

DISEASE INFORMATION FACT SHEET

Feline immunodeficiency 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 immunodeficiency virus (FIV) is found worldwide in domestic cats, with variable seroprevalence depending on geography and risk factors. Unlike feline leukemia virus (FeLV), kittens do not appear to be more susceptible to infection than adults. Large serosurveys have found a prevalence of 2.5% in the United States in 2006¹ and 4.3% in Canada in 2009,² with marked regional variation.

The immunodeficiency viruses of domestic cats are classified into several genetically distinct subtypes or clades, designated A to E, based on the sequence of the envelope glycoprotein, gp120. Prevalence of the various clades varies geographically. Within a clade, variations in genotype as well as disease phenotype may occur, including emergence of more pathogenic subtypes. FIV has a high mutation rate due to an error-prone reverse transcriptase enzyme, leading to the circulation of many heterologous strains, even within a single host. Some of these mutations may lead to changes in virulence or antigenicity.³ This tremendous variation has an impact on diagnostics, therapeutics and vaccine development.

The virus is present in the saliva of infected cats, and FIV infection is most likely to occur in male cats and free-roaming cats, reflecting efficient transmission by bite wounds. Transmission via sustained contact among infected and uninfected cats, as with FeLV, may also occur.⁴ In addition, in utero and lactogenic transmission to kittens from queens may occur, especially if the queen is experi-

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).

encing high levels of viremia.^{5,6} Experimentally, queens can be infected via semen, but it is unknown how important this mode of transmission is in nature.⁷

Most infected cats will mount an immune response to the virus, which leads to decreased virus replication and viral load in infected cats, but not elimination of infection. The ability of the virus to persist integrated into the cellular genome makes treatment as well as prevention through vaccination challenging. One of the main target cells of FIV is the CD4⁺ T helper lymphocyte, which is essential for both cell-mediated and humoral immunity. Dysfunction and destruction of these cells is critical to the pathogenesis of disease.

After infection, cats enter an asymptomatic phase that may last for many years. Virus replication continues, but at very low



AAFP FELINE VACCINATION ADVISORY PANEL

Margie A Scherk
DVM Dip ABVP
(Feline Practice)
Advisory Panel Chair*

Richard B Ford
DVM MS Dip ACVIM
DACVPM (Hon)

Rosalind M Gaskell
BVSc PhD MRCVS

Katrin Hartmann
Dr Med Vet Dr Med Vet Habil
Dip ECVIM-CA

Kate F Hurley
DVM MPVM

Michael R Lappin
DVM PhD Dip ACVIM

Julie K Levy
DVM PhD Dip ACVIM

Susan E Little
DVM Dip ABVP (Feline Practice)

Shila K Nordone
MS PhD

Andrew H Sparkes
BVetMed PhD Dip ECVIM
MRCVS

*Corresponding author:
Email: hypurr@aol.com

levels. Initially, levels of both CD4+ and CD8+ lymphocytes decline. As the cat mounts an immune response, a rebound of CD8+ lymphocytes above pre-infection levels occurs. This causes an inversion of the CD4+:CD8+ lymphocyte ratio that is persistent. Over time, the level of both CD4+ and CD8+ lymphocytes may gradually decline, ultimately leading to immunodeficiency in the infected cat.

The clinical signs and illnesses associated with FIV are varied and non-specific, and are usually not a direct effect of the virus, but are due to secondary infections that may be treatable. Other common associated diseases include inflammatory ocular and oral disease, neoplasia, neurologic disease and renal disease.⁸

FIV 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. FIV is not zoonotic. In one study of 204 veterinarians and other occupationally exposed individuals, no serologic or molecular evidence of zoonosis with FIV was detected.⁹

Vaccine types

A vaccine for FIV is commercially available, and contains inactivated whole virus isolates from clades A and D, with infected cells and an adjuvant. It has been found to induce antibodies as well as cell-mediated responses.¹⁰ Studies of the currently available vaccine conducted by the inventor or manufacturer have demonstrated efficacy when vaccinated cats were challenged with subtypes A and B.^{11–14} One independent study showed that the vaccine was not able to protect cats when they were challenged by a subtype A field strain from the United Kingdom.¹⁵ While it offers some protection to some cats at high risk, its use remains controversial and it is listed as non-core or not recommended by the major vaccine advisory groups.^{16–18} Another very important concern is that current screening/testing methods cannot reliably distinguish naturally infected from vaccinated cats.

Onset and duration of immunity

Onset of immunity occurs by 3 weeks after primary vaccination.¹⁴ According to the manufacturer, FIV vaccine-induced immunity persists for at least 12 months following vaccination, although the actual duration of immunity is unknown.

Vaccine safety

Adverse events associated with vaccination against FIV include local swelling or pain,

transient lethargy or fever, and vomiting, diarrhea or anorexia.¹¹

Other vaccine considerations

Vaccinated cats produce antibodies that cannot be distinguished, by any current commercially available antibody test, from antibodies induced by natural infection.¹⁹ These antibodies are detectable within a few weeks of vaccination. Vaccine-induced antibodies have been shown to persist for more than 4 years in some cats.^{19,20}

Clients should be informed that vaccinated cats will have positive FIV antibody test results, and the decision to vaccinate should be reached only after careful consideration. Vaccinated cats should be permanently identified, such as with a microchip, and FIV vaccination history should be included in the microchip database.

Testing of cats prior to vaccination is essential to ensure negative status. Inadvertent use of FIV vaccine in a cat infected with FIV 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 cat tests positive for FIV.

When a cat is vaccinated against FIV for the first time, owners should be instructed to confine the cat until at least 3 weeks after the final vaccination to ensure that an adequate immune response has developed before risk of exposure.

Advisory Panel Recommendations

Vaccination against FIV is considered non-core but could be recommended for cats at high risk of exposure, such as outdoor cats or cats living with FIV-infected cats.^{16,18,21} One expert panel recommends against use of the vaccine until further evaluation of vaccine efficacy against field strains is performed and test interference is resolved.²² When FIV vaccination is appropriate, a three-dose primary series is administered, with the first dose given as early as 8 weeks of age. Annual revaccination is recommended subsequent to the initial series if the risk of infection continues.

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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
- ❖ *Chlamydomydia felis*
- ❖ *Bordetella bronchiseptica*

GENERAL INFORMATION FACT SHEET

- ❖ The immune response to vaccination: a brief review

SUPPLEMENTARY FILES

Fact Sheets accompanying the 2013 AAFF 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