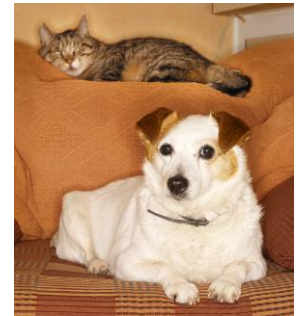


What is *Staph aureus* & MRSA?

- *Staph aureus* (short for *Staphylococcus aureus*) is a bacterium that is normally carried in the nose of about 30% of the general human population. Typically it causes no problems at all, but it is an **opportunistic pathogen** – if a person gets injured or sick for another reason, *S. aureus* can take advantage of the body's weakened defenses and cause infection. It can infect almost any tissue, but skin and soft tissue infections are most common.
- Strains of *S. aureus* can be either methicillin-resistant (**MRSA**) or methicillin-susceptible (MSSA). But MRSA strains are not just resistant to methicillin, they're **resistant to all the antibiotics in the same drug family as methicillin** (the beta lactams), including many common drugs such as penicillins and cephalosporins.
- Some strains of MRSA, particularly in hospitals, are also resistant to other families of antibiotics, which can make infection extremely difficult to treat.
- People and animals can carry MRSA without any signs of infection at all. This is known as **colonization**, which may be short-term or long-term. **Infection** with MRSA causes signs of inflammation (e.g. heat, pain, swelling, discharge, fever).
- Pets such as dogs and cats do not commonly carry MRSA. It is suspected that **MRSA found in pets usually originates from humans**. However, once colonized or infected, dogs and cats can pass the bacterium on to other animals and people.



How Common is MRSA?

Humans

- ▶ MRSA may be carried in the nose by 0.2-3.5% of the general population, depending on geographical location.
- ▶ MRSA is an important **hospital-associated (HA)** pathogen, which causes infection in people with risk factors such as recent hospitalization, surgery, antibiotic use, chronic illness, and residence in long-term care facilities.
- ▶ Infection with MRSA has also become a **community-associated (CA)** disease, which can affect anyone in the general population, even without traditional HA risk factors.
- ▶ People who work with horses, cattle or pigs may be at increased risk of acquiring MRSA.
- ▶ The prevalence of MRSA varies widely in different parts of the world. In some places in the USA, more than half of all *S. aureus* isolates are MRSA, whereas in some European countries less than 1% are MRSA.

Animals

- ▶ *Staphylococcus aureus* is not usually found in most dogs and cats, although the frequency with which it is found varies widely between studies.
- ▶ Cases of MRSA colonization and infection were first described in dogs and cats in the 1990s, including some reports in which the people who lived with the pet were carrying the same strain.
- ▶ As in people, the percentage of healthy pets that carry MRSA is low (less than 4%). Pets may carry MRSA in the nose, intestinal tract or on the skin.
- ▶ Risk factors for MRSA in pets are largely unknown. Some are likely similar to those in humans, such as previous surgery, hospitalization, and antibiotic use. Pets used in hospital visitation programs may also be at increased risk.

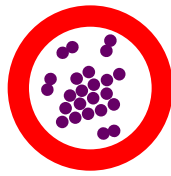


How Do Animals & People Get MRSA?

Transmission of MRSA to people or animals can lead to colonization alone, infection, or both.

- **In human hospitals**, MRSA is most often transmitted on the **hands of healthcare workers**.
- Transmission of MRSA **in the community** occurs through **direct contact** with high-risk, colonized or infected individuals. Outbreaks have occurred on sports teams, military bases and prisons where many people may have close contact with each other, hygiene may be less than ideal, and breaks in the skin may be common.
- **Pets** most often probably get MRSA from people, and they can carry MRSA in their **noses and around the anus**. Direct contact with these areas or tissues infected with MRSA (e.g. an infected incision) are most likely to result in transmission from pets.

MRSA can survive **in the environment** for a limited period of time, but the bacteria are susceptible to most commonly used disinfectants, if the surface/equipment is cleaned properly before the disinfectant is applied.

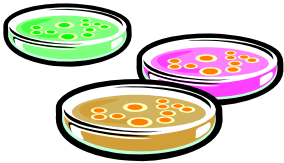


What Happens If A Person Or Pet Gets MRSA?

Most healthy people and animals that are exposed to MRSA have no problems at all – they may become colonized for a short time, or even a long time, often without ever knowing it. But in some cases, infection can occur.

- **Humans:** Infection with MRSA in humans can cause the same kinds of infections as MSSA, including skin and soft tissue infection (SSTI) (in particular infection of surgical sites), pneumonia, and infection of the joints, bone, bloodstream and heart valves. Community-associated MRSA infections are most frequently associated with SSTIs, including simple skin abscesses, but *rarely* CA-MRSA strains can also cause severe, rapidly fatal pneumonia and “flesh-eating” disease. Soft tissue infections with some CA-MRSA strains can occur without any previous damage to the skin, and initially may appear very similar to a spider bite.
- **Animals:** In dogs and cats, the most common conditions associated with MRSA tend to be skin infections, post-operative incisional infections and wound infections. The bacteria have also been isolated from the urinary tract, auditory canal, skin, eye and joints.

How is MRSA Diagnosed?



Because MRSA can cause so many different kinds of **infections**, and it's impossible to tell for sure what kind of bacteria are involved based on how the infection looks, MRSA is usually diagnosed based on bacterial culture, which can take 1-3 days to complete. Molecular tests are now being used which can detect MRSA more rapidly (hours versus days), but these tests are not used in animals.

The body site most likely to be **colonized** with MRSA in humans is the nose, so a nasal swab is often cultured to check for MRSA colonization. The ideal body site to culture in colonized animals is unknown, but swabs are usually taken of the nose and the area around the anus in pets.

Molecular typing and classification of MRSA, which determines how closely related different strains are, is not routinely performed for isolates from single cases. This type of testing is used for outbreak investigations. MRSA isolates from pets tend to be the same strains that are common in people in the same geographic region.



How is MRSA Treated?

Infection: All MRSA strains are resistant to beta-lactam antibiotics, but because different strains may be resistant to other antibiotics as well, the bacteria must be tested in order to choose the best antibiotic. Automatically choosing the most powerful antibiotic to treat the infection when a more common drug will do can be very dangerous (and expensive), because the MRSA, or other bacteria in the body, may become resistant to it, and then there may be no drug that can effectively treat the infection. Local treatment of skin and soft tissue MRSA infections (e.g. lancing and flushing an abscess) is often very effective as well, and should not be overlooked, even if the person or animal is also treated with antibiotics.

Colonization: Decolonization therapy, including nasal ointment and/or oral antibiotics, is not needed or recommended for most people. It may be considered for people who are at higher risk for infection or in contact with individuals at higher risk for infection (e.g. HIV/AIDS, cancer, transplant patients). Most if not all pets eliminate MRSA colonization on their own within a few weeks as long as they are not re-exposed to the bacterium – decolonization therapy with antibiotics is not needed or recommended, but household infection control practices (see below) are very important.



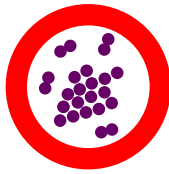
Infection Control For MRSA In Pets



Wash Your Hands! Hand hygiene is the simplest and most practical way to prevent transmission of MRSA between humans and animals. In general, MRSA colonization is uncommon in healthy pets, but if they have been exposed to a hospital environment (such as animals used in hospital visitation programs) or a person who was recently hospitalized, they may be more likely to be carrying MRSA. Proper hand hygiene is important after handling any animal, but it is particularly important in these cases. Use **soap and water** or an **alcohol-based hand sanitizer**.

What Should I Do If My Pet Is Infected With MRSA?


Don't panic! The majority of MRSA infections can be treated effectively if they are diagnosed and appropriate treatment is started in a timely manner.



- Follow the treatment recommendations of your veterinarian very carefully. It is especially important to **completely finish any antibiotic prescriptions, as directed**, even if your pet seems to be better earlier.
- **Avoid contact with the infected area** of your pet. If possible the area should be kept covered or bandaged. Wear gloves if you need to change the bandage and place all used bandage materials directly in the garbage.
- **Wash your hands** well after handling your pet, and especially after changing any bandages.
- **Infected pets are often colonized as well**, so also follow the recommendations for colonized pets below.

What Should I Do If My Pet Is Colonized With MRSA?

Animals that are positive for MRSA can be “isolated” at home if there are no high-risk individuals (e.g. HIV/AIDS, cancer or transplant patients) in the household.

- ▶ Avoid touching the pet’s nose or bum, as these are the most likely areas to harbour MRSA.
 - ▶ The animal should not be allowed to lick a person’s face, or any area of broken or damaged skin.
- 
- ▶ MRSA-positive dogs should be walked in low-traffic areas, where they are not likely to encounter other animals or people to which they may transmit MRSA through direct contact. MRSA-positive cats should be kept indoors.
 - ▶ MRSA can be found in the stool of colonized animals, so stool should be collected as promptly as possible and disposed of directly into the garbage. Cat litter boxes should be scooped out daily.
 - ▶ Although the importance of the environment in transmission of MRSA is unclear, MRSA can survive in the environment for some time. The toys and bedding of an MRSA-positive pet should regularly be changed/cleaned (daily if possible), to reduce the exposure of both the animal and people to MRSA.
 - ▶ Keep the animal off beds and especially pillows used by people.
 - ▶ Hand hygiene remains the most important means of preventing transmission.

Therapy Animals

Animals that regularly visit healthcare facilities are more likely to be exposed to MRSA, and therefore are more likely to carry it. There are guidelines available to help reduce the risk of pets acquiring infectious diseases in hospitals. These include:

- Never let your pet lick a patient’s face, hands or any area of broken skin.
- Do not let patients feed your pet any treats.
- If your pet needs to be placed on a bed or patient’s lap, place your animal on a clean towel or sheet, never directly on the patient’s hospital gown or bed sheets.

Testing or treating normal animals for MRSA is not necessary, but MRSA should be considered in these animals if they develop infections, particularly of the skin and soft tissues.



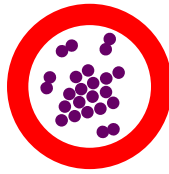
If I Have MRSA, What Should I Do About My Pet?

- ▶ **Wash your hands thoroughly** before and after handling your pet, to help prevent transfer of MRSA to your pet, and transfer of MRSA from your pet if it becomes colonized.
- ▶ **Do not kiss your pet**, and do not let your animal to lick your face or any broken skin.
- ▶ **Testing or treating normal pets for MRSA is not necessary**, *even if a person in the house is infected or colonized with MRSA*. However, if one or more individuals in a household is repeatedly positive for MRSA, then screening of pets for MRSA may be considered as part of a whole-household intervention, *which includes screening and decolonization of all people*.

Is My Pet The Source Of My MRSA Infection?

Pets can be carriers of MRSA, especially in households where people are repeatedly found to have MRSA infections, but this does not mean they are the source. Pets are often “innocent bystanders” that acquire the MRSA from their owners. If all the people in the household are being tested for MRSA, then testing of pets should also be coordinated by your veterinarian, in consultation with the attending physician.

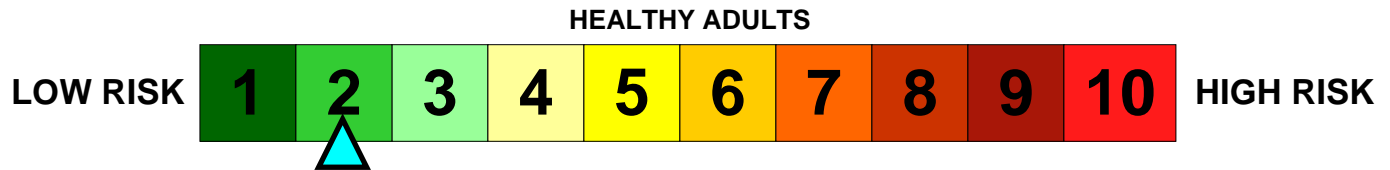
If household infection control measures fail to control transmission of MRSA between people, and there is evidence that a pet may be a source of MRSA, **temporarily removing the pet** from the household can be considered (but is rarely necessary). This should allow the pet to naturally eliminate MRSA colonization while the human members of the household undergo decolonization. **Permanent removal of pets is not indicated.**



It is impossible to completely prevent pets (or people) from being exposed to MRSA, because so many people and animals carry MRSA without any signs. However, proper use of antibiotics according to the prescription, and *only* using antibiotics when they are *really* needed are very important.



The zoonotic risk to the general population posed by MRSA in *healthy house pets* such as dogs and cats is:



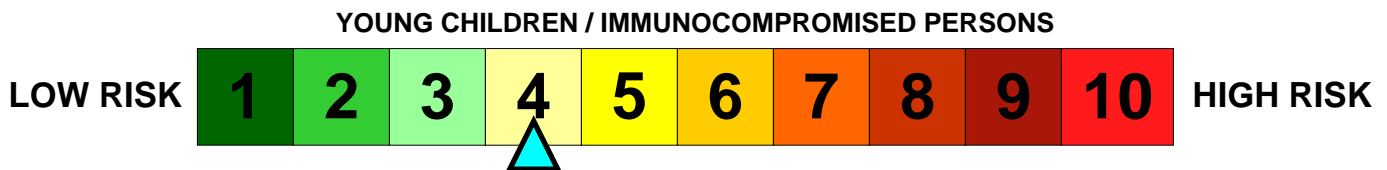
Individuals with compromised immune systems (e.g. HIV/AIDS, transplant and cancer patients) are more susceptible to many kinds of infections, including those which may be transmitted by pets. While these individuals are not advised to get rid of their pets, precautions should be taken to reduce the frequency of contacts that could result in pathogen transmission (e.g. avoiding contact with open wounds, feces), as well as the ability of infectious agents to survive in the household (e.g. prompt and thorough disinfection of potentially contaminated surfaces).

- Immunocompromised individuals should avoid contact with any pet that is colonized or infected with MRSA. This may involve temporarily removing the animal from the home until the condition resolves and the animal is negative for MRSA, but **it is not necessary for these individuals to give up their pets** altogether.

Infants and young children (less than 5 years old) are more likely than adults to extensively handle animals if given the opportunity, more likely to touch their faces or mouths, and less likely to wash their hands after handling an animal. Children may “snuggle” with pets; this very close contact can increase the risk of disease transmission.

- Young children should be supervised when playing with animals, and an adult should ensure that they wash their hands afterwards, and especially prior to handling food. Older children should be taught to do the same.

For these groups, the zoonotic risk posed by MRSA in *healthy house pets* such as dogs and cats is likely:



Additional Information

- ▶ Centers for Disease Control and Prevention, 2008. Community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA). Available at: http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca.html. Accessed Aug 2008.
- ▶ Centers for Disease Control and Prevention, 2007. Healthcare-associated methicillin-resistant *Staphylococcus aureus* (HA-MRSA). Available at: http://www.cdc.gov/ncidod/dhqp/ar_mrsa.html. Accessed Aug 2008.

