1 Part 1: The Rationale for Sentinel Surveillance to Monitor Seasonal and Pandemic Influenza

Instructor Guide

This section should take 3 hours

Instructions

During this session the moderator will lead you through questions to consider when developing or enhancing sentinel influenza surveillance systems in your country. For some of this first part of the session, the facilitator will present some key concepts and the rationale for sentinel surveillance. In some instances you will work with one or two of the people seated next to you to answer questions, and then the facilitator will bring the large group back together to discuss the answers.

Background Information (also presented as slides from facilitator)

Global influenza surveillance has historically focused on virologic data collection for vaccine strain selection with very limited epidemiologic data collection. Lack of international standards for the collection of epidemiologic data on influenza-related illness has limited our ability to make comparisons across national and regional boundaries. As a result, gaps remain in our understanding of the epidemiology of influenza, the social and climatic factors that influence community transmission, influenza's true global burden, and variation in severe respiratory disease occurrence between countries.

Slides 1-13

Presentation: Introduction to sentinel surveillance (slides from the facilitator)

Discussion with the group

Facilitator makes a blank table shell on the board and starts to fill in objectives of sentinel surveillance with input from the group. He/she asks out loud:

1) "What are the virologic and epidemiologic objectives of sentinel inpatient and outpatient surveillance systems? We want to discuss these objectives separately for seasonal influenza surveillance and for pandemic surveillance."

Draw the following blank table shell on the board:

Sentinel surveillance in outpatient *and* **inpatient settings:**

	Seasonal surveillance	Pandemic monitoring
Virologic Objectives		
Epidemiologic Objectives		

a) Virological and Epidemiological Objectives for Seasonal Surveillance:

Main answer:

For virology, we are interested in monitoring circulating strains, monitoring for new strains, and vaccine planning. These virological goals have traditionally been the primary focus of outpatient/GP based sentinel systems. Epidemiologic objectives include having data on mild disease, but importantly, severe disease as well. This not only includes the epidemiologic characteristics of severe vs. mild cases, but monitoring for differences in the viruses causing mild and severe disease. This can be used to target control and prevention efforts, determine burden of disease, and provide respiratory surveillance infrastructure.

b) Virologic and Epidemiologic Objectives for Pandemic Monitoring:

Main answer:

Slide 14

For virology, we are interested in monitoring any antigenic changes in the pandemic virus, characterizing the pandemic virus to look for known markers of virulence, monitoring the antiviral sensitivity of the virus, and monitoring the relative circulation of pandemic and seasonal strains for vaccine planning.

Especially important during a pandemic is the systematic sampling of viruses from mild and severe cases in order to look for differences in the viruses causing severe illness. Systematic sampling needs to also assess the relative circulation of pandemic and seasonal viruses among those of different ages.

Epidemiologic objectives include having data on mild disease, but more importantly, severe disease as well. This can be used to target control and prevention efforts, determine burden of disease, and provide respiratory surveillance infrastructure. With limited resources available to devote to surveillance, systematically collecting virologic and epidemiologic data from severe cases will most efficiently address many (but not all) of these surveillance objectives.

Through a quick discussion the facilitator should complete the table. Many of the following points should be included, but additional points may be raised by the group as well.

	Seasonal surveillance	Pandemic monitoring
Virologic Objectives	• *Monitoring changes in viral antigens* • *Monitor antiviral susceptibility* • *Monitor known markers of virulence* • *Strain surveillance, by age, for the development of new vaccines* • *Strain surveillance, by severity, to assess virologic risk factors for severe disease* • *Detect novel viruses*	• *Monitoring changes in viral antigens* • *Monitor antiviral susceptibility* • *Monitor known markers of virulence* • *Strain surveillance, by age, for the development of new vaccines* • *Strain surveillance, by severity, to assess virologic risk factors for severe disease* • *Detect novel viruses*
Epidemiologic Objectives	• *Identify priority groups for vaccination campaigns. This includes tracking epidemiologic risk factors for severe outcomes, including hospitalization and death.* • *Monitor the timing/ seasonality of influenza to inform shifts in treatment practices and public communications* • *Monitor the intensity of influenza season in relation to baselines* • *Provide data that can contribute to the estimation of the burden of influenza as a cause of respiratory disease in the population* • *Provide a platform for surveillance that includes additional common respiratory pathogens (e.g. RSV, adenovirus, parainfluenza viruses, and rhinovirus)*	• *Identify priority groups for vaccination campaigns. This includes tracking epidemiologic risk factors for severe outcomes, including hospitalization and death.* • *Monitor the intensity of influenza season in relation to baselines* • *Inform timely public risk communication messages* • *Monitor treatment practices* • *Support rapid operational investigations to study the pandemic virus (e.g. contact tracing and transmission studies)* • *Provide data that can contribute to the estimation of the burden of pandemic influenza as a cause of respiratory disease in the population* • *Support efforts to monitor surge on hospitals*

Concluding Points: *The objectives of sentinel surveillance for seasonal and pandemic influenza are remarkably similar!*

A routine system that systematically obtains epidemiologic and virologic data from sentinel inpatient and outpatient facilities can be efficiently enhanced/maintained through the stress of a pandemic. Similarly, such a system that is set up to monitor a pandemic will have value for years to come to inform annual influenza policies at the national level.

Slides 66-77

2) Roles and responsibilities in the surveillance system. The facilitator will now give a short presentation the respective roles of the sentinel site focal point, the national virologic focal point, and the national epidemiologic focal point in the surveillance system. This presentation will focus on routine reporting requirements, and regional/global reporting requirements as well.

Discussion with the group (Organization of sentinel systems)
The facilitator will open the discussion briefly to different examples of how sentinel systems are organized in the region.

3) Case definitions – SARI and ILI.

The facilitator will now quickly summarize the surveillance case definitions using the pocket guide that was provided to the class.

SARI: Severe Acute Respiratory Infection
ILI: Influenza-like Illness

The following two case definitions will be presented. Present the three surveillance case definitions for SARI and ILI:

Severe Acute Respiratory Infection (SARI) in Persons ≥ 5 Years Old
Any person requiring hospitalization and presenting with manifestations of acute lower respiratory infection with:*

- *sudden onset of fever (> 38 ºC), AND*
- *cough or sore throat, AND*
- *shortness of breath, or difficulty breathing with or without clinical or radiographic findings of pneumonia, or any person who died of an unexplained respiratory illness.*

** hospitalization may not be a required in some sites (i.e. remote from hospitals). Time requirement for onset of illness may vary.*

In adults, 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 present as pneumonia.

SARI in Children < 5 Years Old

For children <5 years old, the WHO case definition for pneumonia and severe pneumonia from the program of Integrated Management of Childhood Illness (IMCI) should be used.
The IMCI case definition for pneumonia is any child aged 2 months to 5 years with ***cough or difficulty***

breathing and:

- *breathing faster than 40 breaths / minute (ages 1 – 5 years)*
- *breathing faster than 50 breaths / minute (ages 2 – 12 months).*
- *Note that infants less than 2 months of age with fast breathing of 60 breaths or more per minute should be referred for serious bacterial infection.*

The IMCI case definition for Severe Pneumonia is any child aged 2 months to 5 years with cough or difficult breathing and any of the following general danger signs:

- *unable to drink or breastfeed, or*
- *vomits everything, or*
- *convulsions, or*
- *lethargic or unconscious, or*
- *chest indrawing or stridor in a calm child.*

Influenza-like Illness (ILI)

- *A person with sudden onset of fever >38°C and cough or sore throat in the absence of other diagnosis.*

As time is limited in this session, the facilitator will then present the clinical strengths and weaknesses of these surveillance case definitions, and then open the discussion to questions.

Slide 23 Clinical strengths and weaknesses of ILI and SARI case definitions:

	ILI	SARI
Strengths	• Less resource intensive as a case definition	• Captures hospitalized component of influenza. • Will capture cases with exacerbations of chronic conditions, not just those with pneumonia.
Weaknesses	• Fever requirement may overlook persons without fever, such as elderly and immune-compromised. • Not ideal if being used to monitor viral respiratory pathogens other than influenza.	• Will overlook those that do not present with fever such as elderly and immune-compromised. • Will overlook those that do not seek care at a hospital. • Fever requirement makes it more specific, less sensitive

Concluding points: *The facilitator will present slides that quickly make the following points:*

Slides 16-28 *The combination of ILI surveillance with SARI surveillance will provide a description of a broad range of medically-attended influenza.*

SARI surveillance is a standard for hospitalized severe respiratory disease related to influenza and may be used as the core component of influenza surveillance for countries with limited resources. It should also be considered as an additional measure in countries with existing outpatient surveillance. However, there are limitations to this case definition: Where seasonal influenza is concerned, the requirement of fever may result in the exclusion of elderly and immunocompromised influenza cases, which may be of concern in countries where these groups comprise a significant portion of the population. Using a modification of the case definition that does not include the presence of fever, or require measured fever, may detect more cases from these risk groups and may also detect cases caused by other non-influenza viral pathogens, such as Respiratory Syncytial Virus. However, dropping the fever requirement will significantly increase resource demands.

In countries with younger populations or limited resources, or those that are not testing for other respiratory pathogens, the SARI case definition will provide an internationally standardized method of measuring and describing the occurrence of severe influenza. If a country chooses not to include the fever requirement in the SARI case definition, they should record the presence or absence of fever on the SARI swab form in order to permit the comparison of their data with that of other countries.

Discussion with the group.

Facilitator makes a blank table shell on the board and starts to fill in objectives of sentinel surveillance with input from the group. He/she asks out loud:

4) "What are the benefits and drawbacks of establishing pathogen-based sentinel surveillance (involving laboratory confirmation of influenza) for ILI and SARI?"

In the course of a group discussion draw the following blank table shell on the board:

Benefits and drawbacks of ILI and SARI sentinel surveillance:

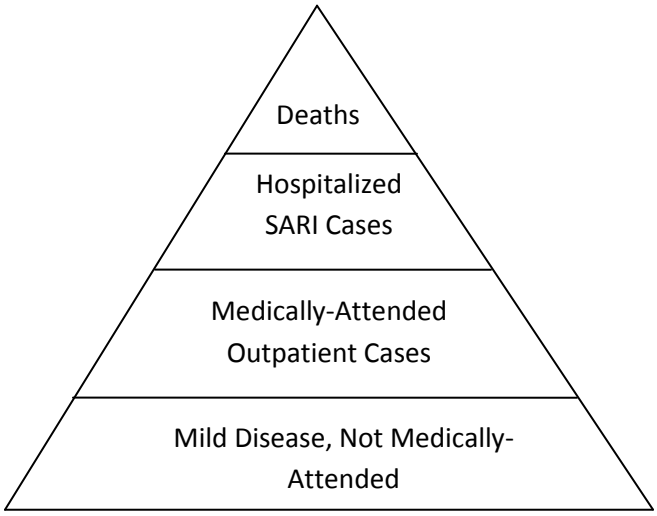
	ILI Sentinel Surveillance	**SARI Sentinel Surveillance**
Benefits for seasonal surveillance/pandemic monitoring		
Drawbacks for seasonal surveillance/pandemic monitoring		

Slide 36 ***Main answer:***

	ILI Sentinel Surveillance	**SARI Sentinel Surveillance**
Benefits for seasonal surveillance/pandemic monitoring	• *Existing systems in many places, so not a "new" system that must be created in a pandemic.* • *Systematic sampling may give meaningful distribution of virus circulation by age* • *With laboratory support and sound sampling strategies can be used to monitor progression of pandemic even when other testing shifts to focus on only severe cases.* • *Can be compared to meaningful baselines in many places to provide a measure of the relative magnitude of ILI consultations as compared to previous seasons.*	• *Like ILI, can also be used to monitor the progression of a pandemic.* • *Efficient way to monitor severity and clinical characteristics of severe cases by focusing limited epidemiologic surveillance resources on fewer cases of higher priority. Can change over time.* • *Monitor the progression and impact of a pandemic by focusing on an important outcome with a standard case definition for severe disease.* • *Will inform understanding of viruses that cause severe disease* • *Timely feedback of results to clinicians can inform treatment practices.* • *Well-placed sentinel hospitals can provide indicators of the population-based burden of severe respiratory disease.* • *Sentinel hospitals can also be locations where the impact of a pandemic on health care resources/ICU may be monitored.*
Drawbacks for seasonal surveillance/pandemic monitoring	• *Does not capture severe illness, which is needed to inform priority groups for intervention* • *Not an easy or valuable entity to collect epidemiologic data on* • *No viruses from severe cases* • *Not ideal for monitoring if a pandemic is becoming worse.*	• *Baselines are less well established at this point in time.* • *It is a change from traditional practices to initiate systematic testing in hospitalized setting* • *Sentinel sites are limited in their ability to fully inform planners about the geographic spread of severe disease in a country.*

Concluding points (Show the "burden pyramid" on the screen):

Slide 17



- *Most influenza cases are mild and not medically attended. These are very difficult to capture through surveillance mechanisms.*
- *A smaller but still sizable number of cases develop illness severe enough to seek outpatient care. These are the cases generally targeted by routine ILI surveillance.*
- *An even smaller proportion of cases will develop severe disease and require hospitalization. The systematic collection of laboratory and epidemiologic data from these hospitalized Severe Acute Respiratory Infection (SARI) cases can help public health authorities to focus limited influenza surveillance resources, including vaccination, on those at the highest risk for severe outcomes due to influenza virus infection. WHO recommends adding SARI surveillance to existing outpatient surveillance systems to fully describe the spectrum of disease related to influenza and to identify individuals at highest risk for severe disease. SARI surveillance is becoming a standard for weekly or monthly reporting in many parts of the world. In addition, the recent emergence of pandemic (H1N1) into human populations has led several countries to initiate and strengthen SARI surveillance as a way to better monitor severe disease related to influenza.*
- *While deaths due to influenza are certainly of public health importance, they are relatively difficult to routinely measure because they often occur in non-healthcare settings, making laboratory confirmation very difficult. Thus, when considering systematic pathogen-based surveillance options, surveillance for deaths can be more costly and less efficient to operate than surveillance for hospitalized respiratory illness.*

The Facilitator should then ask the audience, "From your experience, how can severity and virulence be tracked during a pandemic in a timely way? Why is this important to us?"

Rationale: *At a national, regional, global level this would inform how we think about school closures, stopping public gatherings, vaccination, and antivirals. A lot of behaviors and a lot of recommendations would change if it became virulent - we would pursue many interventions more aggressively. There is some data, for example, indicating that early school closure does actually impact transmission. The argument against is that it's just too disruptive and costly to justify. If the virus was suddenly killing two or three times as many people as it is now, I think it would be hard to make that same argument. What could be gained is time to get vaccine. With a more virulent virus, they could fight a lot harder to slow transmission to give time for the vaccine to arrive. A change in virulence might also be associated with a change in other epi characteristics, like risk groups (the increase would likely be in people without comorbid conditions) or age distribution.*

The facilitator should mention that not all surveillance needs for a pandemic will be met by a sentinel system (although it is an efficient way to address many of them). The facilitator should ask out loud:

5) "What additional data/information systems will be needed in a pandemic, and why?"

Discussion topic: The discussion could center around the need to passively monitor the broader extent of severe outcomes, hospital surge capacity, and vaccine adverse events. These three areas could be targeted points for discussion because it could be argued that there is some need for population-based, not sentinel-based reporting for these discrete entities.

a) *Added value would be gained by making laboratory confirmed influenza deaths nationally reportable. This would allow for total deaths to be enumerated in the country, and for policy-makers to quickly identify disproportionately affected populations (e.g. indigenous or rural populations).*
b) *Similarly, a formal or informal system of contact with the major hospital ICUs in the country would inform systems of referral of severe cases on an ongoing basis.*
c) *If a vaccine is being implemented, then a population-based system for reporting vaccine adverse events should be implemented as well.*
d) *The instructor should also show the slide that demonstrates how sentinel systems can be embedded in national reporting systems for ILI and SARI. While only cases from sentinel sites might receive systematic laboratory testing, monitoring these syndromes more widely will give a strong indication of the spread of the pandemic within a country.*

Concluding Points: *There remains value in having deaths that are laboratory confirmed as influenza as nationally notifiable conditions. Other non-sentinel (population-based) surveillance systems that may be important for pandemic monitoring include surveillance to assess impact on the health care infrastructure, and surveillance to assess vaccine adverse events. The sentinel systems we are describing are not contrary to national reporting systems in the region, but complementary to them.*

2 Part 2: Country examples of sentinel surveillance for ILI and SARI

This section should take 45-60 minutes

In this session, there will be three 10-15 minute country presentations on the implementation of sentinel SARI/ILI surveillance.

The presentations should focus on:

- The extent of general practitioner surveillance and the establishment of baselines
- The process of adding pathogen-based SARI surveillance
- Integration of the sentinel surveillance into a national reporting system
- The plans to continue/enhance these systems to support pandemic monitoring
- Perceived challenges and strategies to overcome these challenges

3 Part 3: Practical aspects of surveillance implementation: Interactive session.

This section should take 3 hours

Instructions

During this session the moderator will continue to lead you through questions to consider when developing influenza surveillance systems in your country. You will work with one or two of the people seated next to you to answer questions, and then the moderator will bring the large group back together to discuss the answers.

Instructor Note: For each question below, give the participants about 10 minutes to discuss answers and thoughts with their closest neighbors. At the end of 10 minutes, choose a participant or request a volunteer to discuss their responses. Ask the rest of the group whether they agree or disagree, and allow some discussion, if needed. Conclude by showing the students the Surveillance PowerPoint slides. The slide numbers that address each of the questions presented are shown in the answer key below each question. Keep the participants on-topic, and allow only about 5 minutes for discussion of each point.

Background Information

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

For the sake of discussion, let's consider the selection of sentinel sites that will include both inpatient (i.e. hospitalized SARI) components. While many ILI sentinel systems select just a few cases from many geographically dispersed sites, SARI surveillance is a little different. It is preferable to collect data and specimens from all or most SARI cases from a few facilities rather than a small sample of SARI cases from multiple facilities. In addition to being more logistically feasible this will reduce bias in the selection process.

1) Sentinel sites and sentinel site placement. Ask the group to choose partners and quickly brainstorm 2-3 ideal attributes of

1) a sentinel site, and

2) 2-3 important criteria to consider for sentinel site placement.

In addition, list some reasons why each attribute is important. After 10 minutes select volunteers to present their answers.

Draw this box on the board:

Attributes of the Site	**Explanation**
Attributes of Site Placement	

Suggested answer:

Attributes of the Site	***Explanation***
Feasiblity	*Main answer: This has many subcomponents. A sentinel site should have:* • *People that are motivated to run the system* • *Political willingness for a site to participate* • *Laboratory support for the site to maintain sampling during times of surge* • *Efficient data management and transmission capability.* *Further information:* *This refers to human resources and infrastructure necessary for efficient collection and transport of clinical specimens; data management; and timely communication of results.* *Electronic data entry and transfer methods are advantageous. Efficient mechanisms for electronic data transfer will reduce the need for redundant data entry and increase timeliness. This will importantly also increase the timeliness of feedback to clinicians reporting severe cases.*
Representative of patient population	*Main answer: Epidemiology of disease can be more accurately determined with a patient population that represents the population attributes in the larger community.* *Further information:* *The facility(ies) should provide care for patients of all ages presenting with a wide range of medical conditions including infectious diseases and chronic medical conditions.* • *For SARI surveillance, general or community hospitals are preferable to specialty care hospitals, and surveillance should include all adult medical and paediatric wards of a hospital.* • *For ILI surveillance, general outpatient clinics are often appropriate choices for sentinel sites. Specialty outpatient clinics, such as OB-GYN or diabetes clinics, do not usually represent the wider patient range and should be avoided.*
Population denominator is quantifiable	*Main answer: The population denominator is required for burden of disease estimates.* *Further information:*

	Sentinel sites should ideally be placed in areas where the population denominator can be quantified, if possible, to facilitate burden of disease estimates. In some cases, this may require additional investigations or surveys to better understand the catchment population of a sentinel site. • *The decision regarding whether or not to include large referral hospitals can be a challenging one. If possible, large referral hospitals should be avoided for routine surveillance, as it may be difficult for the surveillance staff to identify all SARI cases in the hospital, and difficult to test a large proportion of all of the identified SARI cases. In addition, if rates are to be calculated, the nature of a referral hospital will make it difficult to assess the total population served by the surveillance site. Referral hospitals typically reflect a very biased patient population because of all the referrals. This often makes it impossible to estimate denominators if you need to do it. Thus SARI surveillance in referral hospitals allows you to obtain specimens and follow trends in disease (similar to ILI surveillance) but has limited additional value.* • *A counterpoint is that referral hospitals are located in big cities where infrastructure is available and they may have doctors who are perhaps more astute clinically. You can also quickly identify lots of cases at referral hospitals. They may also be an important place to monitor the impact of a pandemic on health resources.* • *Experience has suggested that a possible compromise on these issues is to implement SARI surveillance at several facilities in a well circumscribed medium-sized city (e.g. population of around 1,000,000) . This will allow for plenty of SARI cases to be detected to allow for monitoring of viruses and trend of disease. In addition, the population of a medium-sized city can be small enough that just a few sentinel facilities in that city will together serve the total population, and hence will have a meaningful population denominator.*
Attributes of Site Placement	
Representative of population	*The population served by the sentinel sites should be representative of the broader cross-section of ethnic and socioeconomic groups of the country or region*
Representative of	*Influenza virus activity varies with climate; therefore, in some*

geographic climate	*countries, it is important to include sites from different climatic regions.*

Slides 31-45

The facilitator should present a short set of slides summarizing attributes of good sentinel sites and criteria for placement. **Conclude this section by asking two countries what sites they would choose for SARI surveillance in their country, and why?**

2) Sampling cases at sentinel sites.

For each of the following approaches for sampling cases at a sentinel site, briefly discuss how well it represents the patient population (whether it is biased), what should be done to reduce potential bias, and how feasible it would be given limited resources.

Ask the working group to assume they are establishing ILI and SARI surveillance at 4 sentinel inpatient/outpatient facilities around their country. Ask them to rank the "feasibility" and "desirability" of each sampling method below separately for both ILI and SARI.

Ranking system:

3 = most feasible	2= somewhat feasible	1 = least feasible
3 = most desirable	2=somewhat desirable	1= least desirable

NOTE: A high desirability rating can be given even if you think that a particular approach is not feasible.

A. Selecting samples from all cases
B. Selecting every X^{th} case
C. Selecting samples from cases only on a certain day (or days) of the week
D. Selecting the first x cases on a certain day of the week

Ask the group to work with their partners to fill in the following table shell:

	SARI		ILI	
	Feasibility	**Desirability**	**Feasibility**	**Desirability**
A. Selecting all cases for testing				
B. Selecting every Xth case				
C. Selecting samples from all cases on certain days of the week				
D. Selecting the first x cases on a certain day of the week				

After 10 minutes, present your suggested answers. Mention that you are hoping that people will disagree with you to stimulate discussions appropriate for this region! Ask a 2 or 3 of the working pairs that have not yet participated to report their rankings.

Slide 53

	SARI		ILI	
	Feasibility	**Desirability**	**Feasibility**	**Desirability**
A. Selecting all cases for testing	2	3	1	3
B. Selecting every Xth case	3	3	2	3
C. Selecting samples from all cases on certain days of the week	3	1-2	2	2
D. Selecting the first x cases on a certain day of the week	3	1	3	2

After a brief discussion present 2-3 slides that address the following answers:

Slides 46-52

A. *All cases (Feasibility -SARI = 2, ILI = 1; Desirability – SARI = 3, ILI= 3). Unbiased, but also requires the most resources. May not be feasible in many settings, but is much more feasible for sentinel surveillance focused on hospitalized cases (SARI). In very small countries, it may be possible for testing of SARI cases to occur on a population-wide level. If resources allow for collecting samples from all cases, this will provide the most unbiased representation of the cases in the population. Bias becomes a problem when not all of the samples can be tested.*

Testing all cases, even if only at sentinel facilities, is not feasible for ILI surveillance.

B. *Every X^{th} case (Feasibility -SARI = 3, ILI= 2; Desirability – SARI = 3, ILI=3). This type of random sampling tends to be unbiased, and uses fewer resources than sampling all cases. This is the suggested method of implementation for SARI surveillance at large sentinel hospitals where all cases cannot be tested.*

This may be feasible for ILI surveillance at sentinel sites. However more frequently, testing is limited to certain days of the week to increase compliance of outpatient clinicians and general practitioners. This method is straightforward and is less likely to be biased than other methods that only select cases on the same day or at the same time. Several considerations should be made when deciding on X, such as the number of cases typically seen at a sentinel site and the resources available to test all of the specimens collected. Additionally, laboratory resources must be used or at least available all day every day to process specimens that are selected, which may be resource intensive.

C. *All cases on a certain day(s) of the week. (Feasibility - SARI = 3, ILI= 2; Desirability – SARI = 1-2, ILI=2). This can reduce the logistical challenges of surveillance by focusing laboratory specimen collection efforts on a single day. However the day of the week that is selected for testing should be systematically alternated to avoid care-seeking biases associated with any particular day. This is not an optimal strategy for SARI surveillance (which should be an uncommon enough outcome to undertake a more systematic sampling approach) but has been considered in very rural areas, or in areas where there is very limited laboratory capacity.*

D. *First X cases on certain day(s) of the week (Feasibility - SARI = 3, ILI = 3; Desirability – SARI = 1, ILI=2). Can introduce some bias if care-seeking behaviors differ on different days of the week. May decrease resources by requiring less time from the laboratory. This is the most common approach take to pathogen-based ILI surveillance. This is not desirable for SARI surveillance. If this method is used, the selection protocol should take into account local health seeking behaviors 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. This can become a challenge when trying to estimate the proportion of all medically-attended ILI cases that may be caused by influenza or describing the*

patient population seeking care. Since this method is likely to introduce bias, it is not recommended for sampling SARI cases.

Take a 10 minute break

3) Epidemiologic data collection at sentinel sites.

Ask the group to work together to answer each of the following questions.

Pocket Guide

A. List the data elements that should be collected from ILI cases selected for laboratory testing.

Discussion should include:

- *Unique identification number*
- *Patient demographics*
- *Minimal clinical information including relevant dates of onset and clinical symptoms*
- *Pre-existing medical conditions (for SARI only)*
- *Vaccine and antiviral use*

B. What, if any, additional elements should be routinely collected from SARI cases?

Suggested answer:

- *At a minimum, pre-existing medical conditions*

*This may become a complicated discussion. Questions that will arise may involve how to define pre-existing conditions, and whether obesity should be included on the form. Also, outcome indicators (death, ICU admission etc..) may also be suggested. It is important to drive the discussion towards what can efficiently and rapidly be collected during **seasonal** surveillance, and what should be the focus of a targeted **epidemiologic investigation** (such as of the "1st 100" cases investigation in a country). Sentinel surveillance should be used as a basic way to monitor the progression and clinical characteristics of severe cases during an influenza season. In the case of this pandemic, it can also serve as a first set of information, or to "flag", those patients requiring more detailed clinical/epidemiologic follow-up.*

Conclude the discussion by passing out the SARI and ILI swab forms for discussion. Ask how this is similar or different to case-based data collection that is currently ongoing, and if countries agree or disagree with any of its elements. Ask if they feel important elements are missing.

Slides 54-60

Present slides that demonstrate the following:

- *SARI Swab Form. The SARI Swab Form should be completed for all SARI cases being tested for influenza. This form should be completed as soon as possible after admission of a SARI case to a hospital. One copy of this form should be sent to the confirmatory laboratory, packaged with the specimen. Another copy should be sent to the national surveillance centre. The original form should remain at the sentinel site. Coordination between the NIC and the national surveillance*

centre may eliminate the need for a second copy of this form to be made.

- *Outpatient Swab Form. The Outpatient Swab Form should be completed for all ILI cases being tested for influenza. This form should be completed as soon as possible after selection of a case for laboratory testing. One copy of the form should be sent to confirmatory laboratory, packaged with the specimen. Another copy should be sent to the national surveillance centre. The original form should remain at the sentinel site.*

4) Data reports and analyses.

A. Now also mention the need for weekly reporting of aggregate data from sentinel sites. Present two slides that demonstrate the following:

Slides 61-63

- *SARI Aggregate Data: 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 at the sentinel site for each epidemiologic week.*

- *Outpatient Aggregate Data. Aggregate tally of all ILI cases, the ILI cases tested for influenza, and the total number of outpatients seen at the sentinel site for each epidemiologic week.*

Pass out blank SARI (and ILI) weekly reporting forms for discussion. Ask the group to break into pairs for 10 minutes to review its contents. Ask them to consider how this is similar or different to the reporting that is currently ongoing, and if they agree or disagree with any of its elements.

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 Cases During Week						
Number of New Inpatients During Week						
Number of SARI Cases Selected for Influenza Testing						
Number of SARI Deaths During Week						

ID Number of Sentinel Site Focal Point:

Please retain a copy of this form for record at hospital and send a copy to the national surveillance centre

B. Now ask the group to pretend for a moment that they are a sentinel site coordinator. Tell them that they have compiled the data below for week 41 at their site. Using these data, fill in the weekly reporting form given at the end of this document.

Patient ID	Case Definition	Age	Gender	Specimen Collected	Status
ER1546	SARI	42	F	No	Admitted
IN4390	SARI	38	M	No	Admitted
IN3828	SARI	65	M	Yes	Admitted/Died
ER4929	ILI		F	No	Released
IN3983	SARI	8	F	No	Admitted
IN8953	SARI		M	No	Admitted
IN1264	SARI	71	F	No	Admitted
ER6753	ILI	55	F	Yes	Released
ER8231	ILI	12	M	No	Released
IN4319	SARI	27	F	Yes	Admitted
IN8347	SARI		M	No	Admitted
IN4820	SARI	19	M	No	Admitted

IN stands for inpatient, ER stands for emergency room. To keep this data shee short also assume that there were 38 total new inpatient admissions during the week. Of these 5 were aged 0-4, 5 were aged 5-14, 5 were aged 15-29, 15 were aged 30-64, 5 were aged 65+, and 3 did not have any age recorded.

Ask the group to work together for 10 minutes to complete the reporting form. Hand out the completed form for discussion. Re-emphasize the value of selecting sentinel sites with automated data entry. Query the room to determine who is using paper-based, email-based, or web-based reporting.

Suggested answer:

Sentinel SARI Surveillance: Aggregate Data Form - Week #*41*, Year *2009*

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 Cases During Week	***0***	***1***	***2***	***2***	***2***	*9**
Number of New Inpatients During Week	***5***	***5***	***5***	***15***	***5***	*38***
Number of SARI Cases Selected for Influenza Testing	***0***	***0***	***1***	***0***	***1***	*2*
Number of SARI Deaths During Week	***0***	***0***	***0***	***0***	***1***	*1*

ID Number of Sentinel Site Focal Point: XXXXX

*** Includes two patients without known age**

**** Includes three patients without known age**

Please retain a copy of this form for record at hospital and send a copy to the national surveillance centre

For the last session the facilitator should make a short presentation of 3-6 slides that covers reporting by national surveillance authorities:

Slides 78-91

This presentation should mention that the weekly report requirements are not dissimilar to what is expected of sentinel sites, but includes laboratory results and appropriate stratification of results where appropriate:

1. For SARI surveillance, these are the data that the national surveillance centre should report weekly to relevant partners:
   - Number of new SARI cases during previous week
   - Number of total new hospital admissions
   - Number of SARI cases selected for influenza testing during previous week
   - Percent of tested SARI cases positive for influenza, by influenza type and subtype
   - Number of inpatient deaths due to SARI during previous week
   - Number of sentinel SARI sites reporting

2. For outpatient surveillance, these are the data that the national surveillance centre should report weekly to relevant partners

   - Number of new ILI cases reported during previous week
   - Number of total outpatients seen at ILI sentinel site
   - Number of ILI cases selected for influenza testing during previous week
   - Percent of tested ILI cases positive for influenza, by influenza type and subtype

3. Mention that because data are aggregated at the national level, they can be stratified further, such as by:
   - Age
   - Gender
   - Laboratory confirmation
   - Sentinel site

Show/pass out the template tables for the SARI/ILI weekly report, and ask how this is similar or different to tabulations that are currently being undertaken at the national level in each country. Discuss briefly.

Summarize the session by noting that you have discussed:

1) The rationale for sentinel surveillance for seasonal and pandemic influenza monitoring
2) The case definitions that are used
3) The integration of sentinel sites into country-wide clinical reporting systems
4) Country-specific experiences in establishing sentinel site surveillance
5) Selection of sentinel sites

6) *Sampling of cases at sentinel sites*
7) *Epidemiologic data collection*
8) *Data reporting by sentinel sites and national authorities.*

Diagram of the flow of data, specimens, and reports for influenza sentinel site surveillance in humans.