

# Risk factors for feline leukemia virus (FeLV) infection (A review)

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## Abstract

Feline leukemia virus (FeLV) is a clinically important infectious disease of cats worldwide. The infection rate of FeLV depends on lifestyle, gender, cat population density, and the health status of cats. This present review deals with risk factors for acquiring FeLV infection. According to the literature data presented in this review paper, risk factors for FeLV infection are multi-cat household, outdoor exposure, health status, age, gender, and fighting behavior. The literature data presented varies in terms of age, gender, and breed.

**Key Word:** Review; Risk factors; Feline leukemia virus; Cat.

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## I. Introduction

Feline leukemia virus (FeLV) is a clinically important infectious disease of cats worldwide (Little *et al.*, 2009; Bande *et al.*, 2012; Chhetri *et al.*, 2015). FeLV infection is transmitted via the oro-nasal route through mutual grooming, nursing, or sharing food, water dishes, use of common litter areas, and apart from bites (Gleich *et al.*, 2009; Chhetri *et al.*, 2015). The prevalence of FeLV depends on lifestyle (Gleich *et al.*, 2009; Burling *et al.*, 2017); gender (Gleich *et al.*, 2009; Bande *et al.*, 2012; Luckman and Gates, 2017); cat population density (Bande *et al.*, 2012); and the health status of cats (Gleich *et al.*, 2009; Little *et al.*, 2009; Burling *et al.*, 2017).

## II. A Literature Review

Studies in the United States and Canada (Levy *et al.*, 2006; Burling *et al.*, 2017), Germany (Gleich *et al.*, 2009; Englert *et al.*, 2012) and Brazil (Jorge *et al.*, 2011; Almeida *et al.*, 2012) found that FeLV infection was significantly more frequent in cats with outdoor access than in those who live only indoors. Studies in Croatia (Kučer *et al.*, 2000; Rudan *et al.*, 2017), Malaysia (Bande *et al.*, 2012), Mexico (Ortega-Pacheco *et al.*, 2014), Brazil (Poffo *et al.*, 2017), Hungary (Szilasi *et al.*, 2019) and Ireland (Szilasi *et al.*, 2021) found that FeLV infection was more frequent in cats with outdoor access than in cats with no outdoor access, but the difference was not significant. Contrastingly, other studies in Croatia (Raukar, 2022) and Brazil (Rocha *et al.*, 2019) reported that FeLV infection was more frequent in exclusively indoor cats.

Studies in Malaysia (Bande *et al.*, 2012) and Brazil (Almeida *et al.*, 2012) reported that FeLV infection was significantly more frequent in cats living in multi-cat households than in cats living in single-cat households. Another Brazilian study (Rocha *et al.*, 2019) and a study in Croatia (Raukar, 2022) reported that FeLV infection was registered more frequently in cats living in multi-cat households than in cats living in single-cat households, but the difference was not significant. Contrastingly, Polish (Rypuła *et al.*, 2014) and Mexican (Ortega-Pacheco *et al.*, 2014) studies found FeLV infection more frequently in cats living in single-cat households than in cats living in multi-cat households, but the difference was not significant.

A study in Malaysia (Bande *et al.*, 2012) reported that FeLV infection was significantly higher in young cats than in adult cats. Contrastingly, studies in Canada (Little *et al.*, 2009), Mexico (Ortega-Pacheco *et al.*, 2014), and in the United States and Canada (Burling *et al.*, 2017) found that FeLV infection was significantly higher in adult cats than in young cats. In a Brazilian study (Almeida *et al.*, 2012), FeLV prevalence was significantly higher in cats aged 1-5 years compared with other age groups. In contrast, studies in Italy (Bandecci *et al.*, 2006), Germany (Gleich *et al.*, 2009; Englert *et al.*, 2012), Spain (Miró *et al.*, 2007), Poland (Rypuła *et al.*, 2014), Austria (Firth and Möstl, 2015), Australia (Westman *et al.*, 2016), Hungary (Szilasi *et al.*, 2019), Ireland (Szilasi *et al.*, 2021) and Thailand (Sprißler *et al.*, 2022) did not observe a significant association between age and seropositivity for FeLV.

Studies in Spain (Arjona *et al.*, 2000), Germany (Gleich *et al.*, 2009), Malaysia (Bande *et al.*, 2012; Sivagurunathan *et al.*, 2018), the United States and Canada (Burling *et al.*, 2017) and New Zealand (Luckman and Gates, 2017) reported that the risk of FeLV infection was significantly higher in males than in female cats. However, the Spanish study (Miró *et al.*, 2007) found that the risk of FeLV infection was significantly higher in female cats than in male cats. Contrary to this, studies conducted in Italy (Bandecci *et al.*, 2006), Germany (Englert *et al.*, 2012), Brazil (Almeida *et al.*, 2012), Mexico (Ortega-Pacheco *et al.*, 2014), Poland (Rypuła *et al.*, 2014), Austria (Firth and Möstl, 2015), Australia (Westman *et al.*, 2016), Brazil (Poffo *et al.*, 2017), Croatia (Rudan *et al.*, 2017; Perharić *et al.*, 2018), Hungary (Szilasi *et al.*, 2019), Ireland (Szilasi *et al.*, 2021) and Thailand (Sprößler *et al.*, 2022) did not observe a significant association between gender and seropositivity for FeLV.

Studies in Germany (Gleich *et al.*, 2009) and Malaysia (Sivagurunathan *et al.*, 2018) registered FeLV infection significantly more frequently in mixed-breed than in purebred cats. One Spanish study (Miró *et al.*, 2007) reported that FeLV infection was registered significantly more frequently in European shorthair cats than in Persian cats. A study in Poland (Rypuła *et al.*, 2014) found FeLV infection more frequently in crossbreeds than in purebreds, but the difference was not significant. A Malaysian study (Bande *et al.*, 2012) reported that FeLV infection was more frequent in pedigree cats than in domestic cats, but the difference was not significant. A study conducted in the Czech Republic (Knotek *et al.*, 1999) found that FeLV infection was more common in domestic short-bred cats than in pedigree cats, but the difference was not statistically significant.

Studies in the United States and Canada (Levy *et al.*, 2006; Chhetri *et al.*, 2015; Burling *et al.*, 2017), Canada (Little *et al.*, 2009), Malaysia (Bande *et al.*, 2012) and Australia (Westman *et al.*, 2016) observed that FeLV infection was significantly more frequent among sick cats than among healthy cats. A study in New Zealand (Luckman and Gates, 2017) found that immunosuppression was a significant risk factor for FeLV test positivity. Arjona *et al.* (2000) and Gleich and Hartmann (2009) reported that there was a statistical association between anemia and FeLV infection in Spain and Germany. A study in the United States (Pare *et al.*, 2022) reported that 74% of FeLV-positive cats had nonregenerative anemia. Pare *et al.* (2022) found that neoplasia of haematopoietic origin was significantly more frequent in cats younger than 4 years. Contrastingly, Miró *et al.* (2007) found no significant link between health status and FeLV seropositivity in Spain. Gleich *et al.* (2009) in Germany found that FIV co-infection was a significant risk factor for FeLV infection. On the other hand, Bande *et al.* (2012) in Malaysia found that FeLV infection was more frequent in FeLV-positive cats with FIV co-infection than in FeLV-positive cats with FIV negative status, but the difference was not significant.

Studies in Malaysia (Bande *et al.*, 2012) and Germany (Gleich *et al.*, 2009) reported that FeLV infection was registered significantly more frequently in cats showing aggressive behavior (fighting behavior) than in non-aggressive cats.

A study in Germany (Gleich *et al.*, 2009) reported that FeLV infection was registered significantly more frequently in cats that had contact with other cats than in cats that had no contact with other cats. In contrast, a study in Thailand (Sprößler *et al.*, 2022) reported that contact with the cats was not associated with a higher risk for FeLV infection.

### III. Conclusion

According to the literature data presented in this review paper, risk factors for FeLV infection are multi-cat household, outdoor exposure, health status, age, gender, and fighting behavior. The literature data presented varies in terms of age, gender, and breed.

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### List of abbreviations

FeLV: feline leukemia virus

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