection that they routinely follow.

26. Please note which type of PPE was described /used in the demonstration:

- | | |
|-------------------|-------------|
| a. Gloves | Y N UNKNOWN |
| b. Gown/Lab coat | Y N UNKNOWN |
| c. Safety glasses | Y N UNKNOWN |

RESPIRATORY PROTECTION TYPE:

- | | |
|----------------|-------------|
| d. Mask | Y N UNKNOWN |
| e. Respirator | Y N UNKNOWN |
| f. Shoe covers | Y N UNKNOWN |

27. Was hand hygiene performed before specimen collection?

Circle one: Y N UNKNOWN

- | | |
|--|-------------|
| a. Was hand hygiene performed after specimen collection? | Y N UNKNOWN |
| b. Is soap available for hand washing? | Y N UNKNOWN |
| c. Is there adequate water for hand washing? | Y N UNKNOWN |

28. Are specimen collection materials readily available?

Circle one: Y N UNKNOWN

a. *If yes, for how many specimens are materials usually available?*

29. What type of applicators is used for specimen collection (cotton, Dacron/polyester swabs etc.)?

30. Which specimen collection materials are available at the site:
- | | | | |
|--------------------------------------|---|---|---------|
| a. Tongue depressors | Y | N | UNKNOWN |
| b. Specimen swabs | Y | N | UNKNOWN |
| c. Vials containing VTM at 4°C | Y | N | UNKNOWN |
| d. Alcohol/bleach | Y | N | UNKNOWN |
| e. Packaging materials for transport | Y | N | UNKNOWN |

31. Is a unique identifier assigned to the swab/specimen to allow for linkage to swab collection form/clinical/epidemiologic data?

Circle one: Y N UNKNOWN

32. Are there SOPs in place and accessible describing the method to deal with spillage of a sample?

Circle one: Y N UNKNOWN

a. *If yes, have the staff members been trained on these procedures?*

Circle one: Y N UNKNOWN

b. *If trained, has this training occurred in the last 12 months?*

Circle one: Y N UNKNOWN

33. How are laboratory specimens packaged in this facility? (please describe)

a. Is a triple package system used?

Circle one: Y N UNKNOWN

b. Are packaging and shipping materials readily available?

Circle one: Y N UNKNOWN

c. *If yes, please list the materials available:*

d. Are shipping materials returned to the site and reused?

Circle one: Y N UNKNOWN

34. What methods are used to store laboratory specimens in this hospital?

Type of storage used	(Y/ N/UN)	Maximum amount of time (hours/days/months) specimens are stored <u>before</u> being sent for testing for each of the storage methods used
a. Refrigerated		h.
b. Freezer -20		i.
c. Freezer -70		j.
d. Liquid nitrogen		k.
e. Cold pack		l.
f. Ambient temperature		m.
g. Other (please describe):		n.

35. For each storage method used, please indicate if there is a system in place for routine monitoring of the temperature of the samples in storage.

Type of storage used	Temperature monitoring (Y/N/UN/NA)	If Yes, please describe:
a. Refrigerated		
b. Freezer -20		
c. Freezer -70		
d. Liquid nitrogen		
e. Cold pack		
f. Ambient temperature		
g. Other (please describe):		

SPECIMEN TESTING

36. Where is **routine** influenza testing performed?

- Check one: On-site laboratory
 Regional (subnational) laboratory
 Central (national) laboratory

37. What tests are used routinely?

- | | | | |
|------------------------------|---|---|---------|
| a. Rapid-test | Y | N | UNKNOWN |
| b. Immunofluorescence assay | Y | N | UNKNOWN |
| c. PCR (typing) | Y | N | UNKNOWN |
| d. PCR (typing & subtyping) | Y | N | UNKNOWN |
| e. Viral culture | Y | N | UNKNOWN |
| f. Hemmagglutinin inhibition | Y | N | UNKNOWN |
| g. Other | Y | N | UNKNOWN |

h. If yes, please describe:

i. If **routine** testing is performed on-site, how often are specimens tested?

Circle one: Daily Weekly Monthly Intermittently

Other _____

j. If **routine** testing is performed off-site, how often are specimens sent for testing for routine analysis?

Circle one: Daily Weekly Monthly Intermittently Other _____

k. If specimens are **routinely** tested on-site or at the subnational level, how often are specimens sent to the national laboratory for **confirmatory** testing?

Circle one: Daily Weekly Monthly Intermittently Other _____

38. What means are used to transport laboratory specimens to the offsite laboratory? Please describe:

39. Are results of ALL specimens (positive and negative) routinely reported to surveillance coordinator at the site?

Circle one: Y N UNKNOWN

a. *If results are reported to the coordinator, how often are they reported?*

Circle one: Daily Weekly Monthly Intermittently Other _____

b. What is the typical lag time between specimen collection and receipt of results for the coordinator?

40. Are laboratory results reported back to clinicians?

Circle one: Y N UNKNOWN

a. *If yes, what proportion of laboratory results is reported to clinicians?*

b. What is the typical lag time between specimen collection and receipt of results for the clinician?

Data Reporting, Management, Analysis and Quality

REPORTING TO NATIONAL LEVEL

41. What method is primarily used to routinely report/submit information to the national level?

Check one: Web-based system
 E-mail
 FAX
 Text message
 Mail/Post
 Other _____

42. With what frequency is this reporting done?

Circle one: Daily Weekly Annually Never Other _____

43. Is a standard reporting template used?

Circle one: Y N UNKNOWN

DATA MANAGEMENT

44. How are surveillance data stored at the site?

Check all that apply: Electronic file at site
 Web-based system
 Paper forms
 Other _____

If an electronic or web-based system is not used at the site – go to question 45.

a. Which computer program/software is used at the site?

b. How often is data entered into the electronic system at the site?

c. When is data entered into the electronic system at the site? (e.g. every Friday, last day of month)

d. Who is responsible for data entry at the site? (title/position)

45. Is data quality monitored at the site (e.g. records/logbook periodically reviewed to ensure that all ILI cases have been recorded, data base checked for double entries, database with built-in checks to minimize data entry errors, etc.)?

Circle one: Y N UNKNOWN

a. If yes, what methods are used to monitor data quality?

b. If yes, how frequently is data quality monitored?

46. How frequently are actions taken in case of data quality issues?

47. How often are total all-cause admissions tallied at this clinic/OP facility?

- Check all that apply:
- Daily
 - Weekly
 - Monthly
 - Once - at the end of the Influenza Season
 - Other _____

48. Are all-cause admissions tallied by age groups?

- Check one:
- YES
 - NO
 - UNKNOWN

a. If yes, please describe the age groups:

49. Are ILI visits summarized:

- Check all that apply:
- Daily
 - Weekly
 - Monthly
 - Once - at the end of the Influenza Season
 - Other _____

50. Is any other ILI data analysis performed on site?

Circle one: Y N UNKNOWN

a. *If yes, what analysis is performed? (e.g. ILI visits by age and sex)*

51. Is there a method in place for identifying changes in influenza/ILI activity/abnormal respiratory disease activity at the site level (e.g. has a baseline been calculated for this site)?

Circle one: Y N UNKNOWN

a. *If yes, what method(s) were used?*

b. *If a change in activity is observed, to whom is this change reported?*

c. *Which actions will be taken if changes/abnormal ILI activity is observed?*

d. Have any actions been taken in the past 12 months as response to abnormal ILI activity?

Circle one: Y N UNKNOWN

f. *If no activity was taken in response to abnormal ILI activity, why not?*

52. Does the surveillance focal point compile and prepare reports on ILI activity (weekly, monthly, other) at the site level?

Circle one: Y N UNKNOWN

a. If yes, is standard report template used?

Circle one: Y N UNKNOWN

b. With whom are these reports shared?

Check all that apply:

- National level
- Surveillance staff at site
- Local/Regional public health office
- Physicians at surveillance site
- Physicians in county/city/region
- Other _____

53. How often does the site receive data quality feedback from the national level?

Check all that apply:

- Daily
- Weekly
- Monthly
- Once - at the end of the Influenza Season
- Other _____

54. How often do staff members from central level perform sites visits (e.g. to perform quality assurance assessments)?

Check all that apply:

- Daily
- Weekly
- Monthly
- Once - at the end of the Influenza Season
- Other _____

55. Do site staff members receive training updates from the national level in response to data quality issues?

Circle one: Y N UNKNOWN

a. If yes, how often do these trainings take place?

**INFLUENZA SURVEILLANCE REVIEW
SARI SITE VISIT**

1. Name of SARI Site/facility:

- a. Date of Interview: _____
- b. Name and position of staff interviewed: _____

- c. Name of interviewer and organization: _____

General Information

2. Where is this facility located?

- a. Country: _____
- b. Province: _____
- c. City/Town/Village: _____

3. What year did the site begin to collect data on SARI?

a. When is SARI data collected?

Circle one: All year During the influenza season Other: _____

4. Who is responsible for coordinating surveillance at this site (name/position)?

a. How many surveillance staff members are present at this site?

b. Have the staff members received training in surveillance data and specimen collection from the national level?

Circle one: Y N UNKNOWN

c. *If yes, did they receive training in the last 12 months?*

Circle one: Y N UNKNOWN

d. Are these staff members given an incentive to participate?

Circle one: Y N UNKNOWN

e. *If yes, what is the incentive?*

f. Please describe the surveillance duties assigned to designated surveillance staff members:

5. What type of hospital is it?

Circle one: Public Private Other (please describe): _____

a. What is the hospital's area of specialization?

Check one:

- General hospital
 Therapeutic hospital
 Infectious disease hospital
 Paediatric hospital
 Specialty clinic/referral facility
 Other _____

b. What level of care is provided at this hospital?

Check the most appropriate box: Primary care (local, non-referral)
 Secondary (first level of referral)
 Tertiary (highest level of referral)

c. Which wards participate in SARI surveillance? (e.g. ICU, adult medicine, paediatric medicine, maternity ward)

6. How many beds are in this hospital?

Type of bed	No of beds
Non-ICU	a.
ICU	b.

7. Using the information collected, the interviewer should decide if this site likely provides a representative sampling of the following?

Circle one for each criteria and explain your answer:

Criteria	Y N UNKNOWN	Please explain:
a. Age		
b. Sex		
c. Ethnicity		
d. Socio-economic status		
e. Risk factors/chronic disease		

SARI Case Detection

8. What is the case definition in use for SARI?

a. Does the case definition specify a period of symptom onset?

Circle one: Y N UNKNOWN

b. If yes, what is that time period?

c. Are any other exclusion criteria in use?

Circle one: Y N UNKNOWN

d. If yes, what are they?

e. *If possible please ask staff about the SARI case definition and their understanding of it. Provide a description below:*

f. Is the SARI case definition posted and visible to all staff members?

Circle one: Y N UNKNOWN

9. Please describe the standard procedure used to screen SARI cases?

a. Does SARI screening occur at all times (24 hrs per day/everyday)?

Circle one: Y N UNKNOWN

b. *If no, when are patients screened?*

Day	Y N UNKNOWN	Time of day (e.g. morning, afternoon, all day, etc)
1. Monday	c.	g.
2. Tuesday	d.	k.
3. Wednesday	e.	l.
4. Thursday	f.	m.
5. Friday	g.	n.
6. Saturday	h.	o.
7. Sunday	i.	p.

q. Does this method detect only patients who present with SARI upon admission (e.g. would exclude patients that develop SARI after admission)?

Circle one: Y N UNKNOWN

r. *Please provide an interpretation of whether the screening procedure might bias the surveillance data collected, including whether there any measures in place to minimize this bias?*

10. Does this site collect severity indicators and final outcome for SARI patients detected by the surveillance system?

- | | | | |
|-------------------------------------|---|---|---------|
| a. ICU admission | Y | N | UNKNOWN |
| b. Ventilator use | Y | N | UNKNOWN |
| c. Final outcome (death, discharge) | Y | N | UNKNOWN |

d. *If yes to any above, where is this information recorded?*

11. Does the site have standard aggregate SARI forms accessible and in use?

Circle one: Y N UNKNOWN

12. Is a record of total SARI cases maintained, regardless of enrollment/sample collection?

Circle one: Y N UNKNOWN

a. *If yes, is this record maintained by age or age group?*

Circle one: Y N UNKNOWN

b. *Are records/logbooks of total all-cause hospital admissions kept?*

Circle one: Y N UNKNOWN

13. Does the site have a standard individual report form(s) to record epidemiological and specimen information (type of specimen collected, laboratory confirmation method, test results) for each SARI case, accessible and in use? *(If possible, please obtain a copy of this form(s).)*

Circle one: Y N UNKNOWN

a. If yes, is the individual case data and specimen data combined on the same form or separate forms?

Check one: Combined form

Separate: Epidemiologic Form and Specimen Form

14. Please indicate which of the following items are included on the form(s):

- | | | | |
|--------------------------------|---|---|---------|
| a. ID Number | Y | N | UNKNOWN |
| b. Date of symptom onset | Y | N | UNKNOWN |
| c. Date of form completion | Y | N | UNKNOWN |
| d. Date of hospital admission | Y | N | UNKNOWN |
| e. Date of specimen collection | Y | N | UNKNOWN |

IDENTIFICATION

f. Patient Unique Identifier Y N UNKNOWN
g. Patient name Y N UNKNOWN
h. Sex Y N UNKNOWN

If Female

i. Pregnancy status Y N UNKNOWN
j. Post-partum (up to 6 weeks) Y N UNKNOWN
k. Age or date of birth (years, months if under 1 year) Y N UNKNOWN
l. Contact telephone number Y N UNKNOWN

CHRONIC MEDICAL CONDITIONS:

m. Chronic respiratory disease Y N UNKNOWN
n. Asthma Y N UNKNOWN
o. Diabetes Y N UNKNOWN
p. Chronic cardiac disease Y N UNKNOWN
q. Chronic renal disease Y N UNKNOWN
r. Chronic liver disease Y N UNKNOWN
s. Chronic neurological impairment Y N UNKNOWN
t. Immuno-compromised (incl. HIV+/AIDS) Y N UNKNOWN
u. None Y N UNKNOWN
v. Obesity reported (BMI>30 or clinically obese) Y N UNKNOWN
w. Others (please indicate) Y N UNKNOWN
x.

y. Please list other conditions on form:

VACCINES AND ANITIVIRALS

z. Antiviral use in the previous 14 days Y N UNKNOWN
aa. Osteltamivir Y N UNKNOWN
bb. Zanamivir Y N UNKNOWN
cc. Other Y N UNKNOWN

dd. Please list other antivirals on form:

ee. Influenza vaccination for the current season Y N UNKNOWN

SARI CASE CRITERIA

ff. Measured fever $\geq 38^{\circ}$	Y	N	UNKNOWN
gg. History of fever	Y	N	UNKNOWN
hh. Cough	Y	N	UNKNOWN
ii. Shortness of breath or difficulty breathing	Y	N	UNKNOWN
jj. Requires hospitalization	Y	N	UNKNOWN

PATIENT OUTCOME

kk. Discharged alive	Y	N	UNKNOWN
ll. Died	Y	N	UNKNOWN
mm. Mechanical ventilation	Y	N	UNKNOWN

LABORATORY RESULTS

Type of specimen collected:

nn. Nasal swab	Y	N	UNKNOWN
oo. Throat swab	Y	N	UNKNOWN
pp. Nasopharyngeal swab	Y	N	UNKNOWN
qq. Bronchoalveolar lavage	Y	N	UNKNOWN

Laboratory confirmation method:

rr. PCT/RT-PCR	Y	N	UNKNOWN
ss. Viral culture	Y	N	UNKNOWN
tt. Immunofluorescence (IFA)	Y	N	UNKNOWN
uu. Other (test)	Y	N	UNKNOWN

vv. *Please list any other tests included on the form:*

Test result:

ww. Influenza A/H1	Y	N	UNKNOWN
xx. Influenza A/H1(2009)		Y	N UNKNOWN
yy. Influenza A (H3)	Y	N	UNKNOWN
zz. Influenza A (unsubtyped)	Y	N	UNKNOWN
aaa. Influenza A (not subtyped)	Y	N	UNKNOWN
bbb. Influenza B	Y	N	UNKNOWN
ccc. Other Influenza _____	Y	N	UNKNOWN
ddd. Other respiratory pathogens	Y	N	UNKNOWN
eee. Date of testing	Y	N	UNKNOWN

OTHER CRITERIA ON THE FORM

fff. Please list any other criteria on the form:

15. Where possible, review a random selection of records from those patients eligible to be enrolled as SARI cases in order to determine the sensitivity of the SARI surveillance. Use the patient logbook/line list to select this random group of records.

a. Number of patient records reviewed:

b. Number of those records meeting the SARI case definition:

c. Number of cases reviewed that met the SARI case definition AND were identified as SARI in the logbook/line list:

$Sensitivity = 15c/15b$

d. Number of cases reviewed that were identified as SARI in the logbook/line list but did not meet the SARI case definition:

e. Does this review of charts indicate that all or most cases meeting the SARI case definition are being enrolled?

Circle one: Y N UNKNOWN

f. Please describe your answer:

16. Please list some of the common admitting diagnoses for SARI cases (e.g. if hospital uses different diagnosis than "SARI", i.e. ICD10 code):

Respiratory Specimen Collection, Packaging, Storage and Shipment

SAMPLING SCHEME

17. Is a specimen collected from every identified SARI patient?

Circle one: Y N UNKNOWN

a. *If no, what is the sampling scheme used? (I.e. how are cases selected for enrollment and specimen collection?)*

b. *Please provide an interpretation of the respiratory sampling procedure. Can it be considered random and, if not, how might the procedure bias the surveillance data (include a description of any measures in place to minimize this bias)?*

18. Are total numbers of specimens collected recorded?

Circle one: Y N UNKNOWN

19. Is a unique identifier assigned to the swab/specimen to allow for linkage to swab collection form/clinical/epidemiologic data?

Circle one: Y N UNKNOWN

SAMPLE COLLECTION

20. What types of respiratory specimens are collected in this hospital:

- | | |
|---------------------------|-------------|
| a. Nasal swab | Y N UNKNOWN |
| b. Throat swab | Y N UNKNOWN |
| c. Nasopharyngeal swab | Y N UNKNOWN |
| d. Bronchoalveolar lavage | Y N UNKNOWN |
| e. Other | Y N UNKNOWN |

f. *If other, please describe:*

21. What staff members are responsible for specimen collection (e.g. nurse, clinician, laboratory technician)?

22. How frequently are these staff members trained in specimen collection and storage methods?

Circle one: Annually Every 6 months Quarterly Other _____

a. When was the last training?

23. Does the site have standard operating procedures for specimen collection written, accessible, and in use? Circle one: Y N UNKNOWN

a. If no, please describe the process used for standardization of the procedures:

24. Does the site have standard specimen collection forms available, and in use?

Circle one: Y N UNKNOWN

25. Is this a standard form provided by the national surveillance office/coordinator?

Circle one: Y N UNKNOWN

PERSONAL PROTECTION EQUIPMENT (PPE) AND RESPIRATORY SAMPLING TECHNIQUES

Ask staff members to demonstrate how respiratory samples are collected at the site and observe whether hand hygiene is performed, etc. If there are no patients to swab, ask staff to describe, step-by-step, the procedure for specimen collection that they normally follow.

26. Please note which type of PPE was used in the demonstration:

- | | |
|-------------------|-------------|
| a. Gloves | Y N UNKNOWN |
| b. Gown/Lab coat | Y N UNKNOWN |
| c. Safety glasses | Y N UNKNOWN |

RESPIRATORY PROTECTION TYPE:

- | | |
|----------------|-------------|
| d. Mask | Y N UNKNOWN |
| e. Respirator | Y N UNKNOWN |
| f. Shoe covers | Y N UNKNOWN |

27. Was hand hygiene performed before specimen collection?

Circle one: Y N UNKNOWN

- | | |
|--|-------------|
| d. Was hand hygiene performed after specimen collection? | Y N UNKNOWN |
| e. Is soap available for hand washing? | Y N UNKNOWN |
| f. Is there an adequate water source for hand washing? | Y N UNKNOWN |

28. Are specimen collection materials readily available?

Circle one: Y N UNKNOWN

a. *If yes, for how many specimens are materials usually available?*

29. What type of applicator is used for specimen collection (e.g. cotton, Dacron/polyester swabs)?

30. Which specimen collection materials are available at the site:

- | | |
|--------------------------------------|-------------|
| f. Tongue depressors | Y N UNKNOWN |
| g. Specimen swabs | Y N UNKNOWN |
| h. Vials containing VTM at 4°C | Y N UNKNOWN |
| i. Alcohol/bleach | Y N UNKNOWN |
| j. Packaging materials for transport | Y N UNKNOWN |

31. Are there SOPs in place and accessible describing the method to deal with spillage of a sample?

Circle one: Y N UNKNOWN

a. *If yes, have the staff members been trained on these procedures?*

Circle one: Y N UNKNOWN

b. *If trained, has this training occurred in the last 12 months?*

Circle one: Y N UNKNOWN

32. How are laboratory specimens packaged in this hospital? (please describe):

a. Is a triple package system used?

Circle one: Y N UNKNOWN

b. Are packaging and shipping materials readily available?

Circle one: Y N UNKNOWN

c. *If yes, please list the materials available:*

d. Are shipping materials returned to the site and reused?

Circle one: Y N UNKNOWN

33. What methods are used to store laboratory specimens in this hospital?

Type of storage used	(Y/N/DK)	Maximum amount of time (hours/days/months) specimens are stored <u>before</u> being sent for testing for each of the storage methods used
a. Refrigerated		h.
b. Freezer -20		i.
c. Freezer -70		j.
d. Liquid nitrogen		k.
e. Cold pack		l.
f. Ambient temperature		m.
g. Other (please describe):		n.

34. For each storage method used, please indicate if there is a system in place for routine monitoring of the temperature of the samples in storage.

Type of storage used	Temperature monitoring (Y/N/DK/Not Applicable)
a. Refrigerated	
b. Freezer -20	
c. Freezer -70	
d. Liquid nitrogen	
e. Cold pack	
f. Ambient temperature	
g. Other (please describe):	

SPECIMEN TESTING

35. Where is **routine** influenza testing performed?

- Check one: On-site laboratory
 Regional (subnational) laboratory
 Central (national) laboratory

36. What tests are used routinely?

- | | | | |
|------------------------------|---|---|---------|
| l. Rapid-test | Y | N | UNKNOWN |
| m. Immunofluorescence assay | Y | N | UNKNOWN |
| n. PCR (typing) | Y | N | UNKNOWN |
| o. PCR (typing & subtyping) | Y | N | UNKNOWN |
| p. Viral culture | Y | N | UNKNOWN |
| q. Hemmagglutinin inhibition | Y | N | UNKNOWN |
| r. Other | Y | N | UNKNOWN |

s. *If yes, please describe:*

t. If **routine** testing is performed on-site, how often are specimens tested?

Circle one: Daily Weekly Monthly Intermittently Other _____

u. If **routine** testing is performed off-site, how often are specimens sent for testing for routine analysis?

Circle one: Daily Weekly Monthly Intermittently Other _____

v. If specimens are **routinely** tested on-site or at the subnational level, how often are specimens sent to the national laboratory for **confirmatory** testing?

Circle one: Daily Weekly Monthly Intermittently Other _____

37. What means are used to transport laboratory specimens to the offsite laboratory? Please describe:

38. Are results of ALL specimens (positive and negative) routinely reported to surveillance coordinator at the site?

Circle one: Y N UNKNOWN

a. If results are reported to the coordinator, how often are they reported?

Circle one: Daily Weekly Monthly Intermittently Other _____

b. What is the typical lag time between specimen collection and receipt of results for the coordinator?

39. Are laboratory results reported back to clinicians?

Circle one: Y N UNKNOWN

a. If yes, what proportion of laboratory results is reported to clinicians?

b. What is the typical lag time between specimen collection and receipt of results for the clinician?

Data Reporting, Management, Analysis, and Quality

REPORTING TO NATIONAL LEVEL

40. What method is primarily used to routinely report/submit information to the national level?

- Check one: Web-based system
 E-mail
 FAX
 Text message
 Mail/Post
 Other _____

41. With what frequency is this reporting done?

Circle one: Daily Weekly Annually Never Other _____

42. Is a standard reporting template used?

Circle one: Y N UNKNOWN

DATA MANAGEMENT

43. How are surveillance data stored at the site?

- Check all that apply: Electronic file at site
 Web-based system
 Paper forms
 Other _____

If an electronic or web-based system is not used at the site – go to questions 44.

a. Which computer program/software is used at the site?

b. How often is data entered into the electronic system at the site?

c. When is data entered into the electronic system at the site? (e.g. every Friday, last day of month)

d. Who is responsible for data entry at the site? (title/position)

44. Is data quality monitored at the site (e.g. records/logbook periodically reviewed to ensure that all SARI cases have been recorded, data base checked for double entries, database with built-in checks to minimize data entry errors, etc.)?

Circle one: Y N UNKNOWN

a. If yes, what methods are used to monitor data quality?

b. If yes, how frequently is data quality monitored?

45. How frequently are actions taken in case of data quality issues?

46. How often are total all-cause admissions tallied at this hospital?

Check all that apply:

Daily

Weekly

Monthly

Once - at the end of the Influenza Season

Other _____

47. Are all-cause admissions tallied by age groups?

Check one:

YES

NO

UNKNOWN

a. If yes, please describe the age groups:

48. Are SARI visits summarized:

Check all that apply:

Daily

Weekly

Monthly

Once - at the end of the Influenza Season

Other _____

49. Is any other SARI data analysis performed on site?

Circle one: Y N UNKNOWN

a. If yes, what analysis is performed? (e.g. SARI visits by age and sex)

50. Is there a method in place for identifying changes in influenza/SARI activity/abnormal respiratory disease activity at the site level (e.g. has a baseline been calculated for this site)?

Circle one: Y N UNKNOWN

a. *If yes, what method(s) were used?*

b. *If a change in activity is observed, to whom is this change reported?*

c. *Which actions will be taken if changes/abnormal SARI activity is observed?*

d. Have any actions been taken in the past 12 months as response to abnormal SARI activity?

Circle one: Y N UNKNOWN

f. *If no activity was taken in response to abnormal SARI activity, why not?*

51. Does the surveillance focal point compile and prepare reports on SARI activity (weekly, monthly, other) at the site level?

Circle one: Y N UNKNOWN

a. If yes, is a standard report template used?

Circle one: Y N UNKNOWN

b. With whom are these reports shared?

Check all that apply: National level
 Surveillance staff at site
 Local/Regional public health office
 Physicians at surveillance site
 Physicians in county/city/region
 Other _____

52. How often does the site receive data quality feedback from the national level?

Check all that apply: Daily
 Weekly
 Monthly
 Once - at the end of the Influenza Season
 Other _____

53. How often do staff members from central level perform sites visits at this hospital (e.g. to perform quality assurance assessments)?

Check all that apply: Daily
 Weekly
 Monthly
 Once - at the end of the Influenza Season
 Other _____

54. Do site staff members receive training updates from the national level in response to data quality issues?

Circle one: Y N UNKNOWN

a. If yes, how often do these trainings take place?

Annex 4. Sentinel SARI surveillance: Scaling implementation

As sentinel surveillance for hospitalised SARI is relatively new in the WHO European Region, this annex presents additional options for new SARI systems. These options are intended to be used as a general guide for planning and to convey what data may be collected in basic and more advanced models of sentinel SARI surveillance. Please note that a sentinel system may incorporate both basic and more advanced components from each of the different models below, depending on national interests and capacities. This annex is only intended to give some examples of what basic and more complex SARI surveillance activities might look like.

At the minimum level, *all* sentinel SARI surveillance systems should meet the following minimum criteria:

- All hospitalized patients (e.g. hospitalized in general wards and ICUs) meeting a SARI case definition are routinely tracked at sentinel sites.
- All or a systematically selected subset of these SARI cases are tested for influenza and a SARI swab form is completed (see Chapter 5).
- Aggregate SARI surveillance data (see Chapter 5) is reported to the national level on a weekly basis.
- This weekly reporting is from a standard and stable number of sentinel hospitals and includes weekly “zero reporting” if there have been no recorded SARI cases.

While all SARI surveillance systems should include these minimal components for severe disease monitoring, more complex systems can be implemented depending on available resources in order to meet additional surveillance objectives.

4.1. Basic, intermediate and advanced models of SARI implementation

1. Basic SARI model (less expensive, requires fewer human and infrastructural resources)

- a. Number of SARI sentinel sites:* 1 to 2 sites in a primary population centre or capital
- b. Selection criteria for sentinel sites:* The selection of sentinel sites should be largely based on feasibility in terms of proximity to the national influenza laboratory, human resources and political/administrative commitment. These hospitals will often be medium or large facilities located in or near the primary population centres of a country. Sentinel sites should capture SARI hospitalizations with acute infectious illnesses, as well as patients with exacerbations of chronic diseases listed as primary admitting diagnoses.
- c. Numerators for routine surveillance:* The number of SARI cases selected for respiratory specimen collection, the total number of SARI cases hospitalized at the SARI sentinel sites and the number of SARI cases testing positive for influenza should all be monitored by national authorities on a weekly basis. The

WHO EuroFlu Regional bulletin reports the per cent of sentinel specimens testing positive for influenza in a country only if that country has tested 20 or more sentinel specimens during that week. When there are enough cases, at least 20 SARI specimens should be tested by the sentinel system, per week, during influenza season.

- d. *Denominators for routine surveillance:* The minimum denominator for SARI surveillance should be the total all-cause overnight admissions to the wards under surveillance at the sentinel sites. Optimally this denominator should be obtained or estimated from administrative records systems at the sentinel sites and reported on a weekly basis. To reduce the burden of routine surveillance on the responsible hospital staff it is best to avoid having staff tally this denominator manually.
- e. *Data analyses and reporting from sentinel sites:* National-level analyses of data from the sentinel sites include monitoring the weekly percentage of all-cause hospital admissions that are due to SARI. The weekly percentage of SARI cases that test positive for influenza should also be monitored as a standard indicator of the contribution of influenza to hospitalized SARI. An epidemiological description of the demographics, chronic medical conditions and vaccination history of SARI cases with laboratory-confirmed influenza should be produced early in the influenza season (e.g. just after ILI/ARI activity has exceeded epidemic thresholds [if applicable] or within the first month following confirmation of influenza virus circulation in the community) and again at the end of influenza season.

2. Intermediate SARI model (requires additional resources)

- a. *Number of SARI sentinel sites:* At least three SARI sentinel sites are placed in different populated areas of the country, taking into consideration the criteria for representativeness described in Chapter 3.
- b. *Selection criteria for sentinel sites:* Feasibility and sustainability remain important criteria; however sentinel sites should also be selected to demographically represent the population under surveillance. Sentinel sites should capture SARI hospitalizations with acute infectious illnesses, as well as patients with exacerbations of chronic diseases listed as primary admitting diagnoses.
- c. *Numerators for routine surveillance:* The number of SARI cases selected for respiratory specimen collection, the total number of SARI cases hospitalized at the SARI sentinel sites and the number of SARI cases testing positive for influenza should be monitored by national authorities on a weekly basis. Sample sizes should be sufficient for national authorities to confidently monitor trends in hospitalized SARI caused by influenza at multiple sentinel sites and draw conclusions about the impact of SARI confirmed as influenza in multiple demographic groups in the annual surveillance report. If possible, at least 20

SARI specimens should be tested from each sentinel site, per week, during influenza season.

- d. *Denominators for routine surveillance:* The minimum denominator for SARI surveillance should be total all-cause overnight admissions to the wards under surveillance at the sentinel sites. This should be obtainable from administrative records systems at the sentinel sites and reported to the national level on a weekly basis.
 - One or more sentinel sites should also be selected according to the technical feasibility of estimating population denominators. This will allow the sentinel surveillance system to provide a routine monitoring function but also allow national surveillance staff to estimate incidence rates of SARI hospitalizations due to influenza in some locations.
- e. *Data analyses and reporting from sentinel sites:* National-level analyses of data from the sentinel sites should include monitoring the weekly percentage of all-cause hospital admissions that are due to SARI. The weekly percentage of SARI cases that test positive for influenza should also be monitored as an indicator of the contribution of influenza to hospitalized SARI.
 - In this model the presence of national or regional population health survey data (for example, a national demographic and health survey) may allow the prevalence of risk factors among hospitalized SARI that are confirmed to have influenza to be compared to the estimated prevalence of risk factors in the general population. To achieve this, SARI individual data collection forms (SARI Swab Forms) should be designed to include the broad underlying chronic condition categories specified in Chapter 5. However effort should be made to also have the specific wording of these risk factors be comparable to related questions in national survey data. This allows estimation of Odds Ratios associated with SARI hospitalization for different age and risk factor groups and can allow surveillance data to be used to inform policy-makers about persons at higher risk for complications of influenza.
 - Local or national estimates of the burden of hospitalized influenza can be made by extrapolating data from sentinel sites through one or both of the following methods:
 - If the sentinel sites were selected according to criteria described in Chapter 3, the percentage of hospitalizations due to SARI (and as sample sizes grow to sufficient size, SARI confirmed as influenza) can be extrapolated to subnational or national hospitalization data to make disease burden estimates. This requires that subnational or national data on all-cause hospitalizations has been obtained.
 - For a subset of sentinel sites where the population denominator has been estimated for SARI hospitalizations, incidence rates of hospitalized SARI in the population under surveillance are additionally calculated as an annual rate per 100 000 population.

3. Advanced SARI model (comprehensive surveillance and burden estimation)

- a. *Number of SARI sentinel sites:* While there should be a minimum of 3–5 sentinel sites in a country, the most important criteria is that data from the sentinel system should be considered representative of hospitalizations in the national population.
- b. *Selection criteria for sentinel sites:* The placement of sentinel sites should be sufficient to capture appropriate geographic and climatic diversity in the country. Sites should be selected to assure that cases that are hospitalized at the sentinel sites represent the broader demographic and socio-economic characteristics of the national hospitalized population under surveillance.
- c. *Numerators for routine surveillance:* The number of SARI cases selected for respiratory specimen collection, the total number of SARI cases hospitalized at the SARI sentinel sites and the number of SARI cases testing positive for influenza should be monitored by national authorities on a weekly basis.
 - More advanced systems have estimated sentinel site patient volumes in advance in order to ensure that sample sizes are sufficient for national authorities to monitor trends in hospitalized SARI cases that have tested positive for influenza at each sentinel site, by age groups and by other priority groups (described in Chapter 5).
 - A review of hospital records has determined the expected annual number of cases of SARI that will be hospitalized at sentinel sites.
 - An estimate of the percentage of SARI (across all ages) that will test positive for influenza has also been applied to this record review using laboratory data from prior years in order to help assure that reliable trends in SARI, and SARI confirmed as influenza, will be available for priority groups under surveillance.
- d. *Denominators for routine surveillance:* The minimum denominator for SARI surveillance should be total all-cause overnight admissions to the wards under surveillance at the sentinel sites. This should be obtained from administrative records systems at the sentinel sites and reported on a weekly basis. In addition, at several sentinel sites a population catchment area can be determined for all or a subset of SARI hospitalizations. These data are used in combination with national population data to routinely estimate national age-specific rates of SARI hospitalizations and hospitalized influenza.
- e. *Data analyses and reporting from sentinel sites:* The weekly percentage of total admissions due to SARI is reported routinely from each sentinel site. National

analyses of SARI data with reliable denominators is used to establish a baseline for hospitalized respiratory disease. The weekly percentage of SARI cases that test positive for influenza is also reliably monitored by age group. The demographic and underlying condition profiles of hospitalized SARI cases with laboratory-confirmed influenza is analysed in a timely manner early in influenza season and again at the end of influenza season.

- Data collection from SARI hospitalizations includes patient outcome (e.g. discharged without being admitted to an ICU, discharged from an ICU or death). This adds complexity to routine surveillance through the introduction of a longitudinal element to data collection. However it also is a useful feature of a more advanced sentinel SARI surveillance system as it will allow medical condition and virological data from a subset of the most severe cases to be monitored and compared to less-severe cases
 - Patient outcomes should only be monitored as a part of the sentinel surveillance system if there is a mechanism to quickly update individual patient records as the outcome data becomes available. SARI cases should be reported during the week that they are admitted and reporting of SARI cases should not be delayed while waiting for patient outcome data.
 - Where possible, annual data on patients admitted to intensive care units (ICUs) at the SARI sentinel sites should include enough cases to compare the persons admitted to intensive care (or who died) to less severe hospitalizations that were not admitted to intensive care, with regard to the influenza viruses causing infection, as well as demographic and underlying condition profile.
 - National or regional population health surveys (for example, a national Demographic and Health Survey⁶³) can allow the prevalence of risk factors among hospitalized SARI that are confirmed to have influenza to be compared to the estimated prevalence of risk factors in the general population (provided that the catchment populations served by sentinel SARI hospitals are comparable with the national population). The specific wording of these risk factors on the SARI Swab Form (see Chapter 5) should be comparable to related questions in national survey data. This allows estimation of Odds Ratios associated with SARI hospitalization for different age and risk factor groups and can allow surveillance data to be used to inform policy-makers about persons at higher risk for complications of influenza.
- f. National estimates of the burden of hospitalized influenza are made by extrapolating data from sentinel sites through one or both of the following methods:
- Current national data on age-specific all-cause overnight hospitalizations has been obtained. As the sentinel sites adequately represent the national population under surveillance, the percentage of hospitalizations

due to SARI, and SARI confirmed as influenza, can be extrapolated to this national hospitalization data to make disease burden estimates.

- For SARI hospitalizations at a subset of sentinel sites where the population served by those facilities is known, incidence rates of hospitalized SARI in the population under surveillance can be calculated as an annual rate per 100 000 population. This can be applied to national population estimates in order to estimate the burden of hospitalizations due to SARI and SARI confirmed as influenza.
- In advanced SARI surveillance systems, data from SARI sentinel systems may serve as a platform for additional burden of disease calculations such as the estimation of the costs associated with influenza hospitalizations, length of stay and/or direct and indirect impacts on lost work time and productivity (this may done for ILI/ARI systems as well). An advanced SARI surveillance system may also make use of extended laboratory capacity in order to also estimate the relative burden of non-influenza respiratory viruses (e.g. RSV, para-influenza, etc.) to SARI hospitalizations in different age groups.

Table A-1. Examples of “basic”, “intermediate” and “advanced” models of sentinel SARI surveillance

	Simple model examples	Intermediate model examples	Advanced model examples
Number of SARI sentinel sites	1 - 2 sites in a primary population centre or capital.	At least 3 sentinel sites should be placed in different populated areas of the country.	While there should be a minimum of 3-5 sentinel sites, the most important criteria is that data from the sentinel system should be considered representative of hospitalizations in the national population.
Selection and location criteria for sentinel sites	Based on feasibility, often placed near a laboratory in primary population centre.	In addition to feasibility criteria, sentinel sites are selected to represent the full age range of patients in the population under surveillance. Sites are located in multiple population centres for greater representativeness.	The placement of sentinel sites should be sufficient to capture appropriate geographic and climatic diversity in the country. Sites should be selected to assure that cases that are hospitalized at the sentinel sites represent the broader demographic and socio-economic characteristics of the national hospitalized population under surveillance.
Numerators	# weekly SARI cases hospitalized at the SARI sentinel sites # weekly SARI cases selected for respiratory specimen collection # weekly SARI cases testing positive for influenza When there are enough cases, at least 20 sentinel SARI specimens are tested each week during influenza season.	# weekly SARI cases hospitalized at the SARI sentinel sites # weekly SARI cases selected for respiratory specimen collection # weekly SARI cases testing positive for influenza Sample sizes should be sufficient for national authorities to confidently monitor trends in hospitalized SARI caused by influenza at multiple sentinel sites and draw conclusions about the impact of SARI confirmed as influenza in multiple demographic groups in the annual surveillance report. If possible, at least 20 SARI specimens should be tested per week at each sentinel site during influenza season.	# weekly SARI cases hospitalized at the SARI sentinel sites # weekly SARI cases selected for respiratory specimen collection # weekly SARI cases testing positive for influenza Sample sizes are sufficient for national authorities to monitor trends in hospitalized SARI cases that have tested positive for influenza at each sentinel site and by age groups and other priority groups.
Denominators	Total all-cause hospital admissions in the wards under surveillance at sentinel sites.	Total all-cause hospital admissions in the wards under surveillance at sentinel sites. Population denominators may be determined for SARI hospitalizations at one or more sites.	Total all-cause hospital admissions in the wards under surveillance at sentinel sites. Population denominators may be determined for SARI hospitalizations at multiple sites. These data are used in combination with national population data to routinely estimate national age-specific rates of

<p>Data analysis & reporting</p>	<p>Weekly number of SARI admissions and the percentage of total admissions due to SARI are reported.</p> <p>The weekly percent of SARI specimens testing positive for influenza is reported.</p> <p>An epidemiological description of the demographics, chronic medical conditions and vaccination history of SARI cases with laboratory-confirmed influenza is available early in influenza season and again at the end of influenza season.</p>	<p>Weekly number of SARI admissions and the percentage of total admissions due to SARI are reported.</p> <p>The weekly percent of SARI specimens testing positive for influenza is reported.</p> <p>An epidemiological description of the demographics, chronic medical conditions and vaccination history of SARI cases with laboratory-confirmed influenza is available early in influenza season and again at the end of influenza season.</p> <p>Annually, risk factors may be compared to prevalence estimates obtained in national surveys.</p> <p>Annual estimates of the burden of hospitalized influenza are calculated for SARI hospitalizations at one or more sentinel sites.</p>	<p>SARI hospitalizations and hospitalized influenza.</p> <p>The weekly percentage of total admissions due to SARI is reported routinely from each sentinel site.</p> <p>The weekly percent of SARI specimens testing positive for influenza is reported for each sentinel site. The weekly percentage of SARI cases that test positive for influenza is also reliably monitored by age group.</p> <p>National analyses of SARI data with reliable denominators is used to establish a baseline for hospitalized respiratory disease over time.</p> <p>An epidemiological description of the demographics, chronic medical conditions and vaccination history of SARI cases with laboratory-confirmed influenza is available early in influenza season and again at the end of influenza season.</p> <p>Risk factors may be compared to prevalence estimates obtained in national surveys.</p> <p>Outcome data is collected on SARI hospitalizations. This allows risk factor and virological profiles of SARI patients with laboratory-confirmed influenza that required ICU admission or had a fatal outcome to be compared to those of SARI patients with less severe outcomes.</p> <p>Annual data on patients admitted to intensive care unites (ICUs) at the SARI sentinel sites include enough cases to produce a meaningful virological description of ICU cases by subtype and a description of their demographic and underlying condition profiles.</p> <p>National estimates of the burden of hospitalized influenza in the population under surveillance are calculated annually.</p> <p>The system serves as a platform for additional burden estimation and to evaluate the cost-effectiveness of possible interventions such as vaccination. The surveillance system is also used to monitor the relative contribution of other pathogens to hospitalized SARI, by age group.</p>
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Annex 5. Booking form for World Courier shipments



WHO Influenza Shipment Fund Project

BOOKING FORM

(One form per shipment)

!PLEASE FILL IN THIS FORM CAREFULLY!

Information of Booking Form Sending		
Date :	<input type="text"/>	From : <input type="text"/> Pages : <input type="text"/>
By :	<input type="checkbox"/> Email	<input type="checkbox"/> Fax
TO :	World Courier Geneva (Switzerland) SA	Email: opsgva@worldcourier.ch Fax : + 41-22-827.30.70
CC :	World Health Organization - Global Influenza Program, Mr. Christian Fuster	Email: fusterc@who.int Email: gism@who.int Fax : + 41-22-791.48.78

Requested Date of Pick-up :	<input type="text"/>
-----------------------------	----------------------

Person to be contacted for the pick-up	
Name :	<input type="text"/> Phone: <input type="text"/>
Email :	<input type="text"/>

Place of pick-up		Place of delivery
Institute	<input type="text"/>	WHO-CC in : <input type="text" value="London"/>
Street	<input type="text"/>	
Dept	<input type="text"/>	
City / Zip Code	<input type="text"/>	
Country	<input type="text"/>	
Name	<input type="text"/>	
Phone	<input type="text"/>	

Page : 1



WHO Influenza Shipment Fund Project

DETAILS OF SHIPMENT :

WHO ACCOUNT : #696002 STUDY / PROTOCOL : WHO

Please click on the relevant(s) box(es)

Biological substance, category B, (UN3373): [Dry ice]

Infectious substance affecting humans, category A, (UN2814): [Dry ice]

Other :

Number of Vials and MLS :

Number of inner packaging and size (if available) :

NOTE: LOCAL WORLD COURIER OFFICE OR HIS AGENT WILL PROVIDE DRY ICE, ADEQUATE PACKAGING MATERIALS AND PAPER WORKS (House Air Waybill, DG forms) FOR YOUR SHIPMENT.

Comments :

KIND REGARDS

Print Form

¹ This box should be ticked when you are shipping: (diagnostic specimens containing A(H5N1) or diagnostic seasonal influenza A(H3N2), A(H1N1), B virus isolates, specimens or seasonal influenza A(H3N2), A(H1N1), B virus isolates.

² This box should be ticked ONLY when you are shipping virus isolates [Highly pathogenic avian influenza virus (culture: only)] of A(H5N1).

³ This box should be ticked when you are not shipping on the dry ice (-70°C). Please indicate the category (A or B) and temperature conditions: icepacks (0°C to +4°C) or RT-room temperature (18°C to 25°C) or Dry shipper (-210°C to -195°C).

If you are not sure which box to tick, please contact fcstem@who.int BEFORE sending the form.

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