Prevention - Biosecurity Training, Plans and Execution

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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

Inside
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. Asses 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”

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!

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

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

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

Contaminated outside

Biosecure Barn with poultry

Dirty

Clean

Hand wash

Dirty Boots

Clean Boots
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

Contaminated outside

Biosecure barn with poultry

Dirty Boots

Grey

Clean Boots

Hand wash

Hand wash
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

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

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

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

Bird area

Biosecure Area

Grey Area

Dirty Area

Storage

Contaminated outside

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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
Thank You!
Factsheets


References


