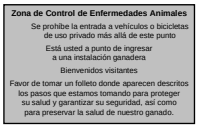
S_Oral and Fomite Transmission-Dairy

Slide 1	Aplicaciones prácticas para el manejo de riesgos biológicos Transmisión por Oral y Fomites Productores de Lácteos	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 aerosol transmission on farm.
Slide 2	**Manejo de Riesgos Biológicos (MRB)** • Proceso general de concientización, evaluación y manejo • Diseñado para mejorar el control de infecciones/ enfermedades – Enfermedades exóticas y endémicas • Proporcionar herramientas para minimizar el riesgo  Zona de Control de Enfermedades Animales Se prohibe la entrada a vehículos o bicicletas de uso privado más allá de este punto Está usted a punto de ingresar a una instalación ganadera Bienvenidos visitantes Favor de tomar un folleto donde aparecen descritos los pasos que estamos tomando para proteger su salud y garantizar su seguridad, así como para preservar la salud de nuestro ganado. Center for Food Security and Public Health Iowa State University 2006	Biological risk management is the overall process of awareness education regarding the risk of infectious diseases entering or spreading through an animal facility. It also involves evaluating and managing those risks. BRM is designed to help livestock producers understand the need for infection or disease control, not only for foreign animal disease threats but domestic diseases as well. Biological risk management provides the tools to minimize the risk (photo courtesy of: DB Weddle).
Slide 3	**Manejo de Riesgos Biológicos (MRB)** • No es posible eliminar totalmente el riesgo de enfermedades – El animal, su entorno – Disminuir la exposición a patógenos • Minimizar la amenaza para animales y humanos • No existe una misma respuesta para todos los casos  Center for Food Security and Public Health Iowa State University 2006	BRM recognizes that diseases 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. For nearly all diseases there is a relationship between dose exposure and severity of disease. For disease that are always present (endemic), 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 cattle facilities are different, there is not a one-size-fits-all answer. Photo depicts cattle in a pasture and the owner walking through them monitoring for illness (courtesy of USDA, taken by Bill Tarpenning).
Slide 4	**Vías de transmisión** • Propagación de patógenos – Animal ⟷ animal – Animal ⟷ humano • Diferentes vías de transmisión – Aerosol – Contacto directo – Fomite – Oral – Vector – Zoonótica  Center for Food Security and Public Health Iowa State University 2006	Disease agents can be spread from animal to animal, or animal to human, through a variety of transmission routes. For the purposes of the biological risk management materials, 5 main routes were identified: aerosol, direct contact, fomite, oral and rector-borne. The sixth route, zoonotic, can be spread from animals to humans through one of the 5 previously listed routes. Many infectious agents can be transmitted by more than one route of infection. This photo shows several dairy cows grazing in a pasture (photo source USDA – ARS).
Slide 5	**Transmisión por vía oral** • Consumo de alimento o agua contaminados – Excremento, orina, saliva – Otros contaminantes (proteína de rumiantes) • Lamer/masticar ambientes contaminados   Center for Food Security and Public Health Iowa State University 2006	Pathogenic agents can also be transmitted to animals or humans **orally** through consumption of contaminated feed, water or licking/chewing on contaminated environmental objects. Feed and water contaminated with feces, urine or saliva are frequently the cause of oral transmission of disease agents. However, feed and water can be contaminated with other infectious agents as well such as ruminant protein in ruminant feed. The top photo depicts a Holstein and an Ayrshire drinking from different sides of a water tank- if it becomes contaminated, all of the animals in those pens could be exposed (photo courtesy of DB Weddle, ISU). The bottom photo shows Jersey calves eating out of rubber feed buckets on the ground which could be contaminated from things in the environment

(photo source USDA).

Slide 6	**Algunas enfermedades que se propagan por vía oral** Enfermedades exóticas • Fiebre Aftosa • Melioidosis Existentes en EE.UU. • Ántrax • BVD • Criptosporidiosis • *E. coli* • Enfermedad de Johne • Listeriosis • Rotavirus • *Salmonella* Center for Food Security and Public Health Iowa State University 2006	There are many diseases transmitted by the oral route, both diseases that are foreign animal diseases (FADs) and those that are present in the US (endemic). Some examples of the foreign animal diseases include foot and mouth disease (FMD) and melioidosis (pronounced: MEE-lee-oyd-OH-sis). Examples of diseases that are already present in the US include anthrax, bovine viral diarrhea (BVD), cryptosporidiosis, *E. coli*, Johne's, listeriosis (circling disease), rotavirus, and *Salmonella*. 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- Oral.
Slide 7	**Transmisión por fomite** • Objeto inanimado contaminado • Transporta a los patógenos hacia otros animales – Botellas/pezones • Tráfico – Vehículos, remolques, personas  Center for Food Security and Public Health Iowa State University 2006	A component of oral transmission is fomites. A **fomite** is an inanimate object that can carry pathogenic agents from one susceptible animal to another. Examples of fomites include contaminated needles, balling guns (top picture; photo courtesy of DB Weddle ISU), calf nipples and bottles (middle and bottom photos, courtesy of DB Weddle, ISU), clothing, 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. **Traffic transmission** is a type of fomite transmission in which a vehicle, trailer, or human spreads organic material to another location.
Slide 8	**Vías de transmisión** • Atañen a todos los agentes infecciosos • El animal tiene que estar expuesto para contraer la enfermedad • Comprender las distintas vías de transmisión = obtener el control • Es necesario identificar las áreas de riesgo – Diseñar protocolos para minimizar la exposición Center for Food Security and Public Health Iowa State University 2006	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.

Slide 9

Transmisión de la enfermedad

- Es posible que los animales no muestren signos evidentes de la enfermedad
- El conocimiento de todas las vías de transmisión es esencial
  - Formular una estrategia que minimice el riesgo de enfermedad en la operación ganadera

Center for Food Security and Public Health
Iowa State University 2006

It is important to remember that disease transmission can occur without animals exhibiting obvious 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 pasture (photo courtesy of DB Weddle, ISU).

Slide 10

Pasos preventivos generales

- Panorama general
  - Perímetro de la explotación lechera
  - Identificación de los animales
  - Salud animal
  - Animales enfermos/muertos
  - Aislamiento/cuarentena
  - Administración del abastecimiento
  - Manejo neonatal

Center for Food Security and Public Health
Iowa State University 2006

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.

Slide 11

Pasos preventivos generales

- Restrinjan el contacto con animales como
  - El ganado vecino
  - Fauna silvestre, aves
  - Perros, gatos que deambulan
- Den mantenimiento a las cercas
- Establezcan protocolos de bioseguridad para vehículos de reparto, del personal
- Cierren con llave las entradas

Center for Food Security and Public Health
Iowa State University 2006

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.

Slide 12

Pasos preventivos generales

- Identifiquen individualmente a los animales
- Importante para
  - Comunicar su estado de salud
  - Las necesidades de tratamiento
  - La ubicación dentro de la explotación lechera
  - Llevar registros

Center for Food Security and Public Health
Iowa State University 2006

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)

Slide 13

Pasos preventivos generales

- Lleven registros del estado de salud de cada uno de los animales
- Revisen los programas de vacunación y tratamientos
  - Anualmente, semestralmente
  - Protocolo comparado con la realidad
- Investiguen síntomas poco usuales, casos que no responden al tratamiento
  - Neurológicos, animales caídos, muerte súbita

Center for Food Security and Public Health
Iowa State University 2006

To monitor health status, it is imperative to keep health records on every animal. 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.

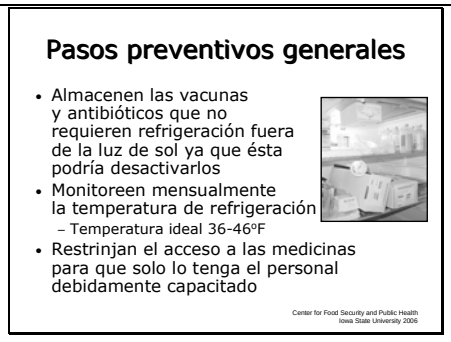
Slide 14

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 (courtesy of UC Davis VMTRC).

Slide 15

Cows 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 and is 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 as pictured here, 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. Photo courtesy of DB Weddle, ISU.

Slide 16



Sunlight deactivates vaccines and can render antibiotics ineffective, causing inadequate protection or treatment when used in your animals; make sure you read the label and store 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).

Slide 17

Pasos preventivos generales

- Garanticen la ingestión adecuada de calostro libre de enfermedades durante las 6 primeras horas de vida
- Eviten el contacto con animales mayores, ambientes contaminados

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Iowa State University 2006

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, 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).

Slide 18

Control de la transmisión oral y por fomites

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

Slide 19

Por vía oral, fomites

- Los pasos preventivos básicos significan
  - Aislar a los animales enfermos
  - Mantener limpios el alimento y el agua
  - Manejar el estiércol
  - Mantener limpio el equipo
    - Para alimentación, tratamiento, vehículos

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Iowa State University 2006

There are various prevention steps that can help ensure oral 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. Keeping feed and water clean by minimizing fecal and urine contamination is extremely important. Another is to manage animal manure so that it does not contaminate young stock areas or contaminate grazing areas. Finally, keep your equipment clean- feeding, treatment equipment and delivery trucks especially. These basic steps will go a long way in preventing oral and fomite disease transmission.

Slide 20

Aislamiento

- Las enfermedades diarreicas propagan organismos
- La separación es esencial para minimizar la propagación
- Los equipos para alimentación y para suministro de agua debe separarse

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Iowa State University 2006

Isolation and quarantine were discussed under general prevention, so we will not cover that in detail here. For diarrheal diseases (*Salmonella*, crypto, rotavirus), animals shed thousands, even millions of organisms into the environment and should be separated from susceptible animals. Separate equipment for feeding and watering are important to minimize disease spread. The animal in this photo should be removed from this group pen so as not to expose the other calves; photo courtesy of DB Weddle, ISU.

S_Oral and Fomite Transmission-Dairy

Slide 21

Alimentación

- No deben pisar los comederos con botas contaminadas
  - Instalen "pasos de acceso"
- Alimenten en comederos, pesebres elevados
- Examinen el alimento en busca de contaminantes, para verificar la calidad
  - Estiércol, hongos, trazas de cadáveres
- Monitoreen las etiquetas de los alimentos, las entregas
  - No alimenten a los bovinos con proteína de rumiantes

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Feed and water can become contaminated with feces and urine if not properly handled both before and after feeding. Do not allow people to step into feedbunks with manure on their boots- install man-passes at the end of feedbunks to allow entry/exit. Feed should be offered in elevated troughs or mangers as pictured here, but protected in such a way so that feces and urine cannot contaminate it. Feed stuffs should be examined routinely for contaminants such as manure, mold, or foreign material (carcasses during ensiling), and overall quality. Ruminant protein is a contaminate and should not be fed to cattle- monitor feed tags and delivery of commodities to help prevent this as a source of disease on your farm. (Photo courtesy of DB Weddle)

Slide 22

Agua

- Limpien los abrevaderos cuando menos semanalmente
- Instalen barras alrededor de los abrevaderos para evitar que los bovinos los pisen o defequen dentro
  - Dejando un espacio de 2 pies para la cabeza
- Controlen el acceso a fuentes naturales de agua
  - Estanques, corrientes de agua
  - Cercado para evitar el ingreso de animales y la contaminación

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Clean waterers at least once a week (more often if needed) to avoid buildup that allows disease organisms, like *Salmonella*, to grow. Install rails around waterers with 2 feet of clearance to allow their heads to pass through but prevent cattle from stepping or defecating into the trough. If a natural water source, such as a pond or stream, is the main drinking water for the herd, control access so that cattle can drink from it but not enter and potentially contaminate it. This can be done with strategic fencing and a concrete or gravel rock pad leading into the water source. Photo courtesy of DB Weddle, ISU.

Slide 23

Alimento y agua

Control de roedores/plagas

- Los roedores pueden ser portadores de enfermedades y contaminar el alimento
  - Heces u orina
- Programas de control de roedores
  - Inhibidores, cebos o veneno, trampas
- Limpien el alimento derramado

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As stated earlier, the greatest threat for exposure to orally transmitted disease is ingestion of disease causing agents in the environment or in feed and water contaminated by other animals. Rodents can carry diseases that affect cattle and can readily contaminate feed with their feces and urine. Every operation should have a rodent control program. Control measures that should be considered include the use of deterrents, baits/poisons and traps as pictured- closed box top photo, open box bottom photo. These boxes would benefit by having a bit of water added to them to attract the rodents to the bait. In addition, attempts should be made to secure all feed storage areas, clean up spilled feed, and avoid having excess feed available to any animals (e.g. wildlife, birds, vermin, dogs, cats, horses, cattle, sheep). For specific information about rodent control, refer to the Bird and Rodent Control Measures handout. Photos courtesy of DB Weddle, ISU.

Slide 24

Alimento y agua

- Control de aves
- Las aves son portadoras de enfermedades
  - A menudo difíciles de controlar
  - No fomenten que hagan nidos o usen de percha ciertos sitios
    - Pónganse en contacto con la oficina de servicios de extensión para obtener recomendaciones
- Limiten que tengan acceso al alimento

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Birds are also disease carriers, *Salmonella* for instance, and while it is nearly impossible to eliminate them from animal housing areas, steps should be taken to discourage their nesting and roosting. There are legal regulations in many areas, so check with your local extension office for recommendations. The risk of feed contamination by birds may be as important as that by rodents so it is important to limit their access and clean up spilled feed so it is not an attractant. Top photo depicts a farm yard with hundreds of birds roosting on the roof and fence (courtesy of http://ianrpubs.unl.edu/wildlife/graphics/ncr451p1.GIF) and the bottom photo is a common scene on many farms where the birds are eating right out of the feedbunk with cattle (courtesy of http://whyfiles.org/193prion/images/feedlot.jpg).

Slide 25

Manejo del estiércol

- Limpien los pasillos interiores
  - Restrieguen o laven con chorros de agua diariamente
- Restrieguen con frecuencia las superficies alrededor de los comederos para minimizar la acumulación
  - Trasladen a los animales a suelos limpios
- Restrieguen con frecuencia los faldones de concreto que rodean a los abrevaderos/comederos

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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. For cattle being fed on pasture, scrape areas around troughs/feeders frequently to minimize feces build up and move them, if possible, to clean ground. If feeding and/or watering sources are on concrete pads, scrape these regularly to remove debris as it builds up. Photo courtesy of DB Weddle, ISU.

Slide 26

Manejo del estiércol

- Almacenamiento
  - Composta
    - Mata a muchos organismos causantes de enfermedades
  - Lagunas
    - Constrúyanlas de forma a evitar derrames, desbordamientos
  - Si lo esparcen en suelos de cultivo, pastizales
    - No permitan el ingreso de animales
    - La luz del sol no logra destruir a todos los organismos causantes de enfermedades

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Manure storage must be done in such a way to limit exposure to animals. Composting will kill many disease organisms, if done properly, while preserving the nutrient value of the manure. Lagoon storage, as pictured here, allows for long term storage but it should be built to prevent spills or overflows that could contaminate water sources or crop ground, and thus exposing animals or humans. If manure is spread on crop or pasture ground, prohibit animals from grazing the field for a sufficient length of time (this will vary with weather conditions, age of animals grazing, and diseases of concern). While sunlight has killing action on organisms, penetrating thick manure does not always occur and the disease risk, especially for Johne's, will be present for months. Photo courtesy of Paul Hester, ISU.

Slide 27

Manejo del estiércol

- Pastizales
  - Arrastren el estiércol para dispersarlo
  - Monitoreen la disponibilidad de forraje para evitar que los animales pasten en exceso

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Another consideration is the risk that manure presents on pastures. Breaking up manure on pastures by dragging with a tractor exposes the disease agents to sun and wind, which will kill them more quickly (not as done by hand in Nepal as seen in this picture). It is important to monitor forage availability to prevent overgrazing, which can result in cattle grazing closer to the ground and nearer to fecal pats. Cattle will typically avoid grazing close to fecal pats, but will graze closer when feed is limited and this increases the risk of ingestion of potential disease causing agents in the manure. (Photo source: Nepal School Project at http://www.nepal-school-projects.org/village_life_in_pictures.htm)

Slide 28

Equipo agrícola

- Utilizar cucharones distintos para alimento y para recoger estiércol
  - Para algunas explotaciones demasiado caro
- Si es el mismo equipo
  - Lavar
  - Restregar perfectamente para eliminar el estiércol
  - Enjuagar y dejar secar al sol

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Using different loader buckets for mixing feed and scraping manure is perhaps the best way to minimize the risk of transmitting diseases orally to the herd. If separate buckets are cost prohibitive, then the loader bucket, tires and anything else that has manure on it must be washed with warm water, scrubbed to remove organic matter, rinsed and allowed to completely dry in the sun to avoid fomite spread to animals. (Photo source www.lancasterfarming.com)

Slide 29

Equipo de tratamiento

- Los animales enfermos sueltan organismos que transmiten enfermedades
- A menudo requieren tratamientos de apoyo
  - Electrolitos, líquidos, edicamentos
- Hay que limpiar el equipo después de usarlo con cada animal
  - Lavar, desinfectar, enjuagar, secar
  - Si se utilizó para antibióticos, NO desinfectar

Center for Food Security and Public Health
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Animals that are ill often need supportive treatment with electrolytes, fluids, or medication. Equipment used to treat these animals can become contaminated with disease causing organisms. After use on an animal, this equipment should be washed in warm water, and if it is not used for antibiotics, disinfected and hung up to dry in an area where it will not be contaminated. (Disinfectants can have residual effect and deactivate antibiotics). Photo depicts an esophageal feeder often used to tube a calf with electrolytes- this should be cleaned after each use (courtesy of DB Weddle, ISU).

Slide 30

Vehículos

- Designen una zona de estacionamiento de vehículos
  - Alejada del área principal de tránsito de los animales

- Minimicen el tránsito de vehículos dentro de la explotación
  - Carga/descarga, beneficio para extracción de grasa en el perímetro
  - No permitan que los conductores de camiones de leche/alimento transiten por los caminos de los animales

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, wheel wells. Any vehicle coming into an operation could introduce disease agents that can be transmitted orally. Minimize vehicular traffic on farm by loading/unloading animals and keeping rendering piles only at the perimeter of the operation. It is also good management 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).

Slide 31

Resumen

- La transmisión oral ocurre diariamente en las explotaciones agropecuarias
  - Cripto, enfermedad de Johne, leptospirosis
- Las enfermedades animales exóticas también pueden propagarse por la vía oral
  - FMD, melioidosis
- Los pasos preventivos que hemos descrito aquí pueden ayudar minimizar sus riesgos

Oral disease transmission does occur on farms with everyday diseases like and cryptosporidiosis (crypto), Johne's disease (*Mycobacterium avium* ssp *paratuberculosis*), and leptospirosis. Should a foreign animal disease occur in the US, such as Foot and Mouth Disease (FMD) can be spread through oral 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.

Slide 32

Objetivos clave de aprendizaje

- El manejo de riesgos biológicos es importante
- Todas las enfermedades se transmiten a través de unas cuantas vías comunes
- Los riesgos de enfermedad pueden manejarse
- La concientización es esencial
- ¡Ustedes desempeñan una función esencial!

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 essential for effective disease control and each of YOU play a critical role!

Slide 33

¿Tienen preguntas?

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RMA

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