

# **Overview of sentinel systems for hospitalized severe acute respiratory infections (SARI) presented in the weekly EuroFlu surveillance bulletin**

**(as of 25 March , 2011)**

During the 2010/2011 influenza season the EuroFlu weekly influenza surveillance bulletin is beginning to introduce data from sentinel surveillance systems on hospitalized severe acute respiratory infections (SARI). This document describes the SARI surveillance systems that are currently represented in the EuroFlu weekly bulletin in some more detail. Countries whose SARI data are now presented in the EuroFlu weekly surveillance bulletin 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; and,
- There has been consistent weekly reporting of epidemiological and virological data from the sentinel SARI system to the EuroFlu surveillance platform during the 2010/2011 influenza season.<sup>1</sup>

The WHO Regional Office for Europe wishes to extend its thanks to those who are working hard to establish sentinel SARI surveillance systems. One of the influenza surveillance gaps most highlighted by the emergence of the pandemic (H1N1) 2009 virus was the need for influenza surveillance systems to routinely monitor severe influenza in order to compare the severity of different influenza seasons, to monitor high risk groups, and to track the viruses which specifically cause severe disease. As noted in the WHO European Guidance for Influenza Surveillance in Humans<sup>2</sup>, surveillance systems which systematically monitor hospitalized SARI, and SARI confirmed with influenza, are directly addressing this gap. WHO/Europe looks forward to continued work with Member States to introduce surveillance data from sentinel SARI systems into the weekly bulletin. As we do so, we will update this document accordingly.

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<sup>1</sup> Reporting on a total all-cause hospitalization denominator was also deemed desirable, but not essential for reporting of data on EuroFlu, as counts can be interpretable as long as a stable number of hospitals reports every week.

<sup>2</sup> [http://www.euro.who.int/\\_data/assets/pdf\\_file/0020/90443/E92738.pdf](http://www.euro.who.int/_data/assets/pdf_file/0020/90443/E92738.pdf)

## SARI surveillance profiles by country

Armenia.....	3
Georgia.....	4
Kazakhstan .....	5
Kyrgyzstan .....	6
Malta .....	7
Republic of Moldova .....	8
Romania .....	9
Russian Federation.....	10
Serbia .....	11
Ukraine.....	12

# Armenia

Introduced in 2010, sentinel SARI surveillance currently takes place in 6 hospitals covering general medicine and paediatric wards. The hospitals are located in the capital city (Yerevan) and in two regions (Lori and Syunig). Surveillance for SARI occurs year round and case-based data are reported to the State Hygiene and Anti-epidemic Inspectorate on a daily basis. Data from all 6 hospitals are reported weekly to EuroFlu.

## **A) Location of sentinel hospitals and patients represented:**

The four hospitals located in Yerevan are:

- “St. Grigor Lusavorich” Medical centre (multi-profile hospital)
- “St. Astvatsamayr” Medical Centre (multi-profile hospital)
- “Arabkir” Institute of Adolescent and Child Care (multi-profile hospital)
- Institute of perinatology, obstetrics and gynecology

The hospital located in Lori region (Medical center #1 after L. Areshyan) includes 1 adult pulmonary, 1 paediatric, and 1 maternity care department. The hospital located in Syunig region (Medical center of Kapan city) includes 1 adult pulmonary, 1 paediatric, and 1 maternity care department.

## **B) Respiratory specimen collection and case definitions:**

Respiratory specimens are collected at all 6 hospitals from the most severe cases among patients meeting the below case definition for SARI. All age-groups are represented in the surveillance system.

SARI in persons  $\geq 5$  years old is defined as:

A person with onset of all the following symptoms  $\leq 7$  days prior to hospital admission

- Fever  $>38^{\circ}\text{C}$ ; AND,
- Cough OR sore throat; AND,
- Shortness of breath OR difficulty in breathing.

SARI in children  $< 5$  years old is defined as pneumonia OR severe pneumonia according to the Integrated Management of Childhood Illness (IMCI):

*Pneumonia*: 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).

*Severe pneumonia*: 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.

## Georgia

Sentinel hospital-based surveillance for SARI was established in Georgia in 2007 by the National Centre for Disease Control (NCDC). Currently six hospitals located in five regions are participating in SARI surveillance, but only one hospital collects both epidemiological and virological data for SARI. In the other 5 hospitals, virological surveillance is being implemented. Surveillance for SARI occurs year round and cases are notified to the NCDC on a 24-hours basis.

### ***A) Location of sentinel hospitals and patients represented:***

Hospital wards participating in the sentinel SARI surveillance include intensive care units, general/internal medicine, paediatric, and infectious disease wards. One hospital (M. Iashvili Children's Hospital - serving children aged 0-18 years) based in the capital Tbilisi routinely monitors the total number of hospitalizations meeting the SARI case definition below and tests respiratory specimens from these cases. All wards of this hospital participate in SARI surveillance. In the other 5 regional hospitals virological specimens are taken from patients fulfilling the standard SARI case definition but the total number of patients meeting the case definition is not routinely monitored, thus only virological data from these hospitals are presented on the EuroFlu platform.

### ***B) Respiratory specimen collection and case definitions:***

Respiratory specimens are taken from all hospitalized patients meeting SARI definition at M. Iashvili Children's Hospital during two selected days in the week. The standard case definition for SARI for persons  $\geq 5$  years of age is as follows:

Onset of the following symptoms  $\leq 7$  days prior to hospital admission:

- Fever  $>38^{\circ}\text{C}$ ; AND,
- Cough OR sore throat; AND,
- Shortness of breath OR difficulty in breathing.

The case definition for SARI for persons  $<5$  years of age is as follows:

- Fever  $>38^{\circ}\text{C}$ ; AND,
- Breathing faster (60 breaths/minute ages 0-1 month; 50 breaths/minute ages 2-11 month; 40 breaths/minute ages 12-59 month); AND at least one of the following symptoms:
  - Unable to drink or breastfeed; OR,
  - Vomits everything; OR,
  - Convulsions; OR,
  - Lethargic or unconscious; OR
  - Chest indrawing.

# Kazakhstan

Kazakhstan introduced SARI surveillance in 2008. Surveillance for SARI occurs year round and case-based data are reported to the Epidemiological Department, State Sanitary and Epidemiological Surveillance, Ministry of Health (Astana), on a weekly basis. Data from the 20 hospitals described below are currently represented on the EuroFlu platform.

## **A) Location of sentinel hospitals and patients represented:**

The hospitals reporting to EuroFlu are located in 7 regions of the country. The participating sites include general, paediatric, and infectious diseases hospitals. The 7 regions of Kazakhstan represented are Aktau, Astana, Petropavlovsk, Taldy-Kurgan, Taraz, Uralsk, and Ust-Kamenogorsk.

## **B) Respiratory specimen collection and case definitions:**

The hospitals collect respiratory specimens from all SARI cases admitted with exception of children <1 year of age. The case definition for SARI used in the hospitals for persons  $\geq 5$  years is as follows:

Onset of the following symptoms  $\leq 7$  days prior to hospital admission

- Fever  $>38^{\circ}\text{C}$ ; AND,
- Cough OR sore throat; AND,
- Shortness of breath OR difficulty in breathing.

SARI in children <5 years old is defined as pneumonia OR severe pneumonia according to the Integrated Management of Childhood Illness (IMCI):

*Pneumonia*: 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).

*Severe pneumonia*: 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.

# Kyrgyzstan

Sentinel surveillance for hospitalized SARI was first implemented in Kyrgyzstan during 2008 by the Sanitary and Epidemiological Service (SES), Ministry of Health. Currently 4 hospitals; 2 referral hospitals for infectious disease and 2 general hospitals, take part in SARI surveillance. Surveillance for SARI occurs year round and case-based data are reported to the SES weekly.

## **A) Location of sentinel hospitals and patients represented:**

The hospitals are located in the capital Bishkek (2) and in Osh (2), the second largest city in the country. The surveillance system includes both intensive care units and infectious disease wards. All age groups are represented in the system, except children under the age of 1 year. Data from all 4 hospitals are presented on the EuroFlu influenza surveillance platform.

## **B) Respiratory specimen collection and case definitions:**

The hospitals systematically screen all hospital admissions using a standard SARI case definition. All patients meeting the case definition are reported to the SES. Respiratory specimens are collected from those SARI cases with reported onset of symptoms within 72 hours of their admission using a standardized selection procedure. The surveillance protocol stipulates that specimens be collected from the first eligible patient per age group per day (Mon, Tue, Wed, Thu, Fri) with a maximum of 3 samples per age group per week. Respiratory specimens are not collected from children under 1 year of age.

The case definition for SARI in persons aged  $\geq 5$  years old used in all hospitals is:

Onset of the following symptoms  $\leq 7$  days prior to hospital admission

- Fever  $>38^{\circ}\text{C}$ ; AND,
- Cough OR sore throat; AND,
- Shortness of breath or difficulty in breathing.

For children aged  $<5$  years the WHO case definition for pneumonia and severe pneumonia is applied:

### *Pneumonia*

- Cough OR difficulty breathing; AND,
- Breathing faster than 40 breaths /minute (children 12 - 59 month)
- Breathing faster than 50 breaths /minute (children 2 - 11 month)

### *Severe pneumonia*

- Cough OR difficulty breathing; AND,
- Any of the following general severe signs:
  - Unable to drink or breastfeed; OR,
  - Vomits everything; OR,
  - Convulsions; OR,
  - Lethargic or unconscious; OR
  - Chest indrawing or stridor in a calm child.

# Malta

Sentinel SARI surveillance was provisionally implemented in the only state hospital in Malta during the influenza A (H1N1) 2009 pandemic and re-introduced in week 51 2010. Case based reporting of SARI cases was performed on a daily basis from week 51, 2010 to week 8, 2011, after which data are reported twice a week until the end of April, 2011. The results are sent to the Infectious disease prevention and control unit within the Department of Health Promotion and Disease Prevention.

## ***A) Location of sentinel hospitals and patients represented:***

The hospital (Mater Dei) is located in Msida, and provides care for the whole population of 405.000 inhabitants. All wards of the hospital are included in the SARI surveillance.

## ***B) Respiratory specimen collection and case definitions:***

Respiratory specimens are collected from all SARI patients meeting the below case definition. All age groups are represented in the surveillance system.

Two SARI case definitions are applied in the hospital for persons  $\geq 5$  years of age:

- Pneumonia

And;

- A person with onset of the following symptoms during the previous 7 days prior to hospitalization:
  - Fever  $>38^{\circ}\text{C}$ ; AND,
  - Cough or sore throat; AND,
  - Shortness of breath or difficulty breathing.

Respiratory specimens may also be collected from patients who develop influenza like symptoms or pneumonia while hospitalized.

For children aged  $<5$  years the following case definition for SARI is applied:

- Cough or difficulty breathing (Respiratory rate  $> 40$  or  $> 50$  in children less than 1 year); AND any of the following general danger signs:
  - Unable to drink or breastfeed,
  - Vomits all fluid/food intake,
  - Convulsions,
  - Lethargic or unconscious,
  - Chest indrawing or stridor in a calm child.

# Republic of Moldova

Sentinel SARI surveillance was established in the Republic of Moldova in 2009. Data presented on EuroFlu are from 9 sentinel districts. Sentinel surveillance for SARI occurs year round and aggregated data are reported on a weekly basis to the National Center for Public Health which coordinates SARI surveillance in the country.

## ***A) Location of sentinel hospitals and patients represented:***

Nine sentinel districts across the country, including the capital Chisinau, take part in the surveillance. The surveillance sites represent a wide range of hospitals, wards or first medical assistance units and include intensive care units, general and internal medicine wards, paediatric wards, chronic disease wards and respiratory disease wards.

## ***B) Respiratory specimen collection and case definitions:***

Respiratory specimens are collected from all SARI cases in all age groups when influenza activity is low in the country. As soon as influenza activity increases, specimens are collected from pregnant women, children up to 5 years, patients in ICU, and medical workers according to the case definition described below.

The case definition for SARI is:

Onset of the following symptoms  $\leq 7$  days prior to hospital admission

- Fever  $>38^{\circ}\text{C}$ ; AND,
- Cough OR sore throat; AND,
- Shortness of breath OR difficulty in breathing.

In addition, patients with **acute pneumonia** or **bronchiolitis** are defined as SARI cases.

# Romania

SARI surveillance was established in 12 hospitals in 2009. In 2010, the National Centre for Surveillance and Control of Communicable Diseases, the National Institute of Public Health, Romania, introduced SARI surveillance in an additional 14 hospitals, increasing the total number of SARI sentinel hospitals to 26. Data from all 26 hospitals are presented on EuroFlu. Case based data reporting of SARI cases occurs on a weekly basis to the National Centre, from 15 of November (week 46), until a date which will be communicated by the National Centre for Surveillance and Control of Communicable Diseases, based on the evolution of epidemiological situation.

## ***A) Location of sentinel hospitals and patients represented:***

The hospitals are located in 8 counties throughout the country and in Bucharest Municipality. They include emergency hospitals, infectious diseases, pneumology, and paediatric hospitals. Infectious diseases wards, ICU's, internal medicine wards and paediatric wards participate in SARI surveillance. Patients of all age groups are represented in the surveillance system.

## ***B) Respiratory specimen collection and case definitions:***

Before onset of influenza activity (season), samples from all SARI cases are investigated for influenza. Of the samples testing negative, 50% are investigated for other aetiologies. After onset of influenza activity (season), one sample per week for each sentinel hospital is collected from the first SARI case detected and the sample is tested only for influenza.

The clinical case definition for SARI in persons  $\geq 5$  years of age is:

Onset of the following symptoms  $\leq 7$  days prior to hospital admission:

- Fever  $>38^{\circ}\text{C}$ ; AND,
- Cough OR sore throat; AND,
- Shortness of breath OR difficulty in breathing.

For children aged  $< 5$  years the WHO case definition for pneumonia and severe pneumonia is applied:

### *Pneumonia*

- Cough OR
- Difficulty breathing AND
- Breathing faster than 40 breaths /minute (12 - 59 month)
- Breathing faster than 50 breaths /minute (2 - 11 month)

### *Severe pneumonia*

- Cough OR difficulty breathing; AND,
- Any of the following general severe signs:
  - Unable to drink or breastfeed; OR,
  - Vomits everything; OR,
  - Convulsions; OR,
  - Lethargic or unconscious; OR,
  - Chest indrawing or stridor in a calm child.

# Russian Federation

The Russian Federation introduced sentinel SARI surveillance in 2010 in 18 hospitals, located in 9 cities within 6 Federal Districts. Sentinel surveillance for SARI occurs year round and case-based data are reported on a weekly basis to the National Influenza Centre at the Research Institute of Influenza (St. Petersburg, Russia)

## **A) Location of sentinel hospitals and patients represented:**

Surveillance takes place in intensive care units, and respiratory disease wards of infectious diseases hospitals. In all cities except St. Petersburg, surveillance includes both children and adults (in St. Petersburg only children are included).



## **B) Respiratory specimen collection and case definitions:**

Respiratory specimens are collected from a sub-sample of SARI cases of all ages in the surveillance system. No standard selection procedure exists, although the samples are taken from all patients in the beginning of the season. With an increasing number of SARI cases as influenza season progresses, specimens are taken from the majority of SARI patients. Data presented on EuroFlu are generally from 11-15 of 18 hospitals included in SARI surveillance.

The standard case definition for SARI in persons above 5 years of age is as follows:

Onset of the following symptoms  $\leq 7$  days prior to hospital admission

- Fever  $>38^{\circ}\text{C}$ ; AND,
- Cough OR sore throat; AND,
- Shortness of breath OR difficulty in breathing.

# Serbia

Sentinel SARI surveillance was implemented in Serbia in November 2009. During the 2009/2010 pandemic influenza A(H1N1) 2009 season, SARI surveillance was performed year round. During the 2010/2011 influenza season sentinel SARI surveillance is carried out during the winter season only, from week 40 to week 20. Aggregated data from the surveillance system are reported on a weekly basis to the Institute of Public Health of Serbia.

## ***A) Location of sentinel hospitals and patients represented:***

Currently 10 sentinel hospitals in 4 cities (Belgrade, Kragujevac, Novi Sad and Niš) participate in the SARI surveillance system. Intensive care units (ICU), infectious disease wards, paediatric wards, respiratory disease wards are all represented. The data presented on EuroFlu come from 9 - 10 of these hospitals on a weekly basis.

## ***B) Respiratory specimen collection and case definitions:***

Respiratory specimens are collected from all SARI patients in intensive care units (ICU) that meet the SARI case definition and which have ARDS (Acute Respiratory Distress Syndrome). Respiratory specimens are also collected from a selection of SARI cases from wards other than the ICU. Both adult and paediatric patients are represented. For all laboratory confirmed cases, case-based data are collected and include patient demographics, clinical signs and symptoms, underlying chronic conditions and risk factors, antiviral use during current illness, vaccination history for current season, severity of illness, and patient outcomes.

The case definition for SARI is as follows:

A person hospitalized with the following symptoms:

- Fever  $>38^{\circ}\text{C}$ ; AND,
- Cough OR sore throat; AND,
- Shortness of breath OR difficulty in breathing.

# Ukraine

Sentinel SARI surveillance was initiated in Ukraine in 2007. SARI surveillance is year round and data are reported to central level on a weekly basis.

## A) Location of sentinel hospitals and patients represented:

Ukraine selected 10 hospitals that are located in the Kiev City, Odessa, Khmelnitsky and Dnipropetrovsk cities 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/or infectious wards of the selected hospitals. Data from all 10 hospitals are reported to EuroFlu and all age-groups are represented.



## B) Respiratory specimen collection and case definitions:

Currently, specimens are taken from the first 4-6 patients per week meeting the SARI case definition in each of the selected hospitals.

SARI in patients  $\geq 5$  years old is defined according to the following:

- Acute respiratory disease of the lower respiratory tract requiring hospitalization with the following symptoms:
  - Fever  $>38^{\circ}\text{C}$ ; AND,
  - Cough OR sore throat; AND,
  - Shortness of breath OR difficulty in breathing.

SARI in patients  $< 5$  years old is defined as:

- Fever  $>38^{\circ}\text{C}$  AND Tachypnea ( $>60$  per minute for infants aged 0-1 months;  $>50$  per minute in children aged 2-11 months;  $>40$  per minute in children 12-59 months); AND at least one of the following symptoms:
  - Inability to drink OR eat OR breastfeed; OR,
  - Lethargic or unconscious; OR,
  - Repeated vomiting; OR,
  - Seizures; OR,
  - Retraction of the chest.