

# Further evidence that science-based biosecurity provides sustainable prevention of PRRS virus and improves productivity in swine breeding herds.

S Dee, L Brands, R Edler, A Schelkopf, J Nerem, G Spronk,  
M Kikuti, CA Corzo



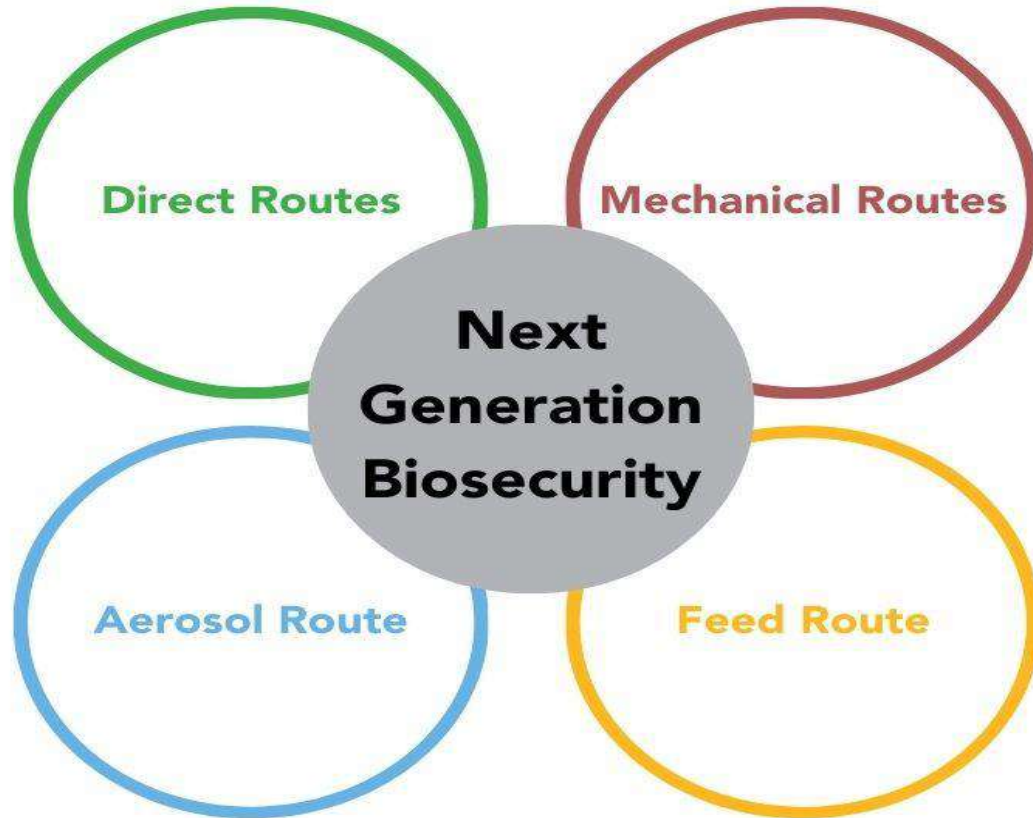
# PRRSV transmission and biosecurity timeline

- **<2000**
  - Direct routes identified.
    - PRRSV infected pigs and contaminated semen.
- **~2000**
  - PRRSV-naïve breeding stock and semen becomes available.
    - Area Spread defined
- **2001-2005**
  - Mechanical routes discovered (transport, personnel, supplies).
    - Biosecurity validated
- **2004-2010**
  - Aerosol route proven.
    - Air filtration validated
- **2014-2020**
  - Feed route discovered.
    - Feed mitigants/storage time validated
- **2021-2024**
  - Next Generation Biosecurity concept developed.
    - Tested



# Evidence-based biosecurity (Dee & Spronk)

Figure 1



# NGB Validation: 2021 - 2024

- **3-year retrospective cohort study across the Pipestone System:**
  - 69 to 76 breeding herds
  - 321,013 to 384,207 sows
- **Outcomes measured:**
  - Incidence risk
    - New variant introduction =  $\geq 2\%$  heterology ORF 5
  - Key Performance Indicators

# NGB Validation

- 2 cohorts were identified:
  - **NGB COMPLETE** herds (77%)
    - Total program
  - **NGB INCOMPLETE** herds (23%)
    - No air filtration
- No statistical difference in area swine herd density between cohorts
  - $p = 0.585 - 1.00$

Figure 1

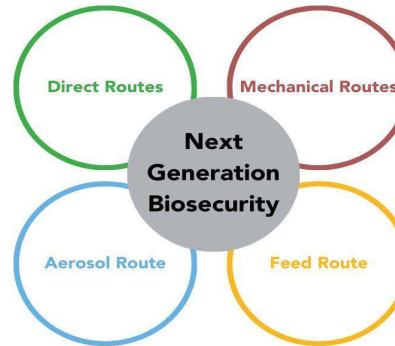
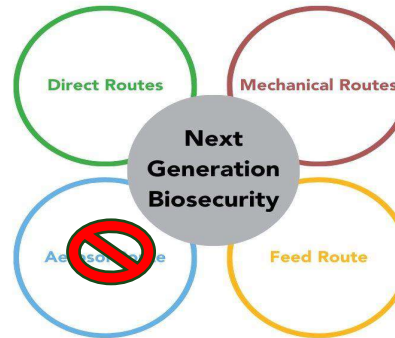


Figure 1



# Results

METRIC	2021-2022	2022-2023	2023-2024
# herds	69	76	75
# sows	321,013	381,404	384,207
Overall incidence risk	8.6% <sup>a</sup>	9.2% <sup>a</sup>	14.6% <sup>a</sup>
NGB COMPLETE	6.3% <sup>b</sup>	3.6% <sup>b</sup>	10.3% <sup>b</sup>
NGB INCOMPLETE	14.3% <sup>c</sup>	25.0% <sup>c</sup>	29.4% <sup>c</sup>

# NGB Validation, cont.

- **PRRSV incidence risk:**
  - Averaged **8%** for 3 years across all herds in the company
    - 10-14% heterology ORF 5
  - No difference in the proportion of positive herds by year ( $p = 0.77$ )
  - Significant association between incidence risk and biosecurity level ( $p < 0.0001$ )
- **Outbreak investigations:**
  - Non-filtered farms
  - Acts of God
  - Repopulations
- **Overall observation = Less disease:**
  - PEDV
  - M hyo
  - IAV-S

# Relationship of biosecurity level and KPIs

KPI	NGB COMPLETE	NGB INCOMPLETE	P value
# herds (2 years of data)	43	19	
Average parity farrowed	3.5	3.5	0.77
Total born	16.1	15.8	0.047
Pre-weaning mortality	15.8%	17.6%	0.013
Pigs weaned/sow	12.2	11.7	0.021
Litters/sow/year	2.3	2.3	0.77
Pigs weaned/sow/year*	28.6	27.7	0.15

\* = 190,115 additional weaned pigs in the NGB COMPLETE cohort

## **Improvements in swine herd biosecurity reduce the incidence risk of porcine reproductive and respiratory syndrome virus in breeding herds in the Midwestern United States**

Scott Dee, DVM, PhD, DACVM<sup>1</sup>; Lisa Brands<sup>2</sup>; Joel Nerem, DVM<sup>2</sup>; Adam Schelkopf, DVM<sup>2</sup>; Gordon Spronk, DVM<sup>2</sup>; Mariana Kikuti, DVM, PhD<sup>3</sup>; Cesar Corzo, DVM, PhD<sup>3</sup>; Karyn Havas, DVM, PhD, DACVPM<sup>1</sup>

<sup>1</sup>Pipestone Research, Pipestone, MN

<sup>2</sup>Pipestone Veterinary Services, Pipestone, MN

<sup>3</sup>College of Veterinary Medicine, University of Minnesota, Saint Paul, MN

\*Corresponding author: Dr. Dee (scott.dee@pipestone.com)



---

*Communication*

## **Further Evidence That Science-Based Biosecurity Provides Sustainable Prevention of Porcine Reproductive and Respiratory Syndrome Virus Infection and Improved Productivity in Swine Breeding Herds**

Scott Dee <sup>1\*</sup>, Lisa Brands <sup>2</sup>, Roy Edler <sup>1</sup>, Adam Schelkopf <sup>2</sup>, Joel Nerem <sup>2</sup>, Gordon Spronk <sup>2</sup>, Mariana Kikuti <sup>3</sup> and Cesar A. Corzo <sup>3</sup>

# Conclusions

- **Next Generation Biosecurity reduced PRRSV incidence risk to 8% and enhanced reproductive performance in a large system of commercial swine production for 3 consecutive years.**
  - Evidence-based biosecurity is effective.
  - The difference between air filtration (yes/no) was significant.
- **New paradigm:**
  - Area spread of PRRSV can be successfully managed.
- **The swine industry and other species groups need to learn from this.**
  - We have all the knowledge and tools we need to mitigate the risk of PRRSV infection in the breeding herd.