


Direct Contact and Fomite Transmission-Dairy

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**Practical Applications for
Managing Biological Risks**

Direct Contact and
Fomite Transmission
Dairy Producers



This presentation will review some key points of biological risk management, general prevention steps that can be applied to every farm to decrease the risk of disease introduction and spread, and specific steps to reduce the chance of direct contact transmission on farm.

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**Biological Risk
Management (BRM)**

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



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Biological risk management is a term used to describe the overall process of evaluating a farm or an animal housing facility based on the risk of infectious disease entry and spread. BRM is designed to help livestock producers understand the need for risk management strategies not only for foreign animal disease threats but domestic diseases as well. Biological risk management is designed to help assess the potential of an infectious disease entering and spreading within a facility and provide the tools to minimize the risk. (Photo courtesy of: DB Weddle)

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**Biological Risk
Management (BRM)**

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




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BRM recognizes that disease risk cannot be eliminated, but that the risk can be managed through effective control measures. As animal caretakers, it is our duty to be knowledgeable of the animal and its environment to minimize the risk of disease and keep the people working with them safe. It may seem hopeless to try to completely eliminate exposure to infectious diseases, especially diseases that are always present (endemic). For nearly all diseases there is a relationship between dose and severity. A threshold dose is required to establish infection, and low doses may cause subclinical or only mild infections. For endemic diseases, reducing the dose of infectious agent the animal is exposed to can positively affect the farm's economic impact and help justify the cost of implementing BRM. Many different solutions exist and because all dairy facilities are different, there is not a one-size-fits-all answer. Photo depicts two dairy employees working in a milking parlor (Photo courtesy of USDA - ARS).

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Routes of Transmission

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



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The approach that was taken in the development of the biological risk management tools was to look at diseases based on their route of transmission to the animal, or human in the case of zoonotic diseases. Disease agents can be spread from animal to animal, or animal to human, through a variety of transmission modes. Many infectious agents can be transmitted by more than one route of infection. This presentation will focus on how to prevent direct contact transmission between animals and from animals to humans. This photo shows several dairy cows grazing in a pasture (Photo courtesy of USDA - ARS)

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Direct Contact

- Pathogen in animal or environment
 - Blood, saliva, nose to nose, rubbing, biting
 - Open wounds, mucous membranes, skin
- Reproductive transmission
 - Breeding
 - Gestation



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Transmission by **direct contact** requires the presence of an agent or organism in the environment or within an infected animal. A susceptible animal becomes exposed when the agent directly touches open wounds, mucous membranes, or the skin through blood, saliva, nose to nose contact, rubbing or biting. It is important to note that depending on the disease agent, it is possible for direct contact transmission to occur between animals of different species as well as to humans. For the purposes of the BRM information, reproductive transmission will encompass those diseases spread through venereal and in-utero routes. **Reproductive transmission**, a type of direct contact, is the spread of pathogenic agents from animal to animal through breeding. **In-utero** transmission, another type of direct contact, is the spread of pathogenic agents from dam to offspring during gestation. The top photo shows a group of calves together in a pen with ample opportunities for direct contact transmission (photo courtesy of DB Weddle, ISU). The bottom photo shows an individual artificially inseminating a cow; one way to minimize reproductive transmission if the source is reputable (Photo courtesy of USDA).

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Selected Diseases Spread by Direct Contact

<p>Foreign diseases</p> <ul style="list-style-type: none"> • Foot and mouth disease • Contagious bovine pleuropneumonia • Malignant catarrhal fever • Rinderpest • Vesicular stomatitis 	<p>Present in U.S.</p> <ul style="list-style-type: none"> • Anthrax • Brucellosis • BVD • IBR • Leptospirosis • Mastitis • Q Fever • Rabies
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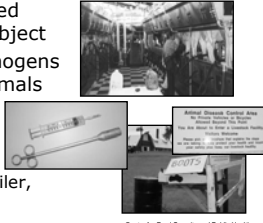
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There are many diseases transmitted by the direct contact route, both diseases that are foreign animal diseases (FADs) and those that are present in the US (endemic). Some examples of foreign animal diseases include foot and mouth disease (FMD), contagious bovine pleuropneumonia (CBPP), malignant catarrhal fever (MCF), rinderpest and vesicular stomatitis. The diseases that are already present in the US include anthrax, brucellosis, bovine viral diarrhea (BVD), infectious bovine rhinotracheitis (IBR or red nose), leptospirosis, mastitis, Q fever, rabies and others. The main point to drive home is that they are all transmitted by the same route and prevention practices aimed at one will protect against others. For a complete listing of all diseases transmitted by the aerosol route, please refer to the Bovine Routes of Transmission Handout- Direct Contact.

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Fomite Transmission

- Contaminated inanimate object
- Carries pathogens to other animals
 - Brushes, needles
- Traffic
 - Vehicle, trailer, humans



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A component of direct contact transmission are fomites. A **fomite** is an inanimate object that can carry pathogenic agents from one susceptible animal to another. Examples of fomites include contaminated brushes, clippers, needles, balling guns (middle picture; photo courtesy of DB Weddle) clothing, milking units, teat dip cups, feed or water buckets, and shovels. These items must be managed as fomites but they will transmit disease when they have direct contact with a susceptible animal. The top photo depicts a situation in which disease transmission may occur via a fomite, milking equipment and teat dip cups; photo courtesy of DB Weddle. **Traffic transmission** is a type of fomite transmission in which a vehicle, trailer, or human spreads organic material to another location. The bottom photos show the entrance to a dairy with a sign stating the premise's visitor restrictions, as well as a handy place for boot distribution and collection at the very entrance to the farm (photo courtesy of: DB Weddle, ISU)

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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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Every disease has to enter into an animal by some route, so looking at disease prevention through the routes of transmission makes sense. One advantage to this approach is that it will also help protect against new or unexpected infectious diseases. This classification system is effective and easy to understand without requiring knowledge about a wide range of diseases, like all those listed at the beginning of this presentation. While disease agents and the infections they produce vary, they all have one thing in common: the animal must be exposed to them to develop disease. Once it is understood that different diseases can be acquired by various routes of transmission (i.e. aerosol, oral, fomite, direct contact, vector), it is easier to gain control over them. From a management standpoint, it may be easier to identify risk areas, such as fomites, and then design protocols to minimize exposure.

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Disease Transmission

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



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It is important to remember that disease transmission can occur without animals exhibiting obvious clinical signs of disease. That is why awareness of the various routes of transmission becomes so essential when assessing and developing a strategy to minimize the risk of disease for a facility or operation. The photo shows a calf lying in a wooden calf hutch (photo courtesy of: DB Weddle, ISU).

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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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There are many general prevention steps that every farm could implement that would help prevent against a variety of diseases that are transmitted in various ways. Things such as knowing what is in the area of your farm perimeter- farms, neighboring livestock, wildlife; individual animal identification, animal health protocols, recognizing and dealing with sick and dead animals, isolation/quarantine, supply handling, and neonatal management. This next section will provide some general prevention recommendations for those areas.

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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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Limit contact with animals that may present a disease risk by coordinating with your neighbors to avoid fence line contact between herds. Prevent cats and dogs from roaming between farms. By maintaining fences (repairing/replacing posts, tightening wires), you minimize the risk of animals escaping, or other animals entering, and mixing with other livestock or wildlife species, which increases their risk of disease exposure. You should establish biosecurity protocols for delivery vehicles and personnel to follow on your farm. Gates are installed as a barrier to human entry and should be locked to prevent animal contact and subsequent disease exposure. Photo courtesy of: Bryan Buss, ISU.

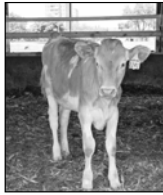
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General Prevention Steps

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



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If more than one person works on an operation, individual animal identification is imperative for proper communication of health status, treatment needs, antibiotic withdrawal/residue prevention status, and location on farm. Individual animal identification is essential for proper record keeping (vaccinations, treatments, pregnancy status) which is an integral part of managing animals and minimizing disease risk on farm. Keeping treatment records on a dairy is an integral part of minimizing disease risk on farm because protocols can be tracked over time with your veterinarian and used to determine whether things are working in various disease situations. (photo courtesy of: DB Weddle, ISU)

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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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To monitor health status, it is imperative to keep health records on every animal. There are many computer programs out there that can simplify this for producers as the photo depicts (courtesy of Dale Moore, UC Davis VMTRC). It is important to work with your veterinarian to review treatment and vaccination records so alterations can be made to the animal health protocols on farm; this will also help ensure what you think is happening is actually happening. Producers should work with their veterinarian to investigate those animals that present with unusual symptoms or are unresponsive to treatment, especially neurologic cases, downers and those that die suddenly.

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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
- Perform necropsy on animals that died from unknown causes



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By establishing and educating all employees on what to look for regarding sick animals and having a reporting system so that those in charge can make treatment decisions or the veterinarian can be contacted, serious diseases can be identified early on and minimize the risk of disease spread. It is important to clean any equipment, boots, clothing that is used between groups of animals with differing health status. Animals that are not going to recover can serve as a reservoir for many disease organisms and should be euthanized humanely and in a timely manner. Dead animals can also serve as a reservoir for many disease organisms and should be promptly removed from the operation. Dead animals need to be rendered, composted or buried in a timely manner so predators, wild birds, etc do not spread disease. By having a veterinarian necropsy animals that die of undetermined causes, a diagnosis may be obtained by sending samples into a diagnostic laboratory. Unusual diseases may not present in a manner you are used to, so involving a veterinarian may help identify a potentially infectious disease before it becomes widespread on your facility. Photo depicts an Ayrshire calf being necropsied and samples being collected for diagnostic testing (photo courtesy of: UC Davis VMTRC).

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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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Cattle that are identified as ill should be removed from the rest of the herd immediately and placed in an isolation area where ventilation, feed/water, and other equipment are not shared and direct contact with other animals does not occur in order to minimize the risk of disease spread. Newly introduced animals, including show cattle/calves that have been away from the farm, may be carrying diseases that your home herd is not immune to, so quarantine them for a period of time. Time spent in isolation and quarantine varies depending on the risk so this should be determined together with your herd veterinarian. Before taking animals out of isolation or quarantine, it is a good risk management plan to test them for key diseases (determined together with your herd veterinarian) and make sure they are not carrying diseases that could be introduced into the home herd.

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General Prevention Steps

- Store non-refrigerated vaccines and antibiotics out of sunlight as it can deactivate them
- Monitor refrigeration temperature monthly
 - Ideal temp 36-46°F
- Restrict access to medication to only properly trained personnel



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Sunlight can deactivate vaccines resulting in inadequate protection; it can also reduce effective treatment by rendering antibiotics ineffective. When using these in your animals, make sure you read the label and store them properly. Vaccines and medicines that need to be refrigerated are susceptible to changes in temperature and may not be effective if they get too warm (greater than 46 degrees Fahrenheit) or too cold/frozen (less than 36 degrees Fahrenheit); monitoring your refrigerator at least monthly can help ensure the products are adequately stored. Work with your veterinarian to teach proper handling procedures to all people who routinely deal with vaccines and medicine and restrict access to only trained personnel. The photo depicts a refrigerator on a dairy farm with a thermometer- purchased for less than \$3 at a large retail store (photo courtesy of: DB Weddle, ISU).

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General Prevention Steps

- Ensure adequate ingestion of disease-free colostrum in first 6 hours of life
- Prevent contact with older animals, contaminated environments



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Adequate ingestion of colostrum is the most important consideration for calf's resistance to disease and all calves should receive colostrum within 6 hours of birth. A calf's immune system depends on the antibodies in colostrum. After 6 hours of life, the calf's ability to absorb antibodies from colostrum diminishes. Once a calf is born, subsequent milk production in the cow will dilute colostrum and therefore require the calf to consume more for maximum antibody absorption and immune function. Another good practice is to prevent contact of the neonate with older animals and also contaminated environments. This will decrease the pathogen load to the newborn and give the colostrum the ability to provide protection. The photo depicts colostrum in a freezer that is stored in palpation sleeves (with the fingers tied off), labeled with the cow ID number and dated. This allows for easy thawing and making sure the calf gets colostrum from one cow (photo courtesy of DB Weddle).

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Direct Contact and Fomite Control

Now that we have discussed some general prevention steps, let us look specifically at direct contact and fomite transmission and control measures you can apply on your dairy farm to minimize disease spread.

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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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There are various prevention steps that can help ensure direct contact and fomite transmission are minimized, and this presentation will discuss these. One essential step in prevention is to isolate all sick animals immediately so that they do not contact other susceptible animals. Another is to keep the animal housing environment as clean and dry as possible to minimize risk of environmental exposure. Finally, as reproductive diseases are spread through direct contact, it is essential to use only semen from reputable sources in your artificial insemination programs or purchase bulls that have been tested for diseases of concern and are negative. These basic steps will go a long way in preventing direct contact disease transmission.

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Farm Perimeter

- Prevent fence to fence contact with other livestock, differing ages
- Maintain fences to keep your animals in, others out
- Minimize wildlife contact
- Post signs limiting animal access to unauthorized visitors



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It is important to prevent fence to fence contact with other livestock, or those on farm of differing ages, due to disease spread by direct contact from neighboring animals. By maintaining fences (repairing/replacing posts, tightening wires), you minimize the risk of animals escaping, or other animals entering, and mixing with other livestock or wildlife species, which increases their risk of disease exposure. Wildlife can transmit many diseases to cattle (e.g. external parasites, leptospirosis, brucellosis in some areas) and contact should be minimized. Posting signs with clear instructions, like the one pictured here, regarding your farm policy for visitors and locking gates will help limit unauthorized access to your animals, feed, and equipment. (photo courtesy of: DB Weddle, ISU)

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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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By having a designated parking area away from animal traffic areas with posted signs, visitors and employees have no reason to drive personal vehicles onto the farm and introduce disease agents on their tires. Minimize vehicular traffic on farm by loading/unloading animals and keeping rendering piles only at the perimeter of the operation. Rendering trucks can visit several farms in one day picking up animals that may have died from contagious diseases. By having the dead pile at the perimeter of the operation, the risk of disease introduction is minimized. Another way to minimize the disease introduction is to designate certain vehicles for use on-farm only and other vehicles for off-farm only. If this is not possible, vehicles used off-farm should be cleaned and disinfected appropriately before coming into contact with animals or their travel paths on farm. In warmer climates, golf carts make excellent on-farm vehicles to minimize disease spread (photo courtesy of: DB Weddle, ISU).

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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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Do not share equipment with other farms, such as tractors for cleaning barns or livestock trailers, because the risk for disease introduction increases. If equipment is shared, it should be inspected for cleanliness and cleaned appropriately (washed down, soap washed, rinsed, disinfected and allowed to dry) before use. It is also good prevention to prevent milk or feed truck drivers from driving in areas where animals will cross the tire path or come into contact with the truck. Photo courtesy of: DB Weddle, ISU.

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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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Since visitors and sales people have had unknown animal contact prior to visiting your farm, require them to make appointments or notify you prior to their visit. Have visitors sign in and disclose their last known cattle contact so you can decide what, if any, animal contact they should have on your farm. Collecting this information is also important with regard to disease tracking, should an outbreak occur on your farm or in your area. Clean clothes and footwear should be required of anyone entering your operation and if not, entry should be denied as the risk of disease introduction increases. By providing clean clothing (coveralls, tyvek suits) and clean boots (disposable or rubber) to all persons, including employees and herd veterinarians, you can help ensure they will not introduce disease organisms. Photo courtesy of: Dr. Sandy Amass, Purdue University.

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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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In order to have an effective Biological Risk Management plan, anyone who enters your farm should understand the protocols. This can be done through posting signs (as pictured here), employee meetings, sending letters to those people who frequent your facility, and verbalizing your protocols to anyone on your farm. Many foreign countries have diseases that animals in the United States have no immunity against. By limiting access of people who have recently (last 7-10 days) been to a foreign country, the risk of disease introduction is minimized; often times a devastating disease. Photo courtesy of: DB Weddle, ISU.

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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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It is important to provide a dry place for animals to lay down when outside so that their udders do not become covered with mud/feces as this can lead to infections/mastitis. Mounds should be included in pens where there is a tendency for water buildup after a rain to give animals a high and dry place to lay. The slope of the entire pen should be 2-4% to allow for drainage with occasional low, flatter mounds (4-6 feet high, 1 to 5 inch slopes, 35 sqft per head) for animals to lay on and keep dry. Manure can carry disease organisms and should not be allowed to build up in areas where cattle travel as it can splash up on the udder or into the feedbunk; alley ways should be scrapped or flushed at least once daily (as pictured here) to minimize disease exposure. Cows need a clean, dry place to lay down so stalls should be monitored at least daily, preferably at every milking, for manure contamination and manure promptly removed to decrease disease exposure to the udder and reproductive tract. Ensure enough bedding is available and refill to encourage stall usage and promote cleanliness of the udder. Photo courtesy of DB Weddle, ISU.

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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



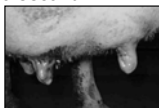
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Milk animals that are housed in isolation either in a separate hospital parlor (as pictured) or last and separate from the rest of the herd. Completely wash and sanitize all equipment afterwards (before milking any other animals) to minimize the risk of disease exposure. Milking should be a routine, and if more than one person has this responsibility on farm, writing down the standard operating procedure (SOP) lets everyone know specifically how it is to be done, ultimately minimizing the risk of disease (mastitis). Cows with mastitis shed thousands, even millions of organisms in their milk and to prevent exposure to other cows, milkers should wear gloves, and wash their hands after milking, treating, or handling the udder of infected cows. Cows should have clean udders/teats before attaching the milking unit otherwise the organisms can enter into the teat end through injection and predispose cows to mastitis. Photo courtesy of DB Weddle, ISU.

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Milking

- Use pre-dips with 15-20 second contact time
 - 30 sec if environmental mastitis challenge
- Attach milking units to dry teats
 - Slippage allows milk inject back into teat
- Shut off vacuum before removing milking units
 - Damage teat end, organisms enter



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Use pre-dips to reduce bacterial numbers on teats by applying full coverage to all teats and allow contact for at least 15-20 seconds; up to 30 seconds when environmental mastitis challenges exist (as pictured with the foaming iodine teat dip). Milking units should be attached to dry teats to prevent slippage, which causes milk to inject back into the teat, potentially causing mastitis if disease organisms exist. If not shut off prior, vacuum pressure can damage the teat end upon milking unit removal which can increase the risk of disease organisms entering the teat because the natural barrier is damaged. Photo courtesy of DB Weddle, ISU.

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Milking

- Apply post dips to all teats
 - Wipe off after 30 seconds in cold temps
- Keep cows on feet 30-45 minutes after milking; good time to feed
 - Keratin plug forms minimizing disease exposure
- Monitor SCC as tool for milking procedure, cow cleanliness

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Post-milking teat dips should be applied to the lower third of all teats to minimize the risk of contagious organisms entering the teat canal and causing mastitis. In cold weather (less than 10°F or with wind chill), post-milking teat dips should be applied, allowed to have contact for 30 seconds and the excess removed with a single use towel to prevent frost bite, subsequent teat end damage, and decrease mastitis risk. Teat ends remain open for 30-45 minutes after milking before the keratin plug forms; cows should be kept on their feet (offer fresh feed, keep water troughs available) during this time to minimize the risk of disease organisms entering the teat canal and causing an infection. Milk companies make somatic cell counts available for every load of milk picked up, so it should be routinely monitored on farm as it is an indicator of udder health and can provide a measuring tool for proper milking procedures and cow cleanliness (goal= under 200,000).

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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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Semen can carry disease causing organisms resulting in unbred cows, infected calves or cows, abortions, and other fertility problems so it is best to establish a disease free breeding program. Artificial insemination (AI) poses less of a disease spread risk than natural breeding if semen is obtained from a reputable source and good hygiene is practiced at the time of insemination (new, clean obstetrical sleeves, sanitary lubrication, clean pipette, and clean vulvar area). Reputable semen companies test their bulls for various infectious diseases and have minimum health requirements for their animals; this information should be provided to you upon request so as to ensure high quality, disease free semen is being brought onto your farm. If natural breeding is used, all bulls must be tested for reproductive diseases of concern and quarantined for a period of time (determined together with your veterinarian) before introducing into the herd. Abortions can be caused by a variety of things so if more occur than expected (as determined together with your herd veterinarian), it may be worthwhile to submit samples to a diagnostic laboratory to identify the cause and best course of treatment. Photo depicts a liquid nitrogen tank used to store frozen semen.

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Calving

- Calve cows separately from heifers to minimize disease exposure
- Clean pens between uses to minimize exposure
- Do not house sick animals in calving pens




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Calving cows/heifers individually and following proper hygiene procedures between animals, such as cleaning pens and putting in fresh bedding, will help minimize the risk of disease exposure. Calving pens should be designated for this purpose and not used to house sick animals due to the risk of disease organisms being shed into the environment and exposing stressed animals at calving. Photo courtesy of DB Weddle, ISU.

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Neonatal Management

- Remove dairy calves immediately after birth
- Prevent calf from nursing cow
 - Deeply bed stall
 - Cover udder
- Make sure tail/udder of cow is clean
- Dip navels with 7% iodine to prevent bacteria entering



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By removing calves from the cow immediately after birth, prior to nursing, disease exposure is minimized and colostrum can be harvested more sanitarly and consumption can be monitored. If calves cannot be immediately removed, keep calves from nursing the cow, by deeply bedding the stall (2-3 feet of straw/fodder) so that it cannot easily stand and suckle, or put an udder support/bra on the cow so if it does stand to nurse, it is prevented; the cows legs and tail should be clean so that the calf does not nurse on them and absorb a mouthful of bacteria-laden manure. Wet umbilical cords are excellent avenues for bacteria to enter the calf's body and should be clean and aided in their drying process by using a tincture of iodine (commonly 7%) dipped or sprayed onto the cord shortly after birth. Photo courtesy of DB Weddle, ISU.

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Neonatal Management

- Feed best quality colostrum at first feeding to maximize protection
 - Within 6 hours, ¾ to 1 gallon
 - Another ¾-1 gallon by 12 hours of life
- Keep calves separated from each other first 5 weeks
- House newborns individually on clean ground



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A calf's immune system depends on the amount of antibodies (protein) in colostrum and 3/4 to 1 gallon of the best quality (as tested by a colostrometer) should be fed within the first 6 hours of life. To maximize the amount of antibodies (protein) absorbed by a newborn calf, a second feeding of 1/2 to 3/4 of a gallon should be fed 12 hours after the first feeding (3/4 to 1 gallon). Newborn calves are highly susceptible to disease, so to minimize this, keep calves separated from direct contact with each other until at least 5 weeks of age to allow for their immune system to develop. Individual calf hutches, when placed on clean ground, shaded from heat, and bedded well in the winter time, help protect the calf from environmental exposure to disease pathogens, prevent calf to calf contact if correctly placed, and decrease the amount of respiratory pathogens if located in an area with good air flow as pictured here. Photo courtesy of DB Weddle, ISU.

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Summary

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

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Direct contact transmission does occur on farms with everyday diseases like mastitis, leptospirosis, and Bovine Viral Diarrhea (BVD). Should a foreign animal disease occur in the US, such as Foot and Mouth Disease (FMD), Malignant Catarrhal Fever (MCF), or Rinderpest they too can be spread through direct contact transmission. Taking some of the basic prevention steps as described in this presentation can help you decrease your risk of disease introduction and spread on your farm.

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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!

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Throughout this presentation, we have stressed that biological risk management is important. All diseases are transmitted by a few common routes and managing disease exposure will help decrease the level of disease. While disease risk cannot be completely eliminated, it can be managed. Awareness education is critical for assessment and response and each of YOU play a critical role!

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Questions?

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Acknowledgments

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