

Prevention - Biosecurity Training, Plans and Execution

Kevin A Janni

Professor and Extension Engineer
Department of Bioproducts & Biosystems Engineering



UNIVERSITY OF MINNESOTA
EXTENSION

Driven to DiscoverSM

Which pathogens are lurking outside your barn?



How do those pathogens get into your barns?

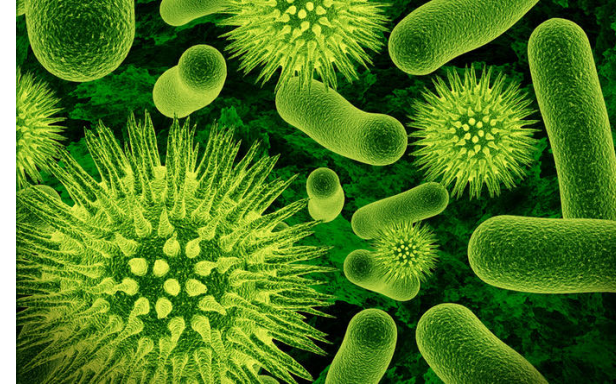


How do pathogens get into barns?

- Carried in by people on boots, clothing, supplies, equipment or other things
- Airborne
- Feed or water
- Other



Biosecurity



- Preventing an infection or outbreak
 - Keep disease out
- Reducing spread
 - Keep disease in
- Line of separation



Flow Analysis



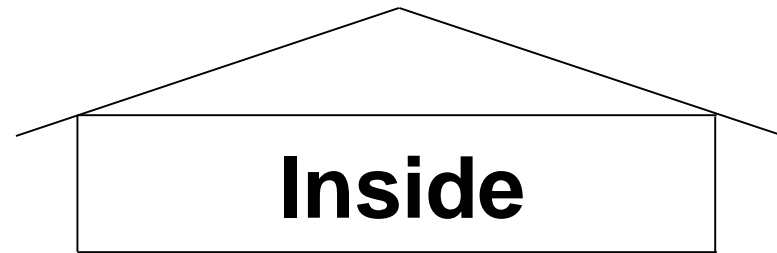
- Systematic planning approach
- Layout and design farmsteads and animal facilities
- Enhance movement into and out of farmstead and barns
 - **People**
 - **Animals**
 - **Feed**
 - **Supplies**
 - **Equipment**
 - **Bedding**
 - **Ventilation air**
 - **Other**

1. Define Boundaries

- Farmstead boundaries
- Barn boundaries
- Identify every opening in boundary

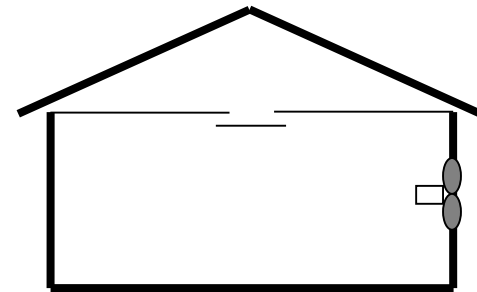


Outside



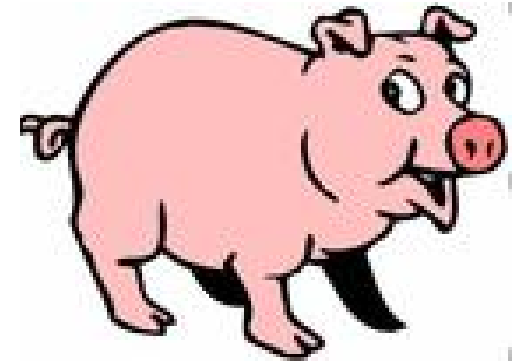
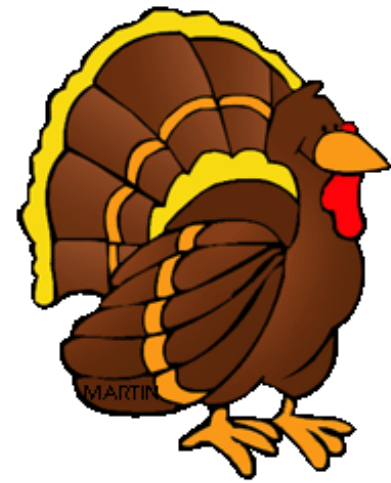
UNIVERSITY OF MINNESOTA | EXTENSION
Driven to DiscoverSM

2. Identify every flow that crosses boundary

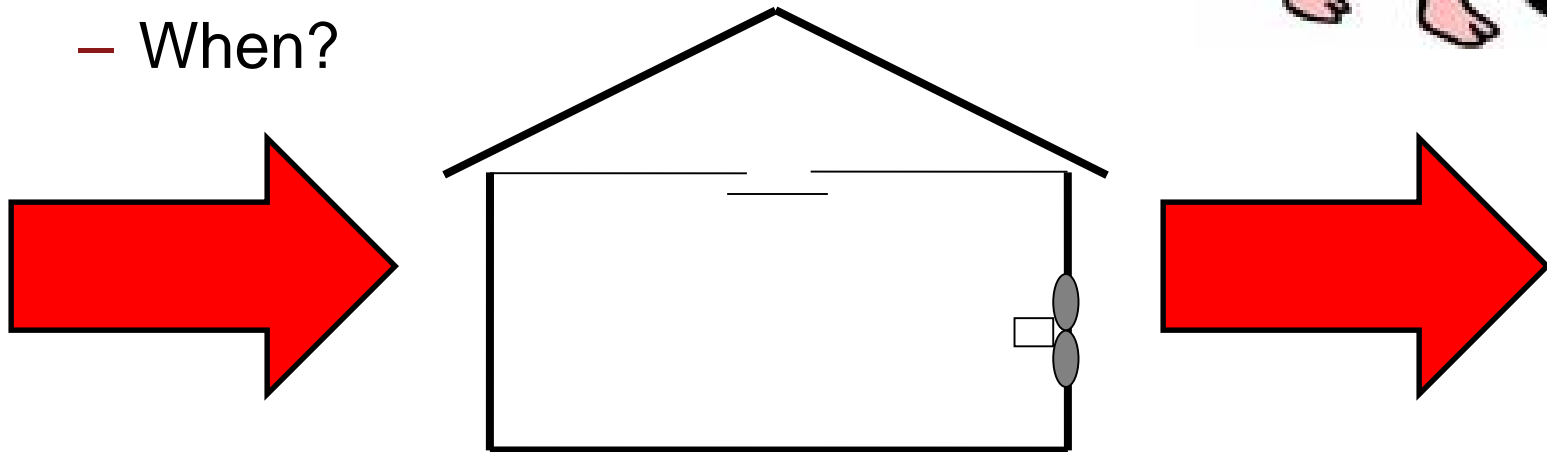


- People
 - Owners
 - Managers
 - Animal care people
 - Maintenance people
 - Consultants
 - Visitors
- Tools & supplies
- Personal items
- Rodents & pests
- Birds
- Mortalities
- Feed
- Water
- Ventilating air
- Equipment
- Bedding
- Old litter
- Other

3. Describe Flows

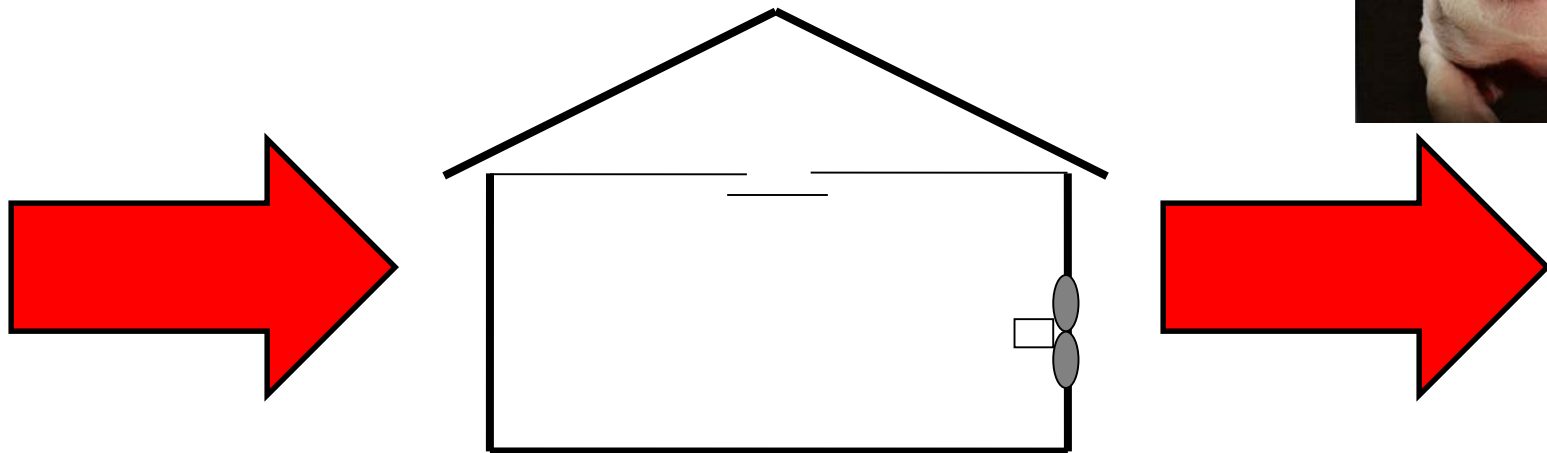


- Feed, bedding, air, birds, people, equipment, manure and on.
 - Where does it come from?
 - Where and how get in?
 - Where and how leave?
 - What happens along the way?
 - When?



4. Assess biosecurity risk

- What biosecurity risk is associated with each flow?
- What are the costs and benefits of practices to manage risk?



5. Implement protocols to manage biosecurity risk

- Pre-visit downtime
- Disinfecting trucks and equipment
- Boots and coveralls
- Biosecure entries
- Hand washing
- Log-books
- Other

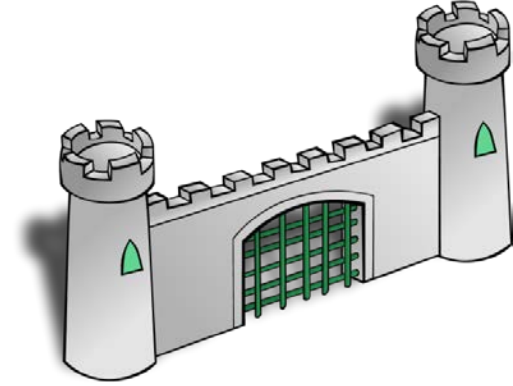


Challenges

- Identifying all the flows
 - Irregular flows – unusual and rare activities
- Easily implemented protocols
- Adequate supplies
- Trained and committed people
- Time to follow protocols every time



Flow Analysis



1. Define barn and farmstead boundaries
2. Identify every flow that crosses each boundary or line of separation
3. Describe or track each and every flow
4. Assess biosecurity risk of each flow
5. Develop and implement protocols to manage biosecurity risk



Danish Entry



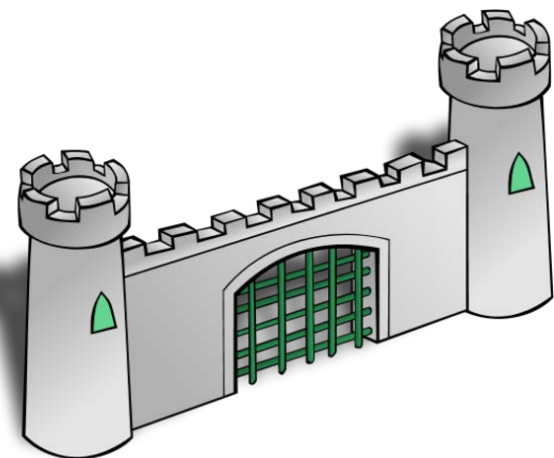
- “Minimum requirements for controlling the entrance and exit of pathogens from a hog barn”
- “Part of an effective biosecurity plan”
- “Can be built at a relatively low cost”



Compelling Rationale for Danish Entries, Ontario Pork Industry Council, <http://www.opic.on.ca/biosecurity-resources/danish-entry>

Biosecure Entry

- Get people and supplies in and out of building
- Prevent introduction of disease organisms
- Prevent disease spread between barns and farms
- Line of separation



<http://www.extension.umn.edu/agriculture/swine/img/main.jpg>

Multi-step Contamination

1. Contamination source
2. Contact with viable contaminant source
3. Retain viable contaminant material on boots, clothing, hands, other
4. Enter barn
5. Shed viable contaminant material



http://www.extension.umn.edu/agriculture/swine/feeder-space-benefits-slow-growing-pigs/img/nursery_pig.jpg

Break the Chain



1. Contamination source
2. Contact with viable contaminant source
3. Retain viable contaminant material on boots, clothing, hands, other

Change boots, change clothing
and wash hands!



<http://umash.umn.edu/wp-content/uploads/2015/11/mrsa-pigs.jpg>

Not Breaking the Chain



1. Contamination source
2. Contact with viable contaminant source
3. Retain viable contaminant material on boots, clothing, hands, other
4. Enter barn
5. Shed viable contaminant



<http://www.extension.umn.edu/agriculture/swine/FDAs-antibiotic-changes/img/piglets-300.jpg>

Line of Separation

- Boundary or space between
 - Biosecure and non-biosecure areas
 - Clean and dirty areas
 - Not contaminated and potentially or known contaminated areas



Biosecure Entry Options

- Biosecure entry using Danish entry concepts
 - Two-zone
 - Three-zone
- Shower-in shower-out



Well Designed Systems

- Attain desired goal and fits management
- Keep It Simple (KISS)
- Prevent circumventing protocol
- Assess safety



<http://www.dailymail.co.uk/news/article-1230529/Shear-lunacy-No-beating-bush-gardener-brought-CRANE-mow-lawn.html>

Biosecurity Guidelines



- Limit access to production areas
- Have clear biosecurity protocols
- Always adhere to the protocols
- Provide biosecurity training and talk about biosecurity regularly
- Teach visitors your protocol
- Post signs and instructions



<http://umash.umn.edu/wp-content/uploads/2016/03/pig-closeup.jpg>

Biosecurity guidelines



- Ensure all tools and equipment are properly cleaned and disinfected prior to bringing them into barn
- Keep disinfectant in entry area to disinfect equipment
- Do not set tools or equipment on the floor

Minimum Entry Protocol



1. Always enter barn through biosecure entry
2. Remove and store outer clothing on dirty side
3. Remove and store outside shoes on dirty side
4. Disinfect hands after removing outer clothing and farm shoes

Minimum Entry Protocol

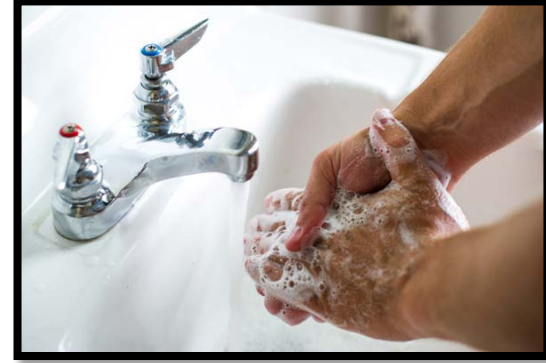


5. Step over line of separation to biosecure side
6. Put on barn specific cloths, coveralls, hats and barn boots
7. Enter production area



<http://www.extension.umn.edu/agriculture/swine/FDAs-antibiotic-changes/img/piglets-300.jpg>

Minimum Exit Protocol



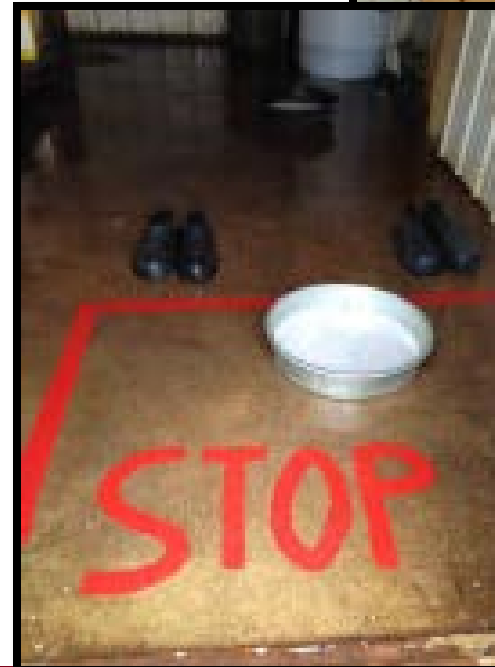
1. Always exit barn through biosecure entry
2. Remove and store barn specific clothing and boots on biosecure side
3. Disinfect hands
4. Step over line of separation to dirty side
5. Put on outside clothing and boots
6. Exit barn

Biosecure Entry and Exit

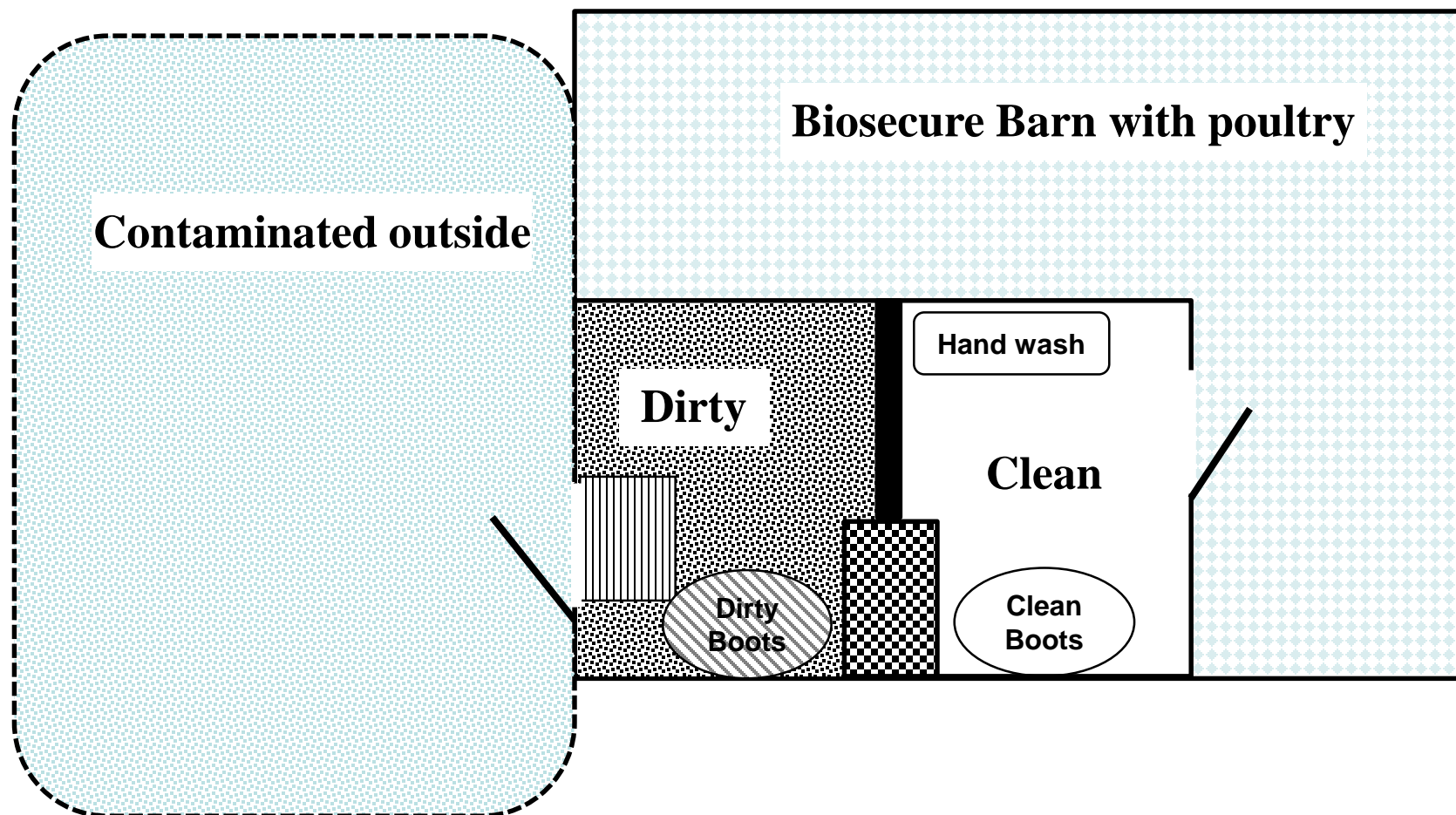
- Crossing Line of Separation between
 - Clean and biosecure side
 - Dirty and contaminated side
- Facilities and practices people use to
 - Remove potentially contaminated clothing and boots
 - Put on barn specific clothing and boots

Two-zone Entry

- One line of separation
- Dirty side
- Biosecure or clean side

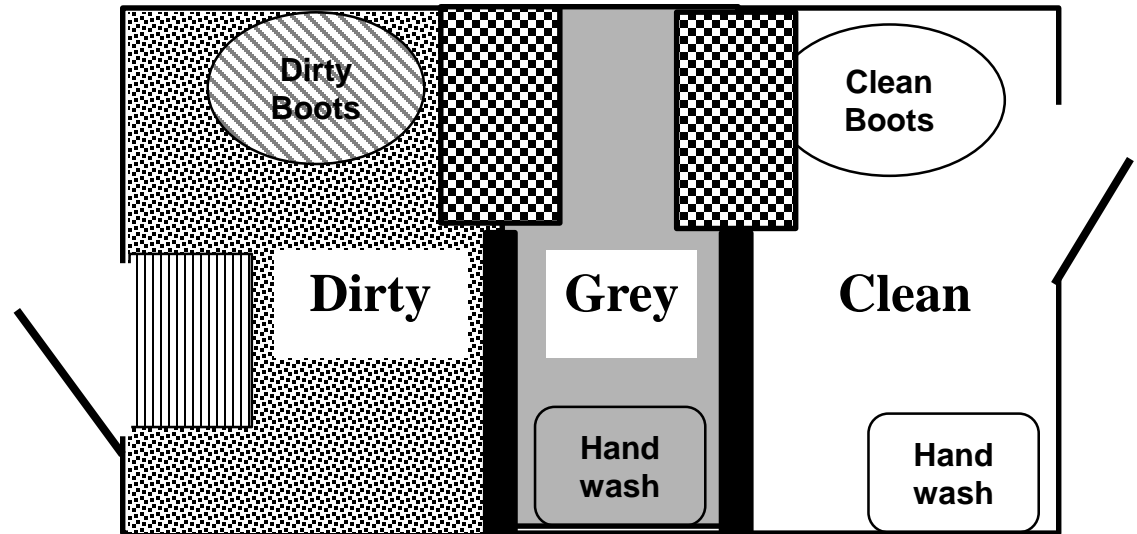


Two-zone Entry

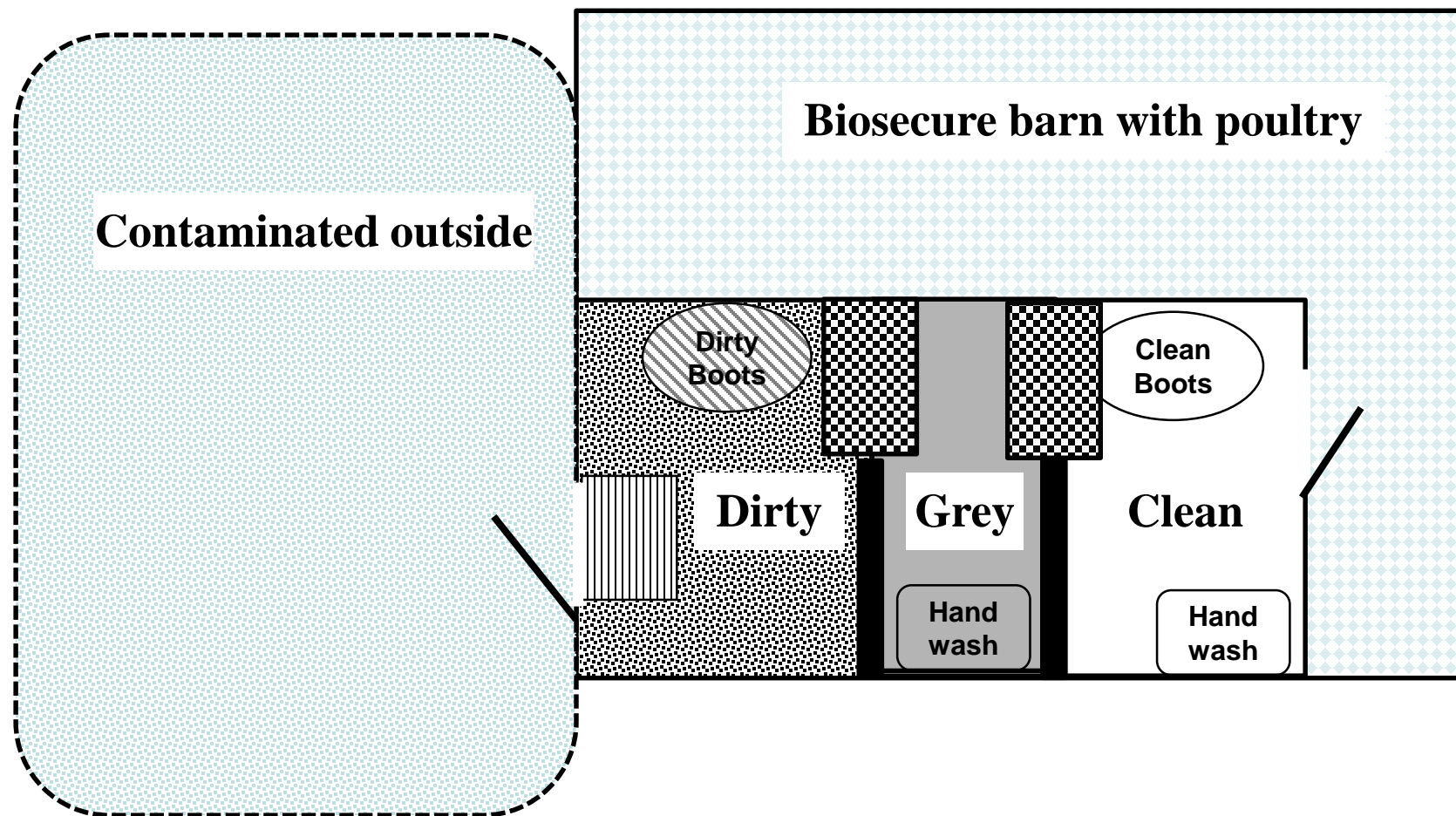


Three-zone Entry

- Two lines of separation
- Dirty area
- Grey area – between dirty and clean
- Clean and biosecure area
- More space required



Three-zone Entry



Exterior Biosecure Entries



http://www.opic.on.ca/images/DANISH_ENTRY_examples_exteriors.pdf

Interior Biosecure Entries



http://www.opic.on.ca/images/DANISH_ENTRY_examples_interiors.pdf

Minimum Zone Sizes

- Airplane lavatory
 - 3 ft x 4 ft before fixtures



- Porta Potty
 - 4 ft x 4 ft



<https://www.smartertravel.com/2013/04/02/airplane-bathrooms-to-get-even-smaller/>
https://www.aawsi.com/portable_toilets.php

Hand Washing

- Sink with hot water
 - Water supply and heater
 - Soap
 - Heated entry to prevent freezing
 - Wastewater collection and disposal
 - Towels
- Hand sanitizer



CDC Handwashing Guidelines

- Wet hands with clean, running water, turn off tap, and apply soap
- Lather hands by rubbing them together with soap
- Scrub hands at least 20 seconds
- Rinse hands under clean, running water
- Dry your hands using a clean towel or air dry them

<http://www.cdc.gov/handwashing/when-how-handwashing.html>



Hand Sanitizer



- Apply product to the palm of one hand (product label specifies correct amount).
- Rub your hands together.
- Rub the product over all surfaces of your hands and fingers until your hands are dry.

<http://www.cdc.gov/handwashing/when-how-handwashing.html>

Separation Options



- Bright line with red paint or tape
 - Simple
 - Does not prevent liquid or dirt movement
- Concrete, plastic or wood curb
 - More complicated to build and clean
 - May reduce liquid or dirt movement
 - Adds tripping hazard

Barn Boot Cleaning

- Barn boots
- Dirty from manure or litter from barn
- Boot washing station
 - Power wash
 - Brush
 - Wastewater drain required
- Soak and store clean boots in disinfectant



Cleaning Barn Clothing

- On-site
- Need
 - Washer and drier
 - Water and wastewater drain
 - Hot water?
- Off-site
- Need biosecure protocol to remove and re-supply cleaned clothing



Visitor Supplies

- Disposable boots and coveralls for visitors
- Washable boots & coveralls



Management Challenges

- Mortality removal
- Replenishing consumable supplies (soap, sanitizer, plastic boots, etc.)
- Trash removal & cleaning each area
- Training and signage



Biosecure Entry Compliance

- Eight Canadian poultry farms
- One randomly selected barn per farm
- Seven required biosecurity measures
- Video recorded entry for 2 weeks
- Six months later, recorded entry for another 2 weeks.
- Total of 883 visits

Racicot, M. et al. 2011. Description of 44 biosecurity errors while entering and exiting poultry barns based on video surveillance in Quebec, Canada. *Preventative Vet Med* (100):193-199.



Required Biosecurity Measures

1. Respect dirty and clean areas
2. Change boots or use plastic boots
3. Wear barn specific coveralls
4. Wash hands on entry
5. Wash hands on exit
6. Disinfect outside footwear
7. Sign logbook



Racicot, M. et al. 2011. Description of 44 biosecurity errors while entering and exiting poultry barns based on video surveillance in Quebec, Canada. *Preventative Vet Med* (100):193-199.

Biosecure Entry Compliance

- Only 26 (2.9%) visits out of 883 visits were performed without error
- 44 different errors were recorded
- Five categories of errors
 - **Area separation**
 - **Boots**
 - **Hand washing**
 - **Coveralls**
 - **Logbook**

Racicot, M. et al. 2011. Description of 44 biosecurity errors while entering and exiting poultry barns based on video surveillance in Quebec, Canada. *Preventative Vet Med* (100):193-199.

Biosecure Entry Ventilation

- Danish entry and double door entries for filtered barns
- Disinfection and drying room for deliveries
- Employee break rooms



Biosecure Entry Education Trailer



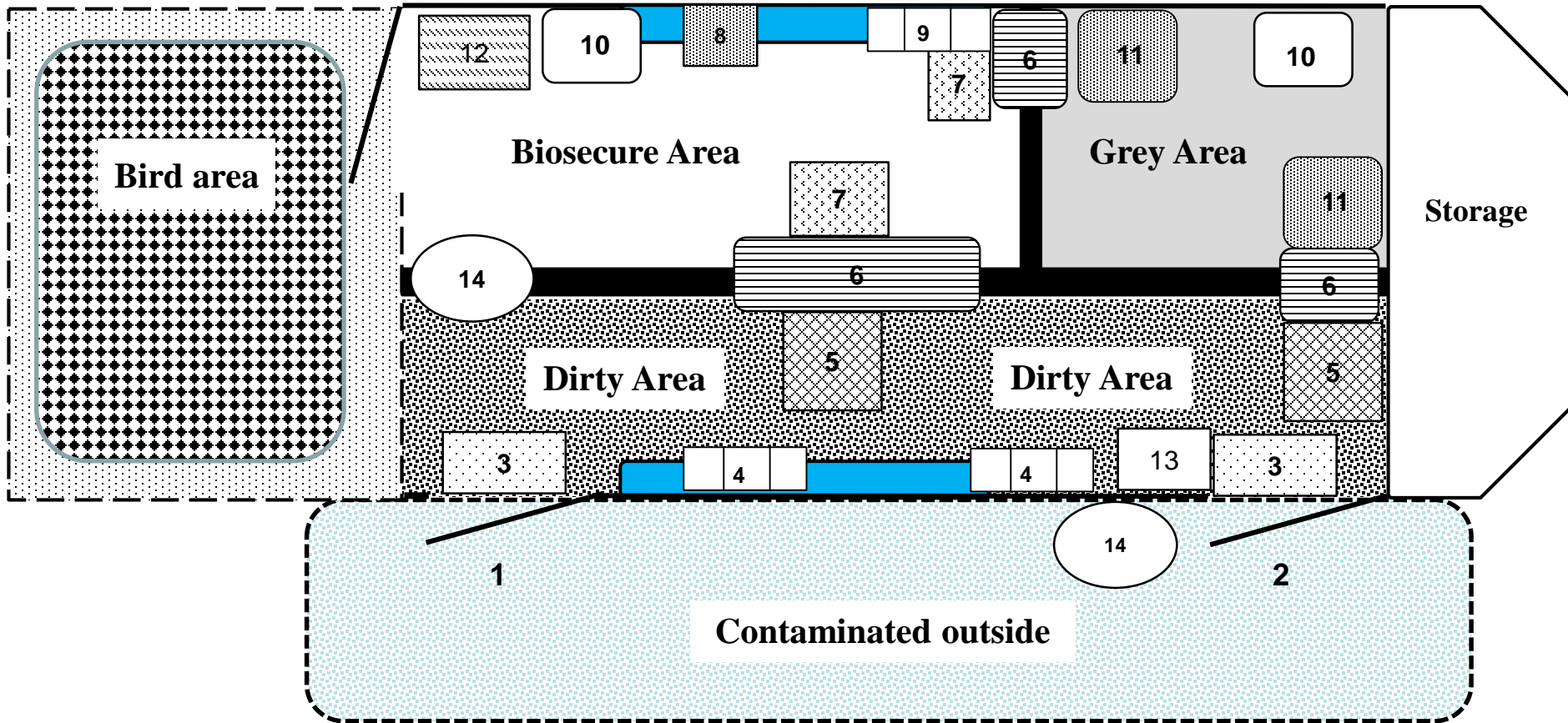
Supported by the University of Minnesota Rapid Agricultural Response Fund from the State of Minnesota

Biosecure Entry Education Trailer

- Primary purposes
 - Develop & assess protocols
 - Train employees



Trailer layout



Keys to Biosecure Entries

Take Home Message:

- Always use biosecure entries and exits
- Clear instructions
- Provide clean boots and clothing that fit well for all employees and visitors
- Hand washing supplies

Make it easy!

Keys to Biosecure Entries

Take Home Message:

- Implement Line of Separation
- No single ideal design or system
- Every design involves trade-offs
- Design and build a system that fits your management



UNIVERSITY OF MINNESOTA | EXTENSION
Driven to DiscoverSM

Thank You!



© 2016 Regents of the University of Minnesota. All rights reserved.

The University of Minnesota is an equal opportunity educator and employer. In accordance with the Americans with Disabilities Act, this PowerPoint is available in alternative formats upon request. Direct requests to 612-624-1222.

MAKING A DIFFERENCE IN MINNESOTA: ENVIRONMENT + FOOD & AGRICULTURE + COMMUNITIES + FAMILIES + YOUTH

Factsheets

- Janni, K.A. 2016. Identifying Biosecurity Hazards by Considering Flows on Animal Farms. p.2. UM Extension. Online at <http://www.extension.umn.edu/agriculture/poultry/biosecurity/beet/index.html>
- Janni, K.A. 2016 Biosecure entry education trailer (BEET). p.2. UM Extension. Online at <http://www.extension.umn.edu/agriculture/poultry/biosecurity/beet/index.html>
- Noll, S., C. Cardona. 2015. Rethink biosecurity for HPAI now. p.2. Online at <http://minnesotaturkey.com/members/hpai-information/>



References

- Levis, D.G. and R.B. Baker. 2011. Biosecurity of pigs and farm security. University of Nebraska Extension. Online at <http://extensionpubs.unl.edu/sendlt/ec289.pdf>. Accessed April 27, 2015
- Racicot, M., D. Venne, A. Durivage, J. Vaillancourt. 2011. Description of 44 biosecurity errors while entering and exiting poultry barns based on video surveillance in Quebec, Canada. *Preventative Vet Med* (100):193-199
- Compelling Rationale for Danish Entries, Ontario Pork Industry Council, Online at <http://www.opic.on.ca/biosecurity-resources/danish-entry> Accessed March 14, 2016.
- Pitkin, A., S. Otake, S. Dee. 2009. Biosecurity protocols for prevention of spread of porcine reproductive and respiratory syndrome virus. Online at <https://www.aasv.org/aasv/publications.htm> Access April 27, 2015.