Veterinary Services

Veterinary Services Swine Activities

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U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Veterinary Services
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Overview

– Comprehensive and Integrated Surveillance (CIS)
  • Pseudorabies and Swine Brucellosis
  • Foreign animal disease surveillance (CSF, ASF and FMD)
  • Influenza A Virus in Swine
  • Enhanced passive surveillance

– Swine Health Protection

– APHIS feral swine project

– Swine Enteric Coronavirus Disease (SECD)
<table>
<thead>
<tr>
<th>Data Stream</th>
<th>Targeted Populations</th>
<th>Pathogen-Specific Surveillance</th>
<th>Non-Pathogen Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CSF</td>
<td>FMD</td>
</tr>
<tr>
<td>Harvest (slaughter) surveillance</td>
<td></td>
<td></td>
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<tr>
<td>Market swine</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Commercial-growers &amp; finishers / pork</td>
<td>X</td>
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<tr>
<td>Cull sow boar</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Commercial- breeding populations</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Roaster</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Commercial; Higher probability of dz</td>
<td>X</td>
<td>X</td>
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<tr>
<td>FAD / Emerging disease reporting</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Foreign animal disease</td>
<td>Domestic and feral swine</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Suspicous cases reported</td>
<td>Domestic and feral swine</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Commingling locations</td>
<td></td>
<td></td>
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<tr>
<td>Live animal markets</td>
<td>Domestic and feral swine</td>
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<tr>
<td>Public exhibitions, sick pigs</td>
<td>Domestic swine</td>
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<tr>
<td>Suspicous cases reported</td>
<td>Domestic and feral swine</td>
<td>X</td>
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<td>Diagnostic laboratory submissions</td>
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<tr>
<td>Case compatible sick pig</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Commercial – Targeted - high value</td>
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<td>X</td>
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<tr>
<td>Routine serology / herd profiles</td>
<td>Commercial swine</td>
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<tr>
<td>Suspicous cases reported</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Commercial – Targeted high value</td>
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<tr>
<td>High probability of feral exposure</td>
<td>Domestic swine – Targeted high value</td>
<td>X</td>
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<tr>
<td>Suspect exposure to feral swine</td>
<td>Domestic swine</td>
<td></td>
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<td>On-Farm collections</td>
<td></td>
<td></td>
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<tr>
<td>Waste feeding operations</td>
<td>Domestic swine – Targeted high value</td>
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<td>X</td>
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<tr>
<td>Designated high risk areas</td>
<td>Domestic swine – Targeted high value</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Exposure to feral swine</td>
<td>Domestic swine – Targeted high value</td>
<td>X</td>
<td>X</td>
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<td>Wildlife monitoring</td>
<td></td>
<td></td>
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<tr>
<td>Opportunistic feral swine</td>
<td>Feral swine- monitor disease reservoirs</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Targeted feral swine sampling</td>
<td>Feral swine - in high dz risk areas</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Enhanced Passive surveillance</td>
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<tr>
<td>FSIS condemnation data</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Commercial</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Practitioner observations</td>
<td></td>
<td></td>
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<tr>
<td>Livestock market observations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VDL syndromic submissions</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
## PRV Surveillance FY 2010-2014

<table>
<thead>
<tr>
<th>Surveillance Stream/ Targeted population</th>
<th>Number of swine tested FY 2010</th>
<th>Number of swine tested FY 2011</th>
<th>Number of swine tested FY 2012</th>
<th>Number of swine tested FY 2013</th>
<th>Number of swine tested FY 2014 Q1-Q3</th>
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<tbody>
<tr>
<td>Diagnostic laboratory serologic submissions:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Sick pig submissions</td>
<td>34</td>
<td>1,890</td>
<td>165</td>
<td>427</td>
<td>152</td>
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<tr>
<td>Routine serology/herd profiling</td>
<td>16,212</td>
<td>26,070</td>
<td>22,566</td>
<td>19,646</td>
<td>19,165</td>
</tr>
<tr>
<td>Swine w/ high probability of feral exposure</td>
<td>636</td>
<td>1,207</td>
<td>916</td>
<td>2,143</td>
<td>5,163</td>
</tr>
<tr>
<td>Swine w/known feral swine exposure</td>
<td>8</td>
<td>160</td>
<td>250</td>
<td>669</td>
<td>818</td>
</tr>
<tr>
<td>Epi traceback investigation</td>
<td>58</td>
<td>95</td>
<td>31</td>
<td>810</td>
<td>59</td>
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<tr>
<td>Total - Diagnostic lab serologic submissions</td>
<td>16,958</td>
<td>29,442</td>
<td>23,928</td>
<td>23,696</td>
<td>25,360</td>
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<tr>
<td>Cull sow-boars at slaughter</td>
<td>278,022</td>
<td>290,304</td>
<td>277,808</td>
<td>239,284</td>
<td>178,887</td>
</tr>
<tr>
<td>Market swine at slaughter</td>
<td>13,318</td>
<td>13,795</td>
<td>8,833</td>
<td>11,370</td>
<td>7,238</td>
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<tr>
<td>Feral swine</td>
<td>2,563</td>
<td>3,161</td>
<td>2,804</td>
<td>2,393</td>
<td>2,026</td>
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<tr>
<td>Swine cases highly suspicious for PRV</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>310,861</strong></td>
<td><strong>336,702</strong></td>
<td><strong>313,373</strong></td>
<td><strong>276,742</strong></td>
<td><strong>213,511</strong></td>
</tr>
</tbody>
</table>

**FY 2014 - No commercial herds identified as infected with PRV**
### Swine Brucellosis Surveillance FY 2014

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cull sow-boars at slaughter</td>
<td>54,848</td>
<td>67,579</td>
<td>56,460</td>
<td>...</td>
<td>178,887</td>
</tr>
<tr>
<td>Feral swine</td>
<td>285</td>
<td>1,026</td>
<td>696</td>
<td>...</td>
<td>2,007</td>
</tr>
<tr>
<td>TOTAL</td>
<td>55,133</td>
<td>68,605</td>
<td>57,156</td>
<td>...</td>
<td>180,894</td>
</tr>
</tbody>
</table>

**FY 2014 - No commercial herds identified as infected with Brucellosis**
PRV and Swine Brucellosis

- PRV sample reduction at cull sow/boar slaughter
  - Per 2008 PRV surveillance plan collaboratively developed
  - Continue to collect ~ 575,000 to 600,000 samples annually; test only ~ 280,000 of those samples
  - To date, no positive commercial herds
  - Continue to find positive transitional herds
- Concept Paper: Published Feb. 7, 2013
PRV and Swine Brucellosis

• Proposed changes
  – Align PRV and Swine Brucellosis testing (CIS concept)
  – Reduction in slaughter surveillance activities
    • Continues to meet all surveillance goals
    • Creates efficiency and cost savings
    • Allows savings to target more high valued samples to support disease freedom
PRV and Swine Brucellosis Surveillance FY 2015

- Continue PRV surveillance in NAHLN labs
- Move towards swine brucellosis testing of high-risk herds in NAHLN labs
- Refinement of PRV and Brucellosis surveillance
  - USDA’s analyses of PRV & SB slaughter surveillance (oversampling at slaughter plants)
  - Revision of surveillance plans and implementation
Foreign Animal Disease (FAD) Surveillance in swine

- Incorporation into the CIS system
- Currently includes
  - Classical swine fever (CSF)
  - African swine fever (ASF)
  - Foot and Mouth disease (FMD)
Classical Swine Fever

• Surveillance Streams
  – Swine highly suspicious for CSF - Investigations
  – Sick pigs submitted to veterinary diagnostic labs
  – High-risk slaughter swine
  – Feral swine
  – Swine from waste feeding operations in high-risk States
Classical Swine Fever

- No Positives Identified

<table>
<thead>
<tr>
<th>Surveillance stream</th>
<th>Quarter 1 Oct-Dec 2013 YTD Totals</th>
<th>Quarter 2 Jan-Mar 2014 YTD Totals</th>
<th>Quarter 3 Apr-Jun 2014 YTD Totals</th>
<th>Quarter 4 Jul-Sep 2014 YTD Totals</th>
<th>All quarters FY 2014 YTD Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic laboratories</td>
<td>850</td>
<td>598</td>
<td>496</td>
<td>-</td>
<td>1,944</td>
</tr>
<tr>
<td>High-risk slaughter swine</td>
<td>582</td>
<td>442</td>
<td>195</td>
<td>-</td>
<td>1,219</td>
</tr>
<tr>
<td>Feral swine</td>
<td>280</td>
<td>1021</td>
<td>704</td>
<td>-</td>
<td>2,005</td>
</tr>
<tr>
<td>Domestic swine in States with higher probability of CSF introduction</td>
<td>1022</td>
<td>1353</td>
<td>1304</td>
<td>-</td>
<td>3,679</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2,734</strong></td>
<td><strong>3,414</strong></td>
<td><strong>2,699</strong></td>
<td>-</td>
<td><strong>8,847</strong></td>
</tr>
</tbody>
</table>

†Year-to-date totals are updated each time a new quarterly report is produced
CSF OIE Status update

- USDA submitted to OIE for recognition for historical freedom in September 2014;
- Final outcome expected in the spring
ASF and FMD Surveillance Pilot

Objectives:

1. **Enhance awareness** for the reporting /collection of samples from cases compatible with ASF and FMD.

2. **Implement active diagnostic testing for ASF and FMD** surveillance in eight authorized laboratories from the NAHLN.

3. **Collect baseline surveillance information** from surveillance streams that could be used to substantiate ASF and FMD disease freedom and to monitor for early detection of disease.

4. **Exercise a communication plan** for potential suspect cases of ASF and FMD and ensure that all parties involved understand the communication process and implement it in an effective and timely manner.

5. **Increase diagnostics preparedness** and provide the laboratory testing network with an exercise for a potential outbreak.
ASF and FMD Surveillance Pilot

• 12 month pilot / 8 approved NAHLN labs
• Sept 2014 FMD implemented. ASF delay
• Notification plan = handled same as CSF
• ASF or FMD suspected → FAD investigation
• Surveillance streams = CSF
• Test: rRT-PCR
• Sample types
  ASF = whole blood (EDTA)
  FMD = oral swabs
  FADDL validation of additional tests and tissues
Influenza A Virus in Swine (IAV-S)

• Efforts towards changing “SIV” to “IAV-S”
  – Working to update USDA documents and websites

• Surveillance continues
  – Case compatible accessions submitted to D-Labs
    • Anonymous
    • Traceable
  – Commingling events
  – Swine linked to human cases of variant influenza
    • 2012 (300+ human cases)
    • 2013 (19 cases)
    • 2014 (2 cases to date)
Influenza A Virus in Swine

- Adjustments to testing algorithm for efficiency in collecting valued information

- APHIS and Iowa State collaboration
  - Influenza vaccine guidance documents

- APHIS and ARS collaboration continues
  - Testing novel viruses in pigs
  - Molecular analysis of surveillance isolates

- Continued collaboration with Ohio State University on IAV-S at fairs
63,953 Samples (not graphed)
15,781 Accessions
5,743 Positive Accessions
2,069 Accessions with viral isolates
3,718 Accessions subtyped
2,487 Samples sequenced to Genbank
Enhanced Passive Surveillance Overview

• Multiple-data stream syndromic surveillance through monitoring of:
  – Slaughter condemnations
  – Livestock markets
  – Veterinarian and producer on farm health
  – Diagnostic laboratory submissions
  – Wildlife data

• VS partnered with Dept. of Homeland Security (DHS) and Texas A&M’s Institute for Infectious Animal Diseases (IIAD)

• VS Liaison detailed with DHS for this project

• DHS providing funding for EPS system development
Enhanced Passive Surveillance

**Active Surveillance**
- Analytical
- Risk-based, targeted
- Slaughter
- Programmatic, OIE list diseases

**Enhanced Passive Surveillance**
- Participatory, community-based
- Opportunistic
- Disease Agnostic
- Vets/Producers

**Diagnostic Laboratory**
- Internationally recognized assays
- ELISA, PCR
- Sequencing
- LIMS/submission form data
- Test orders
- Test results

**Animal Disease Surveillance**
EPS: Slaughter condemnation

- Monitored weekly
- Three classes of swine
  - Sow/boar, Roasters, Market
- Ante-mortem condemnations
  - CNS, DOA and Pyrexia
- Postmortem condemnations
  - Septicemia, Erysipelas, Pneumonia
- Signals verified through FSIS
- Verified signals are communicated to Industry for field observations
Swine Health Protection

- 9 CFR 166 – Requires licensing and treatment of garbage (waste material derived from meat of any animal) fed to pigs *
- Data as of 9/30/2014
  - ~1,120 licensed premises
    - ~676 in PR
  - Inspections of licensed premises
    - 5,490 premise inspections
    - 1,089 temperature checks
    - 51 violations
    - Consequences of a violation
      - 28,774 searches for non-licensed feeders
      - 122 non-licensed feeders found
Swine Health Protection

September 2014

- Permit Garbage Feeding (20 States + PR & VI)
- Prohibit Garbage Feeding (22 States)
APHIS Feral Swine Initiative

- **Feral Swine**
  - WS continues to work with VS and IS (International Services) to develop a feral swine program
  - Funded ~ $20 Million in FY 2014 budget
    - Operational (Feral swine control and eradication where possible)
    - Research
    - Surveillance and sampling
    - Modeling
  - VS’ role
APHIS NFS Program Components
VS is Involved/Supporting

• Program Components
  • Field operations (WS)
  • Disease and Population Monitoring (VS, WS, IS)
  • Analysis/Modeling/Research (WS, VS)
  • Planning, Evaluation, and Monitoring (WS, PPD)
  • Communication and Outreach (LPA, WS)
Current Monitoring Activities

Pseudorabies
FY14: 20.7%

Brucellosis
FY14: 10.0%

Influenza A virus (serology)
FY14: 6.9%

PRRS
FY14: 1.9%
Swine Enteric Coronavirus Disease

• Porcine epidemic diarrhea virus (PEDV) identified May, 2013
• Spread to 31 states, with approximately 7 million piglet deaths.
• Porcine Delta coronavirus (PDCoV) identified February 2014
Federal Order (FO)

• June 5, 2014
• Federal Order- Reporting, Herd Monitoring and Management of Novel Swine Enteric Coronavirus Disease
  – Establishes mandatory disease reporting
  – Establishes requirements for development of herd monitoring and management plans
Federal Order: Purpose

• Determine the total number of currently infected and newly infected herds along with location
  – Collect information to characterize and understand the scope of SECD

• Decrease the shedding and spread of SECD
  – Facilitate safe movement by assisting control of viruses through industry recommended biosecurity practices
  – Herd Management plans
About the Federal Order

• Mandatory reporting of an initial detection or reoccurrence of previous
  – Reporting of presumptive of confirmed positive cases
    • Herd owners,
    • Producers
    • Veterinarians
    • Laboratory personnel
    • Anyone with knowledge of disease identifying PEDV

• Report to SAHO or APHIS Assistant District Director
About the Federal Order

• What must be reported

• Case Definition
  – Presumptive positive - A herd that has tested positive by PCR or VI or genetic sequencing with non-specific, unknown or known clinical signs
  – Confirmed positive - A herd that tested positive and has a history of clinical signs consistent with SECD
About the Federal Order

• Herd Management Plan
  – For Confirmed Positive Premises
    • Biosecurity of visitors
    • Monitoring employee biosecurity
    • Periodic herd health
    • Animal movements
    • Maintenance of records
    • Cleaning and disinfections of facilities
    • Diagnostic testing to monitor the status
Biosecurity Activities

• Confirmed positive premises
• Indicated in herd plan
  – Payment for livestock vehicle washing
  – Payment of disinfectant purchases.
NAHLN and Testing

• Current reimbursement with FO
  – Individual animal samples and environmental samples derived from animals.
    • Intestine
    • Feces
    • Fecal swabs
    • Oral fluid
    • Environmental samples associated with farm site and live pigs
  – Environmental samples from truck washing or research samples are not reimbursable.
Vaccines and diagnostics

• CVB is receiving information that multiple companies are looking at vaccines and diagnostics for SECD.

• Two vaccines on market now with a conditional license.
Data

• EMRS
  – Receives LMS data
  – Confirmed positives and presumptive positive
  – Herd Plan
  – Biosecurity procedures

• DATA must be entered in EMRS
PDCoV Map (October 9, 2014)

PDCoV Positive Biological Accessions
Created: October 9, 2014

Positive Accessions with No State Recorded: 10
Situation report: Confirmed positive premises: PEDv

CUMULATIVE STATISTICS: PEDV Positive Premises confirmed (June 5, – October 8, 2014) -By Case Definition
Situation report: Confirmed positive premises: PDCoV
Cumulative Positive Premises by Production Type

<table>
<thead>
<tr>
<th>Production type</th>
<th>Number of herds positive (n=408)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farrow to Finish</td>
<td>21</td>
</tr>
<tr>
<td>Finisher</td>
<td>86</td>
</tr>
<tr>
<td>Nursery</td>
<td>57</td>
</tr>
<tr>
<td>Sow/Breeding</td>
<td>107</td>
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<tr>
<td>Wean to Finish</td>
<td>86</td>
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<tr>
<td>(blank)</td>
<td>51</td>
</tr>
</tbody>
</table>

Note: "(blank)" indicates some submitters have not yet provided information on positive premises production type.
Cooperative Agreements

• Funds available for States and Tribes
  – Activities supporting decreasing shedding and spread
  – State swine health committees
  – Data support in EMRS
  – Supplying disinfectant
  – Awareness and education
  – Evaluation and analysis of disease control measures, biosecurity and disease pathways
  – Activities supporting collection and monitoring of samples
• Award for Truck Wash Directory (Iowa State)
• Award for investigation into SECD
  – General information (National Pork Board)
  – Nasal transmission (Univ. of MN)
Resources

• Public Information
  - On USDA website

• ***Versions change, please stay current***
SECD and the Federal Order

• Successes
  – Data
  – Disease Reporting Officer
  – Use of Premises identification
  – Development of reimbursement procedures and protocols
  – Active engagement of industry and States
Questions?