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Attitudes to and use of the feline immunodeficiency virus vaccine by veterinarians in New Zealand

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Abstract

Aims: To identify factors that may influence veterinarians' opinion on whether they support or use the feline immunodeficiency virus (FIV) vaccine and in which clinical situations. Attitudes towards FIV testing, including what tests and when they were used, were also explored.

Methods: An eight part, 22 question questionnaire was sent to 1082 registered veterinarians in April 2010 who likely currently work in small animal practice in New Zealand.

Results: Most respondents reported that they used the FIV vaccine (323/466; 69%); most commonly after cats had been involved in multiple cat fights (249/310; 80%). Manufacturer's advice with regard to the FIV vaccine most positively influenced a veterinarian's decision regardless of whether it was to support (OR=2.14 95%CI=1.56–2.92) or discourages use (OR=0.51 95%CI=0.39–0.67) of the FIV vaccine.

Conclusion: The majority of New Zealand veterinarians support use and recommend the FIV vaccine. Manufacturer's advice provided the greatest influence on this decision. The majority (199/258, 77%) of veterinarians test cats for FIV after many cat fights, very few (45/256, 18%) test cats for FIV after a single cat fight.

Clinical Relevance: Whilst the veterinarians surveyed are generally supportive of the FIV vaccine, and the majority suggest they test cats after many fights and those who are ill, further quantitative research is required regarding actual patterns of use and testing as reported figures are likely to be overestimated.

Key Words: feline immunodeficiency virus, vaccine, FIV, survey, veterinarians, New Zealand

FIV Feline immunodeficiency virus
AAFP American Association of Feline Practitioners

Introduction

New Zealand is in a unique situation compared to other countries for a number of reasons. New Zealand has high prevalence of FIV: prevalence in healthy cats is reported to be 6.8% in New Zealand (Swinney *et al*., 1989), compared to 4.9% on average across all cats in the UK (Muirden, 2002), and 4.3% in pet cats allowed outdoors in the US (Levy *et al*., 2006). New Zealand has a predominance of strains from the C subclade (Hayward *et al*. 2007), whereas Australia (Kann *et al*., 2006), the UK (Samman *et al*., 2011) and the USA (Weaver, 2010) have a predominance of strains from the A and B subclades. The proportion of cats which have predominately outdoors residence is widely accepted to be close to 100% in New Zealand. This is compared to 80% in Australia (Toribio *et al*., 2009) and the UK (Habacher *et al*., 2010), and 40% in the US (Clancy *et al*., 2003).

There is disagreement in the literature as to whether or not vaccination should be used to prevent FIV infection in cats. The 2008 American Association of Feline Practitioner's (AAFP) Feline Retrovirus Management Guidelines recommend "FIV vaccines are non-core vaccines and may be considered for cats whose lifestyles put them at high-risk of infection, such as outdoor cats that fight or cats living with FIV-infected cats" (Levy *et al*., 2008); whereas other groups do not support FIV vaccine use (Hosie *et al*., 2009, Day *et al*., 2010).

The only alternative to vaccination to prevent cats from contracting FIV is to confine cats indoors, thereby preventing contact with FIV-infected cats (Hartmann, 1998). Confining FIV-infected cats indoors is listed in the literature as the recommended method of preventing further spread of FIV infection (Levy *et al*., 2008; Hosie *et al*., 2009). As mentioned earlier, these practices are not likely to be achieved in New Zealand where the culture is to allow cats to roam free outdoors.

The aims of this study were firstly to produce descriptive data on the value of various information resources as influencers of veterinarian's attitudes to the FIV vaccine. Secondly, to identify FIV vaccine-specific factors that affected veterinarians' opinions on whether they supported the use of or recommended the FIV vaccine. Thirdly, to evaluate the clinical situations in which the FIV vaccine is recommended by New Zealand veterinarians. Finally, veterinarians' attitudes to FIV testing were examined.

Materials and methods

Study Design

This is a retrospective study examining veterinarian's attitudes via a voluntary questionnaire. A questionnaire containing 9 parts and a total of 22 questions was mailed to veterinarians who were listed on the New Zealand Register of Veterinarians on the Veterinary Council of New Zealand website who did not list themselves in practice which excluded small animal work (e.g. industry or equine veterinarian). Of a total of 2392 veterinarians registered to practice in 2010, the questionnaire was sent with a prepaid reply envelope to 1082 veterinarians. Veterinarians were

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excluded for the following reasons: veterinarian's work in industry, research or pathology, Massey University staff, equine vets, locum vets, worked in practice outside New Zealand or no address or practice name was provided on the register. Unitec Institute of Technology Ethics Committee approval was obtained prior to delivery of the questionnaire.

The survey was divided into eight parts, five of which will be presented in this article. The first part requested information regarding the respondent including year of graduation and the amount of small animal work undertaken. Part two asked questions regarding the degree of influence (on a scale of 1–5 where 1 = strong negative and 5 = strong positive) various information resources had on the respondent when obtaining information regarding the FIV vaccine. Part three asked respondents if they supported use of the FIV vaccine in New Zealand and, using the same scale, the degree of influence various FIV-specific factors had on this decision. Part four asked about FIV testing including what tests were used and in which situations. Part five asked respondents if they use the FIV vaccine and if so, in which situations.

Statistical analysis

Data from the completed questionnaires were entered into a database (Excel 2007; Microsoft). In order to determine if there was any association between the FIV vaccine-specific factors (see Figure 2) and a respondent's support or choice to not use the vaccine, data were analysed using SAS 9.2 (SAS Institute Inc). Multivariable logistic regression was used and a significance level of $P<0.05$ was set.

Results

Of the 1082 veterinarians to which the questionnaire was sent, replies were received from 467 veterinarians; a response rate of 43%. Of these, 445 provided their year of graduation which ranged from 1964 through to 2010. The majority of responders (299/467; 64%) worked > 80% of their time undertaking companion animal work; whereas only 15% of veterinarians (70/467) spent less than 20% of their time in small animal practice (Table 1).

Seventy-one percent (323/456) of veterinarians reported they support the use of the FIV vaccine in New Zealand, while (71/456) 15% did not support use of the vaccine (Table 1). A similar proportion of veterinarians to those who support the use of the vaccine (323/466, 69%) reported they currently recommended the FIV vaccine to their clients.

The majority of responders (266/462; 58%) routinely perform FIV screening tests (Table 2). In healthy (192/255; 75%) and sick cats (216/311; 69%) in-house FIV testing was selected as the most common FIV screening test. Few veterinarians routinely used a secondary test for confirming the results of a screening FIV test (46/265; 17%). Laboratory FIV PCR testing was the most frequently selected confirmatory test (34/50; 68%), with the second most frequent being laboratory FIV antibody ELISA (10/50; 20%).

Of the respondents who said they tested for FIV, 31 responders stated they did not test cats which presented with an illness (other than cat fight wounds).

Table 1. Descriptive statistics regarding veterinarian signalment, support of FIV vaccine and FIV testing recommendations.

Variable	Category	Number (%) of respondents
Year of graduation	2008–2010 2000–2007 1999–1980 < 1979	57/445 (13%) 221/445 (50%) 118/445 (26%) 49/445 (11%)
Proportion of companion animal work	20% or less 21% to 40% 41 to 60% 61 to 80% Greater than 80%	70/467 (15%) 39/467 (8%) 33/467 (7%) 26/467 (6%) 299/467 (64%)
Support use of FIV vaccine	Yes No No Opinion	323/456 (71%) 71/456 (15%) 62/456 (14%)
Perform FIV screening test routinely	Yes No	266/462 (58%) 196/462 (42%)
Recommend FIV testing prior to vaccination (adult)	Yes No Don't vaccinate	235/260 (90.4%) 1/260 (0.4%) 24/260 (9.2%)
Recommend FIV testing prior to vaccination (kitten)	Yes No Don't vaccinate	26/259 (10%) 196/259 (76%) 37/259 (14%)
Recommend FIV testing (first cat fight)	Yes No	45/256 (18%) 211/256 (82%)
Recommend FIV testing (repeated cat fights)	Yes No	199/258 (77%) 59/258 (23%)
Recommend FIV testing (ill cat)	Yes No	224/255 (88%) 31/255 (12%)

Table 2. Descriptive statistics regarding use and recommendations regarding the FIV vaccine.

Variable	Category	Number (%) of respondents
Currently use FIV vaccine	Yes No	323/466 (69%) 143/466 (31%)
Recommend FIV vaccine to healthy kittens	Yes No	32/306 (10%) 274/306 (90%)
Recommend FIV vaccine to healthy outdoor kittens	Yes No	198/308 (64%) 110/308 (36%)
Recommend FIV vaccine to healthy indoor adults	Yes No	13/307 (4%) 294/307 (96%)
Recommend FIV vaccine to healthy outdoor adult	Yes No	182/309 (59%) 127/309 (41%)
Recommend FIV vaccine after 1st cat fight	Yes No	120/305 (39%) 185/305 (61%)
Recommend FIV vaccine after many cat fights	Yes No	249/310 (80%) 61/310 (20%)
Recommend FIV vaccine in ill cats	Yes No	77/299 (26%) 222 (74%)

However, nearly a third of these 31 responders (29%; 9/31) indicated that they tested cats presenting with clinical signs suggestive of FIV infection; suggesting many vets are differentiating between a sick cat and an FIV-infected cat.

Of those respondents who stated they used the FIV vaccine, the proportion that used the FIV vaccine in a range of situations was evaluated (Table 2). Subsequent to frequent cat fights was the most common situation in which the vaccine was recommended (249/310; 80%). Vaccination was often recommended both in kittens and adult cats with outdoor access (198/308; 64% and 182/309; 59% respectively). Infrequently the FIV vaccine was recommended to adult cats and kittens who resided indoor only (13/307; 4% and 32/306 10% respectively).

Some respondents (40) answered "No" (or provided no response) to all the situations listed in the survey for which they could use the FIV vaccine. Another

group of respondents (50) answered "Yes" to only one situation and a further 48 responders only recommended the vaccine in two situations listed in the survey. Consequently over a third of respondents (43%%; 138/323) who reported they used the FIV vaccine recommended it in none, one or two of the seven situations lists in the survey. Furthermore, only 3 respondents answered "Yes" to all the situations listed in the survey.

The importance ascribed to various information resources and the extent to which they influenced a veterinarian's opinion when making decisions about the FIV vaccine is presented in Figure 1. Textbooks do not provide much influence, positive or negative. Interestingly journals, web-based veterinary sites and specialists provided similar levels of influence, but with a small tendency towards the positive. Colleagues and manufacturer representatives provided positive influence and none of the resource types provided a predominantly negative influence.

The results regarding the degree of influence various FIV vaccine-specific factors had on a veterinarian's opinion regarding the FIV vaccine are presented in Figure 2. Shelf life, potential side effects and cost of the vaccine showed a predominantly neutral influence with negative slightly outweighing positive influence. Advice from the FIV vaccine manufacturer and clinic policy on use of the FIV vaccine were the most positive influencers, whereas diagnostic confusion, cost of the vaccine and potential side effects caused by the FIV vaccine resulted in the strongest negative influencers.

Analysis assessing whether various factors correlate with positive support of the vaccine is found in Table 3. Only potential side effects, diagnostic confusion and manufacturer's advice were statistically significant ($P<0.05$). Potential side effects (OR=0.66 95% CI=0.48–0.91) and diagnostic confusion (OR=0.72 95%CI=0.55–0.94) had an odds ratio < 1 indicating this factor had a negative influence on veterinarians who nevertheless still support use of the FIV vaccine. Manufacturer's advice had an odds ratio > 1 (OR=2.14 95%CI=1.56–2.92) indicating that this factor had a positive influence on veterinarians who support use of the FIV vaccine.

Table 3. Results of multivariable logistical regression examining relationship between veterinarians' support of the FIV vaccine and FIV-vaccine specific factors

Odds Ratio Estimates				
Factor	OR	95% Confidence Limits		P-value
Potential side effect of FIV vaccine	0.66	0.48	0.91	0.01
Efficacy of the vaccine	1.07	0.85	1.36	0.56
Diagnostic confusion	0.72	0.55	0.94	0.02
FIV testing (No vs Yes)	1.50	0.84	2.68	0.17
Manufacturer's advice	2.14	1.56	2.92	< 0.0001
Cost of the FIV vaccine	1.18	0.88	1.59	0.27

Analysis assessing whether any factors correlate with a veterinarian's decision to not use the FIV vaccine is found in Table 4. Thirty-one percent (143/466) of veterinarians reported that they did not use the vaccine. Such a small pool of respondents made it difficult to achieve correlations which were statistically significant.

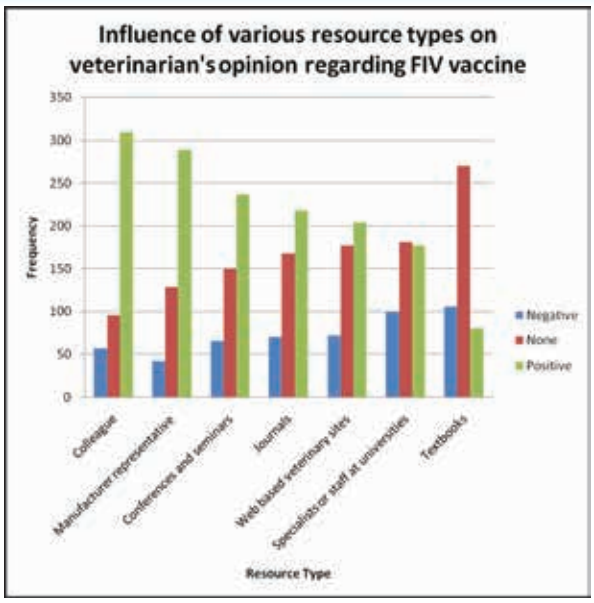

Figure 1. Relative importance of resource type in influencing decisions regarding FIV vaccine ordered in decreasing frequency of positive response.

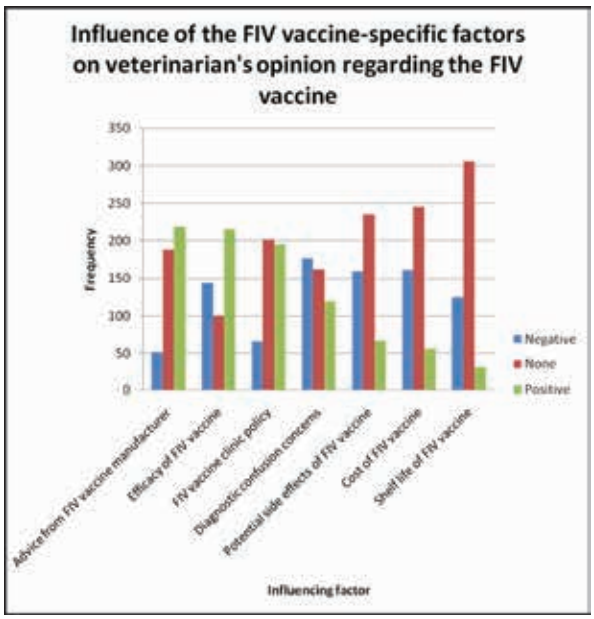

Figure 2. Relative influence of various factors affecting veterinarian's opinion of the FIV vaccine ordered in decreasing frequency

Table 4. Results of multivariable logistical regression examining relationship between veterinarians' not using the FIV vaccine and the FIV-vaccine specific factors

Odds Ratio Estimates				
Factor	OR	95% Confidence Limits		P-value
Potential side effects of the FIV vaccine	1.50	1.10	2.03	0.01
Year of graduation	0.97	0.75	1.26	0.81
Efficacy of the FIV vaccine	0.99	0.80	1.21	0.90
Diagnostic confusion	1.27	1.01	1.61	0.04
Manufacturer's advice	0.51	0.39	0.67	<0.0001
Shelf life of the FIV vaccine	1.08	0.76	1.52	0.68
Cost of the FIV vaccine	0.98	0.74	1.29	0.87
Clinic policy for use of FIV vaccine	0.83	0.65	1.04	0.11

Of the eight variables assessed, only diagnostic confusion and manufacturer's advice were statistically

significant. Diagnostic confusion had an odds ratio > 1 (OR=1.27 95%CI=1.01–1.61) suggesting this factor contributed to a veterinarian's decision to not use the FIV vaccine. Manufacturer's advice had an odds ratio of < 1 (OR=0.51 95%CI=0.39–0.67) suggesting this factor negatively contributed to a negative decision to use the FIV vaccine; that is manufacturer's advice was a positive influencer despite the veterinarian's choice to not use the FIV vaccine.

Discussion

This is the survey is the first attempt, to our knowledge, of gaining information on veterinarians' attitudes towards Feline Immunodeficiency Virus (FIV) vaccine and its use in cats. The majority of responders stated they support the use of the FIV vaccine and they used the FIV vaccine. Since the majority of cats in New Zealand have outdoor access, these findings are in line with the AAFP Feline Retrovirus Management Guidelines (Levy *et al*., 2008).

Most respondents reported that they recommend the FIV vaccine in healthy adult cats, healthy kittens and cats after multiple cat fights. This would suggest that the majority of cats in New Zealand are vaccinated for FIV. However, based on Fel-O-Vax FIV® vaccine sales in 2010 sales and New Zealand cat population statistics (Anonymous, 2011), no more than 5% of the New Zealand cat population may be vaccinated; hence the survey results are highly overestimated.

Additional information found in the "Comments" section of the questionnaire suggests that, while veterinarians answered that they used the FIV vaccine, they qualified this response with comments such as: "It is offered where the risk profile is high and the client would like to use it", "if owner wants full prophylactic care", "if client requests, not routinely". Responses such as these were provided in many of the questionnaires suggesting, in the authors' opinion, that the response "Yes" to use of the FIV vaccine is over-represented. Most veterinarians appear to offer rather than recommend the FIV vaccine.

The majority of veterinarians in this study reported they test sick cats for FIV, which follows the recommendations by the AAFP Retrovirus Management Guidelines (Levy *et al*., 2008). However, some respondents reported that cats with clinical signs related to FIV infection were different to "sick" cats. This would suggest that many symptomatic FIV-positive cats are being missed by practitioners who are not testing all sick cats for FIV. Consequently response that veterinarians test sick cats for FIV is likely overrepresented. Latest information suggests that even cats without clinical signs may have physiological abnormalities. A recent study investigating FIV positive cats without clinical signs found that 48% showed haematological abnormalities in which no other cause of cytopaenia other than FIV infection was observed (Fujino *et al*., 2009). This evidence, one may argue, supports all cats being tested for FIV infection regardless of clinical signs.

Retrospectively, some errors regarding the design of the questionnaire were noted. Use of the word "routinely" in one question (Do you routinely perform FIV screening tests?) likely resulted in bias in the results because many respondents answered "No". Additional comments in the questionnaire revealed some respondents placed particularly strong significance on the word "routinely". Furthermore, questions asked respondents which test they would use in certain situations; however these questions did not specifically ask respondents to choose only one test (Which of the following FIV tests do you routinely use as a screening test?). Therefore analysis comparing preference for specific tests could not be undertaken.

Interestingly the current study found that anecdotal information (from colleagues or manufacturer representatives) provided the most positive influence, greater than published journal articles, in terms of information resources regarding the FIV vaccine. This finding suggests that veterinarians are not critically evaluating strength of evidence as part of evidenced-based medicine (Doig, 2003). However, Gyles (2009) reported veterinarians have an interest in having practice tips and other forms of anecdotal experience-based advice. Research in human medicine has also found personal experience to influence clinical practice behaviour more than scientific evidence (Greer, 1988). These authors went on to suggest that there was a reliance on local colleagues for guidance, which they suggested "reflects a need for both social support and for technical clarification".

This research is a preliminary study investigating New Zealand veterinarians' opinions with regards to FIV testing and the FIV vaccine. Further research is needed to explore actual use of the FIV vaccine by New Zealand veterinarians. Furthermore actual quantitative data on FIV testing rates and situations is needed. Finally, rates of microchipping of cats, particularly with use of the FIV vaccine, along with quantifiable FIV testing rates of shelters across New Zealand would provide valuable information for New Zealand veterinarians. An education campaign encouraging more FIV testing by veterinarians, especially in unwell cats, will help obtain more accurate determination of prevalence of this serious, potentially fatal disease.

Declaration of interest

This study was funded by a NZ Companion Animal Health Foundation grant. One of the authors (CS) is a current employee of Zoetis, and assisted with study design, data analysis and writing of the manuscript. The other author (MR) is an owner of a referral practice which receives sponsorship for an internship position from Zoetis. Zoetis is the distributor of the Fel-O-Vax FIV® vaccine in New Zealand.

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