

Prevention of Disease Associated with Animals in Public Settings

[Adapted from Compendium of Measures to Prevent Disease and Injury Associated with Animals in Public Settings, 2004
National Association of State Public Health Veterinarians (NASPHV)]

Contact with animals in public settings, such as petting zoos, fairs and farm tours, provides opportunities for entertainment and education about animals and animal husbandry. However, many diseases can be transmitted from animals to humans. The following information and recommendations will help you and your organization reduce the risk of disease transmission through proper management and supervision of such settings.

Groups at high-risk for serious infection include children less than 5 years of age, the elderly, pregnant women and those who are immunocompromised. The behaviors and actions of people are significantly related to the risk of infection. Among these are inadequate hand-washing; large numbers of children among attendees; a lack of close supervision of children; hand-to-mouth activities (e.g. smoking, eating, use of pacifiers, bottles, sippy cups, and thumb sucking) in the animal area; and a lack of education and awareness of the risk.

A number of microorganisms can be spread from animal to humans. Most of these are transmitted through contaminated food and water, but transmission also occurs from contact with animals and their environment. Recently, there have been a number of reported outbreaks among visitors to petting zoos, fairs, and farms. Organisms linked to human disease outbreaks due to animal contact in exhibition settings include *E. coli O157*, *Campylobacter*, *Salmonella* and *Cryptosporidium*.¹⁻⁹

The primary way transmission occurs is the fecal/oral route. Since animal fur, hair, skin, and saliva¹⁰ can become contaminated with fecal organisms, transmission may occur when people pet, touch, or are licked by animals. Transmission has occurred from fecal contamination of foods, water¹¹⁻¹³, and environmental surfaces.^{4,14-16}

Several factors increase the likelihood of transmission at animal exhibits. Animals are more likely to shed pathogens because of stress induced by prolonged transportation, confinement, crowding, and increased contact with people.¹⁷⁻²³ Co-mingling of animals increases the probability that an animal shedding organism will infect other animals. The prevalence of some pathogens may be higher in immature animals²⁴⁻²⁶ and most petting zoos exhibit young animals.

The layout and maintenance of the facility contributes to the risk of infection. Risk factors include inadequate hand-washing facilities; structural deficiencies associated with temporary food service facilities; poor separation between animal exhibits and food-consuming areas;²⁷ and contaminated or poorly maintained drinking water^{12,13} and sewage/manure disposal systems.

Recommendations for Contact with Animals

In order to reduce the potential for disease transmission, the following three areas should be addressed:

- 1) Animal Areas – where animal contact is possible or encouraged;
- 2) Transition Areas – where people pass to and from the animal areas; and
- 3) Non-Animal Areas - all areas where animals are not permitted.

1. Recommendations for Animal Areas

These recommendations apply both to settings in which animal contact is possible (such as county fairs) and settings in which direct animal contact is encouraged (such as petting zoos). However, in settings in which direct animal contact is encouraged, extra precautions should be taken to reduce the risk of injuries and disease transmission.

For areas in which animal contact is possible, design of the entry and exit points for animal contact areas should be planned to facilitate visitor flow through transition areas (see Appendix B for recommendations). The transition areas should include educational information and hand-washing facilities. Fences, gates, or other types of barriers can restrict uncontrolled access to animals and animal contact areas, and ensure that visitors exit through transition areas.

- **Food and Beverages:** No food and beverages should be allowed in animal areas. In addition, smoking, carrying toys, and use of pacifiers, sippy cups and baby bottles should not be permitted in animal areas.
- **Cleaning:** Manure and soiled animal bedding should be removed promptly. Animal waste should be temporarily stored in appropriate labeled containers, preferably lined with plastic bags. Waste containers and tools used for waste removal (e.g., shovels, pitchforks) should be kept within designated animal areas, and restricted from public access. Manure and soiled bedding should not be transported or removed through non-animal areas or transition areas used by human visitors. If manure or soiled bedding must be transported through these areas, they should be in closed containers or bags to prevent spillage.
- **Supervision of Children:** For children less than 5 years old, animal contacts should be carefully supervised to discourage hand-to-mouth contact and to ensure appropriate hand-washing.
- **Volunteers/Owners/Workers/Supervisors:** A responsible person(s) must be present in areas of animal contact to encourage appropriate human animal interactions, to reduce risk (e.g., by promptly cleaning up waste), and to receive reports of injuries and exposures.
- **Feeding Animals:** If feeding animals is permitted, only food sold by the venue for that purpose should be allowed. Food sold for animal consumption should not be eaten by people and should not be provided in containers that can be eaten by people (e.g., ice

cream cones). This policy will reduce the risk of animal bites and the likelihood of children eating food that has come into contact with animals.

- **Use of Animal areas for public (non-animal) activities:** Zoonotic pathogens can contaminate the environment for long periods of time.¹⁵ If animal areas must be utilized for public events (i.e., weddings, dances, etc.), cleaning and disinfection is essential, particularly if food and beverages are served. Materials with smooth, impervious surfaces such as steel, plastic, and concrete are easier to clean than materials such as wood or dirt floors. It is important to remove organic material (bedding, feed, and manure) before using disinfectants. A list of disinfectants is provided in Appendix D.

2. Recommendations for Transition Areas (Between Animal Areas and Non-Animal Areas)

It is important to provide transition areas for visitors to pass through when entering and exiting animal areas. The transition areas between animal and non-animal areas should be defined as clearly as possible, even if they need to be conceptual rather than physical (see Appendix B). Information should be provided in these areas to reduce the risk of infection or injury, and to provide hand-washing facilities upon exiting.

- **Entrance transition areas** should inform visitors that they are entering an animal area. Signs instructing visitors not to eat, drink, or place their hands in their mouth while in the animal area should be posted.
- **Exit transition areas** should be clearly marked with signs instructing the public to wash their hands. Hand-washing stations should be available and accessible to children. See Appendix A for detailed recommendations for hand-washing.

3. Recommendations for Non-Animal Areas

Non-animal areas are areas in which animals are not permitted, with the exception of service animals.

- Food and beverages should only be prepared, served, and consumed in the designated non-animal areas. Hand-washing facilities must be available (see Appendix A for detailed recommendations).
- If animals or animal products (e.g., animal pelts, animal waste, owl pellets)²⁸ are brought into school settings (see Appendix C), careful cleaning must be done (see Appendix D for list of disinfectants). Animals and animal products should not be brought into school cafeterias and other food-consumption areas.

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Appendix A

Hand-washing recommendations to reduce disease transmission from animals in public settings.

Hand-washing is the single most important prevention step for reducing disease transmission.

How to Wash Hands

1. Wet hands with running water; place soap in palms; rub together to make a lather; scrub hands vigorously for 20 seconds; rinse soap off hands; then dry hands with a disposable towel.
2. If possible, turn off the faucet by using a disposable towel.
3. Assist young children with washing their hands.

Hand-Washing Facilities or Stations

- Hand-washing facilities should be accessible and sufficient for the maximum anticipated attendance, and configured for use by children, adults, and those with disabilities.
- Hands should always be washed after leaving animal areas and before eating or drinking.
- Hand-washing stations should be conveniently located between animal and nonanimal areas and in food concession areas.
- Maintenance should include routine cleaning and restocking of towels and soap.
- Running water should be of sufficient volume and pressure to remove soil from hands. Volume and pressure might be substantially reduced if the water supply is furnished from a holding tank. Therefore, a permanent pressured water supply is preferable.
- The hand-washing unit should be designed so that both hands are free for hand-washing.

- Hot water is preferable, but if the hand-washing stations are supplied with only cold water, a soap that emulsifies easily in cold water should be provided.
- Communal basins, where water is used by more than one person, do not constitute adequate hand-washing facilities.

Hand-Washing Agents

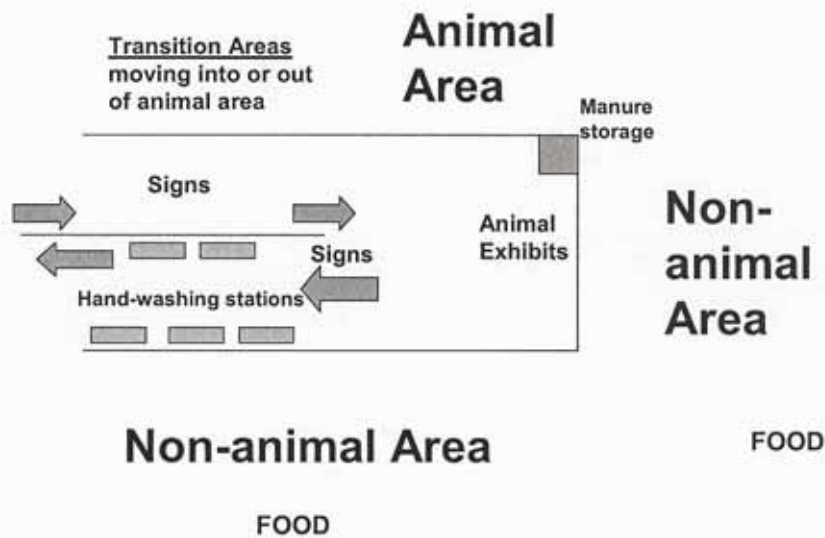
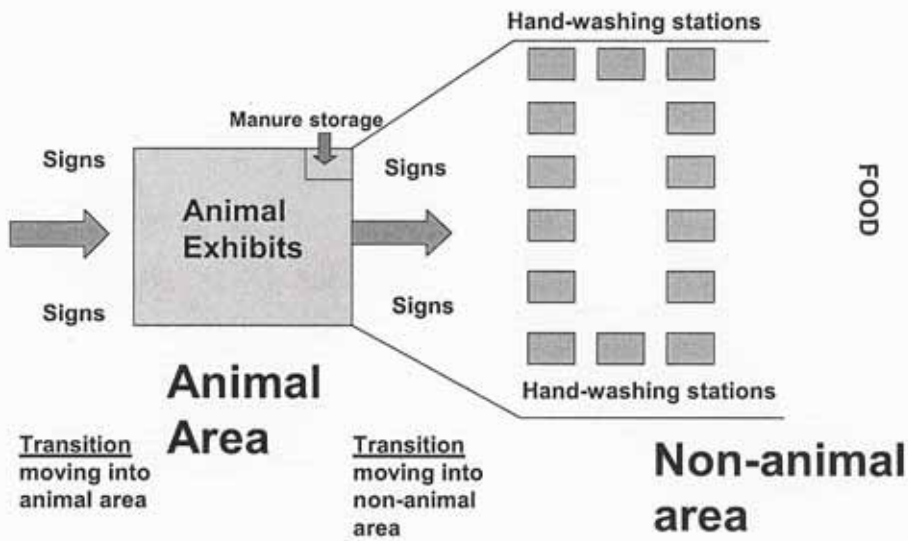
- Liquid soap dispensed by a hand or foot pump is recommended.
- Alcohol-based hand-sanitizers are effective against multiple common disease agents (e.g., *Escherichia coli*, *Salmonella*, and *Campylobacter*) when soap and water are not available. However, they are ineffective against certain organisms (i.e. bacterial spores, *Cryptosporidium*, and certain viruses).
- Hand-sanitizers are less effective if hands are visibly soiled. Therefore, visible contamination and dirt should be removed to the extent possible before using hand-sanitizers.

Hand-Washing Signs

At venues where human-animal contact occurs, signs regarding proper hand-washing practices are critical to reduce disease transmission.

- Signs that are reminders to wash hands should be posted at exits from animal areas.
- Signs should direct visitors and animal handlers to hand-washing stations.
- Signs with proper hand-washing instructions should be posted at hand-washing stations and restrooms to encourage proper practices.
- Hand-washing signs should be placed in food concession areas.

Appendix B: Two Possible Designs for Animal Contact Facilities
Separation of Animal and Non-animal Areas, Identification of Transition Areas



Appendix C

Guidelines for visiting and resident animals in schools.

Animals are effective and valuable teaching aids, but safeguards are required to reduce the risk for infection and injury. These abbreviated recommendations are based on guidelines developed by the Alabama Department of Public Health¹ and the Kansas Department of Health and Environment.² Recommendations are also available from the National Science Teachers Association³ and the National Association of Biology Teachers⁴.

General Guidelines for School Settings⁵

- Wash hands after contact with animals, animal products, or their environment.
- Supervise human-animal contact, particularly for children aged <5 years.
- Handle and house animals humanely.
- Display animals in enclosed cages or under appropriate restraint.
- Designate areas for animal contact.
- Do not allow animals to roam or fly free.
- Do not allow animals in areas where food or drink are consumed.
- Clean and disinfect all areas where animals have been present. This task should not be performed by children aged <5 years. Children aged >5 years should only perform this task while supervised by an adult, ideally when children aged <5 years are not present.
- Obtain a certificate of veterinary inspection for visiting animals.
- Administer rabies vaccine to mammals, as appropriate.
- Keep animals clean and free of intestinal parasites, fleas, ticks, mites, and lice.
- Consult with parents to determine special considerations needed for children who are immunocompromised, who have allergies, or who have asthma.

Animal-Specific Guidelines

- Fish – Use disposable gloves when cleaning aquariums, and do not dispose of aquarium water in sinks used for food preparation or for obtaining drinking water.
- Nonpsittacine birds – See General Guidelines.

- Psittacine birds (e.g., parrots, parakeets, and cockatiels) – Consult the psittacosis compendium,⁶ and seek veterinary advice. Ensure that staff cleans cages when children are not present. Use birds treated or testing negative for psittacosis (chlamydiosis).
- Domestic dogs, cats, rabbits, and rodents (e.g., mice, rats, hamsters, gerbils, guinea pigs, and chinchillas) – See General Guidelines.
- Baby chicks and ducks – To prevent *Salmonella* or *Campylobacter* infection, children aged <5 years should not have direct contact with baby chicks and ducks.
- Reptiles (including turtles, lizards, and nonvenomous snakes) and amphibians – To prevent *Salmonella* infection, children aged <5 years should not have direct contact with reptiles.
- Ferrets – To prevent children aged <5 years from being bitten, they should not have direct contact with ferrets.
- Farm animals – See General Guidelines. Certain animals (e.g., young ruminants and young poultry) excrete *E. coli* 0157:H7, *Salmonella*, *Campylobacter*, and *Cryptosporidium* intermittently and in substantial numbers; therefore, meticulous attention to personal hygiene is essential or these animals might not be appropriate in some settings (e.g., particularly for children aged <5 years).

Animals Not Recommended in School Settings

- Wild or exotic animals (e.g., lions, tigers, ocelots, and bears).
- Nonhuman primates (e.g., monkeys and apes).
- Mammals at higher risk for transmitting rabies (e.g., bats, raccoons, skunks, foxes, and coyotes).
- Wolf-dog hybrids.
- Aggressive or unpredictable animals, wild or domestic.
- Stray animals with unknown health and vaccination history.
- Venomous or toxin-producing spiders, insects, reptiles, and amphibians.

¹W.B. Johnston, DVM, Alabama Department of Public Health, personal communication, 2002.

²Hansen GR. Animals in Kansas schools: guidelines for visiting and resident pets. Topeka, KA: Kansas Department of Health and Environment, 2004. Available at <http://www.kdhe.state.ks.us/pdf/hef/ab1007.pdf>

³National Science Teachers Association. Standards for Science Teacher Preparation. Arlington, VA: National Science Teachers Association; 2003. Available at <http://www.nsta.org/main/pdfs/NSTASTandards2003.pdf>.

⁴National Association of Biology Teachers. The use of animals in biology education. Reston, VA: National Association of Biology Teachers; 1995. Available at http://www.nabt.org/sub/position_statements/animals.asp

⁵Guide, hearing, or other service animals and law enforcement animals can be used when they are under the control of a person familiar with the specific animal and in accordance with recommendations from the sponsoring organizations.

⁶Smith KA, Bradley KK, Stobierski MG, Tengelsen LA. Compendium of measures to control *Chlamydia psittaci* (formerly *Chlamydia psittaci*) infection among humans (psittacosis) and pet birds, 2005. *J Am Vet Med Assoc* 2005;226:532-9.

Appendix D

Disinfectants and their properties.

All surfaces should be cleaned thoroughly before disinfection. For basic disinfection, a 1:100 dilution of household bleach (i.e., 2.5 tablespoons/gallon) or a 1:1,000 dilution of quaternary ammonium compounds (e.g., Roccal-D® or Zephiran®) may be used. This appendix includes instructions for disinfection when a particular organism has been identified. All compounds require a contact time of >10 minutes. Local or state environmental health officers might have recommendations for

appropriate disinfectant selection and precautions for environmental effect. Additional information is available from the Purdue University National Biosecurity Resource Center for Animal Health Emergencies.¹

¹National Biosecurity Resource Center for Animal Emergencies. West Lafayette, IN: Purdue University; 2004. Available at <http://www.biosecuritycenter.org/dismixchrt.htm>

TABLE. Chemical compounds used for disinfection, effectiveness of chemical disinfectants and selected products against certain organisms, and selected properties of chemical disinfectants that should be considered when used for cleaning and disinfection.

Chemical compounds	Chlorine* 0.01%-5%	Iodine iodophor 0.5%-5%	Chlorhexidine 0.05%-0.5%	Alcohol ² 70%	Oxidizing agents .2%-3%	Phenol 0.2%-3%	Quaternary ammonium 0.1%-2%
Selected products	Clorox®	Tincture/ Provodine	Nolvasan®	Rubbing alcohol	Virkon-S®	pHisoHex®	Roccal-D®
Effectiveness of chemical disinfectants against certain organisms³							
Bactericidal	Good	Good	Good	Good	Good	Good	Good
Bacterial spores	Good ⁴	Poor	Poor	Poor ⁴	Fair to good	Poor	Poor
Virucidal	Good	Good	Poor	Fair	Good	Poor ⁵	Poor
Envelope viruses	Yes	Yes	Limited	Yes	Yes	Limited	Limited
Nonenvelope viruses	Yes	Limited	No	No	Yes	No	No
Fungicidal	Good	Fair	Fair to good	Good	Fair	Fair	Fair
Protozoal parasites	Fair	Poor	Poor	Poor	Poor	Poor	Fair
							(ammonia)
Properties of chemical disinfectants⁶							
Effectiveness							
in organic matter	Poor	Poor	Fair	Poor	Poor	Good	Poor
Inactivated by soap	No	Yes	No	No	No	No	Yes
Effective in hard water	Yes	No	Yes	Yes	Yes	Yes	No
Residual activity	Poor	Poor	Good	Fair	Poor	Poor	Fair

Source: Adapted from the Nebraska Cooperative Extension and the U.S. Department of Agriculture, 2003

¹Bleach should be mixed fresh daily and replaced whenever contaminated with organic matter (1:32 dilution of 5.75% solution provides >1,500 ppm chlorine).

²Rubbing alcohol is flammable.

³Effectiveness as a bactericidal, virucidal, or fungicidal agent and effectiveness in eliminating bacterial spores and protozoal parasites; good = effective; fair = moderate effective; and poor = inferior effect. Effectiveness in eliminating envelope and nonenvelope viruses: yes = effective; limited = moderate effect; and no = not effective.

⁴Alcohol synergistically potentiates the sporicidal effect of hypochlorites (chlorine). Mix 5.75% solution of hypochlorite 1:1 with 50% ethyl alcohol/water. Mix fresh at the time of use and provide contact time of >30 minutes.

⁵The effectiveness of 2-phenylphenol (ortho-phenylphenol) is fair.

⁶Effectiveness in organic matter: good = effective; fair = moderate effect; and poor = inferior effect. Inactivated by soap and effective in hard water: yes = chemical compound has this property; no = chemical compound does not have this property. Residual activity: good = chemical compound has residual activity; fair = moderate residual activity; and poor = inferior residual activity.