

DISEASE INFORMATION FACT SHEET

Feline leukemia virus



This Disease Information Fact Sheet accompanies the 2013 AAFP Feline Vaccination Advisory Panel Report published in the *Journal of Feline Medicine and Surgery* (2013), Volume 15, pp 785–808.

Disease facts

Feline leukemia virus (FeLV) is found worldwide in domestic cats, with variable seroprevalence depending on geography and risk factors. Large serosurveys have found a prevalence of 2.3% in the United States in 2006¹ and 3.4% in Canada in 2009,² with marked regional variation.

Viremic FeLV-infected cats shed virus in many body fluids, including saliva, feces, milk and urine. FeLV transmission occurs through sustained close contact among cats. Behaviors such as mutual grooming, sharing of food and water bowls and litter boxes, and fighting can contribute to transmission, primarily via saliva. Resistance to progressive infection increased with age in one study that evaluated two strains of FeLV in an experimental model.³ However, there are multiple strains of FeLV with different biological behaviors, and differences in immune responses among individual cats, and it is impossible to predict the dose of FeLV given during natural exposure. Thus, the degree of natural, age-associated resistance to FeLV cannot currently be predicted for individual cats. In general, it is believed that kittens less than 16 weeks of age are most likely to develop progressive infection after exposure. However, adult cats may be susceptible to FeLV infection after long-term exposure.⁴

Vertical transmission of FeLV occurs. Infected pregnant queens may suffer reproductive loss; kittens that survive to term are generally born viremic and fade quickly. Up

The 2013 Report of the Feline Vaccination Advisory Panel of the American Association of Feline Practitioners (AAFP) provides practical recommendations to help clinicians select appropriate vaccination schedules for their feline patients based on risk assessment. The recommendations rely on published data as much as possible, as well as consensus of a multidisciplinary panel of experts in immunology, infectious disease, internal medicine and clinical practice. The Report is endorsed by the International Society of Feline Medicine (ISFM).

to 20% of vertically infected kittens may survive to develop progressive infection as adults.⁵ Transmission to kittens may also occur via the milk from an infected queen or via saliva when the queen cleans the kittens.⁵

Clinical research suggests that many cats may remain infected with FeLV for life following exposure, but may revert to a regressive state with a low risk of clinical disease.^{6–8} Following exposure, cats may exhibit mild clinical signs, such as fever and malaise, or may remain asymptomatic. For cats that remain persistently infected, this acute phase is followed by a period of asymptomatic infection that may last months or years. Ultimately, progressive infection occurs, with development of one of several FeLV-associated disorders (eg, lymphoma, anemia) or a secondary



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disease associated with immune dysfunction (eg, opportunistic infections, oral inflammatory disease).

FeLV is very labile outside of the host and remains infectious for mere minutes in the environment; in moist secretions it may survive until dried. It is readily inactivated by soap, disinfectants, heat and drying. FeLV is not zoonotic. In one study of 204 veterinarians and other occupationally exposed individuals, no serologic or molecular evidence of zoonosis with FeLV was detected.⁹

Vaccine types

Several vaccines for FeLV are available, including whole inactivated virus, genetically engineered subunit or recombinant canarypox vector vaccines. The efficacy of commercially available vaccines is difficult to assess.¹⁰ Most of the published efficacy trials have been conducted or supported by the vaccine manufacturer, and most studies do not evaluate more than one vaccine. Other factors hamper interpretation of vaccine efficacy, including lack of standard challenge and testing protocols as well as the difficulty of infecting adult cats without immune suppression.³

Inactivated vaccines are most common. In addition, a recombinant FeLV vaccine has been shown to provide protection against persistent antigenemia equivalent to an efficacious inactivated vaccine.¹¹ One study using inactivated vaccines found that, after challenge, vaccinated cats had no detectable viral antigen, RNA, proviral DNA or infectious virus.¹² Other studies have shown that vaccines fail to prevent the persistence of proviral DNA following exposure.¹³ Therefore, FeLV vaccination does not necessarily induce sterilizing immunity. Despite these findings, several current vaccines are efficacious at preventing virus persistence and replication, as well as FeLV-associated disease.¹⁴

Onset and duration of immunity

Onset of immunity is 2–3 weeks after primary vaccination depending on the product. Minimal information concerning maximum duration of immunity for FeLV vaccines is available. Results of several studies indicate that FeLV vaccine-induced immunity persists for at least 12 months following vaccination.^{15–17} In a recent 2 year challenge study, a greater proportion of glucocorticoid-treated control cats (11/11 cats; 100%) developed persistent FeLV viremia when compared with vaccinated cats (2/12 cats; 16.7%).¹⁸ This study suggests that duration of immunity induced by some FeLV vaccines may last for at least 2 years.

Vaccine safety

Adverse events associated with vaccination against FeLV include local swelling or pain, transient lethargy or fever, and granuloma formation. (See the section in the Report on injection-site sarcoma formation, on pages 796–798, for a discussion of this potential side effect.)

Other vaccine considerations

Testing of cats prior to vaccination is essential to ensure negative status. Inadvertent use of FeLV vaccine in a cat infected with FeLV is not harmful, but it is also of no benefit. However, vaccination of a cat that is unknown to be retrovirus infected gives false expectations to the owner and could result in questions about vaccine efficacy and failure to recommend testing when the infection is finally discovered.

When a cat is vaccinated against FeLV for the first time, owners should be instructed to confine the cat until at least 2 weeks after the final vaccination to ensure that an adequate immune response has developed before risk of exposure.

Advisory Panel Recommendations

The Advisory Panel recommends administering FeLV vaccines to all kittens but considers the vaccine to be non-core for cats after their 1 year booster unless they are at risk of exposure.^{19–22} Risk of exposure to FeLV is defined as access to outdoors, living with known FeLV-infected cats, or living in a multiple-cat environment where the status of all cats is not known. Vaccination of all kittens is recommended because a kitten's status (indoor versus outdoor, low risk versus high risk) may change, and susceptibility to persistent infection is believed to be highest in kittens.

The manufacturer's label should be followed for the primary vaccination series. The Advisory Panel recommends that a single

booster vaccination should be administered 1 year later for previously vaccinated cats.²¹ One guidelines group (European Advisory Board on Cat Diseases) recommends that, in cats older than 3–4 years of age, a booster vaccination every 2–3 years is sufficient.²⁰ The AAFP Advisory Panel recommends that for cats at high risk of infection (eg, spending most of the day outdoors, in contact with infected cats, multiple-cat homes where the status of all cats is not known, etc), a booster vaccination may be administered yearly. Cats at low risk of infection (eg, households with small numbers of cats, cats with limited outdoor access), a booster vaccination may be administered every 2 years.

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DISEASE INFORMATION
FACT SHEETS

- ❖ Feline herpesvirus 1
- ❖ Feline calicivirus
- ❖ Feline panleukopenia
- ❖ Rabies
- ❖ Feline leukemia virus
- ❖ Feline immunodeficiency virus
- ❖ Feline infectious peritonitis
- ❖ *Chlamydomphila felis*
- ❖ *Bordetella bronchiseptica*

GENERAL INFORMATION
FACT SHEET

- ❖ The immune response to vaccination: a brief review

SUPPLEMENTARY FILES

Fact Sheets accompanying the 2013 AAAP Feline Vaccination Advisory Panel Report are available, together with the Pet Owner Guide included in Appendix 2, at <http://jfms.com>
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PET OWNER GUIDE
(APPENDIX 2, pp 807–808)

- ❖ Vaccinations for Your Cat