Turtles

For Public Health Personnel

Worms & Germs
Promoting Safe Pet Ownership

General Information on Pet Turtles

- Most pet turtles can be broadly classified into one of two kinds: aquatic turtles or terrestrial turtles, which are also called tortoises. The most commonly studied pet turtle species is likely the Red-Eared Slider (*Trachemys scripta elegans*), which is an aquatic species, but both types are popular and many different species are available.
- Husbandry and environmental factors play a key role not only in the well being of a pet turtle, but also in its ability to fight disease and its tendency to shed potentially pathogenic bacteria. Particularly in turtles from pet stores, stress and suboptimal management result in most turtles either carrying or being infected by one or more bacterial or protozoal pathogens at the time of purchase. Turtles are commonly carriers of *Salmonella* spp., zoonotic transmission of which is a well recognized phenomenon, and results in significant human disease.
- A well-cared for turtle can live for over 50 years in captivity, and turtles can be fascinating, enjoyable pets for many people if a few simple guidelines are followed to reduce the risk of disease transmission from pet to owner.

Obtaining a Turtle

- In 1975, the US Food and Drug Administration (FDA) banned the sale of pet turtles with a carapace (shell) length of less than four inches, except for educational or exhibitional purposes. This was done due to high rates of turtle-associated salmonellosis among children, who were more likely to extensively handle these smaller turtles. When originally put into effect, it was estimated that this ban prevented some 100 000 cases of childhood salmonellosis each year in the US.
- This law is not in effect in Canada, however in the same year Agriculture Canada banned the importation of turtles into the country in a similar attempt to decrease the number of cases of human salmonellosis associated with these animals. Importation of embryonated (fertilized) turtle eggs, however, was still allowed.
- Some pet stores no longer carry turtles because they tend to be impulse purchases of people who do not understand what is required to properly take care of a turtle, nor the health risks associated with turtles.
- The number of households with reptiles, including turtles, in the US doubled between 1991 and 2001, with a parallel increase in isolation of reptile-associated *Salmonella* serotypes from humans. Canadian statistics are not available, but it is likely that the trends would be similar.

Turtle Management

Turtles have very specific dietary and environmental requirements to keep them healthy. Owners should be referred to their veterinarian or other experienced reptile owners for specific details on turtle husbandry.

Cleaning: Keeping a turtle's environment clean is essential for disease prevention and control. Neither a turtle nor any objects that have come in contact with a turtle should ever be washed in the kitchen or anywhere where food might be kept or prepared. Any surface or object that comes in contact with a turtle or something from the turtle's enclosure should be considered contaminated and disinfected appropriately with a solution such as 10% household bleach.

Recognizing Illness In Turtles

- Signs of illness in turtles include abnormal discharge, changes in skin or shell colour, swellings on the legs or head, foul odour and diarrhea. Anorexia and lethargy are often indicators of illness, but can also occur with hibernation.
- If the behaviour or appearance of a pet turtle becomes abnormal, the owner should be encouraged to seek veterinary advice. Some owners may avoid taking a turtle to a veterinarian due to the cost of veterinary care relative to the value of the animal. Many times turtles become sick due to inadequate or inappropriate diet or environment, but it is very important to rule out infectious disease.

Certain stresses can increase the active shedding of *Salmonella* in turtles, even if they do not become sick. This may occur if a turtle's environment is not properly maintained in terms of temperature, humidity, or cleanliness, if the turtle does not have adequate food and clean water, or if the turtle is handled excessively. This increased shedding can increase the risk of both the turtle and its owner developing clinical salmonellosis.

Turtle Bites

Turtles should be handled as little as possible, both to limit the opportunity for disease transmission and because overhandling can be a significant stressor to the animal. All turtles may bite. Many of the opportunistic pathogens found in the turtle's intestine are also found in the mouth. Bite wounds should be vigorously cleaned immediately with large volumes of soap and water, and monitored closely for signs of infection.

Zoonotic Diseases Of Turtles

The greatest public health concern with regard to pet turtles is their potential to carry and transmit *Salmonella* spp. Please refer to the information sheet on salmonellosis for more details about this specific disease.

- It has been estimated that 90% of all reptiles carry and shed *Salmonella* in their feces. In the majority of cases these animals are subclinically infected because the bacteria are often part of the commensal flora of the gastrointestinal tract.
- Fecal shedding can be intermittent, therefore a negative fecal culture does not rule out *Salmonella* carriage. There is in fact **no reliable method by which a turtle can be guaranteed to be free of *Salmonella***.
- *Salmonella* serotypes that have been isolated from turtles include, but are not limited to, S. Pomona, S. Java, S. Jangwani, S. Stanley, S. Poona, S. Muenchen, and S. Newport. The most common serotypes isolated from human salmonellosis cases, S. Enteriditis and S. Typhimurium, are also found in reptiles.
- Although salmonellosis in people is most commonly the result of consumption of contaminated food, between 3-6% of sporadic human salmonellosis cases may be the result of exposure to exotic pets, including reptiles. It has therefore been recommended by the Centers for Disease Control and Prevention (CDC) that households with children less than five years old, pregnant women, or individuals who are elderly or immunosuppressed should not keep any reptiles, including turtles, as pets.

- *Mycobacterium* spp. are known to be carried by turtles.
- Turtles often carry many potential pathogens, other than *Salmonella*, as part of their commensal gastrointestinal flora, including *Escherichia coli*, *Klebsiella* spp., *Citrobacter* spp., *Pasturella* spp., *Aeromonas* spp., *Pseudomonas* spp., *Clostridium* spp., *Enterococcus* spp., *Corynebacterium* spp., *Streptococcus* spp. and *Staphylococcus* spp.
- Gastrointesinal parasites are also very common in turtles, including *Cryptosporidium* spp., roundworms and tapeworms, but there is no evidence that these parasites are zoonotic.

Infection Control

- **Hand Hygiene:** Hands should be thoroughly washed with soap and running water after handling a turtle, cleaning the turtle's terrarium/aquarium, or coming into contact with turtle bedding, feces or urine. It is important that a person not touch any parts of his/her own face, other people, objects or surfaces prior to washing his/her hands as this can result in contamination and spread of *Salmonella*.

- **Environmental Contamination**: Any object or any surface that has come in contact with a turtle should also be treated as potentially contaminated with *Salmonella*, and disinfected accordingly with an appropriate product such as 10% household bleach. Touching contaminated objects or surfaces constitutes indirect contact with the turtle, and can result in transmission and infection with *Salmonella*, particularly in high-risk individuals.

- **Public Education:** Education of the public regarding the risk of *Salmonella* transmission from reptiles, including turtles, has been shown to decrease the number of reptile-associated salmonellosis cases. The Center for Disease Control and Prevention (CDC) has recommended for years that pet stores, healthcare providers and veterinarians alike provide information regarding the risk of transmission of *Salmonella* from reptiles to owners and to individuals considering purchasing such an animal. Some US states now require that anyone acquiring a reptile is provided with written point-of-sale educational material regarding the risk and prevention of reptile-associated salmonellosis.

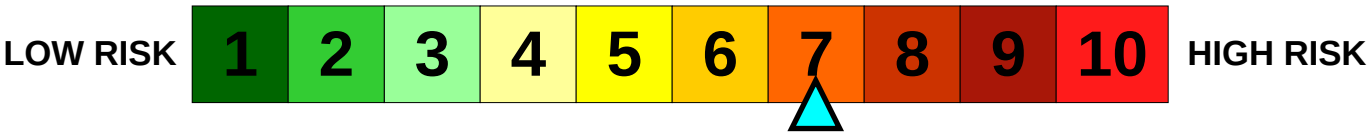
Zoonotic Disease Risk

For **healthy adults and older children**, the risk of acquiring *Salmonella* from a pet turtle is present, but can be minimized by:

- Handling the animal as little as possible
- Restricting the turtle to its enclosure and not letting it roam
- Keeping the turtle and its enclosure clean
- Using proper hand hygiene to decrease the transmission of bacteria

For this group, turtles are:

HEALTHY ADULTS / OLDER CHILDREN



Individuals with Compromised Immune Systems:

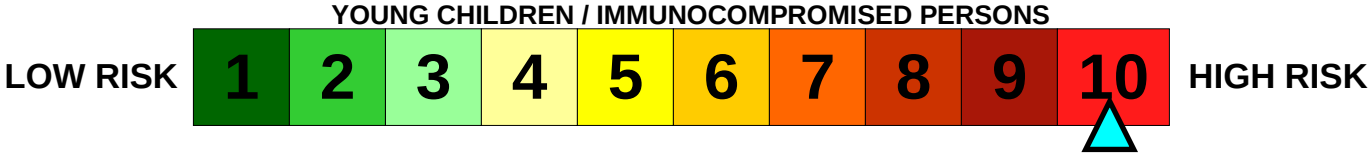
- Immunosuppressed or immunocompromised individuals are more susceptible to many kinds of infections, including those which may be transmitted by pets. Some pets are much higher risk than others. It can be safe and even beneficial for such a person to have a pet, if extra precautions are taken to prevent disease transmission.
- Unfortunately, due to the very high carriage rate of *Salmonella* among turtles and other reptiles, as well as the severity of the infection these bacteria can cause, these animals are **NOT** suitable pets for persons in this group, and should not be kept in the same household.
- If an immunocompromised person comes into direct or indirect contact with a reptile, he/she should immediately and thoroughly wash his/her hands with soap and running water. Any clothing that may have become contaminated should also be removed and laundered separately as soon as possible. Similar precautions can be applied to elderly individuals.

Infants and Young Children:

- Young children are more likely than adults to extensively handle animals if given the opportunity. This was part of the reason for the FDA ban of the sale of smaller turtles in particular, as these animals are easily picked up and handled much like toys, and children may even put them in their mouths.
- Children are also more likely to touch their faces or mouths, and are less likely to wash their hands after handling any kind of animal. Although children tend not to "snuggle" with an animal such as a turtle, small turtles, especially, are quite attractive due to their brightly coloured shells and slow, non-threatening demeanor.
- Due to the high risk of transmission of *Salmonella* from turtles and other reptiles, these animals should not be kept in the same household as any child under five years of age, even if the child is not allowed to have direct contact.
- Expectant mothers, although perhaps not at any significantly increased risk of acquiring salmonellosis compared to other adults, should ensure that any reptiles are removed from the home prior to arrival of the baby.

For these groups, turtles are:

YOUNG CHILDREN / IMMUNOCOMPROMISED PERSONS



Additional Information

- Centers for Disease Control and Prevention (CDC). Multistate outbreak of human *Salmonella* infections associated with exposure to turtles - United States, 2007-2008. MMWR Morb Mortal Wkly Rep. 2008;57:69-72.
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- Mermin J, Hutwagner L, Vugia D, et al. Reptiles, amphibians, and human *Salmonella* infection: a population-based, case-control study. Clin Infect Dis. 2004;38:s253-261.
- Stam F, Romkens TE, Hekker TA, Smulders YM. Turtle-associated human salmonellosis. Clin Infect Dis. 2003;37:167-169.