New Zealand Veterinary Journal

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/tnzv20

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To cite this article: MC Gates, NJ Kells, K Kongara & KE Littlewood (2023) Euthanasia of dogs and cats by veterinarians in New Zealand: protocols, procedures and experiences, New Zealand Veterinary Journal, 71:4, 172-185, DOI: 10.1080/00480169.2023.2194687

To link to this article: https://doi.org/10.1080/00480169.2023.2194687

NEW ZEALAND VETERINARY JOURNAL
2023, VOL. 71, NO. 4, 172–185
https://doi.org/10.1080/00480169.2023.2194687

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Euthanasia of dogs and cats by veterinarians in New Zealand: protocols, procedures and experiences

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ABSTRACT

Aims: To collect data on protocols used by New Zealand veterinarians to perform euthanasia of dogs and cats, and to explore opinions towards the training they received in euthanasia during veterinary school.

Methods: A cross-sectional survey was administered to all veterinarians registered with the Veterinary Council of New Zealand. The survey asked respondents about their practices' policies for euthanasia; protocols for performing euthanasia of dogs and cats; opinions towards euthanasia training received in veterinary school; and subsequent experiences with euthanasia in practice. Descriptive statistics were provided for all quantitative study variables and thematic analysis was performed on the free-text comments.

Results: The survey was completed by 361/1,448 (24.9%) veterinarians in companion or mixed animal practice. The mean numbers of dogs and cats euthanised each month were 7.2 (median 5; min 0; max 60) and 7.9 (median 5; min 0; max 60), respectively. Fewer than half of respondents reported that their clinic had a standard protocol for euthanising dogs (147/361; 40.7%) or cats (157/361; 43.5%). For euthanasia of dogs, 119/361 (32.9%) always used sedation while 71/361 (19.7%) indicated that they would not use sedation. For euthanasia of cats, 170/361 (47.1%) always used sedation while 53/361 (14.7%) indicated that they would not use sedation. Placement of IV catheters, methods for patient restraint, preferences towards the presence of owners during euthanasia, services provided with euthanasia, and discussions with owners were also highly variable and handled case-by-case depending on the client, patient, and clinical scenario. When asked about the euthanasia training received at veterinary school, it was generally ranked as below satisfactory, with approximately one-third of respondents indicating that they received no training in dealing with emotional clients (113/361; 31.3%), sedation protocols for euthanasia (107/361; 29.6%), or managing compassion fatigue (132/361; 36.6%). Most respondents (268/361; 74.2%) received no formal training in euthanasia after graduation and learned from experience or discussions with colleagues. Providing animals and owners with a good experience during the euthanasia process was highlighted as important for managing compassion fatigue.

Conclusions: Euthanasia is a common procedure in companion animal practice and there is considerable variation in how veterinarians approach both the technical and non-technical elements. Training provided during veterinary school was generally considered below satisfactory, particularly regarding managing compassion fatigue and clients' emotional needs.

Clinical relevance: Providing veterinarians with additional training on adapting their euthanasia protocols to different clinical scenarios may improve the experience for patients, owners and veterinary staff.

Abbreviations: AVMA: American Veterinary Medical Association; NZVA: New Zealand Veterinary Association; VCNZ: Veterinary Council of New Zealand

ARTICLE HISTORY
Received 29 August 2022
Accepted 20 March 2023
Published online 22 March 2023

KEYWORDS
Euthanasia; animal welfare; education; dog; cat; cross-sectional survey

Introduction

Euthanasia is a common procedure in companion animal clinical practice that has the potential to cause significant distress for patients, clients and veterinary team members if not managed appropriately (Turner 1998; Scotney *et al.* 2015). The definition of euthanasia typically encompasses both the application of a technique that minimises suffering (i.e. is humane) and that killing is being performed for the animal's benefit (i.e. for reasons related to welfare or quality of life) (Leary *et al.* 2020; Persson *et al.* 2020). Veterinarians, as proposed experts in animal welfare, have a role to play in end-of-life management of animals and have special legal and professional obligations (VCNZ 2011). The New Zealand Code of Professional Conduct for Veterinarians expressly mentions the duty of veterinarians "to protect animal welfare and alleviate animal suffering" (VCNZ 2011). When a veterinarian is

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Supplemental data for this article can be accessed doi:https://doi.org/10.1080/00480169.2023.2194687.

considered to be the person in charge of an animal, various sections of the New Zealand Animal Welfare Act 1999 apply (Anonymous 1999). In particular, Section 11 states:

> The owner of an animal that is ill or injured, and every person in charge of such an animal, must ensure that the animal receives treatment that alleviates any unreasonable or unnecessary pain or distress being suffered by the animal (Anonymous 1999).

The Act also reminds us that a person is not required to keep an animal alive if it is "suffering unreasonable or unnecessary pain or distress" (Anonymous 1999).

There have been a large number of publications providing guidelines around selecting appropriate drug protocols and routes of administration to ensure that euthanasia is performed with good clinical technique (Cooney 2020; Leary *et al.* 2020; Robertson 2020). There is also growing awareness that other non-technical factors such as creating a low-stress environment to perform the euthanasia, having client-focused discussions around the euthanasia decisions and process, and providing clients with adequate support to manage complex emotions can greatly increase satisfaction with the procedures (Martin *et al.* 2004; Matte *et al.* 2020a; Shearer 2020).

Previous studies have shown that there are gaps in primary training that veterinary students receive around the technical aspects of euthanasia (Littlewood *et al.* 2018) as well as the decision-making process (Littlewood *et al.* 2021b) and managing grief (Littlewood *et al.* 2020) that result in a lack of confidence and potentially competence with performing euthanasia in clinical practice (Springer *et al.* 2019). Another study explored the role veterinarians play in end-of-life management from the perspective of owners of older and chronically ill cats in New Zealand (Littlewood *et al.* 2021a). Together, these studies demonstrated some gaps, that if filled, could improve veterinary training in the end-of-life management of animals. The results of these studies revealed that while students at all Australasian veterinary schools were taught about euthanasia of all common veterinary species, the technical aspects of euthanasia of companion animals was not consistently taught (Littlewood *et al.* 2018). Teaching of techniques for euthanasia needs to be improved to ensure new graduates meet client expectations – that is, veterinarians are as competent as cat owners assumed they are (Littlewood *et al.* 2021a). There also appeared to be gaps in teaching end-of-life decision-making relative to what was important to cat owners (Littlewood *et al.* 2021b). Owners expected their veterinarian to be the professional or "expert" when it came to knowledge of animal health and welfare, but not all veterinary students were taught how to assess animal welfare or quality of life in the context of end-of-life decisions (Littlewood *et al.* 2018, 2021a). In contrast, teaching of grief-related topics left only a few gaps to fill (Littlewood *et al.* 2020). Grief management teaching best reflected many of the features cat owners wanted from their veterinarian, and particularly the human-centred themes taught to students (e.g. understanding an owner's relationship with their cat). Most teaching of grief management was performed by student counsellors and psychologists in earlier (preclinical) years. This means that these human-centred themes may not have been explicitly linked to the decision-making process, and, more importantly, to the veterinarian's role in end-of-life management. However, cat owner participants emphasised the important role their veterinarian had played in the end-of-life process, suggesting that training, in New Zealand at least, is effective in this regard (Littlewood *et al.* 2020). While clear gaps exist in Australasian veterinary school training in end-of-life management of animals, this does not imply that practising veterinarians lack the necessary skills or expertise. Clinical training continues throughout the professional lives of veterinarians – via workplace-based learning and continued professional development (Magnier *et al.* 2011; Norman 2017).

While there have been some studies overseas exploring the protocols that veterinarians use for euthanasia in clinical practice (Platko and Holtzman 2017) and their opinions towards various aspects of euthanasia (Dickinson *et al.* 2011; Hartnack *et al.* 2016; Matte *et al.* 2020a), little is currently known about these factors in regard to companion animal euthanasia in New Zealand. The objectives of this cross-sectional survey were to collect data on the protocols used by New Zealand veterinarians to perform euthanasia of dogs and cats under different clinical scenarios, and to explore the veterinarians' opinions towards the training received in euthanasia during veterinary school.

Materials and methods

Study design

A cross-sectional survey was administered to all New Zealand veterinarians registered with the Veterinary Council of New Zealand (VCNZ) with the objective of collecting data on protocols for euthanasia of dogs and cats in first-opinion companion animal practice in New Zealand. The initial survey advertisement was distributed by VCNZ on behalf of the research team on 13 November 2020 through the VCNZ November 2020 monthly update e-mail to all registered veterinarians with a valid e-mail address in the VCNZ database (approximately 3,000 individuals). Based on the Veterinary Council Workforce Report from 2018/2019, an estimated 1,448 individuals were working in companion animal or mixed animal practice, of which 885 were female (VCNZ 2019). The e-mail contained a

brief overview of the study objectives and a hyperlink to voluntarily complete the anonymised survey online using the Qualtrics platform (Qualtrics XM, Seattle, WA, USA; www.qualtrics.com). A reminder e-mail was sent by the research team to all veterinary clinics in New Zealand with a publicly registered e-mail address on 8 December 2020 and the survey was closed 1 week after the reminder e-mail was sent. Copies of the initial and reminder survey notices are available in the Supplementary Materials. The study advertisement was also shared through the Massey University and New Zealand Veterinary Association (NZVA) social media channels. By voluntarily choosing to complete the survey, respondents were assumed to have provided informed consent. The study was judged to be low risk through peer evaluation and an online assessment by the Research Ethics Office (Massey University, Palmerston North, NZ), and therefore did not require review by a human ethics committee.

Survey design

The survey was divided into five key sections that asked respondents questions about (i) their practices' policies for euthanasia; (ii) their protocols for euthanising a stable, non-aggressive 20-kg adult mixed-breed dog with a BCS of 3/5 that presented for a euthanasia appointment due to valid quality of life or medical concerns that warranted euthanasia; (iii) their protocols for euthanising a stable, non-aggressive 5-kg adult domestic shorthair cat with a BCS of 3/5 that presented for a euthanasia appointment due to valid quality of life or medical concerns that warranted euthanasia; (iv) their opinions towards the training they received for performing euthanasia in veterinary school and their subsequent experiences with euthanasia in practice; and (v) general background and demographics. The survey was piloted with five veterinarians to refine the wording and structure of the questions before distribution. A full copy of the survey is provided in the Supplementary Materials.

Data analysis

Data were imported from the online survey tool into R statistical software, version 3.6.1 (R Development Core Team 2020, R Foundation for Statistical Computing, Vienna, Austria) for cleaning and analysis. Only complete responses (defined as responses where individuals completed > 90% of questions and clicked "Submit" on the final survey page) were retained for analysis, and any duplicate responses from the same IP address were removed. Responses from any veterinarian who performed euthanasia on dogs and cats were included regardless of their predominant practice type (companion animal, mixed animal, or production animal).

Descriptive statistics were provided on all quantitative study variables. The number of years since graduation was calculated as 2020 minus the reported year in which the respondent completed their final year. For the Likert-scale questions, a weighted score for each statement was calculated by assigning numeric values from 1 to 5 to the categories as appropriate, and then taking the weighted mean for individuals who provided a response to the question. The purpose for calculating weighted scores was to provide an objective means of ranking and comparing the relative importance of the statements within each question.

Data from the qualitative free-text responses were imported into a spreadsheet program and thematic analysis was performed using a simplified version of the methodology described by Braun and Clarke (2006), which involved (i) reading through all free-text responses for each question multiple times to gain familiarity with the data; (ii) reading through the individual responses again in detail, underlining keywords, phrases, and/or ideas exemplifying major themes; (iii) collating the coded data into potential themes by subjectively grouping responses with similar perceived meaning; and (iv) then re-reading and reflecting on the coded data to identify more in-depth meanings and to make any required amendments to the themes or sub-themes. A subset of quotes from each theme were selected for inclusion in the manuscript to highlight key issues raised by respondents.

Results

Respondent demographics

The survey was attempted by 468 individuals located in New Zealand with a total of 361 individuals providing complete responses that were retained for analysis. With an estimated 1,448 veterinarians in companion or mixed animal practice in New Zealand, the overall response rate was therefore approximately 24.9%. There were 262 female respondents (72.5%), 93 male respondents (25.8%), and 6 respondents (1.6%) who preferred not to say or did not provide a response. The distribution by ethnicity was 287 New Zealand European (79.5%), 55 Other European (15.2%), 12 Asian (3.3%), 8 other non-European (2.2%), 7 Māori (1.9%), and 1 Pasifika (0.3%). It should be noted that 13 individuals selected two ethnicities. The mean age of survey respondents was 41.5 (median 40; min 23; max 80) years. The majority of respondents (292/361; 80.8%) completed their veterinary degree at Massey University, and the mean number of years since completion of final year clinical rotations was 17 (median 14; min 1, max 48) years. There were 87 respondents (24.1%) that held at least one advanced qualification, with 37 (10.2%) holding a post-graduate certificate, 31 (8.6%) holding a master's degree, 7 (1.9%) holding a PhD, 5 (1.4%) holding a business qualification, 32

(8.9%) who were members of the Australian and New Zealand College of Veterinary Scientists and 8 (2.2%) who were diplomates of a veterinary certifying body.

Of the 361 respondents, 215 (59.6%) were exclusively in small animal practice, 137 (37.9%) were in mixed animal practice, 7 (1.9%) were exclusively in large animal practice, and 2 (0.6%) listed an "other" practice type. For those in mixed animal practice, the mean percentage of time spent working with small animals was 49.5% (median 40%; min 5%; max 100%). Across all respondents, the mean number of dogs euthanised per month was 7.2 (median 5; min 0; max 60) and the mean number of cats euthanised per month was 7.9 (median 5; min 0; max 60).

Clinic euthanasia policies and practices

The majority of respondents (336/361; 93.1%) worked in a veterinary clinic that had a standardised consent form for euthanasia, but only 38 respondents (10.5%) worked in a veterinary clinic that had a dedicated room for performing euthanasia. Veterinary clinics used a variety of different options for handling payments, with 43/361 (11.9%) requiring clients to pay before the euthanasia, 82/361 (22.7%) requiring clients to pay after the euthanasia but before leaving the clinic, and 81/361 (22.4%) billing clients for euthanasia later. Of the 155 respondents (42.9%) who selected "other" for this question, most indicated in the free-text comments that they varied the payment policy based on their relationship with the client.

Fewer than half of respondents reported that their clinic had a standard protocol for euthanising dogs (147/361; 40.7%) or cats (157/361; 43.5%). Those that worked in clinics with standardised protocols indicated that they were likely to follow them (143/147; 97.3% for dogs; and 151/157; 96.2% for cats). There were variable policies for home euthanasia. For dogs, 210/361 (58.2%) respondents would perform home euthanasia only if the client specifically requested it, 49/361 (13.6%) would perform home euthanasia only for certain clients or circumstances, 81/361 (22.4%) routinely offered home euthanasia as an option for all clients, and 21/361 (5.8%) would not perform home euthanasia at all. Similarly for cats, 205/361 (56.8%) would perform home euthanasia only if the client specifically requested it, 67/361 (18.6%) would perform home euthanasia only for certain clients or circumstances, 64/361 (17.7%) routinely offered home euthanasia as an option for all clients, and 25/361 (6.9%) would not perform home euthanasia at all.

In general, most respondents had the same personal policy towards performing convenience euthanasia in dogs and cats as their practice policy for performing convenience euthanasia (Table 1). Overall, for dogs, 119/361 (33.0%) respondents worked in practices that did not perform convenience euthanasia, 188/361 (52.1%) respondents worked in practices that would perform convenience euthanasia under special circumstances, and 54/361 (15.0%) respondents worked in practices that would perform convenience euthanasia for any client who asked. For cats, the distribution was 108/361 (29.9%) respondents working in practices that did not perform convenience euthanasia, 198/361 (54.8%) respondents working in practices that would perform convenience euthanasia under special circumstances, and 55/361 (15.2%) respondents working in practices that would perform convenience euthanasia for any client who asked.

Table 1. Number (%) of veterinarians (n = 361) responding to a survey on euthanasia of dogs and cats indicating their personal policy regarding convenience euthanasia[a] for dogs and cats compared to the policy of the veterinary practice in which they work.

	Personal policy		
Practice policy	No	Only in special circumstances	Yes for any client who asks
Dogs			
No	114 (31.6%)	5 (1.4%)	0 (0%)
Only in special circumstances	30 (8.3%)	153 (42.4%)	5 (1.4%)
Yes for any client who asks	1 (0.3%)	9 (2.5%)	44 (12.2%)
Cats			
No	104 (28.8%)	4 (1.1%)	0 (0%)
Only in special circumstances	27 (7.5%)	166 (46.0%)	5 (1.4%)
Yes for any client who asks	2 (0.6%)	9 (2.5%)	44 (12.2%)

[a]Defined as when the owner no longer wants an otherwise healthy animal alive for personal reasons (e.g. lifestyle changes or not being able to afford to keep the pet).

It was common for veterinary clinics to offer individual cremation (354/361; 98.1%), sympathy cards (335/361; 92.8%), group cremation (217/361; 60.1%), and paw prints (171/361; 47.4%), while only 19/361 respondents (5.3%) reported that their veterinary clinic offered charitable donations. From the 72 free-text comments provided by respondents about other services offered with euthanasia, the listed options included arranging burials, providing special cardboard boxes for clients to take animals home for burial, collecting fur samples from the pet, sending flowers to clients, creating jewellery from the pet's ashes, and making memorial plaques or poems.

Protocols for dog and cat euthanasia

Topics for discussion

Table 2 summarises the topics that respondents would discuss with dog and cat owners before, during and after the euthanasia procedure described in the clinical scenarios. While it was common practice to discuss the decision to euthanise, steps involved, euthanasia complications, and disposal of remains before the euthanasia procedure, the majority of respondents indicated that they never discussed options for grief counselling

Table 2. Number (%) of veterinarians (n = 361) responding to a survey on euthanasia of dogs and cats reporting the timing[a] of when they discuss various aspects of euthanasia with the owners of dog and cats to be euthanised.

Aspect discussed	Before euthanasia	During euthanasia	After euthanasia	Never discussed
Owner's decision to euthanise the animal				
Dog	345 (95.6%)	14 (3.9%)	14 (3.9%)	13 (3.6%)
Cat	342 (94.7%)	13 (3.6%)	15 (4.2%)	14 (3.9%)
Euthanasia procedure (steps involved)				
Dog	354 (98.1%)	66 (18.3%)	5 (1.4%)	0 (0%)
Cat	352 (97.5%)	61 (16.9%)	8 (2.2%)	0 (0%)
Euthanasia complications[b]				
Dog	329 (91.1%)	83 (23.0%)	32 (8.9%)	2 (0.6%)
Cat	329 (91.1%)	87 (24.1%)	30 (8.3%)	4 (1.1%)
Disposal of remains				
Dog	343 (95.0%)	12 (3.3%)	56 (15.5%)	1 (0.3%)
Cat	342 (94.7%)	14 (3.9%)	58 (16.1%)	1 (0.3%)
Options for grief counselling or support				
Dog	28 (7.8%)	4 (1.1%)	48 (13.3%)	284 (78.7%)
Cat	31 (8.6%)	2 (0.6%)	48 (13.3%)	274 (75.9%)
Other discussions				
Dog	17 (4.7%)	5 (1.4%)	7 (1.9%)	3 (0.8%)
Cat	11 (3.0%)	1 (0.3%)	4 (1.1%)	4 (1.1%)

[a]Respondents were allowed to select more than one timing option for each aspect of the euthanasia process and therefore the row totals may sum to greater than 100%.
[b]E.g. vocalisation, urination, defecation, muscle spasms.

or support with dog owners (284/361; 78.7%) or cat owners (274/361; 75.9%). Other discussions mentioned in the free-text comments included the cost of the procedure, highlighting positive memories of the animal, how to support other family members, possible reactions from their other pets, safety of the owner driving home, and whether the owner wished to be present for the procedure.

Owner presence during euthanasia

Most respondents would always offer dog and cat owners the option of being present for the euthanasia (Table 3). However, only 105/361 (29.1%) would actively encourage dog owners and 102/361 (28.2%) would actively encourage cat owners to be present. A small number of respondents (3 for dogs and 3 for cats) would actively discourage owners from being present and some would never offer the owners the option of being present (1 for dogs and 2 for cats). In most cases, dog owners (352/361; 97.5%) and cat owners (344/361; 95.3%) would be allowed to remain with the animal until ready to leave.

Location of euthanasia

The most common place for the euthanasia to be performed was in a routine consultation room for both dogs (288/361; 79.8%) and cats (302/361; 83.7%), with only a small number performing euthanasia in a dedicated euthanasia room, treatment room, or other location. In the free-text comments for the "other" option, respondents indicated that it often depended on which rooms were available in the clinic, whether the owner wanted to be present for the euthanasia, if the euthanasia was performed at home, or whatever location would allow the most privacy for the owner.

Pre-euthanasia sedation

A summary of the responses to the quantitative questions regarding pre-euthanasia sedation are presented in Table 3. Overall, there were 71/361 respondents (19.7%) who never used sedation for dogs and 53/361 (14.7%) respondents who never used sedation for cats, with the majority indicating that they felt it was unnecessary. For those who listed "other" reasons for not using sedation, the most common were that sedation would cause the owner distress, it was clinic policy not to sedate animals, and/or they found that euthanasia was smoother without sedation. Among the 290 respondents for dogs (80.3%) and 308 respondents for cats (85.3%) who used sedation at least some of the time, the choice was often based on whether the owner requested it or decided case-by-case depending on whether the animal was anxious or aggressive.

Respondents listed 58 unique combinations of drugs used in sedation protocols for dogs, with the five most common protocols being medetomidine and butorphanol (52/290; 17.9%); zolazepam and tiletamine (24/290; 8.3%); acepromazine, medetomidine and butorphanol (23/290; 7.9%); acepromazine, zolazepam and tiletamine (21/290; 7.2%); and alfaxalone (16/290; 5.5%). There were 62 unique combinations of drugs used in sedation protocols for cats, with the five most common protocols being zolazepam and tiletamine (111/308; 36.0%); acepromazine, zolazepam and tiletamine (28/308; 9.1%); medetomidine and butorphanol (26/308; 8.4%); ketamine, medetomidine and butorphanol (11/308; 3.6%); and medetomidine (10/308; 3.2%). The most common route of administration was IM for both dogs (206/290; 71.0%) and cats (223/308; 72.4%). The majority of respondents indicated that they would be comfortable administering the sedation to dogs (248/290; 85.5%) and cats (246/308; 79.8%) with the owners in the same room.

Table 3. Approaches used by veterinarians (n = 361) responding to a survey on euthanasia of dogs and cats for performing different elements of dog and cat euthanasia procedures.

	N (%)	
	Dog	Cat
Offering owner option of being present for euthanasia		
Always offer, but let owner decide	249 (68.9%)	250 (69.2%)
Always offer and encourage owner to be present	105 (29.1%)	102 (28.2%)
Always offer, but discourage owner from being present	3 (0.8%)	3 (0.8%)
Sometimes offer depending on the client	3 (0.8%)	4 (1.1%)
Never offer for owner to be present	1 (0.3%)	2 (0.6%)
Location to perform euthanasia in clinic		
Routine consult room	288 (79.8%)	302 (83.7%)
Dedicated euthanasia room	29 (8.0%)	34 (9.4%)
Treatment room	3 (0.8%)	3 (0.8%)
Other location	41 (11.3%)	22 (6.2%)
Use of pre-euthanasia sedation		
Not used	71 (19.7%)	53 (14.7%)
Always used	119 (32.9%)	170 (47.1%)
Only used if client elects	59 (16.3%)	45 (12.5%)
Other	112 (31.0%)	91 (25.2%)
Reasons for not administering sedation[a]		
Too expensive	11 (15.5%)	8 (15.1%)
Too time-consuming	21 (29.6%)	13 (24.2%)
Causes animal distress	11 (15.5%)	14 (26.4%)
Not necessary	56 (78.9%)	45 (84.9%)
Makes the vein difficult to find	22 (31.0%)	19 (35.8%)
Other	18 (25.4%)	5 (9.4%)
Route of administration of sedation[b]		
Subcutaneous	108 (37.2%)	126 (40.9%)
Intramuscular	206 (71.0%)	223 (72.4%)
Intravenous	58 (20.0%)	23 (7.5%)
Oral	15 (5.2%)	5 (1.6%)
Placement of IV catheter		
None placed	136 (37.7%)	177 (49.0%)
Always placed	131 (36.2%)	103 (28.5%)
Only placed if owner present	50 (13.8%)	45 (12.5%)
Other	44 (12.2%)	34 (9.4%)
Methods of restraint for performing euthanasia		
None	71 (19.6%)	54 (14.9%)
Sedation	157 (43.5%)	195 (54.0%)
Muzzle	30 (8.3%)	5 (1.4%)
Towel wrap	0 (0%)	57 (15.8%)
Crush cage	0 (0%)	10 (2.8%)
Owner restraining animal	111 (30.7%)	99 (27.4%)
Nurse restraining animal	246 (68.1%)	232 (64.2%)
Other	54 (15.0%)	33 (9.1%)

[a]Among the 71 respondents for dogs and 53 respondents for cats who did not use sedation.
[b]Among the 290 respondents for dogs and 308 respondents for cats who used sedation at least some of the time.

Placement of IV catheters

Only 131/361 (36.2%) respondents for dogs and 103/361 (28.5%) respondents for cats always placed an IV catheter for performing euthanasia (Table 3). The most common reasons given in the free-text comments for placing an IV catheter were concern over ability to access veins; that the dog was not going to be sedated for the procedure; or that they were injecting a large volume of euthanasia solution.

Method of patient restraint

There was high variability in the methods of restraint that respondents used for euthanasia, with the three most common being a nurse restraining the animal, providing sedation, or having the owner restrain the animal (Table 3). For respondents who selected the "other" option, most free-text comments indicated that the method of restraint varied based on the animal, owner and location of the euthanasia.

Euthanasia drug protocol

The majority of respondents indicated they would use pentobarbitone as their preferred euthanasia drug for dogs (359/361; 99.4%) and cats 358/361 (99.2%), with the remaining respondents indicating that they used propofol followed by pentobarbitone. Almost every respondent indicated that they would administer the euthanasia solution IV for both dogs (356/361; 98.6%) and cats (339/361; 93.9%). There were two respondents for dogs and two respondents for cats who indicated they would use intracardiac injections, nine respondents for cats who would use intrarenal injections, and three respondents for dogs and 11 respondents for cats who indicated that it would depend on whether the veins were collapsed or whether it was a feral animal.

Cost of euthanasia

The mean cost for the euthanasia procedure as the respondents would have performed it in the scenario was NZ$114 (median NZ$100; min NZ$30; max NZ $400) for dogs and NZ$91 (median NZ$85; min NZ$5; max NZ$225) for cats.

Change in euthanasia protocols under different clinical circumstances

Table 4 provides the summary of responses to the question regarding whether different aspects of respondents' euthanasia protocol for dogs or cats would likely change under different clinical circumstances. Most notably, respondents would be more likely to use different restraint methods for an aggressive animal, have less detailed discussions about the euthanasia protocol with emergency cases, use a different route of administration for the euthanasia drug with emergency cases, and be less likely to use sedation for emergency cases, geriatric animals, and clients who were unable to afford euthanasia.

Experience performing euthanasia in veterinary school and clinical practice

When asked about the training received in different aspects of euthanasia at veterinary school (Table 5), every listed subject area had a weighted mean score that fell below satisfactory, with approximately one-third of respondents indicating that they had received no training at all in dealing with emotional clients, disposing of remains, euthanasia sedation protocols, and managing compassion fatigue.

Table 4. Number (%) of veterinarians (n = 361) responding to a survey on euthanasia of dogs and cats that indicated that various aspects to their approach for performing a dog or cat euthanasia would change under different clinical scenarios.

	Children present for euthanasia	Emergency case	Geriatric animal	Aggressive animal	Client unable to afford euthanasia	Convenience euthanasia
Less detailed discussions with owners about euthanasia procedures						
Dog	29 (8.0%)	159 (44.0%)	4 (1.1%)	45 (12.5%)	9 (2.5%)	18 (5.0%)
Cat	22 (6.1%)	149 (41.3%)	4 (1.1%)	24 (6.6%)	9 (2.5%)	10 (2.8%)
Less likely to allow owners to be present during euthanasia						
Dog	25 (6.9%)	49 (13.6%)	1 (0.3%)	71 (19.7%)	11 (3.0%)	15 (4.2%)
Cat	15 (4.2%)	56 (15.5%)	0 (0%)	75 (20.8%)	9 (2.5%)	8 (2.2%)
Less likely to use sedation						
Dog	25 (6.9%)	105 (29.1%)	61 (16.9%)	11 (3.0%)	78 (21.6%)	6 (1.7%)
Cat	1 (0.3%)	93 (25.8%)	47 (13.0%)	1 (0.3%)	57 (15.8%)	7 (1.9%)
Less likely to place IV catheter						
Dog	25 (6.9%)	47 (13.0%)	12 (3.3%)	51 (14.1%)	39 (10.8%)	7 (1.9%)
Cat	1 (0.3%)	46 (12.7%)	19 (5.3%)	48 (13.3%)	35 (9.7%)	5 (1.4%)
A different route of administration of the euthanasia drug						
Dog	25 (6.9%)	91 (25.2%)	36 (10.0%)	58 (16.1%)	2 (0.6%)	1 (0.3%)
Cat	3 (0.8%)	91 (25.2%)	49 (13.6%)	91 (25.2%)	2 (0.6%)	1 (0.3%)
Different restraint methods						
Dog	25 (6.9%)	55 (15.2%)	16 (4.4%)	264 (73.1%)	7 (1.9%)	3 (0.8%)
Cat	14 (3.9%)	45 (12.5%)	9 (2.5%)	205 (56.8%)	4 (1.1%)	1 (0.3%)

Of the 297 individuals who provided data on their experience with euthanasia of dogs prior to graduation, 38 individuals (12.8%) reported that they had not observed euthanasia of a dog and 251 (84.2%) reported that they had not performed euthanasia of a dog. Amongst those respondents who had observed and/or performed euthanasia, the mean number of dogs they observed being euthanised was 10.2 (median 5; min 1; max 100) and the mean number of dogs they euthanised was 8.6 (median 2; min 1; max 100). Confidence in performing euthanasia of dogs at graduation received a mean ranking of 4.5 (median 5) on a scale of 1 (least confident) to 10 (most confident).

Of the 297 individuals who provided data on their experience with euthanasia of cats prior to graduation, 42 individuals (14.1%) reported that they had not observed euthanasia of a cat and 238 (80.1%) reported that they had not performed euthanasia of a cat. Amongst those respondents who had observed and/or performed euthanasia, the mean number of cats the observed being euthanised was 17.0 (median 10; min 1; max 100) and the mean number of cats they euthanised was 7.6 (median 2; min 1; max 100). Confidence in performing euthanasia of cats at graduation received a mean ranking of 4.2 (median 4) on a scale of 1 (least confident) to 10 (most confident).

Most respondents (268/361; 74.2%) indicated that they had received no additional training in euthanasia after graduation. Of the 81 individuals who provided free-text comments on the type of training received after graduation, only eight indicated that they obtained training through formal continuing professional development courses, while the remaining respondents indicated that their training was through colleagues or their employer. The majority

Table 5. Number (%) of veterinarians (n = 361) responding to a survey on euthanasia of dogs and cats reporting their rating of the the training they received on different aspects of euthanasia in veterinary school.

	Cannot recall	Did not receive training	Very poor	Poor	Satisfactory	Good	Very good	Weighted score [a]
Euthanasia administration techniques	42 (11.6%)	38 (10.5%)	18 (5.0%)	82 (22.7%)	99 (27.4%)	59 (16.3%)	23 (6.4%)	2.60
Euthanasia drug protocols	46 (12.7%)	54 (15.0%)	21 (5.8%)	59 (16.3%)	109 (30.2%)	51 (14.1%)	21 (5.8%)	2.46
Ethical decision-making	60 (16.6%)	49 (13.6%)	21 (5.8%)	75 (20.8%)	88 (24.4%)	49 (13.6%)	19 (5.3%)	2.41
Legal requirements	62 (17.2%)	49 (13.6%)	24 (6.6%)	66 (18.3%)	97 (26.9%)	47 (13.0%)	16 (4.4%)	2.39
Discussing euthanasia complications	47 (13.0%)	70 (19.4%)	25 (6.9%)	75 (20.8%)	68 (18.8%)	48 (13.3%)	28 (7.8%)	2.26
Dealing with emotional clients	40 (11.1%)	113 (31.3%)	41 (11.4%)	67 (18.6%)	53 (14.7%)	34 (9.4%)	13 (3.6%)	1.67
Disposal methods for remains	48 (13.3%)	127 (35.2%)	24 (6.6%)	67 (18.6%)	64 (17.7%)	21 (5.8%)	10 (2.8%)	1.55
Euthanasia sedation protocols	50 (13.9%)	107 (29.6%)	33 (9.1%)	103 (28.5%)	46 (12.7%)	17 (4.7%)	5 (1.4%)	1.51
Managing compassion fatigue	38 (10.5%)	132 (36.6%)	47 (13.0%)	76 (21.1%)	38 (10.5%)	21 (5.8%)	9 (2.5%)	1.37

[a]Calculated as a weighted mean among those individuals who provided a response to the statement, and where: did not receive training = 0, very poor = 1, poor = 2, satisfactory = 3, good = 4, and very good = 5.

Table 6. Number (%) of veterinarians (n = 361) responding to a survey on euthanasia of dogs and cats reporting their level of comfort with different aspects of euthanasia at the time of survey completion.

	Very uncomfortable	Uncomfortable	Neutral	Comfortable	Very comfortable	Weighted score [a]
Discussing euthanasia complications	6 (1.7%)	3 (0.8%)	14 (3.9%)	161 (44.6%)	177 (49.0%)	4.39
Disposal methods for remains	7 (1.9%)	2 (0.6%)	20 (5.5%)	165 (45.7%)	167 (46.3%)	4.33
Euthanasia administration techniques	6 (1.7%)	5 (1.4%)	24 (6.6%)	178 (49.3%)	148 (41.0%)	4.27
Euthanasia drug protocols	7 (1.9%)	6 (1.7%)	32 (8.9%)	169 (46.8%)	147 (40.7%)	4.23
Ethical decision-making	7 (1.9%)	6 (1.7%)	26 (7.2%)	197 (54.6%)	125 (34.6%)	4.18
Euthanasia sedation protocols	8 (2.2%)	14 (3.9%)	58 (16.1%)	169 (46.8%)	112 (31.0%)	4.01
Dealing with emotional clients	9 (2.5%)	27 (7.5%)	66 (18.3%)	188 (52.1%)	71 (19.7%)	3.79
Legal requirements	10 (2.8%)	45 (12.5%)	107 (29.6%)	144 (39.9%)	55 (15.2%)	3.52
Managing compassion fatigue	16 (4.4%)	52 (14.4%)	146 (40.4%)	109 (30.2%)	38 (10.5%)	3.28

[a]Calculated as a weighted mean among those individuals who provided a response to the statement, and where: very uncomfortable = 1, uncomfortable = 2, neutral = 3, comfortable = 4, and very comfortable = 5.

of respondents (298/361; 82.5%) also indicated that their euthanasia technique had changed since graduation, with 16 (4.4%) unable to recall. In the free-text comments, the most common reported change was adopting a pre-euthanasia sedation protocol.

When asked about their current level of comfort with different aspects of euthanasia (Table 6), respondents were still most comfortable with the more practical and technical elements of euthanasia, including discussing euthanasia complications, disposal methods for remains, and administering euthanasia drugs.

There were 282 individuals (78.1%) who reported experience with having their own dog or cat euthanised, either by themself or another veterinarian. Of these, 83 (29.4%) indicated that it had an impact on how they subsequently performed euthanasia. Key topics mentioned in the free-text comments for this question were developing more empathy for clients, using sedation or other strategies to minimise stress for the pet, better communicating the possible adverse reactions to euthanasia drugs, and allowing sufficient appointment time so that the clients did not feel rushed. Several respondents also indicated that bad experiences with their own pets had made them either unable to perform euthanasia or made it more difficult to manage the emotional burden of euthanising client animals for days to months afterwards.

Thematic analysis of general comments regarding euthanasia

A common theme in the general comments on euthanasia training was that veterinary students needed more formal training in veterinary school to be confident performing these procedures after graduation.

> There needs to be more practical experience for students surrounding euthanasia rather than just rote learning. I thought I was okay until I came out and realised how inexperienced and unconfident I was when it was just me.

However, it was also acknowledged that there were difficulties providing students with adequate exposure to real clinical cases because "most [placements] don't allow students in on euthanasias as it is so personal" and "there is so much to learn in vet college to not make it busier with euthanasia [content]." Some of the suggestions for improving education included offering euthanasia workshops where both the techniques and discussions to have with owners were taught, or having a dedicated section in final year working through common euthanasia scenarios in small and large animal practice. While some respondents thought that having more standardised protocols, particularly around performing convenience euthanasia, would be helpful for new graduates, others were concerned that this may be too restrictive:

> I hope that this survey does not result in a "protocol" that we must follow; I do not want to appear before the VCNZ because I did not follow a protocol as I should have.

Furthermore, there was recognition that every clinical situation was different and veterinarians needed to adapt their euthanasia protocols to meet patient and client needs.

> Too much reliance on protocols rather than focusing on the client and animal's needs can, in my experience, lead to poor outcomes.

Respondents acknowledged that a lot of learning occurred on-the-job when students entered clinical practice as new graduates, and this was "an area where senior veterinarians can have a massive influence on the way a new graduate develops their soft skills in regards to euthanasia." In most cases, having a good clinical mentor was a positive experience, but there were also concerns that older generation vets were sometimes reluctant to adopt practices such as IV catheterisation and sedation:

> I think that the perception of older vets on younger vets using catheters and sedation needs to change. The NZVA recommend the use of these but for some reason we are always looked down upon for not doing it off the needle. I used to do that and found it stressful for everyone, now I sedate nearly every-

> thing and love it as it is a lot less stressful for everyone and [the] animal involved.

There were many different opinions regarding the emotional side of euthanasia, both for the veterinarian and the owner, ranging from complete self-reported ignorance ("Not sure what compassion fatigue is all about really") to others indicating that they compartmentalised that aspect of the job, but often felt the emotional impacts later:

> [I f]eel there is a huge psychic and emotional cost to regularly taking life, even if it is to prevent suffering. Though usually I feel little during the procedure (other than the pressure to make everything go as smoothly as possible), later I feel hugely drained.

One respondent highlighted that discussions around whether it is acceptable for veterinarians to show emotion during euthanasia are becoming more common, but also highlighted the importance of learning not to take on the owner's emotional burden:

> During euthanasia the animal's welfare should be paramount. For me, the owners distress comes second. I see an increasing trend of vets being upset during euthanasias and discussions around whether it is okay (for example) to cry in front of owners. I think it's a time for the owner to be upset but for us to be professional, caring, and pragmatic. We can be compassionate without 'taking on' the owner's emotions.

Having discussions with colleagues, particularly around a difficult euthanasia with more emotional impact than usual, was identified as a valuable coping mechanism:

> Years ago, [I] had close family bereavement and then several euthanasias to perform that week. We [are] an emotional family [and I] also had difficulty performing job. Discussed immediately with colleagues. Euthanasia is discussed frequently in all practices I have worked with. [With n]ew vets, [it is] very important to discuss and monitor performance and workload.

The reasons for performing euthanasia also had an impact on the emotional burden experienced by veterinarians, with particular difficulties in situations like convenience euthanasia with significant ethical and welfare implications:

> It is uncommon in our practice to have to euthanise animals out of convenience and there are normally some mitigating circumstances, however I do feel it is an important service our profession must offer. I worry that if a clinic turns these clients away the outcome for the animal can be severe (e.g. cat is dumped, dog is surrendered to the pound and stays for 7 days before being euthanised, during which time it is stressed, client attempts euthanasia at home). I don't think it is fair for a clinic to decline providing convenience euthanasia unless they are able to take that pet on and ensure it is found a loving, suitable home. This only increases the burden of convenience euthanasia on other clinics/veterinarians or potentially leads to very poor welfare outcomes for the pet.

Euthanasia was also difficult in situations where the veterinarian was concerned about the client's ability to cope with the euthanasia:

> I never had an issue with euthanasia, as I believe there are worse thing for an animal than a quick exit, all my pound euthanasias got a cuddle as they went. The hardest for me were my elderly clients that depended on their pets for companionship, who knew they wouldn't get another one after this one had gone due to their own age.

There were concerns over the level of support that can be provided to clients both for personal and clinic reasons. One male respondent highlighted concerns that physical gestures of reassurance could be misconstrued as inappropriate:

> After an emotional euthanasia, the owner may be looking for someone to hug, a "shoulder to cry on", etc., but as an older male vet I feel I can't do that without it being misconstrued.

Another respondent noted that while they tried to provide clients with adequate time to process the event, it was a difficult balancing act because it required a lot of staff resources and it would be difficult for the clinic to charge out professional time appropriately.

> [It c]an be very time consuming and I never rush the process. Each client sets their own pace and most people that may be waiting for their appointment are very understanding. We however can't allot 30–45 minutes standard without increasing charges so it is a balance between what owners expect or can afford. We have a mixed clientele with some in real hardship to others [where] money is no concern – so one formula doesn't fit all (as long as animals' welfare is met). People's personal requirements for the process also run the full scale from 'just get on with it' to feeling like they are losing their child.

However, many veterinarians saw euthanasia as a privilege in the right circumstances, which was a significant protective factor against compassion fatigue:

> I find a compassionate euthanasia doesn't lead to fatigue. When you know you've helped someone through the loss of their pet in a kind and considerate way it can be rewarding. I have had several students ask me if they are normal in not feeling bad after a euthanasia and one confess guilt at not feeling sad. I personally find it easy to take pride in a job well done and find that means I leave satisfied rather than emotionally drained. Though of course there are always cases that do have an emotional impact.

This was particularly true when euthanasia was perceived to be the right decision for the patient:

> Euthanasia can be [a] very emotionally charged event, but I think that if I genuinely believe that it is the right decision for the patient, it becomes a privilege to be able to provide this service in a compassionate and caring manner. If regarded in this way, it becomes much less of a stress in day-to-day practice.

Companion animal euthanasia was also seen to be rewarding in other ways, with many clients later expressing gratitude for the compassionate way that the veterinarian handled the euthanasia:

> I have received more thanks for doing a good job of euthanasia than for any other procedure – because you can make a difference in how someone else experiences a potentially traumatic experience.

Discussion

To our knowledge, this study represents the first cross-sectional survey exploring how New Zealand veterinarians approach euthanasia in companion animal practice. This procedure is very common, with respondents euthanising a mean of seven dogs and seven cats per month. The large variation in numbers of animals euthanised per month (0–60 for both dogs and cats) may reflect differences between respondents in the proportion of time devoted to companion animal practice or the type of companion animal practice they engage in. For example, veterinarians who are employed in shelter medicine settings, contracted to do clinical work for animal management teams in local councils, or specialise in home euthanasia services may be required to perform euthanasia more often than veterinarians working in traditional private practice. Overall, the main finding was that while there was considerable variation in the technical protocols that respondents used to perform euthanasia, there were also common underlying challenges related to managing the psychological aspects of euthanasia, both for veterinarians and their clients. It has been well established that performing euthanasia can have profound impacts on the wellbeing of veterinary professionals, leading to burnout, depression and suicide (Tran *et al.* 2014; Scotney *et al.* 2015; Marton *et al.* 2020).

The process of euthanasia generally begins with making the conscious decision that it is time to end the animal's life (Cameron *et al.* 2022). Over 95% of our survey respondents indicated that they discussed the decision to euthanise the animal with clients before the procedure, with some providing additional feedback to owners during and after the euthanasia as well. It was interesting to note that almost 4% of respondents indicated that they never discussed the decision to euthanise with owners. The most likely explanation is that these were shelter veterinarians working with unowned animals, although we were unable to definitively confirm this with our data. Veterinarians have an extremely important role in counselling owners about the decision to end their pet's life (Christiansen *et al.* 2015; Littlewood *et al.* 2021a), which can have a significant toll on veterinarians' wellbeing (Matte *et al.* 2019a), particularly in situations where the owner has requested euthanasia for convenience rather than because it is in the animals' best interest (Rathwell-Deault *et al.* 2017a, 2017b). About 15% of respondents reported working for practices where convenience euthanasia is performed for any client who requests it, which often conflicted with their own personal views and ethics around performing these procedures. In the free-text comments, one of the strategies that respondents used to manage complex emotions around making euthanasia decisions was reminding themselves that the definition of euthanasia is "a good death" and seeing it as a positive experience where they can provide animals with a humane end that alleviates suffering. This has previously been conceptualised in the literature as a philosophy of ethically-driven and "good" euthanasia (Persson *et al.* 2020; Quain 2021). A qualitative study of Finnish pet owners' experiences with euthanasia further highlighted that using the euthanasia experience as an opportunity to celebrate the human-animal relationship and reflect on good memories about the pet can help owners to manage strong negative emotions (Schuurman 2017). Taking more client- and patient-centred approaches to having euthanasia discussions can also be beneficial in reducing owners' uncertainty and grief (Nogueira Borden *et al.* 2010).

It is important for veterinarians as well as veterinary clinics to consider a range of approaches that can be used to minimise stress for the animals, clients, and veterinary staff during the euthanasia procedure. An important component to this is selecting appropriate drug protocols and routes of administration to ensure that death occurs in a quick and humane fashion with minimal adverse events. Virtually all respondents reported using IV pentobarbitone as their preferred method of euthanising dogs and cats, with variable use of IV catheters. This is consistent with the best-practice recommendations for methods of euthanising animals as published by the American Veterinary Medical Association (AVMA) (Leary *et al.* 2020). Other routes of administration, including intracardiac and intrarenal injections, were reported by a small number of respondents in situations where IV access was compromised or they did not feel they could safely administer the drug IV (e.g. to feral animals). The AVMA guidelines state that intracardiac and intrarenal injection of euthanasia agent is acceptable only when performed on anaesthetised or unconscious animals (Leary *et al.* 2020). Whether or not respondents that used these routes did so under general anaesthesia is unknown as this was not directly

addressed by the survey. Approximately 40% of survey respondents indicated that their clinic had standardised euthanasia protocols, with the majority also agreeing that they were likely to follow them. However, it was not clear from the responses whether the respondents perceived the protocols as being good or bad.

The use of sedation prior to performing euthanasia was highly variable across respondents, with only 32.9% of respondents always using it in dogs and 47.1% always using it in cats. For those who never used sedation (19.7% for dogs and 14.6% for cats), the most common reasons were that they felt it was not necessary, that it made the veins difficult to find, and/or that it was too time-consuming to perform. The advantages of sedation in terms of improving the overall experience for patients, clients and veterinary staff far outweighs the potential undesirable side effects such as a painful reaction to the injection administration, dysphoria and vomiting (Robertson 2020). Furthermore, many of the undesirable side effects of sedation can be minimised by selecting appropriate drug protocols for the patient. For example, protocols involving ketamine combined with xylazine, acepromazine and/or a benzodiazepine are widely used in shelter medicine to provide deep sedation or full anaesthesia prior to euthanasia (Ko and Berman 2010). Other possibilities include the use of injectable anaesthetic induction agents such as alfaxalone (Deutsch *et al.* 2017) or propofol (Bullock *et al.* 2019) prior to administration of pentobarbitone. In further exploring the drug protocols selected by survey respondents, it was interesting to note that many included an alpha-2-agonist such as medetomidine or dexmedetomidine despite recommendations that these should not be used for pre-euthanasia sedation because of the potential for vomiting and peripheral vasoconstriction (Porters *et al.* 2014; Robertson 2020). On the whole, our results indicate that respondents are complying with VCNZ Code of Conduct recommendations (and by extension AVMA guidelines) in terms of euthanasia drugs and routes of administration. However, the failure to implement pre-euthanasia sedation among some respondents warrants further exploration.

There was also wide variation across respondents regarding non-pharmacological means of improving the euthanasia experience for owners, such as taking time to thoroughly explain the procedure; maintaining dedicated rooms for euthanasia; granting owners the autonomy of deciding whether they want to be present for the euthanasia; allowing flexibility around when payments for euthanasia were collected; offering home euthanasia at the request of clients; and providing a range of options for helping owners memorialise their pets, such as making paw prints or charitable donations in the pet's name. These factors are now considered to be equally if not more important than performing the technical aspects of euthanasia correctly (Shearer 2020), and are strongly linked to client satisfaction with the euthanasia consultation (Martin *et al.* 2004). While most respondents indicated that they discussed important issues like the steps involved in the euthanasia procedure, potential complications, and options for disposing of the animal's remains, other research studies have shown a mismatch between veterinarians' and owners' perceptions of how this information was communicated (Shaw and Lagoni 2007; Nogueira Borden *et al.* 2019). This highlights the value of veterinarians taking the time to get external feedback from clients as well as support staff on how well they are doing with euthanasia discussions.

Previous research identified that the three most common wishes of owners of companion animals for their end-of-life care were that they expected to be able to contact the veterinarian with any concerns or questions about their pet's health leading up to euthanasia; for euthanasia to be performed in their home; and to have access to after-hours services for euthanasia (Matte *et al.* 2020b). Although many respondents indicated that they would perform home euthanasia at the request of clients, it was often not proactively offered as a choice and may represent an avenue for expanding euthanasia services for clients.

One of the most challenging aspects of euthanasia flagged by the survey respondents was being able to manage their clients' grief on top of managing their own complex feelings towards the procedure. Similar findings have been reported elsewhere (Dow *et al.* 2019) and likely reflect the growing societal expectation that it is the veterinarian's responsibility to create a safe emotional space for clients to grieve the loss of their pet (Morris 2012). Clients who have a very strong level of attachment to their pet or have conflicting views about whether euthanasia was the correct decision are particularly vulnerable to experiencing severe grief (Adams *et al.* 2000). Our survey did not include many specific questions around the level of support that veterinarians currently provide to clients or their feelings around managing grief. However, previous research has shown that while veterinarians often strive to be meaningful sources of support for clients (Matte *et al.* 2019b), there is often a mismatch between intentions and actions when it comes to providing clients with support in practice (Matte *et al.* 2020a). For veterinarians who do not feel comfortable in this role, it can potentially be helpful to have discussions about euthanasia planning during routine senior wellness consults when owners are not in the acutely emotional situation of having to make an immediate euthanasia decision (Fernandez-Mehler *et al.* 2013). Veterinarians can also refer clients to professional counsellors or pet loss support

helplines (Turner 1997; Rémillard *et al.* 2017). Almost 80% of respondents in our study indicated that they never discussed options for grief counselling and support with pet owners. There is also a potential role for mental health practitioners to be involved in the planning phase leading up to the euthanasia to help clients develop better coping skills, rather than strictly managing grief after the event occurs (Lagoni 2011).

Overall, most respondents ranked the training they received in veterinary school to prepare them for performing euthanasia as being well below satisfactory. Almost one-third of survey respondents indicated that they had received no formal training around key aspects of euthanasia while they were in veterinary school, with 12.8% and 14.3% indicating that they had not observed euthanasia of any dog or cat, respectively, prior to graduation. There were particular identified knowledge gaps around dealing with emotional clients, compassion fatigue, sedation protocols, and disposal of remains, which were also unsurprisingly identified as the aspects of euthanasia that respondents often felt least comfortable with after graduation. These findings are consistent with previous research studies identifying curricular gaps in how Australasian veterinary schools currently approach teaching decision-making in euthanasia (Littlewood *et al.* 2021b), technical aspects of euthanasia (Littlewood *et al.* 2018) and managing grief associated with the end of life (Littlewood *et al.* 2020). It can be difficult for veterinary schools to provide students with adequate hands-on clinical experience in companion animal euthanasia due to the variability in caseloads seen on clinical rotations as well as concerns about letting students perform euthanasia on client-owned animals because of the emotionally charged nature of these consultations and the desire to minimise the likelihood of anything going wrong (Cooney *et al.* 2021). Alternatives such as running euthanasia workshops (Cohen-Salter *et al.* 2004) or using filmed video clips of euthanasia consultations (Hafen *et al.* 2009) are potentially valuable in improving student confidence with these procedures at the time of graduation. It is also worth noting that the mean time since our survey respondents graduated from veterinary school was 17 years and it is likely that education regarding euthanasia has changed over time. For example, as a direct consequence of running this survey, the authors developed a new 3-hour module on euthanasia of companion animals which, since 2021, has been integrated into the fourth year veterinary curriculum at Massey University.

As with any voluntary cross-sectional survey, there is the potential for bias since individuals with the strongest opinions about the subject are the most likely to respond. Similar to the demographic profile of the New Zealand veterinary profession, our respondents were primarily New Zealand European females who were approximately 15–20 years post-graduation. This demographic group has been identified as having greater ethical dilemmas and occupational stress around euthanasia, particularly when performed for convenience (Hartnack *et al.* 2016). Another limitation of our survey was that we focused strictly on the experiences of veterinarians with euthanasia. However, previous research has also documented that clients often turn towards veterinary nursing staff as a source of emotional support around pet euthanasia, which can also lead to burnout and compassion fatigue for nurses (Edwards 2009). The COVID-19 pandemic has placed additional stressors on veterinary staff working with clients in no- or low-contact clinical settings, and with clients who were requesting euthanasia for their pets due to financial hardship (Vincent *et al.* 2020; Chalmers and Hodgdon 2022; Quain *et al.* 2022). It would be interesting to conduct follow-up work in New Zealand to assess how the climate surrounding euthanasia has changed as a result of the pandemic. Additionally, it would be worthwhile exploring whether providing veterinarians with additional training on better adapting their euthanasia protocols to different clinical scenarios would improve the experience for patients, owners and veterinary staff.

Acknowledgements

The authors are grateful to the Veterinary Council of New Zealand and the New Zealand Veterinary Association for their assistance with advertising the survey, and to the veterinarians who generously volunteered their time to provide responses.

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References

Adams CL, Bonnett BN, Meek AH. Predictors of owner response to companion animal death in 177 clients from 14 practices in Ontario. *Journal of the American Veterinary Medical Association* 217, 1303–9, 2000. https://doi/org/10.2460/javma.2000.217.1303

***Anonymous**. *Animal Welfare Act* 1999. https://www.legislation.govt.nz/act/public/1999/0142/latest/whole.html (accessed 25 January 2023). New Zealand Government Printer, Wellington, NZ, 1999

Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 77–101, 2006. https://doi/org/10.1191/1478088706qp063oa

Bullock JM, Lanaux TM, Shmalberg JW. Comparison of pentobarbital-phenytoin alone vs propofol prior to pentobarbital-phenytoin for euthanasia in 436 client-owned

dogs. *Journal of Veterinary Emergency and Critical Care* 29, 161–5, 2019. https://doi/org/10.1111/vec.12813

Cameron A, Pollock K, Wilson E, Burford J, England G, Freeman S. Scoping review of end-of-life decision-making models used in dogs, cats and equids. *Veterinary Record* 191, e1730, 2022. https://doi/org/10.1002/vetr.1730

***Chalmers E, Hodgdon R.** Veterinary end-of-life care and euthanasia in the age of COVID-19: a qualitative study of provider perspectives. *Poster Presentation*, Thinking Matters Symposium, University of Southern Maine, Portland, ME, USA, 2022

Christiansen SB, Kristensen AT, Lassen J, Sandøe P. Veterinarians' role in clients' decision-making regarding seriously ill companion animal patients. *Acta Veterinaria Scandinavica* 58, 1–14, 2015. https://doi/org/10.1186/s13028-016-0211-x

Cohen-Salter C, Folmer-Brown S, Hogrefe KM, Brosnahan M. A model euthanasia workshop: one class's experience at Tufts University. *Journal of Veterinary Medical Education* 31, 73–6, 2004. https://doi/org/10.3138/jvme.31.1.73

Cooney K. Common and alternative routes of euthanasia solution administration. *Veterinary Clinics of North America: Small Animal Practice* 50, 545–60, 2020. https://doi/org/10.1016/j.cvsm.2019.12.005

Cooney K, Dickinson GE, Hoffmann H. Euthanasia education in veterinary schools in the United States. *Journal of Veterinary Medical Education* 48, e20200050, 2021. https://doi/org/10.3138/jvme-2020-0050

Deutsch J, Jolliffe C, Archer E, Leece EA. Intramuscular injection of alfaxalone in combination with butorphanol for sedation in cats. *Veterinary Anaesthesia and Analgesia* 44, 794–802, 2017. https://doi/org/10.1016/j.vaa.2016.05.014

Dickinson GE, Roof PD, Roof KW. A survey of veterinarians in the US: euthanasia and other end-of-life issues. *Anthrozoös* 24, 167–74, 2011. https://doi/org/10.2752/175303711X12998632257666

Dow M, Chur-Hansen A, Hamood W, Edwards S. Impact of dealing with bereaved clients on the psychological well-being of veterinarians. *Australian Veterinary Journal* 97, 382–9, 2019. https://doi/org/10.1111/avj.12842

***Edwards N.** What about the nurse's emotional experience? In: Moore AS, Frimberger AE (eds). *Oncology for Veterinary Technicians and Nurses*. Pp 148–54. Wiley-Blackwell, Ames, IA, USA, 2009. https://doi/org/10.1002/9781119264903.ch16

Fernandez-Mehler P, Gloor P, Sager E, Lewis F, Glaus T. Veterinarians' role for pet owners facing pet loss. *Veterinary Record* 172, 555, 2013. https://doi/org/10.1136/vr.101154

Hafen Jr M, Rush BR, Nelson SC. Utilizing filmed authentic student–client interactions as a communication teaching tool. *Journal of Veterinary Medical Education* 36, 429–35, 2009. https://doi/org/10.3138/jvme.36.4.429

Hartnack S, Springer S, Pittavino M, Grimm H. Attitudes of Austrian veterinarians towards euthanasia in small animal practice: impacts of age and gender on views on euthanasia. *BMC Veterinary Research* 12, 1–14, 2016. https://doi/org/10.1186/s12917-016-0649-0

Ko JC, Berman AG. Anesthesia in shelter medicine. *Topics in Companion Animal Medicine* 25, 92–7, 2010. https://doi/org/10.1053/j.tcam.2010.03.001

***Lagoni L.** Family-present euthanasia: protocols for planning and preparing clients for the death of a pet. In: Blazina C, Boyraz G, Shen-Miller D (eds). *The Psychology of the Human-Animal Bond: A Resource for Clinicians and Researchers*. Pp 181–202. Springer, New York, NY, USA, 2011. https://doi/org/10.1007/978-1-4419-9761-6_11

Leary S, Underwood W, Anthony R, Cartner S, Grandin T, Greenacre C, Gwaltney-Brant S, McCrackin M, Meyer R, Miller D, *et al. *AVMA Guidelines for the Euthanasia of Animals: 2020 Edition*. https://www.avma.org/resources-tools/avma-policies/avma-guidelines-euthanasia-animals (accessed 25 July 2022). American Veterinary Medical Association, Schaumburg, IL, USA, 2020

Littlewood KE, Beausoleil NJ, Stafford KJ, Stephens C, Collins T, Fawcett A, Hazel S, Lloyd JK, Mallia C, Richards L. Exploring how end-of-life management is taught to Australasian veterinary students. Part 1: technical euthanasia. *Veterinary Record* 183, 691, 2018. https://doi/org/10.1136/vr.104775

Littlewood K, Beausoleil N, Stafford K, Stephens C, Collins T, Fawcett A, Hazel S, Lloyd J, Mallia C, Richards L. How management of grief associated with ending the life of an animal is taught to Australasian veterinary students. *Australian Veterinary Journal* 98, 356–63, 2020. https://doi/org/10.1111/avj.12960

Littlewood K, Beausoleil N, Stafford K, Stephens C. "What would you do?": How cat owners make end-of-life decisions and implications for veterinary-client interactions. *Animals* 11, 1114, 2021a. https://doi/org/10.3390/ani11041114

Littlewood K, Beausoleil N, Stafford K, Stephens C, Collins T, Quain A, Hazel S, Lloyd JF, Mallia C, Richards L. How decision-making about euthanasia for animals is taught to Australasian veterinary students. *Australian Veterinary Journal* 99, 334–43, 2021b. https://doi/org/10.1111/avj.13077

Magnier K, Wang R, Dale V, Murphy R, Hammond R, Mossop L, Freeman S, Anderson C, Pead M. Enhancing clinical learning in the workplace: a qualitative study. *Veterinary Record* 169, 682, 2011. https://doi/org/10.1136/vr.100297

Martin F, Ruby KL, Deking TM, Taunton AE. Factors associated with client, staff, and student satisfaction regarding small animal euthanasia procedures at a veterinary teaching hospital. *Journal of the American Veterinary Medical Association* 224, 1774–9, 2004. https://doi/org/10.2460/javma.2004.224.1774

Marton B, Kilbane T, Nelson-Becker H. Exploring the loss and disenfranchised grief of animal care workers. *Death Studies* 44, 31–41, 2020. https://doi/org/10.1080/07481187.2018.1519610

Matte AR, Khosa DK, Coe JB, Meehan MP. Impacts of the process and decision-making around companion animal euthanasia on veterinary wellbeing. *Veterinary Record* 185, 480, 2019a. https://doi/org/10.1136/vr.105540

Matte AR, Khosa DK, Meehan MP, Coe JB, Niel L. An exploratory study of veterinary professionals' self-reported support of bereaved clients before, during, and after companion animal euthanasia in southwestern Ontario, Canada. *OMEGA – Journal of Death and Dying* 83, 352–70, 2019b. https://doi/org/10.1177/0030222819853924

Matte AR, Khosa DK, Coe JB, Meehan M, Niel L. Exploring veterinarians' use of practices aimed at understanding and providing emotional support to clients during companion animal euthanasia in Ontario, Canada. *Veterinary Record* 187, e74, 2020a. https://doi/org/10.1136/vr.105659

Matte AR, Khosa DK, Coe JB, Meehan M, Niel L. Exploring pet owners' experiences and self-reported satisfaction and grief following companion animal euthanasia. *Veterinary Record* 187, e122, 2020b. https://doi.org/10.1136/vr.105734

Morris P. Managing pet owners' guilt and grief in veterinary euthanasia encounters. *Journal of Contemporary Ethnography* 41, 337–65, 2012. https://doi/org/10.1177/0891241611435099

Nogueira Borden LJ, Adams CL, Bonnett BN, Shaw JR, Ribble CS. Use of the measure of patient-centered communication to analyze euthanasia discussions in companion animal practice. *Journal of the American Veterinary Medical Association* 237, 1275–87, 2010. https://doi/org/10.2460/javma.237.11.1275

Nogueira Borden LJ, Adams CL, Bonnett BN, Ribble CS, Shaw JR. Comparison of veterinarian and standardized client perceptions of communication during euthanasia discussions. *Journal of the American Veterinary Medical Association* 254, 1073–85, 2019. https://doi/org/10.2460/javma.254.9.1073

Norman E. Supervisor descriptions of veterinary student performance in the clinical workplace: a qualitative interview study. *Veterinary Record* 180, 570, 2017. https://doi/org/10.1136/vr.104224

Persson K, Selter F, Neitzke G, Kunzmann P. Philosophy of a "good death" in small animals and consequences for euthanasia in animal law and veterinary practice. *Animals* 10, 124, 2020. https://doi/org/10.3390/ani10010124

***Platko EJ, Holtzman JL.** *Small Animal Euthanasia: Analyzing Euthanasia Protocols. BSc Project Report*. Worcester Polytechnic Institute, Worcester, MA, USA, 2017

Porters N, Bosmans T, Debille M, De Rooster H, Duchateau L, Polis I. Sedative and antinociceptive effects of dexmedetomidine and buprenorphine after oral transmucosal or intramuscular administration in cats. *Veterinary Anaesthesia and Analgesia* 41, 90–6, 2014. https://doi/org/10.1111/vaa.12076

Quain A. The gift: ethically indicated euthanasia in companion animal practice. *Veterinary Sciences* 8, 141, 2021. https://doi/org/10.3390/vetsci8080141

Quain A, Mullan S, Ward MP. Low and no-contact euthanasia: associated ethical challenges experienced by veterinary team members during the early months of the COVID-19 pandemic. *Animals* 12, 560, 2022. https://doi/org/10.3390/ani12050560

Rathwell-Deault D, Godard B, Frank D, Doizé B. Conceptualization of convenience euthanasia as an ethical dilemma for veterinarians in Quebec. *Canadian Veterinary Journal* 58, 255, 2017a

Rathwell-Deault D, Godard B, Frank D, Ravel A, Doizé B. Convenience euthanasia in companion animals: dilemma among veterinarians in Quebec. *Canadian Veterinary Journal* 58, 953–63, 2017b

Rémillard LW, Meehan MP, Kelton DF, Coe JB. Exploring the grief experience among callers to a pet loss support hotline. *Anthrozoös* 30, 149–61, 2017. https://doi/org/10.1080/08927936.2017.1270600

Robertson SA. Pharmacologic methods. *Veterinary Clinics of North America: Small Animal Practice*, 525–43, 2020. https://doi/org/10.1080/08927936.2017.1270600

Schuurman N. Performing good death at the veterinary clinic: experiences of pet euthanasia in Finland. *Area* 49, 208–14, 2017. https://doi/org/10.1111/area.12316

Scotney RL, McLaughlin D, Keates HL. A systematic review of the effects of euthanasia and occupational stress in personnel working with animals in animal shelters, veterinary clinics, and biomedical research facilities. *Journal of the American Veterinary Medical Association* 247, 1121–30, 2015. https://doi/org/10.2460/javma.247.10.1121

Shaw JR, Lagoni L. End-of-life communication in veterinary medicine: delivering bad news and euthanasia decision making. *Veterinary Clinics of North America: Small Animal Practice* 37, 95–108, 2007. https://doi/org/10.1016/j.cvsm.2006.09.010

Shearer T. Nonpharmacologic methods to improve the euthanasia experience. *Veterinary Clinics of North America: Small Animal Practice*, 627–38, 2020. https://doi/org/10.1016/j.cvsm.2019.12.011

***Springer S, Moens Y, Hartnack S, Grimm H.** Soft skills for hard problems: what prepares Austrian veterinarians to effectively manage end-of-life issues? In: Vinnari E, Vinnari M (eds). *Sustainable Governance and Management of Food Systems: Ethical Perspectives*. Pp 263–7. Wageningen Academic Publishers. Wageningen, Netherlands, 2019. https://doi/org/10.3920/978-90-8686-892-6_10

Tran L, Crane MF, Phillips JK. The distinct role of performing euthanasia on depression and suicide in veterinarians. *Journal of Occupational Health Psychology* 19, 123, 2014. https://doi/org/10.1037/a0035837

Turner WG. Evaluation of a pet loss support hotline. *Anthrozoös* 10, 225–30, 1997. https://doi/org/10.2752/089279397787000914

***Turner WG.** *Euthanasia of the Companion Animal: Understanding the Pet Owner's Experience. PhD Thesis*. Ohio State University, Columbus, OH, USA, 1998

***VCNZ**. *Code of Professional Conduct for Veterinarians*. https://vetcouncil.org.nz/common/Uploaded%20files/Web/Publications/2020_01%20Code%20of%20Professional%20Conduct.pdf (accessed 25 January 2023). Veterinary Council of New Zealand, Wellington, NZ, 2011

***VCNZ**. *Workforce Report 2017–2018*. http://www.vetcouncil.org.nz/documentation/VCNZ_VeterinaryWorkforce2017-18.pdf (accessed 25 January 2023). Veterinary Council of New Zealand, Wellington, NZ, 2019

Vincent A, Mamzer H, Ng Z, Farkas KJ. People and their pets in the times of the COVID-19 pandemic. *Society Register* 4, 111–28, 2020. https://doi/org/10.14746/sr.2020.4.3.06

*Non-peer-reviewed