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# Attitudes to preventative healthcare for cats and dogs in Aotearoa / New Zealand in 20–30-year-olds

Mikayla Scott, Laura C. Harvey and Dr Kristie E. Cameron

## Abstract

Pet ownership has increased in Aotearoa / New Zealand over the last decade, with the largest jump in dog ownership attributed to 18–34-year-olds. With the transitional nature of this age group, considering the increase in independence and responsibility, this survey aimed to measure the attitudes of 20–30-year-olds to preventative healthcare of their pets. A survey was disseminated through social media; respondents self-selected their participation and were asked questions about their living situation and management of components of preventative care in their animals, including vaccinations, parasite control and veterinary check-ups. There were 93 usable responses. The findings revealed that most pet owners were renting or were homeowners, with the number of cats owned and the incidence of dog ownership higher than expected in rented homes. Most respondents had knowledge about worm transmission, with living situation and number and type of pets affecting knowledge of worm and flea infestations. The responsibility of health management was assumed by those that made decisions about what types of preventative care was given and who paid for services and treatment. Overall, owners tended to know more about, and provided preventative care and treatment for, parasites that directly affect humans, such as worms, and two thirds of respondents would deworm the household, including pets and humans. Fewer respondents were aware of the effect of fleas, with a variety of treatments used. Knowledge of preventative care, in line with the standards of animal care in Aotearoa / New Zealand, by this age group is reassuring but there could be further compliance with increased awareness of the effects of worms and flea infestations on humans.

## Keywords

Preventative health, parasite control, vaccinations, veterinary visits

## Introduction

Preventative healthcare is essential in maintaining an animal's health, wellbeing and quality of life. According to the Animal Welfare Act 1999, if you are responsible for an animal, you must provide veterinary care when they are ill, injured or distressed (Part 1, 2b). For dogs and cats, the Codes of Welfare (2018) provide best practice and recommendations regarding preventative healthcare. This includes annual vaccinations for known transmissible diseases, regular parasite control, and an annual check-up at the veterinary clinic. Following a preventative health regime increases the chance of illness being addressed and decreases the likelihood of an animal becoming sick, dying, or costing money for treatment. Simply put, an owner that fails to engage with preventative healthcare for their pet is putting their own, their family's and their pet's health at risk.

The Companion Animals New Zealand (CANZ) survey, conducted every four years, measures the demographics of animal ownership and animal care in Aotearoa / New Zealand. They reported in 2020 that 41% of homes have a cat, 34% have a dog, and 15% have both a cat and a dog. Cat owners aged 18–24 decreased from 45% in 2015 to 40% in 2020, and those aged 25–34 decreased from 39% in 2016 to 38% in 2020. Dog owners aged 18–24 increased from 32% in 2016 to 47% in 2020, and those aged 24–34 increased from 35% in 2015 to 41% in 2020. Estimates of pet ownership are even higher after the Covid pandemic lockdowns; however, there has been no formal survey (Flaws & Morrison, 2020).

While 73% of 18–24-year-olds and 66% of 25–34-year-olds are responsible for an animal (Companion Animals New Zealand, 2020), young adults are experiencing immense multi-faceted life changes, such as transitioning from a school environment to either a job or study; living as an adult in the family home, or leaving to flat or buy a property; becoming responsible for their own needs and making decisions about daily activities, such as food, work–life balance and finances; and developing and managing relationships (Munson et al., 2013). Further, the population of adults under 30 years old make up the smallest percentage of homeowners at 3.9%, with up

to 61% of 20–30-year-olds living in an owner-occupied dwelling, compared to 32% of all New Zealanders who are renting (Stats NZ, 2021). Further, young people are reported to be staying at home with parents for longer (Stats NZ, 2021). If, and how, young adults manage to provide preventative healthcare for their pets during this time of transition and the increase in pet ownership between 2016 and 2020 is of interest in this study.

Vaccinations aid the immune system to protect against pathogens so that an animal does not become seriously ill or die. In Aotearoa / New Zealand, cats are vaccinated against ‘cat flu’ and ‘snuffles’ (feline viral rhinotracheitis and feline calicivirus), (Code of Welfare – Companion Cats, 2018, Section 6.1.2). The CANZ 2020 survey reported that 74% of cat owners and 80% of dog owners considered vaccinations necessary, and 4% of cat owners and 3% of dog owners thought them unnecessary. Of 198 veterinarians in Aotearoa / New Zealand, 59% recommended vaccinations annually, 17% two yearly and 24% at three-yearly intervals for adult cats (Cave et al., 2015). Further, in Aotearoa / New Zealand and Australia 63% of cats were vaccinated yearly, 13% every 2–3 years, and 12% once as a kitten or never. The respondents were knowledgeable regarding feline health, with 75–85% aware of feline herpesvirus and calicivirus. Only 3.4% were uninformed (Johnston et al., 2017). Thus, the small percentage that do not vaccinate might be uninformed of the risks to their animal if they were to contract a disease.

In Aotearoa / New Zealand, dogs are vaccinated against canine parvovirus, canine distemper, canine adenovirus 2 (canine hepatitis), canine infectious cough (*Bordetella* spp. and other pathogenic agents), and leptospirosis (Code of Welfare – Dogs, 2018, Section 7.3). Twenty-seven percent of veterinarians surveyed in New Zealand (n = 198), recommended vaccinations annually, 28% two-yearly, and 45% at three-yearly intervals for adult dogs. For at-risk dogs and farm dogs, 35% recommended vaccinations annually, 22% two-yearly, and 43% at three-yearly intervals (Cave et al., 2015). O’Connell et al. (2019) reported that 36% of farm dog owners vaccinated their dogs annually (19/53), 11% (6/53) every two years, 21% (11/53) unsure or sporadically, and 19% (10/53) did not vaccinate at all.

Ectoparasites affect humans and animals; often an infestation of fleas, ticks or mites begins with the pet and spreads to the household (Halos et al., 2014). Within the home only 5% of fleas are in their adult state, with 95% of common infestations occurring from existing flea eggs, larvae and pupae (Wright, 2022); thus,

preventative flea treatments are required to break the flea life-cycle. Topical flea treatments are up to 99.9% effective (Meadows et al., 2017); however, a range of flea-control methods is used in Aotearoa / New Zealand, including swimming (O’Connell et al., 2019).

A UK study identified that of a population of 812 cats and 662 dogs, 28.1% of the cats had fleas, compared to 14.4% of the dogs (Abdullah et al., 2019); and across seven European countries, 42% of dogs and 47% of cats initially had fleas, with 89% flea free after 90 days of treatment (Beugnet & Franc, 2010). Furthermore, Azrizal-Wahid et al. (2022) found that 51% of cat owners had a moderate knowledge of fleas and 65% were aware of diseases carried by fleas in Malaysia. In the US, UK and France, 66–75% of sampled cat owners used a common brand of flea treatment every three months and 94% were satisfied with the product maintaining a flea-free home; 79–88% preferred a longer interval between doses than recommended (Lavan et al., 2021). Conversely, 16% of respondents (24/150) in Qatar followed the monthly recommendations for flea treatment and 24.7% of respondents never used flea-preventative treatments, even though warned of the risk by veterinarians, books and the internet (Alho et al., 2018). An Aotearoa / New Zealand study found that non-compliance with flea treatment increased with age and being male, therefore information targeted to this group might be needed to increase compliance with parasite control (Forrest et al., 2023).

As with ectoparasites, endoparasites, such as helminths, can infect humans and animals. Tapeworms (*Dipylidium caninum* and *Taenia ovis* in dogs, and *Taenia taeniaeformis* in cats), roundworm (*Toxocara canis* and *Toxascaris leonine* in dogs, and *Toxocara catii* in cats) and hookworms (*Uncinaria stenocephala*) are intestinal parasites that can be transmitted to humans (Cooper et al., 2011). As immunity to worms is not possible, regular treatment of anthelmintics for animals and the household (Traversa, 2012) is required to control for reinfestation. Although directions on deworming treatments warn to only treat when there is evidence of an infection (Multichem NZ Ltd, n.d.), regular deworming every 1–3 months in dogs and cats is recommended (Traversa, 2012).

There is some knowledge regarding worms as a risk to human health in pet owner populations globally. In Portugal, of 312 owners, 87% wormed their dogs, and 63% wormed their cats (Matos et al., 2015), and in Finland, of 296 owners, 86% treated their dogs for worms at least once per year (Pullola et al., 2006).

Further, 591 faecal samples from dogs in Finland were analysed and four species of endoparasites were identified in less than 6% of the sample. Kennel housing, visits abroad and status as a working dog such as those used for hunting were identified as risk factors (Pullola et al., 2006). In a survey of 171 working farm dogs in Aotearoa / New Zealand, 40% (69/171) were infected with a species of endoparasite; the most prevalent was the protozoa sarcocytosis in 21% (35/171) of the dogs, which creates cysts in the muscles (O'Connell et al., 2019). Most owners reported treating for worms every 2–3 months (42/53, 80%); however, deworming does not treat protozoa.

The Code of Welfare for dogs recommends that dogs and cats have an annual health check with a veterinarian (Code of Welfare – Dogs, Part 7; Code of Welfare – Companion Cats, Part 6). In the 2020 CANZ survey, 66% of dog owners and 52% of cat owners reported annual veterinary check-ups to be important, while 10% of cat owners and 5% of dog owners considered check-ups unimportant. Gates et al. (2019) reported that 70% (711/1013) of New Zealand dog and cat owners had taken their pet to the veterinarian within the previous year, most for an annual check-up and vaccination. In a study spanning Australia and Aotearoa / New Zealand, Johnston et al. (2017) found that 76% of owners took their cats to the veterinarian when unwell, 75% for vaccinations, and 56% for routine check-ups. Owners that did not regularly attend the veterinarian stated that their cats were never unwell (55%), it was costly (40%) or too stressful (24%). Further, 12% reported that check-ups were unnecessary and 16% did not know they were recommended (Johnston et al., 2017), indicating that there are high levels of compliance, but some owners are failing to see the value or understand the importance of regular check-ups.

Compliance for vaccinations, parasite control and annual check-ups globally is not an inherent part of pet ownership, with a number of owners using different methods of preventative health or not doing it at all – either not recognising the risks to their pets and themselves, or not believing that they are at risk. The aim of this study was to measure the attitudes and actions of young adults 20–30 years old in a transitional stage of their lives, and how they provided preventative care for their pets.

## Method

A link to an online survey conducted through Google forms was disseminated via Facebook and Instagram, and remained accessible for responses from 28 July to 19 October 2022. The link was shared through animal-associated pages and groups on social media, for example, Stand Up Auckland Dog Owners, Cats of Auckland, and Unitec course and programme Facebook pages. After reading introduction to the survey explaining that consent was given by completing the survey, and confirming they fitted the age criteria of between 20 and 30 years old, respondents completed the survey.

The survey involved questions regarding demographic details of the respondent (e.g., age, sex, household diversity) and details regarding veterinary check-ups, vaccinations and parasite control for either the respondent's cat, dog or both. Reported here is whether 20–30-year-olds provided the components of preventative healthcare for their cats and dogs, frequency of care, knowledge they had for preventative care and the main source of their knowledge. Information collected also included the person responsible for supplying food and veterinary care such as check-ups, vaccinations, flea and worm treatment.

The Unitec Research Ethics Committee approved this research. The survey was download to Microsoft Excel and descriptive statistics were conducted using this software. Statistics were performed using SPSS Statistics. A two-way ANOVA was used to calculate the number of respondents owning at least one cat, or dog, or both, and whether this was related to their living situation, and chi-square analyses were used to identify relationships between types of pet, living situation and knowledge of parasite risk, incidence of veterinary visits and compliance with flea and worm treatments.

## Results

### Demographics

The survey resulted in 93 usable responses once incomplete and incorrect (outside age criteria) responses were excluded. Respondents were mostly female (85/93, 91.4%), with an average age of 25.0 years (SD = 2.85 years, Table 1). Most of the respondents either rented a home with a partner (23/93, 24.7%), were a homeowner living with family (15/93, 16.1%), or rented with flatmates (14/93, 15.1%).

Nearly a third of respondents owned at least one cat and one dog (30/93, 32.3%), with more respondents owning at least one dog (45/93, 47.3%) than at least one cat (19/93, 20.4%, Figure 1). However, not all respondents that owned both pets answered both sections of the survey, thus in some instances the denominator is different to the number of samples.

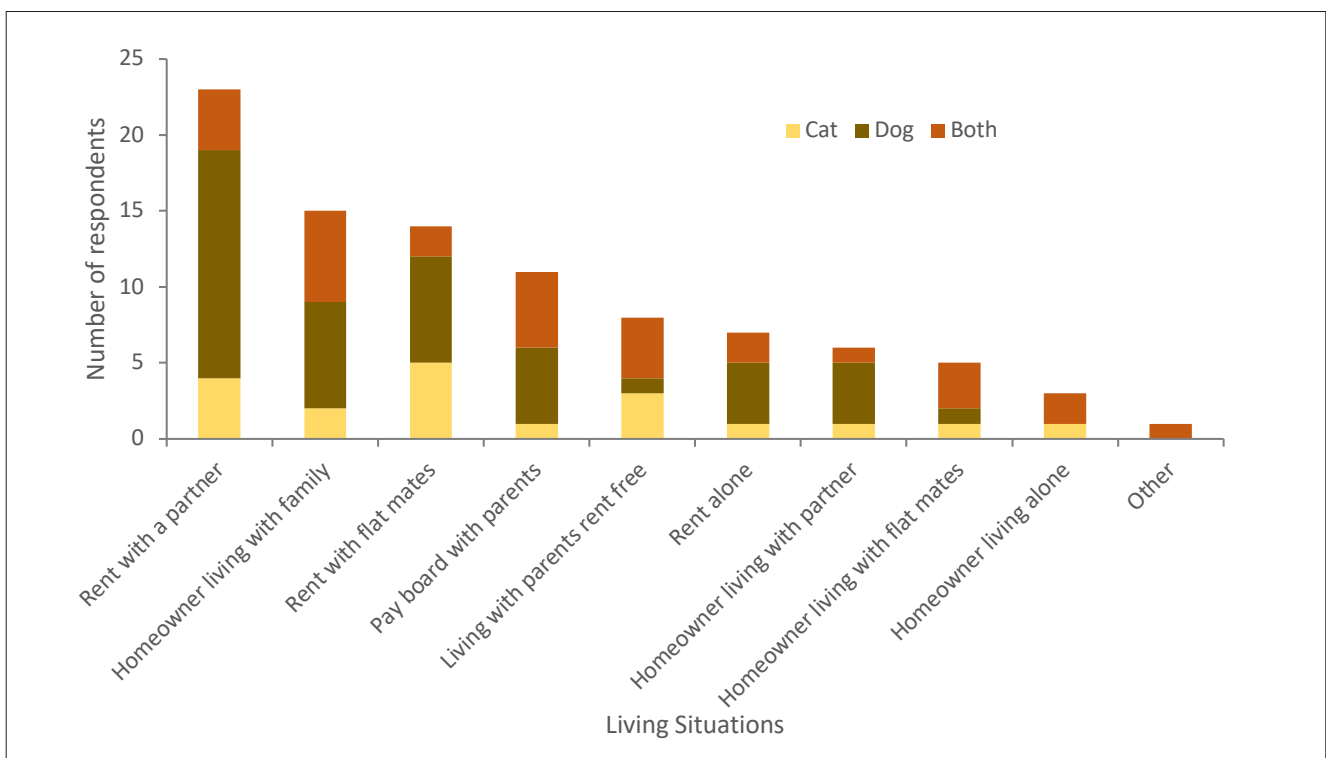
There was no significant difference in the number of respondents that owned both a cat and a dog, or at least one cat or dog [ $F(2,2) = 2.23, p = .223, \eta^2 = .69$ ], and no significant difference in owning a pet based on whether they were homeowners, living with parents or renting [ $F(2,4) = 6.49, p = .055, \eta^2 = .76$ ].

**Table 1.** Demographic information (gender, age, current living situation, animal type, number of animals and age of animals) including sample sizes and percentages.

Variable	N	%
Gender (n = 93)		
Female	85	91.4
Male	5	5.4
Diverse	2	2.2
Prefer not to say	1	1.1
Age (n = 93)		
20	3	3.2
21	7	7.5
22	13	14.0
23	11	11.8
24	8	8.6
25	8	8.6
26	10	10.8
27	13	14.0
28	10	10.8
29	3	3.2
30	7	7.5
Current living situation (n = 93)		
Rent with a partner	23	24.7
Homeowner living with family	15	16.1

Rent with flatmates	14	15.1
Pay board with family	11	11.8
Living with parents rent free	8	8.6
Rent alone	7	7.5
Homeowner living with partner	6	6.5
Homeowner living with flatmates	5	5.4
Homeowner living alone	3	3.2
Other (Live in my partners house and help pay the mortgage; at residential college; rent with family)	1	1.1
Animal type (n = 93)		
At least one cat only	30	32.3
At least one dog only	19	20.4
At least one dog and one cat	44	47.3
Number of cats per respondent (n = 50)		
1	19	38.0
2	24	48.0
3	6	12.0
4	1	2.0
5+	0	0.0
Number of dogs per respondent (n = 73)		
1	50	68.5
2	19	26.0
3	2	2.7
4	1	1.4
5+	1	1.4
Age of cats (n = 85)		
<2	32	37.6

2–6	32	37.6
7–12	16	18.8
12+	5	5.9
Age of dogs (n = 92)		
<2	52	56.5
2–6	23	25.0
7–12	12	13.0
12+	5	5.4

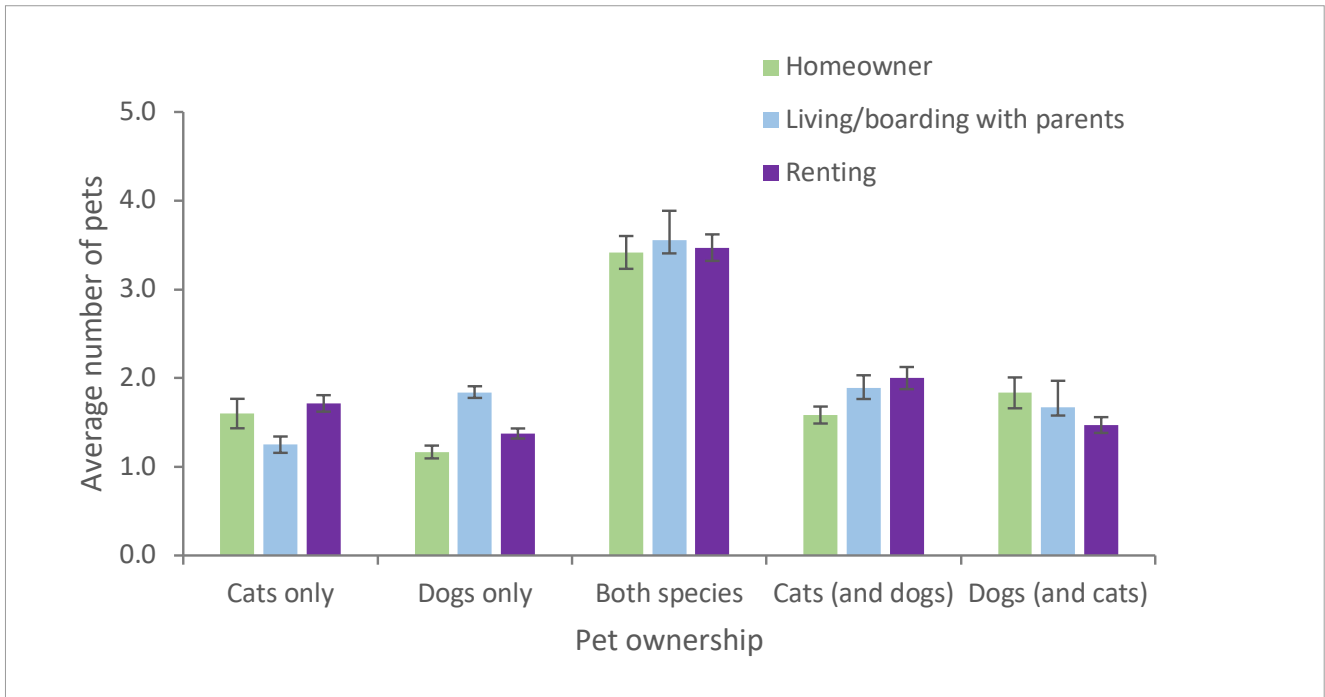


**Figure 1.** Number of respondents that owned a cat, dog or both and living situation.

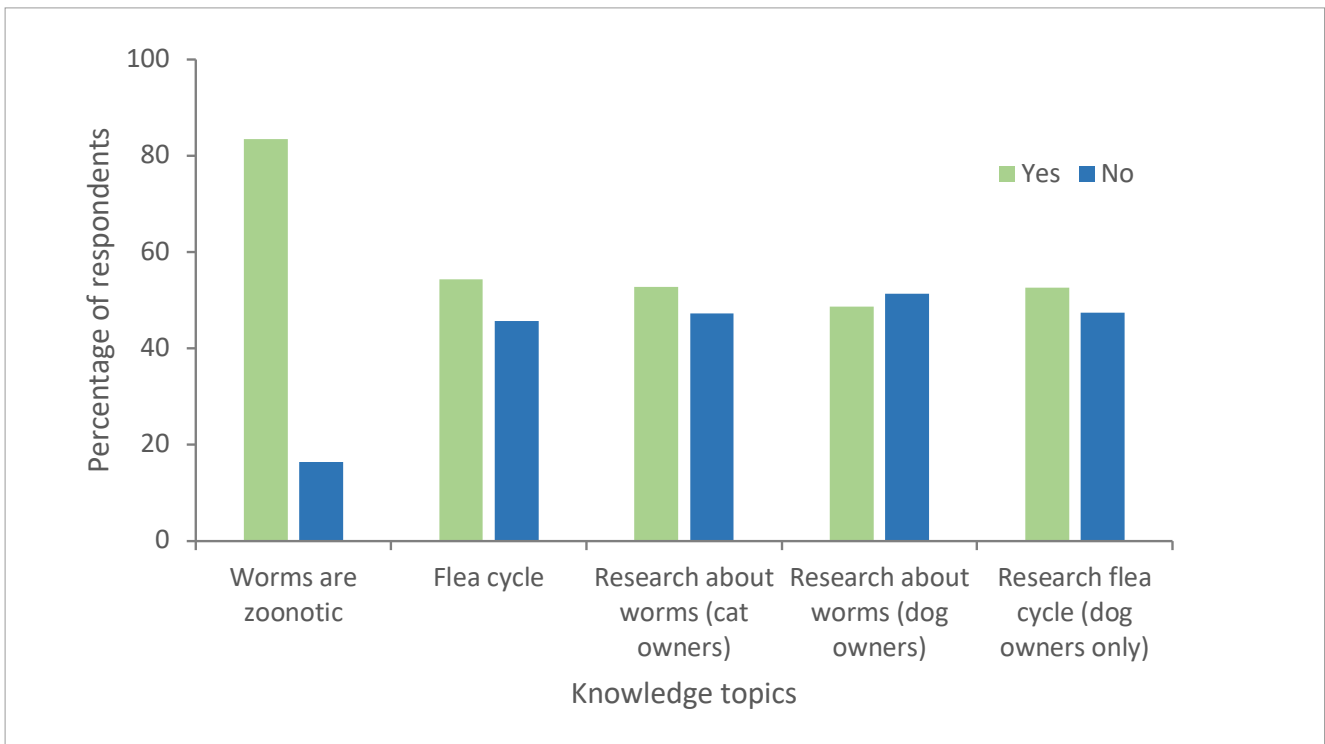
Nearly half of cat owners had two cats (24/50, 48.0%) whereas two thirds of dog owners only had one dog (50/73, 68.5%). Renters living with both species had more cats ( $M = 2.0$ ,  $SD = 1.0$ ), and homeowners living with both species had more dogs ( $M = 1.8$ ,  $SD = 0.9$ ) on average than those in other living arrangements (Figure 2). Those that had a single species of pet and

were renting had more cats ( $M = 1.7$ ,  $SD = 0.7$ ), and those living/boarding with family had more dogs ( $M = 1.8$ ,  $SD = 0.4$ ) on average than those in other situations; however, these were not significant (all  $p$ 's  $< .05$ )

Respondents were asked about their knowledge of signs of a parasite infestation and risk, where they obtained information about parasite control and whether



**Figure 2.** Average number of pets in living arrangements aggregated to ‘Homeowner’, ‘Living/boarding with parents’ and ‘Renting’ when a single species or both species are owned.



**Figure 3.** Percentage of respondents reporting knowledge on the following: “Do you know that worms can transmit from animals to humans? Did you know it is mainly from ingestion of worm eggs and through the environment?”; “Are you aware that only 5% of the flea life-cycle is observable as adult fleas?”; “Have you done much research or do you have much knowledge on the indications of worms in your dog?”; “Have you done much research or do you have much knowledge on the indications of worms in your cat?”; “Have you done any research or do you have knowledge about the flea life-cycle or symptoms of a flea infestation?”.



they had conducted independent research about parasites (Figure 3). More respondents were aware that helminths (worms) are zoonotic (77/93, 82.8%) than about the flea life-cycle (77/93, 74.8%), but more people who lived with their parents knew about the flea life-cycle than those who were homeowners or renting [ $\chi^2(2, N = 93) = 10.1, p = .006$ ]. There was no significant difference between the number of respondents owning at least one cat, dog or both pets who were aware of parasites and those that were not [ $\chi^2(2, N = 93) = 2.01, p = .367$ ]. Half of cat owners (28/50, 56%) and dog owners (35/71, 49.3%) had conducted their own research on the signs of infection for worms. In addition, 84.0% (42/50) of cat owners and 84.5% (60/71) of dog owners had sought veterinary advice on treatments for worms, and 80.0% (40/50) of cat owners and 76.1% (54/71) of dog owners had asked about flea treatment (Tables 2 and 3).

Most respondents complied with deworming (every three months; cat owners 40/50, 80.0%; dog owners 63/71, 83.7%), with those that did not citing treatment

with longer intervals (5/93; Table 2). Nearly all used traditional methods of treatment (cat owners 47/50, 94.0%; dog owners 67/71, 94.4%). Nearly half were able to list symptoms of a worm infestation with increased or a change in appetite (49/93, 47.6%), scooting or itching (38/93, 36.9%), worms in faeces or on anus (38/93, 36.9%) and a distended abdomen (36/93, 35.0%) as signs prompting treatment. Ten respondents responded with 'not sure', and nine owners had only one type of animal with seven of these dog owners. Further, of cat and dog owners, 58–67% reported worming both humans and animals at the sign of infestation (cat owners 33/50, 67%; dog owners 42/71, 58.3) with 11–16% treating only the animals in the household (cat owners 8/50, 16.3%; dog owners 8/71, 11.1%). Dog owners that answered 'no' only treated if required, had no other animals, did not know to treat both humans and animals, or were not responsible for other animals in the household.

**Table 2.** Sources of information, signs and treatment of worm infestations across cat and dog owners. Respondents selected more than one option thus some columns add to over 100%.

Variable	Cat		Dog	
	N	%	N	%
Source of information for worm treatment	n = 50		n = 71	
Veterinary advice	42	84.0	60	84.5
Pet shop assistant	6	12.0	9	12.7
Other research	4	8.0	6	8.5
Google	4	8.0	10	14.1
Friend	6	12.0	6	8.5
Working in the field	2	4.0	6	8.5
Family member	1	2.0	6	8.5
Cheapest	1	2.0	0	0.0
Facebook	1	2.0	1	1.4
Previous experience	0	0.0	0	0.0
Regular deworming (every three months)	n = 50		n = 71	

Yes	40	80.0	63	88.7
No	10	20.0	8	11.3
Longer interval	3		2	
Indoor animal	1			
Treat if seen	1		2	
No sign of worms/unnecessary	2		1	
Given/instructed by vet			1	
Alternative treatment of worms	n = 50		n = 71	
Yes	3	6.0	4	5.6
No	47	94.0	67	94.4
Other	3			
Diatomaceous earth/meal additive	1		1	
Combined treatments (flea/worm)	1			
Fur-covered treats	1		1	
Natural methods			1	
Signs of worm infestation	n = 49		n = 71	
Increased or change in appetite	25	51.0	24	32.4
Scotting/itching	9	18.4	31	41.9
Worms in faeces or on anus	15	30.6	23	31.1
Distended abdomen	19	38.8	17	23
Weight loss	10	20.4	15	20.3
Diarrhoea/change in bowel movement/faeces	10	20.4	11	14.9
No worms/not sure	7	14.3	10	13.5
Vomiting	8	16.3	7	9.5
Overgrooming	5	10.2	7	9.5
Poor coat condition	6	12.2	4	5.4
Sleeping more	2	4.1	5	6.8

Change in behaviour	2	4.1	1	1.4
Constipated	1	2.04	1	1.4
Eating grass	1	2.04	1	1.4
Pale gums	1	2.04	1	1.4
Thirsty			2	2.7
Dull eyes	1	2.04		
No worms due to deworming	1	2.04		
Chasing tail			1	1.4
Application of deworming treatment	n = 55		n = 76	
Yes (humans and animals)	33	67.3	42	58.3
Only animals	8	16.3	21	29.2
No	9	18.4	11	15.5
No other animals	1		3	
No infestation/only treat if required	1		2	
Did not know	1		3	
Human allergy to deworming tablets			1	
Not responsible for other animals	1		2	

Half of cat owners regularly treated their animals for fleas (24/50, 48.0%) whereas more dog owners treated their pets (45/71, 63.4%), but many had not ever found fleas on their pets (cat owners 16/51, 33.3%; dog owners 37/71, 11.3%) and used, or would use, a flea treatment if infestations was identified (cat owners 36/50, 72.0%; dog owners 45/71, 63.4%). However, there was no significant difference between those that dewormed or flea treated their cat or dog if they owned one species or both [ $\chi^2$  (3,  $N = 169$ ) = 1.49,  $p = .684$ ], or if they were a homeowner, rented or lived with parents [ $\chi^2$  (2,  $N = 441$ ) = 0.13,  $p = .935$ ]. Other mechanisms of flea control included a flea collar (3/50 cat owners), regular treating with an interval of 2–3 months (cat owners 13/50; dog owners 14/71), and nearly half of respondents would clean the house (Table 3). Most respondents visited their veterinarian annually (cat owners 36/50, 72.0%;

dog owners 62/71, 87.3%) [ $\chi^2$  (1,  $N = 121$ ) = 4.48,  $p = .034$ ] and nearly all went to their veterinarian if their pet was sick (cat owners 50/50, 100%; dog owners 68/71, 95.8%). Similarly, most respondents complied with vaccinating their animals (cat owners 45, 90.0%; dog owners 62/71, 87.3%) with 5/50 cat owners citing vaccinating at a longer interval than yearly or believing them to be unnecessary.

The respondents either shared responsibility for buying food with their partner (cat owners 21/50, 42.0%; dog owners 32/71, 45.1%) or paid themselves (cat owners 18/50, 36.0%; dog owners 29/71, 40.8%). This trend was evident across all areas of management including deciding to take a pet to the veterinarian, paying for veterinary care, parasite control or vaccinations (Table 4).

**Table 3.** Incidences of flea treating and veterinary visits across cat and dog owners. Respondents selected more than one option thus some columns add up to over 100%.

Variable	Cat		Dog	
	N	%	N	%
Regular flea treatment (every month)	n = 52		n = 71	
Yes, monthly product	22	44.0	45	63.4
No	2	4.0	7	9.9
Other	26	52.0	19	26.7
Longer interval	13		14	
No fleas	3			
Flea collar	3			
Unnecessary	2			
Only when required/vet instruction			4	
Indoor cat	1			
Cost	1			
Too cold	1			
Swimming			1	
Last time when fleas were discovered	n = 50		n = 71	
<6 months	10	20.0	20	52.1
1–11 months	1	2.0	2	28.2
12+ months	15	30.0	8	2.8
Never	16	32.0	37	11.3
(incomplete answers)	8	16.0	4	5.6
Management of infestation	n = 50		n = 71	
Alternative remedies	4	8.0	6	8.5
Ask veterinary for advice	7	14.0	8	11.3
Exterminator	1	2.0	0	0.0
Flea bomb	14	28.0	12	16.9

Flea treat	36	72.0	45	63.4
Never had fleas	8	16.0	24	33.8
Vacuum	26	52.0	32	45.1
Wash animal	13	26.0	31	43.7
Wash animal bedding	22	44.0	31	43.7
Wash bed sheets	27	54.0	25	35.2
Veterinary visit annually	n = 50		n = 71	
Yes	36	72.0	62	87.3
No	14	28.0	9	12.7
Veterinary visits with signs of illness	n = 50		n = 71	
Yes	50	100	68	95.8
No	0	0	0	0
Monitor at home first	0	0	3	4.2
Provision of vaccinations (per clinic directions)	n = 50		n = 71	
Yes	45	90.0	62	87.3
No	5	10.0	9	12.7
Longer interval	2			
Unnecessary (had vaccinations as kittens)	3			

**Table 4.** Details of responsibility for payment and decisions regarding pets. Cat owners (n = 50) and dog owners (n = 71). Respondents selected more than one option thus some columns add up to over 100%.

Variable	Cat		Dog	
	N	%	N	%
Pays for cat food				
Yourself	18	36.0	29	40.8
Sharing the cost with partner	21	42.0	32	45.1
Parents	5	10.0	6	8.5
Sharing the cost with parents	5	10.0	3	4.2

Partner			1	1.4
Sharing the cost with flat mates	1	2.0	0	0.0
Decides/organises a veterinary visit				
Yourself	30	60.0	34	47.9
Yourself and partner	17	34.0	32	45.1
Parents	3	6.0	1	1.4
Yourself and parents			5	7.0
Pays for veterinary care				
Yourself	18	36.0	26	37.2
Sharing the cost with a partner	19	38.0	26	37.2
Sharing the cost with your parents	7	14.0	6	8.5
Sharing the cost with flatmates	1	2.0		
Parents	12	24.0	4	5.6
Insurance	3	6.0	4	5.6
Partner			2	2.8
N/A			2	2.8
Pays for deworming treatment				
Yourself	21	42.0	32	45.1
Sharing the cost with a partner	17	34.0	29	40.1
Sharing the cost with your parents	6	12.0	3	5.3
Sharing the cost with flatmates	1	2.0		
Parents	3	6.0	4	6.6
N/A	2	4.0		
Insurance			1	1.3
Partner			1	1.3
Pays for flea treatment				
Yourself	22	44.0	31	43.7

Sharing the cost with a partner	20	40.0	29	40.9
Sharing the cost with parents	4	8.0	4	5.6
Sharing the cost with flatmates	1	2.0		
Partner			1	1.4
Parents	3	6.0	4	5.6
N/A			2	2.8
Pays for vaccinations				
Yourself	18	36.0	30	42.3
Sharing the cost with a partner	19	38.0	30	42.3
Sharing the cost with your parents	8	16.0	5	7.0
Sharing the cost with flatmates	1	2.0		
Parents	5	10	4	5.6
Partner			1	1.4
Insurance	1	2.0	2	2.8

## Discussion

This survey aimed to identify how respondents between 20 and 30 years of age complied with preventative care regimes for their pets across a range of living situations. Generally, respondents were compliant with preventative care in line with the Animal Welfare Act 1999 and the Codes of Welfare for Dogs and Companion Cats (2018) including parasite control, vaccinations and veterinary check-ups.

Most of the respondents either rented with their partner or were homeowners with family. In terms of pet ownership, the chance of having either both a cat and a dog was highest in a 'homeowner with family' or 'living with family', whereas having at least one cat was highest when 'renting with flatmates', and having a dog was highest when 'renting with a partner'. There was little difference between those in different living situations having either a dog or cat, or both species, or deworming or flea treating their animals; with respondents living with parents more aware of the effects of the flea life-cycle than those living away from parents. For most

preventative care, the respondent alone, or with their partner, would decide and pay for vaccinations, parasite treatment and vet visits.

The 2020 CANZ survey reported that 41% of homes in Aotearoa / New Zealand have a cat, 34% have a dog and 15% have both. In the current survey of 20–30-year-olds, the incidence of cat ownership was lower, with 20% of respondents having one cat, but provided similar results to the national ownership of dogs, with 47% having at least one dog. Further, although only 4% of homeowners in Aotearoa / New Zealand are under 30 years old (Stats NZ, 2021), our data indicates that this group made up a third of respondents, with the majority of respondents (47%) renting either with a partner, family or flatmates. The latter was also surprising, considering the caveat for tenancy is often that tenants do not have pets (Tenancy New Zealand, 2023), although this is not enforceable by law and allowing pets is becoming more accepted (Leahy, 2023).

Most respondents were aware of the risk of worms to humans but only half of respondents were aware of the effects of fleas or looked into parasites or fleas. All

respondents complied with some level of preventative care, especially deworming their animals regularly (>80%) and most had some idea of the symptoms in their pets of a worm infestation. A further two thirds of respondents would worm everyone, humans and animals, in the household if a worm infection was identified. This level of compliance and knowledge of risk evident in the 20–30-year-olds sampled is reassuring, and is likely due to the combined severe risk to humans and animals. There are however, global concerns that the availability of deworming treatments has decreased the perceived risk of intestinal worms to humans and animals (Robertson & Thompson, 2002), where studies in the UK (Wells, 2007) and South America (Katagiri & Olivereira-Sequeira, 2008) identified that the majority of dog owners and non-owners were not aware of the risks of zoonotic intestinal worms, resulting in increased likelihood of infection to pets and owners. Sources of information regarding parasite control in this study were most often the respondents' veterinarians; however, common husbandry, including picking up faeces of pet and keeping shared environments clean should be part of any pet owners' knowledge and behaviour (Traversa, 2012). Thus, maintenance of information sharing by veterinarians and advocacy groups, such as Companion Animals New Zealand or the RNZSPCA and news outlets, must continue to educate owners and the public about the risks, sources and signs of intestinal worms transmitted by animals.

Up to 63% of owners would preventatively treat their pets with a topical or oral substance, with 50% of cat owners and nearly 20% of dog owners using methods such as flea collars, or treatments designed to be applied at longer intervals to mitigate the effects of a flea infestation. Of the respondents, 33% of cat owners and 37% of dog owners had never experienced an infestation, and 50% of owners were not aware of the flea life-cycle and its effects. It is surprising that compliance and knowledge of risk factors for fleas are lower than for worms, when both parasites can adversely affect humans, and the effects of flea infestations both on animals and in the environment being more visible than those of worm infestations. This lack of compliance might signal that flea infestation is considered a 'normal' part of pet ownership. The increased compliance and knowledge of worm infestation may also relate to the education of parents and pet owners by human health professionals as to the importance of deworming both themselves and their pets if worms are evident. Moreover, Forrest et al. (2023) found that New

Zealanders' compliance with flea treatment decreased as the owners aged, thus it would be important to encourage and educate young pet owners when they are complying so the practice might continue to when the owner, and pet, are older. It would also be interesting to survey different age groups and compare compliance to the sample of young people.

Vaccination of pets was high, with over 87% compliance by respondents. Veterinarians indicated that two- and three-yearly vaccinations are considered appropriate by 28% and 45% of professionals respectively (Cave et al., 2015), whereas in our survey most respondents complied with their 'clinic recommendations'. We did not ask at what interval, thus we know that pets are being vaccinated but not how regularly, but also that if clinics are varied in their approach to the most appropriate interval, and that up to three years is sufficient, then most pets are probably protected to some extent.

All respondents would take their pet to the veterinarian if they were ill, and all cat and most dog owners complied with a yearly check-up as per the Codes of Welfare for Dogs and Companion Cats (2018). Also, the incidence of compliance was greater than that observed by the CANZ (2020) survey of all age groups, in which 66% of dog owners and 52% of cat owners considered check-ups important. Up to 16% of owners across Aotearoa / New Zealand and Australia did not know that check-ups were recommended. Veterinarians consider check-ups and when pets receive their vaccinations as the best time to discuss best practices for husbandry and management of their pet (Cave et al., 2015). Thus, the young people surveyed are participating in positive ways to maintain their animals' health.

The same person, in most cases the respondent, was responsible for deciding on or organising, and paying for, preventative care. We can speculate that if the person was responsible and complied with one aspect of preventative care, then they would also comply with other aspects. There is an element of social bias in this type of survey, where it is socially acceptable to comply, thus responses in this survey may not be wholly reliable and there may be a much lower rate of compliance. There is a need for maintaining a social media awareness that advocates for preventative care, and highlights the risks to human and animal health if preventative care is not provided.

Furthermore, the dissemination of this survey was via animal-related pages on social media, so it is likely that respondents in the sample population were more likely to be mindful of the required husbandry and health



requirements of their animals. The first author is a student studying veterinary nursing, thus a proportion of the respondents could be more likely to be knowledgeable about animal care and aware of the risks in failing to provide it, than the general public. However, only one participant mentioned working in the field and the results do not indicate unanimous compliance, which might be expected from a group connected to the veterinary or animal industries. Thus, the reader should receive this information with caution, in that it might only indicate the potential lack of compliance with reportedly important vaccinations, veterinary visits and parasite control.

In conclusion, the type of living situation does not impact pet ownership, therefore, the numbers of pets,

particularly owned by those that rent, could feasibly increase further than that observed in the CANZ surveys of 2016 and 2020. Thus, it is imperative that pet owners continue to comply with preventative health for their pets to ensure their animal remains well, and is not at risk becoming sick, dying, or costing money for treatment. Young people appear to be managing their transitional life stage while making the commitment to pet ownership financially by investing in preventative care. A further push is needed to educate all owners about the risks of a flea infestation and encourage owners to seek veterinary advice to ensure the health of their pets and households.

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