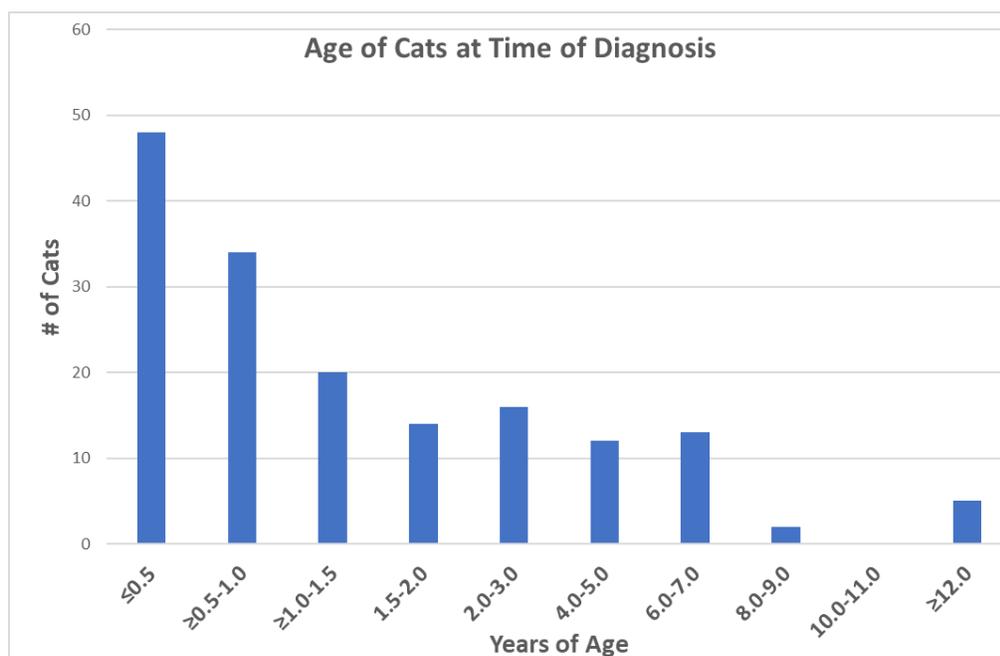


# FIP in Aged Cats

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**Background:** The relationship of age and FIP incidence has been well discussed in the literature and has even been the topic of research [1]. Twenty-nine percent of FIP cases occurs in kittens under 0.5 years of age, 50% under 1.0 years, 80% less than 3.0 years, and 96% in cases before 8 years of age (Table 10). The incidence is extremely low between 7 and 11 years of age. However, at least two studies, one from the USA in 1976 [2] and a second from Europe in 2021 [3] [Table 1], confirm a real but less dramatic increase in incidence to 3% in aged cats. The purpose of this article is to discuss the reason for this peak and its implication on diagnosis and successful treatment of FIP in aged cats.

**Table 1. Age of cats at the time of diagnosis with FIP based on data obtained from GS-441524 treated cats from Europe 2019-2021.**



**Source of FIP exposure-** FIP is a result of FECV exposure [4] and this the same for aged cats. However, there are several unique situations that are associated with such exposure. The first scenario is analogous to what occurs in younger cats, i.e., exposure to multiple younger cats. However, it is common for aged cats to be paired as kittens and live their lives together in relative isolation. This leads to another interesting scenario where one cat of the pair is likely to die before

the other, leaving it without a companion. A new companion, most often a kitten, is then obtained from a rescue organization, shelter or cattery. The chances of a kitten from these sources shedding FECV is high. A second source of FECV exposure also exists that does not require cat-to-cat contact. FECV is known to be carried on people's clothes from one cat to another. FECV is present in high concentrations in litter dust, especially from young cats and kittens, and can survive for many days in the environment. Therefore, owner contact with younger cats outside of the home is another source of FECV infection.

**Unique aspects of FIP in aged cats-** Experience with GS-441524 treatment of aged cats suggests three possible areas of concern: 1) mistakenly diagnosing FIP for some other disorder, 2) the existence of FIP in conjunction with one or more other disorders common to aging cats, and 3) treatment of FIP in the context of a weakened immune system.

**Mistaken diagnosis of FIP** - Observations made with GS-441524 treated cats indicate that FIP in aged cats is more apt to be misdiagnosed and is more difficult to cure. Misdiagnosis of FIP in old cats is best explained by simple odds. For instance, FIP was found to be the most common single cause of spinal disease in cats younger than two years of age in one study, while cancer was the most common single disorder in the 2-8-year age range [5]. Therefore, the first consideration of a spinal disorder in a young cat should be FIP, while the first consideration in an aged cat should be cancer. The incidence of many types of non-retrovirus induced cancer also rises starting at around 7-9 years of age and accounts for about one-third of deaths in aged cats. Chronic renal disease also starts to clinically manifest at about the same age and accounts for one-third or so of deaths in old cats. The remaining deaths in aged cats include diabetes and hyperthyroidism, and numerous musculoskeletal, cardiovascular, neurological, and gastrointestinal disorders. Aged cats, like aged humans, tend to have a decline in immune function that is often manifested by a rise in serum immunoglobulin levels and diseases associated with relative immunodeficiency and autoimmunity. The clinical and laboratory signs of these aging disorders often mimic those of FIP, but the odds of an aged cat having FIP is much lower than for these other conditions. Conversely, the odds of a young cat with clinical and laboratory signs compatible with FIP, having FIP, are much greater than those of an aged cat with similar findings.

**FIP as a secondary disease-** The second scenario is more common as many aged cats with FIP suffer from other serious disease conditions. Chronic renal failure is the most common of these underlying conditions, with cancers such as lymphoma being less common. Older cats also suffer from aging immune systems leading to a state of relative immunodeficiency, another predisposing factor for FIP.

**FIP and immunodeficiency of aging** – The immune system is susceptible to the negative effects of aging in all animal species, including cats [6,7]. Decline of immune function in aging cats is associated with changes in B and T cell lymphocyte populations and increased levels of non-specific immunoglobulin. Therefore, old cats often have higher than expected levels of serum protein and globulin. Increases in total serum protein and globulin levels in younger cats are often viewed as signs of FIP, whereas their diagnostic value in older cats is less significant.

The relative immunodeficiency of aging makes it more difficult to fight new infections and to contain older infections that have remain hidden or latent in the body for decades. The best studied examples of the effect of aging on resistance to new and latent infections comes from humans. COVID-19 deaths in aged humans with complicating diseases such as diabetes and chronic lung disease are the best example of the impact on aging and chronic degenerative diseases on resistance to an infectious agent. Tuberculosis is well known to stay latent in pulmonary lymph nodes for decades before reactivating. Therefore, TB is a particular problem in people in old-age facilities and in individuals being treated for autoimmune disorders with cytokine inhibitors. There are also indications that FIP can exist in a subclinical state for months and even years in some cats before becoming clinical. There are also cases of cats living in complete isolation in apartments for all their lives before developing FIP when old.

**Conclusion-** FIP in the aged cat is fortunately uncommon but has unique features that effects diagnosis and treatment. Special care must be taken to assure the diagnosis of FIP and to identify other health conditions that either predispose to FIP or complicate its successful treatment. It is a greater diagnostic challenge in aged cats and treatment is made more difficult by other degenerative disorders common to this age group. The cure rate for FIP, which is over 80% in younger cats, is not as high in aged cats.

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