# Exotic Pets: Health and Safety Issues for Children and Parents

Kristine M. Smith, DVM, Dipl. ACZM, Katherine F. Smith, PhD, & Jennifer P. D'Auria, PhD, RN, CPNP

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**Department Editor**
**Jennifer P. D'Auria, PhD, RN, CPNP**
University of North Carolina at Chapel Hill School of Nursing
Chapel Hill, North Carolina

Kristine M. Smith, Associate Director, Health and Policy, EcoHealth Alliance, New York, NY.

Katherine F. Smith, Assistant Professor, Brown University Department of Ecology and Evolutionary Biology, Providence, RI.

Jennifer P. D'Auria, Associate Professor, The University of North Carolina at Chapel Hill, School of Nursing, Chapel Hill, NC.

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Correspondence: Jennifer P. D'Auria, PhD, RN, CPNP, Carrington Hall, CB #7460, Chapel Hill, NC 27599; e-mail: jdauria@email.unc.edu.

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In the United States, persons in nearly 28 million households own approximately 45 million exotic pets (a number that rises to 205 million when fish are included), and this trend is increasing (American Pet Products Manufacturers Association, 2011). In fact, the United States is among the world's largest consumers of imported wildlife in the world. Between 2000 and 2006, the United States imported more than 1.48 billion live non-domestic animals, 92% of which were destined for commercial sale as pets (Smith et al., 2009). However, little health regulation of these animals occurs within the pet trade or upon importation, posing an undefined risk to public health.

Exotic pets are commonly encountered by children and families in home and public settings (e.g. zoos and child care settings). Exotic pets may pose the greatest health risk to infants and very young children (i.e., those younger than 5 years) because they are more susceptible to infection as a result of suboptimal hygiene practices and naïve immune systems and because their small size and natural curiosity predispose them to injury from attacks, bites, and scratches (Mermin et al., 2004). Reactionary and spontaneous exotic pet purchases by parents for their children may be accelerated by the popularity of animal characters in animated children's' films, such as the 2009 Disney film *The Princess and the Frog*. This film, accompanied by a pet frog–associated salmonella outbreak in the same year, spurred the Centers for Disease Control and Prevention (CDC) (2009) to issue a warning regarding health risks to children associated with handling reptiles and amphibians. Despite the popularity of these exotic pets, parents may find that they are unable to provide for the unique needs of these animals. Consequently, the additional problems of exotic pet

abandonment or release into the environment may occur, posing risk to other humans, animals, and native wildlife.

Pediatric health professionals can provide anticipatory guidance to children and parents about exotic animals, including health and safety measures needed for ownership of exotic pets. Therefore the purposes of this article are to provide (a) an overview of the health and safety risks associated with certain exotic pet exposures and (b) reliable educational resources on the Web for children, parents, and health care professionals to promote safe and responsible ownership of exotic pets.

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## ZOONOSES ASSOCIATED WITH EXOTIC ANIMALS

Zoonoses, or animal-borne diseases, account for approximately 75% of emerging infectious diseases in humans, the majority of which originate in wildlife (Woolhouse & Gowtage-Sequeria, 2005). In response to zoonotic disease outbreaks, the CDC and Food and Drug Association (FDA) have sought to regulate certain exotic animals. In 1975, after a high number of salmonellosis cases associated with pet turtle ownership broke out in the United States, the FDA banned the importation of turtles less than 4 inches in length. This ban prevented approximately 100,000 cases of salmonellosis in children per year (CDC, 2003). From 2009-2011, an outbreak of *Salmonella typhimurium*, which was linked to contact with pet frogs, sickened 224 people from 42 states. The median age of affected individuals was 5 years, with 70% of the cases involving children younger than 10 years (CDC, 2011). African pygmy hedgehogs, sugar gliders, rodents, and birds also have been implicated in human salmonellosis cases in the United States. Many of these exotic pets do not become ill or show signs of illness from harboring *Salmonella*.

Children are at greatest risk for *Salmonella* exposure from reptiles (e.g. snakes, lizards, and turtles) and amphibians, although other animals may also transmit the bacteria to humans (CDC, 2003). Mermin et al. (2004) estimated that approximately 11% of the 1.2 million sporadic *salmonellosis* cases that occurred annually in children younger than 21 years in the United States were associated with reptiles or amphibians, some indirectly through contact with other persons such as a babysitter who owned the pet.

Unexpected pathogens can be introduced into the United States through the import of exotic pets. In 2003, the CDC banned importation of West African rodents into the United States following a multistate outbreak of monkeypox (orthopoxvirus). More than 70 cases across six states occurred before the end of the outbreak, with 26% of these cases requiring hospitalization. Of the laboratory-confirmed cases of monkeypox, 31% involved children younger than 18 years (CDC, 2003). The CDC investigation revealed the source of the outbreak to be a shipment of African rodents legally imported for the pet trade. The virus spread from the rodents to prairie dogs (also destined to be pets) and from the prairie dogs to subsequent owners. Prior to this outbreak in the United States, community-acquired monkeypox had never been reported outside of Africa. In Africa, monkeypox virus is typically acquired through hunting of rodents and nonhuman primates, and previous outbreaks have resulted in mortality rates of 10% (CDC, 2008). Although the U.S. outbreak was mild, it fueled intense scrutiny about the potential for human health risks from a largely unregulated pet trade industry.

Other examples of pathogens that can be transmitted by way of exotic pets and wildlife include hantaviruses, bartonella, lymphocytic choriomeningitis (which is of particular threat to pregnant women), tularemia, *Mycobacterium*, ringworm, *Yersinia*, and a variety of additional bacterial and parasitic agents. In most of these cases, disease risk is highest from wild-caught animals; however, the exotic pet trade is not well regulated for potential risks to human health, and wild-caught animals often are sold as pets or housed near captive-bred pets while awaiting sale.

## INJURIES AND EXOTIC PETS

Injuries, maulings, and deaths by exotic pets are not uncommon, with the most dangerous incidents involving big cats, bears, primates, and large constrictor and venomous snakes. New owners of exotic pets may not appreciate the specialized care required by many exotic species or the behavioral and physical changes these animals undergo as they develop and grow. The variability in potential size, temperament, and strength of many animals can be significant. For example, iguanas can grow to reach 5 or 6 feet long and have docile or vicious temperaments; snakes may grow to be several meters long and are excellent escape artists; some species of birds demand around-the-clock attention and can live 40 years or more; and rodents may pack a mean bite and can be fervent breeders.

Some exotic species may not respond well to the way they are handled by young children and protect themselves by scratching or biting children. These scratches or small bites may become infected with

unusual bacteria or viruses (Pickering, Marano, Bocchini, & Angulo, 2008). Aggression, especially directed toward small children, also can result in severe mutilation or death, such as through strangulation by a pet snake or nonhuman primate attacks (Born Free USA, 2011; Paisley & Lauer, 1988). Although the majority of animal aggression incidents are associated with more traditional domestic pets (e.g., dogs and cats), owners of exotic pets with small children may be less aware of the potential for injury posed by smaller exotic pets. Even in cases where the physical risk posed by a species is more obvious, exotic animal attacks are not unusual. Children have been attacked or killed by pet pythons, monkeys, and large carnivores owned by their families or neighbors.

The keeping of many species of captured native wildlife as a pet or for rehabilitation and release is illegal without a license or permit. The keeping or rehabilitation of wild birds is regulated at the federal level, and other species are regulated at the state level. Not only can wild animals carry zoonotic diseases such as West Nile Virus, rabies, and parasites, to name a few, but these animals are also particularly physically dangerous given their wild nature and fear of humans. According to the World Health Organization (2011), children younger than 15 years comprise 40% of people who are bitten by suspect rabid animals.

## OTHER HEALTH PROBLEMS ASSOCIATED WITH EXOTIC PETS

Although the frequency with which they occur is unknown, allergies to exotic pets are also of concern (Pickering et al., 2008). Small mammals such as guinea pigs and mice often are kept in children's bedrooms, increasing their exposure to dander, excrement, and bedding that may induce allergies through chronic exposure. Pet birds also may incite allergic reactions to their dander, excrement, or feathers. In fact, although it occurs rarely, the most common type of hypersensitivity pneumonitis in children is due to exposure to birds (Farber, Varghese, & Hilman, 2010). Allergies to other exotic pets such as rabbits, sugar gliders, and (rarely) ferrets and iguanas also have been reported (Phillips & Lockey, 2009).

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## HIGH-QUALITY INFORMATION AND RESOURCES ON THE WEB

Several Web sites sponsored by professional organizations and U.S. government agencies provide high-quality information regarding pet ownership of traditional domestic and exotic pets for parents, educators, and health care professionals. This section will focus on sites that provide consumers and professionals with reliable information specific to nontraditional or exotic pets.

The PetWatch Program was launched in May 2011 by EcoHealth Alliance, an international organization of experts in the fields of disease ecology, veterinary medicine, and conservation biology that reflects the growing concept of One Health (http://www.onehealthinitiative.com). The PetWatch Web site (http://www.PetWatch.net) is dedicated to providing evidence-based information to consumers about exotic species with the goal of helping individuals and families make responsible and safe decisions about exotic pet ownership. The site has a professional and visually appealing design with simple and intuitive navigation to search for general resources or for specific topics related to exotic pets including diseases from pet rodents, *Salmonella* and reptiles, pets with aggressive temperaments, and ownership of constrictor snakes, spiders, local wildlife, venomous snakes, wild cats, and primates. A unique feature of PetWatch is the "Best, Fair and Worst Choice" exotic pet rankings based on four criteria broadly aimed at protecting public health, native wildlife and resources, and global biodiversity. Information associated with a species' health threat, including lists of potential zoonotic diseases and safety concerns, is easily viewed on each species' page and should be of primary interest to children, parents, and pediatric health providers.

The CDC maintains the Healthy Pets Healthy People (http://www.cdc.gov/healthypets) Web site that includes current health information on common household pets and wild animals, prevention tools for individuals at risk of getting animal-borne diseases and for health professionals (including CDC's PetScriptions), and other resources including publications and presentations. In addition, the CDC Emergency Preparedness and Response Web site provides guidelines for animal safety and control of the transmission of infectious diseases during disasters (emergency.cdc.gov/disasters/animalhealthguidelines.asp#management). Health professionals and parents may want to explore the CDC National Center for Emerging and Zoonotic Infectious Diseases (http://www.cdc.gov/ncezid) Web site, which provides up-to-date health information and resources to control the transmission and spread of infectious diseases. The CDC Kidtastics series includes a growing

**BOX. Centers for Disease Control and Prevention Kidtastics series: podcasts related to safe pet exposures**

**All You Have to Do Is Wash Your Hands**
http://www2c.cdc.gov/podcasts/player.asp?f=11072

**Don't Kiss a Frog!**
http://www2c.cdc.gov/podcasts/player.asp?f=13482

**I Love Petting Zoos!**
http://www2c.cdc.gov/podcasts/player.asp?f=955042

**Love Animals AND Stay Safe**
http://www2c.cdc.gov/podcasts/player.asp?f=8595973

**Water Frogs, Aquariums, and Salmonella—Oh My!**
http://www2c.cdc.gov/podcasts/player.asp?f=442708

library of entertaining podcasts to educate children (ages 5-10 years) about how to control and minimize exposures to infectious diseases, as well as other related health topics. These podcasts are written "for kids" and narrated by children and can be downloaded to a computer. The Box provides the titles and links to Kidtastics podcasts (available in English and Spanish) related to minimizing transmission of contagious pathogens between animals and humans.

Several other high-quality health Web sites provide information regarding pet selection and ownership, including exotic pets. Kidshealth (kidshealth.org) provides information and resources for parents, kids, and teens about pet selection, reducing exposure to infectious diseases such as salmonellosis, and other considerations about pet safety. About.com maintains a large Exotic Pet division (http://exoticpets.about.com), supervised by animal experts, on its Web site. A great deal of information is available on the site about exotic pets, ranging from exotic pet laws to zoonotic diseases.

Several "pet vet" educational simulation games have been developed for children. Legacy Interactive (http://www.legacygames.com) has developed two award-winning veterinarian games to help children learn about animals and what is involved in caring for them. Zoo Vet 2 Endangered Animals and Farm Vet are both award-winning games that require the player to take on the role of the veterinarian. In Zoo Vet Animals, the player is the zoo veterinarian and learns how to take care of sick and endangered animals, perform animal checkups, treat animal diseases, and even handle zoo emergencies. In Farm Vet, the player must tackle the role of a farm veterinarian. Sixty medical problems and 30 veterinarian tools are introduced to the player based on real-life scenarios written by veterinarians.

## ANTICIPATORY GUIDANCE FOR CHILDREN AND PARENTS

Well-child visits provide an opportune time for the pediatric nurse practitioner (PNP) to inquire about a child's exposures to exotic animals in the home or in public settings and provide information about associated health risks. The American Academy of Pediatrics (Pickering et al., 2008) does not recommend exotic animal ownership for families with infants and children younger than 5 years. Parents should be advised of the health risks associated with exotic pet exposures for persons with a primary or secondary immunodeficiency, pregnant women, or the elderly. In general, it is important to remind children and parents that frequent hand washing is the simplest and most effective measure to decrease the transmission of pathogens from exotic pets and wildlife to humans.

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Pediatric health professionals are in a critical position to guide children and families to reliable information about exotic animal ownership or pet exposures. PNPs can advise families to avoid impulsive decisions and take time to make an educated decision about exotic pet ownership. When selecting a pet, parents should consider the age, stage of development, and health status of family members, relatives, and close friends, as well as the context of their immediate community. Parents should carefully evaluate the time they will be able to devote to exotic pet care, including the supervision and education of other family members to provide safe handling of the pet. It will be critical for parents to make sure the community has a veterinarian who can provide checkups and illness care for the pet. If the community has such a veterinarian, encourage the parents to speak with him or her to answer any questions they may have about pet selection and care. Once a decision is made, children and their parents should receive education about the health risks associated with the nontraditional pet and guidelines for minimizing health risks. For example, pet reptiles and amphibians should not be allowed to roam free in the home, and their cages should not be kept a child's bedroom. Exotic pet cages should not be cleaned in the kitchen sink, and if a bathtub is used for this purpose, it should be disinfected with bleach afterward and rinsed thoroughly. If children

are exposed to exotic animals in the community through school-related activities, PNPs can consult with veterinarians in the community to educate teachers, day care staff, and children about the potential risks associated with exotic animals, indirect transmission routes (such as surface contamination), and proper hand-washing practices. Finally, closer collaboration among all child health providers, veterinarians, policy makers, and the wildlife industry will be required to effectively advocate for human safety and animal welfare.

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