Overview of the National Respiratory and Enteric Virus Surveillance System

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Epidemiologist

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Objectives

- Describe the National Respiratory and Enteric disease Surveillance System (NREVSS)
- Explain how NREVSS data contributes to influenza surveillance at the national and state level
Outline

- NREVSS Overview
  - Website
  - Reporting Structure
- Data Applications
- Influenza Surveillance
  - National
  - Texas
- Participating in NREVSS
NREVSS Overview

- **Passive, laboratory-based surveillance system**
  - Specimen-based
  - Developed in the early 1980s
  - Electronic data since 1989

- **Monitors real-time circulation of respiratory and enteric viruses**

- **Monitors trends in seasonality of respiratory and enteric viruses**
NREVSS Overview

- **Data sources**
  - State and local public health laboratories, commercial labs, and hospitals/universities

- **Test types**
  - Antigen detection
  - Virus isolation
  - PCR

- **Weekly reporting of no. tests and no. positives**

\[
\text{Circulation} = \frac{\text{# positive results}}{\text{# tests performed}}
\]
NREVSS Overview

Viruses include:

- Influenza
  - 2009 AH1N1, Seasonal AH1N1, AH3N2, A Unknown, Flu B
- Respiratory Syncytial Virus (RSV)
- Human Parainfluenza (HPIV) Viruses 1-4
- Respiratory & Enteric Adenovirus
- Rotavirus
- Human Metapneumovirus*
- Enterovirus*
- Rhinovirus*

* added in 2007
### NREVSS Overview

<table>
<thead>
<tr>
<th>Season</th>
<th># reporting labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-2001</td>
<td>81</td>
</tr>
<tr>
<td>2001-2002</td>
<td>86</td>
</tr>
<tr>
<td>2002-2003</td>
<td>80</td>
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<td>2003-2004</td>
<td>94</td>
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<td>2004-2005</td>
<td>96</td>
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<td>2005-2006</td>
<td>106</td>
</tr>
<tr>
<td>2006-2007*</td>
<td>393</td>
</tr>
<tr>
<td>2007-2008*</td>
<td>648</td>
</tr>
<tr>
<td>2008-2009*</td>
<td>717</td>
</tr>
<tr>
<td>2009-2010*</td>
<td>678</td>
</tr>
</tbody>
</table>

*Surveillance Data, Inc. (SDI), a private company that conducts RSV surveillance with support from MedImmune, Inc. (Gaithersburg, Maryland), contributes laboratory data to NREVSS.*
NREVSS Overview

- **2009-2010 National Statistics**

<table>
<thead>
<tr>
<th>Virus</th>
<th># labs reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSV</td>
<td>652</td>
</tr>
<tr>
<td>Influenza</td>
<td>288</td>
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<tr>
<td>Rotavirus</td>
<td>203</td>
</tr>
<tr>
<td>Respiratory Adenovirus</td>
<td>129</td>
</tr>
<tr>
<td>HPIV 1-4</td>
<td>128</td>
</tr>
<tr>
<td>Enterovirus</td>
<td>74</td>
</tr>
<tr>
<td>hMPV</td>
<td>61</td>
</tr>
<tr>
<td>Rhinovirus</td>
<td>56</td>
</tr>
<tr>
<td>Enteric Adenovirus</td>
<td>32</td>
</tr>
</tbody>
</table>
Map of Participating NREVSS Labs

http://www.cdc.gov/surveillance/nrevsslabs/map.html
Current NREVSS Website

http://www.cdc.gov/surveillance/NREVSS/
Each participating lab is given an individual lab ID and password.
Data Applications

- Recognize and consider possible etiologies and outbreaks of respiratory and enteric diseases
- Determine seasonality of viruses
- Real-time reporting and greater public access to data
**Data Applications – Outbreak**

- **Fall 2009**
  - Hospital in an urban setting
  - Increase in emergency room visits for respiratory disease
  - Very few flu positive lab results
    - Pandemic H1N1?
  - CDC asked to investigate
Data Applications

- Recognize and consider possible etiologies and outbreaks of respiratory and enteric diseases
- Determine seasonality of viruses
- Real-time reporting and greater public access to data
Respiratory Virus Seasonality, United States, July 2005 – March 2010

- Human Parainfluenza 1
- Human Parainfluenza 2
- Human Parainfluenza 3
- Influenza (All Subtypes)
- Respiratory Syncytial Virus

% Positive Tests

Antigen Detection
Virus Isolation
Data Applications

- Recognize and consider possible etiologies and outbreaks of respiratory and enteric diseases
- Determine seasonality of viruses
- Real-time reporting and greater public access to data
Surveillance Reports

2007-2008


- Florida
- Region 6 (Dallas)
- Region 2 (New York)
- Region 4 (Atlanta)
- Region 3 (Philadelphia)
- Region 5 (Chicago)
- Region 7 (Kansas City)
- Region 9 (San Francisco)
- Region 1 (Boston)
- Region 10 (Seattle)
- Region 8 (Denver)

*U.S. Department of Health & Human Services regions (headquarter city): Region 1 (Boston): Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont; Region 2 (New York): New Jersey and New York; Region 3 (Philadelphia): Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia; Region 4 (Atlanta): Alabama, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee; Region 5 (Chicago): Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin; Region 6 (Dallas): Arkansas, Louisiana, New Mexico, Oklahoma, and Texas; Region 7 (Kansas City): Iowa, Kansas, Missouri, and Nebraska; Region 8 (Denver): Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming; Region 9 (San Francisco): Arizona, California, Hawaii, and Nevada; Region 10 (Seattle): Alaska, Idaho, Oregon, and Washington. Note: Maine, New Hampshire, District of Columbia, New Mexico, Nebraska, Montana, and Idaho did not have any participating laboratories in the 2007-08 season analysis.

http://www.cdc.gov/Features/dsRSV/
NREVSS

INFLUENZA SURVEILLANCE
National Influenza Surveillance

- **Data Sources (~155 laboratories)**
  - 85 U.S. WHO collaborating labs
    - All state public health laboratories
    - Some county public health laboratories
    - Some large tertiary care or academic medical centers
  - 70 NREVSS labs
    - Chosen based on geographic region
    - Excluding NREVSS labs that may also be WHO collaborating labs
    - Supplements existing WHO data
National Influenza Surveillance

- **WHO Lab**
  - Resources to subtype
  - Report on age vs.

- **NREVSS Lab**
  - Report subtypes if available
  - No demographic information

- **Data Applications**
  - **H1N1 pandemic**
    - timing and extent of influenza circulation
    - impact of other respiratory viruses

- **Help describe unexplained increases in ILI**
Epidemiology/Surveillance
U.S. WHO/NREVSS Collaborating Laboratories, National Summary, 2008-09

http://www.cdc.gov/flu/weekly/
National Influenza (NREVSS Data)

Unpublished Data
NREVSS: Texas

- **64 participating labs from 52 cities**
  - Limited data from 1990
  - 27 report flu
  - **2008-2009**
    - 85,709 tests, 12490 pos = 14.6%
  - **2009-2010**
    - 128,344 tests, 16643 pos = 13.0%

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>RSV</td>
<td>53</td>
</tr>
<tr>
<td>Influenza</td>
<td>27</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>21</td>
</tr>
<tr>
<td>Respiratory Adenovirus</td>
<td>10</td>
</tr>
<tr>
<td>HPIV 1-4</td>
<td>10</td>
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<td>hMPV</td>
<td>5</td>
</tr>
<tr>
<td>Enterovirus</td>
<td>4</td>
</tr>
<tr>
<td>Rhinovirus</td>
<td>4</td>
</tr>
<tr>
<td>Enteric Adenovirus</td>
<td>2</td>
</tr>
</tbody>
</table>
Texas Influenza Trends (NREVSS)

Unpublished Data
Summary

- **NREVSS**
  - Passive surveillance system
  - Specimen-based
  - Information on circulating respiratory and enteric viruses

- **Influenza**
  - Supplements U.S. WHO surveillance
  - Trends in influenza subtypes and other contributing pathogens
Limitations

- **Generalizability**
  - Not population based
  - Insufficient representation of certain geographic regions
  - No demographic information

- **Specimen-based reporting**

- **Some delays in reporting**
Participate in NREVSS

- Uniform reporting structure
- Not labor intensive
- Epidemiological information and support
- Better regional representation

Contact: NREVSS@cdc.gov
Thank You!

jmutuc@cdc.gov

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov  Web: www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.
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  - Sign in.
  - Attend entire educational activity.
  - Complete evaluation.
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