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**Kristie E. Cameron, Rochelle Johnson,
Laura Harvey**

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Contact:

epress@unitec.ac.nz

www.unitec.ac.nz/epress/

Unitec

Private Bag 92025

Victoria Street West, Auckland 1010

Aotearoa / New Zealand



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Ornamental fish ownership in Aotearoa / New Zealand: Attitudes toward veterinary care and welfare considerations

Kristie E. Cameron^{1*}, Rochelle Johnson¹, Laura Harvey¹

Affiliations:

1. School of Environmental and Animal Sciences, Unitec, Private Bag 92025, Victoria Street West, Auckland 1142, New Zealand

* Corresponding author: kcameron@unitec.ac.nz

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Abstract

This study describes ornamental fish ownership in Aotearoa / New Zealand, focusing on attitudes towards veterinary care and fish welfare. With 9% of households here and 12% in Australia having aquariums with up to eight fish, knowledge of fish husbandry and ability to provide for welfare are important considerations in a growing industry. Utilising an online survey of 58 respondents, the study findings indicate that while fish owners exhibit greater knowledge of fish care compared to non-owners, there is a difference in the perceived value of fish in comparison to other pets such as cats and dogs. Respondents with fish are more likely to seek information from non-veterinary sources due to limited availability of specialised fish veterinary care, which is attributed to veterinary expertise barriers. The findings highlight a gap in the provision of veterinary services for fish, underscoring the need for enhanced education and training for veterinary professionals in aquatic medicine. As fish are often valued less as individuals and more in terms of the aquarium environment, the study recommends that improving fish welfare requires providing access to information that reflects value-based disparities between mammalian and aquatic pets.

Keywords

Ornamental fish, animal welfare, animal husbandry, veterinary care, fishes, fishkeeping, aquatic pets, aquarium hobby, fish health, pet ownership trends, aquaculture

Introduction

Approximately 9% of households in Aotearoa / New Zealand and nearly 12% in Australia keep fish as pets, from freshwater goldfish tanks or ponds to tropical or marine aquariums (Companion Animals New Zealand 2020; Animal Medicines Australia 2016). In this country there are an estimated 1.37 million and in Australia 3.9 million individual ornamental fish, with approximately eight individuals per household (Companion Animals

New Zealand 2020; Animal Medicines Australia 2016). Ornamental aquaculture is a burgeoning industry valued up to US\$20 billion (NZ\$32 billion, Larcombe et al. 2024), with fish being the third most common pet after cats and dogs (Huntingford et al. 2006) and up to 66% of fish hobbyists having had bred fish. There have even been reports of fish hobbyists inadvertently investing in the conservation of endangered species through fish keeping and trade (King 2019).

Locally, fish ownership is highest among those aged

35–44 (13%) and in Asian households (14%), with 34% of owners treating fish as a hobby and 22% as children's pets (Companion Animals New Zealand 2020). Nearly half of fish keepers have goldfish in an aquarium (47%), with 31% in a pond, and 27% have tropical fish (Companion Animals New Zealand 2020). However, unlike the 1.2 million cats and 850,000 dogs living in households in Aotearoa / New Zealand (Companion Animals New Zealand 2020), the husbandry and care of fish is not governed by a Code of Welfare, nor do individual fish benefit from annual visits to the veterinarian for vaccinations (Gates et al. 2019). Furthermore, pet fish have known health and welfare issues associated with being selectively bred (Walster et al. 2015) and living in environments that are inadequate to sustain life or allow for the opportunity to perform behavioural needs (Huntingford et al. 2006). Recently, Walster et al. (2015) published their take on three important fish welfare issues: (1) appropriate housing space, (2) ensuring suitable tankmates and communities within the tank, and (3) knowledge regarding the environmental needs of fish in captivity, none of which are governed internationally by a specific Code of Welfare. While the industry continues to grow, with a corresponding increase in hobbyist interest and knowledge, there is a lack of progress in scientific investigation into factors affecting welfare of ornamental fishes (Stevens et al. 2007).

The rationale for keeping fish ranges from being children's pets (Companion Animals New Zealand 2020), an organic home decoration (Quinn 1987 in Squadrito 1987), a meditative and calming influence adding two years to one's life expectancy (Squadrito 1987), providing income via fish breeding (Pountney 2023), to being pets for those unable to provide space for a cat or dog. However, there is not the relationship between fish and human that there is for the 78% of dog owners and 40% of cat owners that consider their pet a member of the family (Blouin 2012; Companion Animals New Zealand 2020). Guardians and their mammalian pets can physically interact with each other, and guardians have a sense of responsibility over their pet's mental wellbeing in sharing the same environment. There is no tangible interaction between owner and fish, unless the effort of maintaining the health and aesthetic of the aquarium or pond counts as a mixing of owner and fish environments. Further, Walster et al. (2015) suggest that the public believe that fish are expendable, while the same sentiment is not applied to the family dog or cat. Some think it is acceptable to be rid of an unwanted or ill fish by flushing, freezing or releasing into waterways

(Walster et al. 2015) – all of which are inhumane methods of disposal for a fish, which come under the New Zealand Animal Welfare Act 1999. To humanely euthanise a pet fish it is appropriate to seek veterinary assistance (Royal Society for the Prevention of Cruelty for Animals 2024), because in the absence of contradictory evidence, contemporary welfare science research suggests that fish do feel pain (Message & Greenhough 2019). Fish are, however, part of the human–animal relationship and its value system, which is reflected in our knowledge and approach to fish keeping and welfare.

Keeping fish tends to entail the care of fish as a group, with individuals contained in the same controlled environment, whether a freshwater, tropical or marine tank or pond, or whether they are of aggressive or social nature. Thus, the maintenance of a tank for a single fish is the same as that of the tank of many, although there are different requirements and husbandry accommodations, such as size and density, for each of those tanks based on the type of fish being kept. Aquariums are expensive, especially for marine and tropical setups, considering the start-up tank and pump equipment, fish, ongoing equipment, consumables and electricity (Squadrito 1987). Stanton (2022) wrote a guide to keep the cost of owning a goldfish and setup to less than US\$100 (NZ\$160), but this is a concerning and questionable set of guidelines that provides instruction on how to keep a fish alive on the cheap by covering the pet's most basic needs, but not on providing an environment for them to thrive. Maintenance of an aquarium or pond, and upkeep of fish, whether a rare species or a common goldfish, can be costly and intensive. Daily effort is required to keep a tank in balance, including controlling water quality with appropriate pH, temperature, food provision, appropriate handling and cleaning, access to light and control of the growth of algae to ensure welfare of fish (Huntingford et al. 2006). Furthermore, knowledge of behavioural needs is important in identifying behaviours associated with poor health (Brandão et al. 2021; Jones et al. 2021; Stevens et al. 2017). Therefore, the focus of fish keeping is less about the health of an individual fish, as it might be with a dog or cat, and more about maintaining the overall health of the tank ecosystem. Keeping fish is equally about maintaining a healthy filtration system, which is complex, even with inexpensive setups, and it is likely this complexity that contributes to lack of knowledge in veterinary professionals.

Aquariums, especially tropical and marine tanks, can require daily maintenance, with a high level of knowledge regarding fish husbandry required to understand how

much maintenance is required. Issues can develop seemingly overnight that can result in fish ill health or death (Stevens et al. 2017). The knowledge required to treat these conditions is less likely to be found at local companion animal veterinarians than in fish hobbyist communities (Walster et al. 2015). In fact, Pouil et al. (2019) identified that the fish-keeping community was more successful at breeding ornamental fish than scientists apparently armed with all the information, and veterinarians refer fish clients to speciality pet stores for help (Walster et al. 2015). There are inherent risks, however, in the ability of those non-medically trained to assess the long-term risks associated with treating their animals using restricted chemicals or medicines, including the risk of misdiagnosis, incorrect selection of medication or application of medication. In addition, as the environment is often treated rather than a sick individual, by adding treatments to the water to be absorbed via the skin to treat superficial infections (Smith 2023), or delivering via coated food into the environment, persistence in the environment could increase the chance of species developing antimicrobial resistance (Larcombe et al. 2024). This is further complicated by the risk to human health of zoonotic infections that are related to aquariums (Rahman et al. 2020).

Generally, there is dissatisfaction with the availability of veterinary care for fish (Loh et al. 2020; Pountney 2023). Pountney (2023) found that over 90% of fish hobbyists reported insufficient access to veterinary care, and Loh et al. (2020) found between 5% and 20% of veterinary clinics' revenue was in treating ornamental fish. In both studies, a small number of clinics were surveyed in each country, with many of the clinics that did not treat fish likely choosing not to participate due to a perceived lack of relevance, thus the results reflect clinics with some experience in fish medicine. Loh et al. (2020) did find that some clinics were resourced to offer mobile visits to breeding facilities, public aquariums and households with large ponds; however, for most clinics, a lack of experience, knowledge in fish medicine and equipment, such as maintained fresh, marine and quarantine tanks, resulted in clients being turned away.

A lack of veterinarian expertise is a limitation to providing fish medical care. Veterinary schooling focuses on cats and dog, and exotic care is a specialisation that includes companion animals such as birds, rabbits, guinea pigs and reptiles (Mascolo 2020); fish medicine is a different specialisation. In Europe, 77 veterinary schools were examined, with 96% including aquatic

animal medicine in their curricula, and being a mandatory course in 54% of the institutions (Iatridou et al. 2018). In Aotearoa / New Zealand, the single university that offers veterinary science does not teach some aspects of fish medicine, and only six credits across its 600-credit programme focus on birds, amphibians and reptiles (Massey University 2024). Furthermore, there are no domestic fish medicine specialisations offered, with veterinarians or veterinary nurses needing to study internationally to become specialised.

This project aimed to describe the current state and perception of ornamental fish ownership and attitudes to accessing veterinary care for fish in a small sample of people from Aotearoa / New Zealand. It was expected that fish owners would have knowledge of fish behavioural and physiological needs, because fish owners have limited scope for assistance other than their own research (e.g., Walster et al. 2015), and would therefore be more willing to access veterinary and health care for their pets if it was available.

Method

A short online survey was conducted through Zoho (Chennai, India) with a link disseminated via Facebook and Instagram. The link was accessible for responses from 1–28 June 2022. The link was shared through animal-associated pages and groups on social media, for example, Fish Keepers NZ, Betta Keepers NZ and Tropical Fish Keepers New Zealand, and on Unitec course, programme and alumni pages, and the New Zealand Veterinarian Network and New Zealand Veterinary Nursing Association Facebook pages.

The opening page contained information regarding ethics approval (2022-1023) and criteria for participating, which was that respondents were over the age of 18 and currently lived in Aotearoa / New Zealand. The survey was made up of ten questions, some of which were multiple choice, that had to be answered before the next question would open. Questions included asking the respondent's age, industry of employment, current pet ownership information, annual veterinary spend on these animals, knowledge of fish care, and where the respondent would seek help. The final questions were yes/no questions regarding whether the respondent believed that medical care should be provided by a veterinary clinic, and if the \$60 average cost of a veterinary visit (Employment New Zealand 2022) was appropriate for a fish-care consultation. Each of these was followed by an open

typing field to allow respondents to elaborate on their answers.

The survey data was downloaded to Microsoft Excel. Descriptive statistics were conducted in Excel. Percentages of respondents were used to describe the answers to the multiple-choice questions, with the total number of answers to each question divided by the number of respondents because questions allowed for multiple answers. Statistics were performed using SPSS Statistics (IBM version 22). A chi-squared analysis was used to describe the relationship between employment and the level of the respondents' knowledge of fish care, and Pearson correlations were used to describe the association between the level of knowledge of fish care and whether respondents kept fish.

Results

There were 88 responses to the survey, of which only 58 were useable after duplicates, blank entries and responses by those under 18 years of age were removed.

The average age of respondents was 32.7 years old (SD = 11.9 years). Nearly half of respondents were employed in industries involving animals, conservation and veterinary care (26/58, 44.8%). Across all respondents, each owned on average at least two types of animals. The most common companion animals were cats (42/58, 72.4%) and dogs (31/58, 53.5%).

Three times as many people had tropical fish (25/58) than tepid or pond fish (8/58), with half of the latter being in the animal, conservation and veterinary-care industries. Those involved in animal, conservation and veterinary-care industries had on average at least two types of animals, with 9/26 respondents having tropical fish, and 4/26 having tepid or pond fish. In addition, this group had considerably more additional animals, with 17/26 having a cat, 15/26 having a dog, and 15/26 having a guinea pig, rabbit, reptile or bird. Most respondents in sales had tropical fish 4/5, with those grouped in the 'other' category also having tropical fish (8/9) and tepid or pond fish (3/9).

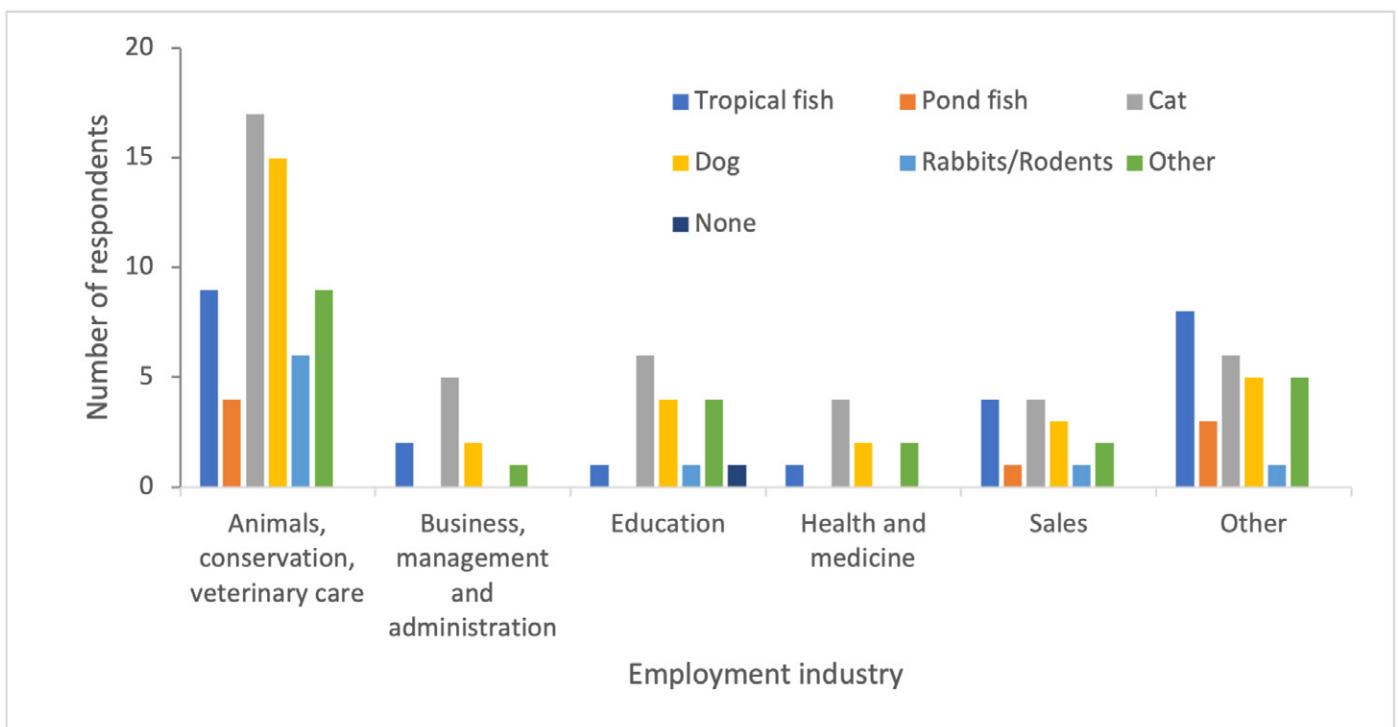


Figure 1. Types of animals owned by respondents from six employment industries (animals, conservation and veterinary care; business, management and administration; education; health and medicine; sales; and 'other', which included industries with fewer than five respondents, including communication, farming, fisheries and forestry, government, other, science and technology and self-employment). Note: 'Other' includes reptiles, birds, guinea pigs, rats and mice.

Respondents who owned fish were more likely to have any knowledge of fish care ($r_p = .86, p < .004$), and more likely to have advanced than none, basic or intermediate knowledge of fish care ($r_p = .95, p < .001$). However, having many animal types did not correlate with owning fish ($r_p = -.09, p = .83$), or having any knowledge

of fish care ($r_p = -.35, p = .45$). Similarly, respondents were not more likely to have any, basic, intermediate or advanced knowledge of fish care if they worked in the animal, conservation and veterinary care industry compared to other industries ($X^2 (3) = 2.16, p = .54$).

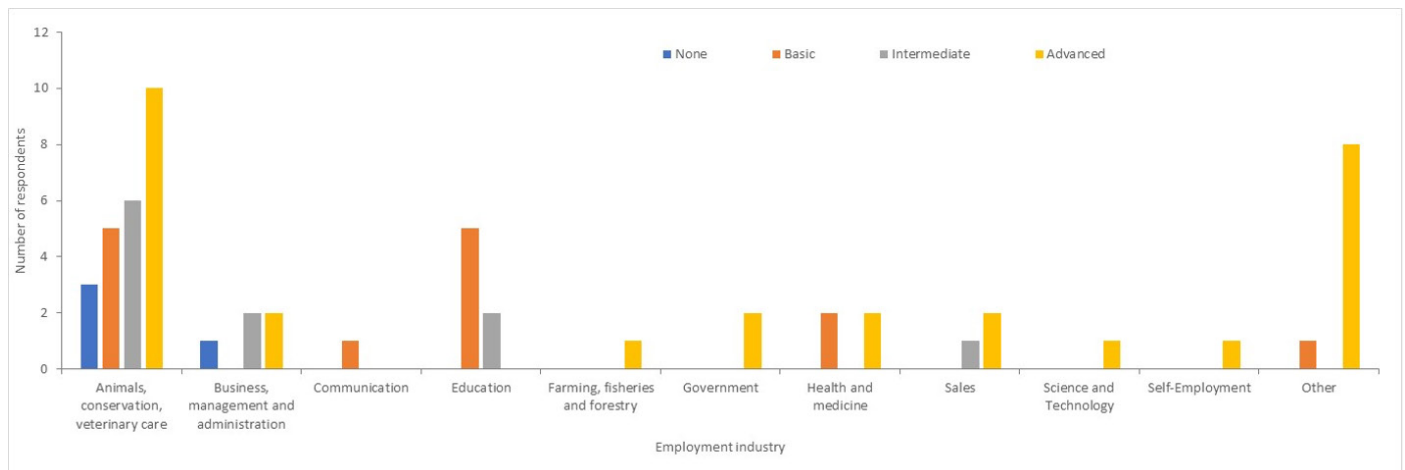


Figure 2. Level of knowledge (none, basic, intermediate and advanced) of respondents from employment industries: animals, conservation and veterinary care; business, management and administration; communication; education; farming, fisheries and forestry; health and medicine; sales; science and technology; self-employment; and other.

Most respondents would use search engines such as Google or help forums if their fish became unwell (39/58, 67.2%), or ask a fish-care specialist (37/58, 63.8%), with fewer respondents asking a veterinarian (22/58, 37.8%) or a pet store attendant (15/58, 25.9%). However, the majority of respondents believed that medical care should be provided by a veterinary clinic (42/58, 72.4%). Respondents were asked to provide their reasoning for veterinary care for fish, and the responses fell into five themes: 1) obligation to offer fish medical care; 2) challenges in offering care, e.g., expertise, equipment or medications; 3) ethical issues in keeping fish; 4) challenges in accessing fish care; and 5) fish keepers' and veterinary professionals' education and awareness of welfare requirements. Examples of responses are given here and in Table 1 of the Appendix:

“In an ideal world, each veterinary practice would have vets trained in various areas, such as cats/dogs, small pets like guinea pigs, chinchillas, birds and other animals such as fish, lizards, etc.”

“I would assume a vet should have basic knowledge of fish to be able to give medical care.”

“While I think in an ideal world this service would be involved, clinics are struggling to see all their cat and dog patients as it is so adding fish would increase the workload even more.”

“Because fish are quite a specific animal and their body’s [sic] work differently so I feel like if I had a fish I would want to see a vet that specialises in exotic animals.”

“Yes – I think it is unfortunately a normalised concept that when fish become unwell it is ‘just what happens’ and people often just let the sickness progress and let them die, however we don’t treat other animals this way.”

“Yes as fish are capable of physical and mental

suffering just as cats and dogs are.”

“The ban on antibiotics has made it exceptionally hard to save fish – the situation has left fish owners operating within the boundaries of animal abuse because necessary medical treatments can no longer be purchased.”

“There is a great lack in fish care from a consumer standpoint.”

“Fish are as important as any other pet owned. Veterinary care should be provided because fish can be in pain, have diseases and we want to provide them a good quality of life.”

“A lot of people don’t have knowledge about fish so having professional people with knowledge is better than assumptions/guesses from the internet or people with the lack of knowledge.”

Of the respondents who owned fish, 15/33 reported spending any money on fish veterinary care, with ten respondents reporting not spending any money, and five respondents spending between \$20 and \$100. Respondents spent up to \$1250 on cats ($n = 32$), \$2500 on dogs ($n = 25$) and \$3000 on animals including rabbits, turtles and horses ($n = 13$). Of the respondents, 62.1% (36/58) believed the average veterinary consultation fee of \$60 for companion animals should be the same for fish, with 76.9% (20/26) of respondents involved in animal, conservation or veterinary care agreeing the same value for cats and dogs should be applied to fish. However, respondents shared the following: 1) that there was a need for consistency in veterinary treatment; 2) that specialised knowledge affects cost; 3) other factors affecting cost; 4) the value of the pet; 5) alternative options for seeking advice; and 6) the lack of information about veterinary care. Examples of responses are given below and in Table 2 of the Appendix.

“All consultation costs should be similar regardless of what type of pet.”

“Yes, a consultation is still taking up the vet’s valuable time and you are paying for this and the vet’s knowledge, much like a consult with another animal.”

“Yes or even more than that because it will

require special knowledge or skilled veterinarian to exam a fish. May require more consultation time as well.”

“Paying for the expertise of the vet.”

“Size of animal does not determine a lower cost, if anything should be higher as more complex and less resources out there to help a vet treat.”

“It should be cheaper because it is a fish and is smaller than a cat or dog.”

“My fish are <\$20 each on average. Although I don’t like to see them unwell or leave them untreated, it would be cheaper to cull my fish than to have them just seen for \$60 (plus additional for the actual meds), esp. when there’s no way they can guarantee the fish would recover.”

“People who have fish are generally looking for a cheap pet and I don’t think they’d be willing to pay for veterinary care for fish.”

“Many owners will treat at home at this cost, plus the stress on the fish is transported, would be better to isolate fish in tank and have a video consultation.”

“Because I already know more than the vet, I know what’s wrong and what meds I need etc. I’m only going in to get the meds.”

“I don’t think there is much one can do for fish once they are sick.”

“How do you even take a fish to the vets?”

Discussion

This project aimed to describe the current state and perception of ornamental fish ownership and people’s attitudes to accessing healthcare for fish. As expected, those that owned fish or were employed in an animal-related industry had greater knowledge of fish needs and had more opinions regarding realistic access to medical care for their fish; and the most commonly owned

was a tropical aquarium. This reflects the challenges associated with fish ownership, where knowledge of fish welfare is different to that of more typical pets.

The general finding of this research is that when owning fish, owners are more likely to have knowledge of husbandry; therefore, health and welfare is increased (Brandão et al. 2021). However, the perceived worth or value of fish compared to cats and dogs was apparent in the answers of the respondents. As dogs and cats are often perceived as members of the family (Companion Animals New Zealand 2020) and share in the same environment as their humans, they, as individuals, are worth more, for example, in terms of the money spent on veterinary care. Arluke and Sanders (1996) call the ranking of value of animals to humans a 'ladder of worth'. Dogs and cats are at the top, as akin to infants, whereas rats and mice are low on the ladder because they are seen as dirty and vermin, or seen as predatory. Fish are not seen as 'good' or 'bad' animals, but as separate from humans, thus are likely to fall lower on the ladder than the companion pets, resulting in human behaviour that might provide good husbandry but will not consider the wellbeing of the animal – as they would in assessing the happiness, comfort and overall welfare of their mammalian pet.

Respondents shared the perceived challenges and barriers to seeking veterinary care for fish related to value, and most used the internet to source information. There were varied opinions as to the viability of taking a fish to the veterinarian and, grimly, some responded that fish could not go to the veterinarian, or that they were worth less than the suggested veterinary visit cost of \$60; thus, replacing the fish was cheaper than seeking veterinary care – a value system highlighted by Walster et al. (2015) as resulting in inhumane methods of disposal. Similarly, respondents said that because a fish is smaller, then the visit should be cheaper. This highlights that individual fish do not have the same value to owners as dogs, cats or other companion animals. Respondents, however, seemed to care about fish welfare, stating that, as an animal and pet, fish deserve veterinary care – and that when it is not available, owners should focus on providing at least a healthy environment for their fish and source information from alternatives to veterinary clinics. We propose that it is the aquarium that is of value, rather than the individual fish, and effort and resources are placed on maintaining the health of that environment, which then impacts fish. This aligns with the statistic of eight fish per household in Aotearoa / New Zealand and Australia found in the

literature (Companion Animals New Zealand 2020; Animal Medicines Australia 2016).

The number of fish owners seeking health advice from non-veterinary sources is not surprising, given the lack of formal fish-related study for locally trained veterinary professionals. With fish care not included in the current veterinary or veterinary nursing curriculum in this country, there presents an opportunity for the upskilling of various veterinary professionals to provide care for fish being kept as pets. However, specialised fish veterinary care is costly, with small numbers of clients leading to low returns on investment for professionals – considering the time restraints, space restrictions and access to educational opportunities – providing veterinary care for fish (Loh et al. 2020).

Fish owners are left to become experts themselves or find support elsewhere. Pet shop and fish hobbyist groups are providing this support; however, there is potential for the information and treatment advice provided to be incorrect, with implications that go beyond that of impacting the individual fish and all the fish in the same environment (Larcombe et al. 2024; Smith 2023; Walster et al. 2015). Without medical supervision, owners run the risk of delaying appropriate treatment, spreading communicable diseases, causing undesirable side-effects, and antibiotic resistance developing (Zhang et al. 2020). Although fish hobbyists and pet shops are well informed (Pountney 2023), and treatments and products don't have the same oversight or regulation as veterinary-only medicines, the potential impact on the environment (for example, contamination of wastewater) could be significant. There are many places that hobbyists can find assistance – reputable one-stop fish hobby shops are able to advise on appropriate methods to improve tank and fish health, and fish-keeping communities discuss their hobby in online forums, for example, the one-million-member r/Aquariums subreddit – and engagement with the fish hobbyist community has recently been suggested as the gateway to improving welfare and healthcare for fish (Pountney 2023).

There are a few limitations of this study. Because of the low response rate, we have not focused on the levels of ownership of fish, but rather the issues raised by respondents to the survey regarding the sourcing of assistance. With the cacophony of opinions available online, fish owners must be mindful in discerning misinformation and ensure accurate provision of care for their pets (Walster et al. 2015). A recently approved Level 4 (on the New Zealand Qualifications

Authority framework) endorsement for the New Zealand Certificate in Animal Management, of Fish, Amphibians and Reptiles at Unitec might be a solution to providing education in accurate fish husbandry and the treatment of fish and aquaria ailments, and best-practice guidance for providing good welfare. However, a programme of delivery is yet to be developed. Furthermore, as Stevens et al. (2017) identified, with the industry increasing in size, owners may be upskilling, but scientific investigation of best practice, subsequently offered to owners as accurate information, needs to occur at a similar rate.

The mindset that owners need to upskill themselves in fish husbandry, risk factors for health and overall welfare of their fish is important. Pet owners are still divided about the value of their fish, as they are inexpensive to replace as individuals, but their value, where the effort and connection between human and animal is held, is in the management of their environment. Recently, fish welfare has been the subject of papers that aim to decrease the degree to which laboratories use fish as laboratory subjects. This need has arisen following claims that fish have the biology to feel pain, therefore laboratory protocols and standards have to consider how to manage fish using best-practice methods to ensure welfare (Message & Greenhough 2019).

This project gives an overview of fish ownership and attitudes to fish husbandry and care. Those with fish possess knowledge about how to provide good welfare; however, there is a fundamental difference in how owners value their aquatic and mammalian pets. This is reflected in the variation in responses to questions about seeking veterinary care, due to the perceived lower value of the fish and higher costs associated with such care. The study suggests that the value placed on fish is linked to the health of the environment and the group rather than to individual animals, which impacts how resources are allocated for their welfare. This research highlights the lack of specialised veterinary care for fish, which results in fish owners relying on non-veterinary sources for advice. This reliance can result in misinformation, inadequate care and potential environmental risks. To address these challenges, there needs to be local educational opportunities for veterinary professionals to improve access to care and promote regulation of fish medical care. Ultimately, in order for fish welfare to improve, we need to understand the value system that dictates how fish owners receive and act on health and veterinary advice to provide for the welfare of their aquatic pets.

References

- Animal Medicines Australia (2016). *Pet ownership in Australia 2016*. Available online: https://animalmedicinesaustralia.org.au/wp-content/uploads/2016/12/AMA_Pet-Ownership-in-Australia-2016-Report_sml.pdf
- Arluke, A., Sanders, C. R. (1996). *Regarding animals*. Philadelphia: Temple University Press. 298 pp.
- Blouin, D. D. (2012). Understanding relations between people and their pets. *Sociology Compass*, 6 (11): 856–869. <https://doi.org/10.1111/j.1751-9020.2012.00494.x>
- Brandão, M. L. Dorigão-Guimarães, F., Bolognesi, M. C., Gauy, A. C. D. S., Pereira, A. V. S., Vian, L., Carvalho, T. B., Gonçalves-de-Freitas, E. (2021). Understanding behaviour to improve the welfare of an ornamental fish. *Journal of Fish Biology*, 99 (3): 726–739. <https://doi.org/10.1111/jfb.14802>
- Companion Animals New Zealand (2020). *Companion animals in New Zealand 2020*. Available online: <https://static1.squarespace.com/static/5d1bf13a3f8e880001289eeb/t/5f768e8a17377653bd1eebef/1601605338749/Companion+Animals+in+NZ+2020+%281%29.pdf>
- Employment New Zealand (2022). *Minimum wage rates and types*. Available online: <https://www.employment.govt.nz/hours-and-wages/pay/minimum-wage/minimum-wage-rates/>
- Gates, M. C., Walker, J., Zito, S., Dale, A. (2019). A Cross-sectional survey of pet ownership, veterinary service utilisation, and pet-related expenditures in New Zealand. *New Zealand Veterinary Journal*, 67 (6): 306–314. <https://www.tandfonline.com/doi/abs/10.1080/00480169.2019.1645626>
- Huntingford, F. A., Adams, C., Braithwaite, V. A., Kadri, S., Pottinger, T. G., Sandøe, P., Turnbull, J. F. (2006). Current issues in fish welfare. *Journal of Fish Biology*, 68 (2): 332–372. <https://doi.org/10.1111/j.0022-1112.2006.001046.x>
- Iatridou, D., Pohl, L., De Briyne, N., Palić, D., Saunders, J. H. & Bravo, A. (2018). Mapping the teaching of aquatic animal veterinary medicine teaching in the European Union and European Free Trade Area. *Veterinary Record Open*, 5 (1): e000309. <https://doi.org/10.1136/vetreco-2018-000309>
- Jones, M., Alexander, M. E., Snellgrove, D., Smith, P., Bramhall, S., Carey, P., Henriquez, F. L. Mclellan, I., Sloman, K. A. (2021). How should we monitor welfare in the ornamental fish trade? *Reviews in Aquaculture*, 14 (2): 770–790. <https://doi.org/10.1111/raq.12624>
- King, T., A. (2019). Wild caught ornamental fish: A perspective from the UK ornamental aquatic industry on the sustainability of aquatic organisms and livelihoods. *Journal of Fish Biology*, 94: 925–936. <https://doi.org/10.1111/jfb.13900>
- Larcombe, E., Alexander, M. E., Snellgrove, F. L., Henriquez, K. A., Sloman, K. A. (2024). Current disease treatments for the ornamental pet fish trade and their associated problems. *Reviews in Aquaculture*, 17 (1): 1–28. <https://doi.org/10.1111/raq.12948>
- Loh, R., Vukcevic, J., Bastos Gomes, G. (2020). Current status of aquatic veterinary services for ornamental fish in Australasia. *New Zealand Veterinary Journal*, 68 (3): 145–149. <https://www.tandfonline.com/doi/abs/10.1080/00480169.2020.1718564>
- Mascolo D. (2020). Is it time to stand united? Fish Veterinary Society (FVS). *The Veterinary Record*, 187 (1): 33. <https://doi.org/10.1136/vr.m2697>
- Massey University (2024). *Bachelor of Veterinary Science – BVSc*. Available online: <https://www.massey.ac.nz/study/all-qualifications-and-degrees/bachelor-of-veterinary-science-UBVTS/#courses-and-specialisations>
- Message, R., Greenhough, B. (2019). “But it’s just a fish”: Understanding the challenges of applying the 3Rs in laboratory aquariums in the UK. *Animals*, 9 (12): 1075. <https://doi.org/10.3390/ani9121075>
- Parliamentary Counsel Office Te Tari Tohutohu Pāremata (1999). *Animal Welfare Act 1999*. Available online: https://www.legislation.govt.nz/act/public/1999/0142/latest/whole.html?search=sw_096be8ed81d3ba07_humane_25_se&p=1
- Pouil, S., Tlustý, M. F., Rhyne, A. L., Metian, M. (2019). Aquaculture of marine ornamental fish: Overview of the production trends and the role of academia in research progress. *Reviews in Aquaculture*, 12 (2): 1217–1230. <https://doi.org/10.1111/raq.12381>
- Pountney, S. M. (2023). Survey indicates large proportion of fishkeeping hobbyists engaged in producing ornamental fish. *Aquaculture Reports*, 29: 101503. <https://doi.org/10.1016/j.aqrep.2023.101503>

- Rahman, M. T., Sobur, M. A., Islam, M. S., Levy, S., Hossain, M. J., El Zowalaty, M. E., Rahman, A. T., Ashour, H. M. (2020). Zoonotic diseases: Etiology, impact, and control. *Microorganisms*, 8 (9): 1405. <https://doi.org/10.3390/microorganisms8091405>
- Royal Society for the Prevention of Cruelty for Animals (2024). *What is the most humane way to euthanase aquarium fish?* RSPCA Knowledgebase. Available online: <https://kb.rspca.org.au/knowledge-base/what-is-the-most-humane-way-to-euthanase-aquarium-fish/#:-:text=Clove%20oil%20is%20readily%20available,cause%20death%20in%20exposed%20fish>
- Quinn, J. R. (1987). Now wait just a minute, there! *Tropical Hobbyist Magazine*, January 6, 1987.
- Smith, S. A. (2023). Fish welfare in public aquariums and zoological collections. *Animals*, 13 (16): 2548. <https://doi.org/10.3390/ani13162548>
- Squadrito, K. (1987). The tropical fish hobby: A moral question? *Between the Species*, 3 (3): 128–132. <https://doi.org/10.15368/bts.1987v3n3.7>
- Stanton, L. (2022, August 1). Goldfish price: How much does a pet goldfish cost in 2022? *Hepper blog*. Available online: <https://www.hepper.com/pet-goldfish-cost/>
- Stevens, C. H., Croft, D. P., Paull, G. C., Tyler, C. R. (2017). Stress and welfare in ornamental fishes: What can be learned from aquaculture? *Journal of Fish Biology*, 91 (2): 409–428. <https://doi.org/10.1111/jfb.13377>
- Walster, C., Rasidi, E., Saint-Erne, N., Loh, R. (2015). The welfare of ornamental fish in the home aquarium. *Companion Animal*, 20 (5): 302–306. <https://doi.org/10.12968/coan.2015.20.5.302>
- Zhang, W., Williams, A., Griffith, N., Gaskins, J., Bookstaver, P. B. (2020). Online availability of fish antibiotics and documented intent for self-medication. *PLoS One*, 15 (9): e0238538. <https://doi.org/10.1371/journal.pone.0238538>

Appendix

Table 1. Responses given to questions about expectations of veterinary care.

Obligation to offer fish medical care
In an ideal world, each veterinary practice would have vets trained in various areas, such as cats/dogs, small pets like guinea pigs, chinchillas, birds, and other animals such as fish, lizards, etc.
Although many illnesses can be treated at home would be great to have professional advice.
Veterinary care should cover all pet species.
Yes definitely! Fish is also under veterinary care, and it's also under the veterinary course.
I would assume a vet should have basic knowledge of fish to be able to give medical care.
I'm not sure. Having kept fish for so many years taking my fish to the vet never occurred to me. I suppose if I had an expensive fish such as an arowana it would be beneficial if I could trust a veterinary practice.
Fish can be helped for certain health conditions, it's just a little more complex. I think vet clinics or exotic clinics should be equipped to care for fish.
Well if there is something wrong with my pet fish I would expect that a vet would be able to help seeing as they have studied for years to be able to help animals.
Fish are pets and veterinary advice should be available and as accessible for dogs and cats.
They should be able to help.
Challenges in offering care, e.g., expertise, equipment, medications
I keep nano fish – in my experience, by the time one looks sick, it's almost certain to die. I possibly had/have columnaris in my tank, and it was going to be \$75 to treat, with no certainty I am treating the right thing, and no guarantee of success. Also, some meds mess up other aspects of the tank. I only have small fish, in a big tank, so tend to treat my fish as a population, so try to treat the cause of the illness, rather than the individuals that might die. If I had a big expensive fish such as an arowana, or a big oscar I'd probably put money into fixing fish, but when they are \$2–5 each...
There are so many species of fish and nuances between them that I don't expect a general vet to be able to learn to identify enough different fish, let alone be able to treat them. Also most fish are cheap and most vets have quite a high premium for their time, so I can't see it being viable.
While I think in an ideal world this service would be involved, clinics are struggling to see all their cat and dog patients as it is so adding fish would increase the workload even more.
I think all vets should have some knowledge and exotic vets should provide care to the species but the skill set of fish care experts at fish stores are more accessible and knowledgeable due to their passion laying in that specific species.
Because other meds are now much harder to get in NZ. If our vets knew what we were talking about it would definitely help. My local vets have 0 knowledge on fish (or rabbits for that matter).
Not sure – I think there should be specialist fish veterinarians but not in a GP vet clinic.
As a veterinary nurse student who is considered the aquarium specialist at a pet store I work at, I want to be able to expand my knowledge to assist customers with any health care concerns for their aquatic animals.
I would not expect a vet to have the adequate knowledge to care for mammals, birds and fish.
Should be with exotic vets not companion animals.
Because fish are quite a specific animal and their body's work differently so I feel like if I had a fish I would want to see a vet that specialises in exotic animals.

I think certain clinics should have a portable set up for fish/aquatic pets such as multiple holding tanks, water treatment, medication, heaters, filters, etc. There should be at least basic understanding of husbandry of cold and tropical species as those are most common. Saltwater species are a bit more intensive with husbandry but they also are costly so owners may be more likely to bring them in for treatment as opposed to say a neon or child's *cringe* comet.

Google is just opinions. You'd expect a vet to be able to advise based on science.

Yes however I wouldn't expect all vets to be able to provide this, I think it would be good to have some clinics with knowledge in this area.

It would be great to have expert medical advice to address issues.

Specialist clinics only, not GP as it requires extensive study to be proficient in providing veterinary care in this area.

Too specialised.

It would be great to have one place where you could take all your pets to for health care and not have to rely on the internet/pet shop to self-diagnose and treat your fish. I also think it's unrealistic to expect every vet clinic to cater to fish as their care is very specialised just like birds. Maybe specialised fish veterinarians?

Specialised area but the vets need to have the knowledge as well which they don't really at the moment. Definitely not a focus of their degree.

Ethical considerations

All pets should fall under pet care.

They seem like they'd be too fiddly to really do anything for. And they cost not much to replace.

Fish are an animal and deserve the same care.

People who have fish are generally looking for a cheap pet and I don't think they'd be willing to pay for veterinary care for fish.

They are an animal and should have treatment available.

They are a pet and people [spend] lots of money on their fish, why shouldn't they get good medical advice for their fish?

Can you do much to save a fish? Fish should be kept in the ocean and not as pets.

Yes – I think it is unfortunately a normalised concept that when fish become unwell it is 'just what happens' and people often just let the sickness progress and let them die, however we don't treat other animals this way.

Yes as fish are capable of physical and mental suffering just as cats and dogs are.

Just put it down the toilet.

Fish are living beings like cats and dogs and should [be] treated as fairly.

Cost would outweigh fish replacement.

Because fish also have emotions and intelligence just like cats and dogs and they need to be treated equally.

Fish deserve quality care and access to antibiotics and other medicines when required as well as owners' instruction around prevention of diseases and illness.

Challenges to accessing fish care

Why not? Granted it is a specialised realm of animal care (and at the same time a bit of a grey zone) and it seems a lot of expertise currently lives outside of veterinary practice. It seems that fish keepers in NZ want access to effective medications and treatments and seeking vet advice might be a good way to better regulate use of medications.

Yes, because the treatments available to New Zealand fish keepers is limited, even Furan-2 has been taken off the shelves.

Vets don't have the knowledge required for ornamental fish species especially with how many varieties there are in NZ, I understand that we have vet approved only medications but chances are if I took a picture to my vet I would have to tell them what's wrong and the treatment and even then they probably wouldn't prescribe it.

The ban on antibiotics has made it exceptionally hard to save fish – the situation has left fish owners operating within the boundaries of animal abuse because necessary medical treatments can no longer be purchased.

Yes in terms of larger fish, however, in terms of smaller species I wouldn't expect a general vet clinic to treat your common goldfish or tropical in a consult. Perhaps some advice over the phone would be more appropriate in these cases or a consultation with a fish specialist.

For medications but not really for visits, possibly for testing.

There are no fish vets locally and it is such an ordeal to get treatment for sick fish that few people in my area are able to seek veterinary attention. Fish welfare suffers. If there was a fish vet in my neighbourhood I would visit them often.

I think there is plenty of advanced conditions requiring prescription medication fish stores are not allowed to sell where the fish just die.

There is a great lack in fish care from a consumer standpoint.

Education and awareness of welfare requirements by fish keepers and veterinarians

Fish are as important as any other pet owned. Veterinary care should be provided because fish can be in pain, have diseases and we want to provide them a good quality of life.

They are pets. They are valuable. They can get sick and as owners we want to provide the best care to avoid any suffering or untimely preventable death.

I don't think there is much one can do for fish once they are sick.

Fish are still living animals and should receive proper care.

Didn't think to take them to a vet.

A lot of people don't have knowledge about fish so having professional people with knowledge is better than assumptions/guesses from the internet or people with the lack of knowledge.

Table 2. Factors affecting pricing of veterinary care for fish.

Consistency in veterinary treatment
All consultation costs should be similar regardless of what type of pet.
I assume vets charge based on the cost of running a vet clinic + call out fee etc. so smaller animals shouldn't be cheaper.
I'll go with \$40 for a fish consult.
Because you're still taking the vet's time and knowledge.
Vet time is valuable as is clinic time.
It's a pretty reasonable price, as it's just like any other pet, the price shouldn't be different. No matter how small or large the animal is.
The consultation time for a fish would no doubt be the same length, if not longer. Therefore it would make sense for it to be the same price.
I don't think it should be more expensive than cats and dogs.
Yes, a consultation is still taking up the vet's valuable time and you are paying for this and the vet's knowledge, much like a consult with another animal.
At least, if not more than a normal cat/dog consult due to the required expertise. \$60 is very low for a veterinary consult.
Yes, same animal and will require different check but still based around health.
The price is the price. If that's what it cost[s] then that's what it costs. Vets etc. need to make money at the end of the day.
I think that the same amount of work is involved to help a fish (years of study etc.) compared to helping other animals.
Consultation fees are about the veterinarian's time and expertise not the value of the pet.
The vet staff are still using time and resources to diagnose and treat your pet regardless of the species.
Whether it be a fish or a dog, a consultation is a consultation. You pay for the vet's time.
Specialised knowledge affecting cost
I would understand if it needed to be more expensive (i.e. if the clinic needed specific equipment) but if not then \$60 is appropriate.
If at a general practice the consult should be the same price for any specie[s] that is able to [be] brought into the clinic. In saying that I would expect to pay more for Exotic specific veterinarian.
Vets cannot consult on ornamental fish, they do not hold the knowledge.
The fee pays for the vet's experience and knowledge.
It really depends. But yes for that fish can have complex health issues not simply fixed by tonic. If someone is going to the vet, they would have tried a lot of things already. So the advice the vet should give should be well informed and show they investigated the cause. This takes time and time is money.
Yes, but depending what is offered in the consult. The veterinarian performing the examination will have done specialised study in order to treat fish – the value of this should not be ignored. However, I would say it is much harder to examine fish, since they are generally very small compared to a cat or dog, so a full body examination may not give the veterinarian a full picture of the fish's overall health. Water testing could also be offered, however this can be done for free at aquarium shops. I think \$60 is reasonable if adjunctive workups are also offered (water testing + other??). If there are multiple small fish, I personally would not pay \$60 for EACH fish if they are all in the same aquarium.
Knowledge needed.
Vet visits for cats and dogs most of the time (in my experience) the vets can get close to the animal and handle them + there is (generally) more knowledge on cats and dogs than fish.
Requires same level of knowledge.

Yes or even more than that because it will require special knowledge or skilled veterinarian to exam a fish. May require more consultation time as well.

Paying for the expertise of the vet.

If it was with a vet that was experienced with fish, then the level of care would still take the same time.

Factors that affect cost

Yes, because the cost of a vet consult covers the time the vet spends on the animal, not the size of an animal. Any extra costs would be debatable, because a cat or dog needing medication would likely have a higher charge than a fish needing a checkup.

Not sure. Depends on the service. Proper diagnosis would probably require a home visit (which are always more expensive).

They are a fraction of the size and only need a fraction of care.

Size of animal does not determine a lower cost, if anything should be higher as more complex and less resources out there to help a vet treat.

I'd imagine there would be less treatment options for fish so the price should be less

Shouldn't be dependent on the species ever it should be based on time taken by the veterinarian. Fish consults may prove to be even more intensive than a basic dog skin irritation consult for example. I imagine the vet may need to remove the fish from their tank for a time to get a closer look, or take samples I foresee this being quite intense when compared to a dog or cat. I wouldn't imagine it being cheaper than a normal consult.

It's time.

You are still taking the same amount of time, vet's knowledge etc as another pet, so it should be similar (unless it is a registered specialist in fish, which should be more).

The cost should be variable.

It should be cheaper because it is a fish and is smaller than a cat or dog.

While the value of fish may challenge assumptions about how much a consultation should cost, the vet would need to assess water conditions, and a thorough history of the living environment, diet, water change frequency, and other things that would take a long time so the money is worth it.

Value as a pet

\$60 for a fish seems a lot when you could probably buy one for less.

My fish are <\$20 each on average. Although I don't like to see them unwell or leave them untreated, it would be cheaper to cull my fish than to have them just seen for \$60 (plus additional for the actual meds), esp[ecially] when there's no way they can guarantee the fish would recover.

I would think this would depend on the value of the fish to most people. Cost is important, especially in the current financial situation.

People who have fish are generally looking for a cheap pet and I don't think they'd be willing to pay for veterinary care for fish.

Cost of fish.

Yes, although it wouldn't be for all fish specialists species and bred fish can be worth a large amount so \$60 seems appropriate for fish care.

They are still a pet.

Well I think unfortunately some people will think of fish as "it's just a fish," not having a lot of personal connection compared with cats, dogs, rabbits etc. You physically can interact with them compare[d] with fish so having a lower price for fish will make people more willing to go for consultants. (P.S. Hope that makes sense sorry wasn't sure how to word that).

Alternative options for seeking advice

Many owners will treat at home at this cost, plus the stress on the fish [if] transported, would be better to isolate fish in tank and have a video consultation.

Because I already know more than the vet, I know what's wrong and what meds I need etc. I'm only going in to get the meds.

It is near impossible to operate on a fish smaller than 20 cm length. So only medicine costs. Easy to treat at home.

Most fish treatments require simple antibiotics and are easy to identify and treat – owners just need access to the right medication.

Imagine more online consultation using video photos due to stress transport.

This is a hard one. The more cost relative the consult to the cost of the fish the more owners will seek help and a better outcome for the fish. If I was getting some fantastic advice and help from someone knowledgeable and appropriate medicines for that \$60 I'd be happy. I do wonder though if a cheaper alternative of email consults through photos and digital communication etc would be a possible more successful model.

Lack of information

I don't think there is much one can do for fish once they are sick.

How do you even take a fish to the vets?

How are you going to take the fish to the vets?

It would depend on the fish. In many cases no but for some yes.

Authors

Dr Kristie Cameron is an Associate Professor in animal behaviour, welfare and husbandry at Unitec, and an active researcher as a behaviour economist. The convenor of the Unitec Early Career Researcher forum, she is also a Co-Chair of the Royal Society Te Apārangi Early Career Researcher Committee. kcameron@unitec.ac.nz

Rochelle Johnson is a Bachelor of Veterinary Nursing graduate with an interest in the welfare of exotic species kept as pets in Aotearoa / New Zealand. She has recently joined the teaching team at Unitec as a Laboratory Technician in Bridging Education.

Laura Harvey, RVN, BSc, PG Cert Vet Education, MSc (APVN), is an Academic Programme Manager and Associate Professor at Unitec, and a registered veterinary nurse with a background in clinical practice and practice management. With an interest in researching the veterinary nursing profession and the role of the veterinary nurse in modern practice, she is Vice-President of the New Zealand Veterinary Nursing Association, and a Board Member for South Pacific Animal Welfare and Healthy Pets New Zealand. lharry@unitec.ac.nz