MRes Thesis

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Abstract

Introduction

Within the veterinary profession, evidence-based veterinary medicine has become a leading approach to decision-making. To practice effective evidence-based decision-making, both veterinary professionals and animal owners need robust, scientific information to base decisions on. Therefore, the lack of high-quality veterinary information available to both professionals and owners is a barrier to good clinical decision-making. Consequently, both stakeholder groups require guidance in navigating the information available to them and utilising the highest-quality information in decision-making.

Though fantastic resources (e.g. websites and online tools) exist to support the general public when assessing evidence-based information, these are not veterinary-specific. Although there are some tools available aimed at veterinary professionals, there is room to develop a comprehensive guidance that incorporates the aims of a number of these existing tools.

Aims

This project aimed to create comprehensive, veterinary-specific guidance for both veterinary professionals and animal owners to use when interpreting information relevant for making clinical decisions about patients.

Methods

During phase 1, the main points from the Key Concepts for Informed Health Choices framework were assessed for their relevance to each stakeholder group (vet professionals and owners) and reworded. The new frameworks underwent

improvement by the Centre for Evidence-based Veterinary Medicine (CEVM) research team, in an iterative process involving several rounds of review to improve clarity, intelligibility, and comprehensiveness.

During phase 2, participants from each stakeholder group were recruited via targeted opportunity sampling using short questionnaires disseminated via social media platforms. Participants were timetabled into focus groups and sent the new frameworks along with an accompanying feedback questionnaire. During discussions, participants shared their opinions surrounding the frameworks and their wider experiences of clinical decision-making. A thematic analysis approach was used to assess the perspectives shared by all stakeholders.

In phase 3, the feedback from phase 2 was actioned and improvements were made, ready for dissemination.

Results

The importance of clarity within and accessibility to the new frameworks were expressed by both stakeholder groups. For veterinary professionals, they wanted the framework to help address the uncertainty surrounding decision-making, while for animal owners, the emphasis was on the role of the framework in upskilling the general public in basic scientific processes.

When assessing participants' general experiences of decision-making, animal owners discussed the impact of knowledge, emotions, finances, and their relationship with their veterinary professionals. In comparison, veterinary professionals discussed the barriers and burdens of evidence-based veterinary medicine.

The veterinary professional framework was sent for uploading onto the ‘That’s a Claim’ website with future plans for widespread dissemination to vet professionals and monitoring access via the webpage.

Discussion

This study highlighted an appreciation by these stakeholder groups around the importance of clear and accessible guidance for anyone interpreting scientific information and that anyone making clinical decisions should be able to use. The next steps are to conduct pilot studies using these frameworks to assess ease of use in a practical setting and to observe real world behaviour change through implementation.

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1. Introduction and literature review

Making decisions regarding the health and welfare of animals is a key part of interactions between veterinary professionals and animal owners. In the veterinary profession there is increased importance placed on the use of scientific evidence to support clinical decision making, however, there is still significant uncertainty amongst clinicians as to how to interpret and apply this information. Additionally, there is a lack of any guidance targeted at animal owners to assist them with the interpretation and application of information to their specific animals' circumstances.

The aim of the research reported in this thesis was to create useable stakeholder specific frameworks for improving the outcomes of discussions relating to clinical decision-making about patients. This was both guidance on the interpretation of relevant scientific evidence, but also on factors to consider when applying the evidence to a specific clinical scenario, including client values and what is best for the patient. This was done by creating frameworks for two different stakeholder groups, veterinary professionals (veterinary surgeons and veterinary nurses) and owners and obtaining feedback on them using stakeholder engagement approaches (questionnaires, and focus groups or interviews). This project aimed to bridge the existing gaps in the hopes of facilitating more cohesive evidence-based decision-making in practice, resulting in better outcomes for patients.

The first section of the thesis focuses on introducing existing concepts relating to decision-making broadly followed by clinical decision-making in both human and veterinary medicine that has been found in the literature, highlighting any gaps and identifying how the research could attempt to eliminate these gaps. This is followed

by a description of the aims and objectives of the project and then by the methodologies used, results achieved, and the interpretation of the work conducted.

1.1 What is decision-making?

Many of us will understand the term ‘decision making’ in its colloquial form as “the process of reaching decisions” (*Collins English Dictionary*, 1994). However, in the field of psychology this term has a more specific definition; “the cognitive process of choosing between two or more alternatives ranging from the relatively clear cut (e.g. ordering a meal at a restaurant) to the complex (e.g., selecting a mate)” (VadenBos, 2013). Discussions on decision making and the processes governing decision making can be traced back further than the 18th century (Bernoulli, 1975). Since that time, many different explanations and theories have been proposed including expected utility theory (Cohen, 1996), prospect theory (Kahneman and Tversky, 1979), compound utility theory, and the theory of reasoned action (Zou, 2006; Beresford, 2008). All of these theories, however, can be criticised for misrepresenting complex human behaviours in a simplistic fashion and for reducing human decision-making down to simple rationality. In reality, our decision making is influenced by a multitude of factors, many of which have only been researched more recently, including the influence of emotions.

The impact of emotions has been missing from much research surrounding decision-making. In recent years its potential impact has had much more attention from the scientific community. It is now almost unanimously agreed that emotions have a powerful influence over our decisions and can be used to both predict and influence our choices (Lerner, 2015). While there is a fountain of support for emotion

influencing decision-making, the field is still relatively new and expanding (Lerner, 2015).

1.1.1 Processing information to use in decision-making

Human beings exhibit a multitude of biases in our decision-making, particularly in our assessment of information (Kahneman and Tversky, 1979). One such bias is known as the argument dilution effect (Nisbett, Zukier and Lemley, 1981; Zukier, 1982; Meyvis and Janiszewski, 2002) which states that information can be either diagnostic (provides important context which should be considered in outcome prediction for decision-making) or non-diagnostic (supplementary information not relevant to predicting the outcome of a decision). The value/importance of diagnostic information is diluted by the non-diagnostic information. This has been explained by the averaging effect (Anderson, 1974) which suggests that rather than information being cumulative in worth, individuals actually “average out” the value of information. Therefore, including information of little importance in the decision-making process reduces the value of all the information. Research by (Sivanathan and Kakkar, 2017) has demonstrated that individuals who are shown both the major and the minor side effects of a drug will rate that drug as safer than those who are shown the same drug but only informed of the major side effects. Although the first group are actually presented with more potential negative outcomes (i.e., a longer list of side effects) the less severe side effects reduce the ‘average’ severity of the major side effects and so the drug is deemed safer by participants.

1.2 Decision-making in a medical context

Two major types of decision making have been described when referring to the medical decisions of human clinicians. Intuitive reasoning, commonly referred to as the “gut reaction”, is a fast-paced, instinctual type of decision making. It is often associated with pattern recognition and experiential knowledge (Croskerry and Nimmo, 2011). Analytic reasoning, on the other hand, involves a methodical reasoning process to determine the best course of action by carefully considering all information available. This type of reasoning is slower but less prone to biases and error (Dawson, 1993).

Both types of reasoning have integral roles in clinical decision making with different circumstances favouring different reasoning types (Campbell and Watters, 2013). It is commonly accepted that a blend of both types of reasoning is necessary for effective clinical decision making (Croskerry, 2009). This blend is known as the dual-process theory and has been described in multiple different ways (Croskerry, 2009; Croskerry, 2007)(Croskerry, 2009). A key form of analytic decision-making which is widely promoted within the medical profession is evidence-based decision-making.

1.2.1 Evidence-based decision-making

In the 1970s, (Cochrane, 1972) conducted an extensive evaluation of the National Health Services’ (NHS) medical interventions, the results of which indicated that when assessing treatment efficacy, scientific information which was backed up by well-designed studies was of the utmost importance. For questions of an interventional nature, randomised control trials (RTC’s) are regarded as the best evidence. Subsequent work within the medical field built on this concept, which

culminated in the formation of the term “evidence-based medicine” (group, 1992) and the refinement of its definition by (Sackett *et al.*, 1996). The definition by Sackett *et al.*, (1996) refers to “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.”

Evidence based medicine (EBM) is now widely encouraged within the human medical field but received a significant amount of backlash when it was first described. Historically, EBM has been criticised for elitist chauvinism, serving “cost cutters” and, reducing clinical freedom (Lancet, 1995; Sackett, 1997). Some criticisms extended to suggesting EBM was a dangerous innovation (Grahame-Smith, 1995). Despite this, the value of EBM has continued to be recognised and currently the General Medical Council within the UK recommends that new doctors attain the skills needed to collect and appraise scientific information and employ methods within their practice to ensure their consistency in applying scientific knowledge to decision-making (Council, 2018).

1.2.1.1 Evidence-based decision-making in the general public

Research on information sources available to the wider public shows that, at present, news websites have a significant role in the dissemination of public information (Willaert *et al.*, 2021). However, the rise of internet access, and social media in particular, has created a surge in the number of unregulated opinions and “information sources” available (Rusbridger, 2018).

It is known that media portrayals have a strong influence on public opinion (Corbie-Smith, Thomas and St George, 2002) and that inaccurate depictions of clinical

research still persist within media (Ramamurthy, 2012) which can lead to a lack of support or even opposition to clinical research (Mills *et al.*, 2006; Jones *et al.*, 2006; Catania *et al.*, 2008).

1.2.1.1.1 Public scepticism of science

'The Credibility of Scientific Expertise in a Culture of Suspicion' by Barnes (2013) recognised an increase in public scepticism of expert figures and of science as a concept but also argued that scientific expertise was still regarded as credible in the public eye. However, research by Gauchat (2012) and others (Pittinsky, 2015; Rutjens *et al.*, 2018) showed an increase in scepticism and distrust towards science since the 1970s, particularly among conservative voters in the US. Furthermore, Lewandowsky, Gignac and Oberauer (2013) noted an increase in conspiracist ideation whose core values directly oppose scientific theory.

Vaccination, and more specifically the antivax movement, is a well-known example of science scepticism having large effects on health-based decision-making. Recent studies have shown that underlying attitudes surrounding religiosity and spirituality, a lack of science literacy, and conspiracy theories may all play a role in antivaccination ideologies (Rutjens and van der Lee, 2020; Hornsey, Harris and Fielding, 2018b). The root causes of science scepticism however are very complex and appear to be domain dependent. For example, where antivax ideologies centre largely around religious and spiritual inconsistencies with scientific information, climate change denial is heavily linked to political standpoint, with far-right voters being much more likely to deny the scientific information surrounding climate change (Dunlap, 2013; Hornsey, Harris and Fielding, 2018; Lewandowsky, Gignac and Oberauer, 2013).

The effects of science scepticism can be seen clearly in the events surrounding the COVID 19 pandemic. Research on compliance with COVID 19 restrictions and safety protocols has shown correlations with levels of science scepticism. In the United States, counties where reports of science scepticism were highest also had higher levels of noncompliance with protocols such as social distancing, mask wearing, and vaccine compliance (Brzezinski *et al.*, 2021). This pattern has also indicated some association with political standpoint (Rutjens, van der Linden and van der Lee, 2021). Research in the US has shown that conservatives were more likely to show distrust in scientific information surrounding COVID-19 and to spread misinformation (Roozenbeek *et al.*, 2020), with right wing media outlets more likely to publish inaccurate claims about the origins of and treatments for COVID-19 (Motta, Stecula and Farhart, 2020). European based studies have also highlighted a link between political affiliation and science scepticism (Krange, Kaltenborn and Hultman, 2018).

There is, to the authors knowledge, no research on the effects of scientific scepticism on animal owners' views of the veterinary profession specifically. However, the relationship between veterinary professionals and animal owners has changed over recent years. Clinical practice is moving away from a time when vets formed a clinical decision and instructed clients on how to comply with treatment (e.g., paternalistic role) to a more inclusive approach utilising joint decision-making (Cary, 2021).

1.2.2 Decision-making in veterinary medicine

1.2.2.1 Veterinary professionals

Evidence-based veterinary medicine (EVM) stemmed from the concepts of EBM, translated to better fit a veterinary context. There was a delay, however, in the adoption of evidence-based decision-making into veterinary medicine. It has been argued that the uncertainty caused by some of the early resistance to EBM may have delayed this uptake into EVM but the influence of alternative veterinary therapies at the time has also been cited as a potential influencing factor. These alternative therapies were criticised for their lack of satisfactory scientific information (Milstein, 2000; Roen, 2001). It was therefore argued that support of these therapies contradicted the ethical obligations of the veterinary profession (Ramey and Rollin, 2001) and EVM was suggested as a preferable option.

Though debate around alternative therapies still exists (Budgin and Flaherty, 2013; Goldstein and Broadfoot, 2008; Physicksheard, 1995), the volume of EVM supporting published works considerably outweighs it (Rothuizen, 2004; Cooper, 2004; Wilks, 2004; Muir, 2003) across fields such as veterinary dentistry (Roudebush, Logan and Hale, 2005), nutrition (Roudebush *et al.*, 2004) and small animal practice (Rosenthal, 2004; Aragon and Budsberg, 2005). Endorsement of EVM by the profession is clearly demonstrated by the Royal College of Veterinary Surgeons (RCVS) inclusion of EVM practices in the Day One Competencies for both veterinary surgeons and veterinary nurses (RCVS, 2014). These guidelines dictate a minimum level of expectation for every new graduate entering into the profession and solidifies the notion set out by (Holmes and Cockcroft, 2004) that all veterinary professionals should use EVM practices in their daily decision-making processes.

1.2.2.2 Animal owners

Veterinary professionals are not the only stakeholders involved in decision-making for animals, animal owners and carers are also making decisions on behalf of the animals in their care. The experiences and opinions of members of the public when it comes to evidence-based decision-making are much more difficult to ascertain.

Though research into owners' decision-making processes exists, it largely centres on their values and the practicalities of enforcing treatment protocols as well as assessing the influence of the emotional nature of decision-making (Christiansen *et al.*, 2016; Shaw *et al.*, 2008). This research does not thoroughly explore how animal owners make decisions – essentially the processes followed or what sources of information are utilised during decision making.

1.2.3 Joint decision-making (JDM)

1.2.3.1 JDM in the medical profession

The definition of shared or joint decision-making (JDM) is inconsistent, and many different attempts have been made to construct a precise description (Moumjid *et al.*, 2007). What is generally agreed upon is the notion that shared decision-making incorporates both the clinician and the patient in equal roles within a collaborative decision-making process. The perceived value of this process lies in its ability to combine scientific knowledge and experience with the patients' values, goals and preferences (Borysowski, Ehni and Górski, 2021; Kamal, Lindsay and Eppler, 2018). Multiple systematic reviews from human medical fields have shown that JDM reduces conflict between clinicians and patients and increases both confidence and satisfaction in decisions for both parties (Shay and Lafata, 2015; Austin *et al.*, 2015).

Since the 1980s, a shift in attitude surrounding the clinician-client relationship has moved to a more collaborative joint decision-making process (Charles, Gafni and Whelan, 1999). In recent years, the concepts of JDM have become popular in many different codes of medical ethics (New Zealand Medical Association, 2020; Australian Medical Association, 2017; Ordre National Des Medecins, 2013; German Medical Association, 2018).

1.2.3.2 JDM in the veterinary profession

Within the veterinary profession, individuals have a clear responsibility to ensure they inform clients appropriately regarding decisions about their animal's health. It is both an ethical and legal obligation to ensure informed consent from an owner. The Royal College of Veterinary Surgeons (RCVS) Code of Professional Conduct for both veterinary surgeons and nurses (RCVS, 2014) in the UK talks extensively about the client-professional relationship and the importance of informed consent from an animal owner. This has traditionally been confirmed through signatures in written consent forms, however, research has shown that these forms do not guarantee client understanding and for one third of animal owners, they can be a source of fear and disempowerment (Whiting *et al.*, 2017). The desire of both domestic and production animal owners to be fully involved in decision-making for their animals is well documented (Janke *et al.*, 2021b; Kanji *et al.*, 2012; Stoewen *et al.*, 2014; Bard *et al.*, 2019; Janke *et al.*, 2021a). However, an evaluation of JDM in companion animal practice in Canada indicated profound differences in the information clients wish to receive from vets and what is provided (Janke *et al.*, 2021b).

1.2.3.3 Criticisms of JDM

Joint decision making is cited in both human and veterinary literature to have a number of limitations. Time constraints, poor communication and a lack of resources have all been cited as potential barriers to effective JDM (Kanji *et al.*, 2012; Shay and Lafata, 2015; Shaw *et al.*, 2006). The process is also criticised for its assumption that patient-clinician relationships are universal internationally. This approach was developed and promoted within the context of western cultures and attempts to recommend it as a generalised "gold standard" have been criticised for ignoring cultural differences in individuals' relationships to authority figures, hierarchical social structures, and bodily autonomy (Susilo *et al.*, 2019). While the author could not find research of this type in a veterinary-specific context, it seems reasonable to consider that this dynamic could also be a factor in JDM within the global veterinary community.

1.3 Availability of information sources

Though an emphasis on the importance of informed, evidence-based decision-making has been evidenced, EVM and related practices cannot be enforced without information sources on which to base the decisions.

1.3.1 Information sources for veterinary professionals

There are over 1,139 veterinary journals available world-wide (Grindlay, Brennan and Dean, 2012) and many other resources in the form of electronic resources, courses, and textbooks, so it is no surprise that veterinary professionals reported

using a wide array of resources. Research by Huntley (2016) investigated which journals and electronic resources were most frequently used by veterinarians worldwide via online questionnaire. The report found that journals were used most commonly (65.8%) and of the 518 journals identified by participants, the Journal of the American Veterinary Medical Association was the most commonly cited by clinicians (12.7%). More than 30% of participants, however, didn't list any journals or electronic resources. These individuals may have used other sources not specifically mentioned in the survey (e.g., textbooks) or they may not be practicing EVM.

A UK specific study by(Nielsen *et al.*, 2015) Nielsen *et al.*, (2015) also found a wide array of resources were being used by veterinarians. In this study, the Veterinary Times was the most cited journal or magazine (79%) and Google was the most frequently cited electronic resource (71%). Other resources frequently mentioned by participants included the In Practice journal (77%), the Veterinary Record (69%), the RCVS website (54%), and the Department for Environment, Food and Rural Affairs website (39%). It should be noted that all of these resources are either free to anyone or to those with a BVA membership which could account for their prevalence.

When considering EVM and evidence-based decision-making, the highest standard of evidence is generally considered to be peer-reviewed, scientific research (Murad *et al.*, 2016). Research by Page (2018) showed that 62% of sample articles could be found online, free to anyone. Free access was defined by the presence or absence of a link to a full-text article from a Google Scholar search. Fifty seven percent of the articles which were free to anyone were available from the publisher's website and articles which were published more recently were more likely to be free. This is a positive finding, indicating large stores of scientific research available to veterinary

professionals, however, it was also found that articles from veterinary-specific journals were less likely to be freely available than in interdisciplinary journals (Page 2018). Furthermore, research into publications in the field of One Health found that only 29% of articles related to animal health topics were open access (Vreeland *et al.*, 2016).

The veterinary profession also suffers from gaps in knowledge where research has not yet been conducted. Extensive gaps in veterinary research knowledge have long been discussed and are widely cited as a major barrier to clinicians implementing evidence-based approaches to practice (Laidlaw *et al.*, 2012; Meats *et al.*, 2009; Boninger *et al.*, 2010).

As well as a lack of information, the veterinary field also suffers from variation in the standard of research available. Randomised Controlled Trials (RCT), though considered 'gold standard', can be influenced by many different types of bias. Biases can be introduced into a trial at any stage from selection of participants, through data collection and even at the reporting stage (Higgins *et al.*, 2011; Gluud, 2006). Research by Wareham *et al.*, (2017) shows a significantly higher proportion of positive outcomes are reported in RCT's that were funded by pharmaceutical companies (56.9%) compared to those with non-pharmaceutical funding (34.9%) or no funding stated (29.1%). The studies which were funded by pharmaceutical companies had a high risk of reporting bias due to selective outcome reporting as well as high risk of attrition and detection bias.

To successfully employ EVM approaches, veterinary professionals must utilise the highest quality evidence available to them. Where there is potential bias within a piece of research, its usefulness to clinician decision-making is limited (Laidlaw *et*

al., 2012; Meats *et al.*, 2009; Boninger *et al.*, 2010). This further shrinks the already relatively small pool of information from which veterinary professionals can draw evidence.

To circumvent these barriers practitioners can make use of a number of tools provided by various sources. Critical appraisal tools, such as CASP ('CASP CHECKLISTS,' 2022), CEBM (*The Centre for Evidence-Based Medicine*, 2022) and the AMSTAR tool for assessing systematic reviews (*AMSTAR - Assessing the Methodological Quality of Systematic Reviews*, 2022), while designed for human medics, can guide practitioners through the process of assessing research papers to determine their quality. They provide a check list which allows practitioners to decide if a particular paper is appropriate to use in decision-making. Though these resources are designed for use by human medics the guidance they impart is transferable into a veterinary setting. Resources such as BestBETs for Vets (*BestBETS for Vets*, 2022), VetSRev (*VetSRev*, 2022), and RCVS Knowledge Summaries (*RCVS Knowledge*, 2022) all facilitate effective knowledge transfer to practitioners. These tools summarise and condense information on a given topic into key take home messages to reduce the volume of information practitioners must search through. This reduces the burden of responsibility for finding and assimilating relevant veterinary information. However, even with such tools available, practitioners still report barriers to their effective implementation of EVM, indicating space for more work to be done by the profession and the necessity for more tools and guidance (Recorrd, 2014).

1.3.2 Information sources for animal owners

The way in which members of the public receive scientific information is much less straightforward as there are fewer official channels for acquiring information. Firstly, there is information that is presented to animal owners 'passively', including adverts, newspaper articles, and treatment claims but also includes vicarious experiences such as that of friends and family. The magnitude of the persuasive power advertising has on an individual's decision making is extensively documented (Lapierre *et al.*, 2017; Lawrence, Furnham and McClelland, 2021; Plant, Irwin and Chekaluk, 2017). According to the World Advertising Research Centre (WARC), the marketing industry is on course to reach a value of $1 trillion by 2025 (WARC, 2021). The industry is valued so highly because of its ability to shape opinions and ultimately decisions of consumers.

1.3.2.1 General public's experiences of health information

When considering information regarding their own health, members of the public have a robust, trustworthy, reliable source in the form of the National Health Service (NHS) website (National Health Service). This is the UKs largest health website and reports more than 50 million visits every month. It offers evidence-based information about health care such as symptoms, risk factors, and treatment options in a simple, easy to digest manner. Unfortunately, not all sources of information available to members of the public are as trustworthy as the NHS website. A large proportion of accessible information is of poor quality (Chalmers I *et al.*, 2018), with social media platforms being considerable sources of misinformation. Research by the American Press Institute investigated the spread of false claims regarding COVID- 19 on social

media (Benkelman, 2020). They concluded that false information was shared by so many individuals partly because the individuals posting simply did not consider appropriately whether the information was accurate or not before sharing. Further to this, information by the Reuters Institute for the Study of Journalism discovered that 21% of COVID-19 or WHO related Twitter conversations were “toxic” although it was also highlighted that more research was needed into the cause of the observed toxicity as well as its impact on the opinions of those who read it (Majó-Vázquez *et al.*, 2020). This pattern of misinformation in social media posts is repeated across multiple pieces of research and concerning multiple topics (Pennycook *et al.*, 2020).

Many individuals do not recognise the importance of, or are not prepared well enough for, thinking critically about the information they come across (Bouygues, 2018). This leads individuals to have inaccurate or false opinions about claims they have seen. Research by Oxman, Austvoll-Dahlgren and Garratt (2017) on members of the Norwegian public found that only 19.2% of participants understood that when an outcome is reported as being associated with a treatment that does not necessarily indicate a causative relationship. Studies in the UK have previously shown that two-thirds of the public trust the experiences of friends and family as reliable sources of information but only one-third trust evidence from medical research (Sciences, 2017). This is particularly concerning as anecdotal information often focusses on the positives of treatment and fails to consider any negatives (Fishman, Ten Have and Casarett, 2010). This problem of misplaced trust and lack of critical evaluation of treatment claims is made evident by the billions of dollars spent on alternative treatments which have no reliable evidence to support their claims (Frass *et al.*, 2012; Starr, 2015). The consequences, however, can be much more serious than wasted money. Unnecessary suffering is caused by both overuse

of ineffective medications and underuse of effective ones (Brownlee *et al.*, 2017; Glasziou *et al.*, 2017).

1.3.2.2 Animal owners' experiences of health information

Research investigating sources of information used by animal owners when making decisions, although limited, is beginning to emerge. For example, Kogan *et al.*, (2018) surveyed UK pet owners and found that the internet (78.6%), veterinary surgeons (77.2%), social media platforms (56.0%), and friends and family (24%) were some of the most popular sources of information used by owners when making decisions for their animals. This source list closely resembles that of other similar pieces of research on the topic. There is also some research into animal owners sourcing of information with regards to specific veterinary topic areas as opposed to veterinary decision-making in general. Research by Kuhl *et al.*, (2022) investigated which information sources were utilised by owners to gather information before buying a dog. Like the previous studies, the internet, breeders, and friends and family were commonly cited resources. However, veterinary surgeons were notably underutilised in pre-purchase information searches. Research into the uptake of preventative measures in dog and cat owners has shown that the vet-client relationship is an important factor as to whether the client uses the vet as an information source (Belshaw *et al.*, 2018). When owners have trust in their veterinary surgeon, they are more likely to follow veterinary advice. However, in cases where owners felt it necessary to carry out their own research, online resources were most used. Interestingly, participants also reported that these resources could be

confusing which could be another barrier to the use of preventative medication in dogs and cats.

1.3.2.1 Tools and frameworks to facilitate critical thinking in animal owners

There are a small number of resources aimed at helping members of the public to start critically assessing information though these are not veterinary specific. Websites such as Science Up First (*ScienceUpFirst*, 2022) aim to combat misinformation, particularly on social media, by emphasising the importance of scientific arguments. The United Nations also recently announced the “pause” initiative (Benkelman and Mantas, 2020) which aims to help individuals think about the accuracy of the content they share online and therefore prevent the spread of false information online.

Sense about Science (*Sense about Science*, 2022) is an independent charity which aims to make high quality scientific evidence accessible to all. They work with the public to promote the importance of scientific information and provide guidance on how to assess the information and also work with organisations and researchers to challenge them to be more transparent in declaring the evidence they use. A number of campaigns, run by the charity, have aimed to tackle misinformation on key public issues such as the anti-GMO protests, crime statistics and nuclear power. This organisation also assesses the transparency of government policies. In partnership with the Institute for Government and the Alliance for Useful Evidence they have assessed policies produced by 12 government departments for their transparency surrounding the evidence used to create each policy.

A medicine specific tool available online is the Trust it or Trash it tool (*Trust it or Trash it*, 2022). This aims to help members of the public assess the quality of human health claims. Its starts with 3 basic questions: Who said it? When did they say it? And how did they know? There is also another version of this tool for individuals who are developing educational materials. This version provides guidance on how to choose content and how to present information effectively. One of the best resources available to the public is the Key Concepts for making Informed Health Choices (IHC) document created by Chalmers et al (2018). This framework consists of 36 concepts that are important to consider when making an informed decision about one's own health (Oxman *et al.*, 2019). These concepts are divided into three sections. The 'Claims' section tackles assessing the trustworthiness of treatment claims and how to gather reliable sources. The 'Comparisons' section focuses largely on critical appraisal of research studies. Finally, the 'Choices' section discusses how to consider the new-found information in light of real-world situations i.e., how this new knowledge relates to an individual's situation. The formation of the framework was a collaborative process involving experts within the field and intended end-users. A list of "candidate" concepts was generated from pre-existing literature and an iterative process was used to refine the final points. The IHC Key Concepts form a coherent framework that maps out all the points an individual needs to learn to develop critical thinking skills for reading health research and claims (Chalmers I *et al.*, 2018). This sets it apart from previous checklist type guidance documents.

Following their creation, the Key Concepts resource was trialled by over 10,000 Ugandan school children across 120 schools (Aronson *et al.*, 2019). The children were given lessons based on the resource and then given a multiple-choice test

designed to assess their critical thinking ability. Sixty-nine per cent of the children who had received the lessons passed the test compared to just 27% in the control group. This dramatic increase in critical thinking ability highlights the effectiveness of the Key Concepts. The success of the Key Concepts has led to interest from multiple different fields including dentistry, social care, and marketing. An interdisciplinary initiative based on the Key Concepts was established with each discipline adapting the original concepts to better fit the context of their discipline, resulting in multiple discipline-specific guidance documents with the same core concepts.

Though resources designed to support evidence-based decision making in the public domain exist, there is currently very limited veterinary-specific help for pet owners. Additionally, though veterinary professionals currently have access to a range of similar tools, the preceding literature review has highlighted that a more comprehensive framework, which incorporates high-quality veterinary information, is needed.

1.4 Aims

This project aimed to create a set of comprehensive veterinary-specific guidance – one for veterinary professionals and one for animal owners - to use when interpreting information relevant for making clinical decisions about patients. There were three main objectives:

1) Translate the 'Key Concepts for Informed Health Choices' framework into two frameworks appropriate for veterinary professionals and animal owners, respectively.

2) Pilot these two new frameworks with their respective stakeholder groups using short questionnaires and focus groups.
3) Create improved versions of each framework based on stakeholder feedback and disseminate these using a number of formats, including 'That's a Claim' website for veterinary professionals.

2 Methods

The study consisted of three main phases; the production of new frameworks, collection of feedback from stakeholder groups, and implementation of the feedback to improve the documents.

2.1 Phase One: Creation of the frameworks

Two guidance frameworks were developed in this study: one designed for veterinary professionals and the other for animal owners. The ‘Key Concept for Informed Health Choices framework’ by Chalmers et al. (2019) was used as a starting point for the creation of both frameworks. The format and content were reviewed, and the language updated to align more closely with the veterinary profession. This process was iterative and completed with input from the team at the Centre for Evidence-based Veterinary Medicine (CEVM).

2.2 Phase Two: Collection of feedback

Feedback on both frameworks was sought from owners and veterinary professionals recruited via social media platforms and the personal networks of the researchers. Data was gathered using both questionnaires and focus groups.

The design of this study was based on a constructionist epistemology, a relativist ontology, and an experiential orientation to the data. The methods will be outlined in line with the consolidated criteria for outlining qualitative research developed by Tong, Sainsbury and Craig (2007).

Throughout the study, any personal information pertaining to participants was stored in accordance with the data protection act. Ethical approval for this study was obtained from the University of Nottingham's School of Veterinary Medicine and Science Ethics Committee.

Participants followed a multistep process designed to obtain as much feedback on the frameworks as possible. This process is outlined in Figure 1 below.

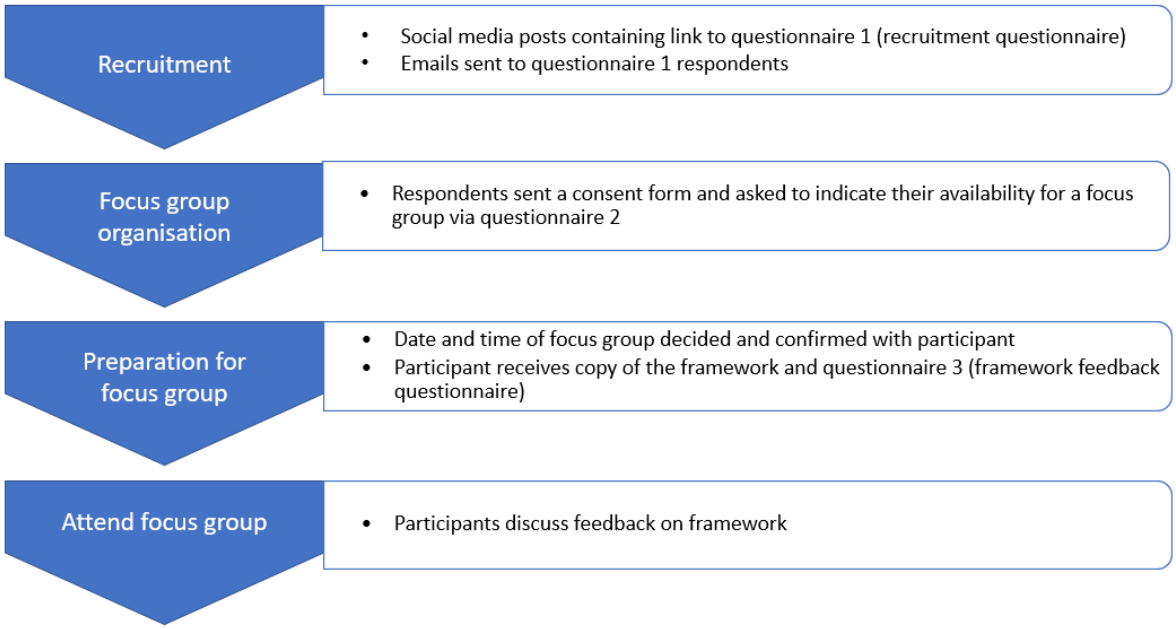


Figure 1: Diagram to illustrate the journey of a participant through the study.

2.2.1 Participant recruitment

Participants were recruited from September 2021 to January 2022 using social media platforms and employing an opportunity sampling method. The two main target populations corresponded with the two frameworks i.e., veterinary professionals and animal owners. For the purposes of this study, animal owners included anyone who had a duty of care to an animal/group of animals and would be responsible for making treatment decisions on behalf of the animal. This included individuals such as livery yard owners or farm managers who may not directly own the animals but could be responsible for making decisions about their health. Subpopulations within both groups were identified and targeted through strategic advertisement in social media groups specific to each subpopulation. Examples of subpopulations included clients who owned various species of animal (e.g., domestic vs equids vs produce animals) and individuals holding various roles within the veterinary profession (e.g. veterinary surgeons, veterinary nurses).

The social media advertisement included a brief description of the purpose of the study and the intended target audience, and a link to a recruitment survey, and a link to a Padlet page which contained more in-depth information regarding the purpose, importance and methods used in the study. For more details relating to the specific approaches used for the social media recruitment see Appendix 2.

Participants were also recruited via the mailing list of the CEVM. A more extensive advert was included in the 31st Issue of the CEVM newsletter released on the 21st of October 2021 (https://www.nottingham.ac.uk/cevm/documents/newsletters/cevm-newsletter-issue-31-october-2021.pdf). The newsletter is circulated every three months to a mailing list of veterinary professionals and reports updates on news, events and recent works produced by the Centre.

2.2.1.1 General Recruitment Questionnaire (Questionnaire 1)

To register their interest in the study, participants filled out a short questionnaire. This questionnaire also enabled an assessment of eligibility and personal characteristics likely to influence opinions on the framework.

Separate questionnaires were developed for the veterinary professional participants and animal owners however both questionnaires collected information such as age, gender, geographical location and occupation. Both questionnaires also contained a free text box at the end which asked participants to enter an email address for further correspondence. All questionnaires were produced using JISC online surveys (*JISC Online Surveys*). For further detail as to the questions asked, please see Appendix 3.

2.2.1.1.1 Questions specific to each stakeholder group

2.2.1.1.1.1 Veterinary professionals' recruitment questionnaire

The veterinary professional-specific recruitment questions aimed to collect information about the type of work each participant engaged in. This was done to ensure representation of the various subpopulations within the umbrella of 'the veterinary profession' and to obtain an even balance of individuals well-versed in scientific literature and those with less experience (see Appendix 3.2).

2.2.1.1.1.2 Animal owners' recruitment questionnaire

The owner-specific recruitment questions were designed to highlight potential background knowledge/experience, indicate species-specific subpopulations, and highlight previous experience searching for veterinary literature (see Appendix 3.3).

2.2.2 Gathering feedback

2.2.2.1 Focus group availability questionnaire (questionnaire 2):

The email addresses of respondents provided at the bottom of questionnaire 1 (the initial recruitment survey) were then used to contact prospective participants who were eligible. All eligible participants were provided with a link to a second questionnaire (questionnaire 2) where they indicated their availability to participate in a focus group. The survey consisted of a grid containing all available dates and times for the next three weeks and allowed participants to mark which of these they could attend.

The responses to the availability survey were collated and, where at least four participants were available for the same time frame, a focus group was scheduled.

Participants were then sent an email confirming the date and time of the focus group. The meeting was then organised via Microsoft Teams (*Microsoft Teams*) and a link to gain access, along with a 'how to' guide for Teams, was emailed to participants.

Where participants did not complete the availability survey within the allotted timeframe (three weeks) a second survey with updated dates and times was sent. If a participant chose not to complete three consecutive availability surveys, it was assumed they no longer wished to participate in the study and they were removed from the participant lists.

2.2.2.2 Focus group consent form:

The email containing questionnaire 2 was also used to provide participants with a consent form to complete and return (see Appendix 4) and a link to a second Padlet (*Padlet*) containing an explanation of what a focus group was and how the next stages of the study would be conducted (https://padlet.com/svynb3/9lw8qmmu4l7dm10f.).

2.2.2.3 Framework feedback questionnaire (Questionnaire 3)

When a potential focus group time had been identified, a confirmation email was sent to participants. Attached to the confirmation email was a copy of the guidance framework and a third questionnaire link to collect participants' initial thoughts about the document. The purpose was to identify key areas for discussion during the focus group.

The questionnaire format split the framework into individual parts and asked for feedback on each part in turn. This allowed for a thorough investigation into participants' thoughts on each part of the framework. Each section of the questionnaire started with a summary, followed by a series of six questions (Appendix 5). Free text boxes were also provided for participants to elaborate on their answers and add any further comments.

2.2.2.4 Attend focus group

All focus groups were conducted virtually via the Microsoft Teams' meeting function. Discussions followed a semi-structured design, guided by a predetermined, verbally administered guide with the flexibility to add additional prompts to expand the depths of the discussion (Bowling, 2014). The researcher developed the focus group guide (Appendix 6) based on specific questions about the framework but also questions that had arisen as a result of the feedback gathered via questionnaire 3 (framework feedback questionnaire).

In most cases, no relationship was established between the participants and the interviewer (NB) prior to the meeting. Two of the animal owner participants were distant family friends of the interviewer but while they knew her personally, they had no prior knowledge of the framework, or any previous work associated with it.

After the initial greeting, participants were informed of the structure of the coming discussion and transcription and recording commenced. Whilst recording, all participants were asked to introduce themselves; this was to facilitate participant identification when recordings were played back. Once introductions had finished, the structure of the discussions followed the template outlined in Appendix 6.

The focus group process was piloted with four veterinary student animal owners. Feedback resulted in improvement in the accuracy and clarity of questions through individual word and phrasing changes, and the inclusion of the second to last question regarding key points each stakeholder group would like to see included in the other group's document.

2.2.3 Data analysis

2.2.3.1 Analysis of framework feedback questionnaire (Questionnaire 3)

The closed-answer question data from the framework feedback questionnaire was imported into a Microsoft Excel worksheet (MicroSoft Excel Corporation). Responses from the Likert scale questions were summarised using descriptive statistics (e.g., proportions). The content of the free text answer questions was coded in the same manner as the focus group transcripts and included as part of a thematic analysis approach.

2.2.3.2 Management of free text questionnaire data and focus group data

Recordings and transcripts of the discussions were retrieved from Microsoft Teams and the accuracy of the automated transcription was assessed. Each recording was played back at half speed and errors in the automated transcriptions were corrected. The orthographic transcripts were transformed from standard grammatical format to discussion transcripts ready for analysis using the Jefferson Transcription System (*Jefferson Transcription System - A guide to the symbols*). All personal information and defining characteristics were removed or altered to protect the participants'

anonymity. After finalising the transcripts, they - along with the free text data from questionnaire 3 - were uploaded into NVivo (*NVivo 12*).

2.2.3.3 Thematic analysis

Data from both the free text answers from the framework feedback questionnaire and the focus groups were analysed using Braun and Clarke's six-phase process of thematic analysis (Braun and CLarke, 2006):

- Becoming familiar with the data.
- Generating initial codes.
- Searching for themes.
- Reviewing themes.
- Defining and naming themes.
- Producing a report.

Two separate thematic analyses were conducted on the feedback from each of the two stakeholder groups (i.e., four thematic analyses in total). The first analysis for each stakeholder group aimed to answer the question 'what are participants' experiences of using the framework?', with the second focused on answering 'what are participants' experiences of decision-making and of using evidence-based approaches in general?'. The process for interpreting the discussion and generating codes however remained the same for all analyses.

2.2.3.3.1 Coding

Transcripts were inductively coded by NB using a constant comparative method (Maykut and Morehouse, 1994). All veterinary professional transcripts were analysed followed by all animal owner transcripts. Each section of the transcript was first analysed on a superficial level and semantic codes were generated. The same section was then reassessed, and the latent subtexts and assumptions were interpreted to generate further codes. Where appropriate, NB further analysed what aspects of the discussion guided their interpretations towards the latent codes previously generated. This process often resulted in the synthesis of more codes or expanded on details of the codes previously described.

2.2.3.3.1.1 Double coding

A second reviewer, MB, reviewed the codes generated during NB's analysis, providing additional comments and avenues of meaning to be considered. Ten percent of the transcripts were assessed and double-coded by MB. In the context of this study, double coding aimed to expand and enrich the interpretation of the analysis previously conducted by NB but was not conducted to reach a consensus between the two coders. The collaborative nature of this 'sense checking' aligns with the principles of reflexive thematic analysis introduced by (Byrne, 2021).

2.2.3.3.2 Formation of themes

The final list of codes was then grouped into as many different patterns of shared meaning as possible. Concepts and topics that appeared throughout the list of codes were grouped together in an attempt to generate a central organising concept. Multiple iterations of these groupings were analysed for their eligibility in forming

themes and many codes appeared in multiple patterns. The “Good questions to ask yourself in developing themes” from Braun and Clarke (2013) was used to facilitate the process of theme assessment.

Once the list of codes had been condensed to a set of convincing subthemes, the same process was used to collate these subthemes into larger overarching themes thus forming a coding tree. This thematic analysis process was carried out independently for each of the four thematic analyses.

2.3 Phase 3: Amendment of frameworks

Extensive lists of participant feedback, both suggested improvements and positive comments, were compiled from the data from the framework feedback questionnaire and the focus groups for each stakeholder group. This list was arranged in ascending order with regards to relative ease of implementation and similar suggestions were grouped together (e.g., all individual word changes were grouped together, suggestions for additions to the document were grouped together etc.).

Once the two lists were formed, they were scrutinised for inclusion of directly contradicting points (i.e., instances where two participants had directly opposing feedback). In these cases, a judgement was made on which suggestion to action. The feasibility of enacting the suggestion, the implication of each suggestion on the overall meaning and readability of the section, and the validity of each suggestion within the context of the wider feedback were all considered when making these judgments.

The practicalities of including each suggestion along with its appropriateness in line with the aims of the document were then assessed throughout the potential

improvements list. Any feedback that was deemed to be unsuitable for inclusion in the final document was dismissed.

Once the list of appropriate feedback had been completed, the suggestions were then executed. A final draft, post improvements, was circulated amongst the CEVM team to identify any spelling or grammatical errors. Once completed, a copy of the veterinary professional's guidance document was disseminated to the That's a Claim website curators via the Informed Health Choices Network (*That's a claim!*) and can be accessed using this link https://thatsaclaim.org/veterinary/. A Microsoft Excel template provided by the Informed Health Choices Network was used to break down the various points in each of three different sections into smaller sections, and additional text to introduce and describe the sections were created. These were taken by the website curators and split into different 'concept cards' for ease of understanding.

The animal owner framework has been attached in Appendix 7.

3 Results

3.1 Phase One: Creation of the frameworks

The final frameworks both consisted of three main sections titled ‘Cautiously Consider’, ‘Always Ask’ and ‘Choose in Context’. These sections contained subsections which in turn contained the concept points relevant to the subsection. Each concept point was accompanied by short explanations giving more context to each point. Examples were utilised to illustrate and clarify explanations.

The two frameworks were largely similar across the first two sections (‘Cautiously Consider’ and ‘Always Ask’) however the final section (‘Choose in Context’ – which explains how to apply new information back to each individual situation) is where the frameworks differed most between the stakeholder groups. An outline of the points covered in each framework can be seen in Table 1

Table 1:Table comparing sections and subsections within the veterinary professional's framework and the animal owners framework.

Title of section	Sub sections	Explanation of contents	Number of bullet points in veterinary professional framework	Number of bullet points in animal owner framework
Cautiously consider	Look for a balanced view	The importance of seeking information on both the positive and negative effects of any treatment under consideration.	3	3
	Do not assume	A reminder that the effects of a treatment or changes to a treatment protocol can only be reliably confirmed through vigorous testing. When assumptions are made surrounding treatments, the decisions are no longer evidence based and this can lead to unforeseen negative effects.	5	5
	Be mindful of the information source	Emphasises that information sources can be biased, and that critical appraisal of our sources is always necessary to ensure reliability. We should not blindly trust a source.	4	3
Always Ask	Interventions should be compared equally	In order to draw valid conclusions, a study must ensure that the independent variable is the only difference between study groups.	3	3

	Results should be described transparently	Indicates the various ways that descriptions within studies can misrepresent/mislead the truth of their conclusions.	4	3
Choose in context	Remember your patients	Highlights the importance of contextualising the information you find within the confines of each patient's unique situation.	4	0
	Prioritise the key problems	Emphasises the importance of considering the important aspects of your individual case both in terms of the conditions/symptoms to treat and the outcomes that are important to you.	0	2
	Balance the options	Reminds owners that decision making should be realistic to what is available in your specific case and should be fully informed.	0	3

3.2 Phase Two: Collection of feedback

3.2.1 Demographic information from questionnaire 1 (Recruitment Survey)

3.2.1.1 Animal owners

Of the 34 animal owner participants, twelve committed to a focus group or interview and were included in the forthcoming analysis. The demographics for these participants can be seen in Table 2.

Table 2:Table representing demographic information from the twelve animal owner participants who attended a focus group or interview.

Gender	Age	Occupation	Species of Animal Owned	Previous interaction with CEVM	Searching for information	Frequency of information searches	Sources of information used
F	40-49	Protective service occupations	Rabbit, Horse/Pony/Donkey	No	Yes	Frequently	Google search, Species/breed specific websites, Species/breed specific magazines, Scientific journals/paper, Asking your vet/vet nurse
F	40-49	Other, Dog walkers	Dog, Rabbit, Exotics (pet birds, reptiles, small	No	Yes	Frequently	Google search, Social media groups/forums, Ask your vet/vet nurse,

			mammals excluding rabbits), Pet fish				Advice from friends and family
F	50-59	Corporate managers and directors	Cat, Dog, Exotics (pet birds, reptiles, small mammals excluding rabbits), Pet fish, Horse/Pony/Donkey	No	Yes	Infrequently	Scientific journals/papers, Asking your vet/vet nurse
F	70-79	Other, Retired manager in children services	Cat, Dog, Rabbit, Exotics (pet birds, reptiles, small mammals excluding rabbits), Pet fish, Horse/Pony/Donkey, Poultry, Sheep	No	Yes	Frequently	Google search, Advice from friends and family

F	50-59	Science, research, engineering and technology professionals	Dog	No	Yes	Frequently	Google search, Species/breed specific websites, Scientific journals/paper Asking your vet/vet nurse, Advice from friends and family
F	20-29	Customer service occupations	Cat	No	Yes	Every few months	Google search
F	60-69	Science, research, engineering and	Cat, Cattle, Dog, Rabbit, Pet fish, Horse/Pony/Donkey, Pigs, Poultry	No	Yes	Frequently	Google search, Species/breed specific

		technology professionals					websites, Scientific journals/papers
F	60-69	Corporate managers and directors	Dog, Rabbit, Horse/Pony/Donkey	No	Yes	Every few months	Google search, Asking your vet/vet nurse
F	50-59	Health and social care associate professionals	Cat, Dog	No	Yes	Every few months	Google search
F	50-59	Health and social care associate professionals	Dog	No	Yes	A couple of times a year	Google search, Asking your vet/vet nurse

F	50-59	Other, Banking lower management	Dog, Cat	No	Yes	Every few months	Google search, Asking your vet/vet nurse
F	50-59	Secretarial and related occupations	Cat	No	Yes	Every few months	Google search, Social media groups/forums, Scientific journals/papers, Asking your vet/vet nurse

3.2.1.2 Veterinary Professionals

Of the 44 veterinary professional participants responding to the recruitment survey, eleven committed to a focus group or interview and were included in the forthcoming analysis. The demographic information for all veterinary professional participants can be seen in Table 3.

Table 3: Demographic information from the eleven veterinary professional participants who attended a focus group or interview.

Age	Gender	Year of Graduation	Role within Practice	Type of Practice	Highest Qualification	Participation in Journal Clubs	Frequency of Reading Scientific Papers
50-59	M	1987	Principal	First opinion and referral small animals	Ethics	No	Infrequently
50-59	F	1993	Veterinary behaviourist	Small animals	Veterinary Medicine & Surgery	No	Weekly

50-59	M	1991	Veterinary surgeon	First opinion small and production animal		No	Monthly
50-59	F	1986	veterinary surgeon	First opinion small animal	Radiology	No	Monthly
20-29	F	2020	student	Mixed practice	Third year vet degree	No	Weekly
60-69	F	1981	Locum vet	First opinion Small animal	PhD	Yes	Weekly
30-39	F	2015	Veterinary Surgeon	Referral Small animal		No	Monthly
50-59	M	2001	associated veterinarian	First opinion small animal and exotics	veterinary medicine	No	Weekly

20-29	M	2018	Veterinarian	first opinion production animal	VetMB	No	Monthly
50-59	F	1990	vet surgeon	First opinion small animal	Small animal medicine CertAVP and Radiology CVR	No	Weekly
30-39	M	2014	Clinical Associate	first opinion and referral production animal	Academic: Masters Vocational: Diploma	Yes	Weekly

3.2.2 Analysis of framework feedback questionnaire (questionnaire 3)

3.2.2.1 Animal owners

Of the twelve animal owners who committed to a discussion, five completed the pre-discussion survey before attending (n=5/12 41.67%). The responses to the closed questions are presented here, the free-text questions are included in the thematic analysis.

Overall, participant feedback of the framework was positive (Figure 5). Participants either agreed or strongly agreed that all three sections of the framework were clear, concise, and relevant and that they understood the content. There was less certainty about how thorough the sections were with more participants stating they were neutral about this concept, but no participants disagreed or strongly disagreed with the statement. Section 2 of the framework was generally more likely to be rated as “strongly agree” across questions except for the area of understanding. Section 3 was most commonly rated as “strongly agree” across all questions.

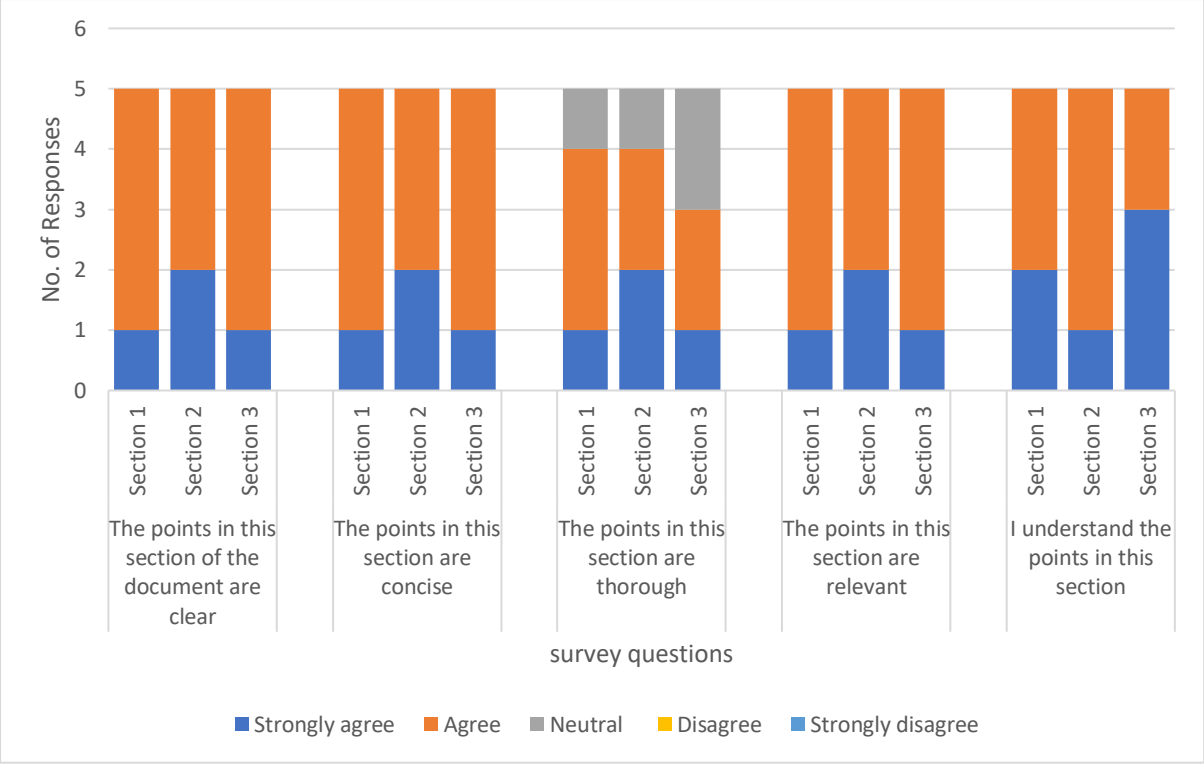


Figure 2: sStacked bar chat depicting pre-discussion survey responses from animal owners.

3.2.2.2 Veterinary professionals

All eleven of the veterinary professional participants who completed the pre-discussion survey attended a meeting (100%). The responses to the closed questions are presented here, the free-text questions are included in the thematic analysis.

Feedback on the framework from veterinary professionals was largely positive. The majority of participants either “agreed” or “strongly agreed” that the sections were clear, concise, thorough, and relevant and that they understood the concepts (Figure 6). However, one or two participants highlighted a need for improvement in these areas by indicating they “disagreed” or “strongly disagreed” to the statements. Section 2 of the framework was particularly criticised for not being clear and concise.

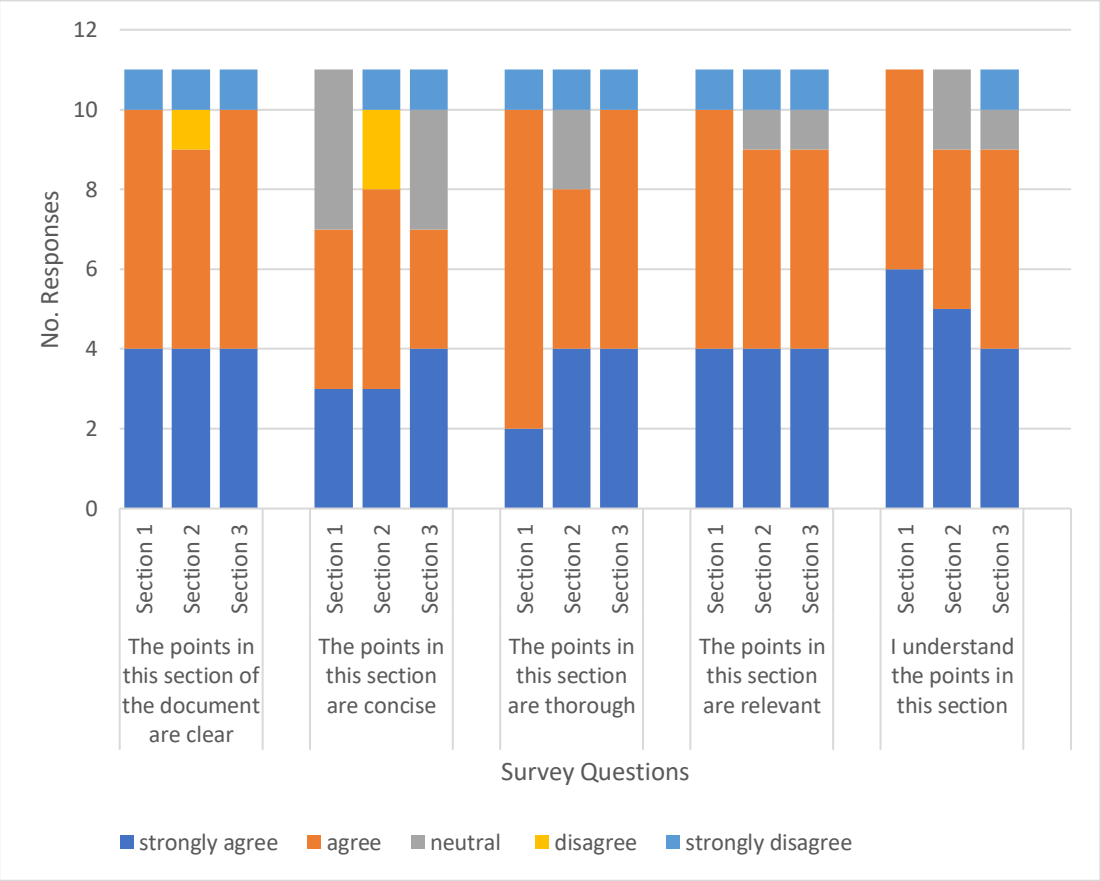


Figure 3: Stacked bar chart depicting pre-discussion responses from veterinary professionals.

3.2.3 Analysis of focus group discussions and free text from questionnaire 3

Due to difficulties scheduling meetings that were convenient for multiple attendees, the decision was taken to also gather data via small focus groups (two/three participants) and one-on-one interviews.

The content of these discussions was analysed alongside the traditional focus group transcripts, using the same process outlined in the methods section.

The animal owner discussions were spread across three focus groups and five interviews. Veterinary professional discussions were conducted across three focus

groups and two interviews. All transcripts and free text pre-discussion questionnaire responses underwent analysis together.

The data collected from the focus groups/interviews and the free text boxes in questionnaire 3 fell into two main categories – comments specifically relating to the frameworks, and more general comments about experiences of clinical decision-making. For ease of data analysis, four separate thematic analyses were conducted that related to the following:

- Analysis 1: Animal Owner Feedback on Framework
- Analysis 2: Veterinary Professional Feedback on Framework
- Analysis 3: Animal Owner Experiences of Decision-Making
- Analysis 4: Veterinary Professional Experiences of Decision-Making

Thematic trees of each of these analyses are shown below and will be reported in detail in this section.

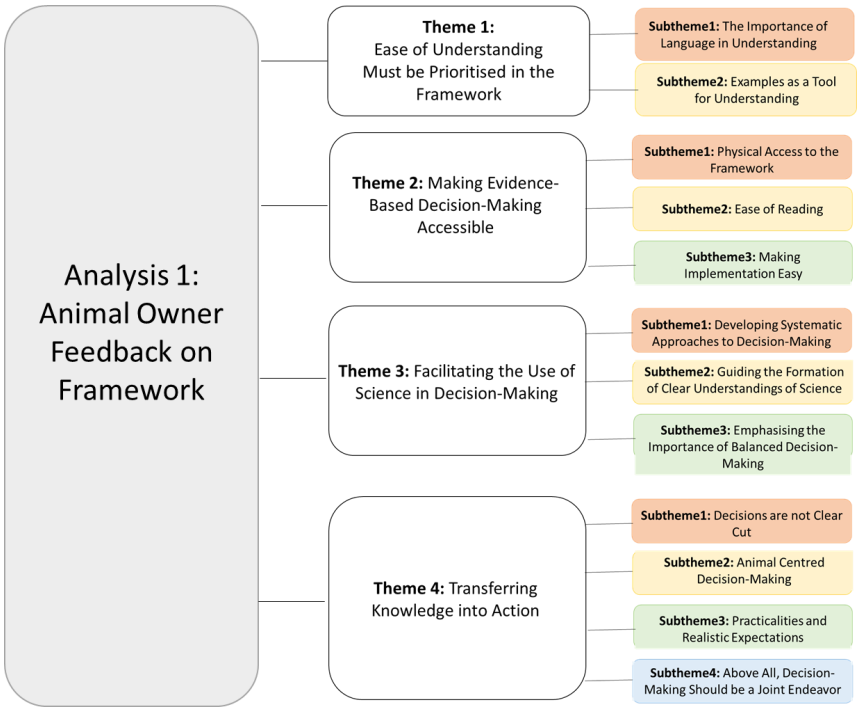


Figure 4: Thematic analysis tree for Analysis 1 (Animal Owner Feedback on Framework) depicting the major themes and subthemes.

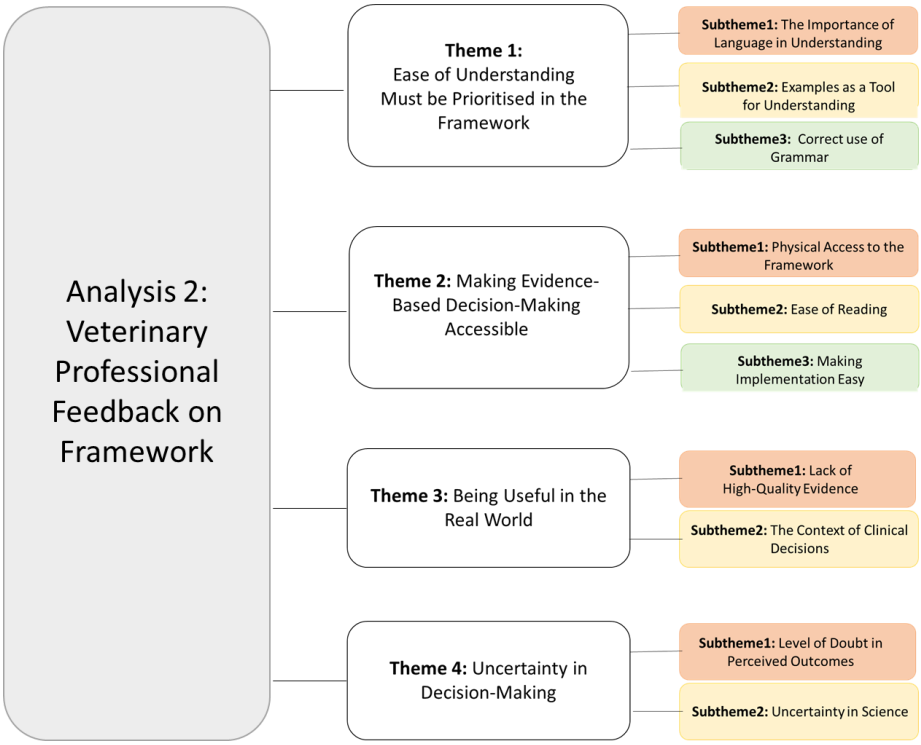


Figure 5:Thematic analysis tree for Analysis 2 (Veterinary Professional Feedback on Framework) depicting the major themes and subthemes.

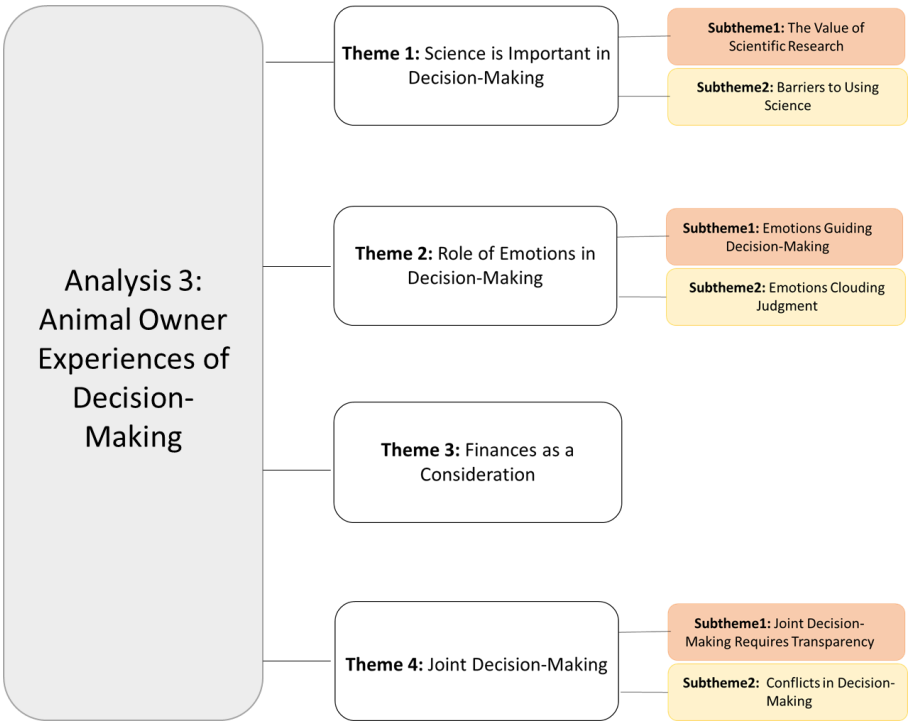


Figure 6: Thematic analysis tree for Analysis 3 (Animal Owner Experiences of Decision-Making) depicting the major themes and subthemes.

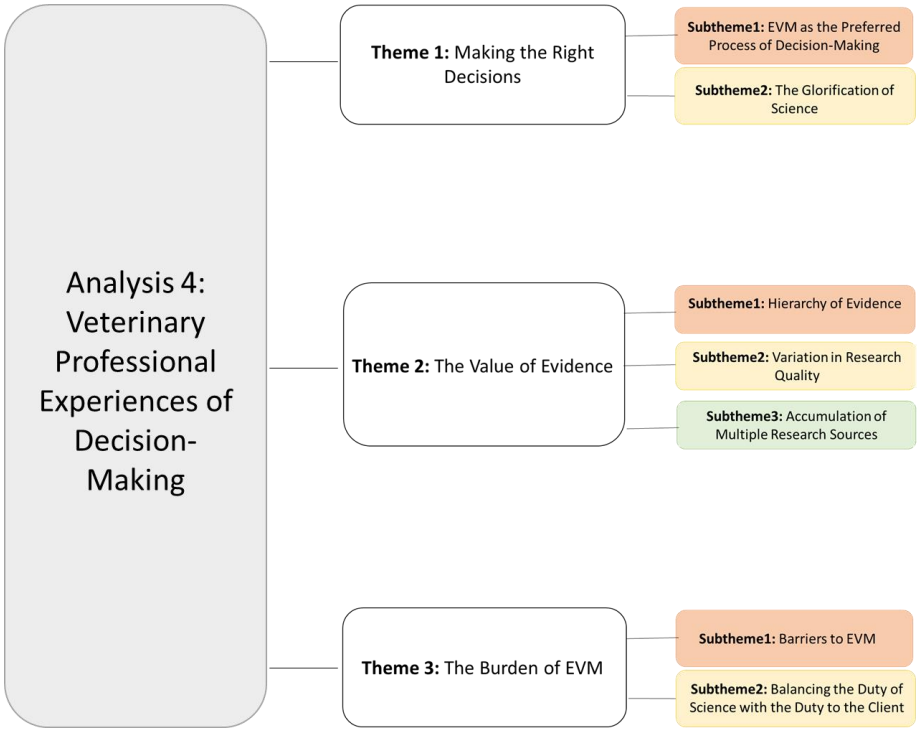


Figure 7: Thematic analysis tree for Analysis 4 (Veterinary Professional Experiences of Decision-Making) depicting the major themes and subthemes.

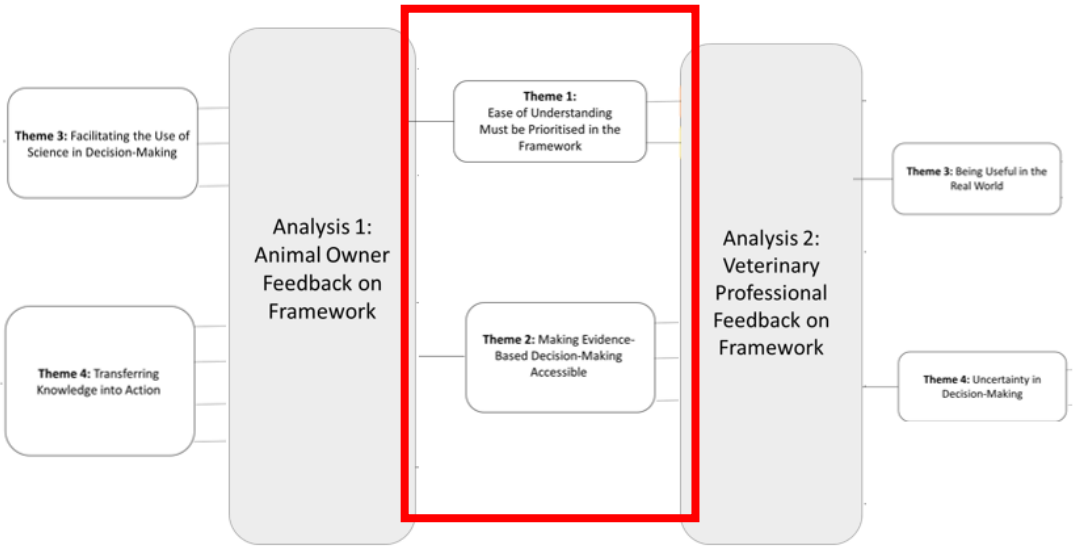
3.2.3.1 Themes common to both stakeholder groups in Analysis 1 and Analysis 2

Analysis 1 and 2 both examined participant feedback on their respective frameworks.

Though these were separate analyses, with separate participant groups, some similar themes occurred in both analyses (Theme 1 and 2). These are outlined in Figure 11 below.

These themes included ‘ease of understanding’ and ‘making evidence-based decision-making accessible’. While the subgroups and nuance of the discussion differed slightly between stakeholder groups, feedback regarding general usability was a key feature in all discussions.

Figure 8: Comparison of similar and unique themes generated from animal owner and veterinary stakeholder group discussions focussed on feedback on the framework with focus on shared themes.



3.2.3.1.1 Theme 1: Ease of understanding must be prioritised in the framework

One theme which came up in every discussion was the importance of clearly understanding the concepts presented in the framework. This theme incorporated all

discussions about how well the participants understood the framework as well as any improvement suggestions which centred around developing clarity and understanding.

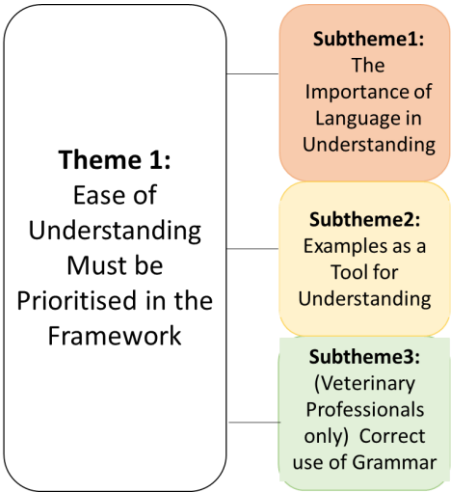


Figure 9: Coding tree for Analysis 1 and 2 Theme 1 Ease of Understanding Must be Prioritised.

Many participants praised the framework for being easy to understand while others pointed out the importance of making it simple, especially with a broad target audience in mind.

O: "I have to say that I think it is very clear and understandable(.)"

P: "And looking for some some real(.) you know easy(.) well written(.) easy to understand stuff about how to to interpret evidence(.) I think it would have been a great great thing to see(.)"

3.2.3.1.1.1 Subtheme 1: The importance of language in understanding

Both stakeholder groups highlighted the importance of word choice when discussing ease of understanding. For animal owners this centred around ensuring the use of simple, descriptive language whereas veterinary professionals discussed the importance of precise word choice in preventing misunderstanding.

O: *"I mean it's not too… how do I put it(.) academically worded(?) 'cause let's be honest(.) not all pet owners have the academic understanding of complex sort of things like that(.) It's pretty easy to read and understand(.)"*

P:"Where it says 'rigorous testing is is is is required to evidence' you sort of go like 'what does that actually mean'(?) Obviously it's explains it(.) But yeah(.)"

3.2.3.1.1.2 Subtheme 2: Examples as a tool for understanding

Both stakeholder groups also discussed the use of examples in providing clarity and understanding. Participants both praised and criticised various examples throughout the document but many people viewed examples as good opportunities to expand upon the key points and explain nuances within the framework.

O1: *I like that you have got points and then an explanation to expand(.)*

O2: Or an example in there?

O1: Underneath yeah(.) I think there's quite good actually(.)"

P:"But I thought like that example was great(.) 'cause that's something I I didn't know(.) but it's a really good example of why just physiology doesn't necessarily just work(.)"

Whilst talking about the examples used within the framework, animal owners showed a particular affinity for those that they could relate to most highly. Examples that were highlighted as particularly useful were often those that participants had personal experiences of.

O: *"Yeah(.) I just smile because when I started(.) my mother used to do that when I was little put butter on the burn(.)"*

Many participants related the points discussed to human contexts that they had personal experiences of. In particular, COVID-19 examples were frequently used as examples by participants.

O: "Like they do with the COVID jab(.) 'A random(.) so and so person from America said this on YouTube(.)'
O: Yeah you want like a reputable source(.) don't you?"

3.2.3.1.1.3 Subtheme 3: Particular to veterinary professionals: correct use of grammar

Veterinary professional discussions generated an extra subtheme regarding the influence of grammar on clarity and understanding. A few participants raised some concerns about potential grammatical errors which hindered their experience of the document.

P:"There and I got in a real tangle tangle right through it with effect and affect(.) I assume it's all correct(.)"

3.2.3.1.2 Theme 2: Making evidence-based decision-making accessible

Concepts relating to accessibility were also discussed by both stakeholder groups. For both, it was important to ensure that the framework catered to a wide variety of people and allowed all members of their stakeholder group to learn about and utilise evidence-based practices. Discussions around accessibility centred around two main sub themes - accessibility of the framework itself and making implementation easy. Each of these had further subthemes, some of which were shared by both stakeholder parties and others which were unique to one group.

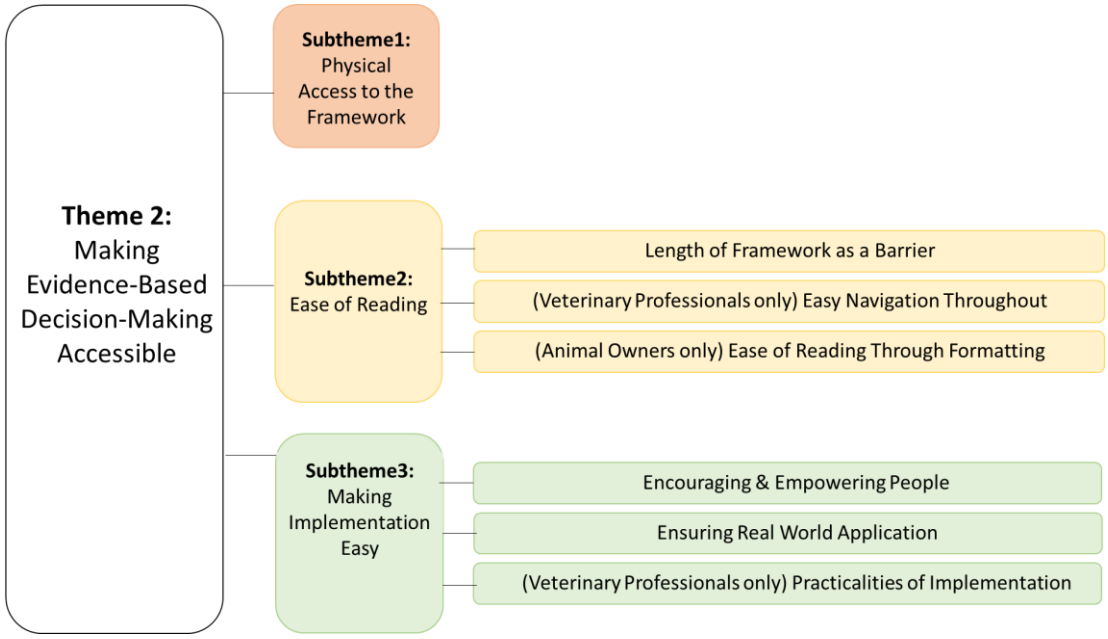


Figure 10: Coding tree for Analysis 1 and 2 Theme 2 Making evidence-based decision-making accessible.

3.2.3.1.2.1 Subtheme 1: Physical access to the framework

It was deemed that having seamless physical access to the framework would be an important factor in whether the document was considered a ‘success’. Multiple discussion groups touched on the importance of presenting the framework in a format that is easy to obtain.

All stakeholder discussions raised online access as an easy way to access information.

O: *“Maybe distribute it through(.) I don't know(.) via a link or something(.) If it's an online document(.) which I would assume it would be in this day and age(.)”*

However, both stakeholder groups also identified limitations to this format. For veterinary professionals, it was highlighted that those who travel to clients rather than practice within a hospital setting may not always have internet access.

P: *“Or you might be on farm with no internet connection(.)”*

Animal owners on the other hand raised concerns that online only formats may not be accessible to older clients.

O: *“Yeah(.) because I mean not everybody is got Internet despite how weird that is that someone hasn't these days(.) but not everybody has(.) And that old dears and stuff don't want Internet(.) They don't want to(.) They want a bit of paper they can read(.)”*

Many discussions settled on the importance of multiple modes of access to this information. Providing a variety of access points and presenting the information in multiple ways was discussed as being the best way to ensure the framework reached a large target audience.

O: “Uh yeah(.) distribute the link through the vets and I don't know(.) put it up in the reception of the vets or something(.) And you know as a sign saying ‘here is the link’(.) And obviously if people haven't got the Internet(.) maybe the vets could keep or be able to copy something(.) print it out for them(.) I don't know(.) That's sort of(.) I don't know how the vets would work(.) but it's but I think that's probably the easiest and most obvious way you could do it is put a big sort of poster in a vet reception going ‘Use this link to gain(.) I don't know(.) information and insight into what you need to know’(.) I don't know(.)”

Veterinary professionals also indicated that veterinary specific publications and CPD courses would be good avenues for accessing the framework.

P: “I don't know what the best read veterinary publication would be(.) Vet times seems to be in most practices(.) It's not the highest level of of research(.) but actually

it could(.) It could be quite accessible and some very short articles on different bits of this document might be(.)"

P: "I think(.) would benefit from reading this as part of their evidence based veterinary medicine course that when they are at university and people on CPD events it probably could be incorporated into that(.) So yes(.) I think it's useful(.) but needs to be presented at the right time and place for people to take it on board(.)"

3.2.3.1.2.2 Subtheme 2: Ease of reading

It was felt that another important factor in ensuring the framework was accessible to readers and therefore not discarded automatically was making sure that it was easy for them to read. Some of the participants praised the framework for being easy to read whilst others highlighted drawbacks.

3.2.3.1.2.2.1 Length of the framework as a barrier

A key criticism shared by many of the participants centred on the length of the framework and the volume of information it contained. Many participants expressed that people would be discouraged by long documents and would likely not engage with them.

O: *"Because I don't think people will read a great long document no matter how relevant those entities(.)"*

P: *“I do worry about the length of the document(.) I think I said in some of the preamble that(.) I do wonder how many people are actually gonna plow through the whole thing….”*

Veterinary professional discussions also generated suggestions for how to shorten the framework without losing content. One subtheme centered on resolving repetition in the framework though there were some directly opposing views on whether the framework was repetitive. Further suggestions included allowing the larger sections of explanatory text to be optional. The explanations and examples made up the bulk of the framework so participants suggested that keeping these separate from the main text and allowing readers to access them of their own accord would make the framework less herculean.

P: *“I think that was that was well conveyed(.) I mean in it was even a bit repetitive in some places(.) so so there probably is room for for refining there(.)”*

P: *“It avoids being too repetitive(.) which is helpful as well(.)”*

Many participants also discussed the advantages of summaries and short overviews in ensuring large amounts of information could be portrayed concisely. The document included multiple short summaries at the end of large explanations which was praised but participants also suggested other ways to provide short snippets of information efficiently.

P: *“My favourite bit of it(.) actually(.) I really like the the where and the remember boxes at the end of each one because I think those were really nice(.) Just one sentence(.) some sort of almost summaries of what you were saying(.) and I think actually(.) as I was going further down the document(.) I was drawn to just reading those as a quick summary rather than normal words(.)”*

P: *“So having you know quick and easy reference charts(.) algorithms(.) diagrams(.) things that people could use in practice or put up in an exam room or something like that would be another element of of a way of disseminating the same thing(.)”*

3.2.3.1.2.2.2 Particular to veterinary professionals: Easy navigation throughout

The importance of effortless navigation to ensure easy reading was discussed by the veterinary professional participants in particular.

Employing a standardised structure which remains constant throughout the document was discussed as a useful feature. Participants felt that knowing exactly what to expect from each section provided some predictability which, it was felt, facilitated easy reading.

P: “And it also uses the same structure first of every set of paragraphs(.) so there's always obviously that almost summary phrase at the bottom(.) which I think works well also(.)”

Highlighting and signposting the most important pieces of information also helped them to stand out and be easily identifiable. Participants discussed multiple strategies for achieving this.

P: "I think that's good for highlighting summaries is an in the first box(.) 'just remember' statement is involved for the second box(.) the whole box is in bold(.) I don't think that works as well because it doesn't give emphasis in the same way(.) So I like having some bits of it in bold(.) I think having the whole lot in bold in a box isn't very useful unless generally that whole box is the most important bit(.)"

3.2.3.1.2.2.3 Particular to owners: Ease of reading through formatting

For animal owners, formatting and presentation of information was of particular importance when discussing ease of reading. The use of bullet points was praised by multiple participants for breaking up text into manageable chunks and alternative suggestions such as tables and visual aids were also regarded to make reading of the document easier.

O: "Yeah(.) much easier(.) specially if it's someone that has no clue what they're on about(.) Trying to read a whole paragraph versus like the sentences that are bullets it is easier(.)"

O: "I know you said about format is coming in at the end(.) but you know(.) like you've got the information about 'outcomes should also be measured'(.) What about you do it like more sort of a table form? 'cause people will pick up on that better than don't they(.) if they can just obviously spot things quickly like numbers and stuff(.)"

3.2.3.1.2.3 Subtheme 3: Making implementation easy

The second major subtheme under 'making evidence-based decision-making accessible' centred around facilitating real world application of the framework and helping readers to actually implement behaviour changes.

3.2.3.1.2.3.1 Encouraging and empowering people to implement evidence-based practices

Another important discussion point was providing the emotional support for individuals to make changes. A number of participants noted that language that could empower individuals and boost confidence in implementation would be more effective than blunt facts. Here participants both praised and criticised the document in equal measure however this further highlighted the importance of its consideration within the framework.

O: *"But to know that they're going to the correct sources to get that information(.) So it perhaps gives the animal owner a bit of confidence in their dialogue with their veterinary professional(.)"*

P: *“It's take nothing at face value(.) Is what it seems to be saying(.) I mean(.) I've I think the one thing that I felt after reading this section was Oh my God(.) where does this leave us(?)”*

Animal owners specifically highlighted criticisms around language that was considered to be too blunt or that produced a negative tone. It was suggested that to empower owners, the focus should be on the things they could do rather than the things they shouldn’t.

O: *“The thing that stood out to me was it was a little bit negative If I'm being honest(.) Like I read that as ‘be really wary of everything’(.) Do you know to mean(?) If I was a brand new pet owner went into the vets and say this(.) I would be like ‘Shit what do I believe? Who do I believe and where do I get the information from?’(.)”*

3.2.3.1.2.3.2 Ensuring real-world relevance

In order to encourage implementation of evidence-based decision-making, readers felt they needed to understand how these points reflected their real-life experiences. Participants directly commented on points relevant to them but also were often led to talk about their past experiences whilst discussing specific points, indicating that those points were reflective of their experiences. Some suggested improvements also centred around improving real world relevance particularly when discussing examples throughout the framework.

P: "I was I was very pleasantly surprised how real life it is(.) You know that it does touch on(.) When they and owners wishes and the reality"

P: *"You could have a veterinary example there(.) You could have(.) I mean I can think of many of behaviour one(.) For instance(.) you'll get papers that come up with the correlation between neutering and a certain behaviour problem(.) But what you don't know is if it's a causation(.) because some people have their dogs neutered because of their behaviour as opposed to the neutering causing the behaviour problem(.) So there may be a correlation between those two(.) but it's not necessarily causation(.) so(.)"*

3.2.3.1.2.3.3 Particular to veterinary professionals: Practicalities of implementation

Although all participants felt they knew how to make an evidence-based decision in theory, many expressed uncertainty around how to actually fit this into the wider context of the job. In order to facilitate implementation of EVM, it was felt that facilitation was required to navigate the practicalities of EVM.

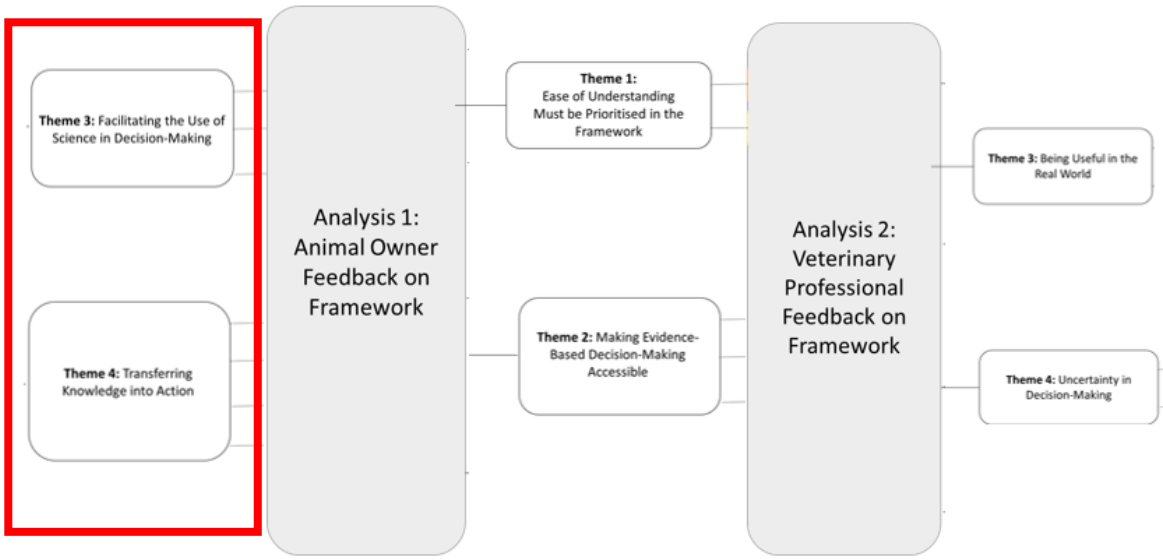
P: "I think so yes yeah(.) And when when you when you need to(.) I(.) uh(.) How to use it(?) Of what to do if you can't find any and what to do(.) if you look at all these papers and they still don't help you(?)"

P: "I didn't feel(.) I didn't know(.) how I then applied this in practice too(.) Help me do those things better and I wasn't quite sure what the aim of the document was there(.)"

3.2.3.2 Analysis 1: Animal owner feedback on framework

Two main themes generated from the discussions were unique to animal owner conversations. These were 'facilitating the use of science in decision making' and 'transferring knowledge into action'.

Figure 11: Comparison of similar and unique themes generated from animal owner and veterinary stakeholder group discussions focussed on feedback on the framework with focus on unique themes.



3.2.3.2.1 Theme 3: facilitating the use of science in decision-making

The overarching aim of the framework was to provide key points for owners to consider when they made medical decisions for their pets, however, much of the

discussion focused on facilitating a decision-making process within individual owners.

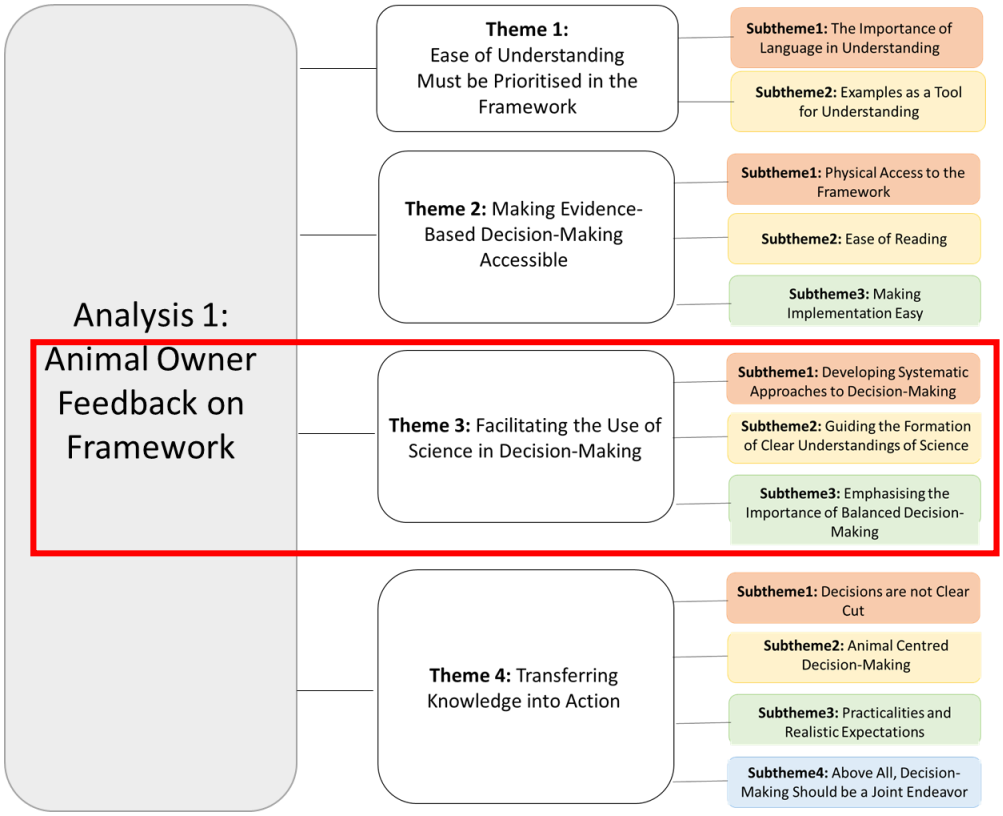


Figure 12: Coding tree for Analysis 1 Theme 3 Facilitating the use of science in decision-making.

3.2.3.2.1.1 Subtheme 1: Developing systematic approaches to decision-making

Many participants expressed a need for step-by-step protocols which could be used to ensure the process of decision making followed a logical order. Many people raised questions about how they would actually use the points raised in the document. Though they understood their meaning and importance, there was a clear need for guidance as to how to put them into practice.

O: "I think is it important about (short pause) it's explaining how people will sort of make the decision on things and how sort of what factors you gotta take into consideration(.)"

O: "Maybe if there's some sort of key things to ask(.) like a checklist?"

3.2.3.2.1.2 Subtheme 2: Guiding the formation of clear understandings of science

Another common theme centred around animal owners needing guidance to understand science and the process of scientific information in order to be able to make use of it in decision making. Although this was the aim of the second section of the framework, it was regularly mentioned as an important aim of the whole framework.

O: "Some people wouldn't know that there's a like if you got a small group of people testing that it's not going to be as good as like 4 different types and getting everything… that's the one isn't it where you got everything is going to be consistent(.) So controlled environment or controlled experiments(.) whereas everything is the same size(.) same age(.) everything like that(.)"

3.2.3.2.1.3 Subtheme 3: Emphasising the importance of balanced decision-making

Many participants spoke about the importance of considering both the positives and negatives associated with any decision made.

O: “Definitely 100% to be told the pros and cons(.) long term or short term(.) With regards to both - sorry I'm looking at my bunnies(.) With regards to the animal(.) but also to the owner(.)”

O: “It's like so easy to get swept up in the moment(.) So yeah(.) just to make sure you look at both the pros and the cons to everything really(.)”

3.2.3.2.2 Theme 4: Transferring knowledge into action

Many of the discussions also involved an element of the individuality of decision making and how this impacted on the way that information was used in decision making.

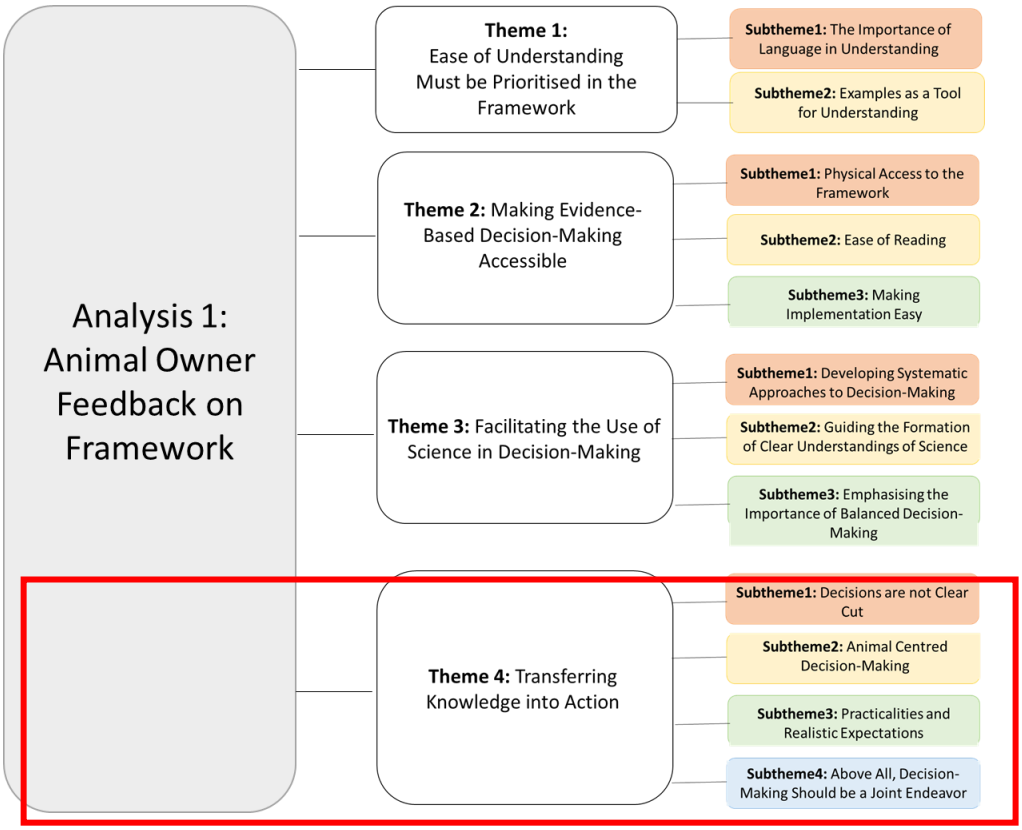


Figure 13: Coding tree for Analysis 1 Theme 4 Transferring knowledge into action.

3.2.3.2.2.1 Subtheme 1: Decisions are not clear cut

The uncertainty around decision making was identified as a key issue for many of the participants in these discussions. There was a clear contrast between their certainty in science as an immovable fact and the outcomes of medical decisions being more subjective.

O: "I think the misconception is(.) in my experience(.) you go to the vet sort of looking for these answers(.) They're not black and white answers(.)"

O: “But then again(.) you might(.) It's the same with doctors(.) You can go to a one down the road and you'll have a different (short pause) they tell you something different wont they(.)”

3.2.3.2.2.2 Subtheme 2: Animal centred decision-making

Participants also noted that decisions should be made based on what was best for that animal at that time and that sometimes that could go against the case features. Many participants spoke about personal situations where the facts led vets to suggest a logical course of action but that this was not necessarily deemed the appropriate course of action by the owner when the animals needs were considered. Participants also stated that they were often most guided by their animal’s quality of life in making decisions and felt it was an important factor to include in the framework.

O: “Yeah(.) I'm just happy with that because unfortunately(.) this time last year we lost our Cocker spaniel(.) But the vet asked us the year before that(.) if we want you to put it down because she had a really bad infection on her paw and it just wasn't getting any better(.) But she still had the quality of life that she'd always had(.) like she was still running around(.) She's still wanting to go for a walk(.) And in the end she the vet did agree that I knew her better(.) “

3.2.3.2.2.3 Subtheme 3: Practicalities and realistic expectations

Participants had particular praise for the third section of the document and its emphasis on the real-world implications on decision-making. Many considered this

an important factor in curtailing scientific information and keeping investigations realistic. A number of participants also linked this to ensuring they didn't get their hopes up while researching possible treatments.

O: "Under the 'balance the options'? that that's giving him more sort of holistic approach(.) not you know 'this is what available(.) You can use this instead of treatments' actually fitting into the whole scheme of things(.) Yes(.) these are the options(.) but actually there are other things to take into consideration(.) I think that that section and pulls those concepts out(.)"

3.2.3.2.2.4 Subtheme 4: Above all, decision-making should be a joint endeavour

A number of participants suggested that it should be clear in the document that searching for information should be conducted in parallel with conversations with the vet and should be used to fuel a joint decision-making process where both parties have equal responsibility. Some participants also discussed feeling that vets were often guilty of not properly including them in the decision-making process but rather in deciding for them and then telling them their advice. The suggestion was to emphasise this also within the veterinary professional branch of the document.

O: "You should I would put a caption in the end 'Any queries you need to speak to a vet personally'(.)"

O: "It's about including the person who brought the animal and not making a decision in your own head about what what's right for that particular person(.)"

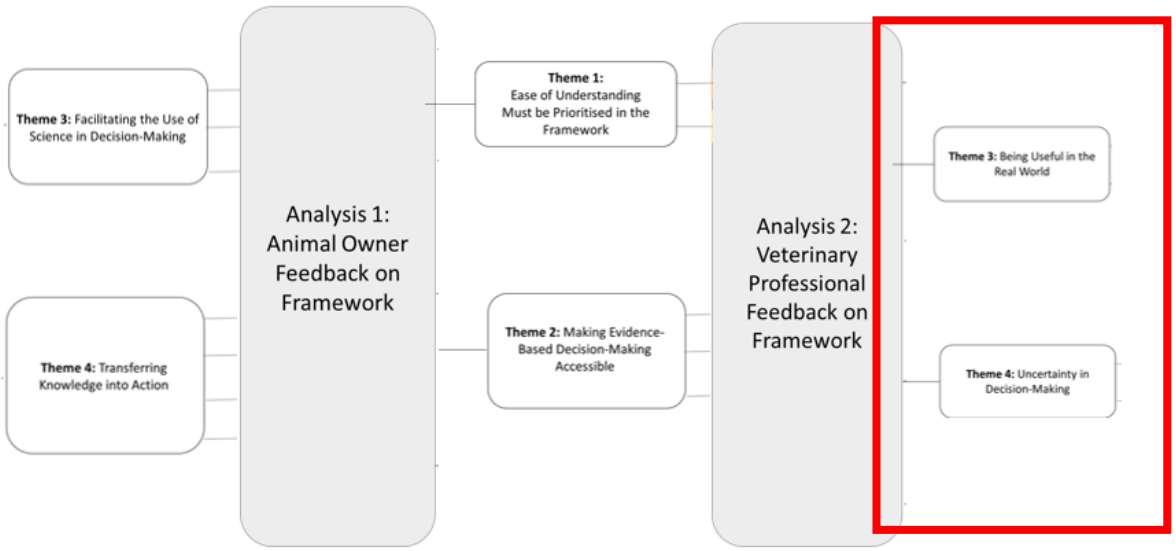
O: "More about them [vets] understanding(.) Yes(.) it's a joint decision"

3.2.3.3 Analysis 2: Veterinary professional feedback on framework

There were two unique themes found from the veterinary professional discussions additional to the two already discussed.

Both of these centred around incorporating the wider context of decision-making into the framework. One theme addressed the context in which veterinary professionals were making decisions and the other focused on the uncertainty around decision-making. Participants felt both factors were important to consider in the framework.

Figure 14:Comparison of similar and unique themes generated from animal owner and veterinary stakeholder group discussions focussed on feedback on the framework with focus on unique themes.



3.2.3.3.1 Theme 3: Being useful in the real world

In many discussions, there was a recurring concern that EVM felt intangible and separate from everyday practice. Participants expressed that to be useful, a framework needed to reflect real-world decision making.

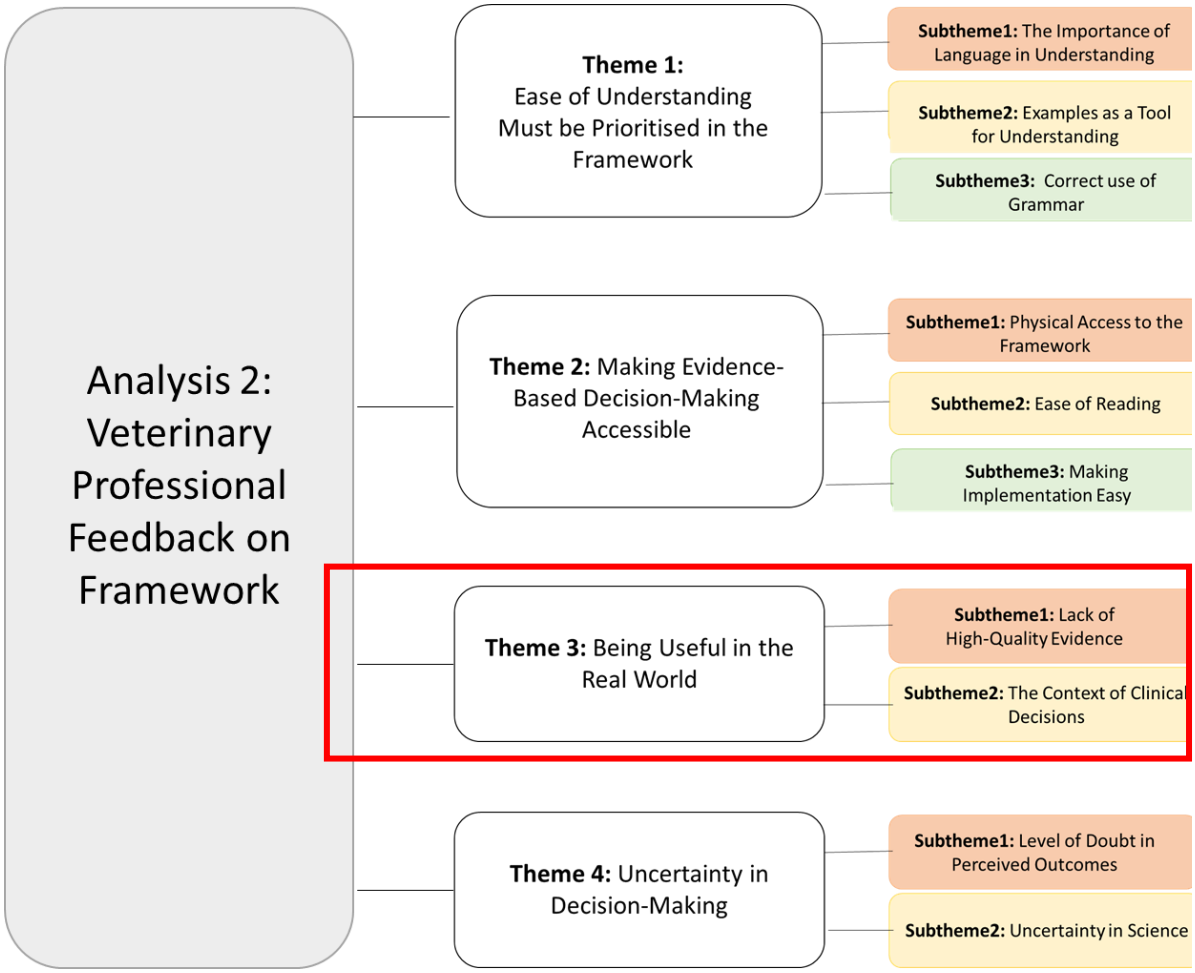


Figure 15: Coding tree for Analysis 2 Theme 3 Being useful in the real world.

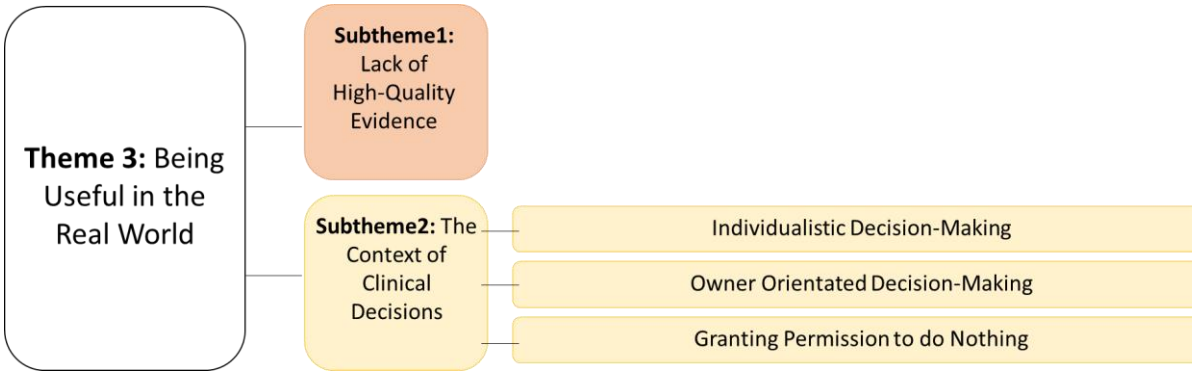


Figure 16: Coding tree for Analysis 2 Theme 3 Being useful in the real world including sub-sub sections.

3.2.3.3.1.1 Subtheme 1: The lack of high-quality evidence

Participants deemed the large sections detailing the gathering and appraisal of scientific research within the framework to be important. However, they also regularly referred to a perceived lack of availability of high-quality veterinary studies.

P: "I think this is really hard because I mean in many ways it highlights the shortcomings of an awful lot of research(.) doesn't it(?) You know(.) and I I mean(.) when you compare most of the studies that are available in veterinary medicine compared to what's available in the human health field(.)"

Many participants expressed that not addressing this issue within the framework limited its usefulness in real-world situations.

P: "I'm sure it's been said by many people many times it's I do see people being paralyzed by evidence-based medicine(.) and in that there is no evidence(.) Therefore we can't do anything(.) You know(.) or we can't use this 'cause there's no evidence(.) or you know(.)"

To address this issue, participants suggested applying more focus on other sources of information and how and when they could be used in an evidence-based manner. The participants still emphasised scientific research as the most favourable evidence source, but indicated they wished to see the discussion of more varied sources within the framework to better capture the real-world context.

P: "So just reading the bit about experiences and anecdotes or opinions of experts(.) Uh(.) That is true to question those(.) but I think everyone needs to accept that(.) in the absence of proper evidence or quantitative evidence(.) sometimes we do(.) as practitioners(.) end up relying on expert opinions because that's all we've got"

3.2.3.3.1.2 Subtheme 2: The context of clinical decisions

Alongside navigating a lack of evidence, participants perceived that EVM sometimes excluded other factors outside of the scientific literature which influenced decision making. Participants explained that a useful framework needed to incorporate these other factors to accurately reflect clinical practice.

3.2.3.3.1.2.1 Individualistic decision-making

A key external factor identified was the boundaries of the individual animal. Participants expressed the importance of considering individual patient factors when making clinical decisions. A number of participants suggested that these

considerations should be more explicitly expressed within the framework, particularly those related to upholding animal welfare.

P: “As a practitioner you need to take into account the individual parameters of your current case(.) Alongside the evidence that you that you think you found and see whether they fit together(.)”

P: “That could almost be summed up with this first section in in do no harm(.) You know(.) which is quite principle(.) isn't it(?) Of of medicine(.) it doesn't quite say that in those those words(.) so I'd sort on this like to see that that put in somewhere(.)”

3.2.3.3.1.2.2 Owner orientated decision-making

Some participants felt that the document should allow more emphasis on the owner’s wants and needs.

P: “Don't forget you’re a vet(.) and don't forget that these are animals and they're attached to people(.) I had (.)I think that's I think it's and again(.) I think that's very important(.)”

3.2.3.3.1.2.3 Granting permission to do nothing

Participants also highlighted that an important part of clinical decision-making could sometimes be knowing when it was appropriate to do nothing. A number of

participants expressed feeling pressure to always offer some form of treatment. Participants also expressed those points within the framework which refer to the validity of a 'wait and see' approach were important and could, in fact, be emphasised more.

P: "I think senior grades now they feel they've got to do something all the time(.)"

P: "And my first boss(.) he said to me(.) well(.) doing nothing is not the worst thing you can do in many cases(.) And I I think you know(.) it does say it(.) but I think the clearer you can make that the brilliant is really(.)"

3.2.3.3.2 Theme 4: Uncertainty in decision-making

The final theme that was generated concerned the various areas of uncertainty which exist in clinical decision making. Participants identified a number of factors which meant there would always be some uncertainty within clinical decision-making. It was deemed important for veterinary professionals to attain a good understanding of these factors from the document to help guide their decision-making.

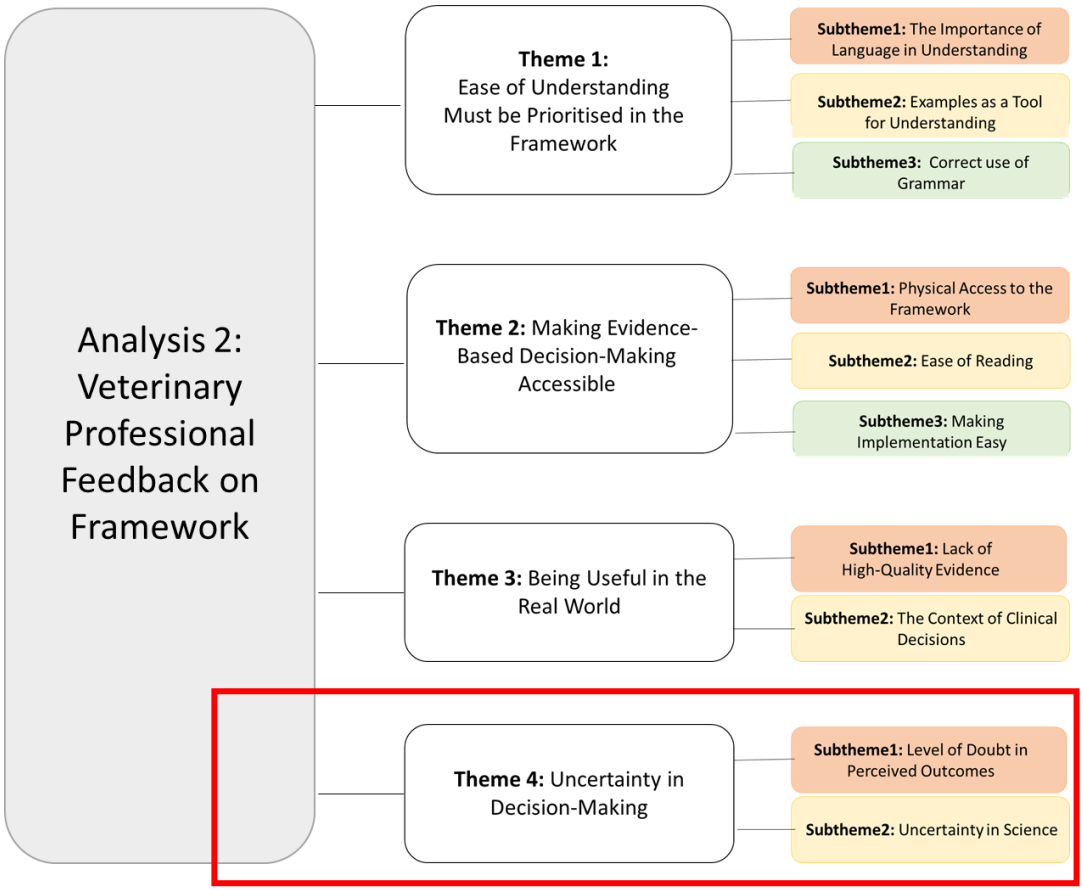


Figure 17:: Coding tree for Analysis 2 theme 4 Uncertainty in decision-making.

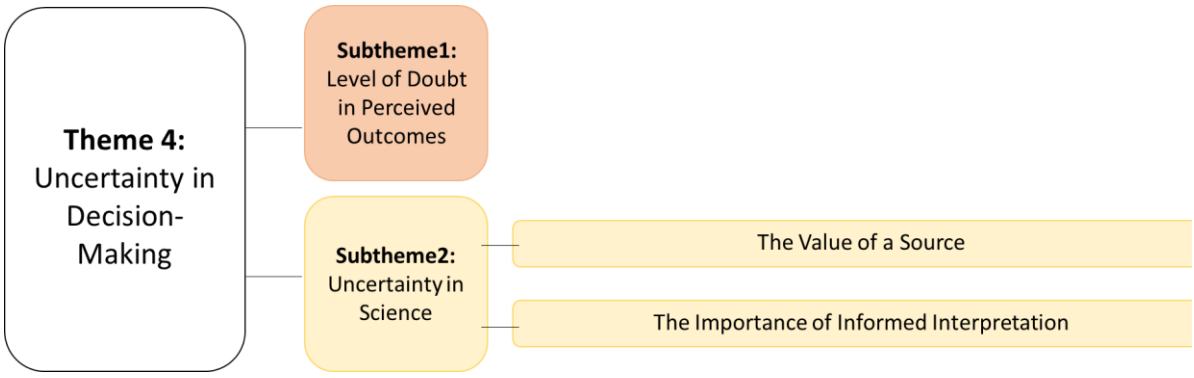


Figure 18: Coding tree for Analysis 2 Theme 4 Uncertainty in decision-making with sub-sub themes included.

3.2.3.3.2.1 Subtheme 1: Level of doubt in perceived outcomes

Participants frequently made reference to the uncertainty which surrounded many of the decisions made regardless of how researched the area was. Participants expressed that it was important for the framework to highlight the existence of

uncertainty and to encourage readers to appreciate that they could never be 100% sure of their outcomes.

P: "Include that we can never be 100% sure of anything and so we might think that we are applying the best treatment(.) but we might get diagnosis wrong or it might not work 100% of the time and so yeah(.) always have valid possibility of doubt(.)"

3.2.3.3.2.2 Subtheme 2: Uncertainty in science

Whilst participants valued research and controlled studies for their ability to reduce uncertainty, they also accepted that a degree of uncertainty could not be controlled for. Participants tried to quantify this uncertainty in two ways; the value of the source causing uncertainty and the quality of their interpretation of the source.

3.2.3.3.2.2.1 The value of the source

Participants commonly expressed that different types of scientific study were inherently more or less valuable than others. This information was expressed as being important to include within the document. Participants also expressed that critical appraisal of a source was a critical step in deciding its value in decision making. Participants readily accepted that even research that appeared to be of high quality could have weaknesses and as decision makers, it was important to have included appraisal in the process to be made aware of these weaknesses.

P: “Potentially having some sort of link within it or directing readers to where they could learn more about the tiers of evidence quality could be useful(.)”

P: “Now if you have got evidence in front of you(.)query whether the evidence is valid and accurate for your situation(.) Don’t just take it at face value and try and be a bit critical in how you think about it(.)”

3.2.3.3.2.2.2 The importance of informed interpretation

Another source of uncertainty in scientific information was deemed to stem from inaccuracies in professionals’ interpretation and understanding of the research. One common factor that was identified from the discussions was to be wary of overinterpreting the science. Participants praised the points of the framework which explained the meaning of statistical significance and p values and their value in discussing clinical significance. Other participants emphasised the importance of understanding the theory behind certain scientific protocols to properly gauge their significance.

P: “I never quote P values because they're pretty meaningless(.) and so I we I really liked(.) yeah(.) I like the point that talked about why P values are actually a little bit misleading(.)”

P: “I suppose my view on randomized and blinded controlled trials(.) These people quote that that's what is needed(.) but don't always question and there sort of is your

point (.) why it's needed or what the purpose of it is(.) So you know(.) randomization is Allocation bias(.) Blinding is interpretation bias(.)"

3.2.3.4 Analysis 3: Animal owner experiences of decision-making

Four major themes were generated during this analysis. These considered the three main influences on owners decision making (evidence, emotions and finances) as well as owners experiences of collaborative decision-making with their vets.

3.2.3.4.1 Theme 1: Science is important in decision-making

One of the main findings of discussions in this area was the role that research, and scientific information played in owners' decision-making processes. Participants discussed the perceived value that scientific information has or should have within decision-making and also the barriers that prevent owners from utilising scientific information.

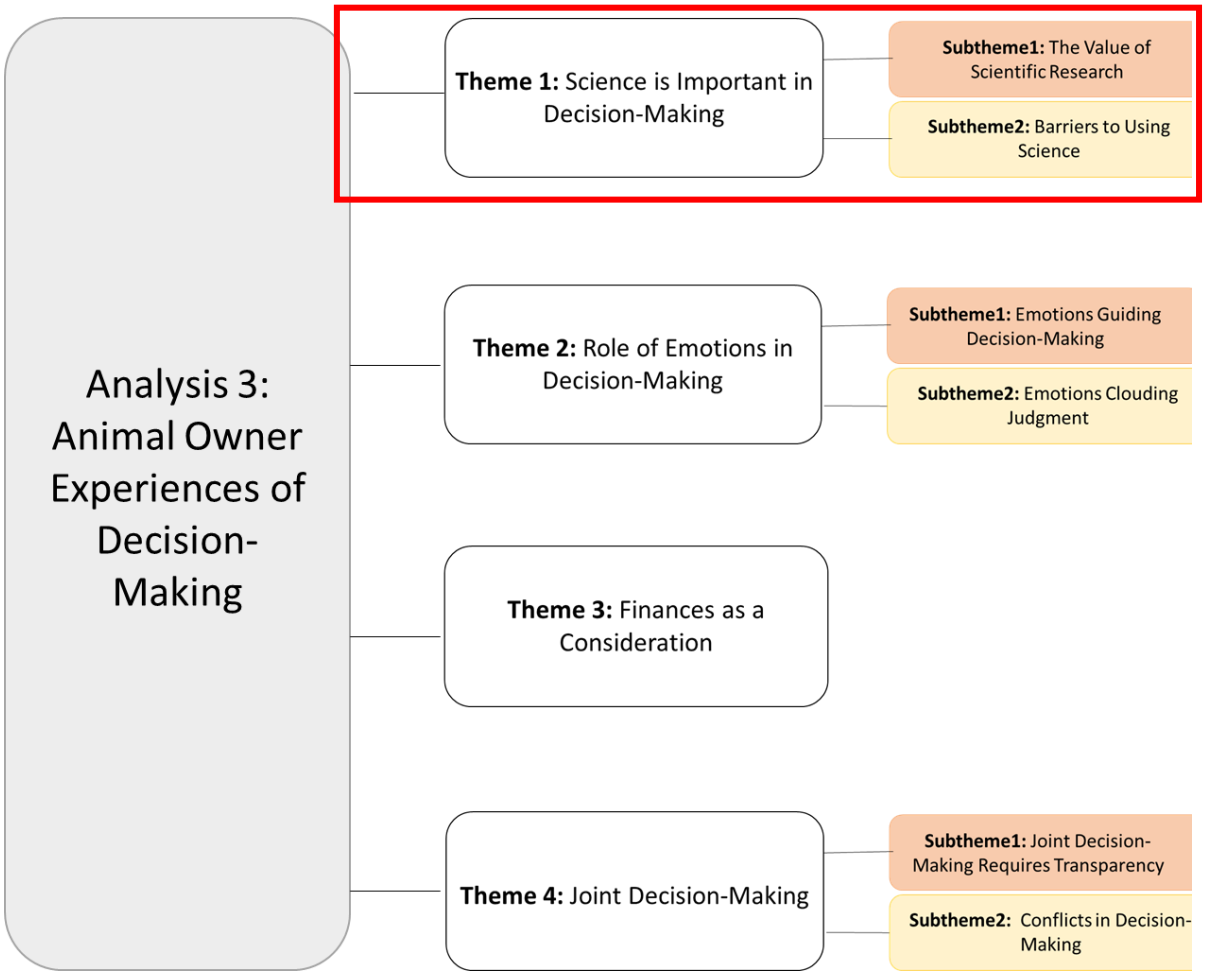


Figure 19: Coding tree for Analysis 3 Theme 1 Science is important in decision-making.

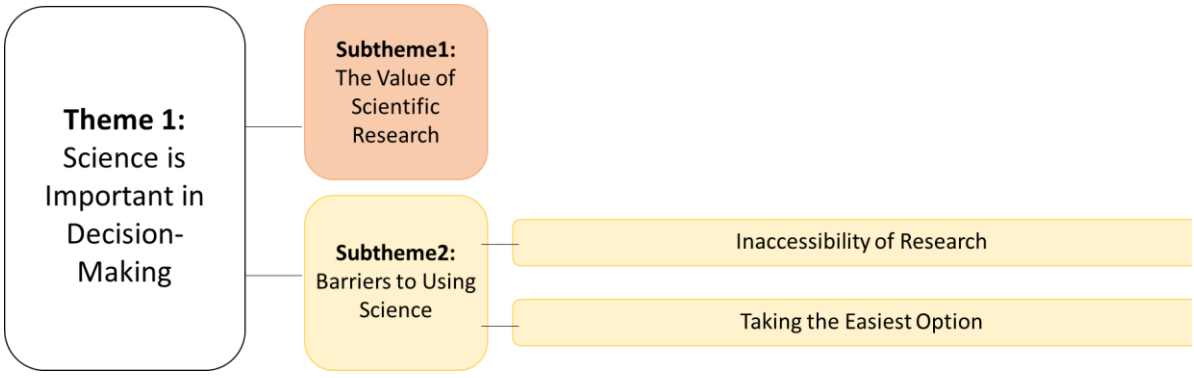


Figure 20: Coding tree for Analysis 3 Theme 1 Science is important in decision-making with sub-sub themes included.

3.2.3.4.1.1 Subtheme 1: The value of scientific research

All of the participants indicated that the certainty provided by scientific fact, backed up by research, was an important basis for both information searching and ultimately decision-making.

O: "You then make your decisions purely on the evidence that's presented to you or that you you're presented with(.)"

O: "Well(.) I'm trained to do this so I know how important is(.) You [other participant] are as well because of your [healthcare role](.) Yeah(.) yeah we are(.) We are sold(.) totally sold(.)"

3.2.3.4.1.2 Subtheme 2: Barriers to Using Science

Frequently the focus group discussions led to admissions that although scientific knowledge was an important tool, it was sometimes difficult to utilise. Participants identified multiple barriers to owners using scientific information and, in particular, research papers. While scientific fact was viewed as important during information searches, research was described as being reserved for the vets use only.

O: "That was yeah(.) one of the key things(.) I mean the research(.) Yeah(.) I get it and I think that is important(.) but I don't think most owners are gonna care(.) Not(.) in a horrible way(.) but they're not gonna go into research studies(.) We kind of leave that to to you guys [vets](.)"

3.2.3.4.1.2.1 Inaccessibility of research

Knowing where to find high-quality research information was a common barrier discussed. Owners felt that this information was difficult to find and noted that the lack of a central resource for all this information added to their challenges.

O: "We've spoken about the sorts of things you should be looking for(.) but like O7 says(.) where do you? Where do you find those? Where do you start when you start to Google?"

O:"I would like to know what sites to go to (short pause) like is there anything like? I know the NHS(.) but NHS direct you can go to and it may not be completely correct(.) but you got an idea(.) Is there anything like that for vet(?) No forum veterinary sort of illnesses(.)"

Another frequently mentioned barrier discussed was difficulty in understanding the papers. Owners reported being aware that some information could be misleading but were not always able to identify which sources they could trust.

O: "I'm reading research papers at the moment(.) and they make absolutely no sense to me whatsoever(.) I'm like 'what is this(?)', 'speak English' So yeah(.)"

O: “There's so much information and not all of it is right? So you gotta decide where you’re taking it from(.)”

3.2.3.4.1.2.2 Taking the easiest option

Another barrier to owners using science in their decision-making was the relative ease of using other options. Many participants discussed a need for information gathering and decision-making to be as easy as possible. The barriers surrounding the accessibility of scientific information meant it was easier for them to use alternative sources of information.

O:“That's something as an owner(.) it's not so important if you see what I mean(.) as at the background of it(.) I just want my vet to tell me what to give(.) what bunny and that's it(.)”

O: “Yeah(.) and access on the Internet obviously because everybody looks on there first now(.)”

When discussing the framework multiple participants expressed that to encourage participants to actually use the guidance it needed to be easy for them.

O: “But at the same time(.) we need to make it not too wordy because a lot of people just bother to read the entire document if it's not too much stuff in it(.) Because they'll just get bored or whatever(.)”

O: “Because I don't think people will read a great long document no matter how relevant those entities(.)”

3.2.3.4.2 Theme 2: Role of emotions in decision-making

Many participants discussed emotional factors as being of equal importance to scientific information in terms of their influence on decision-making.

Largely, emotions were discussed in one of two ways. As a tool to guide decision-making or as a hindrance to rational decision-making. Either way, it was considered to have an important effect on the decision-making process.

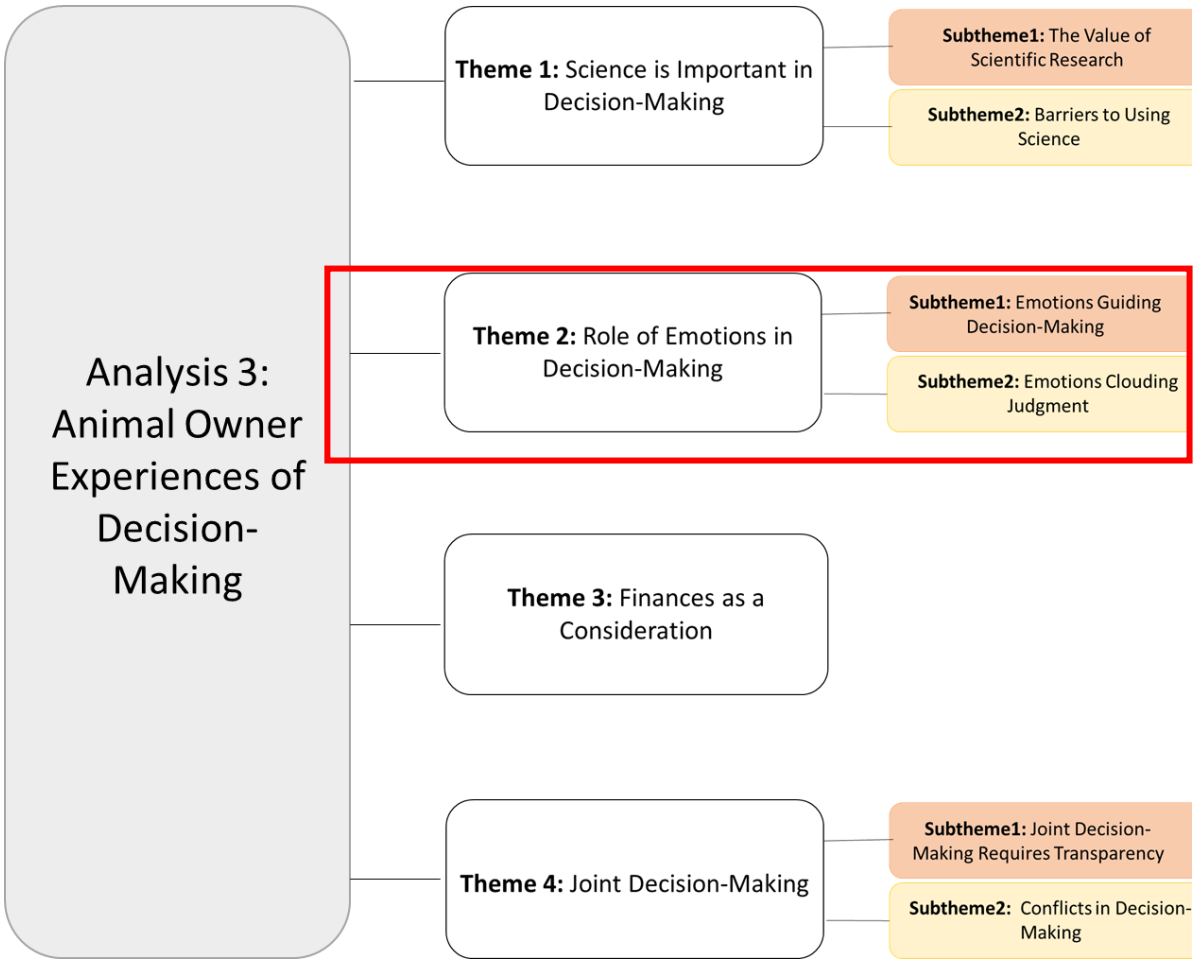


Figure 21: Coding tree for Analysis 3 Theme 2 Role of emotions in decision-making.

3.2.3.4.2.1 Subtheme 1: Emotions guiding decision-making

A key factor which influenced owners decision-making was the emotional context of the situation. Many participants mentioned making decisions that "felt right" and some explicitly highlighted that decisions could be based on emotional contexts.

O: "But it probably those who own pets know that the decisions aren't just based on that goal(.) And many times(.) it's also based on people's own feelings about things"

This intense emotional connection to their animals often led participants to discuss feelings of responsibility for their animals' welfare and of a duty of care to them. Many participants viewed themselves as advocates for their animals. In this way, their love for their animals encouraged them to uphold the animals' best interests.

O: "You know your animal better than the vet does(.) and so therefore I think you have to take that into account when you're making decisions about (short pause) particularly end of life decisions(.)"

3.2.3.4.2.2 Subtheme 2: Emotions clouding judgement

All discussions touched on the emotional burden decision-making has on animal owners. Both the distress caused by animals being unwell and the burden of responsibility that comes with decision-making were common topics amongst participants.

O: "The decision you would make would vary depending on whether it was four or 14(.) And it's very easy to tip over by giving the options that if you choose not to follow it(.) there's almost the guilt of not doing it(.)"

O: "You make his choice of treatment and 'Oh no(.) don't tell me you put the dog down(.) I wouldn't have done it' immediately brings the guilt thing in(.) you know 'you could have done this'(.) 'you could have done the other(.)'"

Participants also suggested that this emotional state could cloud judgment and be detrimental to effective decision-making. The notion that owners need to be able to exclude their emotions from key decisions was a commonly shared viewpoint.

O: "I think you 1) need to have something about trying to(.) in these difficult decisions where emotion is clearly a leading factor(.) there may be instances where emotions should be put to aside for the benefit of all(.) and I'm not necessarily verbalizing this very well(.) but that you get the feeling of what I'm saying(.)"

3.2.3.4.3 Theme 3: Finances as a consideration

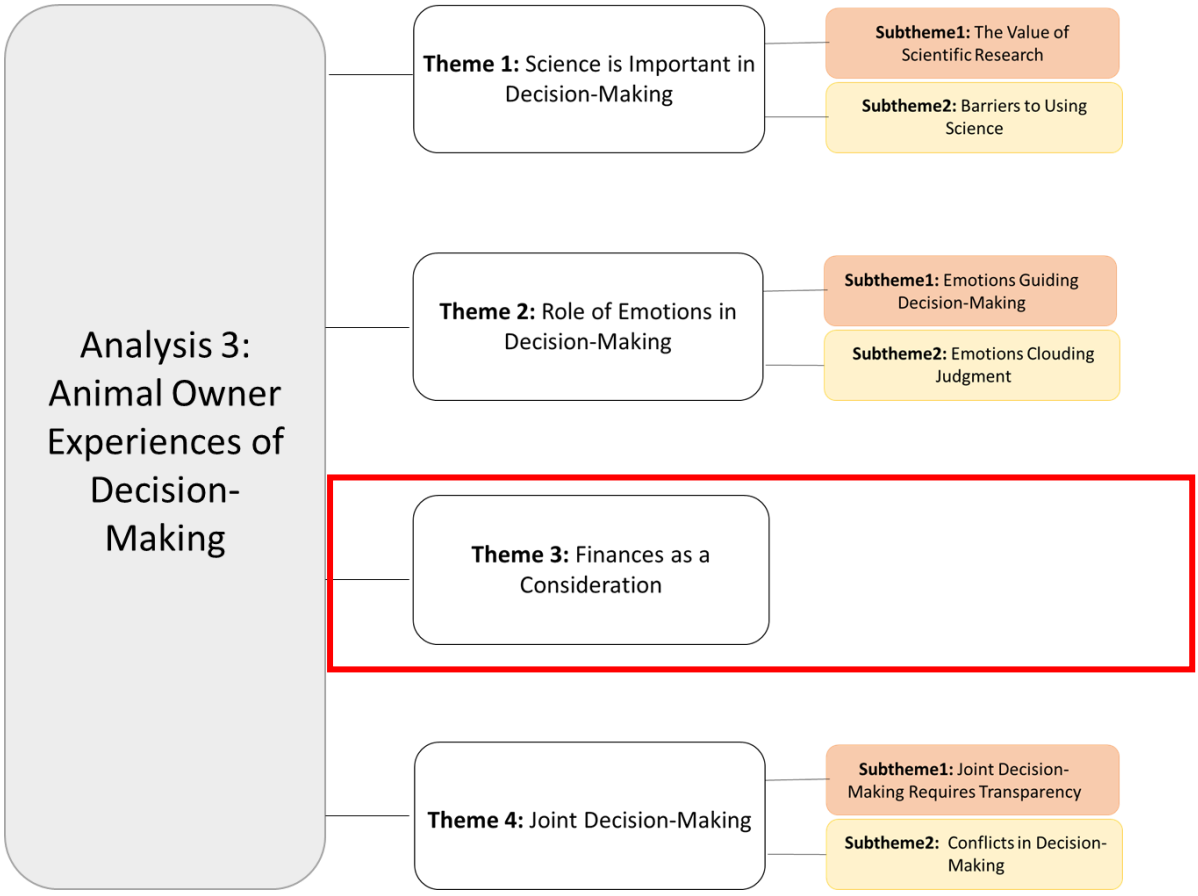


Figure 22: Coding tree for Analysis 3 Theme 3 Finances as a consideration.

Some participants acknowledged that the financial impact of a decision had to be considered as part of the decision-making process. Finances were often discussed as a factor that would limit the list of treatment options available to an owner.

O: "Barney's operations costs like three and a half thousand with his injuries and yeah(.) Lucky we were(.) You know(.) insured 'cause we wouldn't have afforded it(.) A lot of people just won't afford it and they won't do it(.)"

On the other hand, some participants suggested that finances should not be a leading factor in decision making and others suggested that vets sometimes put too much emphasis on cost.

O: "Because I find these days that they take far more account of financial considerations(.) i.e.(.) making profit for themselves(.) Then they would have done many years ago(.) which I think is is very sad(.) But generally speaking the first question they ask you when you go in is 'is your animal insured?'(.) It shouldn't make any difference whatsoever ever(.)"

3.2.3.4.4 Theme 4: Joint decision-making

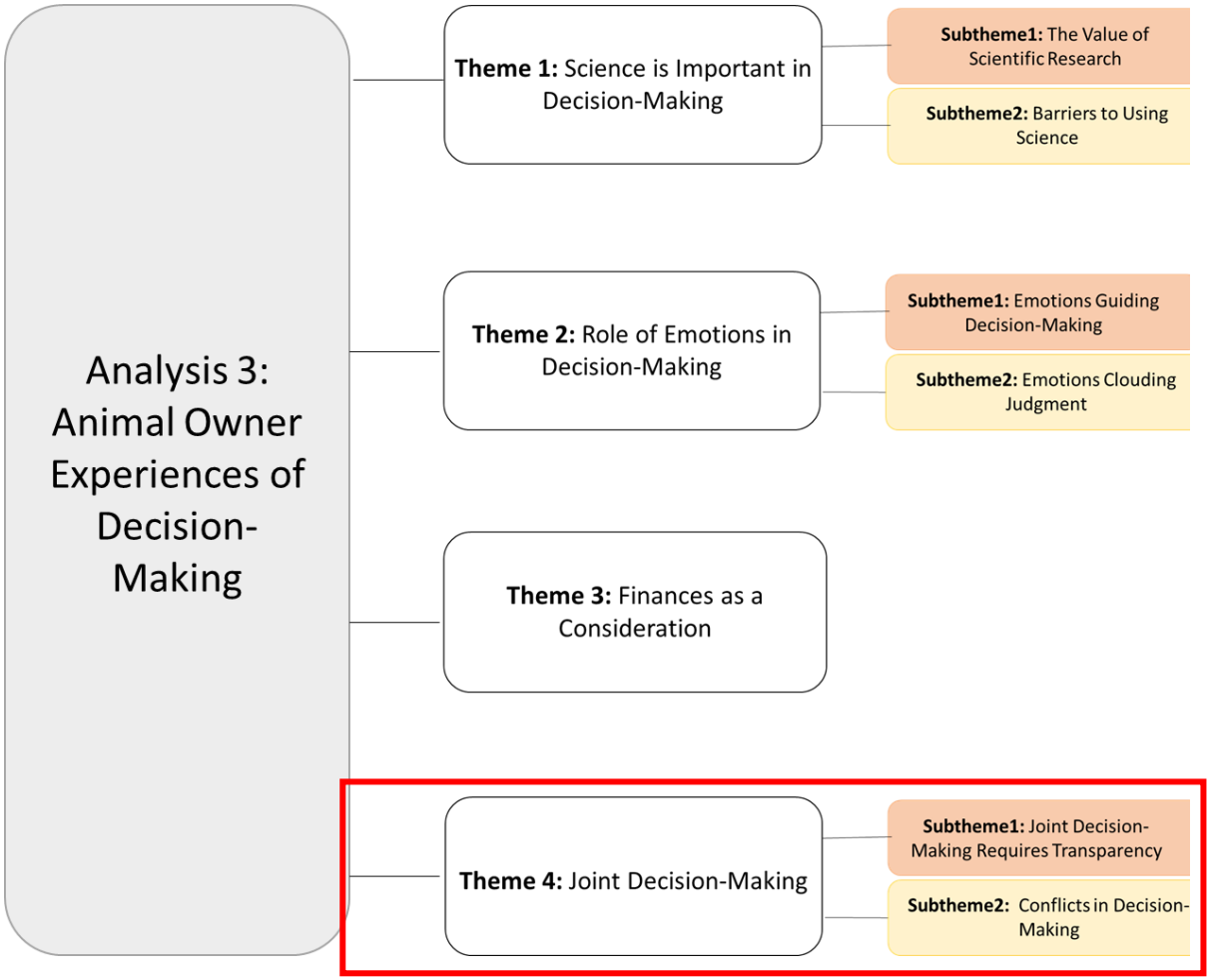


Figure 23: Coding tree for Analysis 3 Theme 4 Joint decision-making.

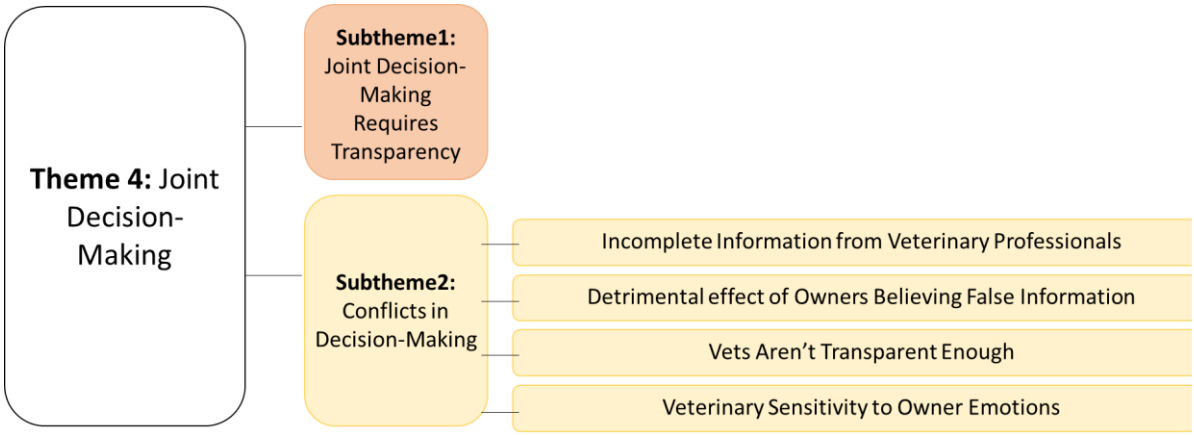


Figure 24: Coding tree for Analysis 3 Theme 4 Joint decision-making with sub-sub themes included.

All discussion groups referred to decision-making as a joint venture between the animal owner and the vet. Clients were keen for both parties to have an equal role in the process and for a final decision to be decided upon collaboratively.

O: "It's about including the person who brought the animal and not making a decision in your own head about what what's right for that particular person(.)"

Many of these discussions however suggested differing roles for each of the stakeholder parties within the decision-making. Often this resulted in veterinary professionals being responsible for the science and being viewed by the owner as a resource to aid their understanding. Participants often reserved for themselves the role of being their animal's advocate and knowing their individual animal best.

O: "Really really keep that in there and let the vet be able to explain to the owner 'this is where this is coming from'(.) 'These are all or this is a study'(.) whatever(.) 'however(.) many studies have shown this happens'(.)"

O: "You've got to be a pets advocate(.) and it's up to you to find out(.) You know and ask the right questions(.)"

3.2.3.4.4.1 Subtheme 1: JDM requires transparency

A common factor that was deemed important to vet-client relationships and the process of joint decision-making was transparency in the conversations between a

vet and an animal owner. This was discussed both as a positive attribute of some veterinary professionals and also as a factor in relationship failures.

O: "I found it interesting to read through to see how you(.) as a new generation(.) coming through (.) vets were viewing it in context of your relationship with your clients and I found it quite comforting that if [Interviewer] was in our local practice(.) I'd be quite happy to come and see you because I felt I could have a dialogue with you(.) So for me it was sort of confidence building if you like and I don't mean to sound patronizing like that at all(.) I really don't mean it it(.) but it did mean to me that I quite liked the way that you as a new generation were thinking(.)"

O: "And I wish I'd had that information sooner(.) You know(.) I put her through a lot for absolutely nothing(.) So that's just like one case of a simple bit of information might have helped a lot(.) If you see what I mean(.) and the long term effects of what was going on inside of her should have been made a bit more available(.) I think(.)"

3.2.3.4.4.2 Subtheme 2: Conflicts in decision-making

When discussing the concept of joint decision-making, many participants alluded to instances where conflicts could arise between vet and client. Participants provided multiple reasons for this breakdown in the relationship.

3.2.3.4.4.2.1 Incomplete information from veterinary professionals

Owners had previously framed veterinary professionals as a source of information for them. They were described as being positions of authority who were trusted as fonts of knowledge. It is therefore unsurprising that perceiving a lack of knowledge within their vet was a source of conflict for owners.

O: "And the rows I had to have over(.) 'well(.) I don't know anything about that' 'Well go and find out you know where to look(.) I don't' you know(.) that is my biggest bugbear(.)"

3.2.3.4.4.2.2 Detrimental effect of owners believing false information

Owners also highlighted that the abundance of misinformation available to them could also detrimentally affect a joint decision process. Owners perceiving vets to be contradicting their 'knowledge' could be a barrier to joint decision making.

O: "Vets must get really fed up with us going 'well I read about this and this and this and you're not offering it to me' 'Yeah thats 'cause it's crap' and it's yeah that's so important to get across to both sides 'cause it will save a lot of vets having to constantly give bad news people(short pause) And then you get a little bit of distrust(.) if you've looked them up yourself(.) you think you're like the dogs(.) you know(.) and the vet says(.) no(.) you're like(.) well(.) you know 'You're not listening to me(.)"

3.2.3.4.4.2.3 Vets aren't transparent enough

Alongside discussing transparency as an important component of healthy vet-client relationships, participants also introduced a lack of transparency as a cause for conflict during decision-making. Owners stated that vet-client relationships (and by extension joint decision-making processes) broke down where vets were unwilling to engage in open conversations or were perceived to be withholding information.

O: "I've also certainly met some veterinary professionals in the past [who] if you did(.) that [ask them questions] would not be happy(.) They would take it as being quite the challenge to their knowledge(.)"

O: "So like for instance(.) and my dog went for their last booster quite a while ago(.) They just said it was a booster(.) Yeah(.) but what's it for? And nobody would tell me what it was for(.) so it's just things like that(.) I think sometimes they just… It's not their fault because they are so busy(.) but sometimes the vet is under such pressure and they don't really have the time(.)"

3.2.3.4.4.2.4 Veterinary sensitivity to owner emotions

Another common cause of conflict discussed was instances where veterinary professionals were not deemed to be understanding of the emotional burden decision making had on owners. When veterinary professionals were thought to be insensitive or to trivialise an owners emotions, owners felt they damaged the relationship between the two parties and increased the owners distress.

O: "I had a little Yorkie was 14 years old and he just had had liver disease but he was getting kidney disease(.) It's gone blind in both eyes(.) He just(.) to me he had enough(.)

He was full of tablets and stuff(.) but you took him into the vet and it was at all 'sorry chaps(.) she don't want you no more' Even the nurse said to me afterwards(.) 'if you wanna report him(.) you can(.) And I was upset because he was out of order(.)"

3.2.3.5 Analysis 4: Veterinary professional experiences of decision-making

Discussions in this area focussed heavily on the emotional aspects of decision-making and the challenges and stressors decision-making brings. Participants talked extensively about a veterinary professionals responsibility to make the correct decision for a patient, evidence as a valuable tool in making this decision, and the difficulties surrounding evidence-based decision-making.

3.2.3.5.1 Theme 1: Making the right decisions

Participants expressed that robust decision-making processes are an attempt to ensure you are making the correct decision and not incorrect decisions. During the discussions, an evidence-based process was deemed to provide this certainty and science was viewed as the key component.

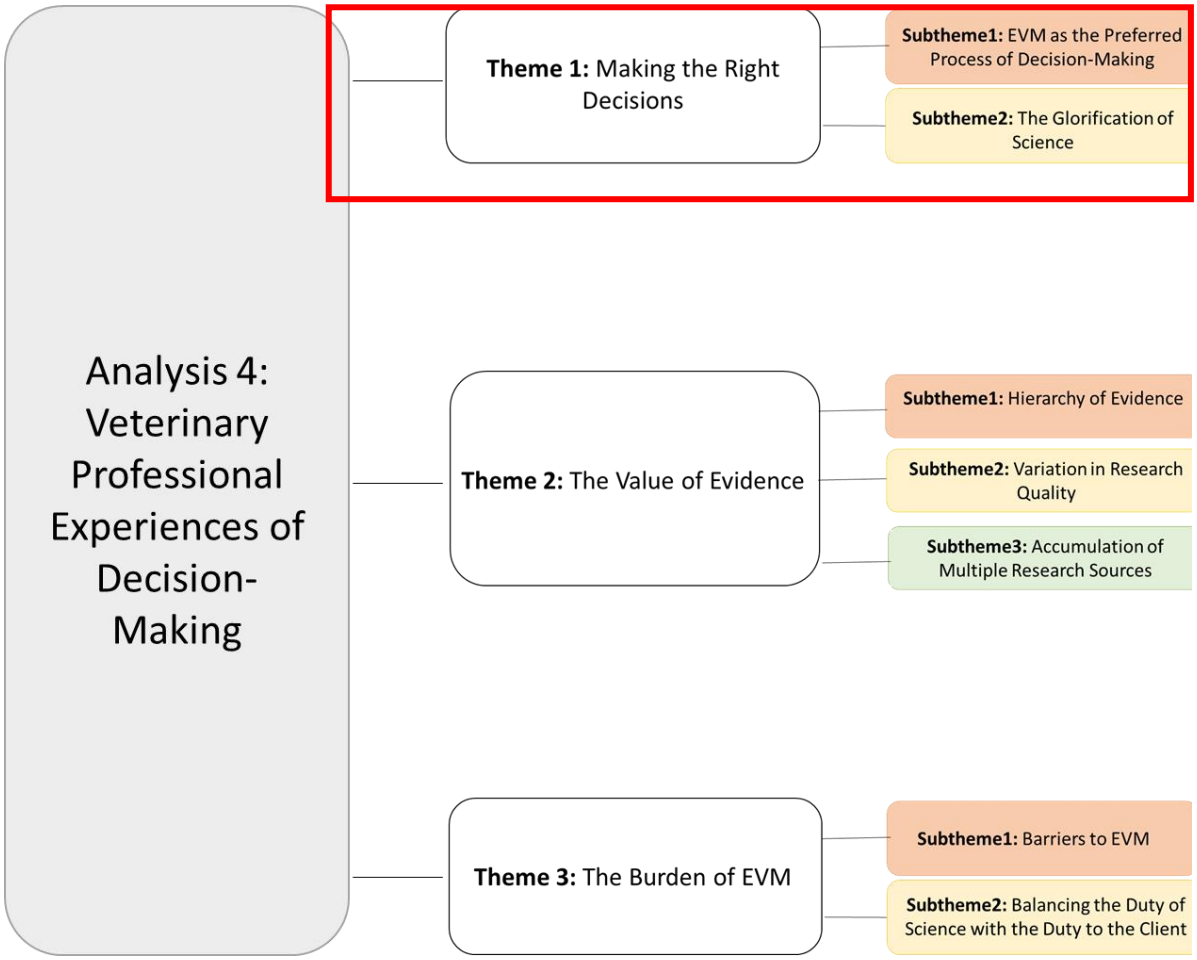


Figure 25: Coding tree for Analysis 4 Theme 1 Making the right decisions.

3.2.3.5.1.1 Subtheme 1: EVM as the preferred process for decision-making

Although the framework did not mention EVM directly, the majority of participants described the concept as the preferred process for decision-making. It was frequently suggested that veterinary professionals should be using EVM processes in their decision-making. Participants indicated that evidence-based practices were encouraged by the profession and so should be guiding the daily practice of vets.

P: "Because we have the code to follow(.) And when you look at the code and it's putting in(.) what you should actually be doing by way of evidence-based medicine(.) by way of clinical audit(.)"

Participants also suggested that the goal of EVM was to ensure better outcomes for patients. It was suggested that basing your decisions on research evidence was in the best interests of the animals in your care.

P: "That should give better outcomes(.)"

Participants did note that not all practitioners were as convinced of the value of EVM and some practitioners would choose other decision-making processes. In fact, one participant explained that they chose not to use evidence-based practices in their own decision-making.

P: "I think be tricky to get that mindset entrenched in people who aren't used to thinking about an evidence-based approach to medicine(.)"

P: "I would have to say it [EVM](.) It just is not on my radar at all(.) And it has no impact really(.) I'm what I'm actually doing and I'm basically working just on autopilot(.)"

3.2.3.5.1.2 Subtheme 2: The glorification of science

When discussing participants' personal definitions of evidence-based decision-making, all participants insinuated that 'evidence' was synonymous with scientific research papers and some participants went as far as to suggest that other factors in decision-making were less important.

P: "I've got a [PG certificate] so I've got quite a lot of background in reviewing papers etc(.) Um I work for [charity vets] on their [clinical quality] team so we really do look at the evidence in deciding what drugs and treatments we have(.) So quite a passionate interest really(.) I understand that EBM is trying to assess the evidence available and use that to appropriately manage how we treat animals with our medicines"

P: "Because the softer aspects of decision making like 'who are the client is' 'what their attitudes are' there's more give in them"

Considering previous discussion on the existence of a 'correct decision' and attitudes towards discovering this through the decision-making process, it is perhaps unsurprising that many participants expressed that the value of research stemmed from its ability to provide certainty and objectivity. Participants placed most value in research which aimed to find a single, correct, generalisable answer.

P: "Whereas you shouldn't view scientific evidence as having any give(.) The whole point is(.) it is meant to be presented as facts(.) "

3.2.3.5.2 Theme 2: The value of evidence

There was much discussion surrounding the calibre of various sources of evidence. Participants put considerable focus on ensuring they used the best information possible for decision making and so often referred to ranking information sources in terms of their usefulness. This was true of ranking sources based on what type of evidence they were but also on their perceived quality.

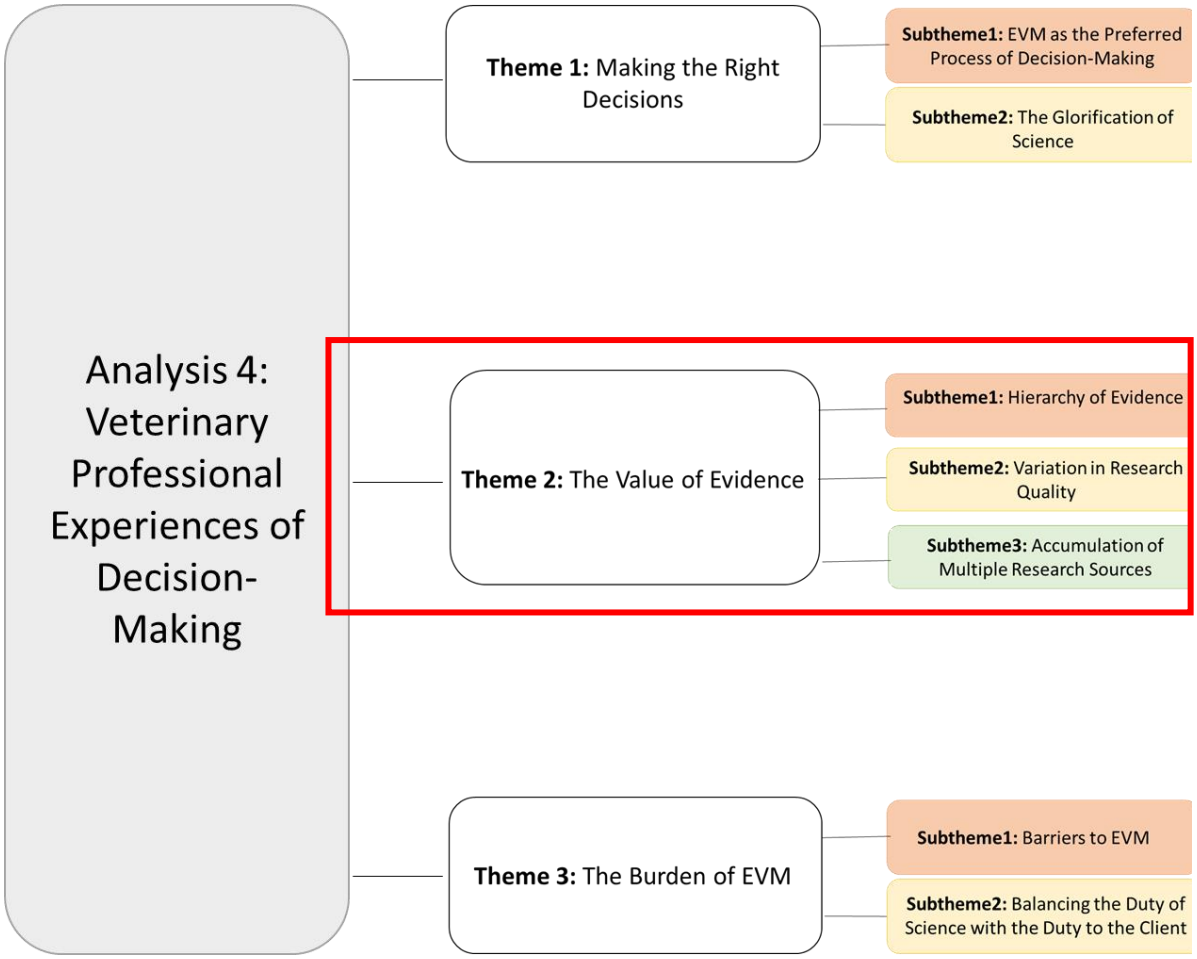


Figure 26: Coding tree for Analysis 4 Theme 2 The value of evidence.

3.2.3.5.2.1 Subtheme 1: Hierarchy of evidence

Multiple participants indicated a belief that some types of sources and some types of research study had inherently more value than others. A key suggestion for

improvements to the framework revolved around the inclusion of a hierarchy or pyramid of evidence.

P: "Potentially having some sort of link within it or directing readers to where they could learn more about the tiers of evidence quality could be useful(.)"

P: "Ideally having some sort of way of ranking the quality of different bits of evidence and applying like a sort of the pyramid of evidence from the weakest being anecdotal personal experiences through to meta-analysis and systematic review(.)"

3.2.3.5.2.2 Subtheme 2: Variation in research quality

As well as its inherent worth, a piece of evidence was also judged for its apparent quality. This was often discussed as a barrier to EVM implementation, as participants considered there to be a lack of high-quality research information in veterinary medicine. While many participants also discussed the importance of critical appraisal few explicitly explained what constituted 'high' or 'low' quality.

P: "I understand that there is a poor sphere of evidence for veterinary medicine(.)"

P: "I think one of the big one of the big problems with all evidence-based decision making is the fact that often when you look at the quality of evidence in any sphere(.) whether it's you know behaviour or any of the others(.) you find the quality of the evidence isn't that great because a lot of it relies on scoring by the owners(.)"

3.2.3.5.2.3 Subtheme 3: Accumulation of multiple information sources

Rather than a single evidence source being sufficient to form a decision, participants indicated that they reviewed a number of sources to form their own conclusions. This was sometimes discussed in terms of seeking a broad understanding and, in other places, as an attempt to mitigate the impact of poor-quality information.

P: "I think it's trying to compile and actually seeking all of the knowledge and information available to you practically(.) at that time(.) when you make any decisions about general treatments(.) interaction with clients(.) "

3.2.3.5.3 Theme 3: The burden of EVM

The difficulties professionals faced in trying to implement evidence-based ideals was a common theme in all of the discussions. Although most participants viewed the use of evidence as important to decision-making, they often referred to the process as difficult.

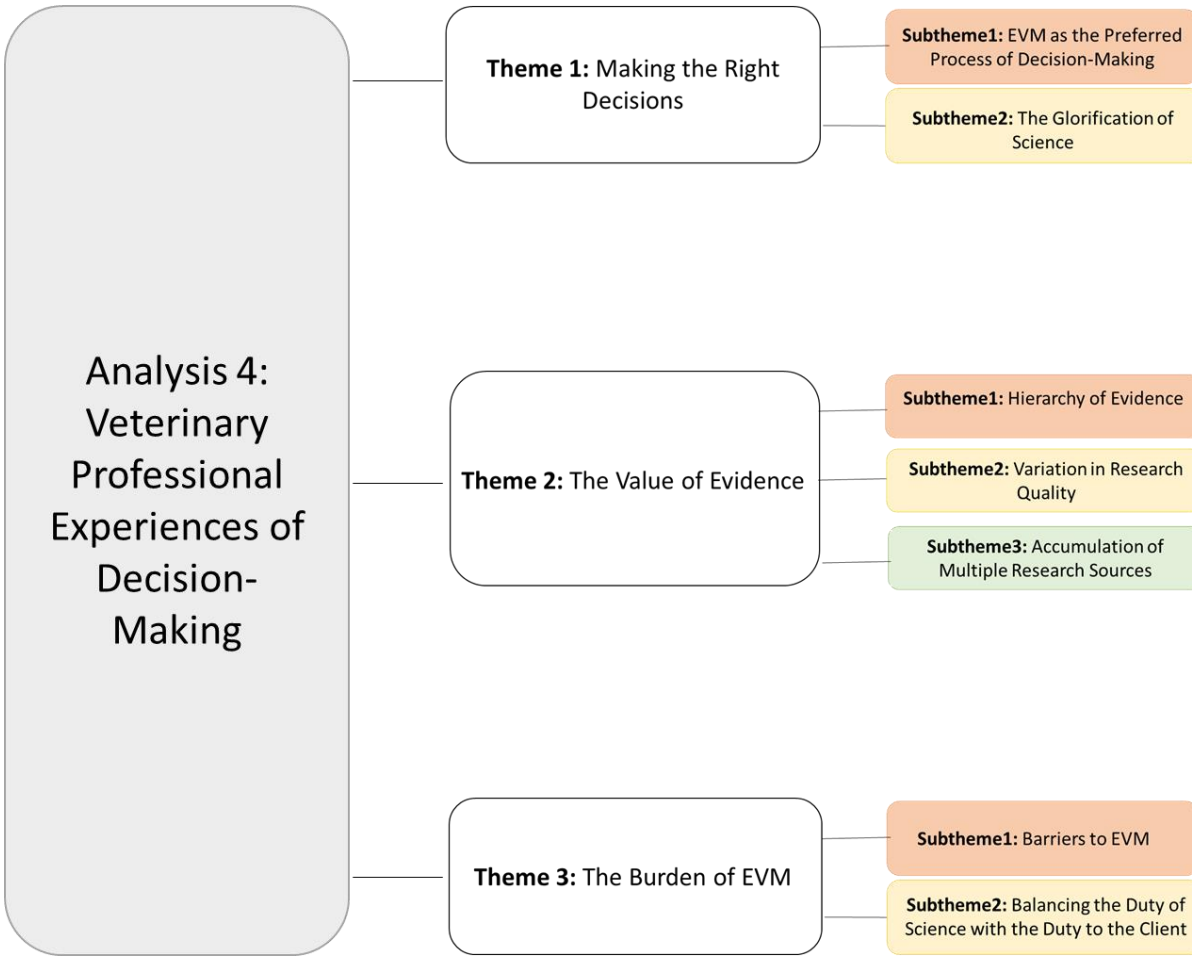


Figure 27: Coding tree for Analysis 4 Theme 3 The burden of EVM.

3.2.3.5.3.1 Subtheme 1: Barriers to EVM

Participants expressed concern over a number of factors which prevent efficient implementation of evidence-based practices. One of these focussed on a lack of time to devote to the process. A number of participants expressed that often decisions had to be made quickly, restricting their ability to compile and assess information on a topic.

P: "Unfortunately(.) in my experience it is not very practical to say in every single situation 'Great got that problem(.) I think we reaching a diagnosis(.) I'll get back to you in two days' time with my evidence-based decision and what we do next(.)'"

P: "It's good to encourage people to look at the evidence basis for decisions but in practice is often not easy or practical to(.) because you might only have a 10 minute appointment slot"

Another significant barrier was the amount of work required of the professional to obtain all of the evidence. Many participants expressed that this expectation was unrealistic considering the variety of topics a professional would need to be up to date on. It was suggested that high quality information needed to be more readily available to make this process easier, otherwise EVM could not be effectively implemented.

P: "But that was the thing I thought(.) Oh(.) this is a lot for somebody who's you know(?) Just trying to decide whether to use you know a semi new drug or but all gone into a new practice saying got a different availability with different drug(.) It's a lot for them to sort of necessarily want to access(.)"

3.2.3.5.3.2 Subtheme 2: Balancing the duty to science with the duty to the client

Participants also expressed that the views and wishes of the clients sometimes prevented them from actioning their evidence-based decisions. It was felt that personal beliefs could sometimes come into conflict with presented evidence. This was expressed as a source of difficulty within EVM implementation.

P: “And then if someone believes that [false information] 100%(.) there's no scope for improvements to be made down the line because they are told categorically every time my dog gets itchy it has to have steroid tablets(.) And they believe that’s fact and you know that doesn't help future case management(.)”

3.3 Phase 3: Finalisation of frameworks

The final veterinary professional framework can be accessed using this link https://thatsaclaim.org/veterinary/. The animal owner framework can be found in Appendix 7.

4 Discussion

4.1 A broad summary of findings

It appears that owners and veterinary professionals recognise the value of assessing evidence and having suitable tools to help facilitate the process. The role of evidence in shared decision-making appears to be pivotal to both stakeholder parties but each identified their own barriers and limitations. Both stakeholder groups welcomed the production of guidance documents and expressed a positive attitude toward receiving help with the implementation of evidence-based practices. There was a largely positive opinion towards the use of scientific research and information in the decision-making process, though both parties also recognised the importance and impact of individual and emotional factors. Each stakeholder group expressed having their own unique requirements from a framework, however, some concepts were shared across both groups.

4.1.1 Participant opinions on framework performance

Both groups emphasised the importance of ease of understanding and clear explanations within the guidance framework. This finding is unsurprising and corroborates the findings and advice of many different studies into readability of guidance information in healthcare (Schmutz *et al,* 2019, Williams *et al,* 2016*)*. This notion also features heavily in guidance from the International Federation of Library Association and Institutions in their 2010 “Guidelines for Easy-to-Read Materials” (Nomura, Skat Nielsen and Tronbacke, 2010).

During focus group discussions, participants identified a number of strengths and weaknesses pertaining to this theme. For both stakeholder groups, these factors were deemed integral to the overall usefulness of the framework.

Both stakeholder groups identified the value of examples in providing clarity and facilitating understanding. Each group also expressed that these examples needed to feel relevant to the reader and were most effective when they could see themselves within the example. By their nature, the concepts in the framework originated from a scientific and research-heavy standpoint and as a result could seem abstract and intangible. Relating these ideas to familiar, everyday scenarios, like treating burns with butter, permits the reader to understand the relevance of the concept in a real-world scenario. For many animal owners, their understanding of illness and treatment is largely framed by personal experience and anecdote. Veterinary professionals, on the other hand, are more familiar with scientific principles; for them ‘relevant examples’ pertains to illustrating the scientific principles in a clinical context.

In both groups, participants reported that while the document was useful, there would be other challenges faced in relation to convincing people to actually read it. Participants in both stakeholder groups spoke at length about the need for the framework to be as easy and user-friendly as possible in order to engage readers and convince them to spend time implementing the framework’s suggestions. Several participants expressed that although they had a particular interest in this area and believed the concepts displayed to be of the utmost importance, they would

likely have stopped reading or changed to skim reading if they had not been required to read it as part of the study. As individuals, people value their time and are often unwilling to invest effort into endeavours not perceived as critical. This is an integral part of human nature and is well documented in literature as far back as the 1960s (Becker, 1965). Time is valued so highly that many attempts have been made to quantify it monetarily to be able to include it in calculations (Okada and Hoch, 2004; Leunig, 2006; Baron and Blekhman 2002). Research into the usability of privacy policies for websites (which themselves have been described as frameworks for assessing personal privacy; (McDonald and Cranor, 2008)) has extensively shown that individuals will not effectively engage with or utilise guidance they perceive to require excessive amounts of personal effort (Jensen and Potts, 2004; Acquisti and Grossklags, 2005). This highlights the importance of ensuring the framework is easy to read – particularly in ensuring effective engagement and implementation of the concepts.

Convenience also extended to ensuring individuals could use one framework for all their evidence-based queries. Veterinary professional participants in particular expressed an awareness of other guidance documents which aimed to facilitate evidence-based decision-making primarily by explaining the process of critical appraisal (Holmes and Cockcroft, 2004; Cockroft and Holmes, 2004; Holmes and Cockroft, 2004). While the aim of the current framework was to take a wider scope and address all aspects of decision-making, some participants raised concerns that "diluting the message" and providing too much choice when selecting which framework to use could hinder effective implementation. Instead, participants from both groups expressed a need for a comprehensive tool that guides them from initial

understanding, through the daily practicalities of implementation, and beyond. This suggestion however seems to be at odds with other concerns about document usability, particularly of large documents. A solution may be the inclusion of links and signposting to other tools and guidance which would provide more in-depth information. In this way, the current framework could act as a central hub, through which a reader could access all the information and tools necessary to effectively implement evidence-based practices without interfering with the conciseness of the framework.

Though there were many similarities between comments from each stakeholder group regarding the framework, there were also key differences. Unsurprisingly, owners expressed a need to understand what the information that was acquired meant, whereas professionals placed high importance on appraising quality. The perceived importance of appraisal amongst professionals could stem from their expectations that the veterinary literature was lacking in both volume and quality. The veterinary profession has long highlighted extensive gaps in research knowledge and reduced quality of some research (Laidlaw *et al.*, 2012; Meats *et al.*, 2009; Boninger *et al.*, 2010). The implication of this in an evidence-based decision-making context is an increased responsibility placed on the professional to assess the quality of a potential source before deciding whether to incorporate it into a decision-making process. As well as the paucity of information hindering a professional's ability to make a decision that is based on scientific evidence, it also necessitates increased effort when attempting evidence-based decision-making in the form of extensive critical appraisal.

4.1.2 Participant reflections on broader decision-making experiences:

There were also both similarities and differences in stakeholder group experiences of broader decision-making. Interestingly, both parties referred to decision-making within the context of finding a 'correct' course of action. Within the discussions, participants were often searching for a single clear answer. Though they acknowledged that decision-making was not black and white, the rhetoric still revolved around decision-making being about choosing the 'correct' decision and facilitating the best outcome as if there were a single answer.

Previous research within the veterinary and human medical professions has highlighted this pressure to make the 'right' decision and has highlighted the negative consequences on professionals' mental health (Rohrer Bley, 2018; Broom, Broom and Kirby, 2014; Starr, 2015). Not only can this be a key source of stress for professionals but can significantly effect prescribing habits. Broom, Broom and Kirby (2014) showed that doctors prescribed antibiotics against the advice of guidelines to manage clinical uncertainty which often led to over-treatment of patients. It is well documented in the human clinical literature that risk perception associated with making the wrong decision has a considerable influence on professionals' behaviour and decision-making (Brewer *et al.*, 2007). In the veterinary profession, risk aversion has been shown to lead vets to advise vaccination in cattle without any evidence of disease "just in case" (Richens, Hobson-West and Brennan, 2016). This highlights professionals' fear of making the 'wrong call'.

To the author's knowledge, there is no previous research on animal owners' perceptions of a 'correct' clinical decision. There is, however, much research on the

emotional value of animals and the emotional strains owners face when decision-making. Many studies report that animal owners feel an intense duty of care to their animals and considerable guilt if they perceive they have made the 'wrong' decision (Rollin and Rollin, 2015). The emotional strain of decision-making is also documented amongst veterinary professionals (Rollin, 2011) and may explain the pressure to do what is 'best' for the animal.

Within discussions about clinical uncertainty and the search for the 'right' answer, both stakeholder groups insinuated that this was where scientific information was a valuable resource as they viewed it as being objective and providing certainty. In this way, it appeared that both professionals and owners were using research 'certainty' to mitigate the emotional turmoil of uncertainty. Interestingly, research by Wood, Ferlie and Fitzgerald (1998) and Higgs and Titchen (1995) has shown that research evidence is not as certain as sometimes thought, but is, in fact, influenced and adapted by the social and historical contexts in which it is constructed.

4.1.2.1 Perceptions of joint decision-making

An interesting difference during broader discussions of decision-making was an emphasis (or lack thereof) on joint/shared decision-making. While both stakeholder parties mentioned each other in their decision-making processes, owners put far more emphasis on decision-making being a shared endeavour. Where owners were viewing vets as a true resource in their decision-making and emphasising collaborative decision-making, professionals talked less about owners. Where professionals did mention owners, they were almost seen as a factor for the vet to consider rather than an equal partner in decision-making. The prompts used during

this study to direct discussion were not designed to explore joint decision-making explicitly which could account for this difference. However, the same prompts were used across both stakeholder groups, and this possibly highlights a lack of emphasis on joint decision-making within the veterinary professional framework. Given the increasing support for this style of decision-making by the profession (Cary, 2021), this was an unexpected find and could highlight an issue that needs to be rectified for the benefit of future veterinary decision-making relationships.

In recent years, the vet profession has responded to scrutiny over the exclusion of owners from decision-making and there are now a plethora of papers and guidance documents addressing this. Joint or shared decision-making has been a prevalent topic of discussion and recommendation within both the veterinary surgeon and veterinary nursing fields. Previous research includes guidance on how to implement shared decision-making (Cary, 2021), research on the roles of professionals and owners within decision-making (Christiansen *et al.*, 2016; Merle and Küper, 2021), and research into communication within decision-making (Cornell and Kopcha, 2007). However, research has also shown that problems in the decision-making relationship can be a cause of increased stress and conflict. Shaw *et al.* (2008) highlighted that differing perceptions in the roles of the vet and owner within decision-making contributed to distress surrounding decisions. A later study showed that vets who had a more client-focused approach to decision-making also had better relationships with their clients and fewer conflicts (Shaw *et al.*, 2016). Both studies also found that better communication between vets and owners resulted in higher owner compliance and better patient outcomes. These factors were all consistent with issues raised in the animal owner discussions. Participants talked extensively about poor vet-client relationships and breakdowns in communication

causing conflict and emotional distress. The frequency of these discussions reflects their importance to the participants and highlights the importance of joint/shared decision-making as a key issue for them.

From analysing participants' definitions of evidence-based decision-making largely inferred, particularly by veterinary professionals, that 'evidence' is synonymous only with scientific research papers which greatly restricts the inclusion of other evidence sources. Even within these discussions, 'evidence' appeared to include only review papers (systematic reviews and meta-analyses) and randomised controlled trials. It was insinuated that any other sources of information were not good enough for inclusion in decision-making. This may again come back to the belief that the value of scientific evidence is in providing certainty and generalisability. This restriction of what constitutes evidence is an oversimplified view of EVM. Though reviews and randomised controlled trials are often highly regarded as good sources of evidence, the definition of EVM allows for a wide range of resources to be utilised where robust scientific evidence is lacking (Dean *et al., 2015)*. This over-emphasis on structured review papers is also documented in the human medical literature. The definition of evidence-based medicine within the human medical field is largely credited to Sackett (1997) but the initial discussion around evidence centred on quantitative research papers. Meta-analyses and systematic reviews were held in high regard as it was thought they were less likely to be misleading about treatment effects (Sackett *et al.*, 1996; Excellence, 2012). The traditional medical definitions of evidence have led to an emphasis on mainly reviews and randomised control trials (RCT's) being considered as evidence good enough to base decisions on (Kennedy *et al.*, 2003). This has led to the relative dismissal of other forms of evidence and caused the

relationship between science, context, practitioner, and patient to be disregarded (Upshur, 1999). However, there has also been much discussion within the human medical field about the nature of evidence and what counts as evidence (Rycroft-Malone *et al.*, 2004). Rycroft- Malone et al. (2004) explores the difference between propositional and non-propositional evidence and the necessity of both for robust decision-making, concluding that combining sources is likely the most beneficial course of action. The definition of evidence-based veterinary medicine does not specify that 'evidence' must be RCTs or review papers (Dean *et al.*, 2015) but this appears to be the inference of the professionals in the study which could be limiting available resources and hindering decision-making. Many of the criticisms of EVM offered by participants also stemmed from misunderstandings of the definition. Participants suggested that the concept of EVM discounted personal experience and owner factors and didn't account for an individual's capabilities. All of these factors are explicitly included in the definition of EVM (Dean, 2013) so it appears that practitioners may have an oversimplified view of what EVM is and perhaps reflect the professions' progress with the concept of EVM generally.

The veterinary professional participants also often referred to EVM as an individual endeavour. Participants spoke of the personal responsibility to implement evidence-based decision making and the descriptions of their evidence-based processes were also very individualistic. Veterinary professionals also commented that the points within the framework, while important, were too much for one person to incorporate. Concern was also raised regarding the practicalities of implementing an evidence-based approach. Though the veterinary professional participants understood the concepts and processes of evidence-based decision-making, they were uncertain

about how to practically achieve them in daily practice in the context of their other responsibilities. These factors together suggest that a re-evaluation of the focus of responsibility from individuals to a practice-wide endeavour might facilitate more effective and efficient EVM implementation within a practice and prove less stressful for practitioners.

During owner discussions, two participants disclosed learning disability diagnoses. These were mentioned in the context of suggestions to improve readability to incorporate those individuals' needs, however, they highlighted an important oversight in the original translation process. In England alone, an estimated 2.16% of adults are likely to have a learning disability (England, 2016), many of which are characterised by the effects that they have on the individual's literacy skills (Rochelle and Talcott, 2006). The understanding of this framework relies heavily on these skills and as such further improvements should take into consideration the needs of these individuals. Many simple modifications such as breaking large passages of text into bullet points, considering colour schemes that are dyslexic friendly, and the inclusion of graphics and visual aids can greatly improve readability for dyslexic people (General Teaching Council Scotland, 2021) and non-dyslexic people alike.

Overall, the discussions generated a multitude of themes and concepts useful to both improvement of the draft framework and also wider understanding of both veterinary professional and animal owner experiences in decision-making.

4.2 Limitations of the study

There were difficulties with recruitment during the process of focus group organisation. Upon initial advertisement of the study, there was considerable

completion of the recruitment survey. However, participation numbers reduced for questionnaire 2 which focused on availability for a focus group. Although participants were contacted on three separate occasions for focus group availability, the lack of responses caused logistical difficulty when combining multiple participants' schedules to identify an appropriate focus group time. After the initial surge of participants, recruitment also plateaued and subsequent advertisements yielded few additional participants. This lack of commitment to a focus group could be explained by many factors. Firstly, the study was relatively demanding of both time and effort from the participants. The method employed was a multi-stage process that required participants to complete multiple surveys. The focus groups required people to pre-read a draft of the framework, formulate their opinions, and then give up a designated proportion of their time to answer questions and actively engage with other participants. In light of the previous discussions on people's perceptions of the value of time, this could explain why individuals did not want to commit to the study. Secondly, the advertisement of the study heavily relied on social media. This was useful because it provided flexibility in targeting each subgroup within the stakeholder groups of interest, but many of the social media sites were high traffic sites and posts may not have reached the news feeds of many members. Furthermore, the nature of the advertisements did not require interaction in the form of likes, comments, etc. Since these factors are important in boosting the visibility of a social media post, the advertisements may have only reached a limited number of people (Kumar *et al.,* 2019). The timing of the data collection window also aligned with the approach to Christmas and the New Year. This is traditionally a very busy time for people in the UK (where participant recruitment was targeted) and may have contributed to individuals being unable to participate. Other studies recruiting

individuals over the festive period have not necessarily been affected (Richens *et al.*, 2018); the current study also coincided with the COVID-19 pandemic which could be an alternative explanation for the low response. While many of the pandemic restrictions were being lifted, the data collection period coincided with a dramatic increase in the number of cases and a wave of the omicron variant (Balogun, 2021) which is likely to have contributed to the difficulty in recruiting participant numbers. Nearly 1 million people were estimated to be positive for COVID-19 in the week before the first focus group (Statistics, 2021). This figure rose to almost 3 million during the week of the last interview (Statistics, 2022). The COVID-19 pandemic had a direct impact on the study with one focus group being cancelled as a number of participants became ill, with the researcher also catching the virus during the data collection period. It is likely, therefore, that this had a significant impact on recruitment.

The ontological and epistemological stance of this research and the guidelines surrounding reflexive thematic analysis methods do not require large sample sizes to ensure validity (Braun and Clarke, 2022; Coyne, 1997; Morse, 2016; Malterud, Siersma and Guassora, 2016). The nature of experiential data prevents generalisability to a wider population (Braun and Clarke, 2013) as the data is defined by the context of the individual participant it is collected from. This means the experiences of one participant are not expected to be the same as that of any other individual or to be representative of the population as a whole. Manipulating the schedules of multiple participants and organising a focus group time that accommodated everyone took a considerable amount of time. Towards the end of the data collection window, it became apparent that the rest of the participants would not be able to be accommodated in large focus groups in the time frame available.

The decision was therefore taken to include smaller groups as well as one-on-one interviews to relieve this time pressure and allow the inclusion of as many participants as possible. Research into the relative value of both data collection methods has previously shown both focus groups and interviews to be highly valuable in gathering participant opinions and experiences (Braun and Clarke, 2022; Kaplowitz and Hoehn, 2000). Interviews are particularly utilised for their ability to gather significant information on an individual's experiences and are most advised when the content of the discussion may be sensitive (Gill *et al.*, 2008). In these scenarios, participants may be less willing to divulge personal information to larger groups of people or, in the case of controversial topics, may be wary of social judgement from other participants. Interviews permit a rapport to be built between interviewer and interviewee leading to interviewee engagement with the interview content to ensure well-rounded, nuanced responses (Galletta and Cross, 2013). Focus groups, on the other hand, foster discussion between participants and allow the interviewer to play more of an observation role (Gill *et al.*, 2008). In this way, the dynamics of group discussions can be analysed and discussion between participants can allow them to build on each other's viewpoints.

After comparison of the data from both collection methods, there did not appear to have been a substantial difference in the content of the discussions. Many similar themes and topics were raised in both the interviews and focus groups and individual participants expressed themselves in largely the same amount of depth. The average focus group was 56 minutes long compared to 48 minutes for interviews. The content of these focus groups was not personal or confidential and so social pressure is unlikely to have altered participant responses. Discussion within focus groups did help to elaborate and expand upon participants points where participants

conversed with each other, however, this role was taken on by the interviewer during interviews so in-depth, nuanced opinions were still conveyed.

Some key stakeholder subgroups were not represented in the participants. Amongst the veterinary professionals, equine-specific professionals, nurses, and other paraprofessionals were not recruited. The animal owner group did not include any commercial farmers.

This research was advertised to veterinary nurses through social media pages targeted at this group. Eight nurses filled out the original recruitment survey, but none were able to commit to a focus group or interview. It was later discovered that the data collection window coincided with a key examination period for veterinary nurses which could have been a barrier to successfully recruiting this subgroup. As well as veterinary nurses, other paraprofessionals such as physiotherapists, behaviourists, and nutritionists are becoming more involved in advising owners and making decisions that affect the welfare of animals in their care. There is less research available within these specialisms however it is important to encourage all paraprofessionals to understand the value of evidence and to facilitate the use of evidence in their practice. One veterinary behaviourist participated in the research, however no other paraprofessionals were able to be recruited into the study. Additionally, the farming community is a key subgroup within the animal owner stakeholder group. Their relationship to both their animals and with the veterinary profession has stark differences from that of pet owners (Hemsworth 2007). In light of this, extensive effort was made to recruit farming participants through targeted advertising, however, this was unsuccessful. Though many of the animal owner

participants had owned production animals, this was not in a commercial capacity, leaving the data devoid of this viewpoint. Many of the suggestions raised by veterinary professional participants who work in production animal medicine could be adapted for inclusion in the animal owners branch of the framework. The farming profession is notoriously busy, so it is unsurprising that farmers felt unable to commit to this study (LaBrash *et al.,* 2008). It is important that the framework addresses the views and needs of all subgroups of the target audience if it is to be effective for all stakeholder groups. The aforementioned barriers to recruitment apply here amongst other influencing factors. In the future, incentives could potentially be offered to compensate these groups for their time or alternatively, the use of questionnaires may achieve more success as participants could respond when convenient for them.

4.3 Future work

Decision-making encompasses every action and interaction within a veterinary environment, however, the results of this study suggest that there is still much uncertainty and stress surrounding the process of making a clinical decision. While many people recognise the importance of using evidence as the basis of clinical decisions, there are still many queries and issues surrounding its application. This highlights the need for frameworks and guidance to facilitate and educate both veterinary professionals and owners.

During the discussions in this study, all participants expressed a desire for this information to be available in as many different formats as possible. While online resources were most popular, leaflets and posters were highly recommended by many participants. Veterinary professionals also commonly suggested short articles

with signposting to the full framework within veterinary journals and magazines. Adapting the framework to fit these forms of media would require extensive work and likely further public testing. The two biggest tasks involved in the continuation of this work are likely to be 1) reducing the number of words from the framework – since posters, leaflets, and articles would be greatly restricted by word count and 2) the creation of visual aids and diagrams. Advertisement of the framework's existence will also need to be a consideration, especially for animal owners where there are less obvious direct information dissemination routes. Once versions of this framework have been disseminated, it would be beneficial to gather data on its real-world application and any changes to decision-making habits as a result of engaging with the framework. This would provide an idea of the success of the framework in actually facilitating change and potentially provide useful feedback for further improvement. Engagement with online resources can be monitored using website monitoring software, however, more in-depth feedback on individuals' experiences of using the framework would require surveys or further discussions.

A frequently expressed concern, largely from veterinary professional participants, focussed on the practicalities of making EVM part of daily practice. Though participants stated that they knew what it meant to make evidence-based decisions and how to select and appraise sources, there were many questions about how they were expected to fit it into their job and day-to-day routines. Though multiple different tools exist to help individuals employ EVM practices (BestBETS for Vets, 2022, VetSRev, 2022, RCVS Knowledge 2022), it appears there are still some fundamental issues with whether current practice logistics (e.g., time available to engage with EVM) support practitioners utilising an EVM approach. Further evidence is needed to uncover the best methods for integrating EVM practices as a daily routine. Currently,

the onus for making evidence-based decisions lies with individual vets who must find time to collect and appraise research on all topics and for whom the sole burden of decision-making often falls. Perhaps some of this responsibility should be given to practices rather than individuals where the burden of responsibility could be shared. Many practices already create protocols for various scenarios and will have a process for creating personalised, in-practice guidance that individual vets could choose to utilise (Gunn, 2000). If the responsibility for updating and adding to these protocols were shared, then individual veterinary professionals may feel less daunted by the process of evidence-based decision-making. Knowledge exchange within and between practices may be just as important as that between researchers and practitioners. Alternatively, perhaps more time needs to be put aside to permit veterinary professionals to update themselves on the plethora of new information published daily. More research is needed into how practices and individuals go about implementing EVM and which strategies are thought to be most useful. It is unfair to expect individual practitioners to have detailed knowledge of the existing literature on every condition they encounter. With the ever-reducing amount of time afforded to conduct consultations and make decisions, vet professionals are often left unable to properly assess the literature before making decisions (Larson and White, 2015). For many, it is not a lack of will to implement effective EVM but simply that the current culture of veterinary practice and decision-making is often at odds with EVM processes (Toews, 2011). Further research is needed to assess a more efficient system of implementation.

If animal owners are now showing more interest in educating themselves on diseases and possible treatments, then the profession needs to facilitate the

provision of high-quality resources for owners. Many of the participants expressed finding it difficult to obtain and gain access to trustworthy resources. Many also expressed that not having the information or having incorrect information was a significant source of stress and conflict with their veterinary professionals. It appears that animal owners would greatly benefit from a centralised, independent source of information that could explain common problems in a simple format, based on evidence. One participant explicitly asked if a veterinary version of the NHS website (National Health Service) existed. Though this human resource is vast, a scaled-back version may help animal owners to make more informed clinical decisions and could help tackle the misinformation epidemic. Further research is required to assess what resources are currently available to owners, what they want from potential resources, and if any of the suggestions posed here are feasible.

In conclusion, this study has highlighted a need for further clarification and guidance on utilising the evidence base in decision-making for both veterinary professionals and animal owners. The production of a comprehensive guidance framework, taking into consideration the feedback from the participants, is the first step in minimising this gap, however, further work is required to reach stakeholder subgroups not covered in this study. Further investigation into how to practically implement EVM for both stakeholder groups would also provide much-needed evidence on how this approach could be achieved and what benefits it is likely to result in.

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6 Appendices

6.1 Appendix 1: Reflexivity statement

The organisation and execution of data collection along with subsequent analysis was conducted by NB who is a white female. NB has conducted this study as part of an intercalated Masters in Research between the 4th and 5th year as part of a Bachelors in Veterinary Medicine and Science from the University of Nottingham. NB has previously attained a Bachelors in Bioveterinary Medical Science (BVMedSci) also at the University of Nottingham. NB grew up in South East London and attended state school to the age of 18 and enrolled in the School of Veterinary Medicine and Science at the University of Nottingham after a year of deferred entry.

It is feasible that NB's role within the veterinary profession may contribute to their interpretation and analysis during the study along with personal experience as an animal owner seeking veterinary advice.

Prior to the focus groups, participants were only informed of NB's status as an intercalated Master's student and an undergraduate student of veterinary medicine.

6.2 Appendix 2: The use of social media in the recruitment of participants

6.2.1 Utilising Facebook For Recruitment of Participants

Facebook (*Facebook*) groups associated with animal content were identified via the Facebook search tool and a series of keywords including vet, veterinarian, veterinary nurse, pet, farm, equine, exotic and various species names. Groups that did not

allow external people to post or whose admin rules stated advertising was not allowed were discounted along with buy-sell sites.

The study was advertised on 30 Facebook groups in total. Six groups were aimed at veterinary professionals, four were specifically aimed at both veterinary professionals and animal owners (e.g., forums where owners could ask vets questions) and the remaining 20 were species specific animal appreciation groups and so were indiscriminate about a target audience and could plausibly contain both veterinary professionals and animal owners. Of the 30 groups, seven contained content relating to small animals (i.e., dogs, cats and rabbits), seven targeted production animals, four exotics, three horses and the remaining nine did not restrict their content by species interest.

Where groups were available publically, the adverts were posted freely. With private groups, a message was first sent to administrators of the group to seek approval to post. All posts adhered to the rules of the individual group. Posts were repeated roughly every 2-3 weeks for the duration of the data collection window.

6.2.2 Utilising Twitter for Recruitment of Participants

The study was advertised on multiple Twitter accounts including the CEVM, IHC, and Ruminant Population Health pages. The content of the Twitter posts was similar to that of the Facebook posts but with shorter study descriptions because of the character length restriction on Twitter posts.

6.3 Appendix 3: Questionnaire 1 (recruitment questionnaire) questions

6.3.1 Demographic questions common to both veterinary professional and animal owner recruitment questionnaire

Questions and closed response options asked within the recruitment survey to both groups of recruits

Questions	Type of Response	Response options from a multiple choice list
What is your age?	Free text box restricted to 2 integers	
Which gender identity do you most identify with?	Multiple choice	Female
		Male
		Gender non-conforming
		Prefer not to say
		other
What country do you currently live in?	Multiple choice question	England
		Scotland
		Wales
		Other
Which county of England do you live in?	Drop down menu. Only prompted to answer this question when 'England' is selected in the previous question.	Bedfordshire
		Berkshire
		Bristol
		Buckinghamshire
		Cambridgeshire
		Cheshire

	(*Lieutenancies Act*, 1997; *Association of British Counties*)	Cornwall
		Cumbria
		Derbyshire
		Devon
		Dorset
		Durham
		The East Riding of Yorkshire
		East Sussex
		Essex
		Gloucestershire
		Greater London
		Greater Manchester
		Hampshire
		Herefordshire
		Hertfordshire
		Isle of Wight
		Kent
		Lancashire
		Leicestershire
		Lincolnshire
		Merseyside
		Norfolk
		Northamptonshire

		North Yorkshire
		Nottinghamshire
		Oxfordshire
		Shropshire
		Somerset
		South Yorkshire
		Staffordshire
		Surrey
		Suffolk
		Rutland
		Tyne and Wear
		Warwickshire
		West Midlands
		West Sussex
		West Yorkshire
		Wiltshire
		Worcestershire
		Other (Specification required in free text box)
		Aberdeen City
Which Local Authority of Scotland do you live in?	Drop down menu. Only prompted to answer this question when	Aberdeenshire
		Angus
		Argyll and Bute
		Clackmannanshire

	‘Scotland’ is selected in the previous question. (*Local Authority Maps of Scotland*, 19)	Dumfries and Galloway
		Dundee City
		East Ayrshire
		East Dunbartonshire
		East Lothian
		East Renfrewshire
		City of Edinburgh
		Falkirk
		Fife
		Glasgow City
		Highland
		Inverclyde
		Midlothian
		Moray
		North Ayrshire
		North Lanarkshire
		Perth and Kinross
		Renfrewshire
		Scottish Borders
		South Ayrshire
		South Lanarkshire
		Stirling
		West Dunbartonshire
		West Lothian

		The Outer Hebrides
		Orkney Islands
		Shetland Islands
		Other (Specification required in free text box)
		Aberconwy and Colwyn / Aberconwy a Cholwyn
Which Principal Authority of Wales do you live in?	Drop down menu. Only prompted to answer this question when 'Wales' is selected in the previous question. (*Local Government Act*, 1972)	Anglesey / Sir Fôn
		Blaenau Gwent / Blaenau Gwent
		Bridgend / Pen-y-bont ar Ogwr
		Caernarfonshire and Merionethshire / Sir Gaernarfon a Meirionnydd
		Caerphilly / Caerffili
		Cardiff / Caerdydd
		Cardiganshire / Sir Aberteifi
		Carmarthenshire / Sir Gaerfyrddin
		Denbighshire / Sir Ddinbych
		Flintshire / Sir y Fflint

		Merthyr Tydfil / Merthyr Tudful
		Monmouthshire / Sir Fynwy
		Neath and Port Talbot / Castell-nedd a Phort Talbot
		Newport/Casnewydd
		Pembrokeshire / Sir Benfro
		Powys / Powys
		Rhondda, Cynon, Taff / Rhondda, Cynon, Taf
		Swansea /Abertawe
		Torfaen / Tor-faen
		Vale of Glamorgan/Bro Morgannwg
		Wrexham/Wrecsam
		Other (Specification required in free text box)
		Corporate managers and directors
Which field best describes your occupation?	Dropdown menu.	Other managers and proprietors

	(*SOC 2020 - Office for National Statistics*, 2020)	Science, research, engineering and technology professionals
		Health professionals (inc. Veterinary surgeons, Veterinary nurses etc)
		Teaching and other educational professionals
		Business, media, and public service professionals
		Science, engineering and technology associate professionals
		Health and social care associate professionals
		Protective service occupations
		Culture, media and sports occupations
		Business and public service associate professionals
		Administrative occupations

		Secretarial and related occupations
		Skilled agricultural and related trades
		Skilled metal, electrical and electronic trades
		Skilled construction and building trades
		Textiles, printing and other skilled trades
		Caring personal service occupations
		Leisure, travel and related personal service occupations
		Community and civil enforcement occupations
		Sales occupations
		Customer service occupations
		Process, plant and machine operatives
		Transport and mobile machine drivers and operatives

		Elementary trades and related occupations
		Elementary administration and service occupations
		Student
		Other (Specification required in free text box)
If your course is at undergraduate level or higher, what subject area is your course primarily focused on?	Free text box – a single line of text. Only prompted to answer this question when 'Student' is selected in the previous question.	

6.3.2 Veterinary professional specific recruitment questions

Questions that were unique to veterinary professionals that were included in the recruitment survey.

Questions	Type of Response	Response options from a multiple choice list
What year did you first graduate?	Free text box	
	Multiple choice question	Yes

Do you currently work in practice? E.g., seeing and treating patients		No
What is your role within the practice? (e.g., Practice manager, Head surgeon/nurse, Surgeon/Nurse, Student Nurse, etc)	Free text box – a single line of text Only prompted to answer this question when 'Yes' is selected in the previous question.	
Do you work in first opinion or referral practice?	Multiple choice question Only prompted to answer this question when 'Yes' is selected in the previous question.	First opinion
		Referral
		Both
		Other (specification required in free text box)
What species do you primarily work with? (Select all that are appropriate)	Multiple choice question	Small animals (dogs, cats, and rabbits)
		Production animal (cattle. Sheep, goats, poultry, aquaculture

		Exotics (any other small mammals, reptiles, birds, and pet fish)
		Equine
		Other (specification required in free text box)
		No longer work with animals
When did you stop working with animals	Free text box. Only prompted to answer this question when 'No longer work with animals' is selected in the previous question.	
What is the subject area of your highest qualification?	Free text box	
Are you part of a journal club or other group that regularly reads scientific papers?	Multiple choice question	Yes
		No

How often do you read scientific papers?	Multiple choice question	Weekly
		Fortnightly
		Monthly
		Infrequently
		Other (specification required in free text box)

6.3.3 Animal owner-specific recruitment questions

Questions that were unique to animal owners that were included in the recruitment survey.

Questions	Type of Response	Response options from a multiple choice list
Which of these species have your previously/do you currently own?	Multiple choice question	Cat
		Cattle
		Dog
		Rabbit
		Exotics (pet birds, reptiles, and small mammals excluding rabbits)
		Pet fish

		Aquaculture
		Horse/Pony/Donkey
		Pigs
		Poultry
		Sheep
		Other (specification required in free text box)
Have you had any previous interactions with the CEVM? (e.g., participating in previous studies, participating in training/courses, reading the newsletter, engaging with our social media platforms, etc)	Multiple choice questions	Yes
		No
Does your current pet have any ongoing medical issues requiring monitoring/maintenance/treatment etc?	Multiple choice question	Yes
		No
Have you ever searched for information about pet health issues?	Multiple choice question	Yes
		No

If so, how often do you research pet health issues on average?	Scale/rank question Only prompted to answer this question when 'Yes' is selected in the previous question.	Frequently
		Every month
		Every few months
		A couple of times a year
		Infrequently
If you were to research animal health issues, which information sources are you most likely to use?	Multiple choice question	Google search
		Species/breed specific websites
		Social media groups/forums
		Species/breed specific magazines
		Scientific journals/papers
		Asking your vet/vet nurse
		Advice from friends and family

		Other (specification required in free text box)

6.4Appendix 4: Participant consent form template

PARTICIPANT·CONSENT·FORM¶

Project·Title:¤
Development·of·a·framework·for·supporting·veterinary·professionals·and·animal·owners·to·interpret·and·apply·scientific·evidence·for·animal·health·and·welfare¤

¶

Researchers·Name:¤
Natasha·Basham·¤

¶

Supervisors·Names:¤
Marnie·Brennan·and·Lisa·Morrow¤

¶

Please·read·the·following·point·carefully·and·enter·an·(X)·in·each·box.·¤	
¤	I·have·read·the·Participant·Information·Sheet·and·the·nature·and·purpose·of·the·research·project·has·been·explained·to·me.·I·understand·and·agree·to·take·part.¤
¤	I·understand·the·purpose·of·the·research·project·and·my·involvement·in·it.¤
¤	I·understand·that·I·may·withdraw·from·the·research·project·at·any·stage·and·that·this·will·not·affect·my·status·now·or·in·the·future.¤
¤	I·understand·that·while·information·gained·during·the·study·may·be·published,·I·will·not·be·identified.¤
¤	I·understand·that·I·will·be·audiotaped·during·the·research.¤
¤	I·understand·that·data·will·be·stored·at·the·University·or·in·the·possession·of·the·researcher·and·will·only·be·accessible·to·the·researcher·and·supervisors.¤
¤	I·understand·that·I·may·contact·the·researcher·or·supervisor·if·I·require·further·information·about·the·research,·and·that·I·may·contact·the·Research·Ethics·Coordinator·of·the·School·of·Veterinary·Medicine·and·Science,·University·of·Nottingham,·if·I·wish·to·make·a·complaint·relating·to·my·involvement·in·the·research.¤

¶

Signed·.....·(Research·participant)¶

Print·name·.....·Date·.....¶

Contact·details¶

6.5 Appendix 5: Questionnaire 3 (feedback questionnaire)

Outline of the questions which were repeated for each section of the document.

Questions	Type of response	The scale used for ranked questions	Statements for ranked questions
How much do you agree with the following statements?	Scale/rank question	Strongly Agree Agree Neutral Disagree Strongly Disagree	The points in this section of the document are clear.
			The points in this section are concise.
			The points in this section are thorough.
			The points in this section are relevant.
			I understand the points in this section.
Please list any words/phrases from the above section that you do not understand.	Free text box – Multiple lines		

Please list any bullet points whose meaning is unclear/confusing	Free text box – Multiple lines		
What do you think the most important points of this section are?	Free text box – Multiple lines		
Are there any additions you would like to see in this section?	Free text box – Multiple lines		
Are there any changes you would make to the points above to improve clarity?	Free text box – Multiple lines		

6.6 Appendix 6: Focus group guide

Hi everyone,

Thank you so much for your continued interest in my research and for completing the million and one surveys I have thrown at you, it is very much appreciated and I hope

you guys can get as much out of being involved as I am going to get out of your participation.

A couple of house keeping reminders if you want to say something but someone else is talking you can use the raise hands feature and I will be able to make sure to ask you. The other thing is background noise. I'm sure you've realised over the pandemic that background noise can play havoc with online meetings so if you find that there is lots of noise where you are please could you mute yourself in between talking. I myself live at the end of an airport runway so if a plane is going over I will mute myself.

Finally, I intend for this meeting to only take an hour but by all means, if we're having really great discussions and theres more that you want to talk about I am happy to keep going for as long as you want to talk. The more feedback we get the better. Having said that if you do need to leave or just want to leave absolutely there is no pressure to stay. You can leave whenever you like.

Point about this not being the final product that will be sent out for use. It is simply just the words and it is the words in its most lengthy form.

- I would like to point out that the format that the document is in is not the final version, this is not the format that it will be disseminated in. So primarily we're discussing the wording and phrasing as oppose to aesthetics and design but if you think there is an important point concerning formatting that we need to bear in mind that's still a valid and helpful point to make so feel free to share those too but my questions are going to be about the wording.

Is everybody okay with that?

Before we go any further I am going to start the transcription.

Okay, the transcription is running now.

To start I thought I would be good if we could briefly introduce ourselves so we know who we are talking to. So If we could each give 2 sentences with our names and the role we play within the industry.

SO my name is Natasha I am an intercalating research masters student and an undergraduate student of veterinary medicine and science with the view of initially going into small animal first opinion practice.

(go round each person)

My first question is:

What do you understand the term evidence-based decision making to mean and what role do you think it plays in your everyday practice?

Define EVM if you have to:

- the use of best relevant evidence in conjunction with clinical expertise to make the best possible decision about a veterinary patient. The circumstances of each patient, and the circumstances and values of the owner/carer, must also be considered when making an evidence-based decision

I'd like to look at the document section by section, like it was in the survey you filled in.

So starting with the first section which is entitled 'Cautiously consider'

- What do you understand the key messages of this section to be?
- How well do you think these points come across?
- Are there any specific points/phrases that you think are a bit confusing or misleading maybe or just that you don't like? Key problem areas for you
- How could we improve this section of points?

Okay, thank you, there's some brilliant feedback there. I am going to ask basically the same questions of the next sections. So the following section is entitled 'Always Ask'

And finally, the last section is "choose in context"

If you need to move on but discussion is ongoing:

In the interests of time and getting through all the sections I am going to move on but if you have any other points please keep hold of them and we can come back to them at the end or if you think of anything at a later date please email them to me, I do really appreciate as much feedback as possible.

Brilliant. So now that we have been through each section I would like to talk about the document more broadly.

- Firstly, do you think the document is useful?
- How easy do you these points will be to implement into daily life?
- Is there anything that you think is missing from the document?
- Which format for dissemination would be most accessible/useful to you?

- Is there anything else that anyone wants to mention or talk about?

Okay, Thank you so much for your time today and for all the amazing feedback. If at a later date you think of any points that we didn't discuss today or you have any questions please feel free to send me an email. My email is always open, even if it is months down the line we really appreciate any and all feedback.

If time:

- How important do you think it is that the decisions you make for your animal/s are based on scientific evidence?
- Are there any points that surprised you? Or maybe resonated with you?
- How likely are you to use these points going forward?

6.7 Appendix 7: Copy of the final animal owner framework

Cautiously Consider: All treatments will have both benefits and harms associated with them so it is important to weigh up all the potential outcomes of a treatment before making a decision.

Look for a balanced view

●● All treatments will have pros and cons associated with them. There are always limitations and risks involved which makes it important that we consider **all** possible consequences in order to make an informed decision. Make sure you know about potential side effects and risks.

●●Treatment is not always necessary, and intervention can sometimes make a condition worse. It is important to consider the effects of allowing the body to heal by itself.

- For example, minor respiratory infections will often get better without the use of antibiotics. However, overuse and incorrect use of antibiotics contributes to antibiotic resistance which has a more damaging effect in the long term. In many cases, allowing the body to fight a minor respiratory infection with close observation and any supportive treatment is the preferred option.

●● Making a comparison is important when assessing the effects of a treatment.

- A study which only looks at the effects before and after giving a treatment can be misleading as you cannot be sure if the treatment caused the effect or another factor that happened to occur at the same time. It is therefore important for a study to compare 2 different groups of individuals which are then compared to each other. The 2 groups can either be given 2 different treatments or you can compare a group which has been given treatment to a group who received no treatment.

Do not assume

●● Just because a link has been made between a treatment and an outcome, it does not necessarily mean that the treatment caused the outcome.

- For example, there is a correlation between ice cream sales and the frequency of shark attacks. However, this does not mean that eating more ice cream will result in someone being attacked by a shark; there is no causative relationship between the two factors. A more probable explanation is that both factors are more likely to happen during summer months when the weather is warmer. There is correlation but no cause.

●● The results of a single study considered in isolation can be misleading. Conclusions are most reliable when they have been repeated by multiple studies.

●● A treatment that is new and/or impressive is not necessarily better or safer. The same may be true of older, well-established treatments.

●●Increasing the dose or length of treatment (or in some cases, decreasing) may not be helpful and in some cases may cause harm.

●● Although a treatment may appear to work ‘in theory’, this alone doesn’t mean it will actually be effective in practice.

- For example, people used to advise putting butter or Vaseline on burns as they believed it would coat the injury and provide a barrier against infection. However, they actually produce the perfect environment for bacteria to grow in and so you are more likely to get an infection using this theory.
- **OR**
- For example, Paracetamol is a good painkiller used frequently in human medicine. It can also be used in dogs in certain situations. In theory the mechanism by which paracetamol relieves pain should also work in cats however in reality paracetamol is highly toxic to cats and is often fatal.

Be mindful of the information source

●● Companies or individuals may exaggerate positive features and minimise negative features of a treament if they are going to benefit from the recomendation or use of the treatment. Always ask yourself if their claim is balanced (i.e. tells you positives and negatives).

●● Individual experiences and stories alone are not a reliable basis for most treatment claims.

- There are many factors that can influence an individual’s experience with a treatment and so their conclusions may not be the only explanation. It is important that our opinions are based on testable evidence.

●●Opinions of experts, authorities, celebrities or other respected individuals may not necessarily be reliable sources of information.

- The trustworthiness of a claim cannot be decided by how experienced, well-known or “expert” the person making the claim is or by where the claim was made. An individuals opinion is still not a reliable source of information unless it is backed up by scientific evidence.

Always Ask: Peer reviewed scientific studies are the best source of information to use when making decisions for your pet, however, it is also good to check that this research has been carried out in a reliable way. Here are some points to consider when you look at scientific research papers.

- Good research will compare treatments equally. This means that:
    - ●●The characteristics of the animals in each group are kept as similar as possible. For example, the breed, the average age and the gender of the animals should be similar. If one group is made up of all females and the other all males, we cannot be sure if the differences found are because of the treatments or simply because they are different genders.
    - ●●The same issue occurs if the 2 groups are not kept in the same conditions.
    - ●●Apart from the treatments being studied, all other treatments and study conditions for the groups being compared should be the same. i.e., the **only** difference between the groups should be the treatment they are testing.
    - ●●The outcomes should also be measured in the same way for all animals in a study.
- Good research should be transparent when describing their results.
    - ●●Treatment effects that are only described with words but are not analysed using numbers can be misleading. For example, 1 person's definition of a "small effect" could be very different from that of another person. On the other hand, saying 1 in 10 animals vomited after taking the medication gives an objective description of what happened so you can decide whether this effect is small or large.
    - ●●Studies involving small numbers of animals or people may be inaccurate and could misrepresent the truth.
    - ●●There may be no evidence at all as to whether a treatment works or not. This is not the same as when there is evidence, but the evidence shows that the treatment has no effect. When there is no evidence, it means that we are still uncertain about the outcome.
- The animals and the circumstances within the research studies you use should be as similar as possible to your animal(s).
    - Differences in factors such as species, breed, age, gender etc can sometimes change how well a treatment works.

These are all questions which might be good to discuss with your veterinary professional when making treatment decisions for your animal.

Choose in Context: There is a lot to consider when deciding what is best to do for your animal(s). It requires consideration of the problems you're trying to address, the aim of treatment for you and your animal, and the scientific information that is available on the treatments you are considering.

Prioritise the key problems

●● Make sure you understand exactly what problems your animal(s) is experiencing so that all realistic options and outcomes can be defined.

●●Think about which outcomes are important to you. What exactly do you want the consequence of the treatment to be for your animal(s)?

- In some cases, it is only acceptable to completely cure a disease but in other cases it is enough to simply reduce the pain. You must discuss with your vet which outcome is most important to you.

Balance the options

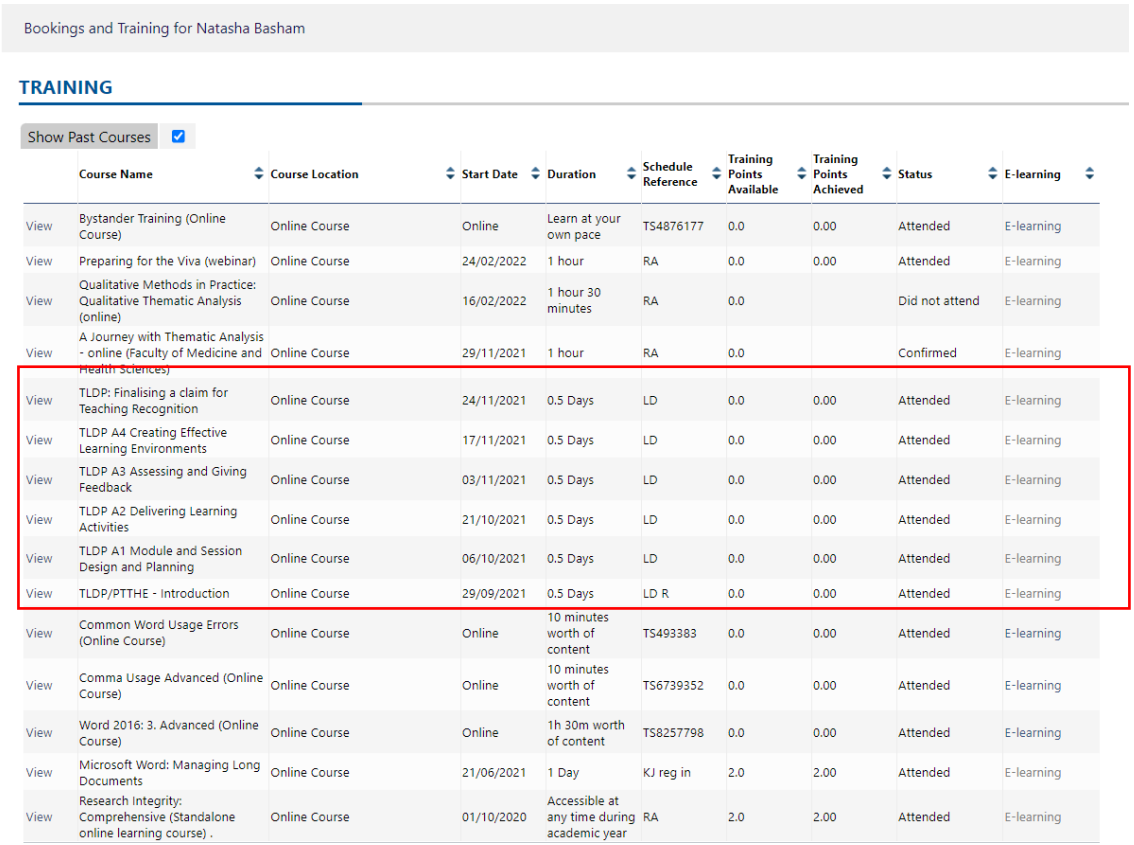
●●Make sure you are aware of all of the options available to you so that you can appropriately weigh up which course of action is best.

●●Always ask whether the treatments in question are actually available to you. Treatments may not be available to you for many reasons including if they are not licenced in your country, are still experimental and not be allowed in your country or are too expensive among other reasons.

●●The possible advantages and disadvantages of a treatment should be considered, primarily in light of the welfare needs of the animal but also in relation to what is feasible to you as an owner.

- The decision-making process should consider the practicalities of caring for the animal, the financial implications and the treatments available at your veterinary practice/with your vet.

6.8 Appendix 8: Proof of participation in the Teaching Learning Development Program (TLDP) to acquire 20 taught credits for MRes qualification.



Bookings and Training for Natasha Basham

TRAINING

Show Past Courses ☑

	Course Name	Course Location	Start Date	Duration	Schedule Reference	Training Points Available	Training Points Achieved	Status	E-learning
View	Bystander Training (Online Course)	Online Course	Online	Learn at your own pace	TS4876177	0.0	0.00	Attended	E-learning
View	Preparing for the Viva (webinar)	Online Course	24/02/2022	1 hour	RA	0.0	0.00	Attended	E-learning
View	Qualitative Methods in Practice: Qualitative Thematic Analysis (online)	Online Course	16/02/2022	1 hour 30 minutes	RA	0.0		Did not attend	E-learning
View	A Journey with Thematic Analysis - online (Faculty of Medicine and Health Sciences)	Online Course	29/11/2021	1 hour	RA	0.0		Confirmed	E-learning
View	TLDP: Finalising a claim for Teaching Recognition	Online Course	24/11/2021	0.5 Days	LD	0.0	0.00	Attended	E-learning
View	TLDP A4 Creating Effective Learning Environments	Online Course	17/11/2021	0.5 Days	LD	0.0	0.00	Attended	E-learning
View	TLDP A3 Assessing and Giving Feedback	Online Course	03/11/2021	0.5 Days	LD	0.0	0.00	Attended	E-learning
View	TLDP A2 Delivering Learning Activities	Online Course	21/10/2021	0.5 Days	LD	0.0	0.00	Attended	E-learning
View	TLDP A1 Module and Session Design and Planning	Online Course	06/10/2021	0.5 Days	LD	0.0	0.00	Attended	E-learning
View	TLDP/PTTHE - Introduction	Online Course	29/09/2021	0.5 Days	LD R	0.0	0.00	Attended	E-learning
View	Common Word Usage Errors (Online Course)	Online Course	Online	10 minutes worth of content	TS493383	0.0	0.00	Attended	E-learning
View	Comma Usage Advanced (Online Course)	Online Course	Online	10 minutes worth of content	TS6739352	0.0	0.00	Attended	E-learning
View	Word 2016: 3. Advanced (Online Course)	Online Course	Online	1h 30m worth of content	TS8257798	0.0	0.00	Attended	E-learning
View	Microsoft Word: Managing Long Documents	Online Course	21/06/2021	1 Day	KJ reg in	2.0	2.00	Attended	E-learning
View	Research Integrity: Comprehensive (Standalone online learning course) .	Online Course	01/10/2020	Accessible at any time during academic year	RA	2.0	2.00	Attended	E-learning