University of Minnesota
Veterinary Diagnostic Laboratory
Responding to Highly Pathogenic Avian Influenza
10/24/15
AAVLD Plenary Session

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Highly Pathogenic Avian Influenza

- Foreign Animal Disease
- Reportable to OIE
- Agent is classified as a Select Agent and handled in BSL-3 conditions
- Wild birds are thought to be the source of the virus
- Segmented virus – vulnerable to mutation and reassortment
- High mortality
11:00 am

just 2 hours later
Figure 1. Typical mortality pattern observed in infected turkey flocks.
United States Poultry Industry

- 49 million turkeys = $600 million
- 46 million broilers = $87.2 million
- 10 million layers = 2.7 billion eggs
- 1.5 million pheasants
- 1 billion dollars

#1 Producer of Turkeys in the US
#18 Broiler production #9 Eggs
HPAI in the US 2014-2015

Pacific Flyway
HPAI H5N8 and H5N2

- Captive gyrfalcon 12/14
- Northern Pintail (wild) 12/15
- Backyard Poultry 12/19
- Mallard, Am Widgeon 12/24
- Backyard Poultry 1/3, 1/9
- Mallard 1/12
- Backyard Poultry 1/16
- Backyard Poultry 1/16
- Backyard poultry 2/17
- California – Commercial turkey H5N8 1/23
- Backyard poultry 1/29, 2/3
- California – Commercial chicken H5N8 2/12
- Backyard poultry 2/17
USDA data: Commercial premises only
VDL submissions: 231

USDA data: Commercial premises only
VDL submissions: 783

USDA data: Commercial premises only
VDL submissions: 1709

USDA data: Commercial premises only
VDL submissions: 1584

USDA data: Commercial premises only
VDL submissions: 1241

USDA data: Commercial premises only
VDL submissions: 1142

USDA data: Commercial premises only
VDL submissions: 1190

USDA data: Commercial premises only
VDL submissions: 982

USDA data: Commercial premises only
VDL submissions: 998

USDA data: Commercial premises only
VDL submissions: 1042 (1076, 980...)

USDA data: Commercial premises only
H5N2 detections – Midwest States 2015

<table>
<thead>
<tr>
<th>State</th>
<th>Detections</th>
<th>Dates</th>
<th>Birds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td>101</td>
<td>3/4 – 6/5</td>
<td>8,987,050</td>
</tr>
<tr>
<td>Iowa</td>
<td>75</td>
<td>4/19 – 6/17</td>
<td>31,723,300</td>
</tr>
<tr>
<td>South Dakota</td>
<td>10</td>
<td>4/1 – 6/1</td>
<td>1,168,200</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>10</td>
<td>4/11 – 5/6</td>
<td>1,950,733</td>
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<tr>
<td>North Dakota</td>
<td>2</td>
<td>4/10 – 4/24</td>
<td>111,500</td>
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United States Totals
- 21 States
- 219 detections
- 16 NAHLN labs
- 48 million birds
- 700 million overall costs
So What Did it Mean to the UMN VDL?

1. Disease detection and identification

2. Surveillance

   - Movement
   - Re-stocking

3. Business continuity
   - Movement
   - Re-stocking

Testing, testing, testing....
Number of AI tests by week, March 2015 – September 2015

UMN VDL AI Testing

US H5N2 Positives
Increased workload

- Lab Receiving
- Molecular Diagnostics
- Administration
- IT
- Virology
UMN VDL Molecular Diagnostic Testing
March 1, 2015 to July 31, 2015

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Routine</th>
<th>Outbreak</th>
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<tbody>
<tr>
<td>Avian Influenza</td>
<td>1,916</td>
<td>17,053</td>
</tr>
<tr>
<td>PRRS Testing</td>
<td>32,908</td>
<td></td>
</tr>
<tr>
<td>SECD Testing</td>
<td>22,053</td>
<td></td>
</tr>
<tr>
<td>Other Testing</td>
<td>24,262</td>
<td></td>
</tr>
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17,053 outbreak tests on top of 81,139 routine tests (21% increase)
Successes and Challenges

• Successes
  • Excellent staff stood up to the challenge posed by largest FAD outbreak in US history
  • NO FALSE POSITIVES out of over 18,000 tests
  • Only 3 complaints on timeliness of results
  • Capacity: proficiency tested staff, plenty of supplies, adequate equipment

• Challenges
  • Communication
  • Test Scheduling
  • Capacity: Staffing

• NAHLN Resources
Communication challenges

• Messaging results
  • NO PREM IDs!

• Relationship with Industry
  • Between VDL, Industry, USDA and BAH not as well developed

• Changing needs
  • Testing schedule changes
  • Courier delivery schedule changes
Scheduling Challenges

• Timing of testing and results reporting
  • Testing 2X per day, 3X per day
  • After hours communications

• Courier schedules
  • Wilmar MN to St. Paul MN : 2 ½ hours

• 2 more testing runs per day (3 total) plus weekends
Staffing Challenges

- Long hours 8 am – midnight plus weekends for several months
- Staff burnout/ sick time /vacation time
- Temporary help for Prem IDs
- Cannot hire/train for AI PCR testing in short term because of extensive training and experience needed.
NAHLN Resources

• Send AI testing to other NAHLN Labs
  • Backyard flock testing sent to SDSU, NDSU
  • Sending out sick bird, surveillance, or movement testing would not be feasible because of business continuity/timing issues.

• PT tested techs sent to UMN VDL2
  • 3 Proficiency-tested technicians from 3 different NAHLN labs were sent to the UMN VDL to provide scheduling relief for 3 weeks: May 4 – May 25
  • Once trained, the techs provided relief for laboratory staff for evening and weekend shifts.
Logistical Issues – NAHLN Technicians

- Unfamiliarity with the lab and specific UMN VDL protocols and laboratory staff.
- Needed training on lab specific equipment
- Required UMN lab safety training
- Required UMN VDL Quality Assurance Training
- Required training on UMN VDL LIMS system
- Required increased supervision
What’s Next?

• How do we prepare for the fall? For next spring? for the next disease outbreak?
• What can we do better?
Thank you UMN VDL Staff and Faculty

Molecular Diagnostics Staff

Thank you
Stephanie Rossow
Mary Thurn
Elizabeth Wiedenman
Tracy Otterson
Sunil Mor
Rob Porter
Jim Collins
Roger Main
MN VDL Staff
MN Board of Animal Health
NAHLN
AAVLD