

Swine Biosecurity Practices

3rd International Biosafety & Biocontainment
Symposium: Bio-risk Management in a One
Health World

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Outline of presentation

- Introduction
- Understanding how pathogens enter swine farms
- Tools available to assess risk and improve biosecurity
 - Production Animal Disease Risk Assessment Program (PADRAP)
 - PRRS Outbreak Investigation Program

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For swine focus is on bio-exclusion

- Biggest concern is with keeping pathogens out of a herd
- Pathogens that
 - Difficult to control
 - Can be eliminated from a herd
 - For which there is poor heterologous protection when new isolates are introduced

- Porcine reproductive and respiratory syndrome virus (PRRSV)

- Porcine epidemic diarrhea virus (PEDV)

- Transmissible gastroenteritis (TGE)

- Swine influenza virus (SIV)

- *Mycoplasma hyopneumoniae*

Prior to introduction of PEDV in the U.S. in 2013, nearly all bio-exclusion practices were done for the sake of PRRSV

- PRRS is most costly disease (\$664 million/year in U.S.)
 - Causes productivity losses in all ages of pigs
- Virus has incredible survival strategies
 - Many isolates with relatively little and unpredictable heterologous protection between isolates
 - Long period of infection and shedding
- Can be eliminated from individual herds
- Control is possible but challenging and requires bio-exclusion of new isolates

Biocontainment

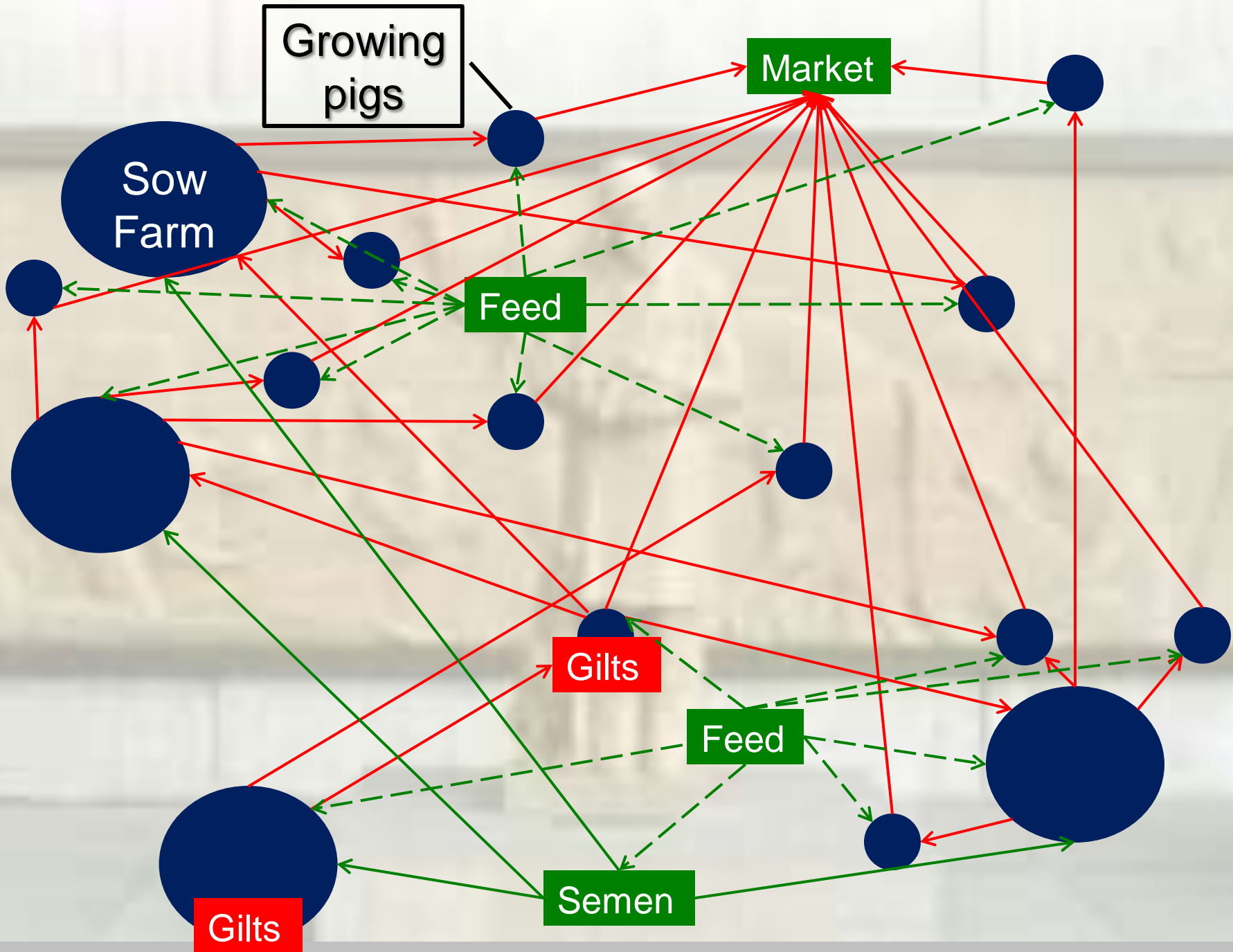
- Generally an afterthought – unwilling to spend resources to benefit neighbors
- Gets some attention in large production systems
- Regional PRRSV / PEDV projects
 - Producers in a geographic area agree to share information on status and outbreaks
 - Producers in some projects are agreeing to adopt practices to reduce spread of virus
 - Vaccination of growing pigs
 - Coordinated weaned pig placement
 - Biosecurity

Outline of presentation

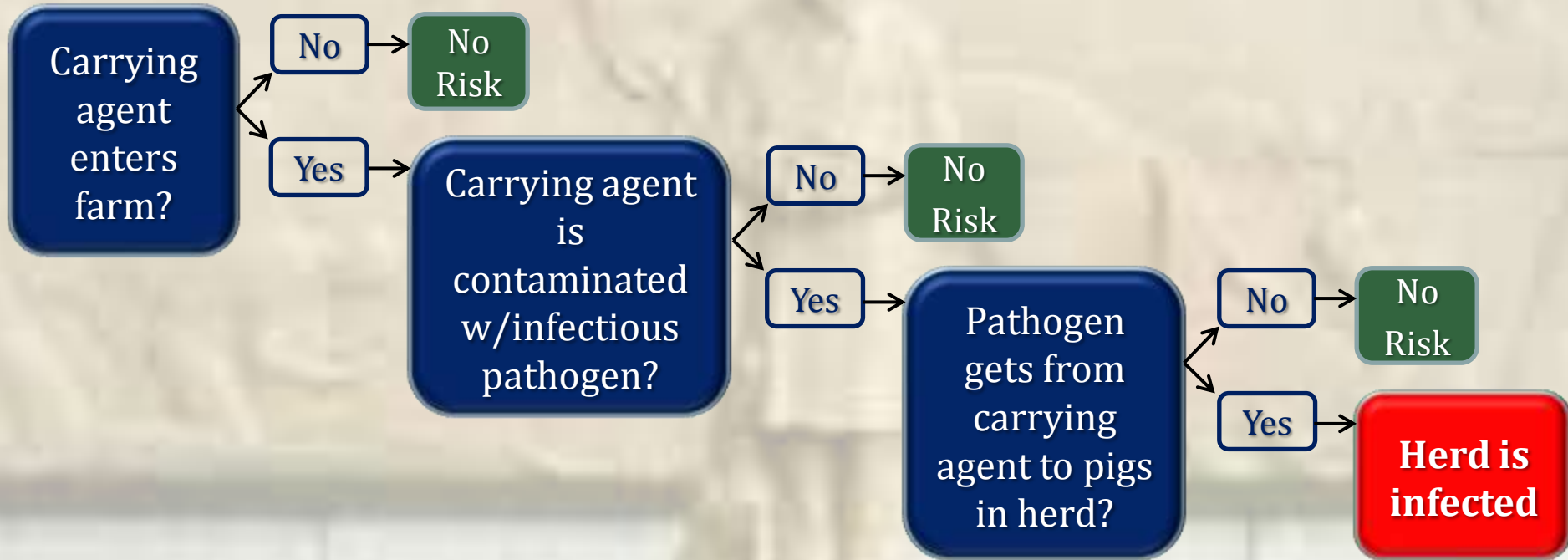
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Basis for thinking about bio-exclusion: Understanding how pathogens enter swine farms

- Swine pathogens are not capable of locomotion
- Must be carried by something else
- That something else may be described as a “carrying agent”
- Examples of **carrying agents**
 - Replacement gilts
 - Semen
 - Trucks
 - People
 - Feed
 - Air



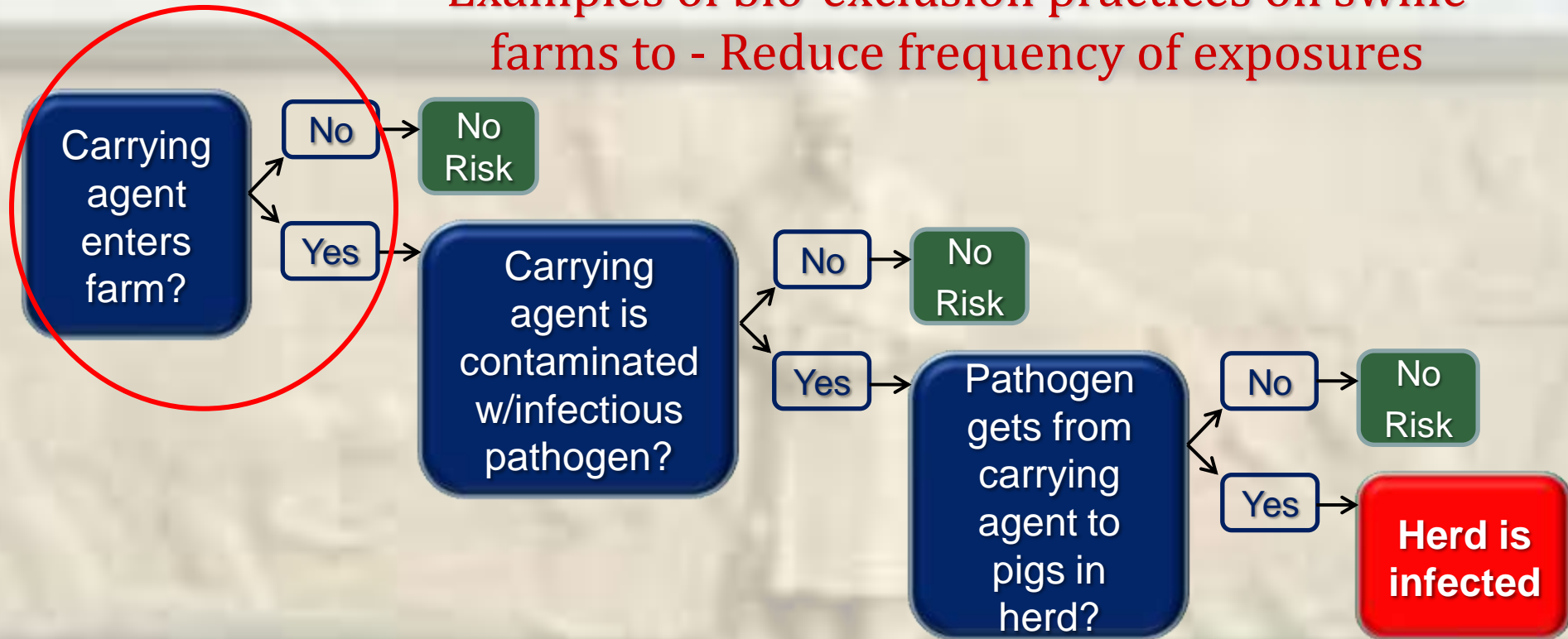
Introduction of pathogens into a herd is the result of a series of “events” and “failures”



Effective biosecurity must do one or more of the following:

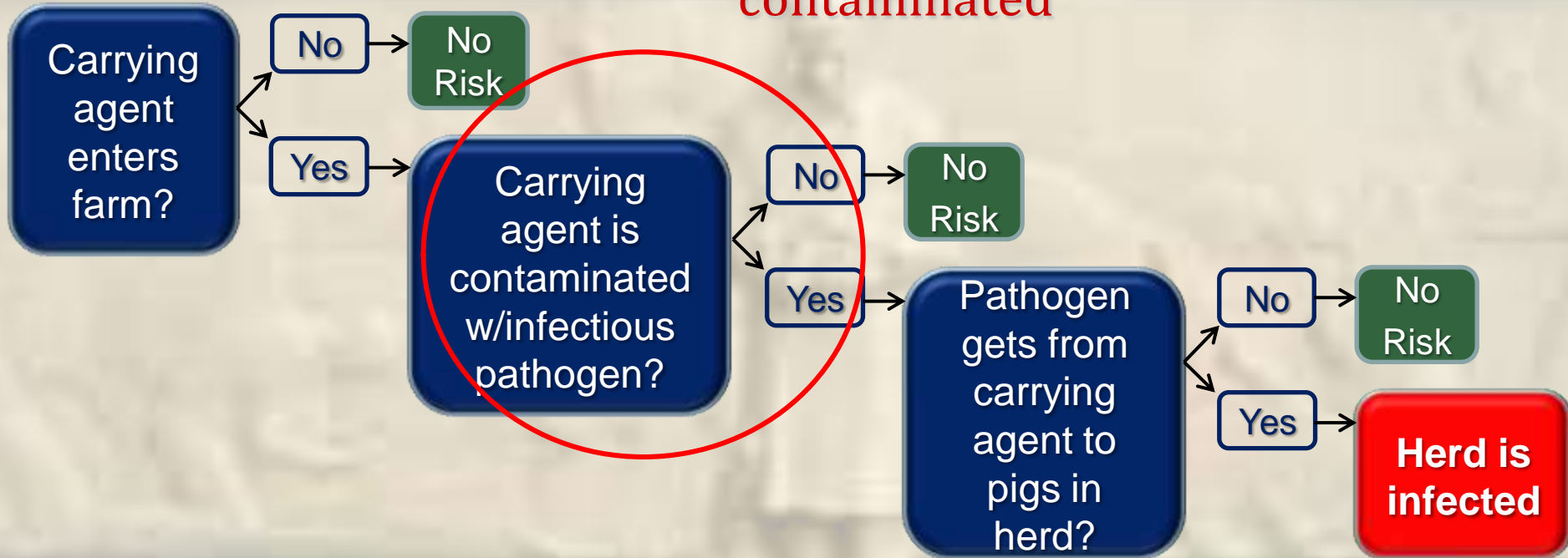
1. Reduce frequency of exposures
 - ie. reduce how often a carrying agent come into close proximity to the herd
2. Reduce probability that carrying agent is infected or contaminated
3. Reduce probability that pathogen is transmitted from infected or contaminated carrying agent to pigs in herd

Examples of bio-exclusion practices on swine farms to - Reduce frequency of exposures



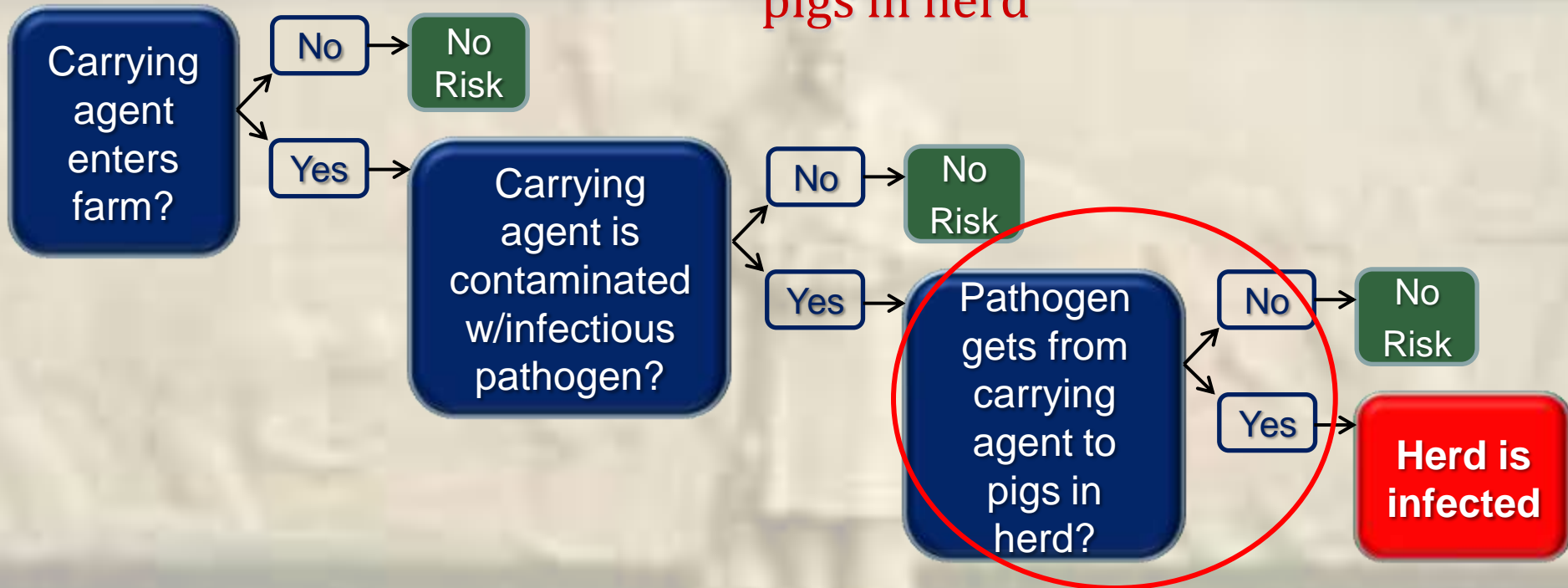
- Capital investments to reduce frequency with which carrying agents enters farm- On-farm disposal of dead animals (e.g. composting, incineration)
- Impose restrictions – Only essential personnel allowed to enter farm

Examples of bio-exclusion practices on swine farms to - Reduce probability that carrying agent is infected or contaminated



- Reduce exposure - Trailers that haul replacement gilts is dedicated to the farm or prohibited from hauling positive animals
- Decontaminate – Wash, disinfect and dry livestock trailers between every load
- Test – Test semen or boars at boar stud for presence of pathogens

Examples of bio-exclusion practices on swine farms to - Reduce probability that pathogen is transmitted to pigs in herd



- Create zones and clean-dirty lines / barriers – Install perimeter fence
- Manage flow of people and vehicles – Dead disposal is located away from buildings with separate drive for rendering truck
- Scheduling – Last activity of the day is move dead pigs to disposal area and check feed bins



BUT... risk assessment on swine farms can quickly get overwhelming for producers “page-after-page” of protocols doesn’t work!

Need tools to assess risks and implement biosecurity that is tailored for farms or production systems

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Production Animal Disease Risk Assessment Program (PADRAP) is a program through which a set of disease risk assessment surveys are delivered



The screenshot shows the PADRAP website homepage. At the top, there is a logo for PADRAP with silhouettes of a pig, a cow, and a chicken. Below the logo is the text "Production Animal Disease Risk Assessment Program". The page has a navigation menu on the left and a main content area. The main content area includes a welcome message for a user named "Derald Holtkamp" and a section titled "AASV Production Animal Disease Risk Assessment Program". This section describes the program's purpose and lists several key features and resources.

Navigation Menu

- [PADRAP Login](#)
- [Home](#)
- [Contact Information](#)
- [Home and Subpages](#)
- [PADRAP Administration](#)
- [Key Features of PADRAP](#)
- [History of PADRAP](#)
- [Training Requirements](#)
- [Version Updates](#)
- [Send us a Message](#)

Home

What is PADRAP?

The American Association of Swine Veterinarians (AASV) Production Animal Disease Risk Assessment Program (PADRAP) was initiated in 2008. Iowa State University College of Veterinary Medicine, Food Supply Veterinary Medicine provides program coordination to develop, manage and promote disease risk assessment tools and databases of completed risk assessments held by AASV.

Production Animal Disease Risk Assessment Program (PADRAP) is an epidemiologically-based initiative to help producers and veterinarians manage disease risks faced by North American swine industry. It offers a set of risk assessment questionnaires, databases and reports for measuring and benchmarking disease risks. There are currently two risk assessments available within PADRAP: PRRS Risk Assessment for the Breeding Herd and PRRS Risk Assessment for Growing Pig Herd. PADRAP is designed to easily accommodate risk assessments for other swine diseases, other stages of production and even other species. Plans are currently being made to improve and refine the PRRS Risk Assessment for the Breeding Herd in Summer 2009.

The PRRS Risk Assessment may be used:

1. To evaluate current biosecurity protocols and/or to develop new biosecurity protocols to avoid risk.
2. To demonstrate improvement in biosecurity over time to help justify expenditure of resources on measures to improve biosecurity.
3. As an aid in the decision to initiate a project to eliminate PRRS from a breeding herd site, or to identify modifiable risk factors in an effort to increase the likelihood that an elimination project will be successful long-term.
4. As an aid in the decision to use a breeding herd site to produce genetic animals.
5. As part of the due diligence process for purchases or contracting agreements.

PADRAP Resources

- [Overview of PADRAP](#)
- [Semi-Annual PADRAP Update](#)
- [2-Page PADRAP Newsletter 1](#)
- [PADRAP Database Statistics](#)
- [PADRAP Poster](#)

Word Documents

- [Breeding Herd Survey](#)
- [Growing Pig Survey](#)

www.padrap.org

PADRAP is owned by The American Association of Swine Veterinarians (AASV) and is used by veterinarians who are members

Enables benchmarking of disease risks

- Example of reports

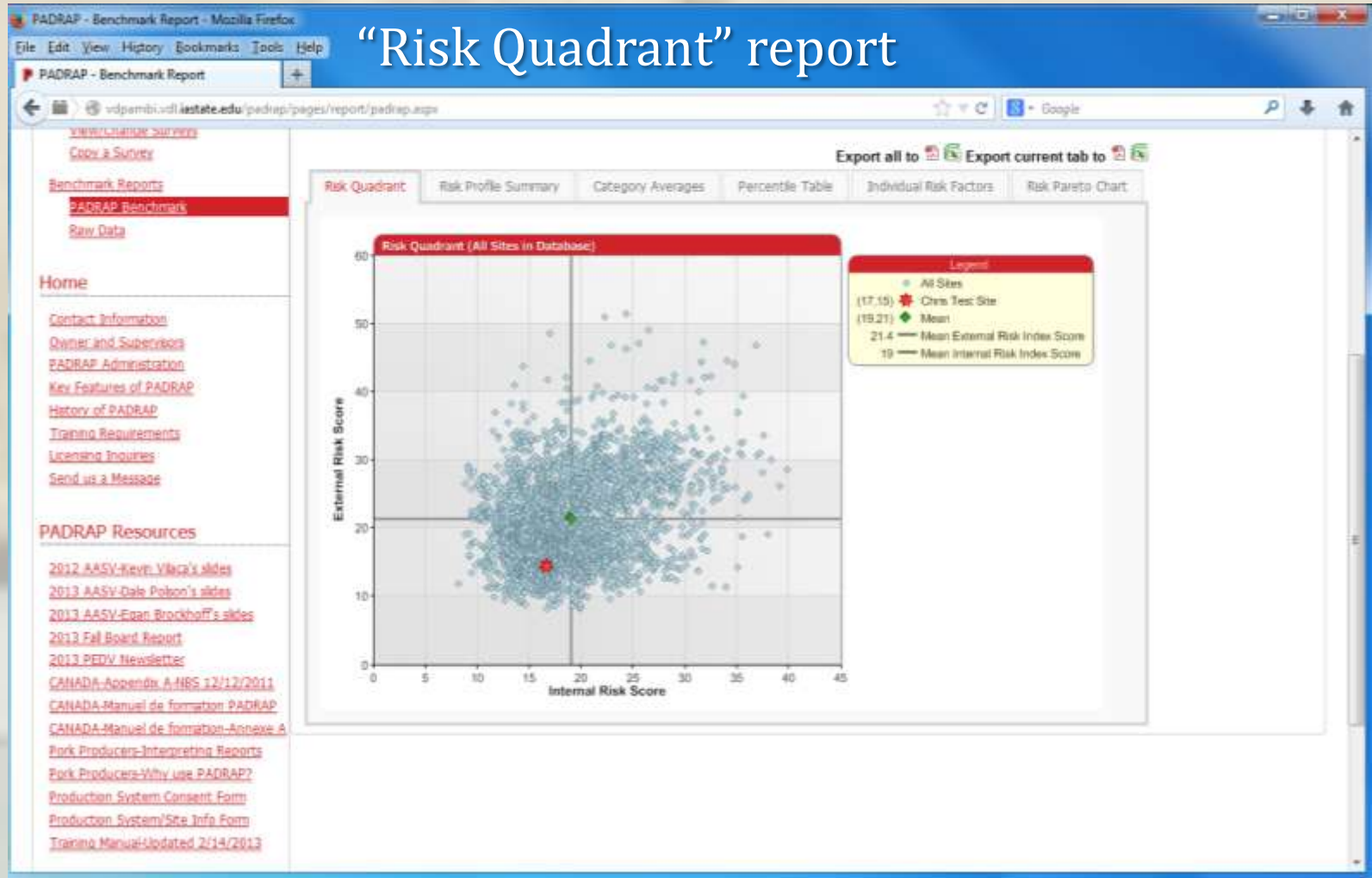
“Individual Risk Factor” report

The screenshot displays the PADRAP Benchmark Report interface. The main content area shows a table of risk factors categorized under 'Internal Risks', 'Circulation Risks', and 'Characteristics of the herd'. The table includes columns for 'Category Question', 'Response', 'Risk Index Score', and 'Mean: All Sites'. The table is color-coded to indicate risk levels, with red for high risk and yellow for low risk.

Category Question	Response	Risk Index Score	Mean: All Sites	Most Risky	Least Risky
Internal Risks		16.62	19.01		
Circulation Risks		18.31	21.38		
Characteristics of the herd		19.27	27.65		
Size of breeding herd (number of breeding age animals)	500	4.60	43.60	>= 3000	>= 2000 and < 3000
Parity segregation	Mixed parity	21.50	21.57	All gilt farm	Mixed parity
Average parity of the breeding herd	35	4.60	10.13	>= 8 and < 1	>= 1 and < 2
Type of breeding herd (commercial vs. genetic)	Commercial	46.40	36.37	Commercial	Genetic nucleus
Characteristics of the site		55.00	19.80		
Stages of production at site	Farrow to finish	100.00	24.36	Farrow to finish	Farrow to wean
Gestation housing	All individually housed gestation	10.00	15.24	Combination pen and individually housed gestation during more than two weeks of each mating cycle or Combination	All individually housed gestation

Enables benchmarking of disease risks

-Example of reports



Collaborative effort

- American Association of Swine Veterinarians (AASV)
- Iowa State University (ISU) providing program coordination and web hosting
 - Director: Derald Holtkamp
 - Associate Director: Chris Mowrer
- Financial support
 - National Pork Board (NPB)
 - Boehringer Ingelheim Vetmedica Inc. (BIVI)
 - Harrisvaccines
 - National Pork Producers Council (NPPC)
 - Newport Laboratories

Training sessions conducted

- **355: Veterinarians trained**
 - 61 training sessions (31 online; 30 face-to-face) conducted in the U.S., Canada, Mexico, Serbia and online
 - Used primarily by veterinarians in the U.S, Mexico and Canada
 - Veterinarians from Australia, Bermuda, Columbia, Chile, Germany, Italy, Japan, Netherlands, Philippines, Serbia, South Korea and UK have also been trained
 - Train-the-trainer program
 - Has worked well for delivering training sessions in non-English speaking countries

There are currently two assessments available through PADRAP

1. PRRS Risk Assessment for the Breeding Herd
2. PRRS Risk Assessment for the Growing Pig Herd

The program was **built to accommodate the inclusion of risk assessments for other diseases in the future**

Examples of how veterinarians use PADRAP to help producers systematically assess disease risk factors and biosecurity gaps

- **Create awareness** about biosecurity gaps and motivate producers to improve
 - Risk **benchmarking** reports can be a powerful motivators
 - Identify opportunities to plug gaps in biosecurity
- **What-if analysis** can be done by completing actual and hypothetical assessments of the same site
 - To assess or demonstrate the impact of changes in biosecurity practices or other risk factors

PRRS Risk Assessment for the Breeding Herd

- Database of PRRS Risk Assessment for the Breeding Herd (version 2) continues to grow
 - **3,509:** Breeding Herd assessments completed and submitted to the database (as of February 2014)
 - **1,734:** Sites assessed (as of February 2014)

PRRS Risk Assessment for the Growing Pig Herd

- Currently have
 - **1,018:** Grow-Finish assessments completed and submitted to the database (as of February 2013)
 - **881:** Sites assessed (as of February 2014)

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Start thinking about every outbreak as an opportunity to **observe, learn and improve**

- **Outbreak investigations** are a way to exploit the opportunity
 - Identify gaps and opportunity to improve biosecurity
 - Attempt to identify the source of the virus and how it may have infected the herd



“Never let a good crisis go to waste”

– Winston Churchill

The most meaningful learning often occurs by those in the field

- Producers and veterinarians who are prepared to observe and record information

More rapidly **“learn from our mistakes”**

Objective

- Develop **PRRS Outbreak Investigations Program** for breeding herds to reduce the frequency of outbreaks in breeding herds
 - Help veterinarians perform outbreak investigations
 - Most veterinarians recognize the value of investigations
 - Often don't get done due to lack of time
 - An “Outbreak Investigations Coordinator” will do the time-consuming data collection and summary tasks for the veterinarian

Funded by Iowa Pork Producers Association (IPPA) with Checkoff \$

Procedures

- Gather historical “pre-outbreak” data
 - Production records
 - Diagnostics and PRRSV status history for the breeding herd
 - History of PRRS outbreaks and virus elimination projects
 - Historical use of bio-management practices e.g. use of vaccine or live virus inoculation
 - PRRS Risk Assessment surveys (PADRAP)
- Great summer intern project for students!

PRRS Outbreak Investigation Form

- What we already have
 - Historical pre-outbreak data collected in the summer
- “Scramble data”
 - Description of current outbreak
 - PRRSV status and sequences of PRRSV isolates from other herds in the region
 - Weather data



PRRS Outbreak
Investigation Report

PREMISES ID: 00

OUTBREAK INVESTIGATION DATE: 10/23/2013

VETERINARIAN CONDUCTING OUTBREAK: Dr. [REDACTED]

E MAIL: [REDACTED]

PRRS Outbreak Investigations Summary

- Summary of findings

Outbreak Investigations Summary is designed to be a report on the investigation that the herd veterinarian can provide to the producer

Outbreak investigations database

- Populated with information collected on the **Outbreak Investigations Form** and **Outbreak Investigations Summary**
- Maintained by coordinator and housed at ISU CVM

Pilot project

- Sites enrolled for the pilot
 - 10 sites in Buchanan County project
 - 2 other sites just outside Buchanan County project
 - 6 in the SE IA project
 - ~10 sites in sites in SW IA project
- Outbreak investigation coordinator position
 - Performed by a research associate at ISU CVM (Chris Mowrer)

Summary of PRRS Outbreak Investigations Program

- Best approach we have to answer the question: Which carrying agents are most frequently causing outbreaks?
- Start thinking about every outbreak as an opportunity to **observe, learn** and **improve biosecurity**
- Recognize that producers and your veterinarians are best positioned to make observations
- Learn from our mistakes faster

Acknowledgements

- Iowa Pork Producers Association (IPPA) for funding the PRRS Outbreak Investigations Program
- American Association of Swine Veterinarians (AASV)
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- Sponsors
 - Boehringer Ingelheim Vetmedica, Inc.
 - Harrisvaccines
 - NPPC
 - Newport Laboratories

Thanks

- American Biological Safety Association (ABSA)
- Eileen Thacker

Questions

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