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JANUARY 7 - 9, 2025

Biosecurity at Load-Out: A Canada West Swine Health Intelligence Network Special Project

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Jenelle Hamblin



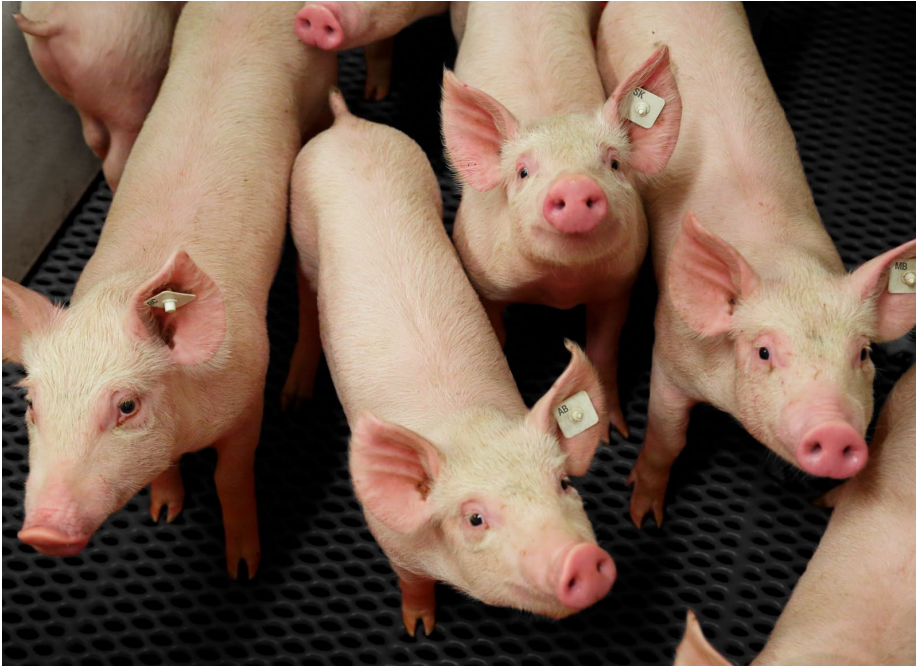
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JANUARY 7-9 2025

Canada West Swine Health Intelligence Network (CWSHIN)

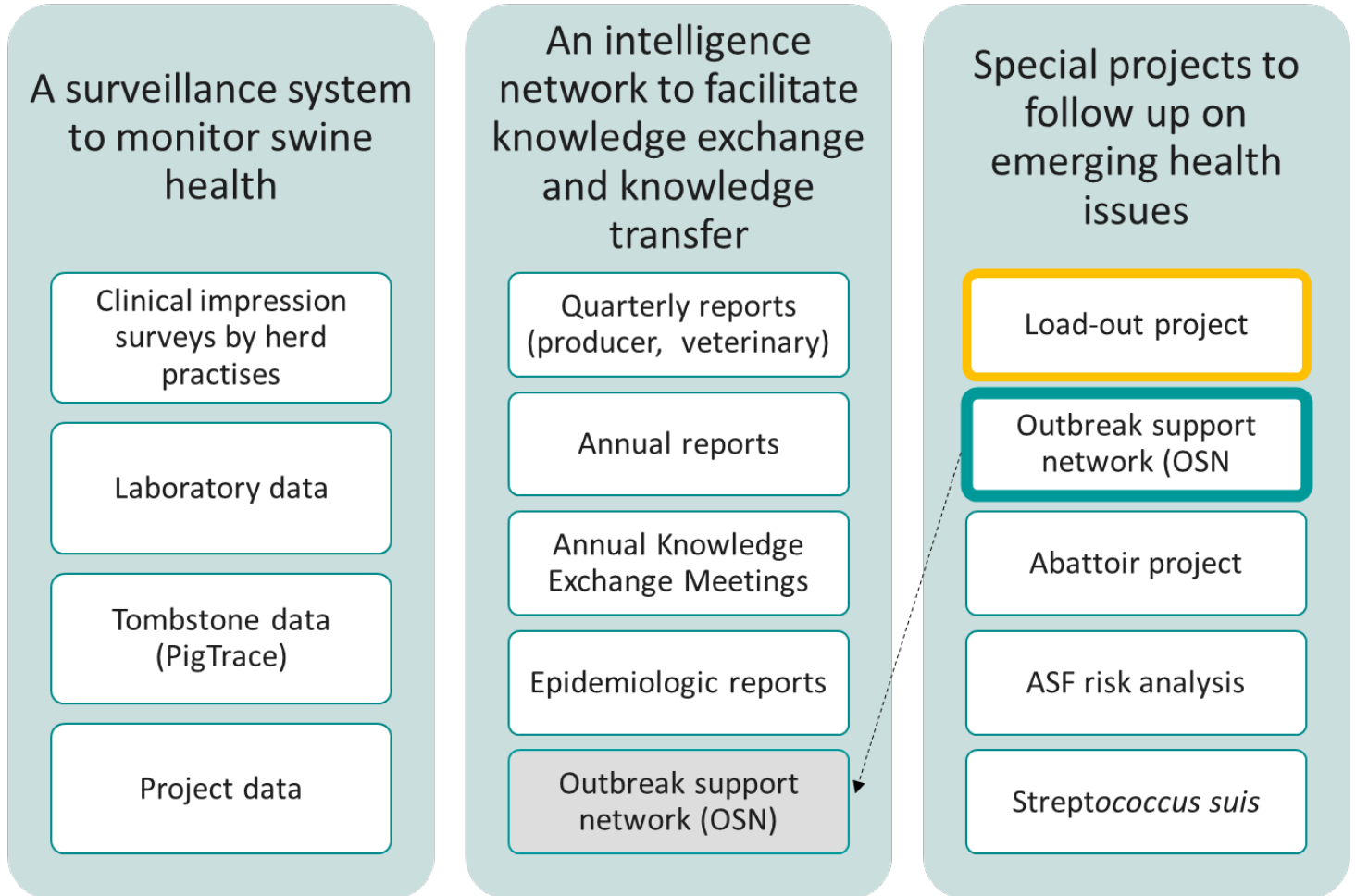


- Is a not-for-profit organization incorporated in Manitoba. It is funded by the four western Canadian provincial pork boards and provincial governments.
- Serves western swine producers, swine herd practitioners and governments to improve swine health, production, and the economic prosperity of the sector.
- The CWSHIN Board of Directors is comprised of representatives from
 - Each of the western Canadian pork boards,
 - With the western provincial agriculture ministries and Western Canadian Association of Swine veterinarians (WCASV) holding ex-officio status



Canada West Swine Health Intelligence Network

Our vision, through 2028,
is to have a swine health
network with 3 pillars.



Why a Load-Out project?

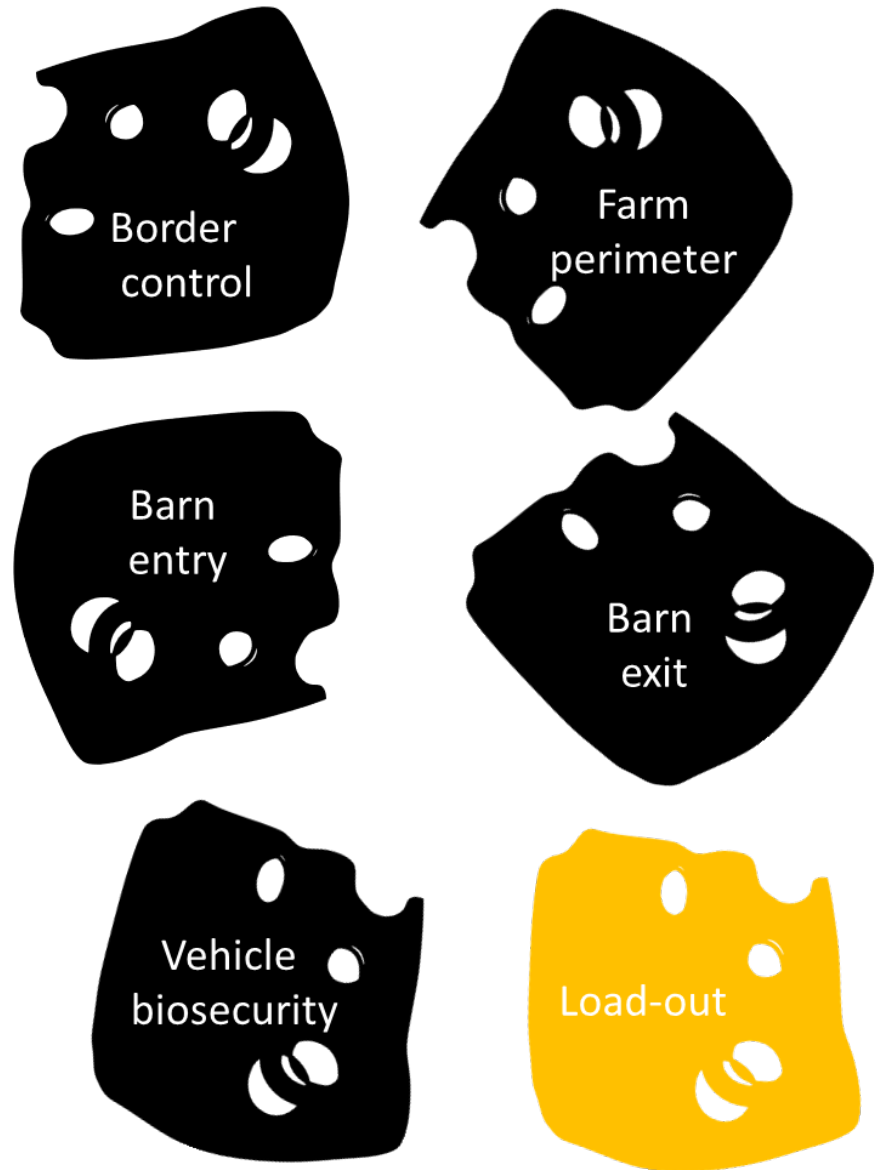
- Outbreak of Porcine Epidemic Diarrhea (PED) in Manitoba winter 2022
- Trailer washing technology; excellent but not 100% perfect 100% of the time
 - Trailers may return to barns potentially spreading the virus
- Cold temperatures and storms
 - Difficult to clean, disinfect and bake trailers
- If truck biosecurity fails, biosecurity at the load-out must be the next barrier to disease

No one biosecurity practice is perfect
(100% effective 100% of the time)



No one biosecurity practice is perfect

Biosecurity = combination of biosecurity practices



CWSHIN contracted Politikos, a multidisciplinary research firm to....

- Find what information has already been published on load-out
- Survey what load-out biosecurity is being done on western Canadian farms



- Dr. Doug Munroe, PhD Founder Politikos Research: Project Manager
- Writer Dr. Julian Reyes Velez, DVM PhD, Senior Researcher, Veterans Affairs Canada
- Dr. Julia Keenlside, DVM MSc, Veterinary Consultant

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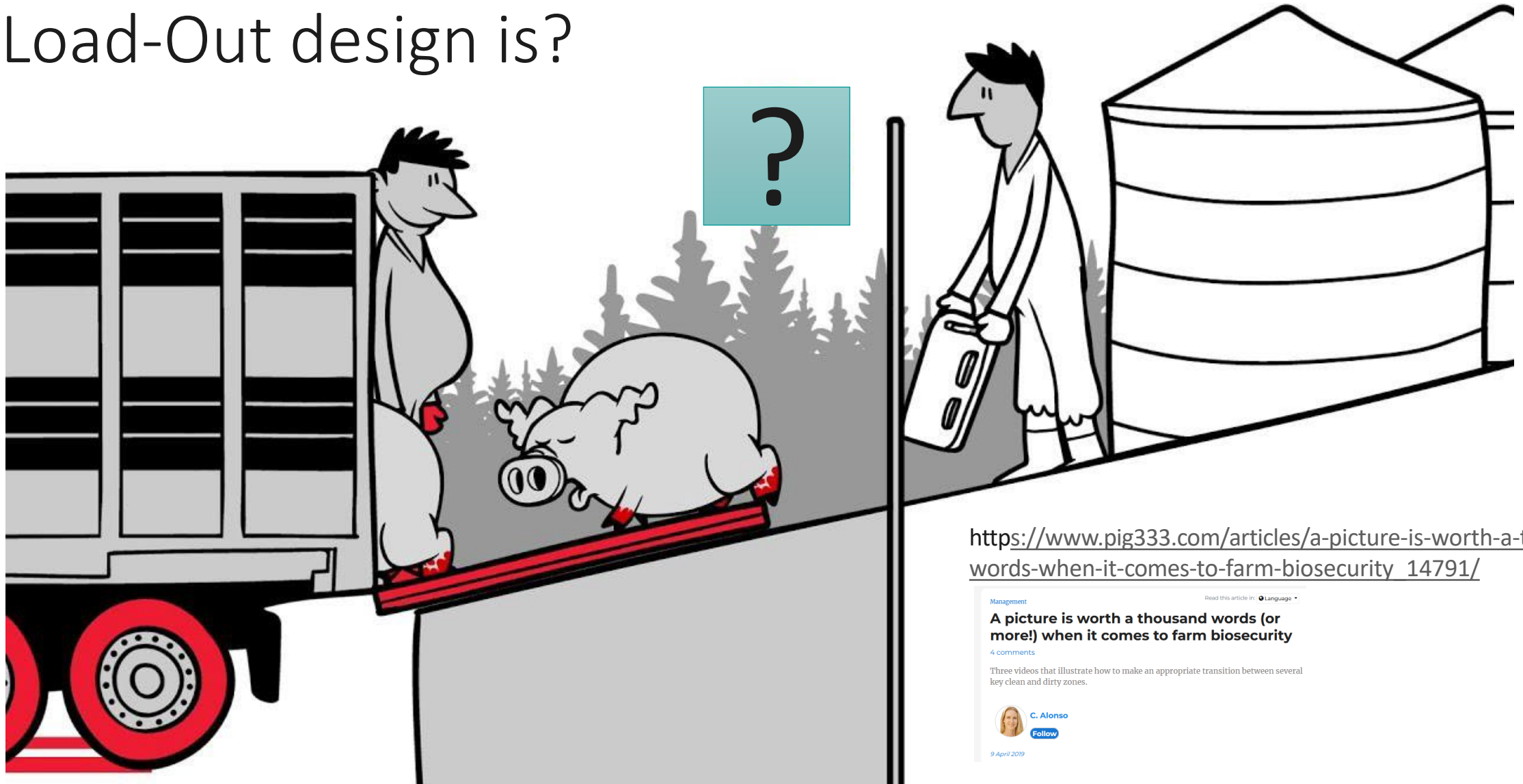


CWSHIN Posed the Research Question:

Knowing that returning vehicles may be a risk and a biosecurity challenge especially during winter:

Can overall biosecurity be improved by changing/improving load-out facilities and procedures?

But do we really know what the best Load-Out design is?



https://www.pig333.com/articles/a-picture-is-worth-a-thousand-words-when-it-comes-to-farm-biosecurity_14791/

Management

Read this article in: [Language](#)

A picture is worth a thousand words (or more!) when it comes to farm biosecurity

4 comments

Three videos that illustrate how to make an appropriate transition between several key clean and dirty zones.



C. Alonso

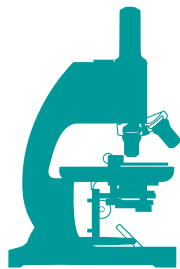
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9 April 2019

Review of load-out facilities and procedures in the commercial swine sector worldwide

SCIENTIFIC LITERATURE

- Dr. Julian Reyes Velez,
- 230 articles found and screened for key words
- 34 articles included

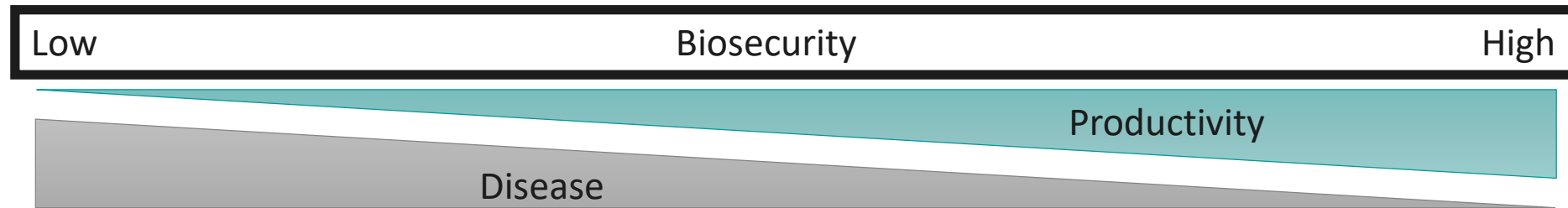


GRAY LITERATURE

- Dr. Julia Keenlside,
- A list of 33 legitimate grey literature websites
- Only articles written in the past 10 years were included



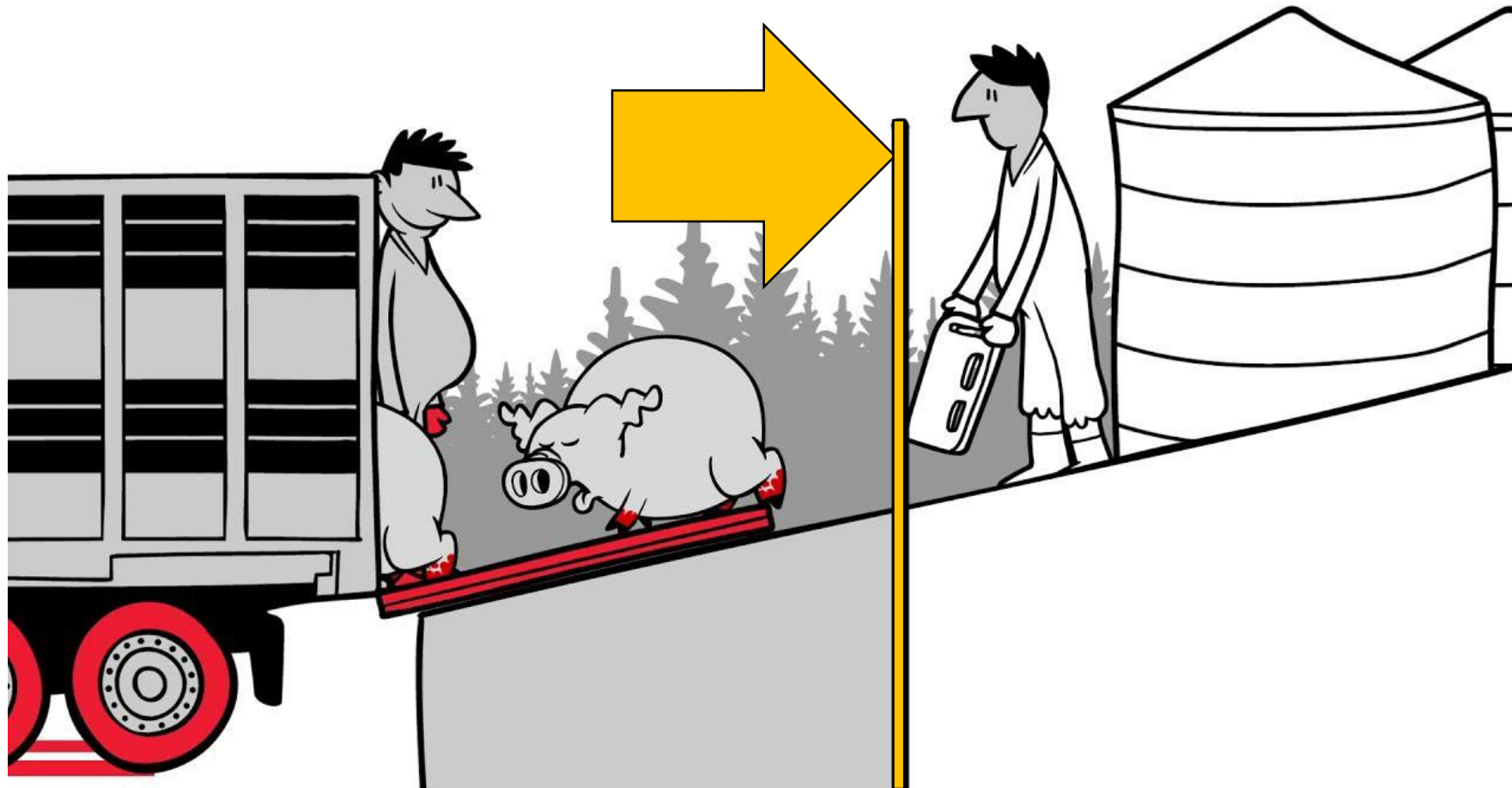
Key findings from the scientific literature

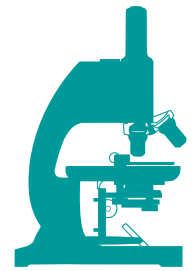


- Higher levels of overall biosecurity are associated with higher productivity.
- Lower levels of overall biosecurity are associated with higher rates of disease.
- Many biosecurity practices that have been proven effective also apply to the load-out:
 - Washing, disinfection, and drying of facilities
 - Cold weather disinfection
 - Danish entry, changing boots and clothing
 - Pig flow
 - Dedicated equipment.



“Line of separation” is One Key Concept

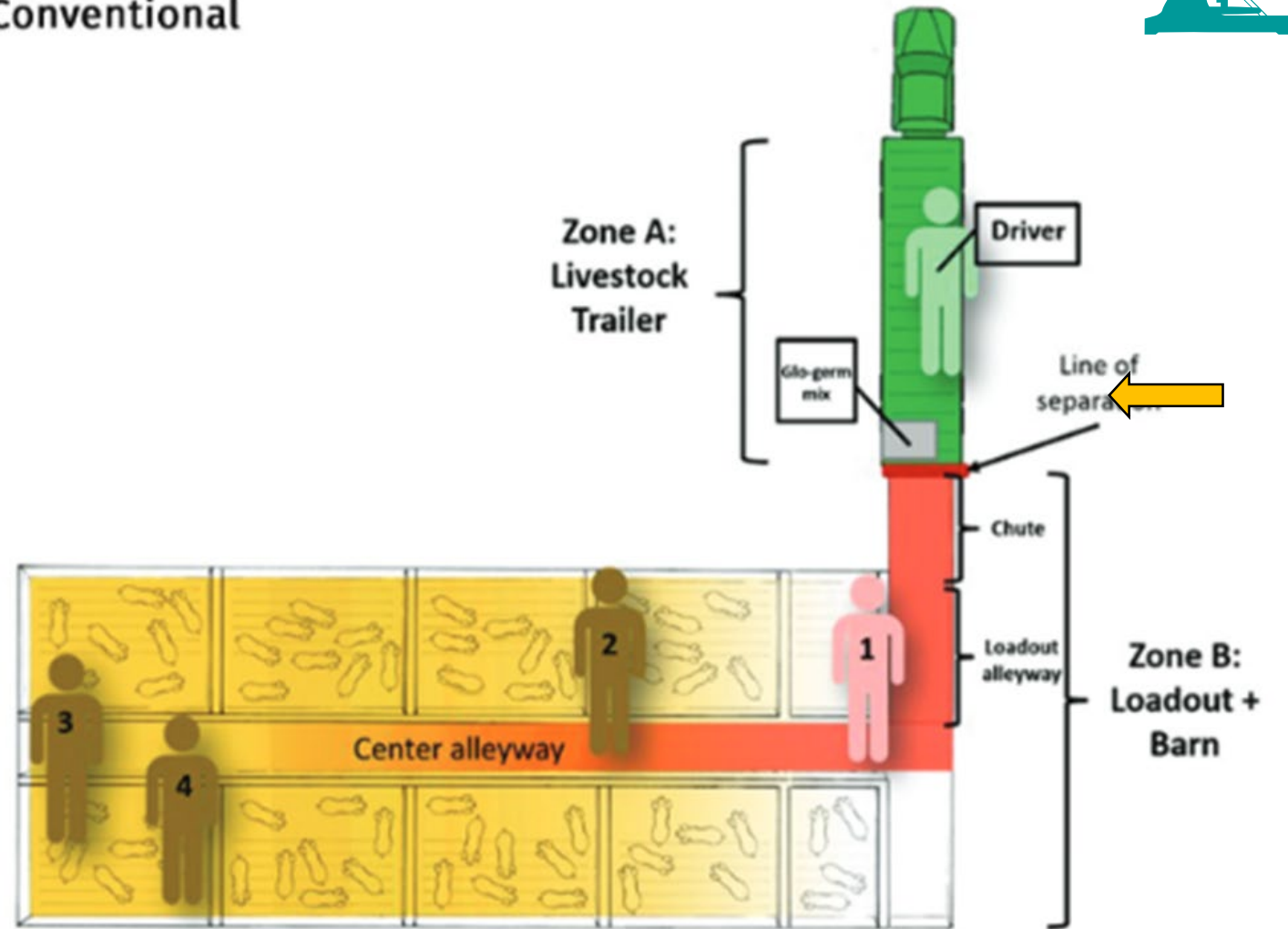




Example

One Line of separation in a conventional Barn

A Conventional



American Association of Swine Veterinarians

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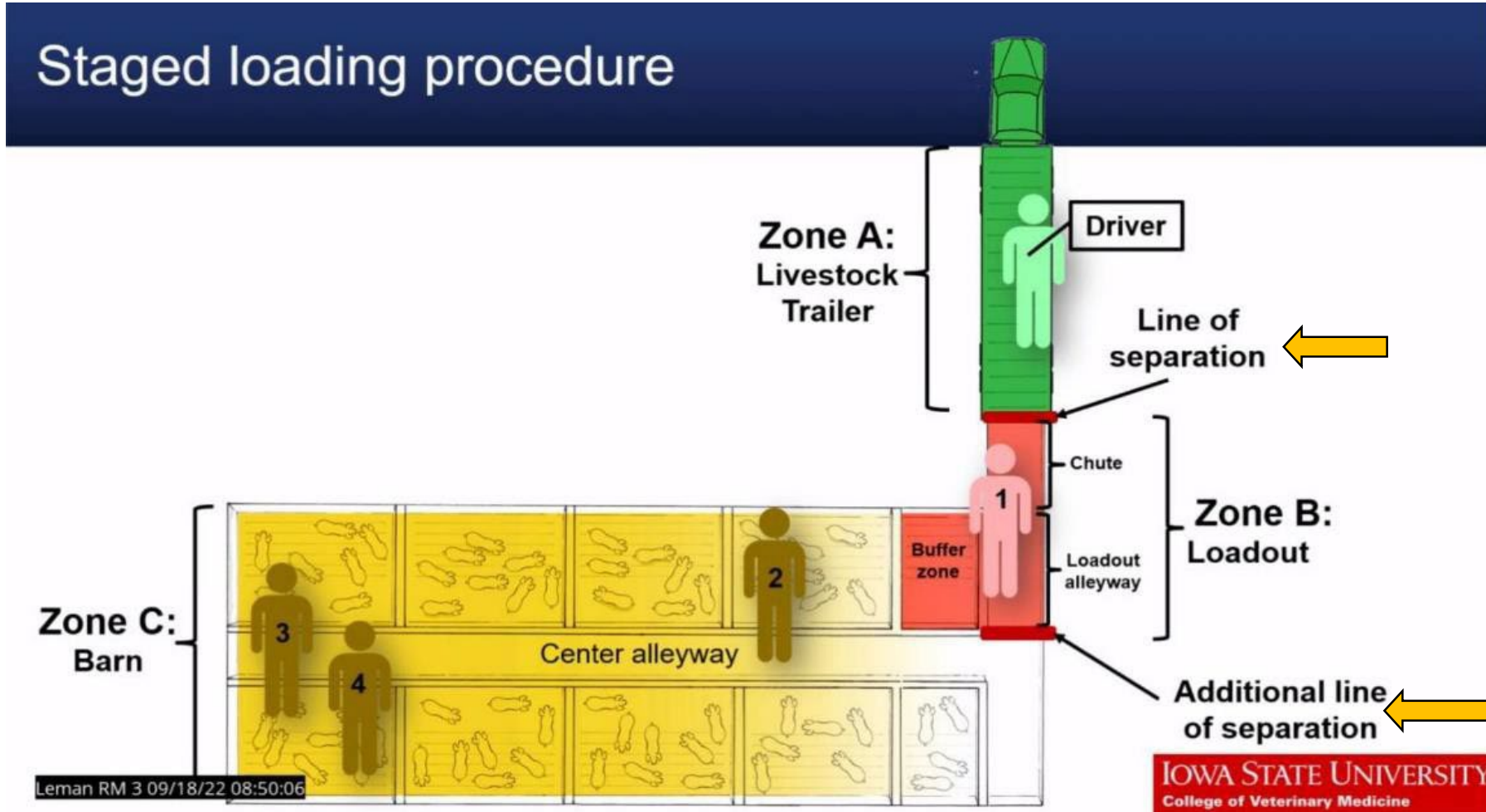
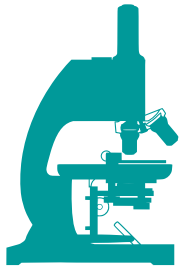
ORIGINAL RESEARCH **PEER REVIEWED**

Evaluation of a staged loadout procedure for market swine to prevent transfer of pathogen contaminated particles from livestock trailers to the barn

Chelsea R. Ruston, DVM; Daniel Linhares, DVM, PhD, MBA; Eli Blay; Megan Nickel, DVM; Kristin Skoland, BS; Heather Kittrell, DVM, PhD; Justin Brown, DVM; Locke Karriker, DVM, MS, DACVPM; Mary Breuer, BA; Lauren McKeen, MS; Derald J. Holtkamp, DVM, MS

<https://www.aasv.org/shap/issues/v29n5/v29n5p234.pdf>

Staged Load-out = Two Lines of Separation

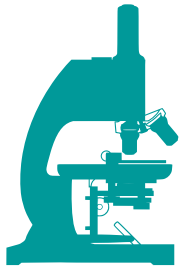


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Dr Jette Christensen, Manager CWSHIN



A project on Staged Load-Out

The screenshot shows the top of a National Hog Farmer article. The header includes the site logo, a search icon, and a 'SUBSCRIBE TODAY' button. Below the header is a navigation bar with categories: Livestock Management, Farming Business Management, Market News, and Our Events. The article title is 'Preventing pathogen transfer during load-out' with a subtitle 'Second line of separation, staged loading can help serve as biosecurity backup.' The author is Ann Hess, dated June 18, 2020, with a '7 Min Read' indicator. The main content area features two side-by-side photographs of a barn floor. The left photo shows a blue fluorescent substance (Glo Germ) on the floor, circled in red. The right photo shows a person using a handheld device to apply the substance to the floor, also circled in red. To the right of the photos is a 'TN Duroc' advertisement with the text 'Look no further...' and bullet points for 'production efficiency' and 'pork quality'. Below the photos is a 'Recent Headline' section featuring a photo of a woman and the text 'LIVESTOCK Becton n SHIC ass director NOV 3, 202'. At the bottom right of the screenshot is a 'MARKET NI' label.

- Staged load-out reduced contamination from trailer to barn but did not eliminate it.
 - Glo Germ showed contamination was especially reduced in the center alley of the barn after the second line of separation.
 - Lines of separation were not always honored, with pigs turning around and going back over the lines.
- A staged Load-out is not feasible to implement in all barns

<https://www.nationalhogfarmer.com/hog-health/preventing-pathogen-transfer-during-load-out>

Where else to look for valid information?



- Not peer reviewed in a scientific journal or produced by commercial publishers.
- From trustworthy and legitimate sources.
- Examples: industry magazines, conference proceedings, government publications, student theses, reports, agricultural newspapers, industry websites.
- Can be valid source of advice and experience
- But not all information may be scientifically validated.



PIG PROGRESS

Key Results from Gray Literature

Line of separation

Dedicated boots, clothing and equipment

Staged loading

Positive pressure ventilation during loading

Staff training

Written protocols

Auditing of procedures



<https://www.pigprogress.net/pigs/correct-layouts-when-moving-pigs-manually/>

Some examples from around the world



Minnesota:
separate
chutes for
loading in and
out



https://www.pig333.com/articles/bio_security-to-minimize-the-unavoidable-risk-of-animal-movement_15083/

Dr Jette Christensen, Manager CWSHIN

Facilities and equipment

Read this article in: Language

Biosecurity in load-ins and load-outs. Minimizing the unavoidable risk of animal movement

Key considerations for the design of biosecure and practical pig loading chutes that will minimize disease transmission during the animal movement process.



C. Alonso

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25 June 2019

The Line of Separation is defined as the line between the area that is to be used by the transporter and the area to be used by farm or market personnel. Be aware and be informed of where the line of separation is in every situation.



There may be multiple areas where the line of separation is drawn. Be aware of where the Line of Separation is when arriving at a producer's site or at a market.

At the cab of the truck:



At the back of the trailer and the loading chute:



At the farm:



(continued)



Line of separation

Chinese farm perimeter



Picture 5. Aluminum open loading chute at the farm perimeter, China. Courtesy of DanAg Group.

Spain



Picture 6. Semi-enclosed loading chute with gates and a horizontal bar to physically separate clean and dirty zones. Courtesy of Agropecuaria Los Girasoles, Spain

Facilities and equipment

Read this article in: [Language](#)

Biosecurity in load-ins and load-outs. Minimizing the unavoidable risk of animal movement

Key considerations for the design of biosecure and practical pig loading chutes that will minimize disease transmission during the animal movement process.



C. Alonso

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25 June 2019



Europe: Load-out chute designed for staged loading of pigs onto a truck.

A double line of separation (red and orange dashed lines)



Spain:

Loading bays with separating fence to allow only animals to pass through to the dirty area.

Leaving a small gap or window is an interesting detail, since we must not forget that delivery notes, transport documents, etc., have to be exchanged with the carrier. Photo courtesy of Lara Ruiz.



https://www.pig333.com/articles/the-farm-with-ideal-biosecurity-2-2_17435/

Dr Jette Christensen, Manager CWSHIN

Pig health

Read this article in: Language

Ideal biosecurity for pig farms (2/2)

Preventing the entry and spread of diseases should be an objective on any swine farm, so adequately designing biosecurity aspects is key. In this article, we continue to discuss biosecurity measures with two experts: Lara Ruiz and José Casanovas.



J. Casanovas

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L. Ruiz

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J. Wennberg

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4 October 2021

The loading bay

A pick-up house for finishers – S. America



A novel addition to the farm: A separate, biosecure pick-up point for finisher pigs.

In 2020, HoCoTec offsite pig house for finished pigs, about 1.5 km away from the main farm.

- On-farm tractors will bring the finishers to this location.
- On the other side of the building, one of the farm's three trucks will load the pigs.
- The pig house has a capacity of 100 animals – which is exactly half of the number of animals that fit into a transport truck.
- That way, no potential pathogens (if any) from the trucks can ever reach the farm's own pig buildings.

<https://www.pigprogress.net/world-of-pigs/farm-visits/hocotec-on-its-way-softbreakto-becoming-an-integrator/>

Dr Jette Christensen, Manager CWSHIN

PIG PROGRESS⁴⁰
YEARS

Pigs ▾ Health & Nutrition ▾ Markets

Farm visit: HoCoTec on its way to becoming an integrator

18-11-2022 | Farm visits | Article



Back to Canada





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YOUR READING LIST

- Biosecurity review recommended in latest PED outbreak
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- Agriculture technology seen as solution to climate change
Feb 24, 2022 LIVESTOCK
- Dairy farm fined for worker's death
Feb 23, 2022 LIVESTOCK
- Sask. crop insurance hikes coverage, premiums
Feb 22, 2022 CROPS
- Greenhouse gas project focuses on farms
Feb 22, 2022 CROPS

Biosecurity review recommended in latest PED outbreak

By Dr. Blaine Tully

Published: February 24, 2022
Livestock

Reading Time: 4 minutes



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LIFE ON THE FARM ESSENTIALS

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THE WESTERN PRODUCER

<https://www.producer.com/livestock/biosecurity-review-recommended-in-latest-ped-outbreak/>

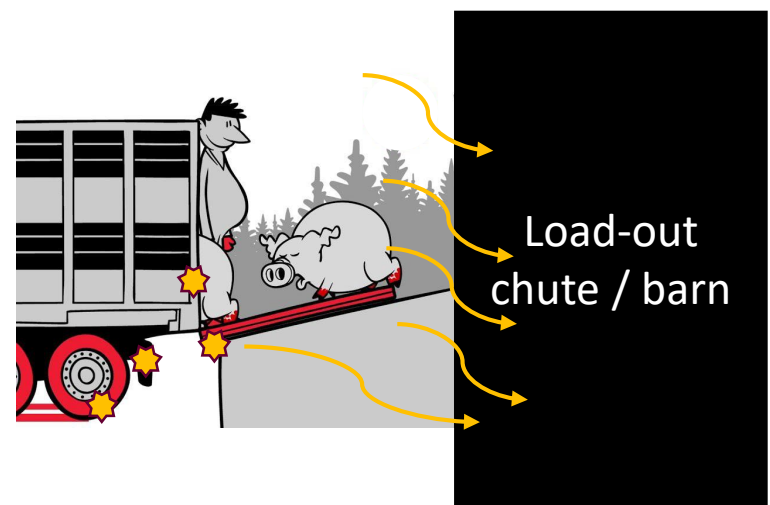
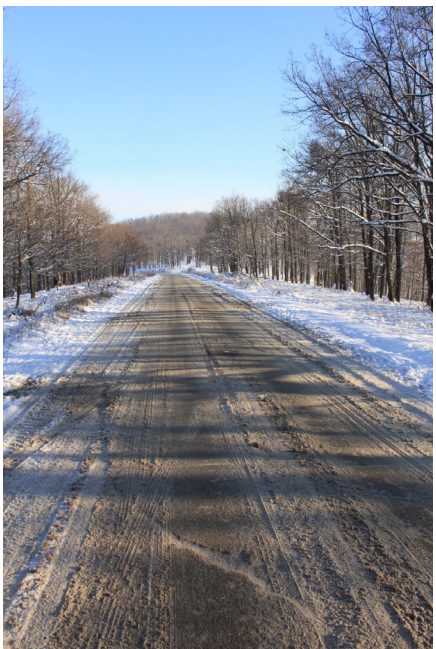


Biosecurity review in PED outbreak

Freezing a trailer (within minutes during winter) does not kill any pathogens
Keeps pathogens viable, waiting for a thaw event.

On mucky roads “mist” or debris can seep into the trailer through gaps, cracks and non-sealed doors

When load-out chute door or the dead-stock removal door open the barn will “suck” in whatever is on the door frame, ramp or in the trailer backed up to the barn.





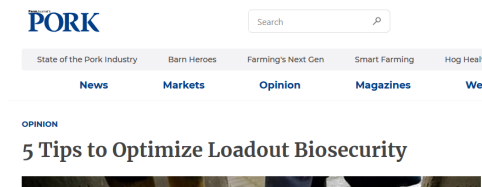
Opinion: 5 Tips to Optimize Load-out Biosecurity

Aaron Lower - Carthage Veterinary System Ltd
June 7, 2021



- A line of separation in a loadout is not absolute.
 - Flicking of manure and pigs circling back happen
- GloGerm has proven
 - Extremely common to contaminate chutes and boots during the loadout process
 - Cheap and effective way to teach and audit
 - Place powder at the back of the trailer prior to the movement
 - After the loadout is complete, utilize a blacklight to identify contamination of the barn and your boots
- This realization has changed the standard for load-outs from one line of separation into a staged loadout procedure, with two lines of separation.

<https://www.porkbusiness.com/opinion/5-tips-optimize-loadout-biosecurity>





Expert Survey of Load-Outs in Western Canada

Literature review results were used to draft survey questions

The Checkbox platform was used to protect identity of respondents

Participants were selected using the following criteria: licensed veterinarian working in specialty swine practice in western Canada for many years and likely to respond

Eleven veterinarians were contacted and **six** completed the survey (**55% response rate**): one working in AB and BC, one working in SK, one working in SK and MB, 3 working in MB only

Four veterinarians reported serving sites that had broken with PED in 2021

Image 3, below, was submitted by one of our survey respondents as an example of the internal layout of a finisher barn in their practice. This layout would be described in our survey as a separate load-out area, either with or without internal doors (depending on the internal structure of the barn). It lends itself to a staged load-out approach in which pigs are first moved from pens to the load-out area, and then up the ramp to a waiting trailer.



Image 3: Diagram of Finisher Barn Layout¹⁰⁷

Load-out project Results

Research Question:

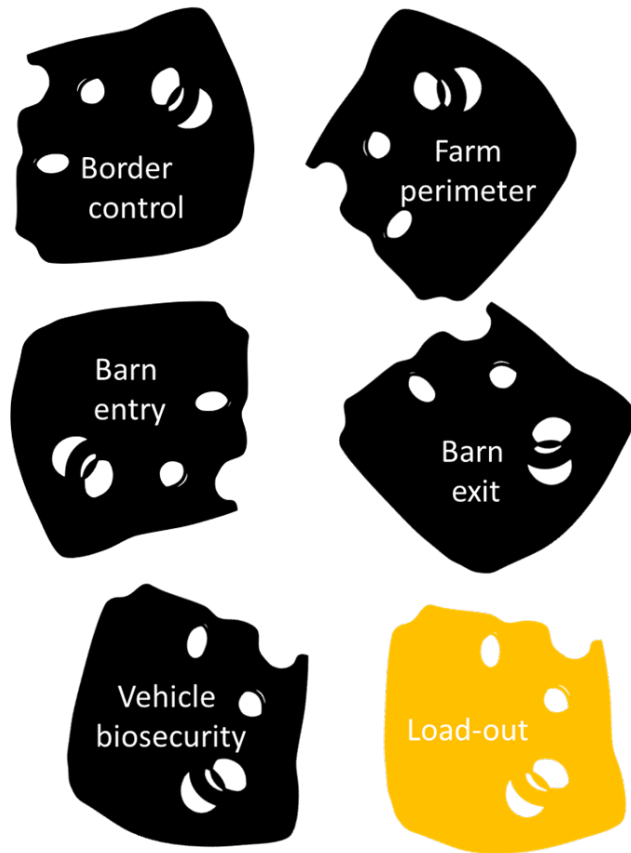
Knowing that returning vehicles may be a risk and a biosecurity challenge especially during winter:

Can overall biosecurity be improved by changing/improving load-out facilities and procedures?

- Many biosecurity practices that have been proven effective in the scientific literature also apply to the load-out:
 - Pig flow
 - Washing, disinfection, and drying (WDD) of facilities
 - Cold weather disinfection is different
 - Danish entry, changing boots / clothing
 - Dedicated equipment.



CWSHIN Load-out project - Conclusions



Emphasize on outcomes because there will be several possible combinations of facilities and procedures that could be employed to achieve:

1. Pigs never move through a potentially-contaminated load-out area;
2. Movement through the load-out area is strictly one-way for pigs and people;
3. Load-out areas are decontaminated after every use.

BIOSECURITY AT LOAD-OUT: REVIEW OF FACILITIES AND PRACTICES FOR RISK MITIGATION AT SWINE FARMS



Politikos
RESEARCH.CA

Julia Keenlside
&
Rhea Teranishi
Co-chaired

BIOSECURITY AT LOAD-OUT

Key Principles for Safer Load-Out Procedures

Research has confirmed that trucks are at high risk for bringing disease into a barn. Significant work has been done over the past several years to minimize this risk - e.g. washing, baking, dedicated trucks, sequencing etc. While this has been successful in reducing disease spread, it has become clear that the risk from transport can never be zero. When a truck or trailer become contaminated, the load-out procedures and facilities must be the next line of defense.

To date very little research has been done on the best load-out designs or practices for preventing disease entry. Because production flows, barn layout and loading procedures vary greatly with each farm, there will not be a single load-out solution that works for every farm.

Based on a thorough review of both peer-reviewed literature on biosecurity and of non-peer reviewed grey literature (conferences, meetings, magazines, industry, and government publications etc.) the following principles were developed:

1. Pigs must never move through a load-out area that could be contaminated (e.g. from trailer bumpers, dead stock or dirt etc.).
2. Movement of pigs, people and equipment through the load-out area is always one-way (i.e. no back and forth movement).
3. Load-out areas must be thoroughly cleaned, disinfected and dried after every use. In general, the risk can be reduced by doing multiple small things consistently:
 - Thorough documentation of load-out procedures
 - Ongoing training of all staff
 - Regular verification that actual load-out operations are following procedures

Research has found that even relatively inexpensive and intensive biosecurity practices result in significant overall savings to a farm by reducing economic losses due to disease.

Two categories of recommendations:

- Facilities (the physical layout, built environment, and equipment present at a site)
- Procedures (describing how load-out is conducted given the facilities available)

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BIOSECURITY AT LOAD-OUT

Page 2

Practical recommendations for facilities

1. Establish a clear line of separation (like painting a line on the floor) between clean (inside) and dirty (outside) areas
2. Consider using a staged load-out design with two lines of separation (refer to staged load-out design on last page)
3. Separate load-out facilities for different animals with different risks, such as for cull sows and piglets on a sow farm
4. Fully enclosed load-out areas to allow for better cleaning and disinfection
5. Separate room for load-out at minimum, not just a door that opens into the barn floor
6. Designing load-out areas to allow wash water to flow away from the barn
7. Dedicated cleaning and disinfection equipment stays in the load-out
8. Change the barn ventilation system from negative to positive pressure during loading so as not to suck dirt from the truck into the barn, or have a separate load-out room with doors that can be closed
9. Design facilities to make loading easier and reduce the risk of pigs falling around, for example alleyways and chutes designed to encourage pigs to flow in one direction, allow loading of small groups at a time, and lighting that is darker in the barn/load-out area and lighter in the trailer
10. A separate exit for deadstock as the load-out area is not used to move or hold dead animals awaiting disposal, as well as consideration for a separate entrance for breeding stock
11. Include your herd veterinarian in designing your procedure and evaluating load-out biosecurity



BIOSECURITY AT LOAD-OUT

Page 3

Practical procedures for load-out

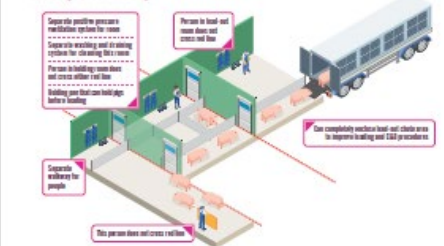
1. Farm personnel should never step onto the transport truck/trailer
2. Staff should put on a set of outer clothing and boots that are specifically dedicated to load-out
3. Staff from different flows should not work across multiple sites outside their flow
4. Where there are staged load-out areas, at least one person should be stationed inside the load-out area, and when possible, farm personnel should remain in assigned locations
5. If possible, have enough trained personnel to assist with all aspects of the load-out to make loading easier
6. If possible, move pigs into separate load-out pens instead of loading out from main barn and move pigs in smaller groups
7. The load-out area should be washed, disinfected, and dried after every use
8. The exterior rear surfaces of the trailer including the bumper should be thoroughly soaked with a disinfectant (add polyamine glycol to prevent freezing in cold temperatures) and applied for at least the manufacturer's recommended contact time before the truck backs up to the load-out ramp or dock
9. Dust proof all roads on site regularly
10. If possible, back up the truck inside a specially built room and let it warm up before loading
11. Develop procedures to address if pigs re-enter the barn from the trailer; include your veterinarian in designing your procedure and evaluating load-out biosecurity
12. Develop written load-out procedures in consultation with a herd veterinarian to train staff on the use and washing of the load-out area
13. Maintain records for staff training, equipment, and verify load-out procedures at regular intervals to ensure compliance
14. Conduct biosecurity training for all staff at least every six months, and train new employees on site-specific biosecurity procedures



Basic Staged Load-Out Design (from Ruston et al 2021)



Two Stage Load-out Design



Acknowledge

CWSHIN would not exist without

- The participation and support of swine practitioners, laboratories, governments and swine health experts
- Funding from pork boards and governments

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Thank you for the opportunity
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