



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



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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



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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



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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



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Monitoring and Analysis



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Swine Disease Matrix Project

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

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.

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



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Global Swine Pathogen Survey

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

**PRRS
Influenza**

**PRRS
*A. pleuropneumoniae***

**PRRS
PED**

***M. hyopneumoniae*
Influenza
*P. multocida***

**PRRS
PED**



Monitoring and Analysis Working Group

- VDL Data Standardization – LOINC and HL7
 - ISU, KSU, SDSU, UMN, Clemson U
 - USDA-APHIS-VS
 - CEAH – USDA NAHLN Lab Coordinator

“establishing and adopting the use of universally recognized data standards and message schema are the foundational elements necessary to support the needs and demands of the 21st century pork industry in North America”



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Swine Health Monitoring Project

- Long term – to develop capacity to:
 - detect & provide capacity to respond to emerging pathogens
- Short term – deliver value to encourage participating:
 - monitor disease incidence & prevalence
 - supplement outbreak investigation
 - understand implications of pig movement



Swine Health Monitoring Project
SHMP@umn.edu
10/14/2016

These producers are willing to share their premises IDs and pathogen status in the interests of national disease control.



Regional Projects:
N212 MN, PA, SE IA, and Lyon Co



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.



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Virus Isolation: D 37 PI (Batch 4 = Beijing to Des Moines)

Ingredient	SVA (FMDV)	BVDV (CSFV)	BHV-1 (PRV)
Soybean meal-Conventional	Pos/Pos	Neg/Neg	Pos/Pos
Soybean meal-Organic	Neg/Neg	Neg/Neg	Neg/Neg
Soy oil cake	Pos/Pos	Neg/Neg	Pos/Pos
DDGS	Pos/Pos	Neg/Neg	Neg/Neg
Lysine	Pos/Pos	Neg/Neg	Neg/Neg
Choline	Neg/Neg	Neg/Neg	Neg/Neg
Vitamin D	Pos/Pos	Neg/Neg	Neg/Neg
Moist dog food	Pos/Pos	Neg/Neg	Neg/Neg
Moist cat food	Pos/Pos	Neg/Neg	Neg/Neg
Dry dog food	Pos/Pos	Neg/Neg	Neg/Neg
Pork sausage casings	Pos/Pos	Neg/Neg	Neg/Neg
Complete feed (positive control)	Pos/Pos	Neg/Neg	Neg/Neg
Complete feed (negative control)	Neg/Neg	Neg/Neg	Neg/Neg
Stock virus (positive control)	Neg/Neg	Neg/Neg	Neg/Neg



Preparedness and Response



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November 2015 Research Coordination

- VDLs
- USDA-NVSL
- USDA-CVB
- USDA-FADDL
- USDA-NAHLN
- USDA-Organisms and Vectors

2016 Research

- Call for Pre-Proposals
 - 29 Pre-Proposals
 - 8 labs including Canada, allied industry
 - 50 viruses
- Full proposals under review



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SHIC Seneca Valley Research

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 –
November 2 Contracts final



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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

USDA

- Epi surveys on affected farms
- Koch's Postulates
 - Historical US
 - Contemporary US
 - Brazilian

Distribution

Manage Movements

What's different?

Tools

Cleaning up

Risk factors

Missing something?



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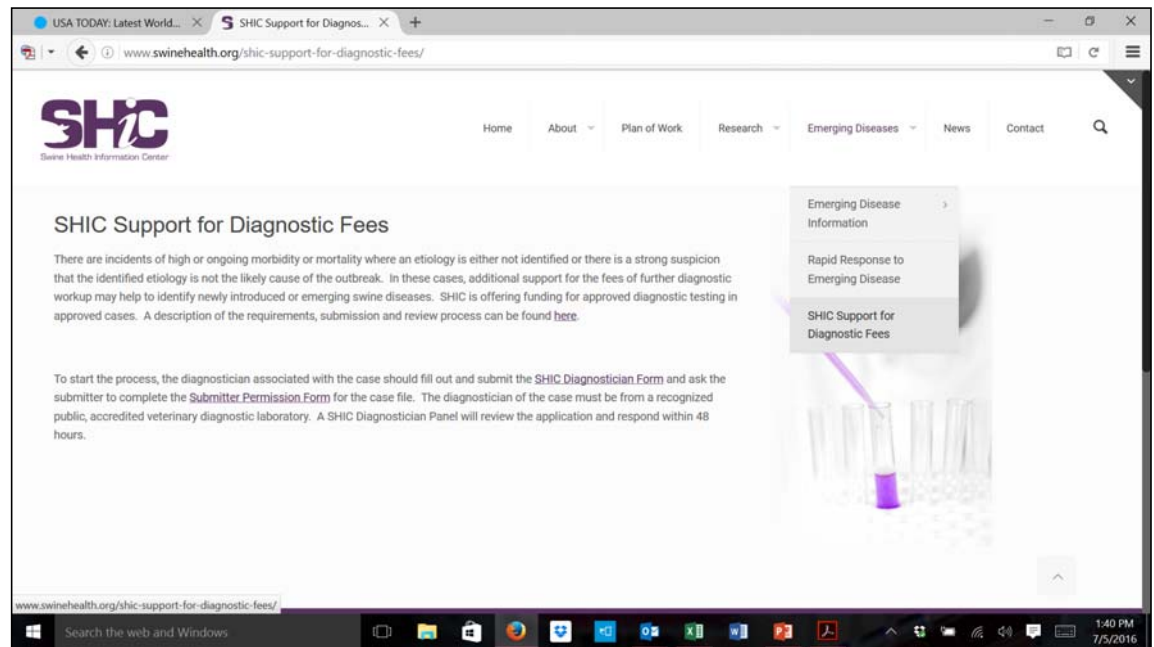
Pilot project for emerging disease discovery support

Dr. Kent Schwartz, ISU

Dr. Albert Rovira, UMN

Dr. Jerome Nietfeld, KSU

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



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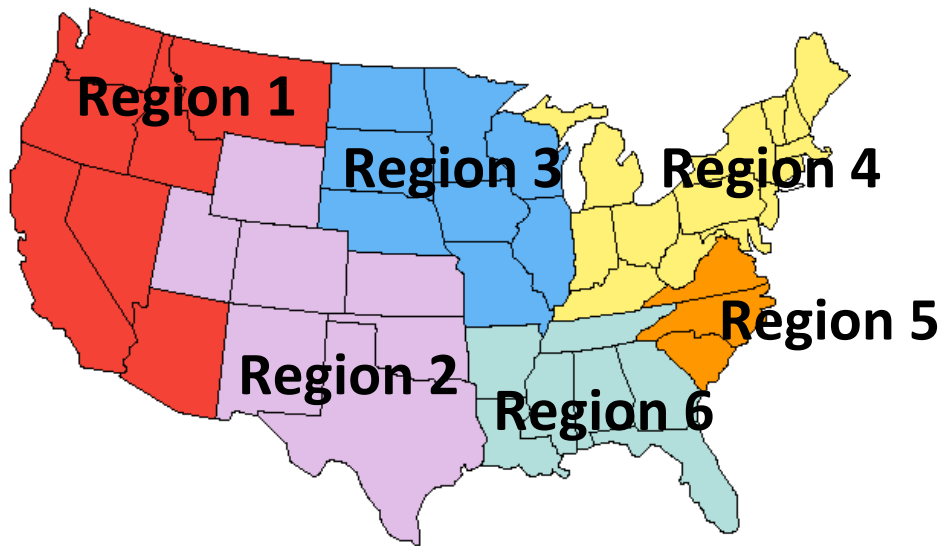
Conclusions

- 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



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SHIC Facilitated Rapid Response Teams



- Joe Connor
- Scanlon Daniels
- Gene Erickson
- Noel Garbes
- Perry Harms
- Steve Henry
- Derald Holtkamp
- Clayton Johnson
- Daniel Linhares
- Doug Meckes
- Montserrat Torremorell
- Dave Wright
- Paul Yeske

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“Identification and Response to Emerging Swine Production Diseases (ESPD)”



Objectives of Swine Health Response Council

- Based on the successes from the PRV Control Board
 - Federal, state and industry cooperation
 - Subject and situation experts
- Two roles:
 - Suggest actions to respond to identification of emerging diseases in the U.S.
 - Suggest actions to respond to known pathogens in other countries

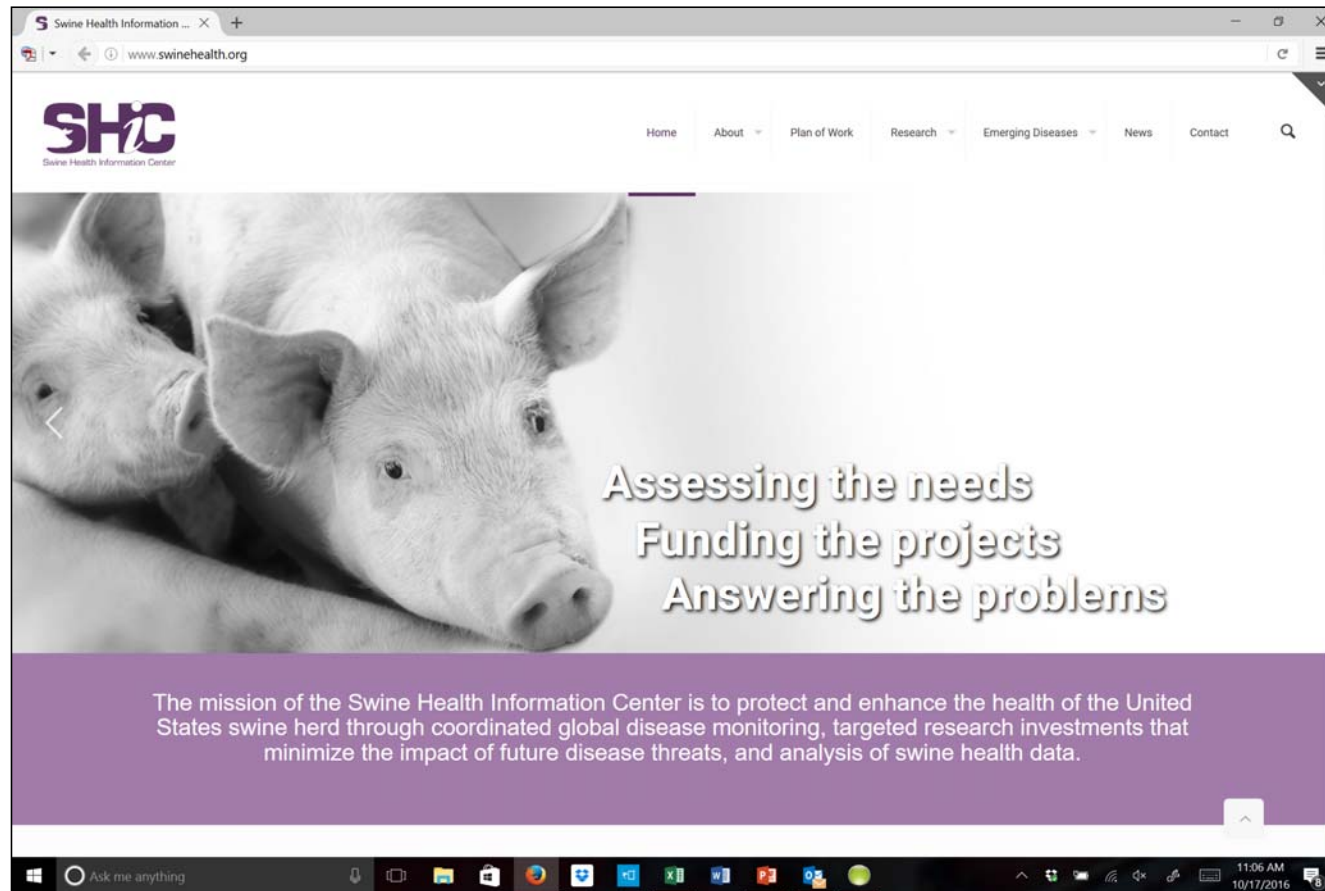
Emerging Swine Production Diseases (ESPD)

SAHO,
APHIS,
NAHLN,
SHIC, Others

Presence of
ESPD
Background
and Scope

Swine Health
Disease
Response
Council

www.swinehealth.org



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