Influenza Surveillance – Animal and Public Health Partnership

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Outline

• Background on influenza surveillance in swine
• Case example – animal health and public health partnership
• Influenza communications
• Conclusions
• Next steps
Swine Influenza Surveillance Plan
Influenza surveillance

- Prior to 2009, collaborative work was ongoing with CDC, AASV, USDA and NPB to develop a pilot for influenza in swine surveillance
- The identification of the influenza A (H1N1) pdm09 virus accelerated that surveillance program implementation
- The goal was to get a broad range of isolates from industry to determine what was “out there”
Animal and human health objectives

- Monitor the evolution of endemic influenza in swine to better understand endemic and emerging virus ecology
- Make available isolates for research and establish an objective database for genetic analysis
- Select proper isolates for the development of relevant diagnostic reagents, updating diagnostic assays and vaccine seedstock products
Animal and human health objectives

• Public health link
  – Further research
  – Sensitize the human health surveillance network in the state
  – Collaborate with animal health to ensure coordinated risk communication – when necessary
How does the plan work?

1. Case-compatible swine accessions submitted to veterinary diagnostic labs
   - On-farm, influenza-like illness (ILI)

2. Swine exhibiting ILI at first points of concentration such as auctions, markets, fairs or other swine exhibition events

3. Swine populations epidemiologically linked to a confirmed isolation of human influenza
   - Coordination between public and animal health officials
   - Follow up with the cooperation of the owner
How are results reported?

• Results are reported into the USDA Surveillance unit by NAHLN laboratories as **anonymous** data or **traceable** data
• An isolate of the virus is placed in the NVSL repository
• Selected virus isolates are sequenced and entered in GenBank
• Public health/research/industry/others can monitor GenBank for sequences of interest
Influenza surveillance program data

- Thirty-seven NAHLN Laboratories are testing swine samples for SIV surveillance
- Over two years, more than 2,100 accessions and almost 7,000 samples have been tested
- The number of samples submitted for testing increased sharply in November 2010
Number of herds (accessions) tested for SIV, FY 2010 and October - June 2011

*Estimating number of herds tested for SIV was initiated in December 2009; although swine were tested in October and November 2009, accurate information on the number of herds tested in that period is not available.
SIV surveillance activities overview

Accessions: 2718
Positive Accessions: 1030
VI Positives: 545
pN1 + Accessions: 169
Subtyped Accessions: 400

Courtesy of Dr. John Korslund, USDA-APHIS
Subtype breakdown FY2010-current

- H3N2-19%: 78 (19%)
- H1N2-39%: 156 (39%)
- H1N1-39%: 96 (24%)
- H1pN1: 11 (3%)

Courtesy of Dr. John Korslund, USDA-APHIS
Pork industry outreach

- Brochure and newsletter sent to all 66,000 producers as of Nov. 1, 2010
- Sent to all state veterinarians and public health counterparts
- Also available on www.pork.org
- Coincided with increase in accession submissions in November 2010
Swine veterinary community outreach

- Brochure sent to 1,350 U.S. AASV members and students
2011-2012 Flu Season
Animal health and public health partnership
Case example

• In the second half of 2011, some U.S. residents were found to be infected with influenza A variant viruses, primarily H3N2v
• H3N2v is a reassortant virus that contains components of human, avian, swine and H1N1 influenzas
Case example

- Between August 2011 and December 2011, there were 12 CDC-reported human infections with variant influenza A viruses in five states since August 2011. No further cases have been identified.

- Public health and animal health officials worked closely to continue to monitor influenza in the human and animal population.
Case example - Background

• On September 2, 2011 a *Morbidity and Mortality Report* (MMWR) Early Release was issued entitled “Swine-Origin Influenza A (H3N2) Virus Infection in Two Children – Indiana and Pennsylvania, July-August, 2011.”
Genome Comparisons of H3N2 SOIV 2005-2011

2005-2010 Human cases of SOIV H3N2 from Triple Reassortant Swine

2011 Indiana and Pennsylvania Human cases of SOIV H3N2

2009 H1N1 Pandemic

Classical Swine – North American Lineage
Avian – North American Lineage
Human Origin H3N2
Eurasian Swine Lineage
Case example - Background

• Genetic sequencing of both viruses showed a genetic variation – the acquisition of the Matrix gene, or “M” gene, from the influenza A (H1N1) pdm09 virus in place of the original M gene in the swine-origin triple reassortant H3N2 virus
Case example – What followed...

- Collaborative and coordinated response from animal health and public health
- Animal health follow-up with the exhibitors at the fair
- Held education and awareness sessions for exhibitors at upcoming fairs
- Prepared to sample and test a points of concentration
Case example – What followed...

- Public health follow-up with close contacts to the cases, potential additional sources of the patients’ infection and with ill contacts of fair exhibitors and attendees
- Prospective human surveillance at upcoming fairs
Case example - Outcomes

• Collaborative and coordinated surveillance between animal health and public health

• Information sharing – ongoing updates with strategic partners
  – Animal health – APHIS, State Animal Health Board
  – Public health – Centers for Disease Control, State Public Health Department
  – Pork industry – National Pork Board, National Pork Producers Council, State Pork Associations, American Association of Swine Veterinarians
Case example - Outcomes

- Successful application of influenza surveillance program and response plans
More activities...
2012 Flu Season
Influenza Communications
Influenza

Standardization of terminology for the variant A (H3N2) virus recently infecting humans

Joint announcement of FAO, OIE and WHO

23 December 2011

FAO, OIE and WHO continue working closely together to address influenza issues related to public health and animal health.

Since July 2011, twelve human cases of infection with a variant influenza A(H3N2) virus have been detected in the United States. To date, no report has been received from elsewhere in the world. This virus has different virological characteristics from current circulating seasonal influenza viruses in humans, and has a new gene constellation: 7 genes from the triple reassortant A(H3N2) viruses known to have been circulating in pigs in the North America and the M gene from an A(H1N1)pdm09 virus, a seasonal virus currently circulating in humans.

In order to improve communications and avoid confusion, FAO, OIE and WHO have established a working group of experts to standardize the terminology for variant influenza viruses. The joint recommendation for the above mentioned A(H3N2) virus is: A(H3N2)v, where “v” stands for “variant”.

An example of use of the terminology:

- Sporadic human cases of infection with a variant influenza A(H3N2) virus A(H3N2)v have been reported in the USA. The A(H3N2)v virus is different from seasonal viruses currently circulating in humans.

For more information, please contact FAO at GLEWS@fao.org, OIE at scientific.dept@oie.int and WHO at gisrs-whohq@who.int.
U.S. Pork Industry: Impact of H1N1

- On April 29, 2009, H1N1 tracking began
- Within 3 weeks 99.3 percent of consumers had heard of H1N1
- In the first 13 weeks, 3.6 percent of respondents said they would avoid eating pork and 2.5 percent said they would avoid eating pork in the last five weeks (ending late September)
New naming convention

• When an influenza virus that normally circulates in swine (but not people) is detected in a person, it is called a “variant influenza virus.”

• For example, if a “swine-origin” influenza A H3N2 virus is detected in a person, that virus will be called an “H3N2 variant” virus or “H3N2v”
Conclusions & Next Steps
Conclusions

• Timely sequencing of isolates is important to monitor the evolution of endemic influenza in swine
  – Central in selecting proper isolates for the development of relevant diagnostic reagents and updating vaccine seedstock products
  – Vital to the protection of both animal and human health
Conclusions

• Aligning of human and animal health messaging is important and should be focused on appropriate terminology and key points to understand the situation and best practices for influenza prevention
What happens now?

• Ongoing surveillance efforts
• Continued dialogue and partnership between animal health and human health
• Sequencing of isolates and analysis of data
• Communication of surveillance data to producers and other stakeholders
• Meeting the animal health objectives of the surveillance plan
• Model for comprehensive swine disease surveillance
Thank you