

# PREVENTING ZOO NOTIC DISEASES ASSOCIATED WITH NON-TRADITIONAL PETS

As people more frequently acquire non-traditional pets (NTP), guidance on preventing zoonotic diseases (which can spread between animals and people) is needed. Three major groups of animals have repeatedly been linked to outbreaks of zoonotic diseases in people in the United States: **rodents**, **backyard poultry**, and **reptiles**. This document presents information on these and other NTP species that can spread zoonotic diseases to people. Other animals covered include those that are less frequently linked to illness or outbreaks but still pose a risk of spreading zoonotic diseases, including non-rodent small mammals (for example, hedgehogs and ferrets), amphibians (for example, African dwarf frogs), and other aquatic species (for example, fish and coral).

Use the links below to find information on types of NTPs, as well as recommendations for different audiences on ways to prevent the spread of zoonotic diseases from NTPs.

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This document is an abbreviated version of the publication [A Review of Zoonotic Disease Threats to Pet Owners: A Compendium of Measures to Prevent Zoonotic Diseases Associated with Non-Traditional Pets Such as Rodents and Other Small Mammals, Reptiles, Amphibians, Backyard Poultry, and Other Selected Animals](#).

## TYPES OF NON-TRADITIONAL PETS

Pet ownership in the United States is increasing, with about 57-70% of households owning one or more pets. Most pets in the United States are dogs and cats; however, ownership of animals other than dogs and cats, or non-traditional pets (NTPs), is increasing.

Non-traditional pets (NTPs) are animals that are generally thought of as **wildlife**, are **imported** or **rare** in the United States, or are **not typically kept as pets** (such as livestock). NTPs covered here include:

- [Rodents and other small mammals](#)
- [Backyard poultry](#)
- [Reptiles](#)
- [Aquatic species](#)

## NTPS AND ZONOTIC DISEASES

Contact with NTPs increases a person's risk of exposure to zoonotic pathogens. NTPs can look healthy while carrying zoonotic pathogens, putting pet owners and others at risk, including people who work with pets. Many zoonotic disease exposures happen at home through direct or indirect contact with pets, agricultural animals, or animals used to feed other animals (feeder animals).

**Direct** spread of zoonotic diseases can happen through:

- Accidentally ingesting feces from contaminated fur, feathers, scales, or spines when touching animals;
- Feeding animals by hand or being licked by animals;
- Touching an animal's body fluids; and
- Animal bites and scratches.

**Indirect** spread of zoonotic diseases can happen through:

- Contact with a surface or environment contaminated by an animal's urine, feces, blood, saliva, nasal secretions, or other body fluids;
- Contamination of food preparation areas and items; and
- Infectious droplets or aerosols.

Despite the risk for zoonotic diseases linked to certain NTPs, the National Association of State Public Health Veterinarians (NASPHV) and the Centers for Disease Control and Prevention (CDC) recognize the many benefits of pets and support safe, healthy, and responsible pet ownership. Responsible pet ownership can prevent injury to people from pets, reduce animal stress, and improve animal health.

## SETTINGS WHERE PEOPLE INTERACT WITH NTPS

People might have contact with NTPs in a variety of settings, including:

- **At home** - contact with pets, farm animals, breeding animals, or feeder animals
- **In group settings** - in classrooms, childcare facilities, and long-term care facilities
- **In retail settings** – at retail pet stores; agricultural and feed stores; online sales; hobby or trade conventions; live animal markets and auctions; flea markets; street vendors; souvenir shops; roadside stands; or toy stores or other retail stores

- **At special events** - at seasonal events (like Easter egg hunts); swap meets; hobbyist meetups; rat races; barn-hunting; or birthday parties
- **At exhibitions** – at petting zoos; agritourism venues; animal exhibition shows (example, those put on by 4H or National FFA Organization); animal shelter/rescue fundraising events; or performing animal shows
- **In work settings** - at veterinary clinics; commercial and in-home breeding facilities; distribution centers; pet, agricultural, or other stores; diagnostic laboratories; delivery routes; animal transport; or animal shelters and rescue organizations

## PEOPLE AT HIGHER RISK OF ILLNESS

Anyone can get sick from a zoonotic disease, including healthy people. However, some people are more likely to have serious illness or even die from these infections. People more likely to get sick after contact with NTPs include:

- Children younger than 5 years old
- Adults 65 and older
- People with weakened immune systems due to illness (for example: HIV/AIDS, cancer, diabetes, liver disease, kidney disease, and multiple sclerosis) or certain medications (for example: steroids, cancer chemotherapy, and drugs used to treat autoimmune diseases like rheumatoid arthritis or psoriasis)
- Pregnant people

# Types of Non-Traditional Pets: Rodents & Small Mammals

## RODENTS & SMALL MAMMALS

In 2017, 5 million small mammals were kept as pets in the United States. Small mammal pets include:

- Rodents (rats, mice, hamsters, gerbils, guinea pigs, prairie dogs)
- Hedgehogs
- Sugar gliders
- Rabbits
- Ferrets

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## RISKS OF OWNING A SMALL MAMMAL

In addition to the common risk factors among all NTPs, additional risk factors specific to rodents and other small mammals include bites or scratches from the animals themselves and exposure to contaminated surfaces. Exposure to contaminated urine, feces, blood, saliva, nasal secretions, or other body fluids, or material within animal habitats can spread bacterial or viral infections.

Bites from small mammals are common, and although they generally don't cause extensive injury, they can spread many bacterial or viral pathogens.

Other important risk factors include cleaning habitats or touching the bedding of an infected animal.

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## DISEASES RODENTS AND SMALL MAMMALS CAN CARRY

*Salmonella* infection is the most common illness linked to small mammals. Lymphocytic choriomeningitis virus infection, monkeypox, Seoul virus infection, and rat-bite fever, tularemia, and *Streptococcus* infections are rarer. The bacterial species most found in small mammal bite wounds include *Pasteurella multocida*, *Staphylococcus aureus*, *Pseudomonas* species, *Streptococcus viridans*, and other anaerobes.

Rabies is uncommon in pet rodents and rabbits. Ferrets, which are distinct from other small mammal NTPs because they are predators, are also capable of spreading rabies.

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### SALMONELLA

*Salmonella* bacteria can spread in many ways, including through contact with the feces of infected small mammals or contaminated surfaces. Rats, mice, guinea pigs, and hedgehogs have caused multiple outbreaks and cases of *Salmonella* in people. Rodents caused more than half of the illnesses identified in these cases.

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### LYMPHOCYTIC CHORIOMENINGITIS VIRUS (LCMV)

Lymphocytic choriomeningitis virus (LCMV) is a rodent-borne arenavirus and a rare cause of human illness. The primary carrier of LCMV is the house mouse (*Mus musculus*). Most LCMV infections in people happen after exposure to wild rodents; however, infections have also been associated with exposure to pet or commercial rodents, particularly hamsters and feeder mice, that have been exposed to wild rodents. LCMV has also been found in other pet rodents, such as guinea pigs.

People can get LCMV through rodent bites, direct contact with rodents and their urine, feces, saliva, bedding or nesting materials, or inhalation of aerosolized infectious materials in the environment.

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### RAT-BITE FEVER

Rat-bite fever is a rare bacterial disease spread by bites or scratches from rodents, typically rats, although mice, gerbils, guinea pigs, and squirrels can also carry the bacteria (*S. moniliformis*). Rat-bite fever can also spread

# Types of Non-Traditional Pets: Rodents & Small Mammals

through exposure to rodent urine or saliva, or surfaces contaminated with these fluids, including water or food. Ingesting the bacteria causes the disease Haverhill fever. Rats with the bacteria may look healthy, although some may develop arthritis, skin infections, pneumonia, and swollen lymph nodes. Children and young adults are more likely to get rat-bite fever, and infection is becoming more common among pet rodent owners.

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## HANTAVIRUSES (SEOUL VIRUS AND OTHERS)

Seoul virus is an Old World hantavirus found worldwide. It is carried and spread by rodents, specifically the brown or Norway rat (*Rattus norvegicus*), including pet and wild rats. People can get infected with hantaviruses through contact with infected rodents or their urine, feces, saliva, or contaminated nesting materials. Infection in people can lead to hemorrhagic fever with renal syndrome, which can be fatal.

Other hantaviruses include Sin Nombre virus, a New World hantavirus and rare cause of hantavirus pulmonary syndrome, a severe pulmonary disease associated with exposure to wild rodents.

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## MONKEYPOX

Monkeypox is a rare viral disease usually found in central and western Africa. Monkeypox does not occur naturally in the United States, but cases have happened after international travel and importation of animals from places where the disease is more common. Monkeypox can infect rats, mice, rabbits, and prairie dogs, but may not cause signs of disease in infected animals.

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## LEPTOSPIROSIS

Leptospirosis is a bacterial disease that is widespread globally. The bacteria can spread through the urine of infected animals including rodents, cattle, pigs, horses, dogs, and other wild animals. Rodents may be infected with the bacteria and show no signs of disease. Infected animals can excrete the bacteria into the environment continuously or periodically over a few months up to several years. Infections in people have been linked to pet mice and rats.

People can get leptospirosis after touching the urine or other body fluids of infected animals or contact with water, soil, or food contaminated with the urine of infected animals. People can also get infected when contaminated water gets into cuts in the skin or mucous membranes in the nose, eyes, or mouth.

To help prevent leptospirosis infection in pets, it's important to keep wild rodents (rats, mice, or other animal pests) from mingling with pet rodents, and to keep rodent pest problems under control.

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## RINGWORM

Ringworm, or dermatophytosis, is a fungal skin infection that can spread from small mammals to people through direct contact or contact with contaminated items such as animal bedding. Ringworm is commonly associated with rabbits and guinea pigs. Infections in small mammals are normally mild (such as hair loss) or don't cause symptoms. Hair loss and other skin lesions on animals should be properly diagnosed and treated by a veterinarian, and all pets in an affected household should be examined for ringworm. In addition, areas where the animal has spent time should be disinfected.

## REPTILES

Reptile ownership has doubled over the last 20 years, with a 37% increase in the number of reptiles kept as pets in the United States from 2006 to 2016. Reptiles include:

- Turtles
- Snakes
- Lizards

Escape or unintentional release of reptiles (such as tegu lizards, pythons, Cayman crocodiles, monitor lizards, chameleons, geckos, and iguanas) and other pets not native to an area has negative impacts on native wildlife, people, and the environment. Imported reptiles can also introduce tick species not naturally found in the United States.

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## RISKS OF OWNING A REPTILE

In addition to common risk factors associated with all NTPs, there are additional risks specific to reptiles. People may incorrectly think that some reptiles, like turtles, are safe for children. However, children may handle small turtles more easily and kiss, snuggle, and put the animals in their mouths. Small turtles (with a shell length under 4in/10cm) are especially risky for children and are responsible for outbreaks of *Salmonella* each year. Water where reptiles are kept, such as aquariums, small bowls housing small turtles, swimming pools, sinks, or bathtubs can become heavily contaminated with pathogens.

Proper husbandry and veterinary care are important to keep pet reptiles healthy, as stress can increase shedding of zoonotic pathogens such as *Salmonella* bacteria, which healthy reptiles can carry in their intestinal tracts.

Additional risks include bites from reptiles that can result in trauma and infection, and some reptiles are venomous. Large reptiles such as mature boa constrictors or crocodylians can pose a risk for severe injuries or even death if not housed or handled properly.

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## DISEASES REPTILES CAN CARRY

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### SALMONELLA

The most common zoonotic disease pet reptiles spread is salmonellosis, or *Salmonella* infection. *Salmonella* bacteria are commonly spread between pet reptiles and people without direct contact. *Salmonella* can live in reptile gastrointestinal tracts, and infected reptiles usually do not have symptoms. Reptiles can shed *Salmonella* in their feces. Reptiles can get *Salmonella* in several ways, including transovarially (spread of the bacteria from the reptile to its offspring), through direct contact with other infected reptiles, or through contamination of their environment. Snakes and carnivorous reptiles may get *Salmonella* from food sources such as feeder animals, whether live or frozen.

People can get *Salmonella* through direct contact with reptiles and indirect contact with a contaminated environment. Cross-contamination can happen in the home, areas where animals roam, or areas where people care for or store animal supplies. Contact with contaminated terrarium or aquarium water can happen with aquatic reptiles. *Salmonella* exposure and cross-contamination through food, water, other animals, or the environment makes raising *Salmonella*-free turtles impossible.

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### OTHER ZONOTIC DISEASES

Less common diseases caused by reptiles include West Nile virus (WNV) infection, *Aeromonas* infections, *Mycobacterium* infection, vibriosis, infection with *Chlamydia* bacteria, melioidosis, and pentastomiasis. Reptiles can carry some arboviruses including chikungunya virus, WNV (crocodylians), and eastern equine encephalitis virus (snakes). Reptiles may shed WNV in their feces, and they may also be able to spread the virus to other animals this

way. Imported reptiles may harbor exotic ticks that can carry diseases that infect people. Four species of *Amblyomma* ticks were introduced into Florida via lizards and tortoises and found to be infected with *Ehrlichia ruminantium*, which causes 'Heartwater' disease, and *C. burnetti*, which causes Q fever. Imported reptiles can also carry antimicrobial-resistant bacteria, contributing to the global spread of multidrug-resistant bacteria.

## AQUATIC ANIMALS

Aquatic animals are animals that need to live in fresh, brackish, or saltwater for survival or to maintain good health, including:

- Fish
- Reptiles
- Amphibians (frogs, toads, salamanders, newts)
- Invertebrates (crabs, shrimp, snails, clams, aquatic worms, corals)

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## RISKS OF OWNING AN AQUATIC ANIMAL

Anyone can get sick from direct or indirect contact with aquatic animals or the water or habitat substrate in their terrarium or aquarium. Aquatic animals bathe in, excrete into, and ingest the water they live in, which can then circulate and even amplify pathogens found in the water. People are more likely to get a zoonotic disease from turtles, frogs, and other aquatic animals after direct and indirect contact with the animal or their tank, water, filtration equipment, or other tank contents. Most exposures happen while cleaning or maintaining aquariums.

Aquatic animals can also bite or cause puncture injuries. Some aquatic animals can produce venoms or toxins. Palytoxin is an example of an emerging invertebrate toxin linked to marine aquariums with certain species of invertebrates such as *Palythoa* soft corals, *Ostreopsis* dinoflagellates, and *Trichodesmium* cyanobacteria. Palytoxin is unique because exposure can happen through inhalation, eye or skin contact, or ingestion. Palytoxin exposures commonly happen while cleaning aquariums or intentionally removing zoanthid corals to control populations from overrunning an aquarium.

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## DISEASES AQUATIC ANIMALS CAN CARRY

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### SALMONELLA

Amphibians have been linked to a multistate outbreak and case reports of *Salmonella* infection in people in the United States. A 2008 multistate outbreak of infections with *Salmonella enterica* serotype Typhimurium was the first time *Salmonella* infection was linked to African dwarf frogs in the United States. This outbreak lasted at least 3 years and caused illnesses mostly among children.

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### MYCOBACTERIOSIS (FISH-HANDLERS DISEASE)

Fish-handlers disease, also called fish tank granuloma, is caused by infection with environmental *Mycobacterium* bacteria. Mycobacteriosis affects aquarium and cultured food fish and can spread to people. Several *Mycobacterium* species can cause mycobacteriosis. *Mycobacterium marinum* is one of the most important species found in salt and freshwater. People, especially fish owners, can be exposed through direct contact with animals or their environment, including contaminated water sources such as aquarium water. Cases of infection with *Mycobacterium marinum* in the United States are uncommon but are likely underreported. Infections have also been reported in reptiles housed in aquariums previously used for fish.

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### OTHER ZONOTIC DISEASES

People can get wound infections from bacteria associated with aquatic animals and their environments. These bacteria may be associated with freshwater (*Aeromonas* species, *Comamonas* species, *Edwardsiella ictaluri*, *E. tarda*, *Burkholderia pseudomallei*); higher salinity water like brackish or marine water (*Vibrio* species); or water sources varying in salinity like fresh and saltwater (*Mycobacterium* species, *Streptococcus iniae*, *Erysipelothrix*

*rhusiopathiae*). In 2019, a person got melioidosis (caused by *Burkholderia pseudomallei*) from a freshwater home aquarium.

Ingestion of bacteria (such as *Vibrio* species, *E. tarda*, *Lactococcus garvieae*, and *Plesiomonas shigelloides*) in untreated water from aquatic animal habitats can also cause illness.

## BACKYARD POULTRY

Owning backyard poultry is increasing in popularity, especially backyard chicken flocks in urban and suburban areas. People keep backyard flocks for many reasons, including as a food source (fresh eggs or meat), companionship, exhibition, hobby, and education. In 2016, 1.1% of all US households owned backyard poultry.

Backyard poultry most commonly includes:

- Domestic land fowl (chickens, turkeys)
- Domestic waterfowl (ducks, geese)
- Game birds (wild turkeys, wild geese, pheasants)

People also keep other poultry species such as guinea fowl or swans in backyards. For all backyard poultry, the different life stages (hatching egg, chick, chicken) can spread diseases to people.

Despite public health recommendations to not have poultry in places with children younger than 5 years old and adults 65 and older, poultry are sometimes found in daycare or nursing homes as resident pets. They may also be used in classroom projects (for example, incubating and hatching eggs to demonstrate the chicken's life cycle).

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## RISKS OF OWNING BACKYARD POULTRY

Some practices can increase the risk of disease by contaminating the indoor or home environment, including:

- Allowing backyard poultry to roam freely indoors
- Cleaning poultry supplies inside the home
- Wearing the same shoes or clothing while working with backyard poultry or their coop
- Improperly or not washing hands after handling birds or potentially contaminated supplies
- Keeping poultry inside the home
- Kissing or snuggling birds

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## DISEASES BACKYARD POULTRY CAN CARRY

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### *SALMONELLA*

Poultry commonly carry *Salmonella* in their intestinal tract. Poultry can look healthy while infected, but some *Salmonella* strains can cause illness in poultry. The bacteria are shed in their droppings and can contaminate any surface where the birds live and roam, as well as their feathers, feet, and body.

Poultry are a known source of *Salmonella* infection in people. Spread to people after contact with backyard poultry or their environment is a well-recognized public health problem. Baby poultry, particularly chicks and ducklings, have been linked to several extensive outbreaks. Poultry can be infected with *Salmonella* in many ways, including through contact with infected birds, spread from infected hens to their eggs, or from contaminated feed.

As the popularity of backyard flock ownership has increased, the number of reported human outbreaks of *Salmonella* from contact with backyard poultry has also dramatically increased. Commonly, outbreaks happen in homes where chicks are allowed to roam freely or are kept in bathrooms, or when there may be cross-contamination of kitchen or dining areas. Outbreaks have also happened with poultry visiting daycares, nursing homes, and other public settings.

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### *CAMPYLOBACTER*

# Types of Non-Traditional Pets: Backyard Poultry

Poultry often carry *Campylobacter* bacteria in their intestinal tract and can look healthy while infected. In the United States, most people get *Campylobacter* infection from eating raw or undercooked poultry or touching surfaces contaminated by raw or undercooked poultry. Other risk factors for getting *Campylobacter* infection from poultry include keeping backyard poultry, butchering poultry for meat, and contact with contaminated eggs. Infections from work exposures have happened in abattoir workers and people working in poultry processing facilities.

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## AVIAN INFLUENZA

Avian influenza refers to infection of birds with influenza type A viruses, which can live in many species of wild waterfowl and domestic water and land birds. Waterfowl, such as ducks, geese, shorebirds, and swans, do not always show signs of infection, but poultry flocks can experience a range of illness, from decreased egg production to extremely high death rates. Avian influenza viruses are classified as low pathogenic or highly pathogenic based on the ability of the virus to cause disease in chickens.

People can get avian influenza through direct contact with infected birds, indirect contact with contaminated surfaces, or through inhalation of virus in the air in droplets or dust. Spread from person to person is very rare and usually doesn't lead to an outbreak.

Because avian influenza viruses could gain the ability to spread easily between people, monitoring wild birds and domestic poultry for outbreaks and monitoring for human infections and person-to-person spread is extremely important. People who have contact with infected birds should take precautions to protect against infection and monitor for possible symptoms.

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## VIRULENT NEWCASTLE DISEASE

Newcastle disease is a viral disease of birds that can cause a range of illness in birds, from no symptoms to mild illness or death, depending on the viral strain. Newcastle disease viruses (avian paramyxovirus) rarely infect people. When people do get infected, they can have mild to severe conjunctivitis (red eyes) or mild influenza-like symptoms. Cases of Newcastle disease in people have only happened after exposure to particularly high amounts of virus.

Virulent Newcastle disease (vND) refers to the most severe form of the disease in poultry, which is only caused by certain viral strains. Although many birds can become infected, wild cormorants and domestic poultry are particularly susceptible.

[Large outbreaks of vND](#) sometimes happen in commercial poultry, and previous outbreaks in the western United States have resulted in large losses of birds. These outbreaks are primarily associated with backyard exhibition chickens raised or smuggled illegally for fighting. Hundreds of premises have been affected, including homes with backyard flocks in other states, due to movement of exposed and infected birds.

## FEEDER ANIMALS

Feeder animals, whether live or frozen, are animals that are fed to other animals, including:

- Rats
- Mice
- Rabbits
- Chicks

Feeder animals may be used to feed reptiles, birds of prey, aquatic animals, zoo animals, and other carnivores.

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## RISKS OF OWNING A FEEDER ANIMAL

Like all NTP species, feeder animals can carry zoonotic pathogens while looking healthy. Dead feeder animals are not cleaned before they are sold because reptiles will refuse to eat them. This increases the risk of contamination when pet owners handle, store, or thaw these animals.

NTP owners who use feeder animals may not be aware of the risks they pose and may not follow disease prevention principles at home such as appropriate handwashing and having a separate storage area away from human food storage.

Feeder animals are unique in that they are sold live or dead, fresh or frozen. People should only feed dead feeder animals (fresh or frozen) to pets to reduce the risk of injury to the pet and the person feeding the pet. To reduce the risk of bites from reptiles, people should be careful not to handle them after handling any feeder animals and to wash hands thoroughly.

Frozen feeder rodents can contaminate human food if they are stored together and can contaminate surfaces where they are thawed or anything they touch. People can get sick from touching contaminated surfaces even if they do not handle the animal. In outbreaks linked to feeder animals, common risk factors include lack of handwashing after handling feeder animals or feeding reptiles, and cross-contamination of surfaces and utensils used in feeding the animals with those used by people in the household.

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## DISEASES FEEDER ANIMALS CAN CARRY

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### *SALMONELLA*

Live and frozen feeder animals – mostly rodents – have been linked to multiple outbreaks of *Salmonella* in people in the United States. In addition to feeder rodents, feeder animals like chicks and other poultry pose a risk of *Salmonella* infection to those caring for NTPs. Freezing does not kill *Salmonella*, and the bacteria have been shown to survive freezing for over 19 months.

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### LYMPHOCYTIC CHORIOMENINGITIS VIRUS (LCMV)

Live feeder rodents have been linked to LCMV infections in people in the United States, mainly among employees at feeder rodent breeding facilities. The main way people get LCMV from feeder rodents is through contact with the urine, feces, saliva, or blood of the house mouse (*M. musculus*).

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### RAT-BITE FEVER

Rat-bite fever is a rare bacterial disease caused by *Streptobacillus moniliformis* that is primarily associated with exposure to rats. Other rodents that can carry the bacteria are mice, guinea pigs, gerbils, and squirrels. Rat-bite fever is not commonly associated with feeder animals, but there is a risk for rat-bite fever when working with live

feeder rodents. Rats usually look healthy, so people with symptoms consistent with rat-bite fever should see a doctor if they breed, distribute, sell, or use rats as feeder rodents.

## RECOMMENDATIONS

A [One Health approach](#) to public awareness and education is important because of the wide range of places where people interact with NTPs, as well as the large variation in the scale and movement of NTPs through supply chains. All One Health partners involved in the NTP lifecycle play an important role in educating animal owners about zoonotic disease risks and the many ways zoonotic diseases can spread from pets and other animals to people. Sharing consistent messages across all One Health partners, from industry to animal health and human health organizations, will ultimately help people:

- Understand the benefits and risks of animal interaction and pet ownership;
- Pick an animal that fits their health status and lifestyle; and
- Safely enjoy interacting with animals in different settings.

The recommendations in this section apply to anyone handling NTPs. The sample messaging below can be used when communicating to people who own or are thinking of getting an NTP.

## SAFE HANDLING

- Always wash your hands thoroughly with soap and running water after handling your pet or its food, habitat, or supplies.
- Avoid bites and scratches from non-traditional pets by learning how to approach and hold the animal safely. Many types of germs can spread from animal bites or scratches, even if the wound does not look serious. If you are bitten, scratched, or pecked by a non-traditional pet, immediately wash the wound with warm, soapy water and contact your healthcare provider. If the animal was sick at the time of the bite or shortly afterwards, then take it to a veterinarian.
- Do not kiss, snuggle, or hold non-traditional pets close to your face.
- Do not touch your face or mouth during or after feeding or handling non-traditional pets until you can wash your hands thoroughly.
- Do not eat, drink, use tobacco products, or put other materials in your mouth while handling non-traditional pets.
- Supervise children when interacting with non-traditional pets.
- Do not let children younger than 5 years old handle non-traditional pets or their food, supplies, or habitats.

## SPECIFIC ANIMAL CONSIDERATIONS FOR SAFE HANDLING

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### FEEDER ANIMALS

- Handle frozen feeder animals with a set of dedicated tongs to prevent bites and scratches from the pet you are feeding.
- Feed dead feeder animals (fresh or frozen) to pets to prevent injury to yourself and your pet from a live feeder animal.
- To prevent bites, don't handle reptiles right after handling feeder animals because the reptile may smell the animal on you and strike or bite.

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### AQUATIC ANIMALS

- Don't touch fish, other aquatic animals, or their water without gloves on. Wear gloves when handling fish, tank water, and any tank equipment (such as when cleaning the tank) and wash hands thoroughly with soap and water immediately after taking off the gloves.

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## SMALL MAMMALS

- If you are pregnant, do not handle rodents, their supplies, or their habitats.
- An adult who is not pregnant should regularly disinfect rodent cages and accessories, including used bedding, with a 10% bleach solution or a commercial disinfectant. If rodents have or are suspected to have Seoul virus infection, LCMV infection, rat-bite fever, or other infections, you should clean the rodent environment wearing a respirator and gloves and cover scratches or open wounds.

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## POULTRY

- When cleaning poultry coops or enclosures, wear designated clothing, including work gloves, boots/shoes, and coveralls or other protective clothing that is solely used for working with poultry. Use a face mask and protective glasses or goggles when cleaning dusty areas.

## HAND HYGIENE

Handwashing is the most important way to stay healthy after contact with animals. Always wash hands thoroughly with soap and water right after:

- Handling any animal
- Touching anything that was in contact with animals
- Handling animal food, supplies, or waste
- Being around animals or spending time in an animal area, even if you didn't touch an animal

Other hand hygiene tips:

- Adults should supervise handwashing for young children.
- Washing hands with soap and water is the best way to reduce the number of germs on them. If soap and water are not available, use an alcohol-based hand sanitizer that contains at least 60% alcohol until hands can be properly washed. Alcohol-based hand sanitizers can quickly reduce the number of germs on hands in some situations, but these products are not effective against all types of germs.

## ANTIMICROBIAL RESISTANCE

Antimicrobials are valuable tools used to fight infections caused by pathogens such as bacteria, viruses, parasites, and fungi in both animals and people. Improper use or overuse of these medications can contribute to the development and spread of drug resistance, which reduces the effectiveness of antimicrobials for the treatment of animal, plant, and human illnesses.

Resistance develops faster when antimicrobial exposure is high. Antimicrobials for medical care and animal health care should only be used when necessary and appropriately, including using the right drug, dose, and duration as prescribed.

## RESOURCES

- [National Association of State Public Health Veterinarians](#)
- [CDC: Proper Hygiene When Around Animals](#)
- [CDC: Healthy Pets, Healthy People](#)
- [Antimicrobial stewardship definition and core principles](#)
- [Veterinary checklist for antimicrobial stewardship](#)
- [AAAP guidelines for judicious therapeutic use of antimicrobials in poultry](#)
- [Antimicrobial Resistance Learning Site](#)
- [Handbook of antimicrobial stewardship in companion animal veterinary settings](#)
- [Recommendations for antimicrobial stewardship in companion animals](#)
- [Core elements of antimicrobial stewardship](#)

## PET OWNERS & THE PUBLIC

- Certain pets are not recommended for households with children younger than 5 years old, adults 65 and older, people with weakened immune systems, or pregnant people because these groups are at higher risk for serious illness from germs these animals carry. These include:
  - Amphibians
  - Backyard poultry
  - Feeder animals
  - Reptiles
  - Rodents
  - Some small mammals
- Households with children younger than 5 years old should not keep pet ferrets due to the risk of severe injury posed to children from bites.
- Do not keep venomous or toxin-producing animals as pets.
- Do not keep wild animals as pets.

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## SELECTING A NON-TRADITIONAL PET

- Before getting a non-traditional pet, research the pet to make sure it's a good match for you and your family, especially if you have young kids or older adults in your household. Learn about the animal's size, temperament, behavior, lifespan, housing, costs, and feeding needs.
- Talk to a veterinarian – check your area for one who specializes in exotic animals or backyard poultry, depending on the type of animal you're considering.
- Purchase or adopt from reputable sources.
- When considering a non-traditional pet, first check state, local, and property laws and ordinances before purchasing or adopting. Some animals are illegal to own in certain areas, or there might be restrictions on certain species, animal numbers, animal sex (for example, roosters), or housing.
- When choosing any pet, pick one that appears healthy. In general, animals should be lively and alert with clean and intact fur, feathers, or scales. An animal that is abnormally quiet or tired, has discharge from the eyes or nose, has diarrhea or poop on its body, or looks unhealthy might be sick. If one of the animals in an enclosure looks sick, the others may also have been exposed to an infectious disease.
- Purchase or adopt captive-bred animals because they are more accustomed to people and living in captivity than animals that weren't bred in captivity.
- Ask about
  - Written pet wellness policies and pet care policies
  - Well-defined animal return policy
  - Well-defined policy to follow if your new pet becomes sick within a specific timeframe
- When buying from a retail store, look for
  - Knowledgeable store employees
  - Clean store (with pleasant smell)
  - Clean habitats
  - Adequate lighting in habitats
- Purchase new backyard poultry from a USDA National Poultry-Improvement Plan flock. Participants in this program must meet certain flock health and sanitation standards.
- Things to avoid when purchasing or adopting a non-traditional pet:
  - Internet sales from unknown sources

- Swap meets and flea markets
- Roadside stands
- Retailers selling animals as a side business

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## AFTER BRINGING A NEW PET HOME

- Take your new non-traditional pet to a veterinarian within a few days to a week for a first check-up and continue to take your pet to the vet regularly to keep it healthy throughout its life.
- Keep your new pet separated from your other pets for at least a week to ensure they are healthy, even if they don't look sick. The length of time may vary depending on the type of animal, so work with your veterinarian to determine how long to keep new pets separated from existing pets to help prevent your other animals from getting sick.

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## PREVENTING CONTAMINATION AT HOME

- Keep non-traditional pets and their supplies out of the kitchen or other areas where food is prepared, served, stored, or consumed. Pets can contaminate surfaces in your home with germs—you don't have to touch pets to get sick from their germs.
- Clean supplies, including habitats and accessories, outside the house when possible.
- If supplies are cleaned indoors, use a laundry or utility sink or bathtub and thoroughly clean and disinfect the area right after.
- Never use food-preparation areas to clean non-traditional pet habitats or anything in their habitats. To avoid cross contamination, use cleaning materials (sponges, brushes, etc.) dedicated for these purposes and keep them separate from those used for routine household cleaning.
- Do not allow non-traditional pets to roam freely in the home.
- Do not allow backyard poultry in the home, even chicks.
- If a non-traditional pet dies, clean and disinfect its habitat thoroughly. Don't put another animal in that habitat without cleaning and disinfecting it.
- Clean all surfaces that have come in contact with a non-traditional pet thoroughly to remove dirt, poop, pee, or other body fluids before disinfecting.

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## RESPONSIBLE PET OWNERSHIP

Responsible pet ownership means the ability to provide enough time and resources necessary to ensure a good quality of life for a pet, as well as a healthy setting for the people and other pets in the household.

- Learn how to properly care for a non-traditional pet, including providing healthy food, daily activities, and the right environment.
- Make sure your pet gets preventive treatment for intestinal parasites and external parasites such as fleas, ticks, and mites.
- Take your new pet to a veterinarian within a few days to a week for a first check-up and continue regular visits to keep the animal healthy throughout its life.
- Never release a non-traditional pet into the wild. These animals are not adapted to live in the wild and they can damage the ecosystem. If you no longer want or cannot care for a pet, check with local or regional animal rescues, local animal control, veterinarians, pet shops, or state wildlife agencies to find out how to appropriately relinquish a non-traditional pet.

- Releasing a non-traditional pet into the wild can spread diseases to native wildlife, outcompete and displace native wildlife, and disrupt ecosystems. It can also put people, pets, and livestock at risk for diseases or injury.
- As a pet owner, keep your pet healthy by only using antimicrobials when prescribed by a veterinarian. Do not save and reuse leftover antimicrobials. Only give antimicrobials to the animal(s) to which they were prescribed.
- If you handle venom- or toxin-producing reptiles, amphibians, fish, or invertebrate animals, know how to manage venom or toxin exposures in people and how to prevent animal escapes during disasters. You should also promptly alert appropriate authorities if animals escape. National Poison Information Centers (800-222-1222) are important resources if animal-related intoxications occur in people but should not substitute for immediate evaluation at an emergency department.
- Include non-traditional pets in your [emergency response plan](#) like you would for any other pet or family member.
- Separate sick people from pets to avoid the spread of diseases such as flu or COVID-19 from people to pets.
- Small mammal non-traditional pets with outdoor access should be protected from contact with wildlife.

## RESOURCES

- Information on **picking the right pet** is available on CDC's [Healthy Pets, Healthy People](#) website.
- **Species-specific considerations** to help you choose a healthy pet are available on [AVMA's](#) website.
- [National Association of State Public Health Veterinarians](#)
- [CDC: Proper Hygiene When Around Animals](#)
- [CDC: Healthy Pets, Healthy People](#)
- [Antimicrobial stewardship definition and core principles](#)
- [Veterinary checklist for antimicrobial stewardship](#)
- [AAAP guidelines for judicious therapeutic use of antimicrobials in poultry](#)
- [Antimicrobial Resistance Learning Site](#)
- [Handbook of antimicrobial stewardship in companion animal veterinary settings](#)
- [Recommendations for antimicrobial stewardship in companion animals](#)
- [Core elements of antimicrobial stewardship](#)

## BREEDERS, DISTRIBUTORS, & RETAILERS

NTP owners may use breeders, distributors, and retailers (including those that operate online) as a resource even after an NTP is brought home or to another setting. Those in the NTP industry play a critical role in ensuring animal and human health and protecting the environment. The following recommendations for industry are from existing guidance and best practices for reducing zoonotic disease risk related to NTPs in industry settings.

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### OCCUPATIONAL HEALTH

Employers play an important role in protecting employees by establishing an occupational health plan that considers workplace-specific risks. These occupational health recommendations apply to any place of employment where employees and volunteers may have contact with NTP species or have indirect contact with their habitat or supplies. This may include veterinary clinics, pet stores, agricultural retail stores, breeders, distributors including air and ground shipping employees, and others.

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#### OCCUPATIONAL HEALTH PLAN

Employers can protect employees by establishing an occupational health plan for all employees who will be working with or around NTP species. The plan should include written and verbal instructions for implementation and documented refresher training on a regular basis.

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#### EDUCATION AND TRAINING FOR EMPLOYEES

Employers should provide routine education and training for all employees who will be working with or around animals on basic principles of disease prevention. Training should include information on animal husbandry, handling, feeding, zoonotic disease risks, handwashing, personal protective equipment use, and other biosecurity protocols.

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#### BIOSECURITY AND PERSONAL PROTECTIVE EQUIPMENT (PPE) IN THE WORKPLACE

Biosecurity refers to measures taken to prevent the spread of pathogens, including bacteria, viruses, fungi, and parasites, to people and animals. Biosecurity measures may be structural, such as physical barriers, or they may be operational, such as procedures, practices (for example: use of PPE), and policies that aim to prevent disease. All employees should follow basic biosecurity practices, including handwashing.

All PPE should be safely designed, constructed, and maintained in a clean and reliable fashion, and fit properly. For PPE to be most effective it should be worn correctly. If PPE is to be used in a workplace, a PPE program should be implemented that addresses the hazards present; selection, maintenance, and use of PPE; employee training; and program monitoring. Employers are required to provide or pay for most types of PPE.

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#### REQUIRED USE OF RESPIRATORY PROTECTION

If hazards in the workplace indicate the need for respiratory protection, the Occupational Safety and Health Administration (OSHA) requires the employer to establish and maintain a written respiratory protection program.

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#### EMPLOYEE VACCINATION POLICIES AND RECORD KEEPING

Employers should maintain up-to-date emergency contact information and staff records including vaccinations in accordance with ACIP recommendations and rabies virus antibody titers when indicated (for example: for those employees working with or around animals that can carry rabies). Employee health information should be

# Recommendations: Breeders, Distributors, & Retailers

collected on a voluntary basis and confidentially maintained. Employees should inform their supervisors of changes in health status, such as pregnancy, that may affect work assignments. New employees should receive training regarding the importance of informing their healthcare provider that their work duties involve contact with animals.

Employees should follow ACIP recommendations and any state or local regulations regarding employee vaccination for rabies, influenza virus, tetanus, SARS-CoV-2, and any other relevant vaccine preventable pathogens that may be encountered in the workplace

## RESOURCES

- [Compendium of Veterinary Standard Precautions for Zoonotic Disease Prevention in Veterinary Personnel](#)
- [Pet Advocacy Network: Pet Store Pro Training Modules](#)
- [CDC: Information for Specific Groups | Avian Influenza \(Flu\)](#)
- [National Institute for Occupational Safety and Health Veterinary Safety and Health](#)

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## RECORD KEEPING

Establish and maintain a record system for traceability of animals during movement from breeder to distributor and retailer.

At a minimum, records should include the following:

- Date and source at arrival/shipment
- Species type, age, and number of animals shipped
- Specific location within facility where shipped animals were housed (if applicable)
- Medications administered, including antimicrobials and parasite prophylaxis
- Medical and death records
- Destination of animals
- Carrier, if traveling by commercial shipment. This may include vehicle or flight identification, time of departure and arrival, and other stops made.

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## ANIMAL HEALTH AND HUSBANDRY

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### ROUTINE ANIMAL CARE

Appropriate veterinary medical care of any animal improves animal health and welfare and reduces zoonotic disease risks.

- Work with a veterinarian to establish an animal health and disease management plan specific to their facility that prioritizes disease prevention and judicious use of antimicrobials; vaccination protocols; parasite prophylaxis; and testing for zoonotic pathogens as recommended and appropriate to the species in question.
- Monitor animals daily for signs of illness and ensure that animals receive appropriate veterinary medical care in a timely manner.
- Consult a veterinarian when an animal in their care shows signs of illness.

# Recommendations: Breeders, Distributors, & Retailers

- Avoid exhibiting or selling sick animals; animals known to be infected with a zoonotic pathogen; and animals from groups with a recent history of abortion, diarrhea, or respiratory disease.
- Display or sell only animals that are of appropriate age based on the species.
- House animals in a manner that minimizes stress and overcrowding, which helps to decrease shedding of pathogens.

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## VACCINATION

Consult with a veterinarian on vaccine needs for certain NTPs. House all NTPs in a way that reduces potential exposure to wild animals that can spread rabies such as racoons, foxes, coyotes, and other wildlife. Keep mammals up to date on rabies vaccinations according to current recommendations.

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## TESTING AND QUARANTINE FOR ZOOLOGIC PATHOGENS

Routine testing for zoonotic pathogens should not replace other prevention measures because NTPs can shed pathogens intermittently. Breeders, distributors, and retailers should consult with a veterinarian about appropriate testing and quarantine for zoonotic pathogens in newly acquired breeder animals or other animals.

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## PREVENTING CROSS-CONTAMINATION

Contamination of surfaces and other objects can happen after contact with animals, equipment, housing materials, and other supplies.

It's important to follow cleaning and disinfection recommendations in addition to the following:

- All retailers should document and train staff on cleaning and disinfection protocols.
- Facilities that raise multiple species of animals should establish separate areas for each species. For example, rodents and reptiles should be physically separate and where practical, employees should not work in both facilities or move between facilities without adherence to appropriate established biosecurity protocols.

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## CLEANING AND DISINFECTION

Tailor cleaning and disinfection practices to specific situations. When a particular pathogen is present, breeders, distributors, and retailers should refer to additional guidance regarding specific disinfectants to use.

- Staff should clean all surfaces thoroughly to remove organic matter before disinfection.
  - While cleaning, staff should wear appropriate personal protective equipment, or PPE (such as eyewear or a face shield to avoid splashes to the eyes and PPE recommended by the disinfectant manufacturer).
  - Moisten dusty material before removal to reduce aerosolized dust.
  - Move animals to avoid injuries from the disinfectants.
- Use disinfectants such as bleach and quaternary ammonium compounds in accordance with the manufacturer label.
  - Commercial formulations based on chemicals with disinfecting capability must be registered with the Environmental Protection Agency (EPA) or cleared by the Food and Drug Administration (FDA).
  - Read labels carefully to select the correct product for the intended use and apply it efficiently.
- Establish a cleaning and disinfection protocol and schedule for all animal habitats and supplies.
  - Post these or make them available to employees.

# Recommendations: Breeders, Distributors, & Retailers

- Staff should clean and disinfect cages, racks, feeders, watering devices, and other equipment between new batches of animals to keep them clean and free of contamination.
- Housing areas for animals should be clean and free from equipment, other animals, dirt, and debris.
- Staff should not use cleaning items such as mops, brooms, and buckets in more than one animal room or housing area to avoid spreading pathogens from one room or area to another.
- Staff should dispose of animal waste and dead animals safely and in compliance with local ordinances.
- Establish safety, hygiene, and infection control protocols and education for all staff on zoonotic disease risks, transmission routes, and prevention measures such as handwashing.

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## PREVENT PARASITE AND PATHOGEN INTRODUCTION

To prevent parasite introduction, maintain appropriate barriers to prevent entry of or contact with wild rodents, insects, birds, reptiles, and other animals. Communicate biosecurity measures to all staff to minimize the risk of pathogen introduction from wild animals.

- Staff should not return escaped animals to the colony unless captured immediately to avoid exposure of the colony to introduced zoonotic pathogens from wild animals.
- Animal feed should be stored in sealed, pest-proof containers and stored off the floor to avoid attracting wild animals.

### RESOURCES

- The Pet Advocacy Network collaborated with One Health partners to [develop best management practices for breeders and distributors of feeder rodents](#)
- Cleaning and disinfection resources for poultry retailers and hatcheries: [USDA Best Management Practices Handbook: A Guide to the Mitigation of Salmonella Contamination at Poultry Hatcheries](#)
- [USDA Biosecurity for the Birds, Defend the Flock](#)
- CDC Healthy Pets, Healthy People: [Backyard Poultry](#)
- [Preventing Human Salmonella Infections Resulting from Live Poultry Contact through Interventions at Retail Stores](#)

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## ROLE DURING OUTBREAK INVESTIGATIONS, AND REPORTABLE OR NOTIFIABLE DISEASES

Industry plays an important role during an outbreak or case investigation of potential, suspected, and confirmed human illness. Involvement could include assisting federal, state, or local public health departments or departments of agriculture in tracing animal movement to determine the source and extent of the outbreak and implementing prevention practices. Additionally, industry can increase awareness of risks and prevention measures needed among potentially affected consumers, as well as others in the supply chain.

Public health officials should include industry notification of an outbreak as part of their standard operating procedures. Industry should be familiar with appropriate points of contact for zoonotic diseases at their state or local public health departments. These points of contact can assist with testing and treatment recommendations, and when to report conditions to local or state authorities.

# Recommendations: Human & Animal Healthcare Providers

## HUMAN & ANIMAL HEALTHCARE PROVIDERS

Veterinarians, physicians, and other healthcare providers play an important role in educating animal owners on potential zoonotic disease risks and prevention measures. They are also critical during outbreak or infection investigations, as they can obtain information about animal ownership and animal contact.

It's important for healthcare providers to be aware of zoonotic disease risks and to counsel people at higher risk for zoonotic infection or serious consequences from infection. When counseling patients at high risk of serious illness from or infected with a possible zoonotic disease, healthcare providers should consider the human-animal bond as a source of support for their patients. Recommendations should adequately weigh the benefits of interacting with or owning these animals against the risks.

To reduce the possibility of illness or injury from NTPs, healthcare professionals should remind owners to:

- Match the size and temperament of a pet to the age and behavior of children
- Provide close supervision of young children
- Educate children about appropriate human-animal interactions
- Take the pet's lifespan into consideration

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## VETERINARIANS

- Discuss responsible pet ownership, choosing an appropriate pet, animal husbandry, and preventive care with current and prospective pet owners.
- Provide information on zoonotic disease risks as well as animal-specific information such as animal behavior and temperament, husbandry, welfare needs, required veterinary care, and overall pet suitability
- Direct staff with occupational risks to relevant resources related to zoonotic disease prevention.
- Provide recommendations on animal husbandry and welfare, biosecurity, disease prevention including zoonoses, and appropriate disease treatment in the case of sick animals or animals suspected to be infected with a zoonotic pathogen. This can include sharing trusted resources like CDC's [Healthy Pets, Healthy People](#) website.
- Inform NTP owners that they should tell their healthcare providers about what pets they have at home and any animals they come in to contact with outside the home.

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## PHYSICIANS AND ALLIED HEALTHCARE PROVIDERS

- Routinely ask patients if they interact with animals at home or away from home and what type of animals they come in contact with.
- Discuss disease prevention precautions such as proper handwashing with patients who are NTP owners or at occupational risk of exposure.
- Advise people at higher risk of illness which types of animals to avoid.
- Share trusted resources like CDC's [Healthy Pets, Healthy People](#) website to provide patients with more detailed information on protecting their health around animals.

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## CONSIDERATIONS FOR SUSPECTED CASES OF ZOOONOTIC DISEASES

# Recommendations: Human & Animal Healthcare Providers

As a part of both regular check-ups and in the case of a suspected infectious disease, human healthcare providers should collect a thorough history of animal ownership and animal contact. Obtaining animal ownership and contact history can lead to specific testing, an accurate diagnosis, and specific treatment recommendations.

Human healthcare providers should consider asking about

- Animal contact in public settings such as exhibits, petting farms or zoos, classrooms, and fairs
- Animal species the patient was in contact with (for example, did you come in contact with rodents, backyard poultry, fish, or their habitat?)

Upon suspicion or confirmation of a zoonotic disease in a pet, veterinarians should:

- Recommend follow up by the pet's owner with a healthcare provider, especially in cases of reported symptoms or illness in owners that may be related to contact with the animal
- Provide information and recommendations on steps that the pet owners can take to reduce the risk of disease spread from the pet to people

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## ROLE DURING OUTBREAK INVESTIGATIONS, AND REPORTABLE OR NOTIFIABLE DISEASES

In the case of a known or suspected zoonotic disease outbreak, it's important for both human and animal healthcare providers to cooperate with authorities conducting the investigation.

Healthcare providers and veterinarians should:

- Be familiar with appropriate points of contact for zoonotic diseases at their state or local public health departments. These points of contact can assist with testing and treatment recommendations.
- Be aware of the conditions and diseases they are required to report to local or state public health authorities as well as when to report conditions that may not be specified on the list but should still be reported (for example, outbreaks of an unknown illness).
- Report suspected cases of human or animal illness to the appropriate authority as soon as possible in compliance with local or state laws.

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## ANTIMICROBIAL STEWARDSHIP RECOMMENDATIONS FOR VETERINARIANS

Good husbandry and preventive care can improve a pet's health and reduce the need for antimicrobial treatment. Antimicrobials should only be used in NTPs and other animals when prescribed by a veterinarian under a valid veterinary-client-patient relationship and consistent with stewardship principles as defined by the [American Veterinary Medical Association](#).

The following are critical when antimicrobial therapy is warranted:

- Judicious use of antimicrobials
- Use of laboratory testing to determine disease etiology
- Culture and susceptibility testing to aid in appropriate antimicrobial selection.
- Antimicrobials should not be used as a substitute for disease prevention measures such as good animal husbandry and sanitation.

It's critical that veterinarians communicate with NTP owners about:

- Appropriate antimicrobial use when discussing diagnostic and treatment plans for their pets, including the importance of culture and sensitivity to ensure the effectiveness of the antimicrobial.

- The owner's role in preserving the effectiveness of all antimicrobials by
  - Not requesting antimicrobials when they are not needed,
  - Following instructions when antimicrobials are prescribed, and
  - Never using a medication in an animal unless prescribed for that animal.

## INDUSTRY GROUPS, ASSOCIATIONS, & AFFILIATED ORGANIZATIONS

The NTP industry includes diverse partner organizations, a broad range of business models of varying sizes and types, and hundreds of animal species. Because of this variety, industry groups, associations, and other affiliated organizations (for example, labor organizations) representing these groups serve as valuable resources to public health agencies in preventing zoonotic disease outbreaks as well as during outbreak investigations and response. Industry groups, associations, and other affiliated organizations should be aware of the conditions and diseases they are required to report to local or state public health authorities as well as when to report conditions that may not be specified on the list but should still be reported (for example, outbreaks of an unknown illness). These groups should encourage proactive reporting of illness outbreaks among their member organizations and cooperate with outbreak investigations to help limit the spread of disease. Doing so benefits their membership by protecting both animal and human health.

All relevant partners should work together to communicate to the public and NTP owners, including those who are fostering or adopting NTPs, the following information:

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### INDUSTRY LEADERSHIP (BREEDERS, DISTRIBUTORS/IMPORTERS, RETAILERS)

- Educate animal owners at each level of the NTP supply chain at which a consumer may be selecting, ordering, purchasing, or adopting an NTP, including online marketing and sales.
- Educate all employees about infection prevention for themselves and customers.
- Educate all employees on how to communicate zoonotic disease prevention information to current and potential pet owners. A retail pet store employee is often the first person an NTP owner may interact with to learn about these pets, thus employee engagement in this process is critical.

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### OTHER RELEVANT ONE HEALTH PARTNERS (INDUSTRY GROUPS, ASSOCIATIONS, AND AFFILIATED ORGANIZATIONS)

- Participate in efforts to raise awareness among communities and partners.
- Include zoonotic disease information in existing or new clinical briefs, guidance documents, and position statements.

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### ROLE DURING OUTBREAK INVESTIGATIONS, AND REPORTABLE OR NOTIFIABLE DISEASES

During an outbreak or case associated with NTP species, these groups may

- Help facilitate communication and contact tracing of animal movement between those in the pet industry such as breeders, distributors, and retailers with the appropriate government agency
- Help to determine the source and extent of the outbreak
- Implement prevention practices
- Increase awareness among potentially affected consumers as well as others in the supply chain.

Effective communication between these groups and government agencies helps to improve both animal and human health and reduce economic impacts of zoonotic disease outbreaks. Access to these networks and building positive relationships can help government agencies during and after an outbreak investigation because many times they include hard-to-reach populations.

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## ROLE IN PREVENTION MESSAGING

Industry groups, associations, and other affiliated organizations can

- Use their knowledge and expertise to collaborate with government agencies to help inform and distribute prevention messaging
- Develop best practice guidelines for animal species based on current science and public health issues
- Disseminate these messages throughout industry and association networks to reach as many partners as possible with consistent and effective recommendations

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## ANTIMICROBIAL STEWARDSHIP RECOMMENDATIONS FOR INDUSTRY

A critical component of antimicrobial stewardship for all sectors of industry is ensuring adherence to best practices for prevention and management of disease. This ensures that animals are healthy, thereby reducing the need for antimicrobials.

- Only administer antimicrobials to treat, prevent, or control disease. Their use should align with antimicrobial stewardship principles.
  - If antimicrobials are needed, they should only be administered under veterinary medical supervision with a valid veterinary-client-patient relationship in any industry setting, regardless of the size or scale of the operation.
- Ensure that existing biosecurity measures are sufficient to reduce the risk for potential disease transmission between people and animals, and among animals.
- Pet stores and other facilities that employ animal care workers should provide education and training on handwashing and other infection prevention measures and provide employees with necessary personal protective equipment for cleaning animal areas.
- Pet stores and other businesses that sell directly to the public should educate customers on handwashing and other prevention measures for decreasing disease transmission in the customers preferred language and at a level understood by the public. Species-specific husbandry and dietary requirements should also be provided to help ensure NTPs are maintained at optimal health.
- Take steps – including cleaning, disinfection, and maintenance of equipment and supplies – to limit environmental contamination of NTP housing.

## GOVERNMENT AGENCIES

Government agencies play a critical role in preventing, detecting, and responding to infectious and zoonotic disease outbreaks. Prevention and control of zoonotic diseases associated with NTPs requires a One Health approach by government agencies at all levels – federal, state, local, and tribal – as well as collaboration with multisectoral partners.

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## EDUCATION AND OUTREACH

Public health agencies, agriculture health agencies, and environmental health agencies should collaborate to:

- Develop and disseminate infection prevention messaging
- Develop data collection and surveillance programs
- Collaborate during outbreak investigations and response efforts

In the event of a suspected or confirmed outbreak associated with animal contact from an NTP, agencies can notify industry groups or associations to allow them to respond and work with agencies to stop the spread of disease. These industry groups have access to networks of breeders, distributors, and retailers, and access to these networks may be able to help inform the outbreak investigation as well as disseminate information to all involved in the industry and supply chain.

Government agencies should include zoonotic disease prevention education and outreach as part of regular agency duties. These outreach and education efforts can be enhanced by partnering with groups such as:

- Community leaders
- Animal or human healthcare providers
- Animal or human health professional associations,
- Industry associations or groups
- Academic institutions including health professions' education programs (for example, for veterinarians, physicians, physicians' assistants, nurses, and allied health professions)

These groups can help to reach a wider range of partner populations, provide subject matter expertise, and provide input on the feasibility of recommendations to help ensure people will follow them. Agencies should conduct surveillance activities for human infections associated with contact with NTPs to help evaluate and improve these recommendations.

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## OVERSIGHT OF REGULATIONS OR RECOMMENDATIONS

Government agencies play a critical role in preventing, detecting, and responding to zoonotic disease outbreaks, including by enforcing regulations, recommendations, or advisories. Government agencies should encourage or require oversight by the appropriate authority (for example, local public health or animal health agencies, industry groups, or associations) to ensure compliance with recommendations at various public settings at which NTPs are present, such as backyard poultry retailers, pet stores, petting zoos and farms, schools, daycares, educational animal shows, and others.

Agencies should consult [The Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2017](#) for further recommendations for disease prevention for animal exhibitors and venue operators. All appropriate venues should be encouraged or required to ensure compliance with recommendations to reduce the risk to human health from zoonotic diseases transmitted by NTP species.

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## OUTBREAK RESPONSE

During an outbreak response, involved sectors should take the following steps as appropriate:

- Conduct thorough epidemiologic, laboratory, and traceback investigations of outbreaks using a One Health approach coordinating across human, animal, and environmental health sectors.
- Follow protocols for collection and laboratory testing of samples from people, animals, and the environment, including molecular subtyping of pathogen isolates.
- Include questions on disease report forms and outbreak investigation questionnaires about exposure to animals and their sources, environments, products, husbandry, and feeding.
- Share outbreak and investigation information across all pertinent agencies, consistent with confidentiality and legal limitations.
- Local and state public health departments should also report all outbreaks of enteric infections resulting from animal contact to the CDC through the [National Outbreak Reporting System](#).
- Local and state public health departments should notify CDC of diseases with severe consequences or that involve multiple states or jurisdictions that are not part of a national reporting system.
- Notify additional relevant partners such as industry and public interest groups and others to promote messaging to partners.