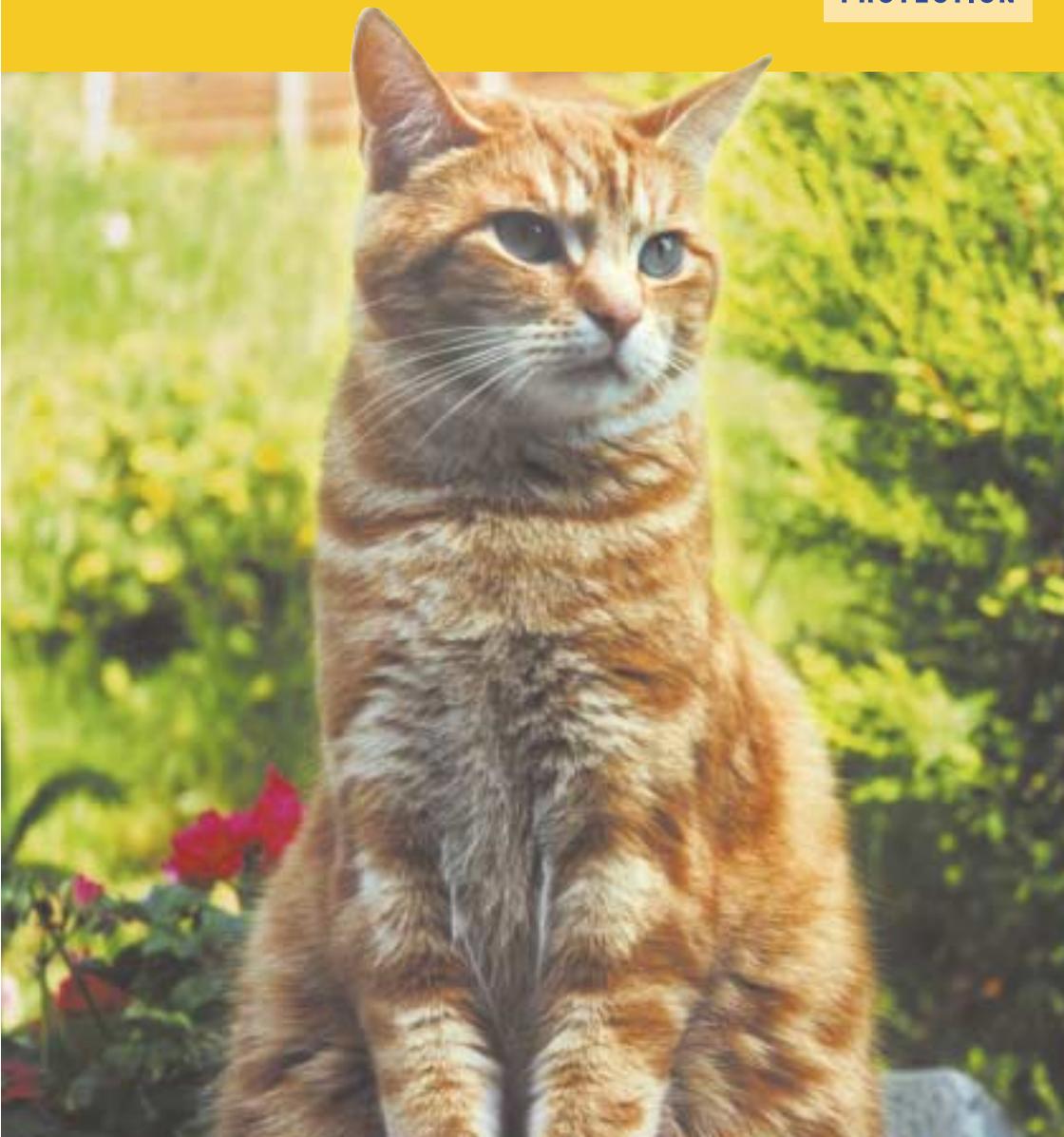


Feline infectious peritonitis – FIP and feline coronavirus – FCoV



Information and advice

What is feline infectious peritonitis (FIP)?

It is a fatal disease that occurs in around one tenth of cats infected with feline coronavirus (FCoV). Feline coronavirus infection has several possible outcomes including FIP, a mild enteritis or no obvious symptoms. **Therefore most cats infected with FCoV do not develop FIP.**

How do cats and kittens catch FCoV?

FCoV is a very contagious virus, infecting nearly all cats that encounter it. It is shed in the faeces of infected cats, and uninfected cats become infected by sharing litter trays with infected cats and possibly by inhaling sneezed droplets. The virus can be inadvertently passed to uninfected cats on soiled poop scoops being used from one litter tray to another. The virus almost never crosses the placenta to the unborn kitten. Most kittens that become infected do so after the protective antibody they receive in their mother's milk has waned, when they are five to seven weeks old.

How long does the virus survive in the environment?

FCoV is shed in the faeces. In natural circumstances, cats go outside to defecate and bury their faeces, in which case the virus lasts hours to days (it survives slightly longer in freezing conditions). However, in domesticating the cat, we have introduced litter trays and FCoV may survive for several days to possibly seven weeks in dried-up faeces in cat litter.

Which disinfectants kill FCoV?

Most disinfectants kill FCoV but Domestos and Milton are the first choice, at a dilution of 1:32, which is one part of disinfectant to 31 parts of water.

What are the clinical signs of FIP?

FIP is very difficult to diagnose because the clinical signs vary so much and FIP can look very like many other diseases. Approximately half the cats with FIP develop the so-called 'wet' or 'effusive' form.

In wet FIP, fluid accumulates in the cat's abdomen, sometimes causing it to swell up. The cat may look fat because of the fluid, but when you run your hands along his back you can feel the spine and ribs. When you pick up a cat with wet FIP, it can feel like lifting a baggy old hot water bottle. Some cats are quite bright and continue to eat despite the fluid, others feel miserable and are off their food. Occasionally in wet FIP, fluid accumulates in the chest, causing the cat to have difficulty breathing – cats lead such relaxed lifestyles that this may only be noticed after the cat has exercised.

Wet FIP: Cases often appear to have a very swollen abdomen. They may be quite bright, like this cat, but are often fairly miserable



In 'dry' or 'non-effusive' FIP the clinical signs are more variable, and this makes it very difficult to diagnose. Most cats with dry FIP lose weight, have a raised temperature and are off their food and a bit dull. Most also have abnormalities in their eyes, such as the iris changing colour, bleeding into the front of the eye, a cloudiness in the eye, or precipitates forming on the cornea (the front of the eyeball). Whenever a cat is ill and the reason is difficult to determine, dry FIP should be suspected.

NOTE – healthy cats with antibodies to FCoV do not have dry FIP. In dry FIP the cat is sick.



Dry FIP: Sometimes the front chamber of the eye looks cloudy as shown in the lower part of this cat's eye. This cat also has iritis, the yellow part of the eye becomes pinkish brown at the edge (arrow)

Which cats are most likely to develop FIP?

Any age, breed or sex of cat can develop FIP. Young kittens are most susceptible (nearly half of all cases occur in cats less than 18 months old). Also susceptible are pedigree kittens, and cats and kittens that have been through rescue centres or pet shops. Keeping too many cats together increases their chances of catching FCoV, the cause of FIP. Stress increases the chance of an individual infected cat developing FIP (examples of stress in cats include rehoming, neutering, going to a boarding cattery, introducing a new cat).

How is FIP diagnosed?

In wet FIP your vet makes a diagnosis based on the clinical signs and laboratory analysis of the fluid in the cat's abdomen or chest; this fluid is different in FIP than in other conditions, such as heart failure, which give similar clinical signs.

In dry FIP the vet will examine the eyes closely for confirmatory signs (changes of the colour of the iris, cloudiness of the front of the eye, changes in the retina). Your vet will also send off a blood sample for an FCoV antibody test. Veterinary surgeons have to base their diagnosis on the cat's clinical signs, his antibody titre (or amount of antibodies present) and biochemical and haematological tests.

Is there an FIP test?

There are two types of test available for detecting FCoV infection, but there is no single test that tells you that a cat is sick with FIP (usually a panel of tests is used to diagnose FIP). FCoV tests detect either antibodies or virus, which healthy cats and cats with conditions other than FIP may also have. It is absolutely crucial to use a reputable antibody test; some tests have high rates of false positives and false negatives. (The gold standard, not only in the UK but across the world, is the immunofluorescent antibody test like that performed at the University of Glasgow Veterinary School). Testing for virus (tests called PCR) is often less helpful than detecting antibodies.

Is there any treatment?

Some cats with clinical FIP can last many weeks or months with treatment but, in the end, they usually die. It is important to realise that having a positive antibody test does not mean that a cat has FIP; we are talking here of cats which are clinically ill. The main treatment is prednisolone (a corticosteroid), and some cases benefit from other anti-inflammatory drugs and supportive therapies.

Is there a vaccine?

Yes – Primucell, made by Pfizer which, at the time of writing, is not available in the UK. Two doses of Primucell are administered into the nose of a kitten of over 16 weeks of age at an interval of three to four weeks. Booster vaccines are given every year. While Primucell is a good vaccine, it will not protect cats that are already incubating FIP, therefore kittens have to be prevented from being infected with FCoV before they are 16 weeks of age (ie old enough to vaccinate). This is done by isolation and early weaning (see table below).

One of my cats has FIP.

Do I need to isolate him from my other cats?

No. FCoV is very contagious, and your other cats will already have been infected. If you have your other cats antibody tested, you may find that they have higher antibody titres than the one which developed FIP, but that does not mean that they will develop FIP.

Protocol for the prevention of FCoV infection in kittens

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| Prepare kitten room | <ul style="list-style-type: none">• Remove all cats and kittens one week before putting the queen in• Disinfect room as far as possible using 1:32 dilution of sodium hypochlorite (Domestos or Milton)• Dedicate litter trays, food and water bowls to this room and disinfect with sodium hypochlorite• Introduce the queen one to two weeks before she is due to give birth. |
| Practise barrier nursing | <ul style="list-style-type: none">• Deal with the kitten room before tending other cats• Clean hands with disinfectant before going into kitten room• Have shoes and coveralls dedicated to the kitten room. |
| Early weaning and isolation of kittens | <ul style="list-style-type: none">• Test queen for FCoV antibodies either before or after kitting• If queen's antibody titre is greater than zero, the kittens should be removed to another clean room when they are five to six weeks old• If the queen has an antibody titre of zero, she can remain with the kittens until they are older. |
| Test kittens | <ul style="list-style-type: none">• Test kittens for FCoV antibodies at over ten weeks of age. |

My cat died of FIP.

When can I get another cat?

FCoV does not survive very well in the environment; so it is probably safe to get another cat a week or so after the cat with FIP died. However, make sure that you disinfect the areas where most virus would occur: the litter trays. Clean these carefully, soak them for 15–30 minutes in a mixture of Domestos or Milton and water, and rinse them thoroughly.

However, if you have other cats, it will not be safe to get a new cat until you have had them antibody tested, because they may infect the new cat. For safety, your other cats should have an antibody titre of zero before you introduce a new cat. If their antibody titres are greater than zero then you should

wait three to six months, have them retested and, if most of the cats' antibody titres have fallen to zero, it should be safe to get another cat. Be prepared to wait; some cats take years to become antibody negative. If there is no sign of the antibody titre dropping, or the cat continually has a positive virus test on his faeces, and you are determined to have another cat, choose one that also has an FCoV antibody titre of over ten. He will be less at risk of developing FIP than a cat which has never met the virus before (though remember that the stress of rehoming him could push him into developing FIP).

Can I prevent my other cats developing FIP?

Only around one cat in ten, which is infected with FCoV, develops FIP. However, cats that have antibodies should not be stressed if at all possible. For example, don't rehome them, delay having them neutered or any other operation which is not life saving and, if you have to leave them, get somebody to look after them in their own home rather than putting them into a cattery.

I'm getting a new cat. Should I have him tested for FIP?

There are two good reasons for testing a new cat for FCoV antibodies before you get him. Firstly, if you have cats already, the new cat could infect them; about one in three cats with FCoV antibodies sheds virus. Secondly, the stress of going to a new home sometimes pushes FCoV infected cats, and especially kittens, into developing FIP.

... but I'm getting my new kitten from a reputable breeder!

Regrettably, pedigree kittens are the most at risk of developing FIP. Few breeders' cats are free of FCoV infection and many of them do not early wean and isolate their kittens to prevent them from becoming infected. Insist on seeing a negative certificate for your kitten, and check that the kitten was ten weeks of age, or older, when it was tested (if tested younger they may be falsely negative).



Dry FIP: Where there is no fluid in the abdomen, there are usually some sort of changes in the eye. Iritis is one of the most frequent where there is a brownish change in the colour of the iris as shown by the arrow

What should cat breeders do about FCoV infection?

They should find out whether or not their cats are infected with FCoV by testing a few of their breeding cats. If their cats are infected, they will need to isolate the queen one to two weeks before giving birth and wean the kittens early at five to six weeks to prevent infection. Just because a breeder has never had a case of FIP occur on their premises, it is no indication that their cats are not infected; most FIP occurs in kittens weeks to months after they have gone to their new homes. The reason is that FIP has a very long incubation period and often occurs some weeks after an infected animal is stressed in some way (eg by rehoming). Tell-tale signs of the presence of FCoV in a cat breeder's premises include the possibility of kittens having diarrhoea and littermates tending to be of uneven sizes.

What should CP workers do if their own cats have FCoV?

This will depend on what fostering facilities the worker has; if the worker left his house daily and travelled to work at a Shelter, there would be very little chance of transporting the virus over any distance. However, if the foster cats were in cat pens in the garden, then the worker would have to be very careful about not transmitting virus on litter trays and hands. If the CP worker fostered cats in his own house, then the best policy would be to stop fostering until his own cats had been tested free of FCoV again. Foster cats shouldn't ever be mixed with the fosterer's own cats to minimise transmission of infectious diseases.

How can CP workers prevent FCoV infection occurring in foster cats?

Because lethal infectious diseases are such a problem in cats, fosterers should endeavour to keep cats in as small groups as possible, preferably housed individually.

If they MUST be kept in groups, there should be no more than two or three cats together and all the cats in a group should be homed before any new cats are introduced, and then only, after the area has been completely disinfected.

Pregnant and nursing queens should be treated as potentially infected with FCoV. There are two options – firstly test the queen for antibodies and if she is negative, the kittens are safe to remain with her. Secondly, if she is antibody-positive, early weaning may be necessary, as for cat breeders.

Can other animals or people develop FIP?

No.

Our thanks to Diane Addie PhD BVMS ALCM MRCVS, a member of the Council of Cats Protection, for writing this leaflet and to Professor Oswald Jarrett for his advice.



Cats Protection, National Cat Centre
Chelwood Gate, Haywards Heath RH17 7TT
Helpline: 08702 099 099
(Calls charged at national rate)
Fax: 08707 708 265

E-mail: cpl@cats.org.uk
Web: www.cats.org.uk
Charity No. 203644
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650