

# FIP

## Reducing the risk

A practical guide for breeders

By

**Dr S F Moreland BA Vet MB MRCVS**

**GCCF Veterinary Officer**

**January 2017**

## **UNDERSTANDING THE PROBLEM**

Feline Infectious Peritonitis is a frightening disease for cat breeders as it is almost invariably fatal and extremely difficult to prevent. There is also a lot of misinformation about FIP and as a complicated and relatively rare disease understanding of it is difficult and breeders are not always given correct advice, even by veterinary professionals.

Many of the problems arise because of the name- Feline Infectious Peritonitis. The only correct bit about the name is that it is specific to felines – thankfully not transmissible to humans or other pets. FIP is not a simple infectious disease – more of this later – and it is a systemic disease (ie affecting multiple systems in a cat's body and not just confined to the peritoneal cavity).

## **WHAT WE KNOW ABOUT HOW FeCoV CAUSES FIP**

The intestines of healthy cats (like all animals) are inhabited by numerous species of micro-organism ie viruses, bacteria, protozoa and fungi. There is a group of viruses in cats called Feline Enteric Coronaviruses (FeCoV). There are many strains of FeCoV and the majority of cats in multi-cat households will harbor a few of these viruses in their intestines without showing any symptoms whatsoever other than occasional transient mild vomiting/diarrhea following initial exposure.

FeCoV is known to be a genetically unstable virus. All viruses reproduce and multiply by replication and division of their genetic material. Coronaviruses are RNA viruses ie their genetic material is made of ribonucleic acid (RNA). Viral reproduction is a complex process and sometimes the RNA is not copied correctly and mutations (changes in the RNA) occur which lead to changes in the structure and behavior of the virus. FeCoV is particularly prone to development of mutations and some of these strains have the ability to penetrate the intestinal wall and invade the cat's body. When this occurs a proportion of cats will develop FIP but not all. The reasons for this are not fully understood but it is thought that susceptibility to FIP is likely to be controlled by genetic factors affecting the function of the immune system. Stress may also play a role by the same route. FIP is actually an inflammatory disease of blood vessels (vasculitis) in various parts of the cat's body. The form of disease (wet or dry FIP) which develops depends very much on the way the individual cat's immune system responds to the presence of the virus.

## **PREVENTION OF FIP**

The only way you will know if your cat is NOT carrying FeCoV is by doing a blood test to detect the level of antibodies to FeCoV. More recently a test (FeCoV Reverse-transcriptase Polymerase Chain Reaction or RT-PCR) has been developed that will also detect FeCoV RNA in the cat's faeces. This is not as fool proof as the older test for serum antibodies as infected cats may shed FeCoV intermittently. The only way to prove a cat does not carry FeCoV is to show that it has no antibodies in the blood. This is called a "Zero titre". The titre is a term that refers to the quantity of antibodies in the cat's blood. A cat with a zero titre is not at risk of developing FIP as long as this state continues.

### **METHOD 1 – THE FeCoV NEGATIVE HOUSEHOLD**

To maintain a zero titre, and hence zero risk of FIP, in a multi-cat household is extremely difficult. Care would have to be taken to ensure that only cats with a zero titre were allowed to join the household as the virus is easily spread by direct and indirect contact mainly via faeces, saliva and nasal secretions. The virus lives in the environment for around 7 weeks and will contaminate a cat's fur so handling cats without disinfecting your hands between each one can easily spread the virus.

Maintaining a FeCoV free household is very challenging and in reality most breeders live with FeCoV and have to deal with the tragedy of the occasional case of FIP. Maintaining a FeCoV household is possible but requires very strict hygiene procedures that may not be compatible with a normal life for your cat and your family. It is not recommended by the majority of experts in the field.

### **METHOD 2 – PRACTICAL WAYS OF REDUCING THE RISK OF FIP IN A MULTICAT HOUSEHOLD**

For the majority of breeders who know they have cats with FeCoV titres or who have never tested their cats for it there are many ways to reduce the risk of FIP developing. Many breeders who adopt sensible practical precautions manage to avoid producing kittens who succumb to this disease.

#### **The Basic Principle**

The higher the amount of FeCoV in the cat's environment the greater the risk. Remember that mutations arise when the virus replicates itself and the greater the virus load carried by your cats the greater the risk that a mutant strain capable of causing FIP (FIPV) will occur in one or more of your cats.

The aim in any breeding household must be to reduce FeCoV levels and hence the risk of FeCoV transmission.

Ways of reducing FeCoV in your cats' environment.

## **1. CAT GROUPING**

Studies have shown that shedding of FeCoV is reduced when cats are kept in small stable groups. Communal sharing of litter trays and mutual grooming in large multi-cat households is a major factor that perpetuates the multiplication and spread of FeCoV.

Try to keep your cats in stable pairs or groups (three or four at the most) which do not mix with other cats. The cats should get on well with each other to avoid stress. Each group should have access to at least one litter tray per 2 cats or more ideally one/cat + 1. By providing this number of trays in a stable environment the cats will tend to use their "own" tray rather than share thus helping to limit spread of the virus. Stress is also reduced which is helpful in increasing resistance to infectious disease plus the added benefit of reducing the risk of inappropriate toileting.

## **2. GOOD HYGIENE PRACTICE**

FeCoV is mainly spread by faeces. Therefore basic hygiene is extremely important. Measures you should take routinely to reduce faecal spread of FeCoV are as follows:

- a. Remove faeces from trays frequently – at least twice a day
- b. Change trays regularly, thoroughly washing and disinfecting tray between each use. If a cat has diarrhoea or soft faeces that become mixed with cat litter you will need to change tray every time the litter is contaminated.
- c. Avoid litter scoops unless you have time to wash and disinfect the scoop thoroughly between each use. Never use a dirty scoop between different trays as this is a good way of spreading FeCoV. Never leave a dirty scoop sitting around as flies landing on it will spread FeCoV around your household or cattery. Disposable biodegradable plastic bags (nappy or doggy bags) are the preferred way to remove faeces and contaminated litter. A link to a bulk supplier of biodegradable bags can be found at the end of this article.

d. General Good Hygiene. FeCoV can live in the environment for up to 7 weeks. Therefore use a good disinfectant licensed for general veterinary use throughout areas inhabited by cats. A number of products are available which are extremely safe and non-irritant and do not require rinsing. These can be made up into spray bottles. It is a good idea to keep one near each try or with each group of cat so that any faecal contamination can be wiped up easily before spread on cats paws or by flies.

### **3 PROTECTING KITTENS**

FIP is most common in young cats under 2 years old with the highest incidence between 4 and 9 months. The risk of FIP developing is highest following first exposure to FeCoV as the virus multiplies most rapidly in a new host and the greater the risk of a mutant FIPV strain. The stresses of rehoming and neutering are also thought to be factors predisposing to development of the disease in kittens exposed to FeCoV prior to leaving the breeder's household. It is terribly upsetting to lose a beautiful young kitten to FIP and breeders should take every possible precaution to reduce spread of FeCoV to their kittens before they leave the household.

#### **a. Limiting infection of queen at mating**

Infection of a queen at mating especially to an outside stud, is a significant risk factor. This may be because the queen can be exposed to a different strain of FeCoV to which she will have little immunity and is likely to still be shedding when kittens are born.

Good litter tray hygiene in the stud house is essential. Provide at least 2 litter trays to reduce sharing. Alternatively let the stud out into a separate run several times a day giving him an opportunity to use a different litter tray. Allowing the queen to share the studs house for a few hours at a time without a tray at all can work well although you will have to mop up plenty of puddles!!

Ideally have your own studs so your queen does not have to visit other catteries. Obviously not always possible but FeCoV infection contracted by queens at mating is one of the higher risk factors for the kittens

## **b. Isolation of queen after mating**

If your queen has a regular companion it will not make a lot of difference if she continues to enjoy their company for the first few weeks after mating

Your queen should be confined to her kitten room for at least three weeks prior to birth. Ideally the kitten room should be spacious, thoroughly cleaned and disinfected and rested without any other feline occupants before the queen moves in. Strict hygiene precautions should be adopted to prevent carrying any infection, including FeCoV into the kitten room. ie disposable gloves, disposable shoe covers or a pair of clean plastic clogs and a clean overall or shirt to wear when handling the queen

These measures help to reduce shedding of FeCoV after the kittens are born and will also help prevent exposure to any other diseases carried by other cats in the household. You will need to continue with these precautions until the kittens are ready to leave the kitten room

## **c. Early Weaning**

Studies have shown that kittens weaned early and removed into isolation away from all other cats and reared under strict hygiene precautions, avoiding any contact with other cats, can succeed in producing kitten with zero FeCoV titre at 13 weeks. The theory behind this is that even though kittens may be exposed to FeCoV on mothers coat and in her saliva, the mothers antibodies (MDA) received in the colostrum will protect them from FeCoV infection becoming established. After this age the MDA levels will have waned and no longer be high enough to protect the kittens.

This is a highly controversial procedure for a number of reasons. It may not work unless done very early ie. as close to 3 weeks as possible, which in many experts' opinion is too early. Forced weaning at this age can be very difficult and is likely to cause digestive problems and the overall mortality might be a lot higher than from FIP. Kittens need their mothers for social development and emotional and nutritional support until at least 6 weeks. Removing kittens at 3 weeks is also very distressing to both mother and kittens.

Even if you are able to wean and rear the kittens successfully from 3 weeks it is very difficult, in practice, not to accidentally introduce FeCoV into the kitten room. In addition proper socialization of the kittens allowing them to meet with other humans and pets, and explore larger areas of your home and experience all the sights, sounds and smells of family life will not be possible.

Although the majority of experts do not recommend early weaning nowadays a link to more information is appended.

## **d        Alternative to Early Weaning**

A system which does not guarantee zero titled kittens but which reduces exposure to FeCoV without the problems of early weaning is a realistic option. This is done by preventing the queen and kittens sharing litter trays which is the main route of exposure to FeCoV.

There are two options here. If you are at home all day and able to let the queen out into an area free of other cats she will easily get into a routine of using a litter tray outside the kitten room and will never use the kitten's tray. Start doing this before you need to give the kittens a tray. When kittens emerge from nest give them a tiny tray close to the nest which the queen is very unlikely to consider suitable for her own toilet!

Alternatively if you work and are out for long periods it is possible to set up a barrier which the kittens cannot scale made from two pieces of polycarbonate sheeting eg 2'6" x 4' and 5'x4' taped together with duck tape to make a hinge. The two sided barrier is then fitted into a corner of the kitten room to make a pen for the queen's tray which the kittens cannot gain access too until about 8 weeks old depending on the athletic ability of the breed. You should be able to wean the kittens fully and remove mum by 6-7 weeks before even the most agile kittens can find their way in. You can of course vary the dimensions to suit your own kitten room. You will need to avoid having any things such as climbers or chairs too close to the barrier or the kittens will climb up and jump down into the pen and become trapped exactly where you do not want them. With a bit of ingenuity you should be able to make a private WC for the queen which will greatly help reduce the amount of FeCoV that the kittens are exposed to.

## **e Care of Kittens after Weaning**

After weaning you must balance the need for socialization with the need to exercise continued vigilance against the spread of FeCoV. The best option is to only allow kittens into parts of your house where there are no other cats or litter trays. These areas should be thoroughly cleaned and floors disinfected before letting the kittens loose. Although kittens do not mix with other cats this does not have much of an adverse effect as they learn about social interactions with their littermates and your human family. You can also allow limited exposure to other cats provided there is no sharing of trays. Use of a kitten crate or large open mesh carrier in a room where the kittens can see, smell and hear older cats but not share litter trays is a good option.

## **GENETIC HEALTH**

There is evidence that genetic factors play a role in FIP. There is a possibility that in the future, genes governing susceptibility may be identified and a DNA test developed. However for now the best advice is to avoid close inbreeding as this may increase susceptibility to infectious disease in general.

At a practical level it also makes sense to neuter any cat which produces FIP kittens with more than one mate as this does suggest the possibility of heritable susceptibility, especially if you are adopting all possible measures to reduce FeCoV levels in your cat's environment.

## **LEGAL AND MORAL LIABILITY – PROTECTING YOURSELF**

Death from FIP is one of the most common reasons for complaints against breeders to the GCCF. This is most likely to happen if you ignore the plight of your kitten buyer and deny any responsibility. It is not acceptable behavior to fail to answer their phone calls or respond to emails.

It is important to explain to kitten buyers about diseases to which your kitten may be at risk prior to collection of the kitten. It is a good idea to include a section about this in the kitten care notes which you give to new owners.

For example you should list the diseases your kitten is vaccinated against and those which your adults are tested or screened for, and give recommendations regarding future vaccine boosters. You should also include a sentence explaining that FIP is an uncommon disease that is not 100% preventable as it is caused by mutation in a harmless ubiquitous virus for which there is no licensed vaccine. You should also include a sentence in your kitten contract

waiving liability for FIP and strongly recommending the buyer takes out comprehensive veterinary insurance for the kitten for at least two years as no liability can be accepted for veterinary expenses.

The question of breeder liability is a very difficult one. The incubation period for FIP following FeCoV infection is highly variable and as short as 2-14 days under experimental conditions but is usually much longer in a normal household or cattery situation. Never sell a kitten that shows any sign of being unwell at the time of leaving your home as if the symptoms worsen and the kitten develops FIP you will most certainly be liable in law for cost of kitten and veterinary expenses under the Sale of Goods Act.

If you sell a healthy kitten to a pet home with no other cats and the kitten develops FIP within the first 6 months, prior to neutering and has never mixed with other cats it has almost certainly contracted FIP as a result of mutation following FeCoV infection in the breeder's household. In those circumstances, although you are not legally liable, it is only right to offer a refund or a replacement kitten if the breeders insurance does not cover the purchase price. When the kitten has gone to a home with other cats the breeder is not necessarily liable. This is why it is so important to ensure your kitten buyers take out veterinary insurance and understand the consequences if they do not want to do this.

Regardless of where responsibility lies most important thing is to give support and advice to the kitten buyer in these circumstances.

If you are unfortunate enough to suffer more than the occasional death from FIP in kittens you have sold do not carry on regardless. Review your procedures and try to identify possible reasons for the problem. The GCCF Veterinary Officers are happy to give advice in these circumstances and all requests for help will be treated with the strictest confidence. They can be contacted via the GCCF office.

## **LINKS TO FURTHER INFORMATION**

Guidelines about FIP by the European Advisory Board on Cat Diseases

<http://www.abcdcatsvets.org/feline-infectious-peritonitis/>

An overview of FIP from International Cat Care

<http://icatcare.org/advice/cat-health/feline-infectious-peritonitis-fip>

Information about Early Weaning

<http://www.dr-addie.com/PreventionS2.htm>

Supplier of biodegradable poo bags

<http://www.muttsbutts.com/>