



Vaccines and Sarcomas: A Concern for Cat Owners

Vaccines can lessen the severity of future diseases and certain vaccines can prevent infection altogether, and today, a variety of vaccines are available for use by veterinarians. Any treatment carries some risk, but these risks should be weighed against the benefits of protecting your pet from potentially fatal diseases. An uncommon but serious adverse reaction that can occur with injection sites, including those sites where vaccines are administered, is tumor growth (sarcomas), which can develop weeks, months, or even years after a vaccination.

Although the risk of feline injection-site sarcomas (FISS) is small, progress has been made over the years to help reduce that risk even further. There are some helpful resources, such as the [American Association of Feline Practitioners' Guidelines](#), that reflect recommendations on vaccinating cats in consideration of the cat's specific needs, local epidemiologic factors, and in line with manufacturer directions. And today, veterinarians and owners alike expect vaccine labels to reflect accurate revaccination needs. Much of what is commonplace today was recommended by a [Task Force](#) that studied this issue and produced a report in 2001:

- aggressive treatment for injection-site masses that met specific criteria,
- vaccination as a medical procedure to be performed only after careful assessment of the needs of the patient, rather than as an automatic act dictated by the calendar,
- use of the vaccine in accordance with the manufacturer's label, which is information approved for use by the US Department of Agriculture,
- encouragement of single-dose vaccines and use of nasal and topical vaccines,
- standardized sites for injection

Why do I need to vaccinate my kitten/cat?

Vaccines help your cat's immune system fight infections from disease-causing micro-organisms. Within some or many of these vaccines are killed micro-organisms or parts of microorganisms that will stimulate your cat's immune system to produce proteins called antibodies so that when your cat encounters the actual living microorganism those antibodies will "fight off" the infection. The vaccine prepares the cat's immune system to fight subsequent infections much more quickly and efficiently, thus either preventing infection or decreasing the severity of disease.

Kittens are even more susceptible to disease than adult cats because their immune systems are not as well developed. However, maternal antibodies (obtained through their mother's first milk) help the kitten's immune system fight disease until they mature and are able to create their own immune response. These antibodies help fight infection but also interfere with vaccination efforts. Thus, vaccines typically need to be administered in a series to ensure adequate coverage.

Every cat faces different infectious challenges depending on age, health status, lifestyle, and environment. This is why it is so important to work with your veterinarian to plan a vaccine protocol that is best for your cat. Recognize, however, that individual state rules dictate rabies vaccine requirements for cats. Rabies vaccination is typically done every one or three years, depending on the regulations in your area, as well as the type of vaccine used.

What side effects could I typically expect after my cat's vaccination?

Vaccine side effects commonly happen and can develop within hours of vaccination. Milder side effects include: local swelling and discomfort at vaccination site, mild fever, lethargy and decreased appetite. (See a related AVMA resource, [Vaccinations: What to expect after your pet's vaccination.](#))

More serious (and less common) side effects include persistent vomiting and diarrhea, itchy and bumpy skin ("hives"), facial swelling, severe difficulty breathing, and collapse. These reactions can be life-threatening and are medical emergencies. Contact your veterinarian immediately if any of these signs develop.

A small, firm swelling may also develop under the skin at the site of a recent vaccination; this should disappear within a couple weeks. If the swelling persists for more than three weeks, or if it appears to grow larger in size, contact your veterinarian.

What are feline injection-site sarcomas?

Although rare, feline injection-site sarcomas (FISS) are cancerous tumors that can arise following injections. Because vaccines are among the most common injections cats receive, vaccination is sometimes a concern for pet owners who might have heard about injection-site sarcomas.

While a specific cause has not been established, it is thought that inflammatory processes related to administration of injectable products can lead to formation of sarcomas. The role of adjuvants (including those containing aluminum) and local inflammation in the pathogenesis of FISS is not clear. (An adjuvant is a substance added to the vaccine to increase the effectiveness of the component antigens - such as killed microorganisms - in induction of an immune response.)

Recent studies (including one by [Srivastav et al.](#) in *JAVMA*, 2012) suggest that risk factors for FISS in cats include long-term corticosteroid injections and adjuvanted vaccines. These studies also show that in some cats the mere process of instilling a substance into the skin can induce inflammation. Thus, non-adjuvanted vaccines, while they have a low risk for most cats, should not be considered to be completely risk free. It is possible that 'any injection in the right cat' may lead to an injection site sarcoma (studies are underway to determine whether genetics of the cat are a factor). It is important to note that the disease causing organisms themselves do not cause injection-site sarcomas; inflammation associated with the vaccine administration is the risk. Due to their aggressiveness, these tumors can invade local tissue and even metastasize to other areas of the body which can lead to a very poor prognosis.

Injection-site sarcomas are considered to be a rare development. Reports indicate that they occur at a rate of about 1 case per 10,000 to 30,000 vaccinations.

Why should I vaccinate my cat if a sarcoma can develop?

Vaccines are administered to protect cats against diseases they can easily acquire and those that could have fatal consequences if your cat is not protected. In the case of rabies, it is imperative to follow the vaccination rules your state has in place to prevent animal health and public health risks from this almost invariably fatal disease. Talk to

your veterinarian about which vaccinations are the most important for your cat. The lifestyle of the cat and previous incidence of FISS should be taken into consideration. However, as always, your veterinarian should be consulted.

My cat has a lump where a vaccine has been given - what do I do now?

Contact your veterinarian if the lump persists for more than three weeks or seems to be getting larger. A small, firm swelling under the skin may develop at the site of recent vaccination and should start to disappear within a couple of weeks.

Why do cats seem to be especially at risk?

While injection site sarcoma has been reported in other animal species, cats seem to have a more aggressive reaction for reasons that have not yet been established. Scientists have not found genetics to play a direct role but research in this area continues.

How long after vaccination can sarcomas develop?

The time interval between vaccine administration and development of a sarcoma can vary tremendously; they have been seen to occur anywhere between 2 months to 10 years after vaccination.

How are sarcomas diagnosed?

Injection-site sarcomas must be differentiated from other types of vaccine associated reactions, which can include mild symptoms such as weakness and fever to the development of hard lumps at the vaccine site after vaccination. Always tell your veterinarian if your cat has any symptoms lasting more than a few days, or your cat has severe signs like trouble breathing.

Varied diagnostic and treatment plans might be needed so your veterinarian can develop treatment options to your pet.

Although advanced imaging (CT, MRI) may not be feasible for all, the AAFP suggests that the best prognosis for these tumors is when advanced imaging is done to determine ideal ways forward. This is because advanced imaging is the best way to know the extent of tumor involvement.

How are injection-site sarcomas treated?

These tumors are typically treated aggressively and quickly. There are various treatment options, including surgery, radiation therapy, and chemotherapy.

Research has shown that aggressive first-time surgery, either before or after definitive radiation therapy is valuable. There are other therapies, such as chemotherapy, that are sometimes used depending on the situation. Many newer more novel therapies are currently being explored.

What's the prognosis for injection-site sarcomas in cats?

The prognosis is variable. As with most cancers early detection and thus early treatment is most closely related to a good outcome. Yearly check-up examinations of your cat will enable your veterinarian to discover early lesions before they grow large and become difficult to remove.

Are vaccines safer now?

The USDA and vaccine companies place great emphasis on vaccine safety and continually work to improve the safety profiles of vaccines. In addition, increased research on duration of vaccine immunity has made it possible to avoid over-vaccination and unnecessary risk to the patient. However, it is important to remember that all vaccines carry some risk and no vaccine is 100% safe.

How do we approach vaccination if my cat has had an injection-site sarcoma?

Some veterinarians suggest that additional vaccines be minimized – and when re-vaccination is necessary (such as rabies for legal reasons), they sometimes consider use of a non-adjuvanted or non-injectable vaccine. Many veterinarians are placing vaccines in sites that would make tumor removal easier should a FISS occur; for example, placement low on the leg instead of in the interscapular space or even vaccination on the tail.

Can other injections (including microchip placement) cause sarcomas?

Other injectables have been known to lead to sarcoma formation but these have not been studied as much. The extent to which other injectables have been associated with sarcoma formation by veterinarians is much less than with vaccines at this time. To date, there has been only one case reported of a sarcoma developing in a cat where a microchip was inserted (out of millions of pets with microchips.)

What can we do to prevent injection-site sarcomas from happening in cats?

It is important to tailor vaccine protocols to the individual patient in order to protect your pet's health and public health, while also preventing unnecessary vaccinations and opportunities for injection-site sarcoma development. Your veterinarian is the best resource for working with you to make these decisions with your cat's age, health status, and lifestyle in mind.

Where can I learn more about vaccines and feline health?

[American Association of Feline Practitioners](#)

[Cornell Feline Health Center](#)

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