



Hazards of Getting Sick from Contact with Farm Animals at Fairs and Petting Zoos

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Animals exhibited at fairs, farm centers, and in petting zoos are very popular and educational, and they bring much joy to people, especially children, but in addition to warm memories of holding them, there is risk that immunocompromised people may take home harmful—even deadly—pathogens. Fortunately, observing sanitation precautions can reduce the risks involved with contact with farm animals.

Animal-contact transmission of disease has recently become widely recognized in the United States. Diseases transmitted from animals to humans are called *zoonotic diseases*. Microorganisms that have been implicated in the transmission of zoonotic diseases include *Escherichia coli* O157:H7 (*E. coli* O157:H7), salmonella, listeria, cryptosporidia, West Nile virus, swine influenza virus, avian flu virus, and rabies. One of the pathogens of broad concern to the scientific community currently is *E. coli* O157:H7.

Farm animals defecate wherever they happen to be, contaminating their environment and themselves in the process. Each day a cow produces about 66 pounds of manure containing about 300 billion fecal coliform organisms. Because animals can be contaminated with fecal matter containing *E. coli* O157:H7, people's hands can become contaminated with this pathogen when they touch the animals and things in the environment surrounding the animals, such as pens and fences. Subsequent touching of the face, body, and clothing with contaminated hands increases the risk of contaminating the mouth or uncovered wounds on the body.

Since 1988, there have been 25 known cases of zoonotic pathogen transmission involving animal-human contacts. The most recent was in March 2005, when

contact with farm animals at Florida fairs resulted in 14 confirmed cases of people getting sick and one death from hemolytic uremic syndrome. Children are the most likely to get seriously ill when infected with *E. coli* O157:H7.

E. coli, which we all carry in our intestines, is not the same as *E. coli* O157:H7. *E. coli* is important in maintaining normal bodily functions. However, a few *E. coli* strains are disease causing, and their presence in water supplies indicates fecal contamination and the potential presence of enteric pathogens, which cause illness characterized by diarrhea.

E. coli O157:H7 has been known primarily as a veterinary pathogen, previously found only in animals. It was first identified as a human pathogen in 1982 when outbreaks in Oregon and Michigan resulted in 47 people developing hemorrhagic colitis. Hamburgers from a fast-food restaurant chain were implicated when the same organism was isolated both from stricken patients and the chain's ground beef patties.

E. coli O157:H7 causes about 73,000 illnesses a year in the United States. From 1982 to 2002, 49 states reported 350 occurrences to the Centers for Disease Control and Prevention (CDC). Of these, 52% was foodborne (ground beef and fresh produce), 21% was from unknown sources, 14% was transmitted person-to-person, 9% was waterborne, and 3% was from animal contact. The sources are various; in addition to undercooked hamburger, other foods implicated include raw milk, fresh apple cider, mayonnaise, and produce fertilized with improperly treated manure or irrigation water. *E. coli* O157:H7 can even be carried in contaminated swimming-pool water.

E. coli O157:H7 can survive refrigeration and frozen storage very well and can even grow slowly at refrigerated temperatures. Although it can be easily destroyed by heat, small numbers of *E. coli* O157:H7 can cause illness among those with immunocompromised systems. Such people include the very young (children less than 5 years old), the elderly, pregnant women, those with AIDS, and those undergoing chemotherapy or radiation.

E. coli O157:H7 produces a toxin in the intestinal tract that destroys small blood vessels, particularly in the lining of the kidneys. Blood vessels of other organs, such as the heart and brain, may also be affected. Symptoms associated with *E. coli* O157:H7 illness are abdominal cramping and watery diarrhea becoming grossly bloody with little or no fever. When the red blood cells of the kidneys are destroyed (*hemolysis*), kidney failure (*uremia*) results, requiring blood transfusion or even dialysis. Hemolytic uremic syndrome (HUS) is the leading cause of renal failure in children.

About 5–10% of those with *E. coli* O157:H7 illness develop HUS, with a mortality rate of 1 in 20 in the United States. Among HUS survivors, about 1 in 20 develop end-stage kidney disease requiring dialysis or a kidney transplant, and the same number have neurological or pancreatic problems.

Precautions in the kitchen

To prevent *E. coli* O157:H7 illness from food, the following practices are strongly recommended:

- Separate cooked from raw foods to prevent cross-contamination.
- Cook all ground beef to 160°F (a thermometer is needed—don't rely on the no-pink-color test!).
- Consume only pasteurized (or heat-treated) milk, dairy products, and cider.
- Wash fruits and vegetables very well if served raw.
- The very young, the elderly, pregnant women, and those with immunocompromised systems should avoid eating alfalfa sprouts until their safety is established.
- Practice good personal hygiene—wash your hands thoroughly with soap and water before eating, especially after visiting a farm or touching animals.

Precautions at the farm fair or petting zoo

To prevent *E. coli* O157:H7 illness from animal contact, observe the following animal infection control guidelines.

Precautions for the animal handler

Provide information on the animals, activities, displays, and precautions—preferably ahead of time—for visiting groups.

Inform visitors of the risks of transmission of diseases and tell them how to prevent those risks.

Give the same information to your staff, and train them to supervise and coach visitors when touching animals.

Create a one-way traffic flow in the animal area.

Provide only healthy animals for display and visitor contact.

Designate an area where animal interaction is allowed. To better control human-animal contact, clearly and effectively separate animal-interaction areas from areas where interaction is not allowed; use barriers or signage.

Birthing animals must not be displayed in public areas. Use clear signs to disallow hand-to-mouth contact in animal areas (e.g., do not allow eating, drinking, smoking, or carrying toys or pacifiers).

Food establishments and infant-care settings should not be in animal areas.

Eating areas should be in animal-free areas and have separate handwashing facilities.

Animals should not be given people food.

Follow strict environmental sanitation procedures to prevent dust from contaminating water sources, eating areas, and surfaces likely to be touched.

Provide and maintain adequate handwashing facilities in both animal-interaction and noninteraction areas; these facilities must be accessible, sufficient for the anticipated maximum attendance, configured for use by adults and children, clean, and equipped with running hot or warm water, soap, disposable towels, and trash bins.

Precautions for visitors

When visiting animals with children:

Feed the children *before* the visit to minimize infections from hand-to-mouth contact.

Explain some of the hazards of visiting and touching animals.

Keep an eye on their hands! Watch for hand contact with mouth, face, body, and clothing.

Bring along a change of clean clothes and shoes. Wash used clothes very well before using them again.

Touch animals as if they are colonized with human enteric pathogenic microorganisms.

Be aware of the group of people who are at serious risk when contracting zoonotic diseases:

The very young (under 5 years old)

The elderly

Pregnant women

Those with weakened immune systems—with AIDS, or undergoing chemotherapy or radiation treatment.

During the visit, do not allow:

Eating or drinking

Touching the mouth or licking (or sucking) fingers

Having wounds uncovered

Wiping hands on clothing

Bringing toys or pacifiers that may become contaminated

Kissing animals.

Remember to wash your hands thoroughly:

Even if you don't touch the animals

After touching animals or their surroundings

After being mouthed, bitten, spat on, or licked by animals

Before eating and drinking.

Use the proper hand-washing technique:

Use warm or hot water.

Lather for 20 seconds, especially behind the hands, between the fingers, and underneath the fingernails.

Rinse well with running water.

Dry with clean, disposable towels.

Warning signs

If symptoms such as nausea, vomiting, and diarrhea (especially with blood) develop after visiting animals, inform your physician immediately. Avoid giving anti-diarrheal medications, such as loperamide, due to the increased risk of kidney complications.

Animals give a lot of happiness and pleasure to people. By knowing the appropriate sanitation precautions and using common sense, you can stay healthy to enjoy them.

Resources

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(All URLs accessed April 15, 2005.)