

Building a sustainable biosecurity culture



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About myself....



- DVM: University of Minnesota
- PhD: University of Minnesota – Influenza A virus epidemiology
- Holden Farms, Inc. (Northfield, MN, USA)
 - Veterinarian and research lead (2009-current)

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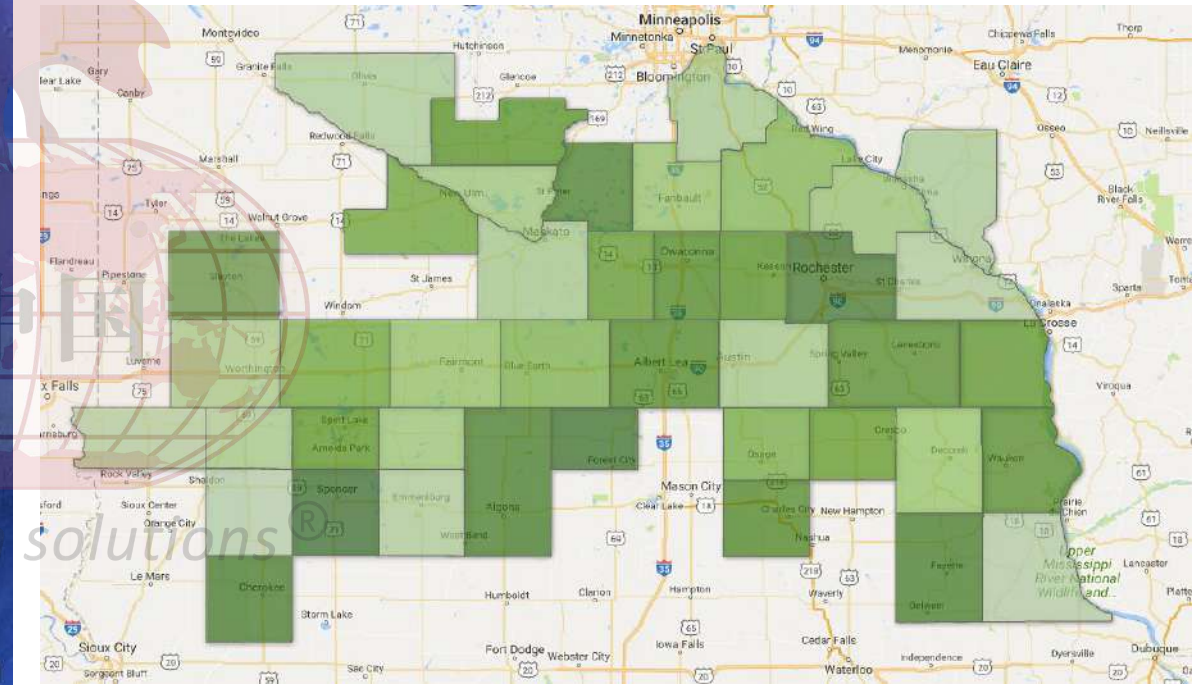
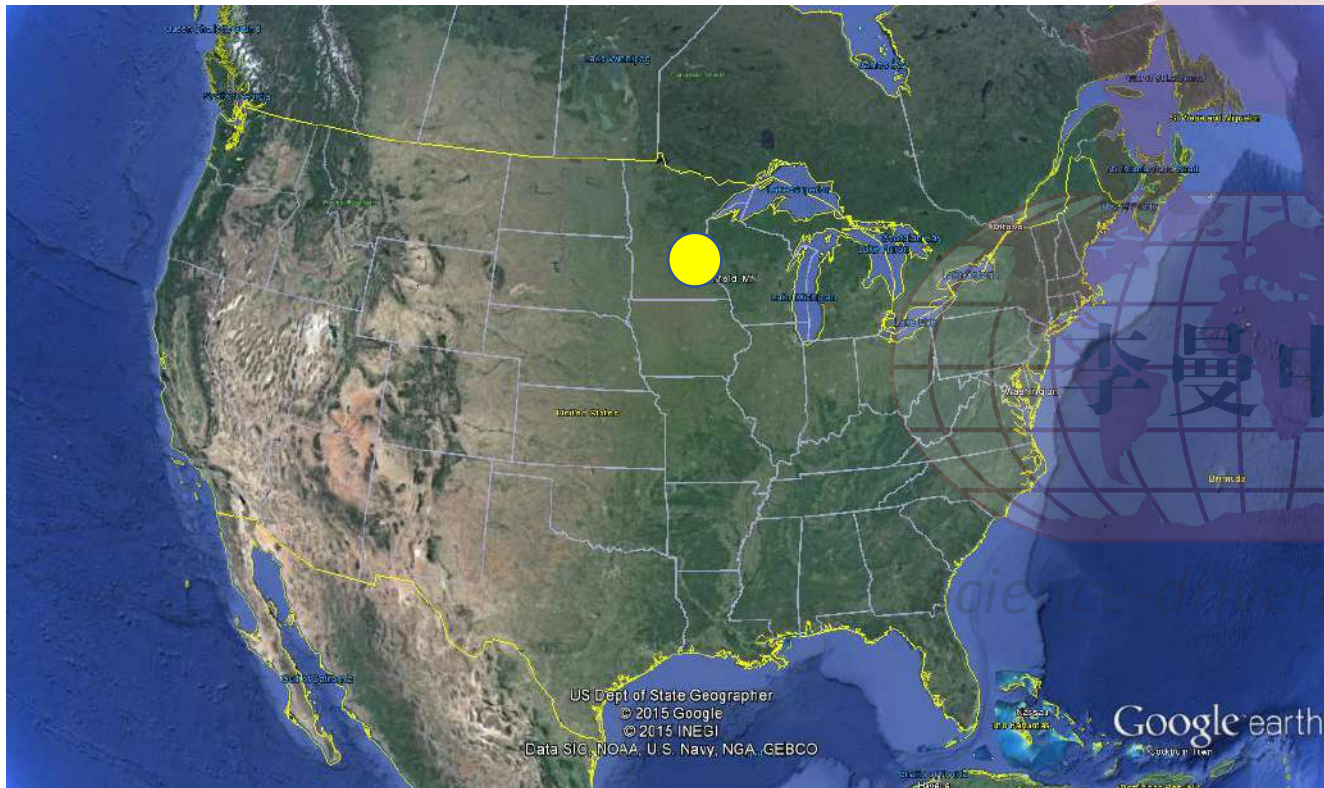
Holden Farms today

- Based in Northfield, MN, USA
- 100% Family Owned
 - 5th Generation
- Primary focus is the hog division
 - Sell ~1.7 million hogs/year
 - Also sell ~500,000 turkeys/year
 - Half owner of Daisyfield Packing in Sandusky, Ohio ~ 800,000 hogs/year

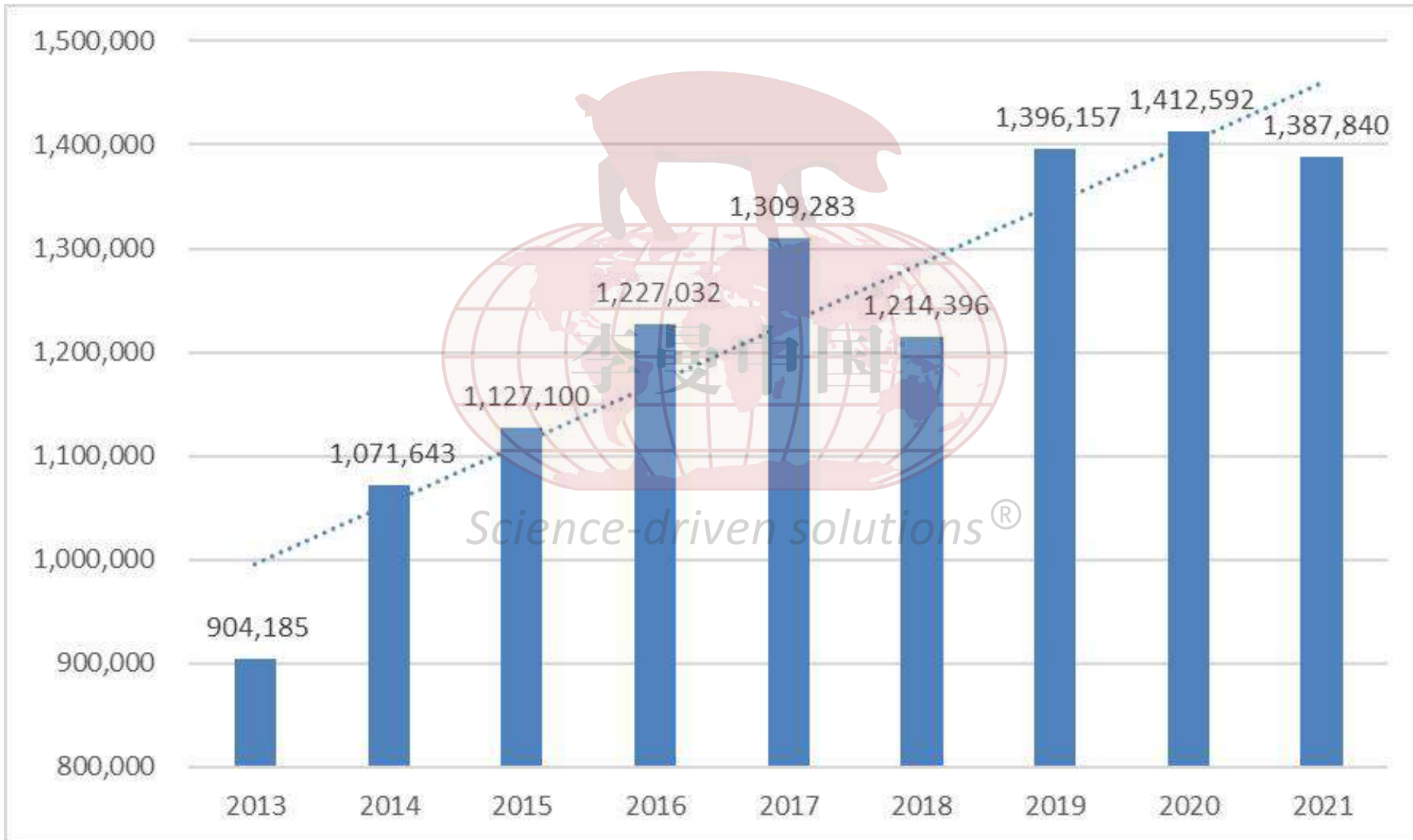


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Holden Farms territory/area



Market hogs - Sales growth



Sow inventory



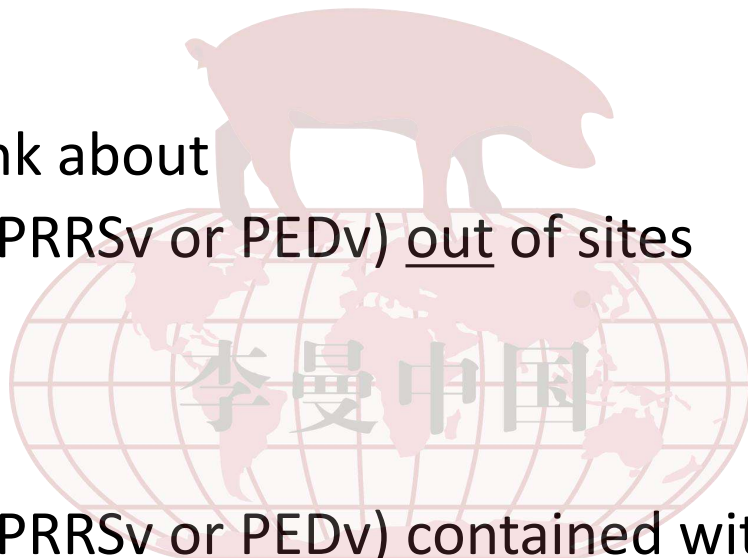
Biosecurity – what do we mean?

1. Bioexclusion

- What we normally think about
- Keeping diseases (like PRRSv or PEDv) out of sites

2. Biocontainment

- Keeping diseases (like PRRSv or PEDv) contained within a site or environment
- We tend not to think about this as much, but can be just as important



Biocontainment

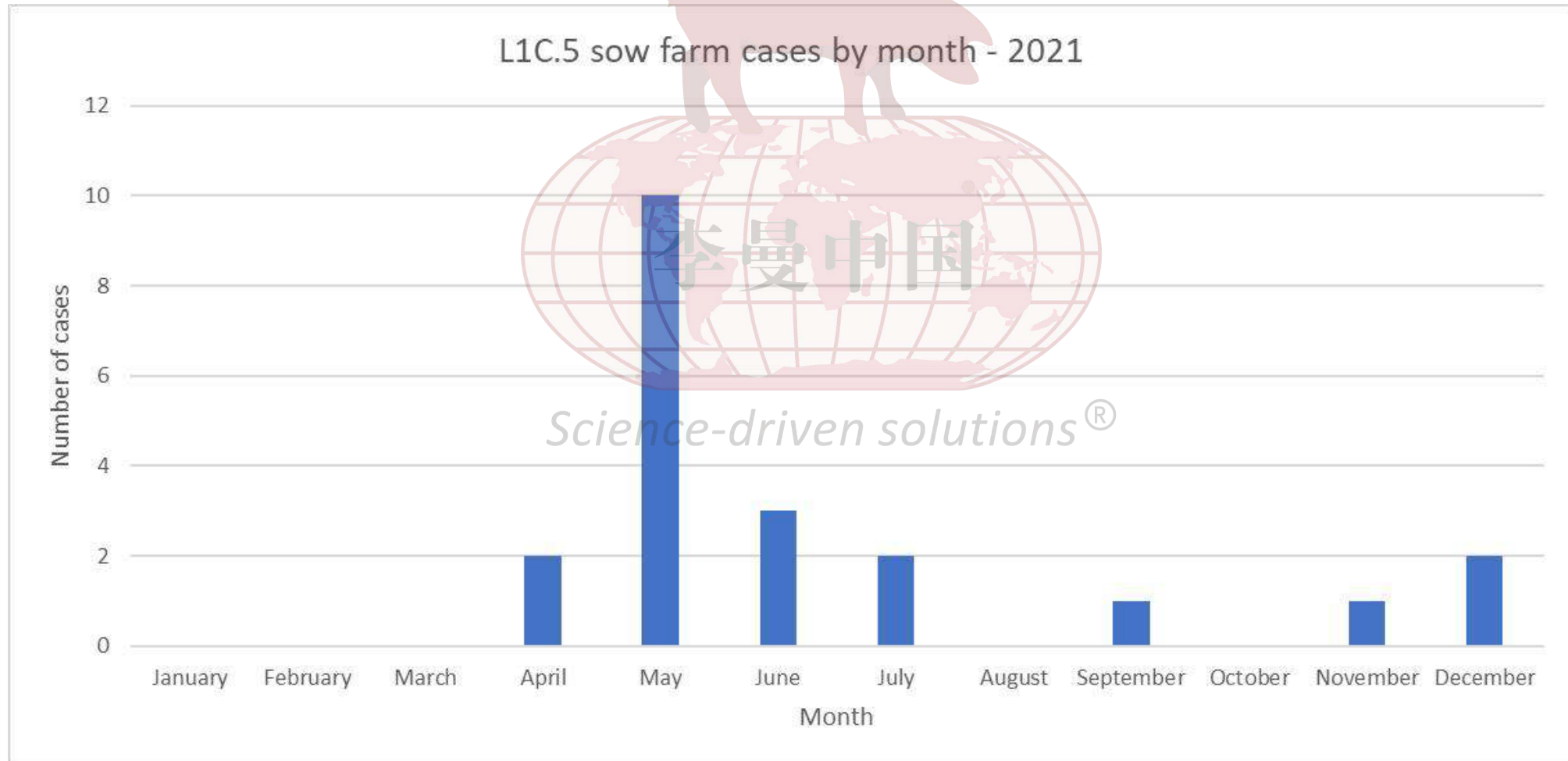
- PEDv in the U.S. highlighted the following:
 - Extremely low infectious dose needed for infection
 - High quantity of viral particles in feces and in the environment
 - Virus is moved everywhere in the farm and outside of the farm in a short period of time
 - Dissemination throughout the U.S. in a short period of time
 - Feed transmission risk/potential

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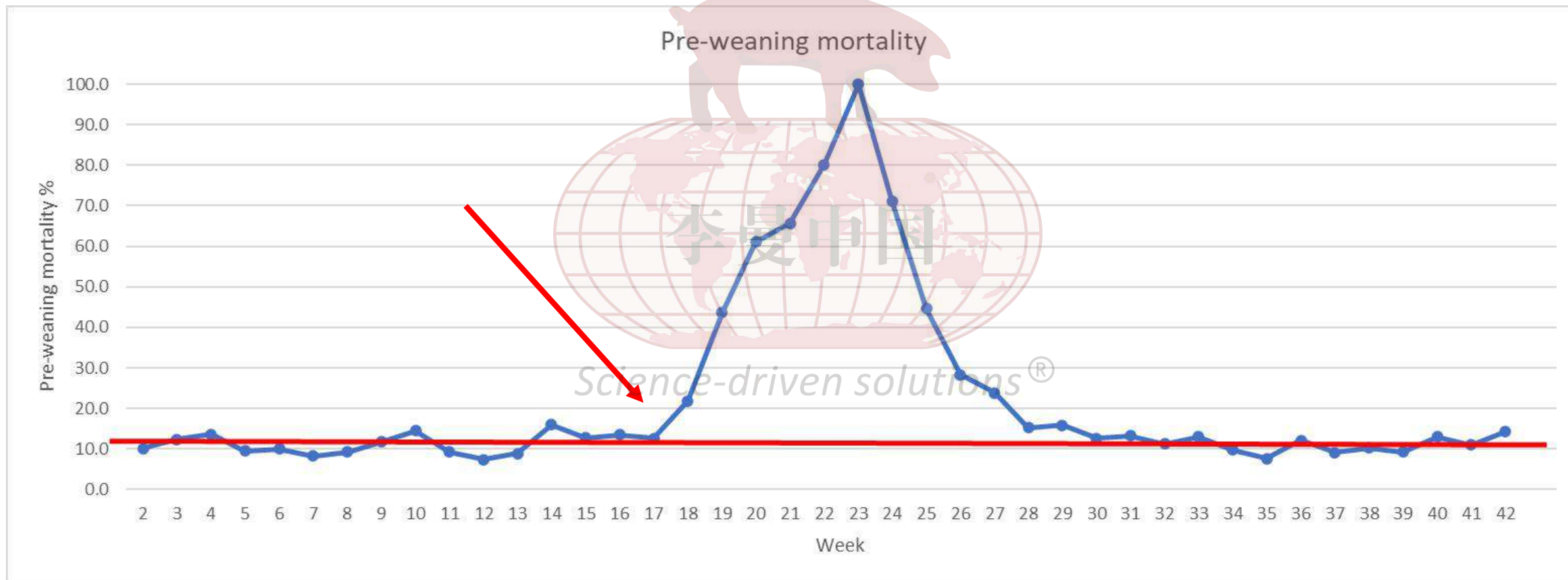
Emphasized a key point of biosecurity principles involve
biocontainment

PRRSv L1C.5 transmission – why such quick spread?

- Historically, uncommon to find the same virus from farm to farm



L1C. 5 Production impact



What's at risk? What can be invested?

- PRRS

- Estimated \$1.2 billion per year in lost production in the U.S. in the period of 2016 to 2020 (Holtkamp et al., 2024)

- PED

- Loss of 5 to 6 weeks of weaned pig production on a naïve farm



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Biosecurity

- Improvements in biosecurity can reduce incidence of PRRSv in breeding herds (Dee et al., 2024)

- Direct

- Feed

- Fomites (mechanical/indirect)

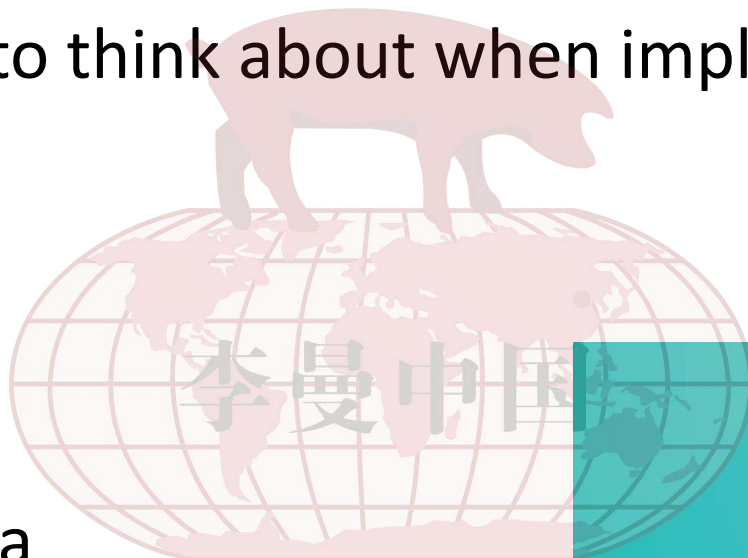
- Aerosol



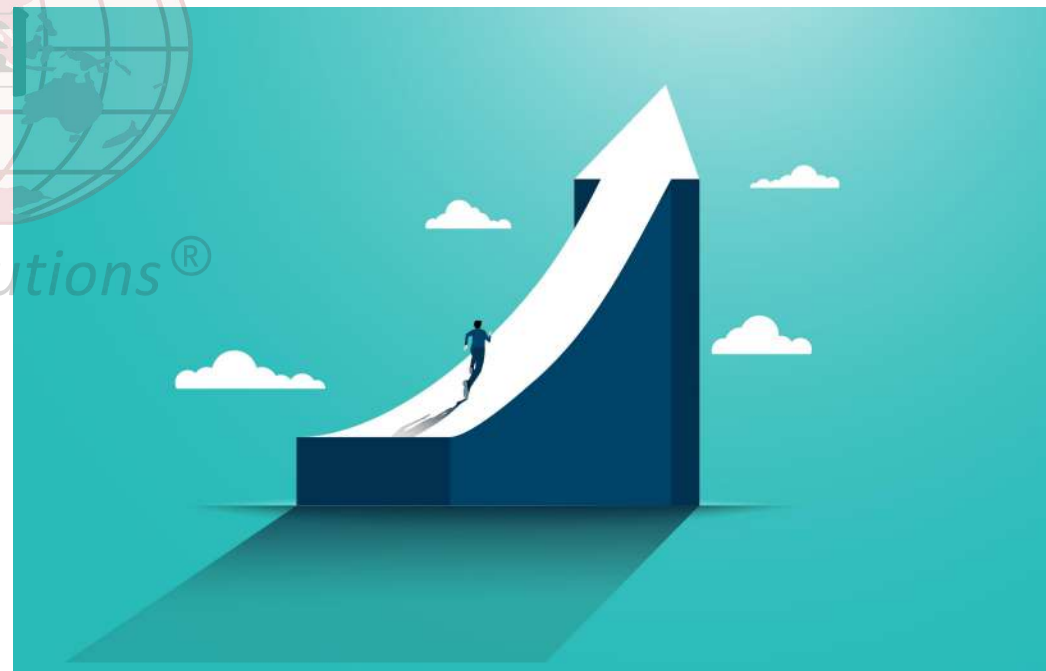
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What are some determinants of success?

- These are important to think about when implementing protocols
- The pathogen itself
 - Transmission routes
- The host
 - Infectious period
- The environment/area
 - Pig density, outdoor temperature
- PEOPLE



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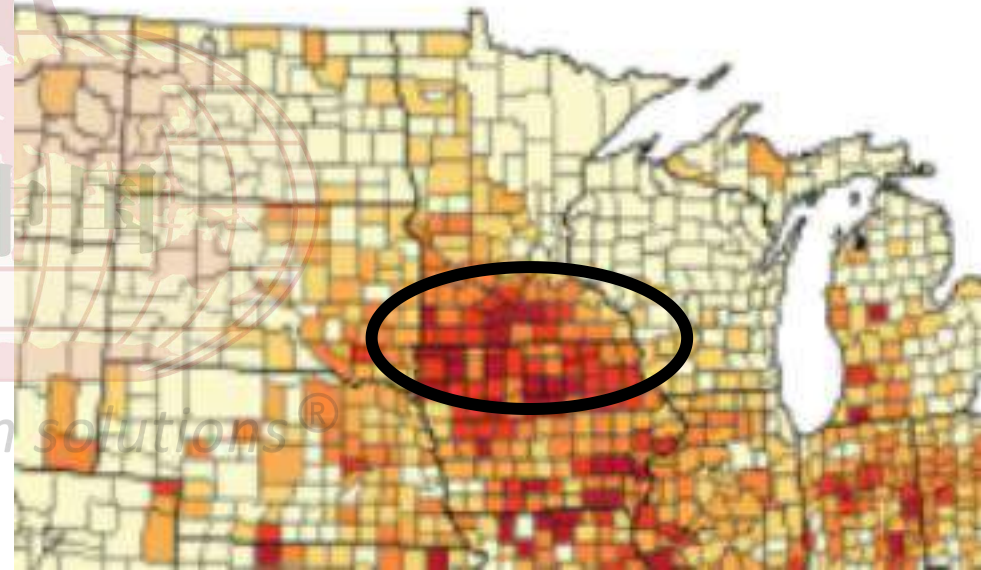
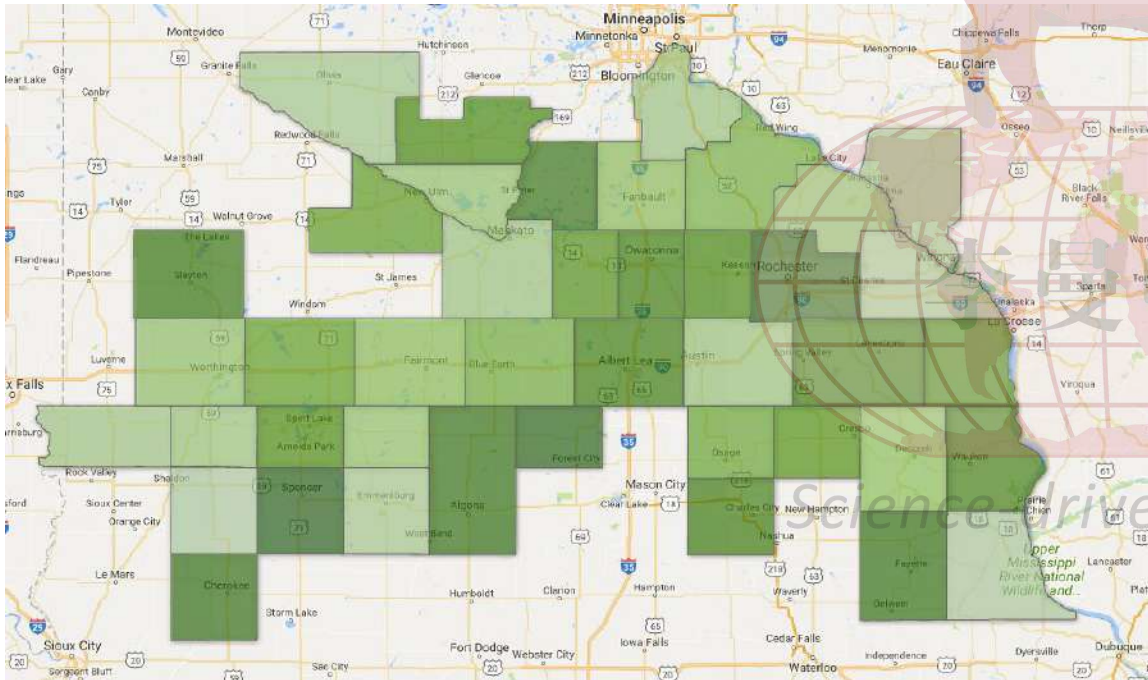
Example: What are some determinants of success?

- The pathogen
 - PRRSv vs. PEDv
- Aerosol: Programs that ignore aerosol transmission will likely fail for PRRSv
- Transportation/trucking: Programs that ignore transportation risk will likely fail for PEDv

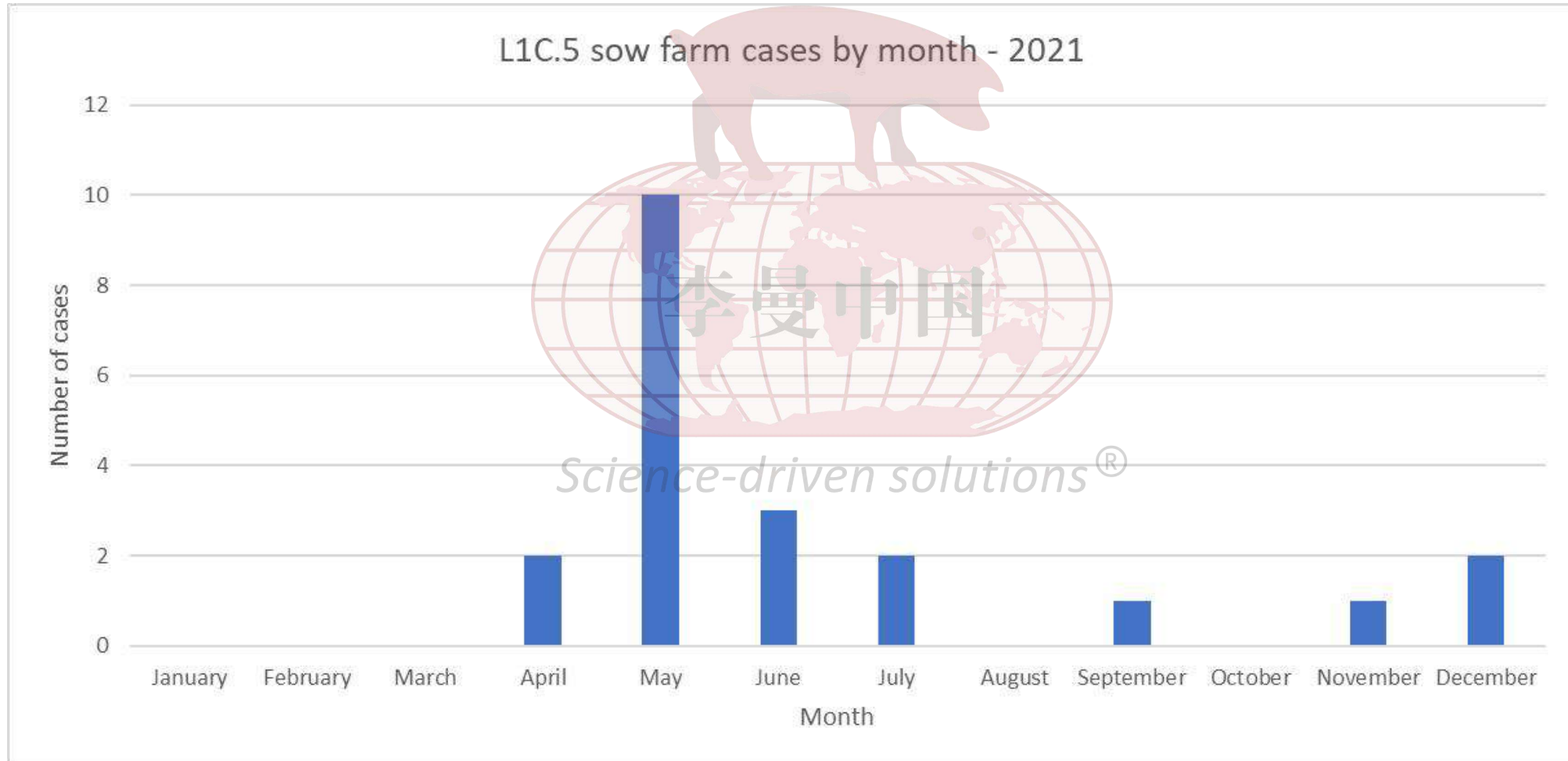


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PRRSv – continues to be a challenge.....

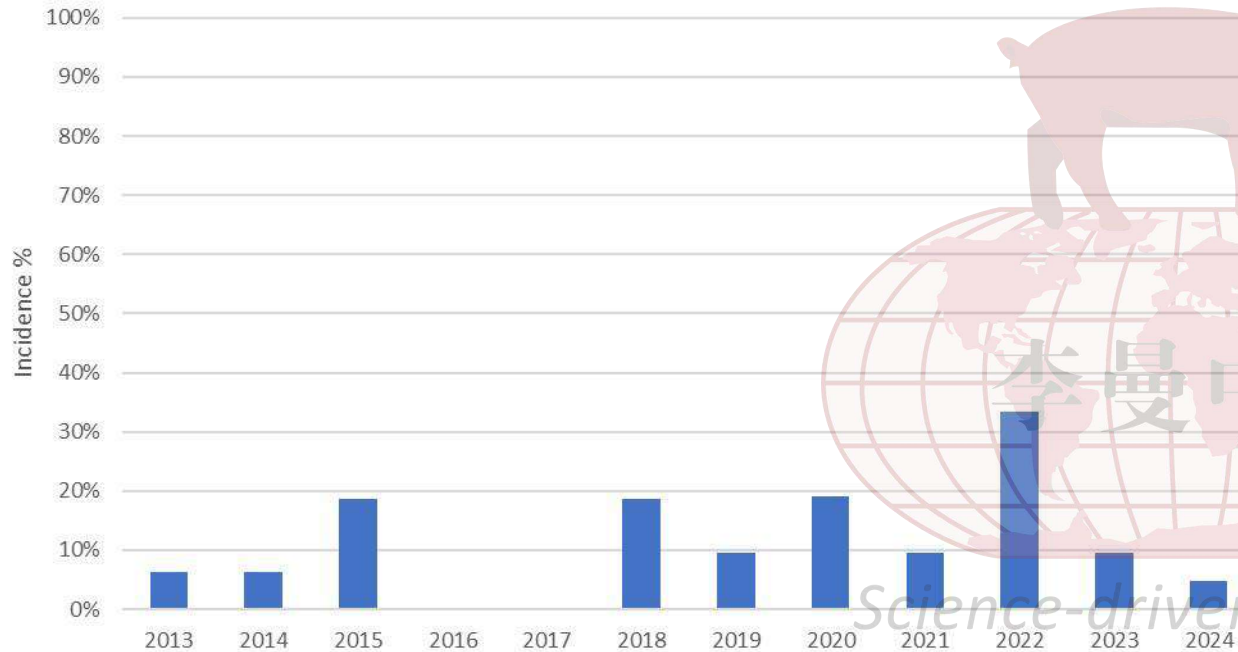


PRRSv



PEDv

PEDv breeding herd incidence %



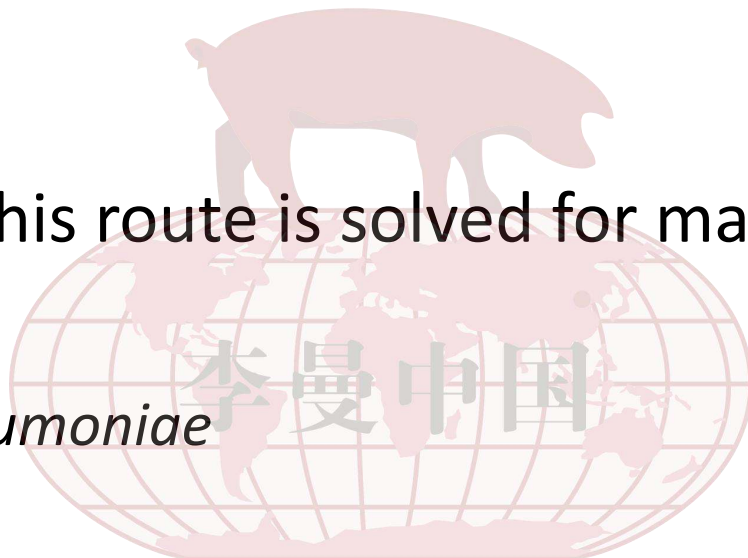
- Large focus on transportation biosecurity
 - Sow
 - Nursery/finish
 - Market
 - 100% wash requirement

- PEDV was found in 5.2% of trailers not contaminated at arrival (Lowe et al., 2014)
 - Transport process is a source of transmission



Biosecurity culture – direct transmission

- Pig to pig, semen
- An expectation that this route is solved for major production diseases
 - PRRSV
 - PEDv
 - *Mycoplasma hyopneumoniae*
- Investment in diagnostics
- Investment in boar studs



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Feces	
PDCoV real-time PCR	1/1 NEG
PEDv S gene real-time PCR	1/1 NEG
TGEV Real-Time PCR - Feces	1/1 NEG
Pooled for NAEU PRRSV real-time PCR - Blood	30/30 Pooled
Thermo Fisher real-time NAEU PRRSV PCR - Blood	
PRRSV EU Thermo Fisher real-time PCR	6/6 NEG
PRRSV NA Thermo Fisher real-time PCR	6/6 NEG



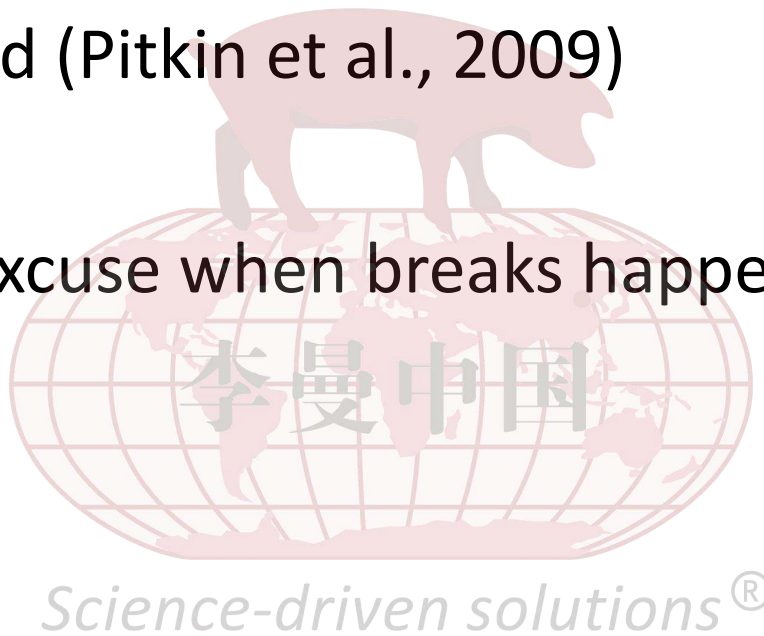
Biosecurity culture – feed transmission

- Many different options available
- Excellent summaries available listing available products and research
 - Kansas State University
- Implementation, cost



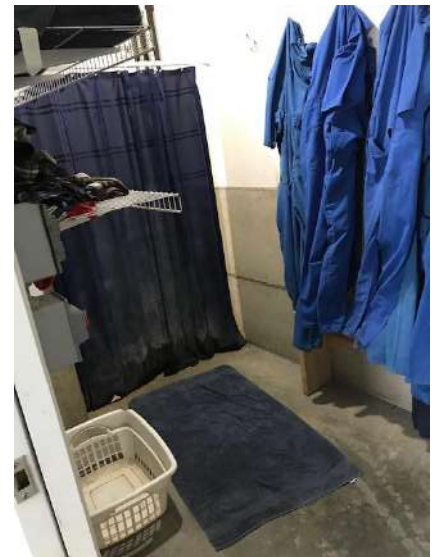
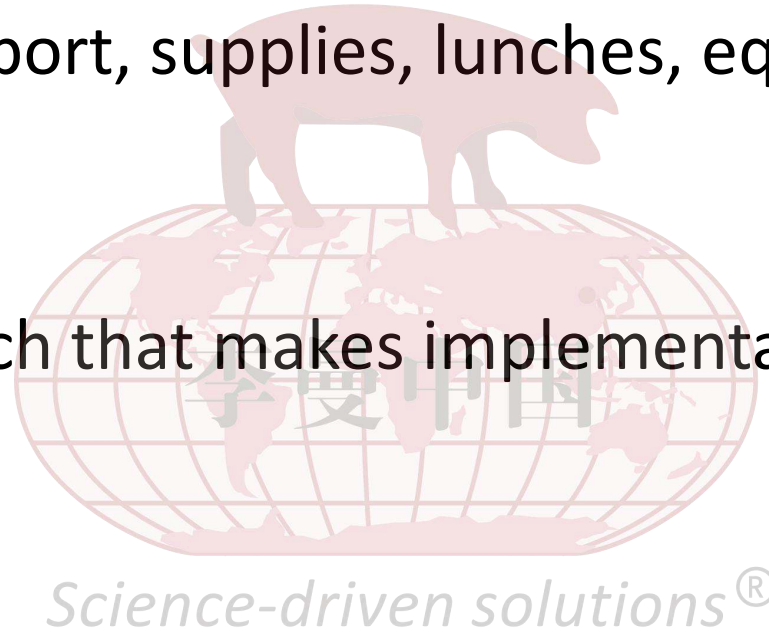
Biosecurity culture – aerosol transmission

- PRRSv airborne spread (Pitkin et al., 2009)
- Becomes a given or excuse when breaks happen and there is no intervention in place

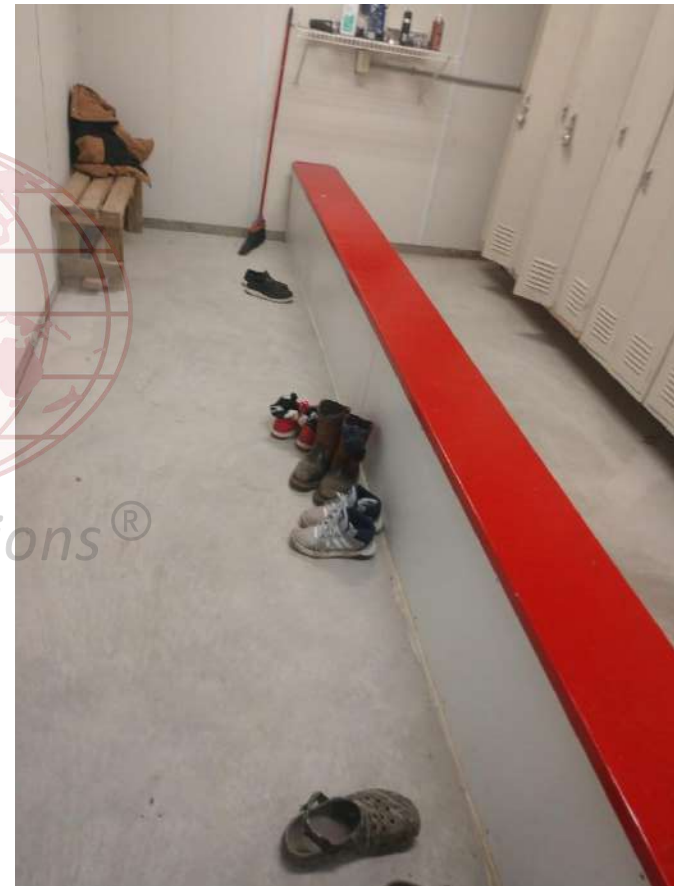


Biosecurity culture – indirect transmission

- Clothes, shoes, transport, supplies, lunches, equipment, cell phones.....
- Standardized approach that makes implementation easy
- People!



Biosecurity culture – indirect transmission examples



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Biosecurity culture – indirect transmission examples

- Site visit order (nursery/grow-finish)
 - PRRS negative to PRRS positive within the day
 - PED negative to PED positive within the day
 - Do not to cross over PRRS and PED within a day
- Review and audit weekly

- Green = PRRS, PED negative
- Red = PRRS positive
- Blue = PRRS vaccinated
- Black = PED positive

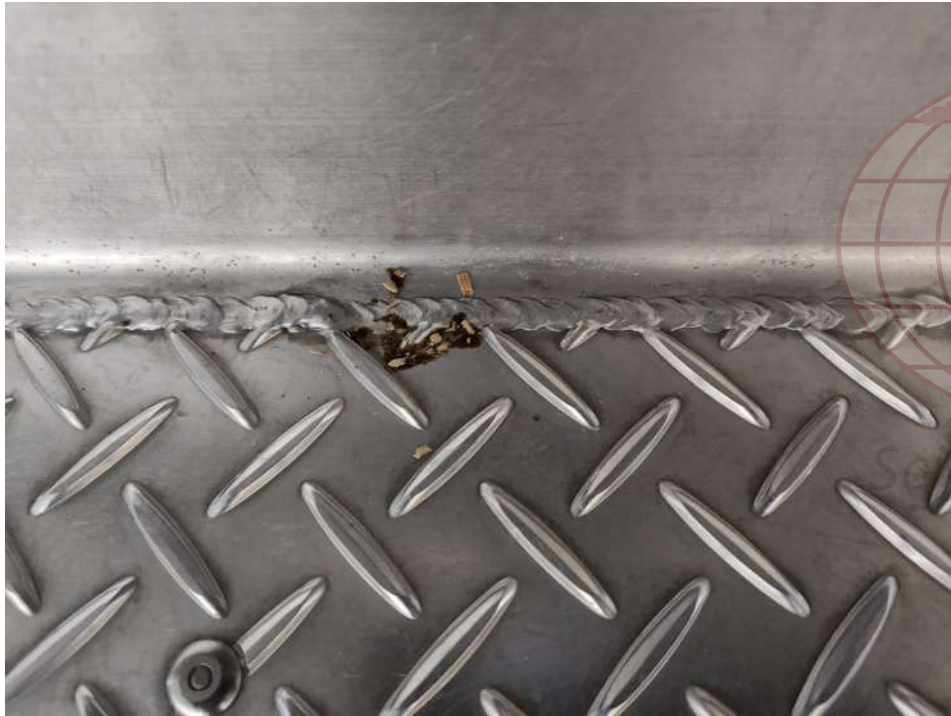
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Always assume every site you visit could have
PRRS or PED or ?



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Biosecurity culture – indirect transmission examples



Biosecurity culture – indirect transmission examples



- How to get non-farm employees or contractors to have buy-in?
- Make them part of the process
- Simple entry protocol
- Have all tools/equipment on site

Biosecurity culture – indirect transmission examples

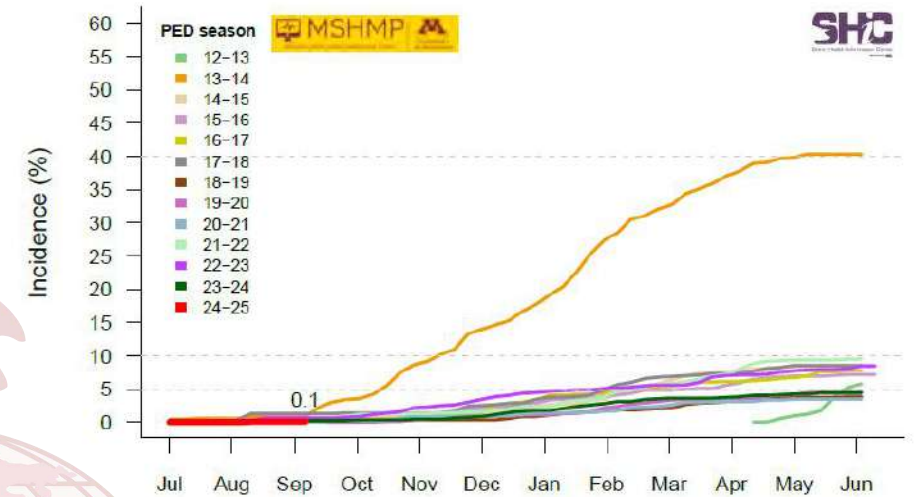
- Continued education
- Meetings
- Weekly updates



Measurement

- PRRSv/PEDv breeding herd incidence
- % of successful truck wash audits
- Nursery/finish PEDv incidence
- % of passed biosecurity audits

Chart 1 - PED Cumulative incidence as of September 11, 2024



MSHMP, 2024

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Summary

- Both bioexclusion and biocontainment are critical
- Biosecurity culture needs to encompass all potential transmission routes
- People will be responsible for managing most of the indirect transmission risks
- Continued review and measurement will help with success

