



Enhanced Surveillance for Hospital-Admitted Severe Acute Respiratory Infections (SARI) 2010-2012 Project Summary

Project Background

- In Arizona, epidemiological surveillance data for influenza currently includes monitoring Influenza-like Illness (ILI) among ambulatory patients at sentinel surveillance sites, tracking laboratory-confirmed cases, monitoring school absenteeism, and other local activities;
- Data on influenza and other respiratory pathogens as causes of Severe Acute Respiratory Illness (SARI) and SARI-related mortality in hospital patients do not currently exist in Arizona;
- Other pathogens, including coccidioidomycosis, a common cause of pneumonia in Arizona, may cause or exacerbate SARI, either with or without concurrent influenza infection;
- Integrating hospital-based surveillance for SARI with existing influenza surveillance will complement and strengthen both of these surveillance activities;
- Enhancing clinic-based and hospital-based surveillance for influenza and other respiratory pathogens will enhance the ability to detect influenza strains currently in circulation, and monitor causes of mortality among inpatients with SARI.
- This will provide a clearer epidemiological picture of influenza activity in our community, and enable public health and community health partners to build on preparedness strategies and control measures to combat different influenza virus strains, as well as detect new virus subtypes, changes in existing strains, and other etiologic agents of SARI.

Project Objectives

- Isolate and antigenically characterize influenza and other respiratory viruses;
- Determine, on a weekly basis and by age category, the proportion of all hospitalizations attributable to SARI, and the proportion of confirmed influenza and other selected respiratory pathogens among SARI case-patients;
- Provide epidemiologic and clinical characteristics of influenza-positive SARI cases and compare with influenza-negative SARI cases;
- Determine the proportion of SARI-associated deaths among all hospitalizations and among all hospitalized deaths;
- Determine the overall case-fatality ratio of SARI cases by type of infecting respiratory pathogen.

Project Benefits

- Measure the impact and incidence of SARI and detect etiologies of public health significance, such as influenza, Pertussis, RSV, *Legionella pneumophila*, *Coccidioides*, and other emerging or novel infections;
- Guide vaccination allocation planning and efficacy evaluation for illness that may be vaccine preventable;
- Offer free testing to physicians and patients to identify etiology of infections. Results are reported back to physicians and clinical sites, these data may offer additional detail about the etiologies of the respiratory infection and may be used for patient treatment or for future care.

Project Methods

- Collection of clinical signs and symptoms, demographic information, co-morbidities, lab test results, and healthcare seeking behaviors of SARI patients. Arizona Department of Health Services (ADHS) has the authority to collect these data under existing communicable disease surveillance rules (ARS R9-6-102).
- Respiratory (nasopharyngeal and throat swabs), and Sera specimens will be tested to identify the etiology of the current infection and any co-infections.
- All databases and completed forms will be kept secure and confidential and stored and maintained in accordance with ADHS confidentiality policies.
- All analyses will be conducted with de-identified data, and results will only be presented at an aggregate level.

Population under surveillance

Any **admitted** patient seeking medical care at the emergency department of the participating sentinel hospital sites is eligible to be enrolled if he/she presents with the following clinical symptoms of severe acute respiratory disease:

Patients 5 years or older
Fever $\geq 100^{\circ}$ F (37.8 $^{\circ}$ C) **or** self-reported fever **AND**
Cough and/or sore throat and/or shortness of breath

Patients less than 5 years old
Clinical suspicion of pneumonia

Sample Collection

Patients meeting the clinical case definition of SARI will have a nasopharyngeal swab collected in ED prior to admission. Attempt to use remnant specimens or to split specimens will be coordinated to limit the number of additional specimens collected.

Tests to be completed

- **Molecular Viral Panel ***

- Sample Type: General upper respiratory
- Sample Collection: Nasopharyngeal swab collected in ED prior to admission
- Sample Volume: > 0.5ml or swab in viral transport media
- Method: Immunodiffusion (ID) using ResPlex II v2.0 RT-PCR identification
- Test Results:

Influenza (A/B)	Coxsackie/Echovirus
RSV (A/ B)	Rhinovirus
Parainfluenza (1, 2, 3,& 4)	Adenovirus (B/E)
Human metapneumovirus	Bocavirus
Coronavirus (NL63, HKU1, 229E, & OC43)	

- **Molecular Bacterial Panel**

- Sample Type: Lower Respiratory (Bronchial Aspirate, Bronchial Brush, Bronchial Lavage, Bronchial Wash)
- Sample Collection: Split lower respiratory specimen remnant
- Sample Volume: Swab or > 0.5ml washings or aspirates
- Method: Single-plex PCR for respiratory bacterial pathogens reflex to Bacterial Culture
- Test Results:

<i>Mycoplasma pneumonia</i>	<i>Neisseria meningitide,</i>
<i>Chlamydia pneumonia</i>	<i>Haemophilus influenzae</i>
<i>Legionella pneumophila</i>	<i>Bordetella pertussis</i>
<i>Streptococcus pneumonia</i>	

- **Fungal (Coccidioidomycosis) Testing***

- Sample Type: Remnant
- Sera Sample Volume: > 1ml sera
- Method: Immunodiffusion (ID) of Coccidioidomycosis and/or Meridian Enzyme Immuno Assay (EIA) IgM + IgG, ID of IgM + IgG

* Initial testing will take place at University of Arizona, College of Medicine Infectious Disease Research Core. Additional reference testing and subtyping will be performed by Arizona State Public Health Laboratory, Naval Health Research Center, and Centers for Disease Control and Prevention Laboratories