

# PARENTERAL IMMUNIZATION OF DOMESTIC CATS

(Photos courtesy of the Serengeti Carnivore Disease Project and KwaZulu-Natal Rabies Project)

This document provides a simple guideline of the correct methods of rabies vaccine administration to a domestic cat.

## ***Types of vaccines and administration route:***

Two types of rabies virus vaccines for cats are currently licensed:

- 1) Killed virus, adjuvanted vaccines to be administered **annually** or **triennially** by injection.
- 2) Canarypox virus-vectored recombinant, nonadjuvanted vaccines to be administered **annually** by injection.

The presence of an adjuvant – usually a chemical in companion animal vaccines – to enhance the immune response in killed agent vaccines has been associated with local inflammatory reactions at injection sites. Local inflammation has been implicated in the development of vaccine-associated sarcomas, one of the most severe vaccine adverse events reported in cats, although a direct association between the presence or severity of postvaccinal inflammation and tumor risk has not been established.

For rabies control, triennial administration of a 3-year approved product may be used since cats may not return for boosters. Regarding vaccine-associated sarcomas, in areas where less inflammatory (nonadjuvanted) products are available, these may be used to decrease the possibility of adverse events associated with vaccination, although this has not been definitely shown. It is also unknown whether annual recombinant vaccines (3 times as many injections) are safer than triennial adjuvanted vaccines.

Vaccines must be administered by routes recommended by the manufacturer. Most injectable vaccines are licensed for administration by subcutaneous (SC) or intramuscular (IM) injection. There is no evidence that the risk of vaccine-associated sarcomas is decreased in cats vaccinated by the IM route; in fact, development of a sarcoma in muscle may delay detection.

Having the correct equipment and storing the vaccines properly are critical factors. The following basic requirements and practical hints are important:

## ***Syringes:***

Multiple animals can be inoculated with the same syringe (approximately 20 doses could be administered using a single syringe) and only needles need changing between animals, which saves costs. However, it should be understood that loading 20 doses in a syringe and changing needles carry a low risk of blood-borne disease transmission.

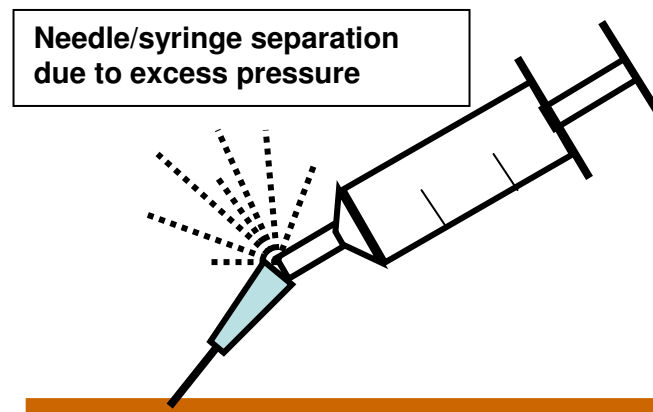
1. A 2-3ml syringe is sufficient for the job. Practical tips are:
  - a. The syringe must fit the hand comfortably.
  - b. Good quality syringes should be used. Poor quality syringes tend to have a very limited life (hence cannot be used for many inoculations) and lose their markings quickly (hence accuracy is compromised). In addition, the vaccine can leak past the plunger.
2. Sterility is important and syringes whose packets are wet or broken should not be used.

## ***Needles:***

1. It is generally accepted that a 22 gauge needle is the correct size for an adult cat. This could however vary according to personal preference. You can use smaller 25 gauge needles for

kittens. Thinner needles increase the pressure and so time needed to expel the vaccine into the animal, which may compromise speed during mass vaccination campaigns.

2. A needle locking tip is useful and can prevent blow back, where pressure exerted on the plunger exceeds the speed at which the vaccine passes through the needle thus needle and syringe separate and you get a blow back or blow up and the vaccine sprays out (see picture below). There are several causes for this:
  - a. Needle gauge too small.
  - b. Intradermal placement of the needle instead of subcutaneous.
  - c. Long needles that increase pressure.
  - d. Needles that are not secured properly.



3. One sterile needle should be used for each cat. Needles should be disposed of in approved sharp containers and incinerated. Replacing caps on needles should be avoided, but if necessary, it should be carried out in approved manner to avoid needle-stick injuries, e.g. by placing the cap on a firm surface and sliding needle into cap, and not by holding the cap loosely in the hand.

#### **Storage and transportation of vaccine:**

Heat, excessive cold, and exposure to sun light can render vaccines ineffective.

Vaccines should be stored in a refrigerator at + 2 to 7°C. Keep a thermometer in the refrigerator to ensure the correct temperature at all times. Make sure refrigerator doors close securely and keep them closed in case of a power failure, noting temperature when power is restored. Avoid the use of refrigerators with open freezer compartments.

Vaccines must NEVER be frozen: excessive cold can alter the vaccine by uncoupling antigen-adjuvant complexes. Uncoupled adjuvant may collect at the bottom of a multi-dose vial, causing pain and local injection reaction and uncoupling of the antigen-adjuvant complex may reduce the efficacy of the vaccine.

During transportation to the vaccination station and during the vaccination day, vaccines should be stored in a cool box with ice packs. Good quality cooler boxes maintain temperatures better. Polystyrene or good quality foam fill plastic boxes are the best. Ensure that ice packs are packed at the top of the cool box (cool air sinks!), and place a layer of newspaper between ice packs and vials so that the vaccines do not freeze. During the vaccination day, avoid opening the cool box unnecessarily. When you need to remove the vaccines from the box, remember that a short period of exposure at ambient temperature is not problematic as long as the vaccine is not exposed to direct sunlight. It may be helpful to have one cool box for bulk storage and a smaller one for smaller vaccine quantities or for keeping a supply of frozen ice packs to supplement thawing packs during the day.

It should also be understood that vaccines taken out of cold storage and embarked in field operations should be used quickly and not repeatedly returned to the refrigerator. Reasons for this are that prolonged periods of vibration (e.g. transport for days on rough terrain) and temperature variations while the vaccine is stored in the cooler may result in gradual degradation of the vaccine (including antigen and adjuvant as well as viral integrity).

***Recording vaccine doses used:***

The number of doses taken to the vaccination station should be recorded in the registration book before departure and the remaining vials returned to the fridge at the end of the day should also be recorded.

***Vaccine administration:***

Vaccines should be administered **SC** on the **lateral side of the right hind limb** below the stifle joint (vaccine-associated sarcomas arising in the proximal femoral area are difficult to completely excise; thus placement of vaccines in this area is strongly discouraged).

Cats will often be transported to vaccination stations in sacks.



Cats used to handling can be coaxed into accepting the procedure with no or minimal physical restraint. For example, very gentle cats will lay upright and can be vaccinated just above the hock without requiring much restraint. Cats more difficult to handle should not be restrained heavily. With respectful handling, even fearful cats can be vaccinated with minimal stress. The team equipment should include gauntlets and a towel to protect handlers against scratches/bites. Workers may also wear disposable gloves for protection.

Minimizing the number of people handling the cat minimizes stressing the cat. Cooperative cats can be vaccinated single-handedly by the use of little or no restraint. At most, one other person may be needed to help hold and distract the cat.

When restraining is required lying on side restraint should be used. Two operators may be required.

- Grasp and hold firmly the scruff (the skin at the back of the neck) with your dominant hand.
- Grab the rear legs (avoiding claws) and tail with your other hand for complete immobilization, and support.



- Place gently the cat on its side. A second person may need to hold the forelegs.



- If the cat is more or less cooperative you may let go of the scruff and/or rear legs. To prevent the cat from jerking the right limb away lay the palm of the hand not administering the vaccine medial to the stifle or elbow joint. If the cat is apprehensive do not let go of the scruff or the rear legs. Another person will be needed to administer the vaccine. Placing a towel or a piece of clothing over a frightened cat will calm it.





To administer the vaccine, pinch the skin and hold it with your fingers. Pinching it tightly is not necessary. Push the needle into the skin about ½-inch deep. Be careful not to push the needle all the way through the fold of skin and out the other side. Push the plunger and inject the entire dose of vaccine.



Courtesy of: Julie Levy, Maddie's Shelter Medicine Program, College of Veterinary Medicine

With feral cats traps may be used and cats can be vaccinated in their traps. It is not possible to know exactly what the injection site is, but it provides very safe handling for both cats and workers.



Courtesy of: Julie Levy, Maddie's Shelter Medicine Program, College of Veterinary Medicine

### ***Adverse events:***

It should be understood that despite the admirable safety record of animal vaccines, more or less severe (sometimes even fatal) adverse events may occur. Adverse events may include local swelling or pain, granuloma formation (see above), transient lethargy or fever or even life-threatening allergic reactions, including anaphylactic shock. Even when vaccination immediately precedes an adverse event, it may be difficult to determine with certainty whether the vaccine was responsible for the event because of confounding factors (e.g. simultaneous administration of more than 1 vaccine from the same or different manufacturer, concurrent administration of nonvaccine products, preexisting disease, or prior exposure to the organism and incubation of disease at the time of vaccination).