

## Calf Housing and Environments Series

### VI. The Calf Environment and Caretaker Health

Individuals working with calves come into contact with the same pathogens that the calves do and are subjected to the same environments. Although physical injuries, heat stress, and farm accidents are the major factors affecting farm worker health, infectious disease and air quality can still pose some risks. This chapter will focus on the calf environment in which some individuals are exposed, what the hazards are, and what preventive measures should be recommended by employers and dairy consultants.



#### *What are the hazards to calf caretakers?*

**Poor Ventilation** -- The same air quality problems that can affect young calves can affect the people that care for them. Ammonia can affect the respiratory tract by damaging the cilia and mucosal barrier to infection. Respiratory symptoms can include inflammation, shortness of breath, wheezing, coughing, and/or a decrease in lung function (Mitloehner & Calvo, 2008).

Poor air quality in some environments may be due to volatile organic compounds (VOCs). Volatile organic compounds (VOCs) are emitted as gases from certain solids or liquids, such as livestock manure but can be found from many other sources. VOCs are widely used in household and commercial products: some cleansers, disinfectants, waxes, glues, cosmetics, dry cleaning products, paints, varnishes and preservatives include VOCs. Gasoline, kerosene and other fuels also contain VOCs as do cigarette smoke and pesticides. Health effects from exposure to VOCs include headaches; nausea; loss of coordination; and eye, nose, and throat irritation. Heavy exposures may cause damage to the liver, kidney, and central nervous system.

Dust may also be a hazard to calf caretakers, particularly from feed and bedding. There may be general respiratory effects of dust, such as overwhelming the clearance function of the upper respiratory tract, or there may be specific allergens, animal dander, urine proteins, and fecal

proteins in the dust (Mitloehner & Schenker, 2007). Airborne bacteria and endotoxins (from the breakdown of bacterial cell walls) can also affect the respiratory system of people.

***Enteric (gastrointestinal) Pathogens:*** Many of the pathogens that cause disease in calves can cause disease in people. In the calf environment, all of the following pathogens can be transmitted through or are shed into calf manure.

***E coli O157:H7*** - Although not recognized as a cause of disease in calves, this pathogen can be carried and shed by calves and can contaminate the environment and caretakers' hands, boots, and clothing. In adults, it can be a cause of diarrhea or bloody diarrhea. In children, it can progress to cause systemic disease and hemolytic uremia syndrome (HUS) and can lead to kidney failure, particularly in very young children.

***Salmonella*** - This bacterium can be found in many environments and may be a cause of disease and be shed by calves. In people, the disease can cause diarrhea but also may cause septicemia and severe illness in some individuals, particularly infants.

***Cryptosporidium parvum*** - *C. parvum* is a protozoal organism (single celled - not a bacteria or virus) and is a very common pathogen causing diarrhea and subsequent dehydration in calves. It can also cause diarrhea in people previously unexposed and can cause chronic, life-threatening diarrhea in immune-compromised people (such as AIDS patients). People with normal immune systems will develop immunity to subsequent infection. It is likely that people who have worked with cattle previously have been exposed and may not get sick, but they may bring the organism home to susceptible family members.

***Campylobacter*** - Although usually associated with poorly cooked chicken, this bacterium can cause disease in people, resulting in gastro-intestinal illness. It is shed by cattle and may be in the calf environment.

***Giardia*** - This is a protozoal organism like *C. parvum* and is associated primarily with contaminated surface water. There have been outbreaks of diarrheal disease in calves with this organism. Although less common, it can be transmitted to people through the same contaminated water source or the contaminated calf environment.

Common diseases of calves that **DO NOT** pose a risk for people include the species-specific corona virus and rotavirus infections that cause diarrhea in calves, and the respiratory pathogens of cattle that are not a risk to people such as *Pasteurella*, *Mannheimia*, *Mycoplasma* and the viral diseases of cattle such as BVD, IBR and BRSV.

***Routes of Transmission for Disease-Causing Organisms*** - Diseases transmitted from animals to humans are known as zoonotic diseases, or zoonoses. Caretakers can contract diseases via different routes of transmission when working on dairies. Some disease agents can survive for extended periods of time in soil, bedding, and other environmental elements. An understanding of the following transmission routes can aid calf caretakers in disease prevention actions (Center for Food Safety and Public Health:Iowa State University, 2008):

1. ***Aerosol*** - Involves the transfer of pathogenic agents through infected droplets from animal-to-animal, or from animal-to-human. Most pathogens do not survive in the environment for extended periods of time. Examples of this route of transmission include pathogens dispersed by coughing or sneezing.
2. ***Direct contact*** - This route involves contact with a pathogenic agent or organism from an infected animal or from the environment itself.

3. *Fomite* - These are inanimate objects that become contaminated by infected animals. Examples include: buckets, lead ropes, pitch forks, calf hutches, clothing, boots, etc. Transmission usually occurs through hand-to-mouth or direct contact.
4. *Oral* - Results when pathogenic agents are consumed through contaminated food, water, or when calves lick/chew on contaminated objects in the environment.
5. *Vector-borne* - This route means that disease is transferred by insects. Examples include: mosquitoes, fleas, or ticks and flies. This route requires a vector to acquire a pathogen from an infected animal, and then transfers it to another animal or a person.

### *Preventive Measures*

The following measures can reduce the risk of caretaker illness to the above-mentioned conditions.

1. *Improve ventilation in the calf rearing area* - Benefits to both calves and their caretakers will be found if improvements in ventilation in the calf rearing areas (such as a calf barn) are made.
2. *Dust mask* - Simply wearing a dust mask when moving bedding and feed will reduce risks posed by dust particles, including allergic reactions by some individuals.
3. *Hand hygiene* - Hand washing with soap and running water helps remove organic material and reduces the amount of organisms on the skin. Hands should always be washed after contact with animals, manure, blood, and body fluids and *always* before eating.
4. *Gloves* - Some individuals may wish to wear gloves when working around calves and their environment to reduce risk of hand contamination by manure. Milker's gloves or work gloves can be used.
5. *Clothing and boots* - If provided coveralls and boots, only wear them at work! A calf caretaker can reduce the risk of bringing pathogens home to family members by leaving coveralls and boots at work. If work clothes and boots are worn home they need to be removed before entering the house and kept separate from the rest of the family's clothing.
6. *Dedicated break area* - If the farm can provide a dedicated break area with a hand-washing facility, the workers can greatly reduce their own chance for illness.



### *Cleaning and Disinfecting*

At work -- Employees and calf caretakers should be reminded to clean and disinfect non-disposable equipment, boots before and after entering calf areas and between calves, individual calf pens, calf transportation equipment, etc. The disinfectants should be an EPA-approved disinfectant, or

diluted household bleach solution. For boots, footbaths, or tires, mix ¼ cup household bleach with 1 quart of water. For hard surfaces - mix ¼ tsp household bleach with 1 quart of water.

At home -- The best way to make sure disease organisms from the calf environment are not brought home is to have work clothes that stay at work. It is worth it for employers to provide uniforms, laundry services, and a place to change for the dairy employees. If work clothes are brought home to clean, place dirty farm laundry in a separate laundry basket, apart from other family clothing. Wash work clothing separate from family clothing. Use detergent and household bleach in water that reaches 130°F.

Having policies and preventive measures in place is the best way to stay one step ahead of disease transmission on farm. Just learning about diseases that can be transmitted from animals to people isn't enough. Caretakers need to be proactive, and just as important, be able to identify potential hazards related to disease spread to the calves, themselves, and their family members.

### **References**

Center for Food Safety and Public Health:Iowa State University (2008). *Biological Risk Management: Resources for Dairy Facilities*. Iowa State University [On-line]. Available: <http://www.cfsph.iastate.edu/BRM/dairyresources.htm>

Mitloehner, F. M. & Calvo, M. S. (2008). *Worker health and safety in concentrated animal feeding operations*. *J Agric Saf Health*, 14, 163-187.

Mitloehner, F. M. & Schenker, M. B. (2007). *Environmental exposure and health effects from concentrated animal feeding operations*. *Epidemiology*, 18, 309-311.

For English and Spanish presentations and notes on zoonoses on the farm:  
[www.cfsph.iastate.edu/Infection\\_Control/zoonotic-disease-information-for-producers.php](http://www.cfsph.iastate.edu/Infection_Control/zoonotic-disease-information-for-producers.php)

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**Funded by USDA: National Integrated Food Safety Initiative # 2007-01877**