



# NATIONAL ASSOCIATION of STATE PUBLIC HEALTH VETERINARIANS, INC.

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**DATE:** April 14, 2006

**TO:** State Public Health Veterinarians  
State Epidemiologists  
State Veterinarians  
Others Concerned with Disease Associated with Animals in Public Settings

**FROM:** Millicent Eidson, MA, DVM, DACVPM (Epidemiology)  
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**SUBJECT:** *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2006*

On behalf of the National Association of State Public Health Veterinarians (NASPHV), we are pleased to announce the availability of the *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2006*. There are many positive benefits of human-animal contact; however, infectious disease outbreaks related to such contacts have been increasingly reported. This Compendium provides standardized recommendations for use by public health officials, veterinarians, animal venue operators, animal exhibitors, and others concerned with disease-control and with minimizing risks associated with animals in public settings.

This Compendium updates the 2005 Compendium that was released in the CDC Morbidity and Mortality Report (MMWR). Due to cost considerations, the 2006 Compendium will not be published in the MMWR. The 2006 Compendium provides the following updates:

- Eight new references have been added from recent publications and disease outbreaks
- Descriptions of recent outbreaks and lessons learned are provided, including the 2005 North Carolina and Florida fair-associated *E. coli* O157:H7 outbreaks.
- The Recommendations section has been re-organized into bullet format, to provide more clear-cut advice on prevention and control.
- A new appendix has been added (Appendix B), providing a simple one-page handout, “Animal in Public Settings—Information for Visitors”. This handout may be helpful for local use, or development of other local information for visitors to animal venues.

We recommend that you distribute this cover memorandum and the Compendium widely to persons responsible for oversight or regulation of animal contact venues, persons who operate such venues, and settings where animal contact may occur. You also may wish to distribute the Appendices as stand-alone handouts, including Appendix A: Hand-Washing Recommendations; Appendix C: Designs for Animal Contact Facilities; and Appendix D: Guidelines for Schools.

If you update any web links to this document, please delete links to prior versions of the Compendium. This Compendium will be available on the web at the NASPHV website: [www.nasphv.org](http://www.nasphv.org), in the Publications section, along with the 2006 Rabies and Chlamydiosis compendia.

This Compendium will be updated again in 2007. Any comments or suggestions for the 2007 Compendium should be sent to Dr. Bender at Veterinary Public Health, University of Minnesota, 1354 Eckles Ave., 136F ABLMS Bldg., St. Paul, Minnesota 55108.

# **Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2006**

**National Association of State Public Health Veterinarians, Inc. (NASPHV)**

## **SUMMARY**

Many venues encourage or permit the public to come in contact with animals, resulting in millions of human-animal contacts each year. These settings include county or state fairs, petting zoos, animal swap meets, pet stores, zoologic institutions, circuses, carnivals, farm tours, livestock-birthing exhibits, educational exhibits at schools, and wildlife photo opportunities. Although multiple benefits of human-animal contact exist, infectious diseases, rabies exposures, injuries, and other human health problems associated with these settings are of concern. Infectious disease outbreaks reported during the previous decade have been caused by *Escherichia coli* O157:H7, *Salmonella*, *Coxiella burnetti*, *Mycobacterium tuberculosis*, ringworm, and other pathogens. Such incidents have substantial medical, public health, legal, and economic effects.

This report provides standardized recommendations for public health officials, veterinarians, animal venue operators, animal exhibitors, visitors to animal venues and exhibits, physicians, and others concerned with disease-control and with minimizing risks associated with animals in public settings. The recommendation to wash hands is the single most important prevention step for reducing the risk for disease transmission. Other critical recommendations are that venues include transition areas between animal areas and nonanimal areas (where food is sold) and that animals are properly cared for and managed.

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Opportunities for animal contact with the public occur in various settings. Recommendations provided in this report should be tailored to specific settings, and the report should be incorporated into guidelines and regulations developed at the state or local level. More detailed recommendations are provided in Appendix A, Hand-Washing Recommendations to Reduce Disease Transmission from Animals in Public Settings; Appendix B, Animals in Public Settings—Information for Visitors; Appendix C, Two Possible Designs for Animal Contact Facilities; Appendix D, Guidelines for Visiting and Resident Animals in Schools; and Appendix E, Disinfectants and Properties.

### **Recommendations for Local, State, and Federal Agencies**

Communication and cooperation between human and animal health agencies should be enhanced, and include cooperative extension offices. Additional research should be conducted at all levels, including academia, into the risk factors and effective prevention and control methods for these health issues.

To improve use of these recommendations, agencies should:

- Disseminate this report to venue operators. Most states do not have a complete list of animal contact venues (1). States should strive to develop a complete list to facilitate dissemination of recommendations.
- Develop and disseminate educational and training materials to venue operators and other interested persons. Material formats could include PowerPoint slide presentations, videos, and written guidelines (98, 99, 106).
- Encourage or require oversight to ensure compliance with recommendations at animal contact venues.

To evaluate and improve these recommendations, surveillance of health issues associated with animal contact should be enhanced. Agencies should:

- Conduct thorough epidemiological investigations of outbreaks.
- Include questions about exposure to animals and their environment on disease report forms and outbreak investigation questionnaires.
- Follow appropriate protocols for sampling of humans, animals, and the environment, and for testing and subtyping of isolates.
- Report outbreaks to state health departments and CDC.

### **Recommendations for Education**

Education is essential to reduce risks associated with animal contact in public settings. Experience from outbreaks suggests that visitors knowledgeable about potential risks are less likely to become ill (18).

**Venue operators** should:

- Be familiar with and implement the risk-reduction recommendations contained in this report.
- Consult with state and local agencies and county extension agents on implementation of the recommendations.
- Develop or obtain training and education materials, and assure that staff are appropriately trained.
- Assure that visitors and exhibitors receive educational messages, for example, with handouts such as that in Appendix B.
- Provide information to persons arranging school field trips or classroom exhibits.

**Venue staff should:**

- Be trained to reduce the risk for disease and injury associated with animals, and be able to explain risk reduction recommendations to visitors.
- Encourage compliance by the public with risk-reduction recommendations, especially compliance with hand-washing procedures (Appendix A) as the visitors exit animal areas.
- Comply with local and state requirements for reporting animal bites, scratches, or other injuries.
- Assure that visitors receive educational messages.

**To educate visitors, venue operators and staff should:**

- Provide information about disease risks and appropriate measures to reduce risk. Inform visitors which groups of people are at high risk of serious infection and the precautions visitors should take (see Additional Recommendations and Appendix B).
- Provide information before the event, and at the animal contact area entrances and exits.
- Provide information in a simple and easy to understand format that is age- and language-appropriate.
- Provide information in multiple formats (e.g., signs, stickers, handouts [Appendix B], and verbal information).

**Recommendations for Managing Public and Animal Contact**

The recommendations in this compendium were developed for settings in which direct animal contact is encouraged (e.g., petting zoos) as well as settings in which animal contact is possible (e.g., county fairs). The public's contact with animals should occur in settings where measures are in place to reduce the potential for injuries or disease transmission and to increase the probability that incidents or problems identified with animal contact settings will be reported, documented, and handled appropriately. The design of facilities and animal pens (Appendix C) should minimize the risk for these contacts, particularly with manure, and facilitate hand-washing (Appendix A). Double barriers can be used to prevent contact with animals or contaminated surfaces. Temporary exhibits should be carefully planned, designed, and managed to avoid problems identified from previous outbreaks. Common problems include inadequate barriers, floor surfaces that are difficult to keep clean, and insufficient plumbing, and inadequate hand-washing facilities (12, 18, 33, 34).

The following recommendations address nonanimal areas (areas in which animals are not permitted, with the exception of service animals), transition areas (both for entrances and exits), and animal areas (where animal contact is possible or encouraged) (Appendix C). Specific guidelines might be necessary for certain settings (e.g., schools [Appendix D]). Recommendations for cleaning procedures should be tailored to the specific situation (Appendix E).

**Nonanimal Areas**

Nonanimal areas are areas in which animals are not permitted.

- Do not permit animals, except service animals, in nonanimal areas.
- Prepare, serve, and consume food and beverages only in nonanimal areas.
- Provide hand-washing facilities and display hand-washing signs where food or

beverages are served (Appendix A).

### **Transition Areas Between Nonanimal and Animal Areas**

Establishing transition areas for visitors to pass through when entering and exiting animal areas is critical. One way visitor flow is preferred with separate entrance and exit points. The transition areas should be designated as clearly as possible, even if they need to be conceptual rather than physical (Appendix C).

**Entrance transition areas** should be designed to facilitate education.

- Post signs informing visitors that they are entering an animal area. These signs should also instruct visitors not to eat, drink, smoke, place their hands in their mouth, or use bottles or pacifiers while in the animal area.
- Exclude strollers, food, and beverages. Establish storage or holding areas for these items.
- Control visitor traffic at the entrance transition area to avoid overcrowding.

**Exit transition areas** should be designed to facilitate hand-washing.

- Post signs instructing visitors to wash their hands.
- Provide accessible hand-washing stations for all visitors, including children and persons with disabilities (Appendix C).
- Position venue staff near exits to encourage compliance with hand-washing.

### **Animal Areas**

In buildings where animals are housed, adequate ventilation is essential for both animals (107) and humans. Additional recommendations for animal areas include:

- Exclude food and beverages. Animal feed and water should not be accessible to the public.
- Exclude toys, pacifiers, spill-proof cups (“sippy cups”), baby bottles, and smoking.
- Remove manure and soiled animal bedding promptly.
- Store animal waste and specific tools for waste removal (e.g., shovels and pitchforks) in designated areas restricted from public access.
- Avoid transporting manure and soiled bedding through nonanimal areas or transition areas. If this is unavoidable, take precautions to avoid spillage and aerosolization.
- Where feasible, disinfect animal areas (e.g., flooring, railings) at least once daily.
- Supervise children closely to discourage hand to mouth activities (e.g., thumb-sucking), contact with manure, and contact with soiled bedding. If hands become soiled, supervise hand-washing.
- Assign trained staff to encourage appropriate human-animal interactions, to identify and remove potential risks for patrons (e.g., by promptly cleaning up wastes), and to process reports of injuries and exposures.
- Use barriers between public and animals in petting zoo areas to reduce excessive contact and contamination of clothing.
- Allow feeding only when contact with animals is controlled, for example with barriers.
- Do not provide animal feed in containers that can be eaten by persons (e.g., ice cream cones), to reduce animal bites and prevent children eating food that has come into contact with animals.

- Use animals or animal products (e.g., animal pelts, animal waste, and owl pellets) (108) for educational purposes only in designated animal areas (Appendix C). Animals and animal products should not be brought into school cafeterias and other food-consumption areas.
- Do not use animal areas for public (nonanimal) activities. Zoonotic pathogens can contaminate the environment for substantial periods of time (36). If animal areas must be used for public events (e.g., weddings and dances), these areas should be cleaned and disinfected, particularly if food and beverages are served. Materials with smooth, impervious surfaces (e.g., steel, plastic, and sealed concrete) are easier to clean than other materials (e.g., wood or dirt floors). Removing organic material (bedding, feed, and manure) before using disinfectants is important. A list of disinfectants is included in this report (Appendix E).
- For animals in school classrooms, specific areas must be designated for animal contact. Designated animal areas must be thoroughly cleaned after use (Appendix E).

### **Animal Care and Management**

The risk for disease or injuries from animal contacts can be reduced by carefully managing the specific animals used for such contacts. These recommendations should be considered for management of animals in contact with the public.

- **Animal care:** Monitor animals daily for signs of illness and ensure that animals receive appropriate veterinary care. Ill animals, animals known to be infected with a pathogen, and animals from herds with a recent history of abortion or diarrhea should not be exhibited. Animals should be housed to minimize stress and overcrowding, which can increase shedding of microorganisms.
- **Veterinary care:** Retain and use the services of a licensed veterinarian. Vaccination, preventive care, and parasite control appropriate for the species should be provided. Health certificates from a licensed veterinarian should be up-to-date according to local or state requirements for animals in public settings. A herd or flock inspection is a critical component of the health certificate process. Screening for diseases is not recommended except for tuberculosis in elephants (89-91) and primates, and for Q fever in ruminants in birthing exhibits (109-110).
- **Rabies:** House exhibit-animals to reduce potential exposures from wild animals. Mammals should also be up-to-date on their rabies vaccinations (111). These steps are particularly critical in areas where rabies is endemic and in venues where animal contact is encouraged (e.g., petting zoos). Because of the extended incubation period for rabies, unvaccinated mammals should be vaccinated at least 3 months before they have contact with the public. If no licensed rabies vaccine exists for a particular species used in a setting where public contact occurs (e.g., goats, llamas, and camels), consultation with a veterinarian is recommended regarding the use of off-label rabies vaccine. Off-label vaccines cannot provide the same level of assurance as vaccines labeled for use in particular species, but the off-label use of vaccine may provide protection for some animals and thus decrease the probability of rabies transmission. Vaccinating slaughter-class animals before displaying them at fairs might not be feasible because of the vaccine withdrawal period that occurs as a result of antibiotics used as

- preservatives in certain vaccines. Mammals that are too young to be vaccinated should be used only if additional restrictive measures are available to reduce and manage risks. These measures can include using only animals that were born to vaccinated mothers and housed to avoid rabies exposure. Records or logs of visitors should be maintained to facilitate locating persons or groups in situations where tracing contacts might be required (e.g., potential rabies exposures).
- **Dangerous animals:** Prohibit certain domestic, exotic, or wild animals in exhibit settings where a possibility of animal contact exists, because of their strength, unpredictability, venom, or the pathogens that they might carry. Species of primary concern include nonhuman primates (e.g., monkeys and apes) and certain carnivores (e.g., lions, tigers, ocelots, wolves/wolf-hybrids, and bears). In addition, rabies-reservoir species (e.g., bats, raccoons, skunks, foxes, and coyotes) should not be used.
  - **Animal births:** Ensure that the public has no contact with animal birthing by-products. In live-birth exhibits, the environment should be thoroughly cleaned after each birth, and all waste products should be properly discarded. Holding such events outside is preferable, because if they are held inside, there is risk of organisms being spread through ventilation systems.

#### **Additional Recommendations**

- **Populations at high risk:** Children aged < 5 years are at particularly high risk of serious infections. Other groups at increased risk include persons with waning immunity (e.g., older adults) and persons who are cognitively impaired, pregnant, or immunocompromised (e.g., persons with human immunodeficiency virus/acquired immunodeficiency syndrome, without a functioning spleen, or on immunosuppressive therapy). Persons at high risk should take heightened precautions at any animal exhibit. In addition to thorough and frequent hand-washing, heightened precautions might include avoiding contact with animals and their environment (e.g., pens, bedding, and manure). Animals of particular concern for transmitting enteric diseases include young ruminants, young poultry, reptiles, amphibians, and ill animals. For young children, risk for exposure might be reduced if they are closely supervised by adults, carried by adults in animal areas, or have animal contact only over a barrier. These measures discourage animals from jumping on or nuzzling children and minimize contact with feces and soiled bedding.
- **Consumption of unpasteurized products:** Prohibit the consumption of unpasteurized dairy products (e.g., milk, cheese, and yogurt) as well as unpasteurized apple cider or juices.
- **Drinking water:** Local public health authorities should inspect drinking water systems before use. Only potable water should be used for human consumption. Back-flow prevention devices should be installed between outlets in livestock areas and water lines supplying other uses on the grounds. If the water supply is from a well, adequate distance should be maintained from possible sources of contamination (e.g., animal-holding areas and manure piles). Maps of the water distribution system should be available for use in identifying potential or actual problems. The use of outdoor hoses should be minimized, and hoses should not be

left on the ground. Hoses that are accessible to the public should be labeled “water not for human consumption.” Operators and managers of these settings in which treated municipal water is not available should consider alternative methods for disinfection of their water supply (or should consider methods to disinfect their water supply.)

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## **Appendix B: Animals in Public Settings--Information for Visitors**

Interacting with animals can be a wonderful experience, both for children and adults. However, healthy animals carry bacteria and other organisms that can sometimes make people sick. People can catch these organisms where animals are present, especially when contact with the animals is encouraged. It is therefore important that all visitors take precautions to avoid illness. This handout summarizes precautions that need to be taken.

### Behaviors to Avoid

If a person contacts an animal, the person's hands become dirty and can pick up bacteria or other organisms. If these dirty hands come in contact with the mouth, the person might ingest the organisms and become sick.

In animal areas take the following precautions:

- Don't eat or drink; eating and drinking should occur in designated non-animal areas. Smoking should not occur in animal areas.
- If possible, avoid feeding animals. If feeding animals, use only animal foods.
- Supervise young children closely to avoid hand to mouth behaviors (such as thumb sucking). Toys, pacifiers, spill-proof cups, and baby bottles should not be used.

### Hand-washing

Hand-washing with soap and water will clean the hands and prevent illness. It is the MOST important thing that can be done to prevent illness! Hands should be washed after leaving animal areas (regardless if animal contact occurred) and before eating in the non-animal areas. Supervise and assist children with hand-washing.

### Populations at High Risk

Some people are at a higher risk of getting sick from bacteria carried by animals in these settings. These people include:

- Young children (especially less than five years old)
- Older adults
- Pregnant women
- Persons who are mentally impaired
- Persons with compromised immune systems

Persons at a higher risk of getting sick should take heightened precautions that include:

- Thorough and frequent hand-washing.
- Consider avoiding contact with animals and their environment (pens, bedding, manure).
- Avoid animals that are at increased risk of spreading disease, such as young ruminants, young poultry, reptiles, amphibians, and ill animals.



## Appendix D: 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 Health\* and the Kansas Department of Health and Environment.† Recommendations are also available from the National Science Teachers Association§ and the National Association of Biology Teachers.¶

### General Guidelines for School Settings\*\*

- 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, fly free, or have contact with wild animals.
- 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 appropriate veterinary care, a certificate of veterinary inspection, and/or proof of rabies vaccination for visiting animals according to local or state requirements.
- 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.
- Nonsittacine birds — See General Guidelines.
- Psittacine birds (e.g., parrots, parakeets, and cockatiels)— Consult the psittacosis compendium,†† and seek veterinary advice. Ensure that staff clean 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 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 contact with reptiles and amphibians.
- Ferrets — To prevent children aged <5 years from being bitten, they should not have direct contact with ferrets.



## Appendix E: Disinfectants and Properties

All surfaces should be cleaned thoroughly before disinfection. For basic disinfection, a 1:100 dilution of household bleach (i.e., 2.5 tablespoons per gallon) or a 1:1,000 dilution of quaternary ammonium compounds (e.g., Roccal or Zephiran) may be used. For disinfection when a particular organism has been identified, use the table below. All compounds require a contact time of  $\geq 10$  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. Available at [www.biosecuritycenter.org/dismixchrt.htm](http://www.biosecuritycenter.org/dismixchrt.htm).

### Chemical compounds used for disinfection, effectiveness of chemical disinfectants 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† 70%	Oxidizing agents 0.2–3%	Phenol 0.2–3%	Quaternary ammonium 0.1–2%
<b>Selected products</b>	Clorox®	Tincture/ Provodine	Nolvasan®	Rubbing alcohol	Virkon-S®	pHisoHex®	Roccal-D®
<b>Effectiveness of chemical disinfectants against certain organisms<sup>§</sup></b>							
<b>Bactericidal</b>	Good	Good	Good	Good	Good	Good	Good
<b>Bacterial spores</b>	Good <sup>¶</sup>	Poor	Poor	Poor <sup>¶</sup>	Fair to good	Poor	Poor
<b>Virucidal</b>	Good	Good	Poor	Fair	Good	Poor**	Poor
<b>Envelope viruses</b>	Yes	Yes	Limited	Yes	Yes	Limited	Limited
<b>Non-envelope viruses</b>	Yes	Limited	No	No	Yes	No	No
<b>Fungicidal</b>	Good	Fair	Fair to good	Good	Fair	Fair	Fair
<b>Protozoal parasites</b>	Fair (concentrated)	Poor	Poor	Poor	Poor	Poor	Fair (ammonia)
<b>Properties of chemical disinfectants<sup>††</sup></b>							
<b>Effectiveness in organic matter</b>	Poor	Poor	Fair	Poor	Poor	Good	Poor
<b>Inactivated by soap</b>	No	Yes	No	No	No	No	Yes
<b>Effective in hard water</b>	Yes	No	Yes	Yes	Yes	Yes	No
<b>Residual activity</b>	Poor	Poor	Good	Fair	Poor	Poor	Fair

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

