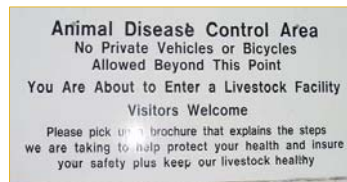


Introduction to Biological Risk Management



Biological Risk Management (BRM)

- Overall process of awareness education, evaluation, and management
- Designed to improve disease control
 - Foreign and domestic diseases
- Provide tools to minimize risk



Biological Risk Management (BRM)

- Disease risk cannot be totally eliminated
 - Animal, its environment
 - Decrease exposure to disease agents
- Minimize threat to animals and humans
- No one-size-fits-all answer



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Importance of BRM

- Importance of agriculture
- Changing food production practices
- Rise in emerging and re-emerging infectious disease
- Increasing globalization
- Increased interaction with animals

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Agriculture and Economics

- 1 in 6 U.S. jobs are ag-related
- Our economy dependent upon agriculture
 - Animal production industry
 - Affects everyone in U.S. in some way



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Agriculture and Economics

- Dairy industry
 - 900,000+ jobs
 - \$29 billion household
 - \$140 billion overall



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Need more convincing?

- Herd expansion from 250 up to 500 cows
 - Purchased 60 springing heifers in May, 1995
 - By October, 1995, 52 of the heifers and 2 cows had died of BVD
- Southwestern Dairy had high level of severe diarrhea
 - Within one year 1,000 calves, heifers and some cows died of salmonellosis

Could your farm withstand those losses?

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Agriculture and BRM

- Realize the impact on the industry
- Provide
 - Income
 - Lifestyle
- Mitigate economic consequences of a disease outbreak



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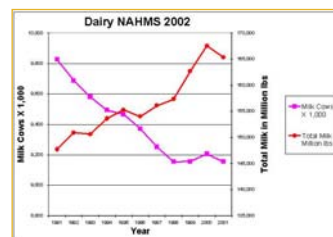
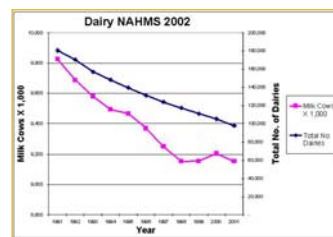
Food Production Changes

- Number of farms decreasing
- Animal numbers rising on some farms
- Opportunities
 - Increasing intensity/specialization
 - Efficient food source: U.S. and world
- Challenges
 - Disease control and eradication
 - Devastating economic effects

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Dairy Production

- Lactating cow and farm numbers decreasing
 - 2001: 9.16 mil cows
 - 97,560 operations
- Increased production
 - Cows and U.S.
 - Increased intensity
- Opportunities and challenges



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The Rise in Emerging and Re-Emerging Infectious Diseases



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Partial list of infectious diseases commonly found on U.S. dairy farms:

- Bovine Leukemia Virus/Leukosis -- BLV
- Bovine Respiratory Syncytial Virus -- BRSV
- bovine Viral Diarrhea Virus -- BVDV
- chlamydiosis
- Clostridial Diseases – Hemorrhagic Bowel, Black Leg, Enterotoxemia, etc.
- Contagious Mastitis -- Staphy aureus, Strep agalactiae and Mycoplasma bovis
- Haemophilus somnus
- Infectious Bovine Rhinotracheitis -- IBR
- Papillomatous Digital Dermatitis -- "Hairy heel warts"
- Leptospirosis
- Listeriosis
- Mycobacterium paratuberculosis -- Johne's Disease
- Mycoplasmosis – Respiratory form
- Neosporosis
- Parainfluenza-3 Virus -- PI3
- Pasteurellosis
- Rota/Corona Virus -- calf diarrheal agents
- Salmonellosis
- Winter Dysentery -- bovine corona virus?

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Conducting a BRM Livestock Facility Assessment



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Components of BRM

- Risk perception
- Risk assessment
 - Routes of transmission
- Risk management
- Risk communication



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What is your level of risk?

1. Closed herd and all bio-traffic strictly monitored
2. No entry or re-entry of cattle
3. No entry of new cattle but re-entry of existing cattle allowed (show cattle)
4. Entry of new cattle with known medical records and isolation/quarantine
5. Entry of new cattle with known medical records and no isolation/quarantine
6. Entry of new cattle without known medical records and no isolation/quarantine

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Risk Perception

- Different perceptions of risk
 - First identify what is viewed as a threat
- Factors influencing perception
 - Previous experience
 - Media
 - Environment
- Acceptance and tolerance varies

First apparent U.S. case of mad cow disease discovered

Japan, other nations ban import of U.S. beef

Wednesday, December 24, 2003 10:22 AM EST (0722 GMT)

WASHINGTON (CNN) — The first apparent case of mad cow disease in the United States has been discovered, the U.S. Department of Agriculture said Tuesday.

Two tests have been carried out on meat from the cow, enabling Agriculture Secretary Ann Veneman to call the case a "presumptive positive." A sample is being flown to England for a third test to confirm the case.



Mad cow disease causes severe nervous system deterioration and has been linked to a similar disease in humans.

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Risk Perception

- Common beliefs
 - “We have always done it this way”
 - “I’ve had most everything on this farm”
 - “It’s too expensive”
- New beliefs
 - Disease outbreaks can and do happen
 - Prevention is less costly than treatment
 - Too much is financially invested to lose
 - Prevention through awareness and management

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Risk Assessment

- Objective evaluation
- Identify strengths, weaknesses
 - Change over time
- Disease prediction is complicated
 - Underlying disease risks are not
 - Cattle’s vulnerability is influenced by:
 - Cleanliness, stress, nutrition
 - Things that can be *managed*



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Routes of Transmission

- Apply to all infectious agents
- Animal must be exposed to develop disease
- Understand different routes of transmission = Gain control
- Risk areas must be identified
 - Design protocols to minimize exposure

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Routes of Transmission

- Spread of disease agents
 - Animal to animal
 - Animal to human
- Different routes of transmission
 - Aerosol
 - Direct contact
 - Fomite
 - Oral
 - Vector-borne
 - Zoonotic



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Aerosol Transmission

- Disease agents contained in droplets
 - Pass through air
- Most agents not stable in droplets
 - Close proximity required
 - Infected and susceptible animals



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Selected Diseases Spread by Aerosol

Foreign diseases

- Foot and mouth disease

Present in U.S.

- Anthrax
- BRSV
- BVD
- IBR
- *M. hemolytica*
- *Mycoplasma*
- Tuberculosis

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Isolation/Quarantine

- Distance is important
- Do not share air space between sick and healthy animals



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Direct Contact Transmission

- Disease agent in animal or environment
 - Open wounds, mucous membranes, skin
 - Blood, saliva, nose to nose, rubbing, biting
- Reproductive transmission
 - Breeding
 - Dam to offspring



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Direct Contact, Fomite

- Basic prevention steps involve:
 - Isolating sick animals
 - Keeping environment clean, dry
 - Keeping equipment clean
 - Establishing a reproductive program using reputable semen sources, test negative bulls

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Farm Vehicles

- Designate a vehicle parking area
 - Away from primary animal traffic
- Minimize vehicle traffic on farm
 - Load/unload, rendering at perimeter
 - Have separate vehicles for “on-farm” and “off-farm” use



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Farm Vehicles

- Do not share equipment with other farms
 - Tractors, livestock trailers
- If shared, completely rinse, wash with soap, scrub, rinse and disinfect before contacting animals
- Do not allow milk/feed truck drivers to cross animal paths



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Farm Visitors

- Require prior authorization before entering the premises
- Sign in and disclose recent cattle contact
- Require clean clothes, clean footwear
 - Provide if necessary



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Farm Visitors

- Make sure all visitors know BRM plan
 - Post signs, employee meetings, discuss with visitors
- Limit access to those who traveled to foreign countries
 - Previous 7-10 days should have NO animal contact



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Animal Housing

- Provide clean, dry housing
- Slope outside lot 2-4% for drainage
- Provide mounds outside
 - 4-6 ft high, 1-5 inch slopes
- Clean alleyways inside
 - Scrape or flush daily
- Groom stalls at least daily



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Milking

- Milk isolation animals separately
 - Hospital parlor, end of milking healthy
- Establish SOPs for milking routine
 - Milkers should wear gloves
 - Monitor for mastitis
 - Wash gloved hands between diseased cows
- Milk clean, dry udder/teats



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Breeding/Repro

- Establish a disease free breeding program
 - AI- obtain semen from reputable source that tests bulls for diseases
 - Natural- all bulls must be tested for repro and other diseases; quarantine upon arrival
- Investigate abortions
 - Work with veterinarian to establish protocol



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Summary on Fomites

- Direct contact, fomite transmission occurs everyday on farms
 - Mastitis, leptospirosis, BVD
- Foreign animal diseases can also be spread via direct contact
 - FMD
- Prevention steps as described here can help minimize your risk

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Oral Transmission

- Consumption of contaminated feed, water
 - Feces, urine, saliva
 - Other contaminants (ruminant protein)
- Licking/chewing contaminated environment



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Vector-borne Transmission

- Insect
- Acquires pathogen from one animal
- Transmits to another animal
 - Biological vectors
 - Fleas, ticks, mosquitoes
 - Mechanical vectors
 - Flies, cockroaches



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Environmental Contamination

- Disease organism in environment
 - Survive in soil, organic material
- Animals and humans can acquire agent(s) through:
 - Inhalation
 - Direct contact
 - Fomites
 - Oral consumption
 - Vectors



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Disease Transmission

- Animals may not exhibit obvious signs of disease
- Awareness of all routes of transmission is essential
 - Develop strategy to minimize disease risk for livestock operation



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The Risk Management Plan

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Extension
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Risk Management

- Facility/operation evaluated
 - Challenges identified
- Tailored management plan
- Prioritize
 - Easy to implement
 - Inexpensive yet yield rewards
- No common formula



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General Prevention Steps

Overview

- Farm perimeter
- Animal identification
- Animal health
- Sick/dead animals
- Isolation/quarantine
- Supply handling
- Neonatal management

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General Prevention Steps

- Limit contact with animals
 - Neighbor's livestock
 - Wildlife, birds
 - Roaming cats, dogs
- Maintain fences
- Establish biosecurity protocols for delivery vehicles, personnel
- Lock gates



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General Prevention

- Identify individual animals
- Important for:
 - Communicating health status
 - Treatment needs
 - Location on farm
 - Record keeping



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General Prevention Steps

- Keep health records on every animal
- Review vaccination and treatment programs
 - Annually, bi-annually
 - Protocol versus actual
- Investigate unusual signs, unresponsive cases
 - Neurologic, downers, sudden death



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General Prevention Steps

- Train farm personnel to report sick animals
 - Inspect animals daily
 - Clean equipment, boots, clothing
- Euthanize terminally ill animals promptly and appropriately
 - Removed or rendered
- Necropsy animals that died from unknown causes



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General Prevention Steps

- Isolate ill animals immediately
 - No shared ventilation, direct contact with other animals
- Quarantine newly introduced animals
 - New purchases, returning animals
- Time determined with veterinarian
- Test for key diseases before placing with rest of herd

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Key Learning Objectives

- Biological risk management is important
- All diseases are transmitted by a few common routes
- Disease risk can be managed
- Awareness education is essential
- You play a critical role!
- No two farms are identical

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Take Home Messages

- Farm biosecurity management is very similar to financial risk management
 - Determine your risk level –
 - What is your risk tolerance or intolerance to loss from disease?
 - Create a farm specific biosecurity program.
 - Safeguard your assets – protect the resident herd!
 - Expanding herds have greater challenges, but also rewards can be worth it--
 - 5% drop in production due to disease can be the difference between profit or loss on the farm

Wallace, Univ. of Illinois, CVM

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Bryan Buss, DVM, MPH

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Operation/Client Description: self
Assessment By: Mr. Chuck Schwartau
Assessment Date: 1/5/2007

General Section

Question #	Y e s	N o	M a y b e	
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are the only animal species on your operation dairy cattle? [DQ1]
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you know what animals your neighbors have? [DQ3]
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are your cows kept away from fence to fence contact with other livestock? [DQ4]
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you limit nose to nose contact between animals from different stages and/or age groups? [DQ6]
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you try to minimize contact with wildlife? [DQ8]
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you have a designated visitor and employee vehicle parking area? [DQ11]
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is your vehicle parking area away from main animal traffic areas? [DQ13]
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you have separate parking areas for employees vs. visitors? [DQ14]
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are signs posted and very visible restricting access to your facility to anyone not employed by the operation? [DQ15]
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	When using off-farm hauling vehicles, are your loading/unloading areas located at the perimeter of your operation? [DQ18]
11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you encourage hoof trimmers to sanitize their clutes, tables, knives and other equipment before coming onto the dairy? [DQ20]
12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If animals are rendered, is the pickup area located on the perimeter and away from all other entrances to your operation? [DQ23]
13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you hire a professional pest control person to maintain an effective pest management system? [DQ29]
14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are steps being taken to minimize bird contact and nesting in your operation? [DQ32]
15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are visitors or sales people required to be authorized prior to entering your premise? [DQ33]

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Question #	Y e s	N o	M a y b e	
16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you require visitors to sign in and disclose their last known cattle contact? [DQ34]
17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you minimize animal contact with anyone entering your operation? [DQ39]
18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you require clean footwear on everyone entering your operation (visitors, service personnel)? [DQ42]
19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you provide clean boots (rubber/disposable) for everyone entering your operation? [DQ43]
20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you request that your employees avoid contact with livestock outside of your operation? [DQ55]
21	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you require employees to report ownership of offsite owned livestock? [DQ56]
22	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are laundering facilities available on farm for washing work clothes? [DQ58]
23	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are employees required to wear latex/nitrile gloves when working with animals? [DQ60]
24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are employees required to clean and disinfect their boots when moving into special areas of the farm such as the maternity and calf areas? [DQ64]
25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do employees have easy access to hand washing stations or hand sanitizers? [DQ65]
26	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are all animals individually identified? [DQ72]
27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you keep treatment records for all animals? [DQ73]
28	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you keep treatment records for lactating animals? [DQ74]
29	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you keep treatment records for all replacements? [DQ75]
30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do you keep treatment records for dry cows/pre-fresh animals? [DQ76]

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Minnesota Dairy Days

Educating the dairy industry on today's and tomorrow's dairy technologies.

<http://www.extension.umn.edu/dairy>

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