

Companion Animals and Zoonoses: Understanding the Physician's Role in Disease Prevention

A One Health Perspective For Physicians

National Center for Emerging and Zoonotic Infectious Diseases
Division of High Consequence Pathogens and Pathology



Learning Objectives

- ❑ Review zoonoses and other health risks associated with pet ownership**
- ❑ Understand how physicians can help prevent zoonotic infections in their patients**
- ❑ Develop ways to improve communication with patients regarding health risks from pets**
- ❑ Identify opportunities for professional collaboration between physicians and veterinarians to promote a One Health approach to further the goal of healthy pets and healthy people**

Presentation Outline

- 1. Case Examples**
- 2. Zoonoses: A One Health Perspective**
- 3. Preventing Zoonoses in Patients with Animal Contact**
- 4. Patient Education: Selected Zoonoses**
- 5. Opportunities for Professional Collaboration**



CASE EXAMPLES

Case Example: Bats and Rabies

- ❑ **As you begin examining a long-time patient, he tells you a story about the bats that are living in his barn. Yesterday, he noticed one of the bats was injured and unable to fly, so he's considering bringing the bat into his home to rehabilitate it.**
- ❑ What questions should you ask him?
- ❑ What preventive messages should you share with him?



See slide 26 for more information on Rabies!

Rabies Case Example (continued): **Rabies Prevention**



- ❑ Rabies is 100% preventable!
- ❑ The most common way for people to get rabies in the United States is through contact with a bat
- ❑ All sick, dead or easily captured bats should be tested for rabies if exposure to people or pets occurs
- ❑ Advise patients:
 - Do not to handle or feed wild animals
 - Keep rabies vaccinations up to date for pet dogs, cats and ferrets

**For more information, visit the CDC Rabies web page:
<http://www.cdc.gov/rabies/index.html>**

Case Example: *Salmonella* and Backyard Poultry

- ❑ **You are preparing to administer routine vaccines to a young patient when she proudly announces she received two chickens for her birthday, and her family will have fresh eggs from now on! Her parents shrug and admit they've never raised chickens before, but they are excited about the new project.**
- ❑ What questions should you ask them?
- ❑ What preventive messages should you share with them?



See slide 34 for more information on *Salmonella*!

Salmonella Case Example (continued):
Salmonella from live poultry is an ongoing problem:

- ❑ **2012 Outbreaks of *Salmonella* Linked to Live Poultry**
- ❑ 8 outbreaks linked to live poultry
 - Chicks and ducklings, backyard flocks
 - Median time from purchase to illness* = 15 days (range: 3-90)
 - Multiple serotypes of *Salmonella*: Thompson, Hadar, Montevideo, Infantis/Lille/Newport, Infantis, Muenchen, Braenderup
- ❑ 517 illnesses reported
 - Outbreak size range: 20 to 195 ill persons
 - 93 (18%) hospitalized
 - 4 deaths, unclear if infection contributed



*information not available for all outbreaks;
Preliminary data, subject to change

Salmonella Case Example (continued):
Human *Salmonella* Infections

- Incubation period 12 to 72 hours
- Illness duration 4 to 7 days
- Acute gastroenteritis: fever, diarrhea, abdominal cramps, vomiting, bloody stools
- Serious illness: meningitis, bloodstream infections, joint infections
 - Young children, immunocompromised, elderly at high risk
- Most patients do not require treatment other than oral fluids
 - May require rehydration with intravenous fluids
 - Antibiotics not usually indicated



Salmonella Case Example (continued):

Trends in Recent Outbreaks Linked to Backyard Flocks

- ❑ **>70% reported contact with baby poultry (chicks, ducklings, goslings)**
- ❑ **Common reasons for purchasing poultry:**
 - Eggs
 - Pets
 - Meat
 - Other reasons, including youth projects
- ❑ **~1/3 of ill people kept poultry inside their home**
- ❑ **~1/3 of ill people reported snuggling with poultry**
- ❑ **~10% reported kissing poultry**
- ❑ **2013: Multiple outbreaks with 100s of illnesses linked to backyard flocks**
 - Current updates are available at www.cdc.gov/zoonotic/gi



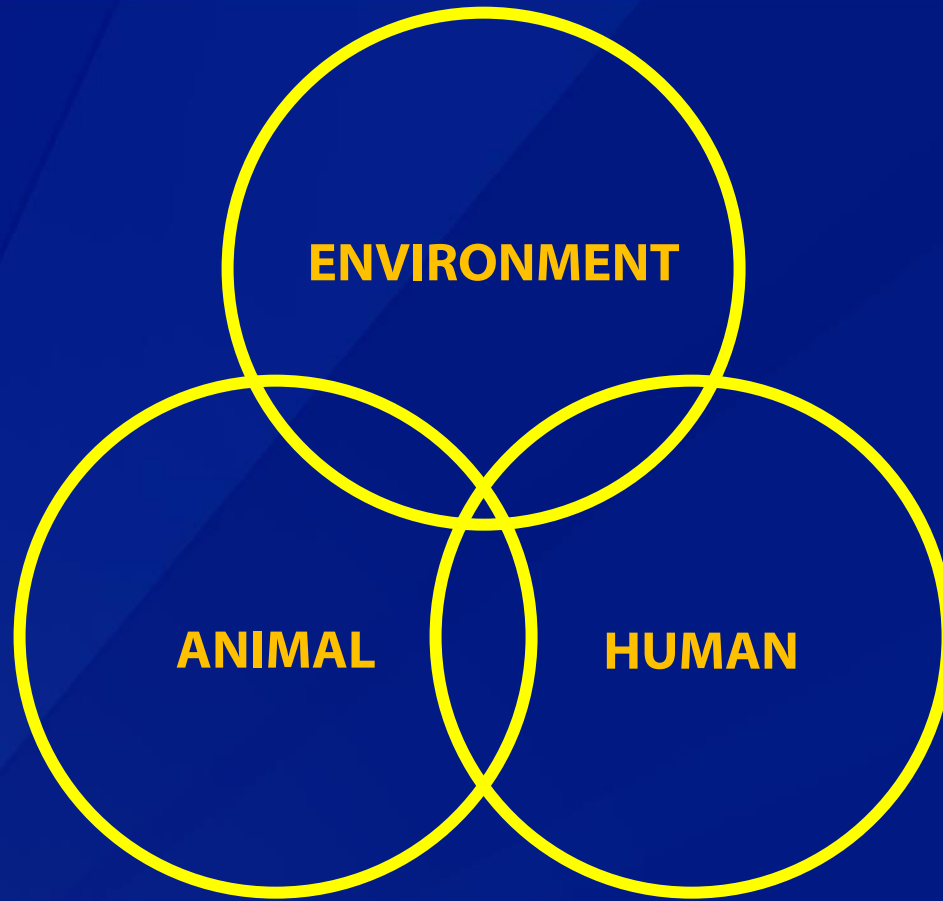
Salmonella Case Example (continued):
***Salmonella* infections can be prevented!**

❑ Advise Patients:

- Wash hands with soap and water immediately after handling live poultry, or materials in their habitat
- Do not allow children to kiss poultry or to put their hands or other objects into their mouths after handling animals
- Do not eat or drink in the area where birds live or roam
- Do not let live poultry inside the house, in bathrooms or especially in areas where food or drink is prepared, served or stored, such as kitchens or outdoor patios
- Habitats and their contents should be carefully cleaned outdoors, if possible

For more information, visit the CDC Enteric Zoonoses web page:

<http://www.cdc.gov/zoonotic/gi/>



**ZOONOSES:
A ONE HEALTH PERSPECTIVE**

What is One Health?

A One Health approach to protecting human health includes collaboration between human, animal and environmental health entities on disease surveillance, outbreak response and prevention in order to achieve an optimal human health outcome.



Image credit: <http://www.avma.org/onehealth/>

What is a zoonotic disease?

“Any disease or infection that is naturally transmissible from vertebrate animals to humans. Animals thus play an essential role in maintaining zoonotic infections in nature...”

- World Health Organization

“Animal diseases that are transmissible to humans.”

- World Organization for Animal Health

“Any infectious disease that can be transmitted (in some instances, by a vector) from non-human animals, both wild and domestic, to humans or from humans to non-human animals.”

- Wikipedia

Why are zoonotic diseases important?

- ❑ Of all human pathogens, 60% are zoonotic. ¹⁻⁴

- ❑ Approximately 75% of all recent emerging infectious diseases of human concern are of animal origin. ¹⁻⁴

- ❑ ~1.1 million domestically acquired *Salmonella* infections annually in USA
 - 11% caused by direct animal contact⁵
 - >127,000 human illnesses
 - >20,600 hospitalizations
 - 47 deaths

1. Jones, K. E., N. G. Patel, M. A. Levy, A. Storeygard, D. Balk, J. L. Gittleman and P. Daszak (2008). "Global trends in emerging infectious diseases." *Nature* 451(7181): 990-993.

2. Taylor, L. H., S. M. Latham and M. E. Woolhouse (2001). "Risk factors for human disease emergence." *Philos Trans R Soc Lond B Biol Sci* 356(1411): 983-989.

3. Woolhouse, M. and E. Gaunt (2007). "Ecological origins of novel human pathogens." *Crit Rev Microbiol* 33(4): 231-242.

4. Woolhouse, M. E. and S. Gowtage-Sequeria (2005). "Host range and emerging and reemerging pathogens." *Emerg Infect Dis* 11(12): 1842-1847.

5. Hale, C. R., E. Scallan, A. B. Cronquist, J. Dunn, K. Smith, T. Robinson, S. Lathrop, M. Tobin-D'Angelo and P. Clogher (2012). "Estimates of enteric illness attributable to contact with animals and their environments in the United States." *Clin Infect Dis* 54 Suppl 5: S472-479.

Modes of Transmission

❑ Foodborne

- ❑ Consumption of animal products (meat, milk, eggs)

❑ Direct Contact

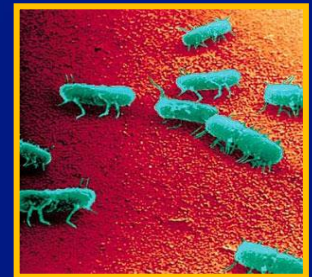
- Bites or scratches from an infected animal
- Petting or handling infected animals
 - Bodies (fur, feathers, scales) may be contaminated
 - Animals often appear healthy
 - Some animals pose a greater risk than others

❑ Indirect Contact

- Cross-contamination of food
- Contact with animal environments and habitats, or areas where animals live and roam

❑ Vector-borne

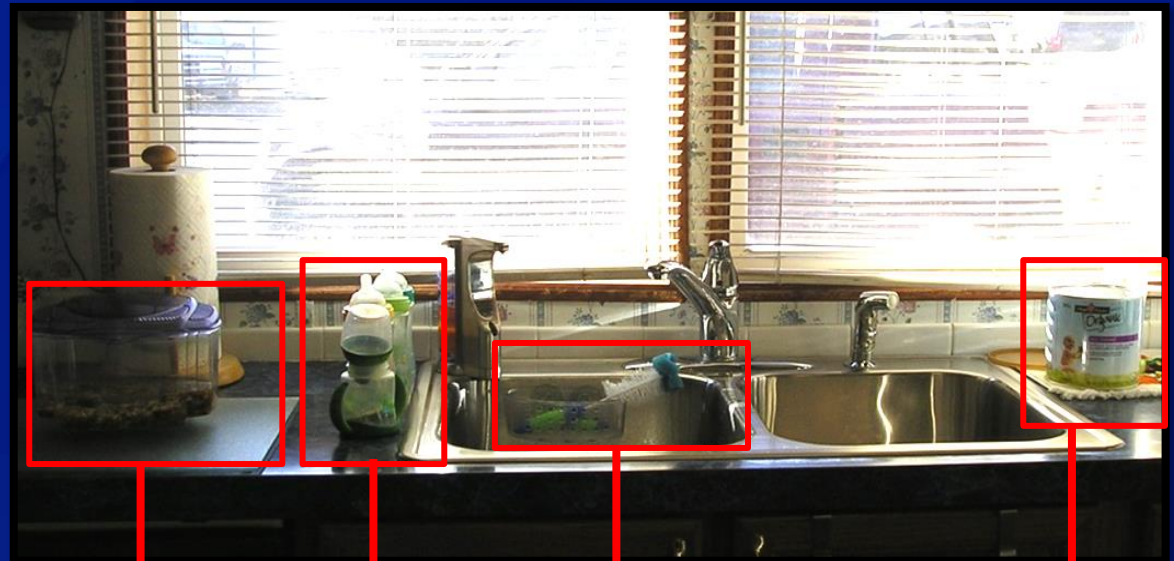
- Transmitted by mosquitoes, ticks & fleas



People do not have to touch a pet to catch a zoonotic disease



Direct Contact



Aquarium

Baby Bottles

**Bottle
Brushes**

**Baby
Formula**

Indirect Contact



PREVENTING ZONNOSES IN PATIENTS WITH ANIMAL CONTACT

Pet Ownership in the United States

❑ Companion animals play an important role in the lives of individuals and families

- 63% of pet owners consider their pets to be “part of the family”
- 39% of US households own at least one dog
- 33% of US households own at least one cat
- 1.6 million households own a reptile¹

❑ Benefits of pet-ownership

- Companionship and emotional health
- Exercise and obesity prevention
- Service animals improve independence of those with disabilities
- Children
 - Responsibility and compassion
 - Immune system development



Diagnoses to Consider in Patients with Animal Contact

□ Gastrointestinal Illness

- *Salmonella*: poultry, reptiles, amphibians, dogs, cats, pigs, cattle; pet food
- *Escherichia coli*: cattle and other ruminants (goats, sheep, deer)
- *Campylobacter*: dogs, cats, some small mammals, birds
- *Cryptosporidium*: cattle, sheep, goats

□ Skin conditions

- Cutaneous larval migrans (*Ancylostoma* spp.): dogs, cats
- Ringworm (Dermatophytes): dogs, cats, cattle
- MRSA (Methicillin-resistant *Staphylococcus aureus*): dogs, cats

□ Other

- Visceral/Ocular larval migrans (*Toxocara* spp.): dogs, cats
- Influenza (swine origin)
- Leptospirosis: dogs, cattle

□ For more information, visit the CDC Healthy Pets Healthy People webpage:

- <http://www.cdc.gov/healthypets/>

Other Health Risks to Consider in Patients with Animal Contact

❑ Injuries - Trauma

- Approximately 50% of dog bites involve an animal owned by the victim's family or neighbors¹.
 - Children are the most common victims of these bites, especially in the case of fatal encounters between dogs and people.
- Zoonoses associated with trauma:
 - Bite wounds Rabies (*Dogs, Cats*); *Pasturella multocida* (*Dogs*)
 - Cat scratches: *Bartonella henselae* (Cat Scratch Disease)

❑ Flea and Tick-borne Disease

- Pets may be the source of disease-carrying fleas and ticks: Lyme disease, Rocky Mountain Spotted Fever (RMSF), Plague, Tularemia (direct transmission also occurs with plague and tularemia)

❑ Allergies²

- Approximately 10% of people with allergies are allergic to pets
- Up to 20% of those with asthma are allergic to pets

¹Presutti RJ. 2001. Prevention and treatment of dog bites. *American Family Physician*. 63(8):1567-1573

Reisner IR and Shofer FS. 2008. Effects of gender and parental status on knowledge and attitudes of dog owners regarding dog aggression towards children. *JAVMA*. 233:1412-1419

²"The Truth about Pet Allergies." *American Academy of Allergy Asthma & Immunology*. (2011).

Physician's Role in Zoonotic Disease Prevention

□ Be aware of your patients' relationship with animals

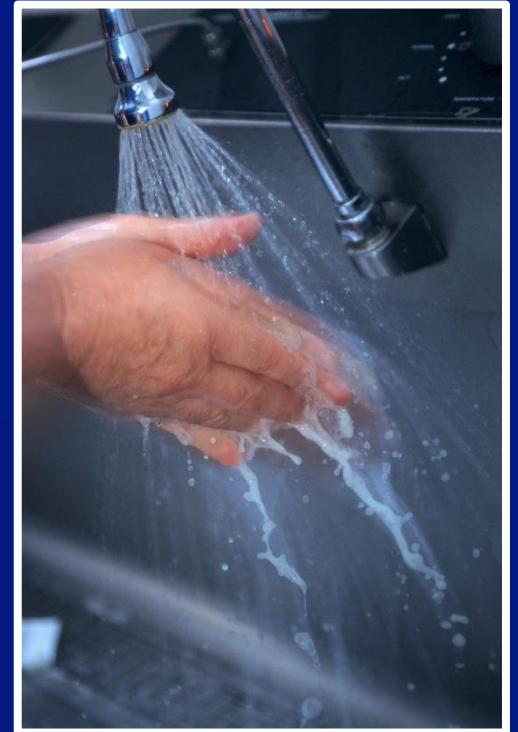
- Are there pets in the home? What kind?
- Are they involved in an animal-related occupation?
- Is there a history of contact with chickens, reptiles, or amphibians?
- Has there been a recent visit to a farm or petting zoo?
- Has there been any recent evidence of illness in pets at home?

□ Patient Education

- Provide information on general risk-reduction strategies, as well as specific information on zoonoses of concern for high-risk patients
- Encourage patients to keep pets healthy with routine veterinary care

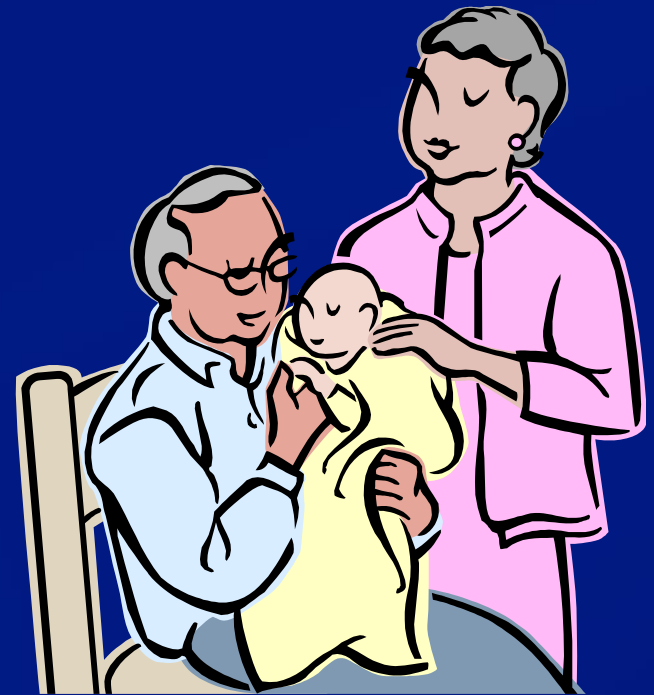
General Prevention Messages

- ❑ Wash hands with soap and water immediately after handling pets, pet foods, or materials in the pet's habitat
- ❑ Don't let pets lick people on the mouth
- ❑ Work with puppies and kittens to encourage gentle play habits
- ❑ Fence pets to reduce contact with stray/wild animals
- ❑ Encourage pets owners to vaccinate their pets as recommended by veterinarians



Identify patients that may be at particular risk for disease

- **General prevention messages are for everyone, but be aware of patients and households who may benefit from additional information**
- **High-risk Patients Include:**
 - Immunocompromised
 - Pregnant women
 - Older persons >65 years
 - Children <5 years
 - Patients with asthma or allergies



For More Information on High-Risk Patients visit :
http://www.cdc.gov/healthypets/extra_risk.htm



PATIENT EDUCATION: SELECTED ZOOONOSES

Rabies

- ❑ Any mammal can get rabies, including dogs, cats and cattle
- ❑ **Transmission:**
 - Transmission occurs when infected saliva of a host is passed to an uninfected animal or person, most commonly through a bite.
 - The most common wild reservoirs of rabies are raccoons, skunks, bats, foxes and coyotes
- ❑ **Treating a Rabies Exposure**
 - Thoroughly clean the wound with soap and water
 - Treat any trauma due to the animal attack
 - Consult your local health department to determine if postexposure prophylaxis (PEP) is needed
- ❑ **Clinical Signs of Rabies**
 - Fever, headache, general weakness, insomnia, confusion, paralysis, hallucinations, hypersalivation, difficulty swallowing, hydrophobia

Rabies



□ Key Patient Recommendations:

- Keep your pets healthy
 - Keep vaccinations up to date for pet dogs, cats and ferrets.
 - Keep pets under your direct supervision so they do not come in contact with wild animals
 - Call your local animal control agency to remove stray animals from your neighborhood
- Avoid direct contact with unfamiliar animals
 - Do not handle or feed wild animals
 - Never bring wild animals into your home
 - Teach children never to handle unfamiliar animals
 - Prevent bats from entering living quarters

Rabies



□ Key Patient Recommendations:

- If bitten by an animal, patients should:
 - Immediately wash bite wounds with soap and water
 - Seek medical evaluation for any animal bite
- A healthy domestic dog, cat, or ferret that bites a person should be confined and observed for 10 days. Any illness in the animal should be evaluated by a veterinarian and reported immediately to the local public health department
- Skunks, raccoons, foxes and bats that bite humans should be euthanized and tested as soon as possible
- If a bat is found in the room with a sleeping person, unattended child, mentally disabled person or intoxicated person, the bat should be trapped and submitted for rabies testing

Toxoplasma gondii



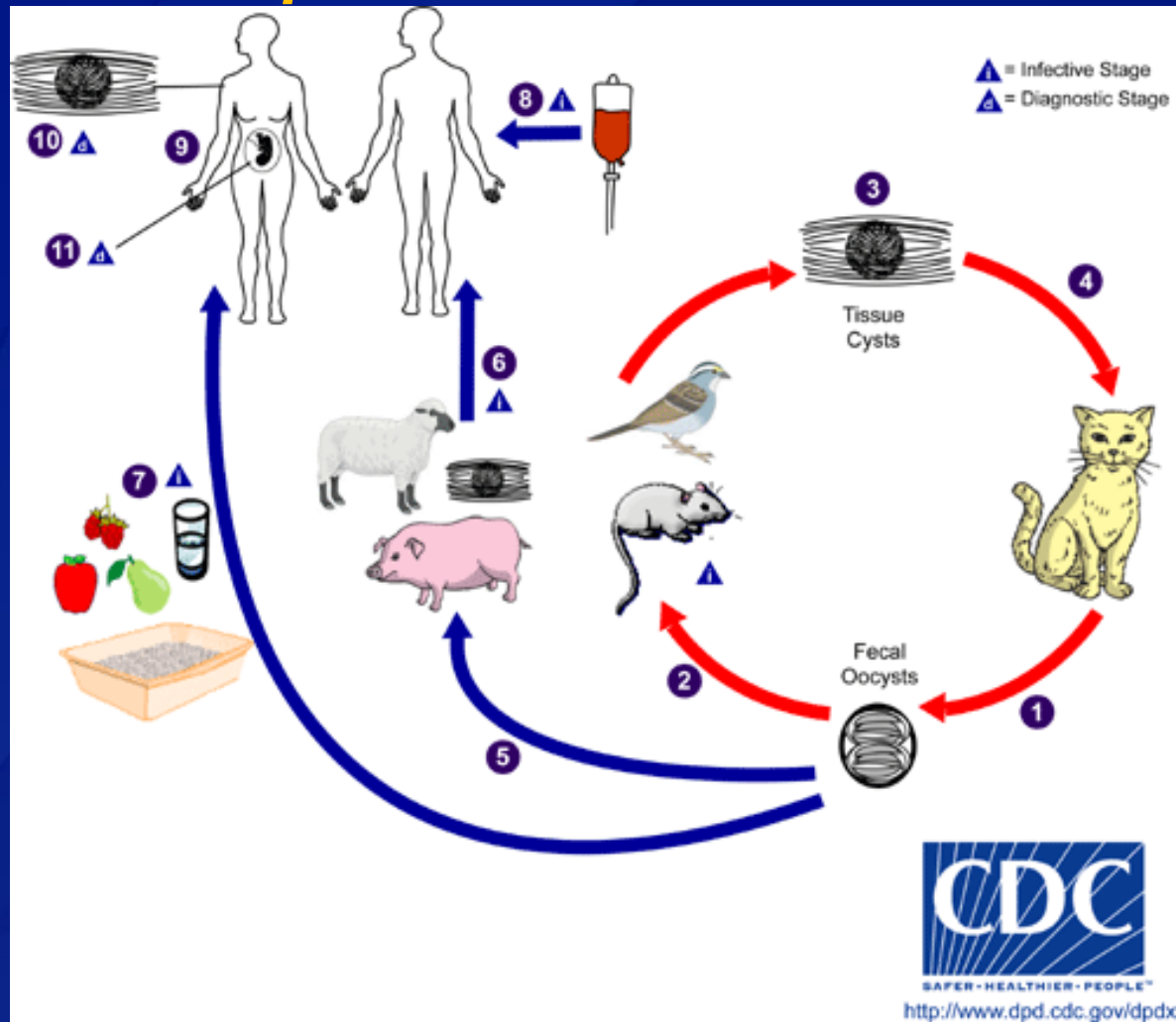
❑ Cats and Toxoplasmosis

- Cats acquire *T. gondii* when they consume infected rodents, birds, or other small animals
- The majority of cats will not show clinical signs when they are infected
- Cats are most likely to shed the infectious oocysts in their feces when they are newly infected
- *Toxoplasma* oocysts become infectious 1-5 days after they are passed in feces

❑ Toxoplasmosis and Pregnancy

- Women infected prior to pregnancy will have protection against the parasite, and are not at-risk for passing the infection to their unborn child
- If a woman is newly infected during pregnancy, she can transmit the parasite to the fetus which can cause fetal death or severe neurologic problems in the child
- Consuming undercooked, infected meat also a potential route of transmission for people

Toxoplasma Transmission



Consuming undercooked, infected meat is also a potential route of transmission to people

Toxoplasma gondii: Key Patient Recommendations

- Consider keeping cats indoors to prevent hunting
- Do not feed raw meat diets to cats
- Do not adopt a new kitten or cat if anyone in the house is pregnant
- Litter boxes should be cleaned by someone else in the household
 - If not possible, clean 1-2 times a day, wear gloves and wash hands immediately afterwards
- Cats like to defecate in garden areas
 - Wash garden vegetables well
 - Wear gloves when gardening
- Do not eat raw or undercooked meat
- Avoid drinking untreated drinking water

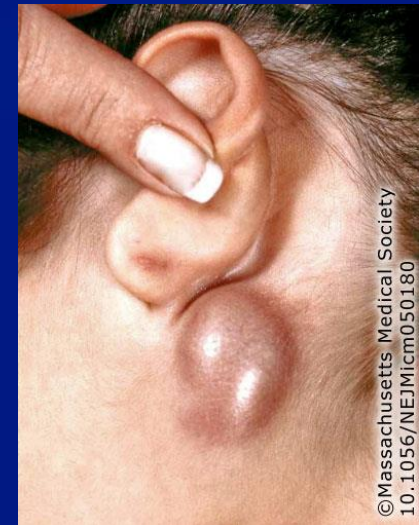


**Pregnant cat owners
should not feel
pressure to relinquish
their pets**

Bartonella henselae (Cat Scratch Disease)



- ❑ *B. henselae* is naturally transmitted among cats by cat fleas
- ❑ **40% of cats carry *B. henselae* at some time in their lives**
 - The majority of infected cats are asymptomatic, subclinical carriers
 - Bacteremia is intermittent and can persist for months
 - Cats < 1 year of age are most likely to be infected
- ❑ **Transmission to Humans**
 - Transmission occurs via cat bite or scratch
 - Although anyone can become infected, immunocompromised individuals are at greater risk
 - Symptoms include fever, a pustule at the inoculation site and enlarged, tender lymph nodes



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10.1056/NEJMicm050180

***Bartonella henselae* (Cat Scratch Disease)**

Recommendations for immunocompromised patients who own a cat or wish to adopt a new cat:

- Avoid rough play with cats
- Wash all cat-associated wounds promptly
- Do not allow cats to lick wounds or cuts
- Apply flea prevention monthly (even for indoor only cats)
- Adopt a visibly healthy cat > 1 year of age; preferably one with known history of consistent flea prevention



Salmonella from Pets

❑ Poultry in backyard flocks, reptiles, amphibians, and rodents commonly carry *Salmonella*

❑ *Salmonella* bacteria are shed in droppings and can easily contaminate an animal's body (fur, feather or scales) and environment



- Salmonellae are naturally found in the gastrointestinal tract of reptiles, amphibians and other animals
- Animals that appear healthy can still shed *Salmonella*

❑ **Ask about non-traditional pets:**

- Backyard poultry flocks are becoming more common
 - Baby poultry are sold by mail-order hatcheries, feed stores and are available over the internet
- Turtles are high-risk for children
 - More likely than any other reptile to be given to a young child
 - Often displayed at daycares, school classrooms and given as prizes at carnivals
 - Terrarium water can amplify *Salmonella*
 - Small turtles (<4 inches in shell length) have been banned by the FDA since 1975

***Salmonella* from Poultry, Reptiles and Amphibians**

□ Key recommendations and prevention messages:

- **Keep live poultry, amphibians, and reptiles out of homes and facilities with high risk people**
- **Clean and disinfect any surfaces that have been in contact with animals**
 - Children should only perform this task under adult supervision
- **Habitats and their contents should be carefully cleaned outdoors, if possible**
 - Do not dispose of water in sinks used for food preparation or for obtaining drinking water
 - To prevent cross-contamination, avoid washing pet food and water dishes in the kitchen sink or bathtub
 - If bathtubs must be used for these purposes, they should be thoroughly cleaned and disinfected with bleach afterward

***Salmonella* in Pet Food**

- ❑ **Pet food is not manufactured to be a sterile product**
 - Pet foods and treats have contents of animal origin and are at risk for *Salmonella* contamination
- ❑ **CDC recommends against feeding raw food to dogs and cats because of the risk of illness in the pet and the people in the household**
- ❑ **Dogs and cats infected with *Salmonella* may not show clinical signs**
 - *Salmonella* can be shed in feces and saliva
 - Dogs and cats can shed *Salmonella* for extended periods of time
 - Stool or vomitus can be submitted to a state or university veterinary diagnostic laboratory for *Salmonella* culturing and pulsed-field gel electrophoresis testing (PFGE)
- ❑ **If a patient thinks their pet has become ill as a result of consuming a pet food product, advise them to visit the FDA pet food reporting page: <http://www.fda.gov/AnimalVeterinary/SafetyHealth/ReportaProblem/ucm182403.htm>**

Salmonella in Pet Food

- ❑ **Key recommendations and prevention messages:**
 - **Purchase packaged food with no visible signs of damage to the package**
 - **Avoid cross-contamination of human food and environments with pet food by:**
 - Feeding pets in areas other than the kitchen
 - Washing hands immediately after handling pet food and treats
 - Avoiding use of kitchen sink and bathtub when washing pet food and water bowls
 - **Keep children 5 years and younger away from areas where pets are fed to help prevent illness and injury**



Children and Pets

❑ Infants and children < 5 years old should avoid contact with:

- Reptiles
- Amphibians
- Baby chicks
- Ducklings
- Pets with diarrhea



Recommendations for Parents of Infants and Young Children



- ❑ Ensure children wash their hands thoroughly after all animal interactions
- ❑ Teach kind handling of animals and understanding of animal body language
- ❑ Do not allow children to kiss pets or to put their hands or other objects into their mouths after handling animals
- ❑ Puppies and kittens < 6 months are more likely have intestinal parasites- discuss the importance of routine deworming
- ❑ Wash hands prior to breast feeding or preparation of baby formula
- ❑ Clean animal cages, tanks etc. outside to prevent cross-contamination in the kitchen
- ❑ Children should be supervised at petting zoos to make the experience fun and safe!

Veterinary Care For Companion Animals

□ How Veterinarians Contribute to Public Health:

- Vaccines for Zoonoses
 - Rabies (dogs, cats) and leptospirosis (dogs)
- Parasite prevention
 - Veterinarians routinely recommend and provide monthly parasite prevention for dogs and cats
 - Preventatives (oral and topical forms) for intestinal parasites as well as fleas and ticks keep pets healthy and reduce the risk of zoonoses in pet owners
- Animal care
 - Proper pet selection and animal training for injury prevention and to support the human-animal bond



**Healthy pets =
Healthier people**



OPPORTUNITIES FOR PROFESSIONAL COLLABORATION

Opportunities for Professional Collaboration: The Physician's Role

- ❑ **Be aware of high-risk patient needs or concerns**
 - Ask if patients if they have any concern about risks associated with their pets
 - Have brochures available to provide information on zoonoses
- ❑ **Be aware of the zoonotic disease potential of your diagnosis**
- ❑ **Encourage consultation with veterinarians for follow-up**
 - Provide copies of diagnostic results and discharges to share
 - Provide a business card to pass on to veterinarian
 - Offer to be available for consultation



Opportunities for Professional Collaboration: Direct Communication with Veterinarians

- ❑ Opening direct lines of communication may be beneficial for some diagnoses
- ❑ Request written permission to contact veterinarian that includes*:
 - the information to be discussed
 - the person(s) disclosing and receiving information
- ❑ Inform patients that they can revoke this permission at any time

***Always document permission, refusal and/or revocation of permission in the patient's chart.**



Summary

- ❑ **Pet ownership has many benefits; understand the role of companion animals in the lives of your patients**
- ❑ **Pets can make people sick; animals that appear healthy can still shed infectious agents**
- ❑ **Physicians can play an important role in zoonotic disease prevention by incorporating patient education on zoonoses into daily activities**
- ❑ **Finding ways to foster relationships with veterinary health partners is vital for closing prevention gaps**



For more information, please contact the Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333

Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

E-mail: cdcinfo@cdc.gov

Web: <http://www.cdc.gov>

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