Rabbits

For Vets

Worms & Germs
Promoting Safe Pet Ownership

General Information on Rabbits

- In 2006, 6.2 million pet rabbits were owned by 1.6% of US households. Rabbits are the most common small mammal kept as pets in the USA other than dogs and cats.
- There are approximately 50 species of rabbits and hares in the family Leporidae (order Lagomorpha), but the **European Rabbit** (*Oryctolagus cuniculus*) is the only domesticated species, which has been selectively bred to produce the wide variety of domestic breeds currently in existence.
- Dwarf rabbits may weigh less than 1 kg, whereas giant breeds may weigh over 10 kg.
- A pet rabbit can live for approximately ten years with proper care, but life expectancy varies by breed.
- It is very important for owners to be informed about appropriate husbandry for rabbits before obtaining such a pet. Rabbits can be excellent, entertaining pets, but good management is critical to keeping a rabbit happy and healthy.
- In general, rabbits are a relatively low-risk pet in terms of their potential to transmit zoonotic diseases to humans, but it is important to be aware of the diseases they can carry.

Obtaining a Rabbit

- As for dogs and cats, rabbits can be purchased from pet stores or directly from breeders, or obtained from rabbit rescue groups or shelters.
- Typically little is known about the history of animals from pet stores, but the stress of transportation, mixing with other animals and sometimes crowded living conditions can lead to an increased risk of infection and disease. Even rabbits obtained from breeders are often housed in large groups, which can facilitate transmission of pathogens in some cases.
- It is important to **counsel prospective rabbit owners** on selection of an animal that appears bright and active, with well kept fur and without any signs of diarrhea or discharge from the eyes, nose or mouth. Because rabbits often have thick or fluffy coats, it is important to palpate the rabbit to determine if its body condition is adequate.

Rabbit Management Basics

Behavior

- Rabbits are typically **sociable animals**. It is important to provide environmental enrichment and social interaction for rabbits so they do not become bored.
- Rabbits are normally **coprophagic**. They pass two kinds of feces: soft or night feces, and hard feces. Soft feces have a relatively lower fibre content and contain more water, protein, volatile fatty acids, vitamins and minerals. Rabbits eat the soft feces in order to absorb these extra nutrients.
- Rabbits should be allowed to **exercise** is a safe enclosure or area of the house **several times a week**, or even daily. Ensure there is nothing in the area that the rabbit could chew (particularly electrical cables), and provide rabbit-safe distractions like chew toys, woven straw mats or even paper towel rolls/toilet paper rolls.

Feeding

- The most important component of a rabbit's diet is provision of adequate **long-stem fibre (hay)** which promotes normal gastrointestinal motility. **Pellet feeds** are typically well balanced, but the length of fibre they provide is too short, so the amount of pellet fed should be limited. **Fresh greens and vegetables** should also be offered in limited amounts. High carbohydrate and sugary foods should be strictly avoided.
- **Fresh water** should be available at all times in either a sipper-tube bottle or bowl. Avoid adding supplements to the water such as vitamins, because this may make the rabbit less likely to drink if it dislikes the taste of the water.

Housing:

- Rabbits can be kept in outdoor hutches, but it is recommended that **pet rabbits be housed indoors** to protect them from attack and disease transmission from wildlife.
- Rabbits are extremely **heat sensitive**. Ventilation and temperature control of the rabbit's environment are very important at all times.
- **Wire cages** provide better ventilation than glass aquariums, which helps prevent build up of ammonia fumes from urine which can cause respiratory and skin problems. The enclosure should be at least three times the size of the adult rabbit stretched out.

- Bedding in **solid-bottomed cages** must be changed frequently to prevent chronic soiling of the animal's feet which can lead to pododermatitis. Some rabbits can be trained to use a litter box. **Wire-bottomed cages** allow feces and urine to drop through, but a platform of wood, hay or cardboard should included to provide a **resting area** where the rabbit does not need to stand on the wire.
- **Bedding** should consist of paper, straw, hay, or pelleted products. Corncob, clay and clumping litters can cause intestinal obstruction if ingested. Woodchips and shavings have been associated with respiratory, dermatologic and hepatic problems.

Basic Veterinary Care

- There are **no vaccines** licensed for use in rabbits in North America, although vaccination against myxomatosis and viral hemorrhagic disease is common in Europe and Australia.
- The gastrointestinal flora of rabbits is very sensitive to the effects of many antimicrobials, use of which should be avoided due to the risk of severe, often fatal, **enteritis**. These drugs include oral penicillin, lincomycin, erythromycin, clindamycin, and cephalosporins.
- Rabbits should be **spayed or neutered** at 4-6 months of age. Spaying and neutering tends to make rabbits less territorial and less aggressive to other rabbits, other pets and people. Intact female rabbits over two years of age are at extremely high risk of reproductive and mammary neoplasia.
- A **dental examination** should be performed as part of every general physical examination. This can be done safely in almost all awake patients, using an otoscope to visualize the caudal dental arcades. However, many dental treatments (including substantial trimming or filing) should only be performed under general anesthesia.

Handling Rabbits

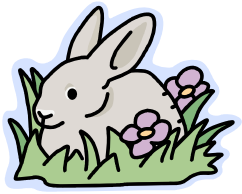
It is very important that rabbits are handled and held properly. A rabbit's hind legs are so powerful that **if the animal kicks when it is not properly supported**, the force can cause a **vertebral fracture** (usually L6-L7). Improper handling can also result in scratches, or attempts by the rabbit to bite.

- Rabbits can be picked up in a similar manner to cats, placing one hand between the forelegs and the other hand under the rabbit's rump, which supports most of the rabbit's weight. The rabbit should be held firmly but gently, and close to the chest. If a rabbit is held too loosely or too tightly, it may begin to struggle or try to get away.
- **Never use the ears or scruff to pick up a rabbit.** The scruff and the ears can be used for secondary restraint if necessary, but the rabbit's weight must be fully supported by other means at the same time.
- In some cases it is best not to pick up frightened or skittish rabbits; these animals may be restrained on a table. **Do not try to restrain the forelegs or especially the hind legs** in order to reduce the risk of vertebral fracture (see picture left).
- A rabbit should always be placed in a cage or pet carrier hind end first, so that it does not try to jump out of the hands of the handler.

Rabbit Bites

- **All rabbits may bite.** Bite wounds from rabbits may be small, but they can create deep puncture wounds.
- All bite wounds should immediately be cleaned vigorously with large volumes of soap and water, and monitored closely for signs of infection. Infection is usually caused by bacteria from the skin of the person bitten or the rabbit's mouth, including *Pasteurella multocida*, which can cause particularly serious infection.
- Medical attention should be sought for any bite over a joint, hand, tendon sheath, prosthesis, implant or genital area, and for any bite to an immunocompromised individual (e.g. HIV/AIDS, transplant and cancer patients).

Zoonotic Diseases Of Rabbits



Rabbits are infrequently associated with disease transmission to people. Nonetheless, each of the following diseases or pathogens may on occasion be carried by rabbits and potentially be transmitted to humans. Please refer to specific disease information sheets for more details.

Salmonella* sp.*, *Escherichia coli, Clostridium difficile:

- These pathogens have all been associated with bacterial enteritis in rabbits and are potentially transmissible to humans by the fecal-oral route. Clostridiosis in particular is associated with dysbiosis following sudden diet changes, antimicrobial therapy or stress resulting is decreased gastrointestinal motility. Subclinical *Salmonella* carriage occurs in many species and can likely occur in rabbits as well, so it is still prudent to take precautions (see below) when handling rabbit feces and soiled bedding in particular. Bacterial enteritis of any kind in rabbits can be very serious, and requires prompt attention.

Dermatophytosis (ringworm):

- A fungal skin infection caused by one of several species of *Microsporum* or *Trichophyton*. Humans may develop well-delineated areas of red, raised, itchy skin that are often lighter in the centre and therefore appear as a "ring." The fungi are transmitted by contact with the skin, fur or dander of an infected animal, particularly if the person's skin is damaged or moist. Signs of dermatophytosis in rabbits can range from none at all, to patches of alopecia and red, dry, scaly skin that are often mildly pruritic.

Encephalitozoonosis:

- Infection with *Encephalitozoon* spp., which are intracellular protozoal parasites (family Microspora) that can cause intestinal or systemic infection in humans and animals. Among the microsporidia that infect humans, *E. cuniculi* appears to be one of the most virulent. Encephalitozoonosis is **rare in immunocompetent persons**, but is a frequent complication in patients who are immunocompromised. *Encephalitozoon cuniculi* can be found in many animal species, including rodents, dogs, cats, horses, pigs and particularly rabbits. Transmission from rabbits is typically via ingestion of spores shed in the urine. Lesions in infected rabbits and humans are most commonly found in the brain and kidneys. Clinical signs in rabbits are typically neurological, but most infections are subclinical. Confirmed transmission of *E. cuniculi* from rabbits to humans has not been reported, but due to lack of evidence to the contrary and the severity of disease caused by the parasite, caution is warranted.

Fleas and Ticks:

- Fleas and ticks can act as vectors for zoonotic diseases such as tularemia, plague, Lyme disease and Rocky Mountain spotted fever, but the species of fleas and ticks typically found on rabbits rarely bite humans, and the risk of transmission of zoonotic disease from rabbits to humans via such bites is considered low. Rabbit fleas are usually distinct species from those that affect dogs and cats, although dog and cat fleas (*Ctenocephalides canis* and *C. felis*) are occasionally found on rabbits.

Mange due to *Cheyletiella parasitivorax*:

- *Cheyletiella parasitivorax* is a common non-burrowing mite of domestic rabbits that can also infect cats and dogs. It can also *temporarily* infest humans, causing dermatitis. Infection in rabbits is often subclinical, but partial alopecia with or without pruritis may occur. Inflammation of the skin is usually not severe.

Rabies:*

- A viral infection of the nervous system which is almost always fatal once clinical signs appear. Transmission occurs when the saliva of an infected animal comes in contact with a wound (such as a bite or scratch) or mucous membrane. Rabbits very rarely become infected with rabies because they are typically killed by the physical trauma of a bite from a rabid animal. However, rabbits can survive and be infected by the bite of a rabid bat. Rabbits can also survive attack by larger rabid animals (and become infected) if they are partially protected in an enclosure. Confirmed cases of rabid rabbits biting humans have not been reported, but post-exposure prophylaxis has been recommended in some cases following non-bite contact with rabid rabbits.

Tularemia ("rabbit fever"):*

- A bacterial infection caused by *Francisella tularensis*, which is found naturally in many parts of the northern hemisphere, including the USA and Canada. It is most commonly found in wild animals such as lagomorphs (e.g. rabbits, hares) and rodents. The major reservoir host in North America is the cottontail rabbit (*Sylvilagus floridanus*). The majority of infections in the USA likely occur due to insect bites (e.g. ticks, flies), handling infected wildlife/game (e.g. rabbits, hares, rodents) and occasionally from airborne transmission. Infection in people and animals can be subclinical, or it may cause flu-like signs, lymphadenitis, severe diarrhea or pneumonia. The bacteria themselves are highly infectious (it only takes 10-50 bacteria to infect a person).

* Notifiable disease in people in Canada

Other "Zoonotic" Diseases of Rabbits

Rabbits can occasionally be infected with *Giardia duodenalis* and *Cryptosporidium* spp., which can potentially infect humans, but transmission of these pathogens from rabbits to people has not been reported. Rabbits can also be systemically infected with *Toxoplasma gondii* and larvae of *Baylisascaris procyonis*, but they cannot transmit these parasites. There are also no reports of human infestation with *Sarcoptes scabiei* acquired from rabbits. Rabbit ear mites (*Psoroptes cuniculi*) are not known to infest humans.

Pasteurella multocida is a common cause of upper respiratory disease ("**snuffles**") in rabbits. This pathogen can cause respiratory infections in humans, and could theoretically be transmitted by aerosol from an infected rabbit, but people are much more likely to develop **pasteurellosis from a rabbit** in the form of an **infected bite wound**.

Recognizing Illness In Rabbits

- Common signs of illness in rabbits include, but are not limited to, decreased appetite and activity level, bloating or abdominal distension, changes in the colour or consistency of feces, ptyalism and bruxism, dysuria, etc.
- Rabbits fed diets with insufficient long-stem fibre content may develop diarrhea or constipation, and some may frequently try to **chew hair**. These animals are often depressed and inappetant.
- If the behaviour or appearance of a pet rabbit becomes abnormal, the owner should be encouraged to seek veterinary advice. Some owners may avoid taking a rabbit to a veterinarian due to the cost of veterinary care relative to the value of the animal. Illnesses in rabbits may be due to inadequate or inappropriate diet or environment, but it is very important to rule out infectious disease.
- Points to address when attempting to discern contributing factors to, or the cause of, illness in a rabbit include:
  - Adequate provision and accessibility to clean drinking water
  - Frequency, quantity and quality of feed, including what the rabbit actually eats versus what is offered
  - Type of enclosure, bedding and frequency of cleaning

Infection Control

Although rabbits are generally low-risk in terms of their potential to transmit disease to humans, there is always some risk. The risk of illness in a rabbit and zoonotic transmission can be reduced by proper handling, good management, personal hygiene and routine healthcare. A rabbit that is not stressed and is well cared for is less likely to be susceptible to infection, and therefore less likely to transmit infection to a person.

- Prolonged close contact, such as allowing a rabbit to sleep in the same bed as a child, should not be permitted.
- Anyone handling a rabbit, especially children, should be taught how to do so correctly and as safely as possible.

Hand Hygiene

- Hands should be thoroughly washed with soap and running water, or an alcohol-based hand sanitizer should be used, after handling a rabbit, cleaning a rabbit's cage, or coming into contact with rabbit bedding, feces or urine.
- Children should be supervised by an adult to ensure that this is done properly.

Cleaning Up

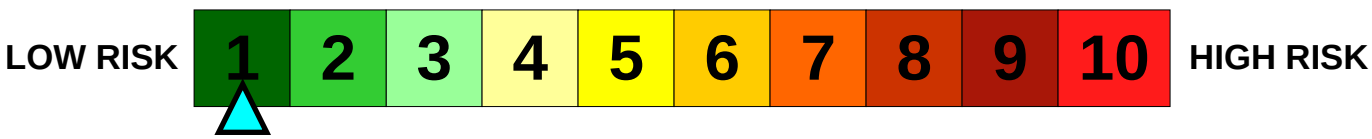
- Rabbit enclosures should be checked daily for build up of feces and urine in the bedding. Feces should be scooped out **daily or every other day**, even if the rabbit uses a litterbox.
- The entire enclosure should periodically be thoroughly cleaned, including removal of all bedding and disinfection of the cage itself. Some rabbits may need to have their cages cleaned out more frequently than others.
  - All old bedding should be removed and the inside of the cage should be scrubbed with soap and water using a stiff-bristled brush in order to remove any remaining excrement/debris that may be adhered to the surface.
  - Once the cage looks clean, a household disinfectant (e.g. bleach (diluted 1:9 with water)) should be applied. The disinfectant should be left in contact with all surfaces for at least 10 minutes, followed by thorough rinsing with water. Allow the cage to dry completely prior to filling it with clean bedding.

- Hands should always be washed thoroughly with soap and water after cleaning the cage. Immunocompromised individuals (e.g. HIV/AIDS, transplant or cancer patients) should try to have someone else clean their rabbit's cage for them if possible. Otherwise, these individuals should wear rubber gloves while they are cleaning and be particularly diligent about washing their hands as soon as they are finished.
- **Food bowls** and **water bottles** should also be cleaned daily, and thoroughly washed with hot soapy water weekly in order to prevent build up of bacteria on these objects. Any **fresh produce** that are not eaten promptly by the rabbit should be **removed** in order to prevent spoilage.

Zoonotic Disease Risk

For **healthy adults and older children** (over 5 years old), the zoonotic disease risk associated with a pet rabbit is:

HEALTHY ADULTS / OLDER CHILDREN



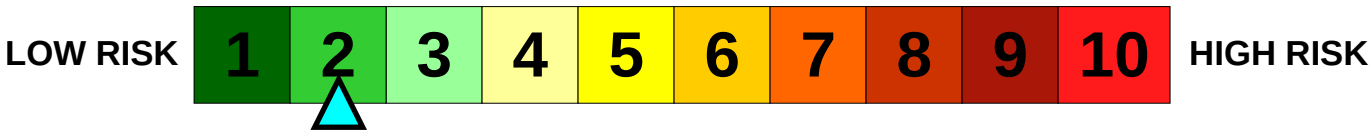
Groups at higher risk of acquiring a zoonotic disease from pets, including rabbits, are **immunocompromised individuals** (e.g. HIV/AIDS, transplant and cancer patients), infants, **young children** less than five years of age, and the elderly. Nonetheless, pet ownership can have significant emotional benefits for members of these groups. With selection of an appropriate pet and close attention to infection control measures, the risk can be significantly reduced.

With regard to rabbits living with high-risk individuals, important points to consider include the following:

- Be diligent and thorough about **hand washing** after handling the animal or cleaning its cage.
  - High risk individuals should try to have someone else clean the rabbit's enclosure regularly. Otherwise the person should wear rubber gloves when cleaning the enclosure and be very diligent about washing his/her hands as soon as the task is completed.
- Keep the rabbit **away from food** preparation areas and food meant for human consumption.
- **Know how to handle** a rabbit correctly (in a calm, gentle manner), and only handle the animal when necessary to minimize the risk of bites or scratches.
- Keep the rabbit in **good health** through proper management and veterinary care.

For these groups, the zoonotic disease risk associated with a pet rabbit is likely:

YOUNG CHILDREN / IMMUNOCOMPROMISED PERSONS



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