Learning Objectives

- Review H1N1 timeline
- Describe surveillance and epidemiology of H1N1 in New Mexico (to date...)
- Describe some inherent obstacles to rapid response within a bureaucracy
- Describe the impact of H1N1 on other disease investigation work
- Describe the first part of NMDOH’s self-assessment

Influenza Surveillance Background

- Influenza as a reportable disease
  - Lab-confirmed influenza hospitalization reportable
  - Pediatric influenza deaths reportable since 2004
  - April 2009 novel influenza reportable
- Influenza-like illness Network (ILI Net)
  - ILI is fever and cough and/or sore throat
  - 26-28 Sentinel sites in NM
  - Reporting since 1990's

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Influenza Surveillance Background

- Laboratory testing
  - Summary reporting of tests performed and # positive
- Influenza deaths – Vital Records and Office of the Medical Investigator (OMI)
  - Death certificates from Vital Records
  - OMI performing viral cultures on suspicious deaths

Influenza Surveillance Background

- Border surveillance
  - 2nd season
  - 16 sites along the US/Mexico border
  - Share data weekly on visits for influenza-like illness
  - Specimens transported across border for testing
- Emerging Infections Program (EIP)
  - Influenza surveillance in NM since 2004
  - Started with pediatric cases in Bernalillo County
  - Expanded to 6 counties in 2008

H1N1: April 15 – June 11, 2009

- April 15 & 17 – TX & CA 2 cases
- April 26 - Release of 25% of the Strategic National Stockpile
- June 11, 2009 WHO declares a pandemic
- April 23, 2009 additional H1N1 cases* in TX & CA
- May 2 - NM's first confirmed case

* TX & CA viruses were genetic matches with genetic material from swine, avian, and human influenza strains - a novel influenza virus
What is New and Different About 2009-10 Influenza Surveillance?

- Statewide reporting of influenza hospitalizations
- Case investigations for every confirmed influenza hospitalization
- Standardized case investigation form
- Demographics, type of care, antiviral treatment, immunization history, underlying medical conditions
- Deaths reported for lab-confirmed influenza cases

What is New and Different About 2009-10 Influenza Surveillance?

- Enhanced lab surveillance
  - PCR at no charge through State Lab (SLD)
  - Lab testing encouraged for all hospitalized patients
- Greater data sharing with Emerging Infections Program
- Enhanced provider/public education

Highly Resource Intensive Stuff
Case Definitions

- Hospitalization
  - Admission to inpatient ward
  - Overnight stay not required
- Suspect influenza hospitalization
  - Hospital admission for Influenza-Like Illness or other suspicious symptoms for influenza
  - Lacking positive flu test

Case Definitions

- Confirmed influenza hospitalization
  - NM resident
  - Hospital admission
  - Positive flu PCR or culture (9/1/09-10/11/09), any positive flu test (10/12/09 and thereafter)

2009 H1N1 in New Mexico: Select Statistics
New Mexico Lab-Confirmed Influenza Hospitalizations Overview

<table>
<thead>
<tr>
<th>Measure</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total NM hospitalizations, 4/2009 - 2/2010</td>
<td>955</td>
</tr>
<tr>
<td>Overall NM rate</td>
<td>48.1 per 100,000</td>
</tr>
<tr>
<td>Region with lowest rate</td>
<td>Central: 37.8 per 100,000</td>
</tr>
<tr>
<td>Region with highest rate</td>
<td>Southeast: 57.3 per 100,000</td>
</tr>
<tr>
<td>Total counties with lab-confirmed hospitalization</td>
<td>30 out of 33</td>
</tr>
</tbody>
</table>

Influenza Hospitalization Rates by Region

- Northwest: 53.0
- Northeast: 45.0
- Central: 37.8
- Southeast: 57.3
- Southwest: 55.6
**Comparison: New Mexico, United States and California H1N1 by Other Factors**

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>New Mexico (% total cases)</th>
<th>United States (% total cases)</th>
<th>California (% total cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obese</td>
<td>12%</td>
<td>29%</td>
<td>33%</td>
</tr>
<tr>
<td>Morbidly obese</td>
<td>5%</td>
<td>26%</td>
<td>25%</td>
</tr>
<tr>
<td>ICU</td>
<td>18%</td>
<td>25%</td>
<td>31%</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>11%</td>
<td>15%</td>
<td>25%</td>
</tr>
<tr>
<td>Antiviral use</td>
<td>70%</td>
<td>75%</td>
<td>79%</td>
</tr>
</tbody>
</table>

**H1N1 Influenza Hospitalization Summary**

- 0-4 age group with highest hospitalization rate, >2 times higher than any other age group
- American Indians with highest rate, 3.5 times higher than Whites, 1.6 times higher than Hispanics
- 76% of those hospitalized had high-risk factors/conditions
- Asthma, cardiovascular disease and diabetes all significant risk factors for hospitalization

**Influenza Death Surveillance**

- Receive reports from hospital-based infection preventionists (IPs), general public, housing authority, clinicians, Office of the Medical Investigator
- Receive weekly reports and death certificates from Bureau of Vital Records and Health Statistics

*Highly Resource Intensive Stuff*
Case Definitions: H1N1 Influenza Death

- Resident of New Mexico
- Any positive influenza test
- Cases individually reviewed to assess timeframe from positive test to death
- May or may not have been hospitalized
- Death data = April through February 2010

Influenza Death Rates by Age Group

Influenza Death Rates by Sex
Influenza Death Rates by Race/ethnicity

Comparison: Death rates by Race/ethnicity

- Deaths Related to 2009 Pandemic Influenza A (H1N1) Among American Indian/Alaska Natives – 12 States, 2009
  (MMWR, Dec. 11, 2009/Vol. 58/No. 48, pages 1341-1344)
  - 12 States: Alabama, Alaska, Arizona, Michigan, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, Wyoming
  - Represents 50% of the American Indian/Alaska Native population in U.S.
  - 426 deaths in total
  - 42 of total deaths were among American Indian/Alaska Natives

Comparison: New Mexico and 12 States* Death Rates by Race/ethnicity

*Deaths Related to 2009 Pandemic Influenza A (H1N1) Among American Indian/Alaska Natives – 12 States, 2009
  • MMWR, Dec. 11, 2009/Vol. 58/No. 48, pages 1341-1344

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Comparison: New Mexico and 12 States* by High-risk Factors

<table>
<thead>
<tr>
<th>Risk factor/condition</th>
<th>New Mexico (n=50)</th>
<th>12 States (n=426)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>14%</td>
<td>16%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>24%</td>
<td>26%</td>
</tr>
<tr>
<td>Any high-risk factor</td>
<td>72%</td>
<td>78%</td>
</tr>
</tbody>
</table>

*Deaths Related to 2009 Pandemic Influenza A (H1N1) Among American Indian/Alaska Natives—12 States, 2009  
MMWR, Dec. 11, 2009/Vol. 58/No. 48, p1341-1344

Influenza Deaths by Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Case count</th>
<th>Percent of total cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU admission</td>
<td>28</td>
<td>56%</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>24</td>
<td>48%</td>
</tr>
<tr>
<td>Antiviral use</td>
<td>24</td>
<td>48%</td>
</tr>
</tbody>
</table>

Influenza Deaths by Place of Occurrence

- 72% of deaths occurred while hospitalized
- 22% of deaths occurred at home
- 6% of deaths occurred in hospital ER
H1N1 Influenza Death Summary

- 50-64 age group with highest death rate, 1.5 times higher than any other age group
- American Indians with highest death rate, 2 times higher than both Whites and Hispanics
- 72% of those who died had high-risk factors/conditions
- Age group, race/ethnicity, and high-risk factors similar to 12 state study population

Limitations

- Missing data and data quality
- Potential for racial misclassification
- Lack of standardized definitions for some underlying conditions
- Includes only lab-confirmed cases
- Change in case definitions and case investigation form over time

Strengths

- Statewide reporting to centralized health department
- Widespread participation from hospitals
- 2 primary labs doing confirmatory testing
- Individual level of data including underlying conditions

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Lessons Learned

- Significant resources needed to conduct this level of surveillance
- Need to consider methods to compare with other influenza seasons (i.e. deaths)
- Difficulties in changing case definitions and data collection tools

What has been done with these data?

- Health Alert Network (HAN) notifications
- Weekly media updates
- Policy development

Pandemic Response
NMDOH Realities: Hiring

- Average Number of Days From Posting Close to HR Submission:
  40 days*
- Average Number of Days From Posting Closed to Position Filled:
  53 days*

*Data taken from internal “Dashboard” reports submitted to the Secretary of Health as part of his continuous quality improvement efforts at NMDOH. Averages are department-wide and reflect the time period of June 2009–October 2009.

NMDOH Realities: Contracts

- Minimum Number of Days from Contract Submission to Execution within the Epidemiology and Response Division:
  73 days*


ILI vs. Onset of Hospitalization Surveillance

*Graph showing New Mexico Influenza-like Illness (ILI) % by MMWR week, 2009-2010.*

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ILI vs. Vaccine Received

ILI vs. Phase III Funds vs. Vaccine Received

Effects on Routine Work

- Survey of NMDOH staff responsible for conducting foodborne disease (Campylobacter, Salmonella, Shigella) investigations during the pandemic
- Survey conducted using Survey Monkey in March and April 2010
- 30 respondents
- 18 (60%) public health nurses; 9 (30%) epidemiologists; 3 (10%) other
Effects on Routine Work

- 20 (80%) respondents worked on foodborne disease investigations during height of the pandemic (Sept. through Dec. 2009)
- Average 11 hr/wk (range: 1-40 hr/wk) on foodborne investigation during the pandemic
- 19 (95%) directed to work on H1N1 response activities an average of 23 hr/wk (range: 4-40 hr/wk) during the pandemic
- Not known how this compares to non-pandemic years

H1N1 response negatively impacted ability to conduct investigations: 16 (80%) agreed
H1N1 response negatively affected timeliness of investigations: 13 (65%) agreed
H1N1 response negatively impacted investigation quality: 10 (50%) agreed

ILI vs. Time to Complete Routine Infectious Disease Investigations

[Graph showing the relationship between ILI % and Mean Days to Complete Infectious Disease Investigations]
Internal Evaluation

- Survey of Senior Leaders at NMDOH: including State Epidemiologist, Deputy State Epidemiologist, State Laboratory Director, Medical Director for Public Health, Regional Public Health Director, Influenza Surveillance Director
- Survey begun in April 2010
- 7 respondents to date
- Likert scale rating key components of pandemic response (scale = 0-4, with 4 being the best)
- Average scores of all respondents
- Preliminary data

### Internal Evaluation: Results

<table>
<thead>
<tr>
<th>Component</th>
<th>Rating</th>
<th>Systemic Preparedness</th>
<th>Operational Readiness</th>
<th>Adequacy of Funding</th>
<th>Resource Availability</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza-like illness surveillance</td>
<td>4.0</td>
<td>4.0</td>
<td>3.9</td>
<td>3.4</td>
<td>3.8</td>
<td>19.8</td>
</tr>
<tr>
<td>Hospital surveillance</td>
<td>3.7</td>
<td>2.5</td>
<td>1.8</td>
<td>1.8</td>
<td>2.4</td>
<td>12.8</td>
</tr>
<tr>
<td>Death surveillance</td>
<td>3.8</td>
<td>3.8</td>
<td>3.7</td>
<td>3.2</td>
<td>3.2</td>
<td>18.8</td>
</tr>
<tr>
<td>Influenza vaccination</td>
<td>3.9</td>
<td>3.8</td>
<td>3.7</td>
<td>3.2</td>
<td>3.2</td>
<td>18.8</td>
</tr>
<tr>
<td>Antiviral distribution</td>
<td>3.9</td>
<td>2.4</td>
<td>2.6</td>
<td>2.4</td>
<td>2.3</td>
<td>12.8</td>
</tr>
<tr>
<td>Vaccine distribution</td>
<td>3.9</td>
<td>2.6</td>
<td>2.6</td>
<td>3.1</td>
<td>2.7</td>
<td>15.8</td>
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<td>Strategic National Stockpile</td>
<td>3.9</td>
<td>1.8</td>
<td>2.7</td>
<td>2.3</td>
<td>2.2</td>
<td>11.8</td>
</tr>
<tr>
<td>Personal Protective Equipment</td>
<td>3.9</td>
<td>3.1</td>
<td>3.4</td>
<td>2.9</td>
<td>2.1</td>
<td>15.6</td>
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<tr>
<td>Laboratory</td>
<td>3.9</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
<td>16.4</td>
</tr>
</tbody>
</table>

### Lessons Learned

- We were very lucky (mildest pandemic in 100 years)
- Large bureaucracies create institutional obstacles that prevent rapid response
- Without surge capacity, existing staff fill the gap
- Routine, though important, work may be delayed or abandoned which creates other potential risks
Recommendations

- Analyze pending After Action Report (AAR) survey responses from external partners
- Develop processes for emergency hiring, emergency contracting and emergency procurement that allow for ‘rapid’ response
- Assess system weaknesses based on data and evidence and modify the pandemic plan accordingly
- Cross-train personnel and exercise surge capacity

Thanks

- Deborah Thompson, MD, MPH, NMDOH (influenza surveillance data)
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- C. Mack Sewell, DrPH, MS, NMDOH State Epidemiologist (internal evaluation data and editing)
- Joan Baumbach, MD, MPH, NMDOH (editing)