Swine Health Information Center Update
USAHA Transmissible Diseases of Swine Committee
Paul Sundberg, DVM, PhD
Executive Director

global disease monitoring, targeted research investments and analysis of swine health data
Swine Health Information Center

Mission

Protect and enhance the health of the US swine herd through

• coordinated global disease monitoring,
• targeted research investments that minimize the impact of future disease threats and
• analysis of swine health data
Swine Health Information Center

- Board of Directors
  - NPB         Mark Greenwood   Brett Kaysen
  - NPPC        Howard Hill      Bill Luckey
  - AASV        Matt Anderson    Daryl Olsen
  - At Large    Mark Schwartz    Mike Terrill   Matthew Turner

global disease monitoring, targeted research investments and analysis of swine health data
Monitoring and Analysis Working Group

Practitioners
- Joe Connor
- Jer Geiger, Genus PIC
- Steve Henry
- Clayton Johnson
- Gordon Spronk
- Paul Yeske

Pork Producers
- Craig Christensen, Iowa
- Jim Niewold, Illinois
- Ray Summerlin, NC

Universities
- Dick Hesse, KSU
- Daniel Linhares, ISU
- Rodger Main, ISU
- Bob Morrison, UMN
- Mike Murtaugh, UMN
- Chris Rademacher, ISU
- Stephanie Rossow, UMN
- Albert Rovira, UMN
- Kent Schwartz, ISU
- Fabio Vannucci, UMN

Industry Associations
- Lisa Becton, NPB
- Tom Burkgren, AASV
- Dave Pyburn, NPB
- Harry Snelson, AASV
- Liz Wagstrom, NPPC
- Patrick Webb, NPB

USDA
- Dana Cole, CEAH
- Michael McIntosh, FADDL

global disease monitoring, targeted research investments and analysis of swine health data
Preparedness and Response Working Group

Practitioners
- Dave Bomgaars
- Marlin Hoogland

Pork Producers
- Brad Greenway, SD
- Conley Nelson, Iowa

Animal Health Companies
- Wayne Chittick, BI
- Christa Goodell, BI (Idexx)
- Bill Nelson, Tetracore

Universities
- Gene Erickson, NCSU
- Jim Collins, UMN
- Ying Fang, KSU
- Jane Christopher-Hennings, SDSU
- Derald Holtkamp, ISU
- Jeff Zimmerman, ISU

Industry Associations
- Lisa Becton, NPB
- Tom Burkgren, AASV
- Dave Pyburn, NPB
- Harry Snelson, AASV
- Liz Wagstrom, NPPC
- Patrick Webb, NPB

USDA
- Cecilia Antognoli, CEAH
- Kelly Lager, ARS
- Sabrina Swenson, NVSL

global disease monitoring, targeted research investments and analysis of swine health data
Monitoring and Analysis

global disease monitoring, targeted research investments and analysis of swine health data
### Swine Disease Matrix Project

#### Criteria
- Production Impact
- Market and Trade Impact
- Likelihood

#### June 2016
- Review and revision underway
- Additions/deletions
- Survey
  - Japan (2); Korea; Philippines (2); China (2)
  - Poland/Ukraine/East Europe (2); UK; Spain
  - Brazil (2); Chile; Columbia (2)
  - U.S.

---

<table>
<thead>
<tr>
<th>Representative virus affecting swine</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot and Mouth Disease (FMD)</td>
<td>8.42</td>
</tr>
<tr>
<td>Classical Swine Fever (CSF)</td>
<td>8.26</td>
</tr>
<tr>
<td>African Swine Fever (ASF)</td>
<td>7.83</td>
</tr>
<tr>
<td>Influenza A Virus</td>
<td>6.17</td>
</tr>
<tr>
<td>Pseudorabies Virus - Pathogenic Chinese Strain</td>
<td>6.08</td>
</tr>
<tr>
<td>PRRS</td>
<td>5.95</td>
</tr>
<tr>
<td>Nipah Virus</td>
<td>5.87</td>
</tr>
<tr>
<td>PRRS - Chinese High Pathogenic</td>
<td>5.51</td>
</tr>
<tr>
<td>Porcine Epidemic Diarrhea Virus (PED)</td>
<td>5.31</td>
</tr>
<tr>
<td>Swine Vesicular Disease Virus</td>
<td>5.07</td>
</tr>
<tr>
<td>Japanese Encephalitis</td>
<td>4.83</td>
</tr>
<tr>
<td>Vesicular Stomatitis Virus</td>
<td>4.50</td>
</tr>
<tr>
<td>Porcine Teschovirus (Teschen/PTV1 are exotic)</td>
<td>4.27</td>
</tr>
<tr>
<td>Ebola Virus - Restin</td>
<td>4.20</td>
</tr>
<tr>
<td>Porcine Circovirus</td>
<td>4.11</td>
</tr>
<tr>
<td>Vesicular Exanthema of Swine Virus</td>
<td>3.96</td>
</tr>
<tr>
<td>Circovirus 3</td>
<td>3.95</td>
</tr>
<tr>
<td>Porcine Rubulavirus (Blue Eye)</td>
<td>3.89</td>
</tr>
<tr>
<td>Transmissible Gastroenteritis (TGE)</td>
<td>3.88</td>
</tr>
<tr>
<td>Seneca Valley Virus</td>
<td>3.88</td>
</tr>
<tr>
<td>Lassa Fever</td>
<td>3.87</td>
</tr>
<tr>
<td>Menangle Virus</td>
<td>3.86</td>
</tr>
<tr>
<td>Porcine Deltacoronavirus</td>
<td>3.79</td>
</tr>
<tr>
<td>Porcine Rotavirus</td>
<td>3.60</td>
</tr>
</tbody>
</table>

*global disease monitoring, targeted research investments and analysis of swine health data*
Global Swine Pathogen Survey

- SHIC Monitoring and Analysis Working Group
- 5 regions
  - China / SE Asia
  - Europe / Russia
  - South America
  - North America (Canada and Mexico)
- Top (up to 5) pathogens; Why; What; Emerging; Impact on U.S.
- Weighted average based on number of responses within region
## Global Swine Pathogen Survey

<table>
<thead>
<tr>
<th>Far East/China</th>
<th>Pathogen</th>
<th>Weighted Ave</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>China x 2</strong></td>
<td>PRRS</td>
<td>5.23</td>
</tr>
<tr>
<td><strong>Philippines</strong></td>
<td>Porcine Epidemic Diarrhea/PED virus</td>
<td>4.55</td>
</tr>
<tr>
<td><strong>Japan x 2</strong></td>
<td>Mycoplasma hyopneumoniae</td>
<td>0.45</td>
</tr>
<tr>
<td><strong>Korea</strong></td>
<td>PRDC</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>Swine Erysipelas</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>Actinobacillus pleuropneumoniae</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>TGE</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>Strep suis</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>CSF</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Bacterial Scouring/E. coli/Clostridia</td>
<td>0.05</td>
</tr>
</tbody>
</table>

*global disease monitoring, targeted research investments and analysis of swine health data*
global disease monitoring, targeted research investments and analysis of swine health data

M. hyopneumoniae

Influenza

P. multocida

PRRS

PED

PRRS A. pleuropneumoniae

PRRS Influenza

M. hyopneumoniae

Influenza

P. multocida

PRRS PED
Evaluate Risk of Imported Feed Ingredients

Background

• Using a transboundary model, contaminated feed ingredients were demonstrated to be a potential means of PEDV entry from China into the US.
  – SBM-C, SBM-O, Lysine, choline and Vitamin D
  – Dee et al BMC Vet Res 2016

New Project

• Objective: Evaluate trans-Pacific survival of FADs through the use of surrogate viruses and transboundary model.
• Hypothesis: Survival will depend on the correct combination of pathogen and ingredient.
## Virus Isolation: D 37 PI (Batch 4 = Beijing to Des Moines)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>SVA (FMDV)</th>
<th>BVDV (CSFV)</th>
<th>BHV-1 (PRV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybean meal-Conventional</td>
<td>Pos/Pos</td>
<td>Neg/Neg</td>
<td>Pos/Pos</td>
</tr>
<tr>
<td>Soybean meal-Organic</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
<tr>
<td>Soy oil cake</td>
<td>Pos/Pos</td>
<td>Neg/Neg</td>
<td>Pos/Pos</td>
</tr>
<tr>
<td>DDGS</td>
<td>Pos/Pos</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
<tr>
<td>Lysine</td>
<td>Pos/Pos</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
<tr>
<td>Choline</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Pos/Pos</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
<tr>
<td>Moist dog food</td>
<td>Pos/Pos</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
<tr>
<td>Moist cat food</td>
<td>Pos/Pos</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
<tr>
<td>Dry dog food</td>
<td>Pos/Pos</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
<tr>
<td>Pork sausage casings</td>
<td>Pos/Pos</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
<tr>
<td>Complete feed (positive control)</td>
<td>Pos/Pos</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
<tr>
<td>Complete feed (negative control)</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
<tr>
<td>Stock virus (positive control)</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
<td>Neg/Neg</td>
</tr>
</tbody>
</table>
global disease monitoring, targeted research investments and analysis of swine health data
Assess the needs, Fund the projects, Answer the problems

• Early-July  Georgia, SE U.S.
• Mid-July     Show pigs and state fairs
• ~July 28    SD finisher outbreak
• August 1    Begin conference calls
• August 13   Research coordinating call
• August 23   Call for research proposals
• September 21 Proposals received
• October 2   SHIC Preparedness Working Group selects
• October 9 – Contracts final
              November 2
SHIC Seneca Valley Research

Swine Health Information Center
• Screen oral fluid samples
• Duration of shedding in finishing pigs
• Duration of shedding on sow farms
• Sequencing and characterization of the virus
• Diagnostics
  – ELISA for serology
• Efficacy of disinfectants

Distribution
Manage Movements

What’s different?
Tools

Cleaning up

Risk factors

Missing something?

USDA
• Epi surveys on affected farms
• Koch’s Postulates
  – Historical US
  – Contemporary US
  – Brazilian

global disease monitoring, targeted research investments and analysis of swine health data
Pilot project for emerging disease discovery support

Dr. Kent Schwartz, ISU
Dr. Albert Rovira, UMN
Dr. Jerome Nietfeld, KSU

- Policies, procedures, communication
  - Requirements
  - Submission
  - Review process
- SHIC VDL Diagnostician Panel

*global disease monitoring, targeted research investments and analysis of swine health data*
Conclusions

- Novel sapelovirus (genetically divergent) was the only pathogen detected in association with a unique clinical presentation and severe polioencephalomyelitis.
- Virus was demonstrated within lesions by *in situ* hybridization.
- Neurologic disease has not been reported to be associated with sapelovirus from other animal species in the US.
SHIC Facilitated Rapid Response Teams

- Dr. Joe Connor
- Dr. Scanlon Daniels
- Dr. Gene Erickson
- Dr. Noel Garbes
- Dr. Perry Harms
- Dr. Steve Henry
- Dr. Derald Holtkamp
- Dr. Clayton Johnson
- Dr. Daniel Linhares
- Dr. Doug Meckes
- Dr. Montserrat Torremorell
- Dave Wright
- Dr. Paul Yeske
global disease monitoring, targeted research investments and analysis of swine health data