

# Feline leukaemia virus (FeLV)



**A comprehensive guide**



### The facts

FeLV is found in the saliva of infected cats

It can only be transmitted by direct contact

It does not survive for long on hands, bowls or cages

Kittens under four months are particularly susceptible

Virus can cross the placenta to the unborn kittens and kittens can be infected via the mother's milk.

## What is FeLV?

FeLV is a virus causing a variety of symptoms including deficiency of the immune system, anaemia and tumours.

### How does a cat catch it?

FeLV is found in the saliva of infected cats and is transmitted by direct (cat to cat) contact, particularly if they lick each other. It is a fragile virus, which does not survive for long on hands, bowls or cages and can be killed easily with disinfectant. Your cat can't catch FeLV by using the same basket or bowl as an infected animal.

Kittens under four months are particularly susceptible, after which time their resistance to FeLV gradually increases. However, this resistance can be weakened by prolonged exposure to infection or by large doses of virus – eg if a cat enters a household with a large number of infected cats.

The virus can cross the placenta to an unborn kitten and usually all kittens born to an FeLV-positive mother will also be FeLV-positive. It is possible, though rare, for a cat to have the virus in her mammary glands (and therefore in her milk) but not in her bloodstream so that, although she tests FeLV negative, her kittens will become infected as they suckle.

### What are the clinical signs?

There is a long incubation period (months to years) before infection develops into disease. However 85 per cent of cats with the virus die within three and a half years of becoming infected. One effect of FeLV infection is to suppress the immune response, leaving the cat more susceptible to other infections.

If your young or middle-aged cat keeps getting ill, takes time to recover, gets a fever or is listless for no reason, you should have him tested for FeLV and feline immunodeficiency virus (FIV). If your pet has spontaneously aborted her kittens or suffers from recurrent infertility or anaemia, he or she should also be tested.

Eighty per cent of FeLV-positive cats die due to their suppressed immune response, while the rest die of FeLV associated cancers – the most common being tumours called lymphosarcomas.

- *Thymic lymphosarcoma* generally affects young cats up to two years. It grows in the thymus (an organ in the chest in front of the heart) causing fluid to gradually fill the chest and press on the lungs. The cat will breathe rapidly or through his mouth. Over 90 per cent of cats with thymic lymphosarcoma are FeLV-positive.
- *Multicentric lymphosarcoma* generally occurs in young to middle-aged cats. The tumours arise in the lymph nodes and can often be detected under the chin, behind the knees and in front of the shoulders. Only two cats out of three with multicentric lymphosarcoma are FeLV-positive.
- *Alimentary lymphosarcoma* usually affects middle-aged to older cats, growing in the small intestine or colon, causing weight loss and diarrhoea. Only one third of cats with alimentary lymphosarcoma are FeLV-positive.

All cats in contact with a cat that has a lymphosarcoma should be FeLV tested. Although some cats with these tumours are FeLV-negative, cases of lymphosarcoma are more common in houses where FeLV is endemic. FIV is also associated with cat tumours.

After the thymus, lymph nodes, intestine and colon – the kidneys, nervous system and eyes are the next most common areas to be affected. Lymphosarcoma is the tumour most likely to affect cats' eyes.

Although FeLV is known as the 'leukaemia virus', leukaemia is less commonly diagnosed, but nearly half of all FeLV infected cats are anaemic. FeLV is also associated with liver failure, enteritis, infertility, abortion, resorption of kittens and stillbirths.



### Can FeLV be treated?

Vets must treat each case of FeLV individually, depending on the clinical signs. A cat which shows its immune deficiency by having chronic cat 'flu, would require almost constant antibiotic treatment. Cats with lymphosarcoma may be treated by chemotherapy.

In a report of 103 cases treated by chemotherapy, the tumour regressed in 62 per cent who survived an average of seven months. Only one in five treated cats survived more than 12 months. Treatment of lymphatic or myeloid leukaemias is generally unsuccessful.

### The figures

- 85% of cats with FeLV die within 3½ years of infection
- 80% of FeLV cats die due to their suppressed immunity
- 20% die of FeLV associated cancers – eg lymphosarcomas
- Over 90% of cats with thymic lymphosarcoma have FeLV
- 66% of cats with multicentric lymphosarcoma have FeLV
- 33% of cats with alimentary lymphosarcoma have FeLV.



## FelV testing

FelV testing remains the best method of control, as no vaccine is 100 per cent effective. Most vets can perform a quick blood test in their surgeries, which detects a bit of the virus called p27. All positive in-practice FelV test results should be confirmed by virus isolation (where the virus is grown in cell culture) or immunofluorescence because around 50 per cent of positive in-house results are false positives (where the result indicates that the cat has the disease, when in fact it does not). Virus isolation is carried out at Glasgow and Bristol University Veterinary Schools.

In around five to ten per cent of cats with positive p27 results, no virus can be detected on virus isolation. They are 'discordant' and not infectious, but should be tested every one to two months. Most will become negative on both tests eventually, but some will become positive.

**Clinically well cats should never be euthanased on a p27 result alone, in case the result is a false positive.**

Some p27 tests on sick cats can give false negative results (failure to detect infection despite its presence), so they should always be retested by virus isolation or immunofluorescence.

A latent infection is when a cat has no whole virus in his bloodstream (therefore is not infectious to other cats) but has the virus in his bone marrow or another organ. This produces p27 that can get into the bloodstream and be detected by the test. Latency may be confirmed by bone marrow biopsy, but this procedure is complex and expensive.

## When can you test?

It can take from two to eight weeks for infection to produce virus in the blood. Cats can be tested from birth, but if they have only recently been infected, the test result may be inaccurate. For this reason, it is recommended that cats be tested twice, 12 weeks apart.

Another reason to test twice, is that a small percentage of FelV-positive cats are in the process of developing immunity, after which they will become negative. Cats testing positive twice, with a 12-week interval, will be permanently infected.

In nature, many cats that are exposed to FelV recover. They have no p27 in their blood, but may have antibodies to the virus. There is a test for these antibodies (virus neutralising) that must not be confused with either the p27 or the virus isolation test.

**A positive virus neutralisation test means that the cat has recovered and is immune.**

## Testing

Testing is the best method of FelV control  
Clinically well cats should never be euthanased on a positive p27 test result alone

50% of positive in-house FelV tests are false positives.

Positive FelV tests must be confirmed by virus isolation or immunofluorescence tests

Cats should be tested twice, with a 12-week interval

A positive virus neutralisation test indicates recovery and immunity.

## Vaccinations

Several different FeLV vaccines exist, for cats of at least nine weeks old. All recommend an initial course of two doses, three to four weeks apart and an annual booster. If your cat is pregnant, ask the vet to check whether the brand he/she uses is safe for pregnant queens. Sick cats should never be vaccinated.

No direct trials have compared all the available UK vaccines, so it is difficult to rank them. However, the trials that are published do show that not all vaccines are equally effective.

While not yet scientifically proven, it is probably safe to boost one vaccine with another.

It is perfectly normal for your cat to be a bit 'off colour' for 24–48 hours after vaccination, but take him to the vet if he seems very distressed. Some cats may form a small lump at the site of the vaccination, which usually disappears eventually. In the USA, there have been concerns about tumour formation following vaccination.

The National Feline Vaccine-Associated Sarcoma Task Force of America recommends that FeLV vaccines be given in the left hind leg. If a tumour should appear, vets will know it has been caused by the FeLV vaccine and can amputate. The rabies vaccine should be given in the right hind leg for the same reasons.

### Vaccinating

No vaccine is 100% effective

Cats of at least nine weeks can be vaccinated

It is possible to boost one vaccine with another

Do not mix FeLV-positive and FeLV-negative cats.



### Does an indoor cat need FeLV vaccination?

The disease cannot be brought in from the outside on shoes, clothes, etc – unlike feline parvovirus (FPV) which can. So, FeLV vaccination isn't required for cats kept indoors.

### Can you mix infected with vaccinated, uninfected cats?

As no vaccine is 100 per cent effective, you should not let FeLV-positive and FeLV-negative cats mix. Even if the negative cats are FeLV vaccinated, they may not be fully protected. The only exception is if the negative cats are known to have high virus neutralising antibody titres. Vaccination is an adjunct to, and not a replacement for, FeLV testing.

## Why should you test before vaccinating?

Because FeLV positive cats derive no benefit from vaccination although it wouldn't be harmful. If you're unsure if your cat has FeLV before vaccination, and he later becomes infected, you won't know if the vaccine has failed. And if your cat is vaccinated, but untested, it will be unsafe to introduce another cat into your house. Similarly, new cats should always be tested before being introduced to your own cats.



## Does the vaccine cause positive FeLV tests?

No. The test looks for a part of the virus itself, not antibodies to the virus.

## How did my vaccinated cat die of FeLV?

There are three possible explanations:

- He was not tested before vaccination or tested before p27 had appeared in his blood and was already infected with FeLV at the time of vaccination
- The test was faulty, giving a false negative result
- The vaccine didn't work.

## How soon can I get another kitten?

If you have no other cats, you can get another kitten within hours. Simply disinfect the food bowls and litter trays, before letting your new cat use them. If you have other cats, they may be infected, so get them tested first as well as your new kitten.

## Spread of infection

FeLV does not infect humans, other animals or birds.

## Can boarding catteries accept FeLV-positive cats?

FeLV can only be spread by direct contact from one cat to another, so boarding catteries can accept a cat with the virus. Obviously an FeLV infected cat should be kept away from other cats and should be given its own litter tray and food bowls. Like the cage, these should be disinfected with bleach (eg Domestos) or Virkon before using them for another cat. Never use a boarding cattery which allows cats from different households to mix.

### Controlling FeLV

Never introduce a new cat to your house without testing first

FeLV does not infect humans or non-feline animals or birds

Disinfect food bowls and litter trays, before letting your new cat use them

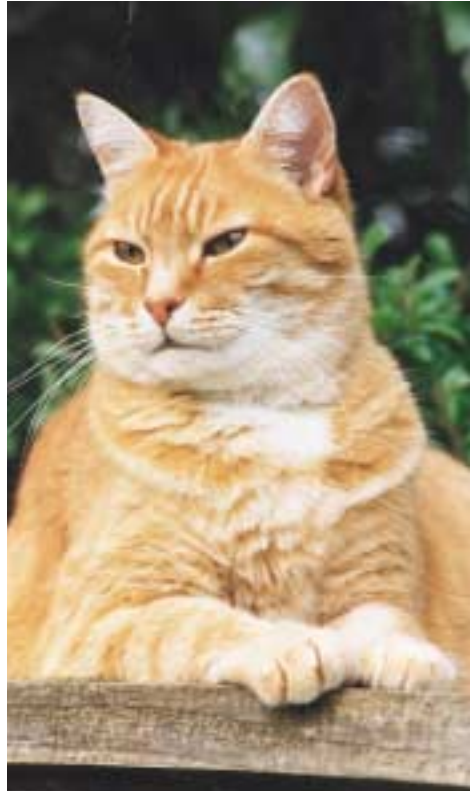
Never use a cattery that allows the cats from different households to mix.

## Preventing the spread of FeLV in CP foster homes

Unfortunately, keeping cats together puts them at risk of FeLV, FIV and feline infectious peritonitis (FIP), as well as non-fatal conditions such as cat 'flu, fleas and ringworm.

At Cats Protection, we are committed to keeping our foster cats protected, but obviously we cannot afford to test every cat coming into care for all diseases. To minimise the spread of infection, we recommend these five simple guidelines:

- 1 Foster cats should not mix with the fosterer's own pet cats (except where necessary, eg for socialising orphan kittens).
- 2 The fosterer should have his or her own cats tested for FIV and FeLV. They should be vaccinated against FPV (also known as feline infectious enteritis (FIE) or feline panleukopenia (FPL)), cat 'flu and FeLV.
- 3 Fostered cats should be kept in isolation or in pairs (unless they have come from the same household where they were mixing anyway).
- 4 If fostering cats in pairs, when one is rehomed, another cat should not be introduced until the remaining cat is also rehomed.
- 5 The fostering area should be rested and disinfected. Litter trays and food bowls must also be disinfected between cats to prevent the build up of infection.



### Fostering and FeLV

Foster cats should not mix with your own

Test and vaccinate your cats against FeLV

Fostered cats should be kept alone or in pairs

If fostering in pairs, do not introduce another cat until both are rehomed

All litter trays and food bowls must be disinfected between cats.



### **What should a CP worker do with a healthy FeLV-positive cat?**

No CP worker wants to euthanase a healthy-looking FeLV-positive cat. However, such a cat SHOULD NOT be rehomed unless the new owner has had previous experience with an FeLV-positive cat. The cat's life will be short, he will definitely incur more veterinary fees and is a risk to other cats. No CP worker should knowingly home an FeLV-positive cat without disclosing the condition.

**All cats which have been in contact with an FeLV-positive cat should be tested.**

### **What about a pregnant or nursing queen who is FeLV positive?**

In both cases, the kittens are at high risk of FeLV. If a pregnant queen is healthy, she should be spayed, as this is kinder than waiting until the kittens are born. If she has already had the kittens, they should be tested for FeLV and euthanased if they are infected.

Cats Protection would like to thank the author of this guide, Diane Addie PhD, BVMS, ALCM, MRCVS, who is a member of the Council of Cats Protection. She would like to express her gratitude to Professor Oswald Jarrett for his advice on preparing this leaflet.