
Factors influencing undergraduate attitudes and decision making regarding a career in production animal practice

Thesis submitted for Masters of Veterinary Medicine

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Abstract

The objective of the research discussed in this thesis was to determine what influences undergraduate veterinary students' attitudes when considering farm animal practice as a future career discipline and how these factors are influenced by experiences gained during students' time as an undergraduate at veterinary school. This research is of relevance during this time of change within the veterinary profession; with increasing numbers of students being offered the opportunity to study veterinary medicine but an undeniable recruitment and retention crisis within the wider profession.

An online survey, distributed to students at all veterinary schools in the UK and Ireland at the time, elicited 1146 responses. Thematic analysis revealed seven themes within the free text data: relationships, preferences and interests, perception of fit, direct experience, fear, ethics and values and lifestyle. Descriptive data analysis revealed the most common factors influencing first job expectation, regardless of anticipated first discipline, were personal interest and extra mural studies (EMS). Respondents anticipating a career involving some farm work also valued previous work experience. Although there were significant differences from respondents depending on their anticipated first career choice ($p < 0.001$) working hours/out of hours were consistently identified as barriers when considering a farm animal career. Salary was also considered negatively by respondents considering a career in farm animal practice; whereas respondents not intending to do any farm animal work on graduation selected working conditions and working with farmers/within the agricultural industry.

The work presented within this thesis demonstrates clearly factors that influence undergraduate choice when considering a career in farm animal practice. Evidently species preference will always be involved in decision making however, there are several other considerations influencing this decision. The profession needs to work towards excluding any barriers that undergraduates feel prevent individuals pursuing a farm animal career. EMS has been presented as highly influential and is an ideal opportunity to develop experiential learning, whilst facilitating open conversations between veterinary professionals and future generations. These conversations must be unbiased, factually accurate and transparent, allowing undergraduates to freely discuss any concerns they may have regarding farm animal careers.

Acknowledgements and declarations

The published paper Payne et al. (2021). “Attitudes of UK veterinary students towards careers in the production animal sector: A mixed methods approach”. *Veterinary Record*, 189(8). DOI: [10.1002/vetr.455](https://doi.org/10.1002/vetr.455) summarises a large portion of the work discussed in this thesis.

A sister paper has also been published covering additional analysis performed. Payne et al. (2023). “Farm animal careers and perception of ‘fit’ in undergraduate veterinary students: A mixed methods study”. *Veterinary Record*, 192(4). DOI: [10.1002/vetr.2339](https://doi.org/10.1002/vetr.2339)

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Glossary/Acronyms

AHEMS Animal Husbandry Extra Mural Studies

BVA British Veterinary Association

BCVA British Cattle Veterinary Association

CEMS Clinical Extra Mural Studies

EMS Extra Mural Studies

RCVS Royal College of Veterinary Surgeons

CHAPTER 1: Introduction and Literature review

1.1: Context

The context of this thesis is as part of a residency and masters programme in dairy herd health and production at the University of Nottingham, School of Veterinary Medicine and Science. This clinical programme provides preparation for specialist clinical qualifications, consisting of a three-year programme combining clinical activity, research and teaching. Core components required to achieve accreditation for examination to become a member of the European College of Bovine Health Management are listed in [Appendix 3](#). Research publications and conferences attended are listed in [Appendix 4](#). The certificate provided for recognition of European Veterinary Specialist title is provided in [Appendix 5](#).

1.2: Introduction

The veterinary profession is an ever-changing world with its own idiosyncrasies; one of which is a concern regarding recruitment and retention. There is, however, limited research into what impacts decision making when considering future career paths of undergraduate veterinary students. The next section of this chapter will consider recent literature relevant to the study within this thesis. The aim of the research within this thesis is to evaluate factors influencing undergraduates' attitudes when considering a career within farm/production animal veterinary sector.

1.3: Literature review

1.3.1: Recruitment and retention

Recruitment and retention within the veterinary profession is now a well-recognised area of concern, with the veterinary profession (all disciplines) currently being listed on the UK's Shortage Occupation List (Home Office, 2022) and the current president of the Royal College of Veterinary Surgeons (RCVS) describing a "workforce crisis", with numbers of veterinary surgeons joining the register falling between 2019-2022 (RCVS, 2022a). This is despite there being an increasing number of veterinary schools training undergraduate students within the UK (eleven recognised at the time of writing this thesis compared with nine at the inception of this project) (RCVS Facts 2018).

Recent research has suggested that employers find it difficult to recruit veterinary surgeons, particularly those with experience (Hagen et al., 2020). When considering the farm animal

industry, rather than the profession as a whole, it has long been forecast that demand could exceed supply (Lowe, 2009). In the 2019 Survey of the Veterinary Profession only 3.2% of veterinary surgeons within the UK identified farm practice as their main area of work (Robinson et al., 2019). Increasing numbers of newly graduated veterinary surgeons are initially embarking upon mixed discipline jobs before progressing into jobs that do not contain any element of production animals work (Adam et al., 2015; Lowe, 2009). The British Cattle Veterinary Association (BCVA) recently surveyed its members and found that 81% of respondents considered there to be an issue with recruitment of farm animal veterinarians to their practice and 49% of respondents considered there to be an issue with retention of farm animal veterinarians to their practice (Yarnall, 2019).

There have been theories suggested for why this might occur. One such theory proposed is the “spiral of disillusionment” (Robinson et al., 2004). Robinson and colleagues performed a study commissioned by the Institute of Employment Studies on behalf of the Department for the Environment, Food and Rural Affairs (DEFRA), funded by the RCVS. They performed a series of interviews and discussion groups with students, newly graduated and more experienced veterinary surgeons and a panel of experts from within the profession (holding prestigious positions within important veterinary organisations). The spiral of disillusionment suggests a negative feedback spiral where a newly qualified veterinary surgeon is keen to perform some large animal work, but they do not feel sufficiently confident to be a sole farm animal clinician. Mixed practice appeals as it appears to offer good experience. However, upon starting this job, their access to farm animal calls is very limited and the farm animal work performed by the practice is declining. This results in the majority of their exposure being during out of hours. Almost inevitably, the newly graduated veterinary surgeon has a negative experience on farm, which is witnessed by the client. This reduces their confidence in production animal work and eventually there is a drift into a sole small animal practitioner role, where they feel more supported and confident. Further exploration into this revealed that for many, the “drift” into small animal was related to a lack of being prepared for the reality of working with farm animals. Robinson and colleagues noted that this was a regularly occurring story within their research, with only minor variations and almost always in graduates that had been practitioners for less than a year. There was particular emphasis surrounding the volume of out of hours work, difficulties with attitudes from farmers towards younger vets, issues surrounding the economic value of the animals and

farm cashflow, the physical nature of the job and the repetitive nature of some of the core work (Robinson et al., 2004).

These suggestions are supported by work carried out by Jelinski and colleagues (2009). In a survey of 348 veterinary surgeons practicing in Western Canada they found that the main reasons for switching disciplines were related to the hours of work and volume of nights on call, the associated compensation and an absence of mentorship and support; with a specific finding of workload and mentorship being major drivers for respondents who had started their career in production animal or mixed disciplines no longer practicing in these areas (Jelinski et al., 2009). A UK study of 380 veterinary surgeons with experience of production animal work found that the major contributors to retaining veterinary surgeons within farm animal practice were associated with employment and background, specifically suggesting that support of newly qualified veterinary graduates transitioning into practice is paramount to retaining newly qualified veterinary surgeons (Adam et al., 2015). Adam and colleagues (2015) also discuss fears surrounding veterinary education not providing sufficient preparation for production animal veterinary surgeons as unfounded in relation to retention in practice. Research into whether recent graduates from one UK veterinary school felt prepared for clinical practice suggested that overall students felt suitably prepared for practice however, farm animal practitioners felt less prepared for diagnostic reasoning, veterinary public health and zoonotic issues, self-reflection and work life balance compared with their small animal and mixed practice peers (Cobb et al., 2015); suggesting that there is not a consensus surrounding this subject.

The 2009 Lowe report was commissioned in response to a perceived loss of expertise within the production animal sector. Lowe summarises that there is no evidence of a shortfall in supply or systemic issues with succession but that there are issues related to the “attractiveness of food animal work” with regards to newly qualified veterinary surgeons and “preparedness” for the work for example, the differences between a more formal educational environment and the more real-world scenarios faced in full time work. The main conclusion drawn is that the transition between completion of the undergraduate course and first job should be spotlighted with the suggestion of optional summer schools supported by industry and government bursaries (Lowe, 2009); a suggestion that has not been taken up within the UK profession but has been in the United States.

In the USA, there is an accepted recognition that the extensive coverage required to fully prepare undergraduates for dairy veterinary roles (a subsector of production animal work) exceeds the scope of the curriculum of most veterinary colleges (Posey et al., 2012). Fetrow et al. (2020) discuss the requirements for dairy veterinary surgeons within the United States dairy industry, supply of these veterinary surgeons and the responsibilities of academic institutions within this sector. They then go on to outline an academic initiative funded by the United States Department of Agriculture's National Institute of Food and Agriculture Higher Education Challenge Grant program whereby four universities formed a consortium to create a centre of excellence for dairy production medicine education (Dairy Centre of Excellence, DCE). An eight-week course was designed to prepare undergraduates for a career in dairy veterinary practice. Some of the aims of the course include ensuring understanding of what is required in terms of roles and responsibilities, improving confidence in one's own ability, be considered as more prepared by future employees and still be in a position within the dairy industry one-year post-graduation (Fetrow et al., 2020). In a companion paper, the group describe initial findings for students who have attended the DCE course and been graduated one to two years. They found that respondents who were keen to work in a dairy production animal job before attending the DCE remained focused on this after the course and that respondents who were not focused on a dairy production animal job post-graduation were not further motivated to pursue this avenue by attending the DCE (Morin et al., 2020); suggesting that education and exposure are not the only motivating factors when considering career choice.

1.3.2: Motivation to become and remain a veterinary surgeon

Motivation, as a concept, is used to describe the forces functioning on or within an individual initiating their behaviours. They can be classified as either primary or secondary, with primary covering innate, basic motives (hunger, thirst, avoidance of pain etc) whereas secondary motives are learned and include motives such as achievement (Petri & Cofer, 2023). Research into motivating factors behind wanting to pursue a veterinary medicine career has revealed that working with animals and interactions with a veterinary role model are major drivers for career choice (Tomlin et al., 2010a). Interestingly, Tomlin and colleagues also identified some fundamental difference between male and female respondents. Male respondents were far more likely than females to want to train as veterinary surgeons due to the scientific, professional nature of the career and prestige associated with the degree course, whereas females were more motivated by the working with animals aspect. These findings are supported by a French study

surveying students prior to university (Fontanini, 2010). Fontanini concluded that motivations were different between male and female prospective veterinary students, with females having spent more time with animals and being motivated by sentiment and interest and males being motivated by finances and technical reasons. VetSet2Go (a collaborative initiative between multinational educational institutions looking at capability and success of employment within the veterinary profession) identified multiple intrinsic and extrinsic motivations for career choice and how these motivations were recognised by the individual or perceived by others. They concluded that animal-related motivations, human interaction, helping people and society were all important to veterinary surgeons (VetSet2Go, 2018). In a small, but in-depth, study of recently graduated veterinary surgeons in Australia, it was found that although being committed to animal welfare was important, it was not for some the only or major driver for a veterinary career; they also suggested that motivations continue to develop post-graduation and that for some individuals they may not be simply defined (Cake et al., 2019). In a study of first year veterinary students looking at influence of demographics and experience on career choice, a bias towards male students, students being from a rural/farm background and students with prior experience of working with farm animals was found when considering a production animal career and attitudes towards career discipline (Serpell, 2005).

When surveying American undergraduate students to understand how the human animal bond is involved with students' decision-making regarding which discipline of veterinary medicine to enter, Martin and colleagues found that undergraduate students aspiring for careers within the production animal sector valued some aspects of the human animal bond less than their non-food animal counterparts (Martin et al., 2003). Although it is worth noting, the researchers evaluating this concluded this was not necessarily a negative trait, given the responsibilities that their future job would entail (i.e., their focus would be on other aspects of animal care). This is perhaps reflective of the differences between the nature of the human animal bond between food producing animals and their keepers compared with their respective non food productive counterparts and keepers.

Clearly the concepts of motivations towards a veterinary career are complex and can change as an individuals' career progresses. Further work into this with regards to career discipline could contribute towards understanding and predicting future supply of veterinary surgeons.

1.3.3: Diversity of the profession and undergraduate population

The first female veterinary surgeon to be recognised by the RCVS was Aleen Cust in 1922 (BVA, 2018), paving the way for gender equality within the veterinary profession with recent figures estimating that approximately 80% of current undergraduates are female (BVA, 2019a). This fits with the proposed trend of “feminisation” of the veterinary profession: 58% of registered veterinary surgeons are female and, when focusing on more recent graduates (respondents who graduated from 2016 onwards), 76% of practising veterinary surgeons are female (Robinson et al., 2019). There are several suggestions that this “shift” is more prominent in the veterinary profession than other comparable professions (Allen, 2016; Woolcock, 2019). Despite this, female veterinary surgeons are underrepresented in many sectors of the profession including, but not limited to, academia, production animal research (as a senior author), RCVS specialist or fellow and director/principal/partner roles within practices (Casad et al., 2021; Dall et al., 2013; Giuffrida et al., 2019; VetFutures, 2014). This issue is not unique to veterinary medicine alone, with human medics reporting women to be underrepresented in medical leadership, academic roles, some specialisms and within trust directorships (The King’s Fund, 2017).

The British Veterinary Association (BVA) recently surveyed its members with the objective of capturing an overview of the encounters that veterinary surgeons, nurses, students and other supporting staff had witnessed or experienced with regards to discrimination within the workplace/learning environment. They identified sex discrimination as the most prevalent form of discrimination, 43-44% of occurrences. In addition to this farm animal practice was highlighted as an area gender discrimination was especially prominent (BVA, 2019a). This is echoed in work performed by Freestone et al. (2022), who found that over a third of respondents to a survey of one university’s undergraduate students had experienced gender discrimination, the majority of which had been on AHMS (n = 261 of which, 83% identified as female). This same report concluded that these experiences of gender discrimination were more likely to impact on female undergraduates’ career aspirations.

In addition to this, there is a distinct lack of ethnic diversity within the veterinary population. In the same report that identified the gender disparity of the profession, 93.9% of veterinarians responded giving their ethnicity as white; with 61% of veterinary surgeons that identified as being from a minority ethnicity also identifying as female (Robinson et al., 2019). The same BVA report that identified sex discrimination as an issue in the workplace also recognised racial discrimination as the second most described form, with 26-27% of described incidents involving race. It was

noted that farm animal practice was less frequently cited here, this could be explained by the lower number of minority ethnicity practitioners that are currently working within the farming sector (BVA, 2019a).

When considering undergraduate experiences, there is concern that students may be under-reporting witnessed or experienced discrimination events, with figures as low as 19% of incidents reported (BVA, 2019). This theory is supported by further research carried out on undergraduate students in the UK during their clinical extra mural studies (CEMS) years which found that 36% of undergraduate respondents had experienced or witnessed discrimination. These events were primarily based around gender, ethnicity and age; with figures of 38%, 16% and 15% respectively (McCarroll, 2020). McCarroll (2020) also identified the production animal sector as having the highest number of experienced incidents (38%) and second highest number of witnessed incidents (28%). The identified offenders in these scenarios were both the general public (including farmers) and veterinary surgeons (either directly or by remaining silent when comments were made). Finally, there is recognition from the RCVS that students from minority ethnicity backgrounds find sourcing placements for extra mural studies (EMS) more of a challenge (RCVS, 2021).

1.3.4: Role of production animal veterinary surgeons

Defining the role of a production animal veterinary surgeon can be a challenge when comparing this sector to its companion animal counterpart. There are elements of herd level and individual animal care as well as considering both the food chain, business enterprises and smallholding animals that are companion farm animals. Often the veterinarian must make decisions weighing animal health and welfare against the cost of food production (Hamilton, 2018). The landscape of agriculture has evolved and, responsively, so has the role of the production animal veterinary surgeon. The more traditional calls (calving, “down” cow, prolapse etc) still form a part of the job role, particularly during out of hours, but these are no longer the mainstay of farm veterinary work. Instead, veterinary surgeons must be able to discuss on farm management, elimination/avoidance of common disease, the food chain and protection of human health all whilst having a fundamental awareness of profitability and the intricacies of the industry (Fetrow et al., 2020). In addition to this, the role of paraprofessionals within farm animal practices is more widely accepted. Rather than seeing this as a potential threat, or means of de-professionalisation of veterinary surgeons, with careful assimilation into a veterinary practices structure, paraprofessionals can free up veterinary surgeon time to allow maximum efficiency (Statham & Green, 2015). This change in day-to-day responsibility should be accounted for with mirrored

development of the undergraduate curriculum and postgraduate training. Data handling, people management and training and advisory skills were highlighted in one study as focus areas to initiate this (Woodward et al., 2019).

Further to this, we have now entered a new generation of veterinary surgeons graduating and fulfilling the role of veterinary surgeon. It has been suggested that “millennials” or “Generation Y” students (born between early nineteen eighties to mid-nineties) have been raised in a digital age and that their aspirations are for a better work-life balance, leading to them occupying less traditional roles such as advisory and consultancy roles (Huxley, 2016). Attributes associated to millennials are that they aspire to progress and further their skill set rapidly but have realistic expectations of first jobs and salary (Ng et al., 2010). These students have now mainly graduated, and we have moved to a student body that is occupied predominantly by “Generation Z” (born mid nineteen nineties to mid twenty tens). As with Generation Y these students are very digitally advanced. They have been described as “energetic, passionate, confident and capable” but also “overwhelmed, overconnected, overprotected and overserved” (Charles & Farnsworth, 2021). Further criticism has included a lack of critical thinking ability (Shatto & Erwin, 2016). It is, however, important to note that some authors dispute these “generational archetype” differences and consider students to be facing the same fundamental challenges that previous students have faced and that by creating these archetypes strengthens power differentials between different generations and allows for mass generalisations (Clark, 2018; Jauregui et al., 2020). These generational differences could mean that attitudes towards career choices no longer align with those assumed by qualified veterinary surgeons and therefore more research in this area is required.

1.3.5: Undergraduate education

All veterinary schools within the UK follow a curriculum that results in an omni-potential graduate. This means that students are trained in all disciplines of veterinary medicine and, in theory, should have the skill set required to pursue a career in any sector. These skills are developed by teaching throughout the pre-clinical and clinical years of the undergraduate degree and via external experiences gained, including EMS.

EMS is described as contributing to student’s clinical education, providing a “real workplace learning” context to the practical skills learned and academic knowledge and has been a requirement of the RCVS for over 80 years (RCVS & Work Psychology Group, 2018). Current

requirements (excluding any covid-19 revisions) include 12 weeks of preclinical animal husbandry, to be undertaken in years 1 to 3, and 26 weeks of clinical EMS, completed during the clinical years of the course (RCVS, 2022c). The RCVS specifies that of the 12 weeks preclinical animal husbandry, students must do a minimum of one week equine, production animal and small animal. The University of Nottingham sets requirements regarding numbers of animals on a holding. For production animal placements, farms must have a minimum of 200 ewes in a sheep flock, 75 cows in a herd or 60 pigs (any age) on a commercial pig unit (Sherwin, 2022). Although there are no stipulations for formal teaching on EMS it is recommended that learning outcomes should be discussed and agreed upon by tutor, student and placement provider prior to the placement taking place (RCVS, 2022b). EMS requirements with respect to veterinary undergraduate training in the UK are entirely controlled by the RCVS and are not mentioned in the European directive, which sets out the minimum requirements for training of veterinary surgeons within individual European university training programmes (DIRECTIVE 2005/36/EC, 2016). There are no comparable systems in place in mainland Europe or the USA (RCVS, 2022b).

1.3.6: Conclusion and aims

Regardless of the evolution of the profession and failings highlighted above, university places continue to be incredibly sought after, with retention on undergraduate courses found to be slightly higher than average (Woodfield et al., 2016). Clearly recruitment and retention after graduation are issues, as is the diversity of the profession and potential for exposure to discrimination. A further understanding of what motivates or demotivates undergraduates' when considering their career choices is vital to ensure that the needs of the production animal sector, and the veterinary surgeons working within this sector, are being met. Therefore, the aims of this study were to ascertain the answer to the following questions:

- What influences undergraduate students' attitudes when considering a career farm animal practice?
- How are those factors influenced by experiences that undergraduates have during their time at university?

CHAPTER 2: Materials and methods

2.1: Mixed methods research

Mixed methods research combines the more traditional styles of quantitative and qualitative research within a single study, allowing for the strengths of both approaches to be exploited (Östlund et al., 2011). This was achieved by integrating quantitative and qualitative data collection within the survey design and analysis. This combining of multiple approaches is known as “triangulation”. The theory behind triangulation is that by using multiple approaches confidence within the findings are increased and thus the research is more rigorous. A more thorough result is achieved than either method would manage alone. Results may be convergent or divergent. If results of both qualitative and quantitative data are convergent, then both aspects result in the same conclusion – they are complimentary, and one aspect of the data supports the other. If they are divergent then the opposite is true and at times the results can even be contradictory (Heale & Forbes, 2013).

2.2 Data collection and analysis

2.2.1: Survey data

Study design

The benefits of surveys (or questionnaires) include that they can be used to quickly and easily access large numbers of people (Östlund et al., 2011). They can generate both qualitative and quantitative data via open (free text) and closed (fixed response) questions and often allow respondents to give more honest answers due to the impersonal relationship with the researchers (Lowe, 2007).

Undergraduate survey

An online survey was developed using Online Surveys (Jisc, Bristol, UK). This was piloted by six University of Nottingham undergraduate students. It was used to monitor completion time and to provide information on, and pre-empt, any aspects of completion that undergraduate students may have difficulties with. No major changes were made post pilot. The survey was then distributed, via a contact within each university, to undergraduate students at each veterinary school in the United Kingdom and Republic of Ireland at the time. Namely: University of Bristol, University of Cambridge (clinical years only), University College Dublin (final year only), University of Edinburgh, University of Glasgow, University of Liverpool, University of Nottingham, Royal Veterinary College and University of Surrey. Universities were requested to distribute surveys

across all years including preliminary and intercalating years. Preliminary courses (year zero) are for veterinary undergraduates accessing the degree course through a non-tradition route, usually having taken alternative secondary education qualifications, or having performed alternative careers before transitioning to veterinary medicine. Intercalated respondents are those who have included further study within their veterinary degree, usually to achieve another qualification such as a Bachelor of Science (BSc) or Master of Science (MSc). The survey was available for four weeks in October 2018 with a prize draw used as an incentive to encourage participation. All respondents were advised of the purpose of the study and asked for consent after assurance that responses would be anonymised and treated confidentially (emails were required for entry to prize draw, however these were removed when data was downloaded from Online Surveys. All data were stored on a personal university one drive).

Ethical approval

Ethical approval (2409 180620 UG) was granted by the University of Nottingham School of Veterinary Medicine and Science before the survey was released.

Survey sections

The survey began with an introduction page (page 1) explaining who the researchers were and where they were based, the purpose of the study and a consent form obtaining informed consent. It also detailed the prize incentive and contact details for any questions. The questionnaire was split into three distinct sections (Figure 1). A full copy of the survey is available in [Appendix 1](#). The first section (page 2) was titled "University Questions". Respondents were asked to identify university attended, year of study and previous educational history (mature student or first degree). These questions were all multiple choice with free text boxes where appropriate. Section two (page 3) was titled "Attitudes towards Farm Animal Practice". The questions in this section were to ascertain the respondents' attitudes towards, and interest in, farm animal practice. Respondents were asked a combination of multiple choice, select all that apply and free text questions. They were asked about their experience with farm animals prior to veterinary school; their interest in working in farm animal veterinary practice before veterinary school and at the time of answering; what area of veterinary medicine they expected to work in for their first job; factors that had influenced that decision; enjoyment of the farm animal teaching at university; what is appealing or puts respondents off a career in farm animal practice and their most positive and negative farm careers experience.

The final section (page 4) of the questionnaire was titled “Demographics”. There was a reminder here that data would be anonymised and if anonymised data might still be descriptive enough to identify a respondent, then any presentation of that data would be aggregated to avoid this. Respondents were asked multiple choice questions (with free text boxes where appropriate) to identify the gender they identified most with; current age; community background; social class; ethnic group; religion and nationality. Finally, respondents were asked their agreement with the following statement “I feel able to pursue a career in farm animal practice”, with a free text box available to explain their answer. When referring to specific survey questions in the results the question number is placed in brackets e.g. (Q1) would respond to survey question 1.

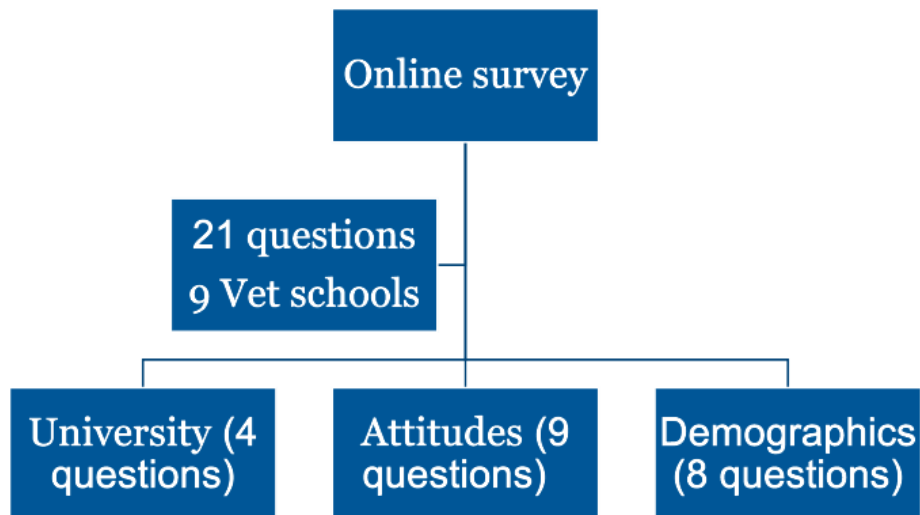


Figure 1: Survey design. Summary of the structure of the survey circulated to undergraduate veterinary students in British and Irish veterinary schools.

2.2.2: Descriptive data

Microsoft Excel (Version 2212, Microsoft Corporation, Washington) was used to store and descriptively analyse data. Data were described, summarised and arranged in a way to allow patterns to be identified. This was achieved by creating tables and graphs using both Microsoft Excel and GraphPad Prism (Version 8.4.3, GraphPad Soft-ware, CA, USA). Tables summarising respondent details were produced. Bar charts were used to visualise distribution of responses to Likert-style and select all that apply questions. These were also sorted, where appropriate, to look

at responses before vet school/at time of answering the survey and by intended first career choice (farm animal only, mixed practice and no farm animal work).

Statistical analysis was used by performing a chi-squared test. This was used to test for differences in categorical responses by anticipated first job discipline (as described above – those who anticipated a career involving some farm work, either farm or mixed practice, and those who did not anticipate a career involving farm work) with statistical significance considered if $p < 0.05$.

2.2.3: Thematic analysis

An explicit and widely accepted definition of thematic analysis is not easy to find. However, advocates of it as a qualitative analytical method argue this makes it a flexible and diverse tool for pattern-based analysis (Terry et al., 2017). The closest universally used description is by Braun and Clarke (2013): “a method for identifying themes and patterns of meaning across a dataset in relation to a research question” (Braun & Clarke, 2013). There are a range of ways that analysis can be performed, these include using inductive, deductive, semantic, latent, realist and constructivist approaches. An inductive approach requires the analysis being performed (coding and theme generation) to be derived and directed from the content of the data. A deductive approach is used when the researcher already has pre-existing concepts or ideas of what may be found in the data because of their own knowledge of the subject area, research and experience. A semantic approach refers to explicitly reflecting the content of the data and a latent approach is where data analysis reports concepts and assumptions from within the dataset. A realist approach is based around delivering a report of a reality with assumptions evident within the data whereas constructionist approaches investigate realities determined from within the dataset (Braun & Clarke, n.d.). These approaches do not necessarily oppose each other with inductive, semantic and critical approaches working in harmony, similarly this is the case for deductive, latent and constructionist approaches (Braun & Clarke, n.d.). This author used an inductive, semantic and realist approach to the thematic analysis reported within this thesis.

Inevitably, analysis is somewhat shaped by the individual researcher, in this case this author identifies as a white, heterosexual female veterinary surgeon in their thirties, performing the analysis as part of a project for a Master of Veterinary Medicine and European specialism qualification. This consideration is reflexivity; critically reflecting on the research process and the individual's part within this process and how the examination of one's own belief and judgement will alter the research. “Insider” and “outsider” positions are considered. Insider status is when the

researcher shares some group identity with the participants in the study and outsider status is when the researcher does not share group identities with the participants (Braun & Clarke, 2013), this author has been a veterinary undergraduate and made the choice to become a farm animal veterinary surgeon and therefore share some identity with the respondents.

Alongside its flexibility, supporters of thematic analysis claim its strengths lie within its accessibility, researchers need minimal to no previous experience with qualitative research to perform this method and it is quick and easy to learn. In addition to this, results can also be widely accessible and easy to understand. Advocates of qualitative research within education have declared it useful for gaining a deeper understanding of “actions, events and situations” and factors that influence these (King et al., 2021).

Data collation and analysis

Data were downloaded from Online Surveys (Jisc, Bristol, UK), collated in Microsoft Excel (Microsoft Corporation, Washington) and analysed using NVivo 12 Pro (QSR International Pty Ltd, Melbourne, Australia). The six-step method of thematic analysis, as outlined in Braun and Clarke (2006), was used to complete qualitative analysis on all free text responses across the survey (this six-step process was used whilst being mindful of the updates and developments provided in more recent literature (Braun & Clarke, 2013, 2019)). The six steps are as follows: data familiarisation, initial coding, identifying themes, revision of themes, theme definition and naming, report production.

Stage 1: Data familiarisation

This was an active process involving immersion within the data collected. The process involved reading the data several times and making notes of any comments of interest. This phase was not structured, and this was not part of the coding process. Notes that were made here were not used for developing of analysis into themes as they are reported to be more likely to be reflective of biases within the person analysing the data (Braun & Clarke, 2013).

Stage 2: Initial code generation

This was achieved using computer assisted qualitative data analysis software (NVivo 12 Pro, QSR International Pty Ltd, Melbourne, Australia), individual phrases or passages of text of interest were identified and organised into meaningful groups. A systematic approach to working through the dataset was taken by working through free text response to each question in turn. Surrounding data were included within the code to ensure that context was not lost, and a codebook was kept ([Appendix 2](#)). Data that was not relevant to the research questions was not coded. A portion of

coding was double coded, by two colleagues, with a copy of the codebook to determine rigour and support credibility of the findings (Roberts et al., 2019).

Stage 3: Theme searching

Generation of themes was performed once code development had been completed. Codes were printed onto individual pieces of paper and then arranged into theme-piles. These themes were then recorded in NVivo 12 Pro.

Stage 4: Theme revision

Collated codes for each initial theme were read to ascertain if a clear theme pattern was identifiable. When this wasn't the case either new themes were generated, codes were relocated to a more appropriate theme, or they were discarded from the analysis as not relevant to answering the research question. These themes were then reviewed in relation to the entire data set to identify that they were reflective of the dataset in its entirety. To enable this to happen the entire dataset was critically reread, considering the themes and also recoding any data that had been missed during the earlier stages. A draft thematic map was created.

Stage 5: theme definition and naming

Braun and Clarke (2006) describe this phase as “define and refine” achieved by “identifying the essence of what each theme is about” individually and when considering the themes as a whole. This was achieved by going through each code within a theme and creating a chronicle and recognising their significance and why this was important to the research. At this stage sub themes were also identified, aiding with assembly of the final themes. By the end of this stage each theme had a concise definition and theme names were representative of the content.

Stage 6: Report production

This thesis forms part of this stage, as does the publication listed within the acknowledgements. The following results section will illustrate and discuss the themes developed.

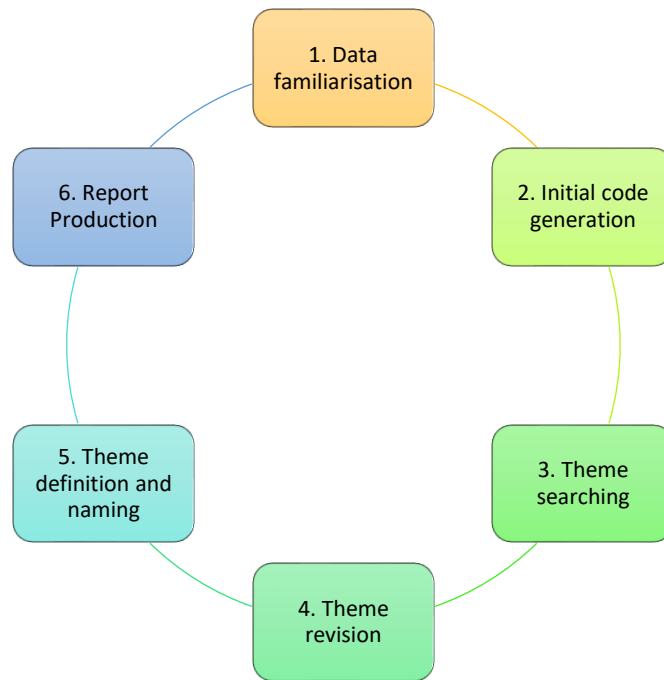


Figure 2: Overview of the stages of thematic analysis applied to the free text responses of a survey of veterinary students. Adapted from Braun & Clarke (2006)

CHAPTER 3: Results

3.1. Descriptive analysis

There were a total of 1146 respondents and all responses were usable. Total numbers of veterinary students within the UK were reported to be 5402 in 2018-2019, this includes gateway students for those degrees that offer a “year zero” (RCVS, 2019). This equates to a response rate of 21.2%. Respondents came from all universities that the survey was distributed to and across all years, including preliminary and intercalating years. The University of Cambridge disseminated the survey link to clinical years only (year 4 and 5/6) and University College Dublin to the final year only (year 5/6). A more detailed description of the respondents can be found in table 1.

Table 1: Respondent information. A summary of information gathered from a survey of undergraduate veterinary surgeons studying at British and Irish veterinary schools.

Variable	Respondents n=1146 (% of the total)
School of graduation	
University of Bristol	140 (12.2)
University of Cambridge	46 (4.0)
University College Dublin	28 (2.4)
University of Edinburgh	156 (13.6)
University of Glasgow	93 (8.1)
University of Liverpool	132 (11.5)
University of Nottingham	168 (14.7)
Royal Veterinary College	274 (23.9)
University of Surrey	108 (9.4)
No response	1 (0.1)
Year of Study	
1	197 (17.2)
2	218 (19.0)
3	247 (21.6)
4	268 (23.4)
5/6	203 (17.6)
Intercalating/Preliminary	12 (1.0)
No response	1 (0.1)
First Degree	
Yes	876 (76.4)
No	269 (23.5)
No response	1 (0.1)
Age	
18-21	574 (50.1)
22-25	454 (39.6)

26-30	87 (7.6)
>30	29 (2.5)
Prefer not to say	1 (0.1)
No response	1 (0.1)
Gender	
Male	165 (14.4)
Female	977 (85.3)
Self-defined	3 (0.3)
Prefer not to say	1 (0.1)
Background	
From a farm/farming community	178 (15.5)
From a rural area but not a farming community	437 (38.1)
From an urban/suburban area	529 (46.2)
Prefer not to say	1 (0.1)
No response	2 (0.2)
Experience with farm animals prior to starting vet school	
None/limited	498 (43.4)
Intermittent	346 (30.2)
Regular	172 (15.0)
Extensive	129 (11.3)
No response	1 (0.1)

3.1.1. Experience and interest prior to Veterinary School and at time of survey

Results in response to the question “How would you describe your experience with farm animals prior to starting vet school?” (Q5) are displayed in figure 3; 43.4% of respondents described themselves as having limited or no experience with farm animals before attending veterinary school.

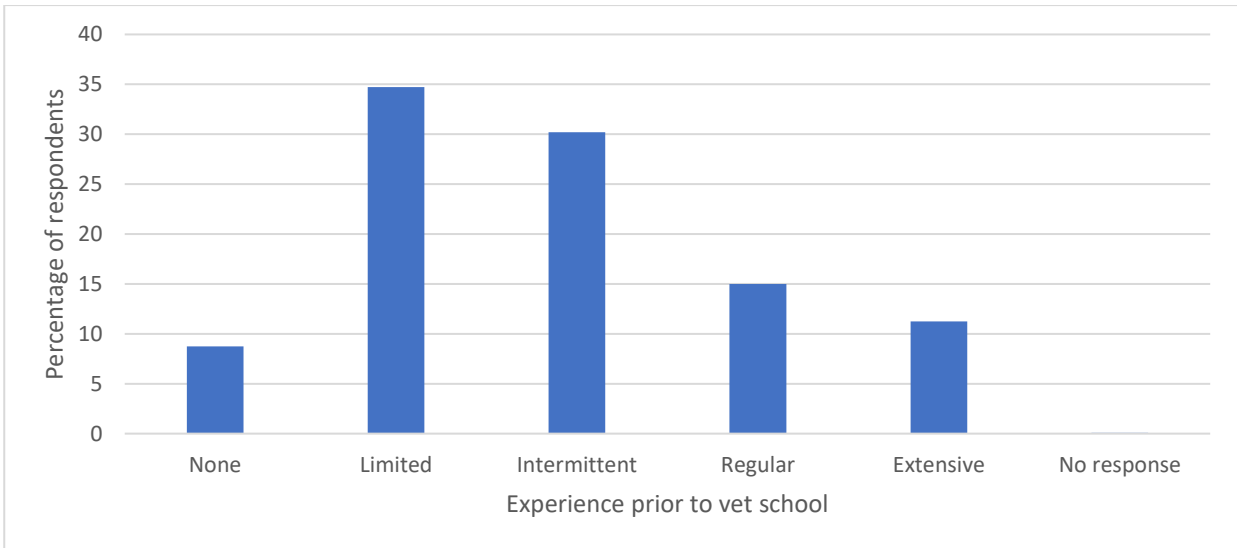


Figure 3: Bar chart displaying experience with farm animals prior to attendance at veterinary school (n=1146)

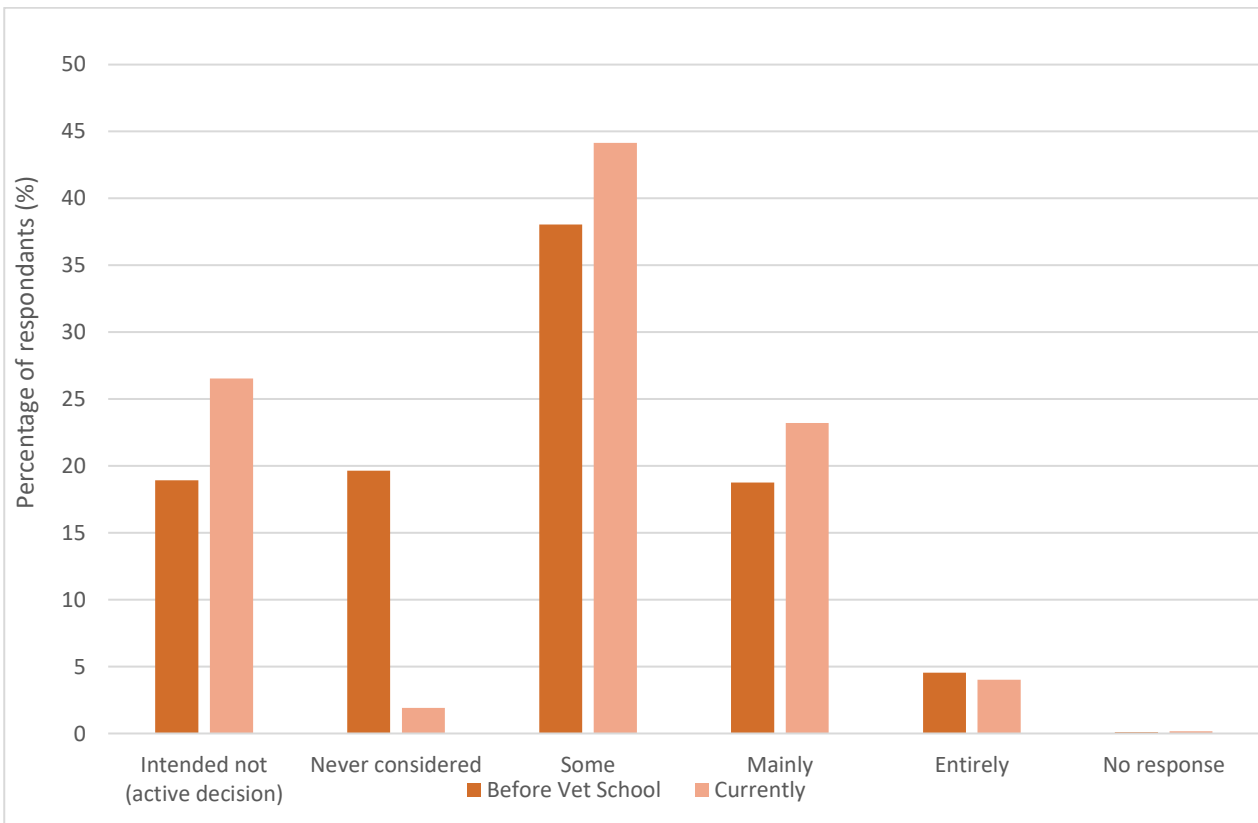


Figure 4: Bar chart displaying interest in a career in farm animal practice before veterinary school and at point of answering survey (n=1146)

Responses to survey questions 7 and 8 (How would describe your interest with working in farm animal veterinary practice as a career before vet school? / How would describe your interest in working in farm animal veterinary practice as a career currently?) are displayed in figure 4.

3.1.2. Factors influencing first job expectation

After answering questions arounds expected discipline(s) of first job, respondents were asked to answer the following question: “Which, if any, of the following factors influenced first job expectation?” (Q8b). Irrespective of the discipline(s) respondents were anticipating working in upon graduating, the most commonly selected factors chosen were personal interest and EMS (75% and 60% of respondents respectively, figure 5). Responses were different depending on the chosen career path (farm, mixed or no farm; $p=0.023$), although overall trends initially appear similar.

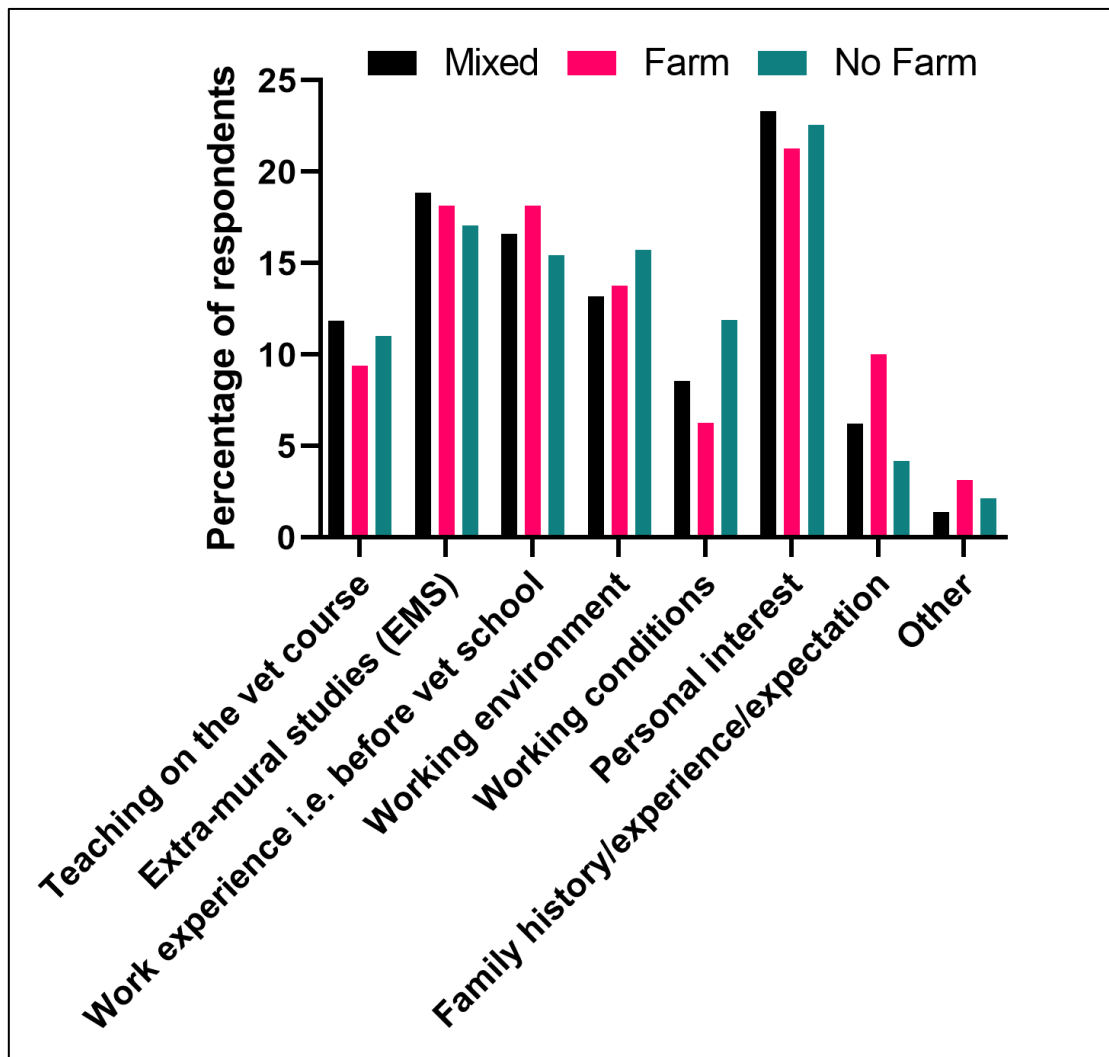


Figure 5: Bar chart displaying percentage responses to factors which influence anticipated first job discipline, sorted by anticipated first job discipline (farm, mixed or no farm; $n=1146$)

In response to the following question “When considering a career in farm animal practice: What do you think, if anything, is appealing about a career in farm animal practice?” (Q10), Responses to the question varied by anticipated career (farm, mixed or no farm; $p<0.001$). Respondents

considering a career in disciplines including mixed practice or without any farm animal work selected similar factors when considering what appealed with regards to a career in farm animal practice (working outside, varied day and working with animals); respondents that anticipated their first job to only include farm animal work also chose working with farm animals but in addition to this they also picked working with farmers/within the agricultural industry, demonstrated in figure 6a.

When answering the paired question “When considering a career in farm animal practice: What do you think, if anything, would put you off a career in farm animal practice?” (Q11), salary and out of hours/working hours were chosen by respondents considering a career in a farm animal only or mixed practice. Again, responses differed depending on anticipated discipline for first job (farm, mixed or no farm; $p < 0.0001$). Respondents who did not anticipate any farm animal work (no farm) within their first job role gave different responses, choosing out of hours/working hours but also working conditions and working with farmers/within the agricultural industry (figure 6b).

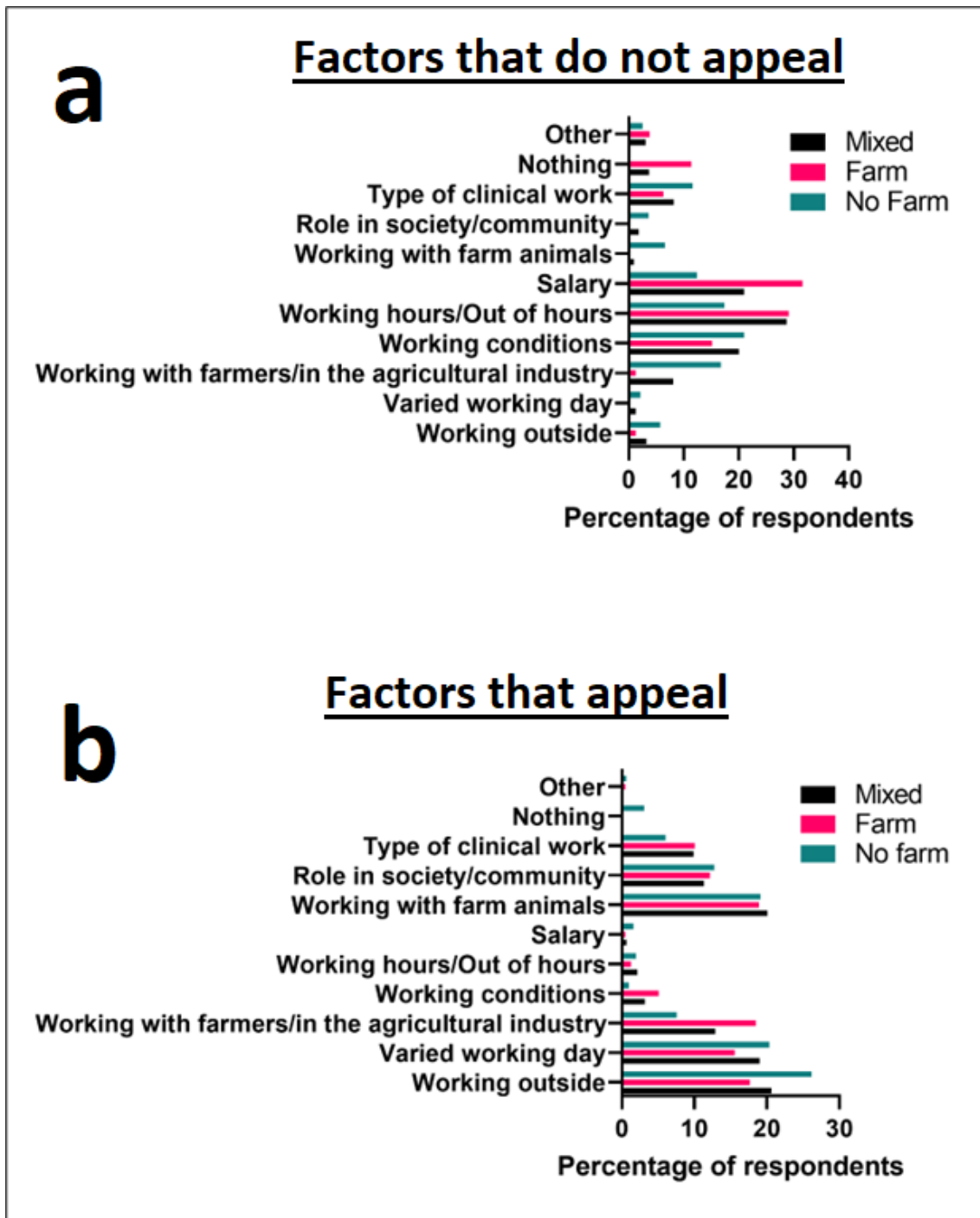


Figure 6: Bar chart displaying percentage responses to factors that do not appeal (a) or that appeal (b) when considering first job, sorted by anticipated first job discipline (farm, mixed or no farm; n=1146)

3.1.3. Enjoyment of farm animal teaching at university

Respondents were asked, via a Likert-style question to answer the question “To what extent do you agree with the following statement: *I enjoy farm animal teaching at university*” (Q9). Results are displayed in figure 7, which displays this question was largely answered very positively by respondents with 80% of respondents responding that they agree or strongly agree with the statement.

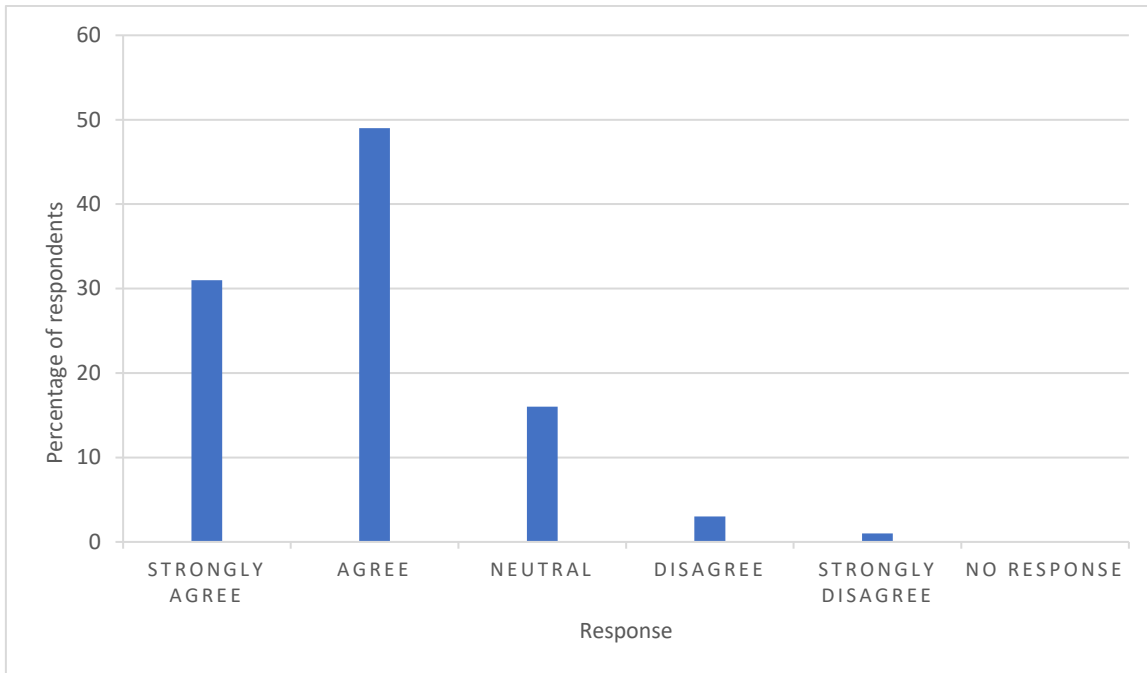


Figure 7: Bar chart displaying enjoyment of farm animal teaching at university (n=1146)

3.2 Thematic analysis

Free text response rates were high with 92.3% of recipients (n=1058) responding to one or more question. Seven themes were generated from the thematic analysis: Lifestyle; Relationships; Ethics and values; Fear; Direct experience; Perception of fit and Preferences and interests. Themes and subthemes are summarised in figure 8. Below, each theme is discussed in more detail with illustrative quotes from respondents. They are formatted to included respondent number (#), survey question, year of study.

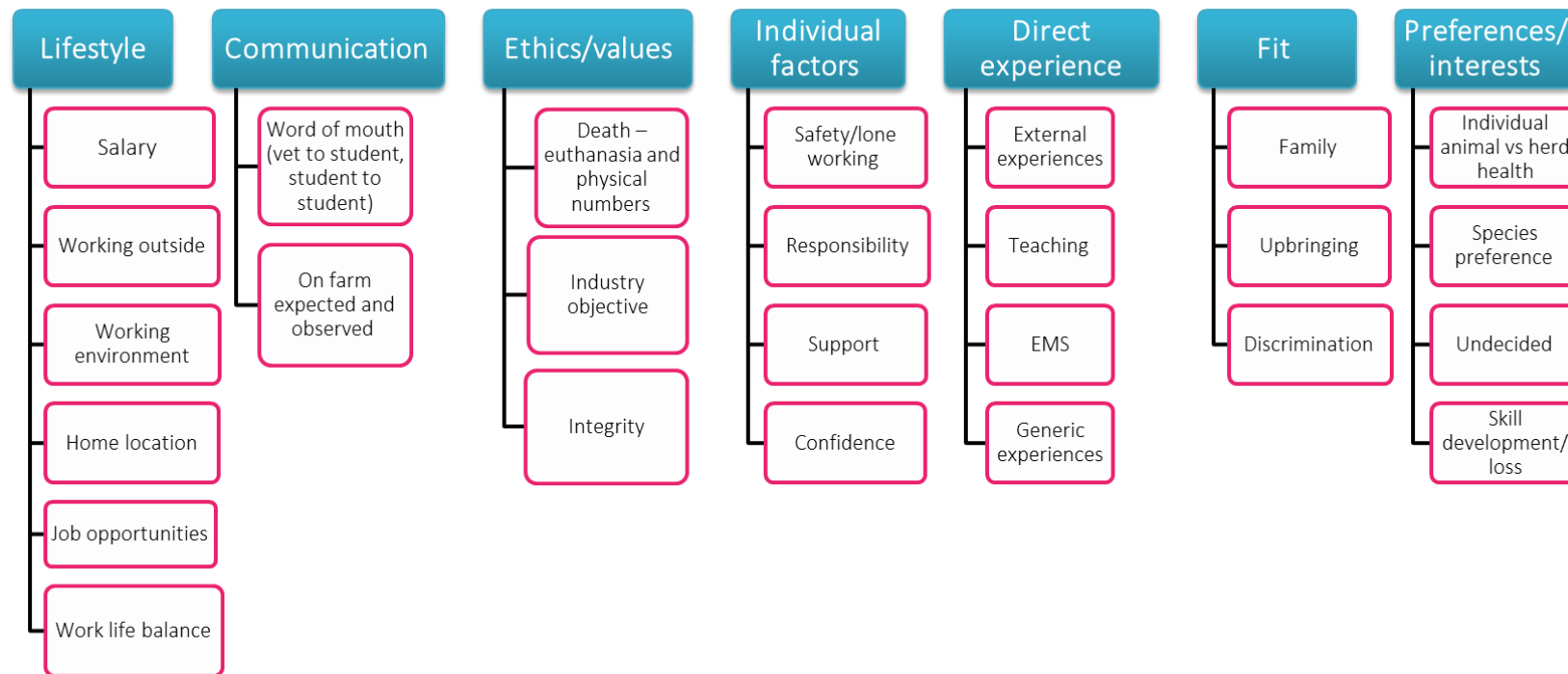


Figure 8: Thematic map including themes and subthemes generated from the free text responses to a survey of veterinary undergraduates studying in British and Irish veterinary schools

3.2.1. Lifestyle

The lifestyle theme captured respondents' answers surrounding both the day-to-day aspects of farm veterinary work and integration of the job with their personal life. Responses surrounding salary were wholly negative, often with comparisons to other sectors:

"Also, the starting salary for most new grad farm animal vets is £6000-10000 lower than smallies which makes a difference when you have a large debt to pay off and little savings due to the inability to work & earn during the majority of vet school." #817, 8c, year 5/6.

Additionally, there were varying opinions on working outside with some respondents viewing this in a positive light and encouraging a career in the farm animal sector, with others viewing it as a barrier, particularly in adverse weather conditions.

"Working outside is fine during the summer months but not in Winter! Don't think my fingers could cope with doing repeated caesareans in the cold." #444, 8c, year 5/6.

"I think working outside can be appealing and not-so appealing. It's great when it's sunny and warm, but not great when it's dark, cold, rainy, etc. The weather really was a factor for me..." #322, 13, year 5/6.

"The freedom of being outside and busy with something i enjoy" #762, 12, year 1.

In addition to working outside, the environment in which graduates would be working was frequently commented on by respondents. This included the conditions that they would be working in on farms, hygiene comments, references to time spent in the car and exploring the countryside. There were also numerous references to the general feel or mood of the environment and composition of working days.

"Spending a day driving around with a vet in nice weather seeing a variety of cases - PDing cows, placing a ring in a bull, checking baby goats. The life style and daily structure are very enjoyable." #524, 12, year 4.

"The working conditions for large animal/mixed vets in Ireland are unsustainable. More needs to be done to improve quality of life for large animal vets and this in turn might have a positive impact on mental health." #334, 11a, year 5/6.

“Also I hate the smell of cows the smell embeds into your skin and stays there for days I don't think I could cope with smelling like that everyday.” #619, 13, year 3.

Another facet to the lifestyle theme was home location with respondents specifically commenting on whether where they wished to live upon graduation would enable them or prevent them from pursuing a farm animal career.

“I want to live in london, where i think it will be hard to find farm work” #395, 8c, year 5/6.

“It is the most available sector in the locality of where I live” #605, 8c, year 1.

Job opportunities were also explored within the lifestyle theme with there being a predominantly negative slant to responses with regards to finding a job in farm animal practice and opportunities for progression and development. This was not absolute however, with participants also describing mixed practice (farm animal work plus elements of other disciplines) as leading to more future job prospects.

“It is something I am definitely interested in however I am led to believe that it is very competitive when applying for jobs which is why I am more likely to end up as a Small Animal Vet initially.” #81, 22, year 1.

“Also feel the opportunities for progression within farm practice are limited on the clinical side of things compared to small animal & equine where you have internships, residencies, diplomas etc.” #817, 8c, year 5/6.

“Working in mixed practice initially gives me the best chance of finding a job as soon as I graduate - most likely it will be some where near a major town or city” #800, 8c, year 2.

Finally, within the lifestyle theme there was the subtheme of the lifestyle required, respondents often discussed the hours required of farm animal veterinary surgeons, including the out of hours (or on call) requirements and how achievable a desirable work life balance would be. There were often references to the difference in working days with regards to the volume of consultations performed and diary layout.

“Although small animal work is perhaps the easier option in terms of better work / life balance, farm practice is a way of life and one I am considering entering into. Plus I don't mind the OOH” #648, 8c, year 4.

"I had an open mind going into veterinary. I always liked dogs and cats and was used to them. I grew up around them and most of my experience was with these species. As I learned about large animal and did some farm work, I really enjoyed it. However, when I thought about the logistics, I just don't see myself waking up at 3 in the morning to a call when it's freezing, dark, etc. as high maintenance as that sounds. I prefer working conditions/environments that are more stable, as well as a more stable schedule." #822, 8c, year 5/6.

3.2.2. Relationships

An overarching theme that covered the bond that was observed, experienced or expected, summarised in figure 9. There were many responses that alluded to the relationship that had been witnessed between farmers and veterinary surgeons, including the nature of the rapport achieved with regularly working with the same clients or expressing a wish to work with farmers over other discipline clients, or vice versa.

"I enjoy the relationship you can build up with farming clients as opposed to seeing so many small animal clients in one day and not remembering them" #367, 8c, year 5/6.

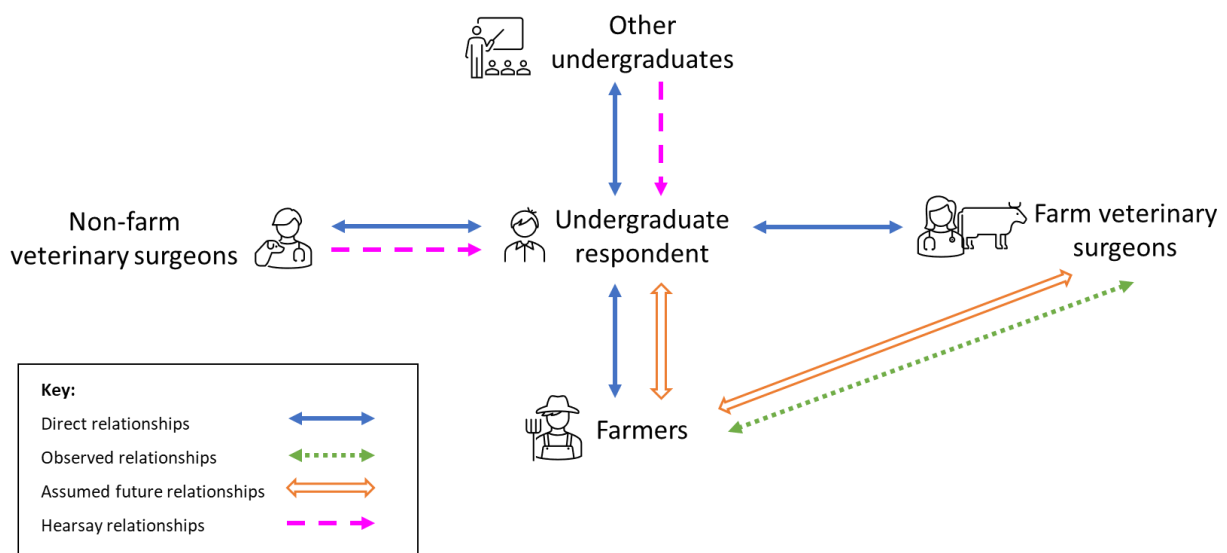


Figure 9: The different types of relationships constructed within the relationships theme (one of seven themes developed from the free text responses to a survey of veterinary undergraduates studying in British and Irish veterinary schools)

There was a distinct categorisation of clients requiring a specific type of communication. For some respondents there was a feeling that there was a barrier to communicating with farmers as a whole due to the nature of conversations required and a lack of industry understanding:

“While I enjoy doing farm work and working with cows etc, I found it difficult to interact with farmers and understanding them because it is almost like a different world to me.” #292, 8c, year 5/6.

In addition to this, respondents often referred to hearsay conversations or experiences that their peers or other veterinary surgeons had experienced that had influenced them, rather than being in reference to relationships they themselves had built.

“A lot of vets i have been with on ems don’t enjoy it and have warned me against it. Especially with certain farms which they dread going to more than awk-ward small animal clients...” #164, 22, year 3.

“Although I haven't had any negative experience personally, the reputation of 'traditional' farmers being quite unapproachable is still commonly discussed.” #592, 13, year 1.

“I feel like on work placements and in lectures I am constantly being told how 'difficult' farmers are and how they don't want to spend money on their animals. This has put me off because I am sure not all farmers are like that but I do not like the thought of constantly struggling to convince farmers that making changes to husbandry practices that could be quite expensive will be worth it in the long run and better for their animals.” #229, 8C, year 4.

This aspect of hearsay also extended to concerns regarding what farmer expectations of the veterinary surgeon might be:

“Going on pre-clinical EMS where the farmers had a very specific idea of who they thought was a good vet, and told me many stories about "terrible" vets and new grads they'd had.” #246, 13, year 4

Lack of compliance within the vet – farmer relationship also featured heavily within responses, often with a link to economics and finances:

“Working with old-school type farmers that are not proactive or inclined to change really disappoint me.” #268, 13, year 5/6.

“Working under poor conditions and with farmers who misunderstand veterinarians and don't apply as much of our health and welfare standards on their farm, rather do what's economical to them. Farm work doesn't always align with a veterinarian's view, in terms of wanting to do the best we can for our patients. That can be very frustrating as we have to lower our standards to suit what the farm can afford/ can do.” #1004, 13, year 2.

Respondents also mentioned the type of communication that you could expect with farmers, especially those that formed as a result of the long periods of contact a vet could have with a farm. These interactions were seen in both a positive and a negative light, with respondents referring to “banter” or “friendships”, that could be developed, and time taken to develop “trust” or being “shouted at” or having farmers “lose their temper”.

“The general construction of a relationship with the client building their trust and having a valuable contribution to a large business.” #541, 12, year 4.

3.2.3. Ethics and values

The ethics and values themes covered issues surrounding the morality of farm animal practice and the agricultural industry in general. There were consistent responses discussing ideas of professional integrity and whether or not this would be challenged in a farm environment. In addition to this there was raising of contentious topics for which veterinary surgeons are considered gatekeepers and how a lack of ability to change opinions on these topics could lead to personal professional integrity being compromised or decrease job satisfaction.

“A number of farmers i've seen while on EMS were unwilling to change theirs ways with things such as antibiotics resistance measures, etc. It's quite tiring and frustrating to deal with people who can't move forward, and quite frankly, I can't sit around and be ok with that.” #485, 13, year 4.

“I really struggled with the difference in priorities between farmers and farm vets. I was surprised how much farmers asked vets to falsely certify for them e.g. Write certificates for on-farm [emergency] slaughter when the animal had a chronic condition, or to record non-reactors as reactors in TB tests to get rid of them cheaply. This isn't the environment I want to work in, and I have developed a strong dislike of the farming community as a result.” #437, 8c, year 4

These comments quickly built a picture of an objection to the farming industry as a whole, including its impact on wider global issues and sometimes including concern regarding animal welfare within agriculture:

"I just don't understand how as a vet, if you claim your highest priority is animal welfare, you can perform many of the farm duties expected of you without being a hypocrite" #87, 22, year 5/6.

"There are environmental concerns with large-scale farming, and if something does not change in the management side to reduce the impact farm animals have on the environment then I may re-think my career path. I would not want to be a part of such a large contributor to climate change, so would put me off working in such a practice." #297, 22, year 2.

Although these responses were not entirely negative, with some respondents seeing an opportunity within a farm career to improve on some of these perceived issues and educate their clientele, making farming practice more sustainable and improving on food safety:

"Ability to make some difference towards driving the food industry's welfare and productivity forward, while supporting the rural economy." #530, 10a, year 5/6.

"I enjoy farm teaching tremendously and feel that production animal veterinary surgeons have one of the most important roles to play within the profession due to their impact on economics and industry. Large animal veterinary medicine is still a very attractive discipline to work in and is still something I would like to try initially." #264 , 22, year 4.

There were references to common place practices within the farming community and disease processes that may be contributed to by the way in which farm animals are kept.

"Just the separation process of the mother and the calf, there must be another way we can do things, but it just hasn't been researched yet. The cattle are emotionally and physically affected. We don't know what they are going through thus we need to have research in place to see how they are feeling and whether that links to the rise in Mastitis. As stress can be physiological not just physical." #836, 13, year 1.

There were often comments that referred to life-style choices and how this was prohibitive to a career in farm animal practice, often with very emotive language used.

"I have the impression that there are more vegans on my course now that put off some people in working in farm practice, which is a shame." #157, 22, year 3.

"As a vet student, i am against the abuse of some of our patients so i am a vegan. In other words, i am against cows being murdered for people to eat them when other patients like dogs have to be treated with more respect. Therefore, i am highly against farming animals as i am against the animal agriculture system so i will not be working for a farm when i graduate." #1089, 8c, year 5/6.

Finally, within this theme there was a subtheme surrounding death and euthanasia. This was both in terms of the volume and methods used. There were often direct comparisons with other disciplines and farm animal practice was often portrayed in a negative fashion. Financial implications of treatment vs euthanasia were often discussed with euthanasia not being presented as an acceptable alternative to treatment. There were frequent comments that either outright discussed or alluded to the "value" of a life and euthanasia of healthy animals.

"It can be tougher than working with smaller animals, higher rates of death or death over treatment" #176, 13, year 1.

"When after a quick diagnosis the animal is sent to slaughter because treatment would be too costly. Very much put me off the sector." #727, 13, year 3.

"Sorting cull cows who apart from reduce milk yield were otherwise healthy" #1049, 13, year 3.

3.2.4. Fear

The fear theme encompassed respondents concerns regarding their own confidence with regards to pursuing a career in farm animal practice, this was often linked with exposure to farm animal environments and knowledge of the farming practice as well as comparisons being drawn with confidence levels in other disciplines:

"Also to do with confidence in handling the animals and knowledge of the industry." #394, 8c, year 5/6.

"I have always felt lacking in my farm skills and after getting more hands-on in final year I now feel more confident and want to pursue this" #610, 8c, year 5/6.

"I doubt my farm knowledge - farmers spend their whole life learning about farming, how could I really advice them when I've spent maybe 1/4 of my vet degree only learning the basics?" 1102, 8c, year 4.

This lack of faith in respondents' confidence was not only in their own ability but also in that they perceived the client would have in them, although some respondents could appreciate farmers understand that undergraduate students are there to learn:

"Having to deal with farmers/clients who don't trust you/have faith in you because they think you don't have enough experience or are too small to handle large animals" #1098, 11a, year 3.

"It's pretty boring when you have a [v]et who doesn't let you do anything, and missing jugulars / not being able to tube the strong willed beef cow in front of farmers definitely takes confidence from me but I've not really had a negative experience! Most farmers laugh it off and understand I'm there to learn!" 1048, 13, year 5/6.

Lone working was a common concern from respondents, with specific reference to out of hours as a time where less support would be available and particularly, calls are more likely to be of an emergency nature and therefore more high stakes.

"The thought of being alone OOH with an angry farmer" #304, 13, year 5/6.

This was often linked with a lack of support for new graduates when working for a practice and the amount of responsibility that would be bestowed upon them with regards to making economic decisions that would impact on farmers' livelihoods (as compared to the more traditional decision making involved with companion animal care).

"Seeing the lack of support for farm vets, especially on call." #835, 13, year 3.

"Recent large animal placement (equine and farm mixed), I was very impressed by the level of support given to new grads when they were on the road. I was initially put off large animal work because of being by yourself but this placement really changed my prespective" #411, 12, year 4.

Another subtheme within the fear theme was one of concern for personal safety when on farm. This ranged from working with farm animals, to equipment and facilities available and zoonotic disease risk.

“Farm animal vets have the most injuries at work within the veterinary profession and it is easy to see why after a scary experience I had. The vet had been called out to visit a “downer” cow but when we arrived to examine the cow she charged at the vet and trampled her to the ground. Luckily, she was alright but very shaken afterwards. It made me realise what a dangerous profession it is that I want to go into and how you must always be aware of the dangers of large animals.” #356, 13, year 3.

“Observing people get kicked/ injured by farm animals, having to perform tasks unsafely due to lack of adequate handling equipment, working with feisty animals (bad experience of a fiery simmental cow with horns)”. #444, 13, year 5/6.

“Contracting cryptosporidium at the end of my dairy placement!” #258, 13, year 4.

3.2.5. Direct experience

The direct experience theme comprised of respondent’s attitudes towards their own experiences within the food production sector. These experiences ranged from those related to their undergraduate veterinary career and those external to this. The responses were often very emotionally charged and despite respondents being directly asked about their most positive and negative on farm experiences within the questionnaire this theme focused more of the emotions relating to enjoyment or dislike of the events and circumstances they discussed rather than a descriptive comments of actual encounters.

“I completed an internship in dairy cows and it was a very positive experience, as I became more confident and learned more sides of agriculture.” #260, 12, year 1.

EMS was a subtheme within the direct experience, with respondents having very polarising experiences that had heavily influenced their decision-making regarding career choice. Respondents discussed a multitude of different facets of EMS including experiences they had had (good and poor), references to sourcing placements (availability, how easy or not they were to find and book), financial implications of undertaking farm EMS (with respondents often referring to costs incurred with travel) and feedback they had received after finishing placements. Respondents seemed to especially associate lambing placements with positive experiences, particularly with regards to being given responsibility for the animals in their care. The phrase “hands on” was frequently used by respondents.

“How hard it is to find a CEMS placement without lying about being farm keen!” #1, 13, year 4.

“Being based in the city and unable to afford a car or extensive public transport I struggled to access farm placements during my clinical years, so my confidence has dipped. In my case I was interested in the farm side of things prior to vet school. Once I was funding and transporting myself it became a case of logistical issues not lack of enthusiasm preventing me from following up this interest.” #163, 8c, year 5/6.

“I enjoyed working on farms as it is so hands on, especially lambing.” #975, 1, 12.

There were also mentions to students’ intrinsic value when on placement and being felt like they were not appreciated, were being used as a source of cheap labour and this impacting on their learning. Often there was very emotive language attached to this, as in the example below where the respondent describes themselves as “slave labour”. In addition to this there was a concern from students about being blamed for event – both this happening (to themselves or the veterinary surgeon) and being worried this would happen.

“Being used as slave labour in AHEMS spending hours cleaning farms and not actually learning anything” #890, 13, year 5/6.

“A cow died after a c sec and the rumours spread about a new grad vet who did the procedure were not pleasant and demoralising. The vet, especially a new grad is easily given the blame even if the surgery at the time went well.” #143, 13, year 2.

Teaching was often referred to, particularly the volume in comparison to other disciplines and the impact this had on respondents’ confidence. In addition to this there was often a link made between the practical teaching at university and how this then helped undergraduates to feel ready to undertake EMS placements. Rotation teaching in clinical years was also highly valued by respondents and frequently commented on.

“Not enough farm content in lectures means not as confident compared with small animals” 871, 13, year 5/6.

“Animal handling classes with farm animals at the university's farms as it made me feel more prepared for EMS and consider working with farm animals a lot more.” #806, 12, year 1.

“teaching in final year a very big factor” #513, 8c, year 5/6.

“University has provided extremely limited farm teaching in my opinion. With 5th year being particularly poor in farm animal provision as a percentage of the year.” #530, 8c, 5/6.

There were also some comments surrounding how farming and farm clients were portrayed by staff within university and how these experiences with university staff had impacted on respondents’ decision making:

“I feel like on work placements and in lectures I am constantly being told how 'difficult' farmers are and how they don't want to spend money on their animals. This has put me off because I am sure not all farmers are like that but I do not like the thought of constantly struggling to convince farmers that making changes to husbandry practices that could be quite expensive will be worth it in the long run and better for their animals.” #229, 8c, year 4.

Finally, within the direct experience theme there was a subtheme of experiences that had occurred either not in relation to their undergraduate veterinary career or prior to respondents starting at veterinary school. These external experiences including part time jobs, placements that had been undertaken before attending university and memberships of farming organisations such as the National Federation of Young Farmers’ Clubs.

“Had never even considered the possibility of being a farm vet until I did dairy work experience before vet school and got bitten by the farm bug” #227, 8c, year 2.

“I worked on a dairy farm as a relief milker which made me fall in love with farm animals.” #852, 12, year 1.

3.2.6. Perception of fit

When describing the word ‘fit’ as a verb the Oxford English Dictionary uses definitions such as “to be suited or suitable, be proper for, to be in harmony with, become, benefit” (Oxford English Dictionary, 2023). The perception of fit theme encompasses undergraduates’ responses that reflect this definition and their perception of their own suitability for a career in farm animal practice.

“I would say I do have more of an interest clinically in farm animal medicine versus small animal, I’m just not sure if my personality would fit on a farm.” #285, 22, year 3.

This often-included examples of discriminatory behaviour that has been encountered or witnessed by respondents. Frequently there were references to gender discrimination (from farmers, veterinary surgeons and fellow undergraduates) and this being more prevalent in farm animal practice:

“Dealing with difficult farmers. One of the best vets I worked with told me she had had her correct clinical diagnoses questioned by farmers who wanted a second opinion from male vets.” #254,13, year 4.

“Dealing with unpleasant farmers, especially those who don't respect female vets. I think this is more of a problem in large animal practice rather than small animal.” #437, 13, year 4.

“Whilst this was always my area of interest, farm work experiences since joining vet school (including 2 sexist remarks from farmers on my ability to handle and work with farm animals and being snowed into a barn) secured my decision to stick to small animal practice.” #1073, 8c, year 3.

“Farmers have said that i'll be capable and have encourages me but fellow (male) vet students have made (joking) comments that my size and sex will mean I cant do it.” #146, 21a, year 2.

“I think there is a big misconception in the vet community that farmers do not like female vets. I have never had any problems with being female in the farming community. I actually think there is more in the small animal community especially when a male vet student is seen as a vet but a female vet student is seen as a nurse.” #242, 22, year 5/6.

Respondents also referred to incidents where they were sexually harassed or incidents where discrimination due to protected characteristics had occurred.

“An AHEMs placement farmer made sexual advances towards me making me feel very uncomfortable and threatened” #873, 13, year 4.

“As a trans gay man I've struggled a lot with my farming placements. I've constantly been misgendered and have struggled much more to correct them than I have on other placements where I was able to show up on day one, tell them I'd changed my name a few months ago, and not receive any negative comments.” #465, 13, year 2.

“Sometimes I think being a woman and of mixed heritage is difficult. Not that I couldn’t be a good farm vet, but I’m not sure I could deal with farmers potentially making comments in the way I’ve already experienced (although most farmers don’t mean it in a horrible way at all! They can just say ignorant things without realising).” #443, 13, year 3.

There was also reference to a lack of role models within the profession:

“I have personally never met or been taught by a farm vet who isn’t white” #1130, 21a, year 3.

Frequently respondents referred to having a family and concerns surrounding both doing the job role when pregnant and also bringing up a family. Physical stature and size were also discussed as potential barriers:

“I feel as though it is harder for women to go into Farm Animal Practice, particularly if you are not born into that background. Also, in a practical sense, I feel it would be easier to have children if you are doing small animal work. You could work for longer during pregnancy.” #583, 8c, year 1.

“Sometimes farmers have commented on lack of height or strength when on EMS with the vet. It is a concern of mine if I do go into mixed practice.” #976, 13, year 5/6.

In addition to this “fit” was discussed by respondents in terms of whether they were from a farming background or in relation to the upbringing they had and whether this would aid or be a barrier to a farm career:

“I’m not from a farming background, so sometimes I feel lost when farmers are chatting to the vet about ‘farming issues’. I felt a bit daft when I couldn’t join in the conversation and ask relevant questions about what was happening on the farm. All stuff that can easily be learnt by asking a few enthusiastic (but daft!) questions... but I can see how that could make someone feel they’re not cut out to be a farm vet” #981, 13, year 4.

“If I was from a rural community I would consider this as a career option more fully.” #1, 22, year 4.

3.2.7. Preferences and interests

Respondents often referred to their own preferences, elements of personal choice and a predilection for a certain discipline. Often this encompassed the nature of the work they anticipated they would be performing when graduating and acting in their role of veterinary surgeon, particularly herd health approaches and large amounts of time spent TB testing were seen in a negative light:

"I like some farm animals eg chickens and sheep, but have no desire to work clinically with them. I also prefer more individual approach to animal health as opposed to herd health and all that entails" #232, 11a, year 5/6.

"shift in the role of the farm vet from practical work and more advisory office work!" #521, 11a, year 5/6.

"I did not enjoy the type of clinical work as the days generally seemed a lot less variable than small animal practice, for example spending most of a day on the same farm just doing TB testing." #972, 13, year 4.

Some respondents clarified that they felt they could have pursued a career in farm animal, had they wished to, but that they simply did not want to follow this career path:

"I could do it if I was interested in it but currently that's not my passion" #10, 21a, year 4.

"I have never felt put off by it or that my background stops me from doing it. I just don't want to." #14, 21a, year 2.

There were several respondents that commented they were undecided on their career path at the point in which they answered the survey. With phrases such as 'broad experience' and 'consolidate knowledge' being used as well as the following examples:

"I would like to go into mixed practice initially and then decide whether I would like to remain in mixed or specialise in small or farm work." #231, 8c, year 4.

"From a farming background, I feel that if I were to start work with small animals I could later move to working with farm. Whereas if I started with farmwork I would struggle to get back into small animal work due to already finding small animal work/surgery more challenging. Starting with small would therefore personally keep my options open for longer" #541, 8c, year 4.

Others wanted to use a farm career for skill development or were worried about skill fade, some wanted to use a farm career as a steppingstone into another discipline and some believed it would give more variety to the working day.

"I would love to have a good broad basis to work from in the future, and feel doing some small animal would be valuable for a number of reasons, especially surgical practice, even though I hope to focus on large animals in the future." #206, 8c, year 3.

"Desire to work with large wildlife, conservation medicine, which requires solid foundation in farm animals and equine." #560, 8c, year 3.

"Wanting more variation when I graduate in day to day life and learning opportunities."
#435, 8c, year 3.

CHAPTER 4: Discussion

The aims of this study were to ascertain the answer to the following two questions:

- What influences undergraduate students' attitudes when considering a career farm animal practice?
- How are those factors influenced by experiences that undergraduates have during their time at university?

By performing thematic analysis on respondents' free text responses, the following seven themes have been identified as influencing attitudes of undergraduate veterinary student's decision making when regarding a career in farm animal practice: Lifestyle, Relationships, Ethics and values, Fear, Direct experience, Perception of fit, Preferences and interests. From the descriptive analysis of closed questions, the most common factors influencing first job expectation were personal interest and EMS. These were important regardless of anticipated first discipline. When contemplating only respondents intending to do some farm work, previous work experience was also an important consideration. When asked about factors that made a farm career appealing, respondents keen on pursuing a farm animal career answered significantly differently to their non-farm keen counterparts, with non-farm keen students selecting working outside, varied day and working with farm animals and those who anticipated a career in farm animal only choosing working with farm animals and working with farmers/within the agricultural industry. Conversely, when considering factors that put undergraduates off a career in farm animal practice, salary and out of hours were chosen by respondents considering farm only or mixed practice. Respondents who did not plan on any farm work upon graduation selected out of hours/working hours, working conditions and working with farmers/within the agricultural industry.

4.1. Influence of extramural studies

Choice of anticipated first job upon graduation was highly influenced by EMS (figure 5); with the direct experience theme shaped by free text responses relating to both animal husbandry EMS and clinical EMS. These results are not entirely unexpected as respondents were asked "What has been your most positive/negative farm or farm careers related experience?" (Q14 & 15). Figure 3 showed 43.4% of respondents describing their experience with farm animals prior to starting veterinary school as either limited or no experience. This then follows that EMS may be one of the only opportunities respondents have had to experience working with farm animals, and display opportunities for career within a production animal setting. This finding is echoed in results of an

Australian study that surveyed final year students after completing a lecture free final year at the University of Sydney (Baguley, 2006). Their aims were to ascertain how effective students felt their preparation for veterinary practice was, including rating the value of EMS for preparation for practice. They found that respondents rated EMS as “very valuable” in developing the main attribute that were vital for becoming a successful veterinary surgeon (communication skills) and 37% of respondents found EMS of most value when obtaining insight into career choices. In addition to this an undergraduate survey conducted by the Farm Animal Veterinary Society (FAVS) found that 74% of students expressed that a positive EMS experience had made them more likely to consider a farm animal job when choosing their future career discipline, conversely 6% of students that had a negative experience whilst on EMS were less likely to consider this as a future career option (Owen, 2022).

This dissertation had the contradictory finding that respondents felt less confident working with farm animals, partially as a result of having less teaching in that area (demonstrated in the quote included by respondent #871) but they also were happy with the teaching received (figure 7). Mixed careers were seen as important to some respondents for skill development and avoiding skill fade within the preferences and interests theme but there was no real recognition of these transferable skills at an undergraduate level, perhaps further demonstrating the importance of a wide range of EMS. It is possible that undergraduates perceive the quality of the farm teaching to be of a high standard but that the quantity within an omni-potential curriculum is insufficient.

Bell et al. (2010) identified that preparation for EMS by the student was key to a successful placement. This is particularly important as, when discussing animal handling teaching at the University of Edinburgh, Cockram et al. (2007) described teaching undergraduates in a university setting as requiring substantial staffing, time and amenities as well as appropriate animals both in terms of species and temperament. These university challenges make AHEMS and being prepared for EMS all the more important. Even when this is achieved well, both parties (veterinary student on EMS and host (farmer/practice/veterinary surgeon)) must have their expectations managed for the placement to be a success. Concerns with regards to variability of quality of EMS have been raised for several years, as well as the rising costs and difficulties associated with sourcing placements (RCVS, 2020).

As described above, criticisms of the current EMS system within the UK include a difficulty in sourcing placements (RCVS, 2020). This was a subtheme of the direct experience theme and is

supported by the RCVS Report of EMS survey (RCVS, 2014). The aim of the survey was to ask recent graduates their views on the EMS system, with particular focus on the role it plays within the process of learning and what respondents felt EMS offered that was not possible to learn within their core teaching environments alone. Quotes such as the following demonstrate similar frustrations to those identified within this study with regards to booking placements:

“There are insufficient truly mixed practices and the few there are swiftly booked up, often years in advance. As a vet who knew she wanted to go into farm/ mixed (would happily drop the equine) it was incredibly frustrating to have to do more small animal than I would have liked, as there were not enough farm practices with spaces and too many vet students (including those who will NEVER EVER touch a cow again in their lives) with too few good placements” (RCVS, 2014).

With regards to issues sourcing placements respondents reported, when attempting to book placements, a decreasing number of practices resulting in places being increasingly competitive with many booking-up a significant time in advance (RCVS, 2014). In addition to this, the 2014 RCVS study further supported this study’s findings with respondents discussing geographical difficulties with regards to accessing placements and the costs of travel and accommodation associated with farm animal placements. Further detail on the concerns the RCVS have recognised and raised with regards to general aspects of the current EMS system include equal opportunities, quality assurance, student safety and wellbeing, the economic cost of EMS and mutual recognition of veterinary degrees (and international standards), noting that there is a general lack of structure and that the majority of veterinary surgeons in mentorship roles for EMS are untrained (although this has improved with relation to the post-graduate Professional Development Phase since this report was generated) leading to a variable student experience (RCVS & Work Psychology Group, 2018).

In addition to these criticisms, the BVA EMS working group identified a “power imbalance” between the undergraduate student on EMS and the veterinary surgeon signing off on the placement, highlighting that due to this, students find it difficult to raise issues or abandon placements and are often unwilling to raise any issues at a university level (BVA, 2022a).

In response to these criticisms, the RCVS Strategic plan for 2020-2024 outlines a number of options that have been developed and presented to the profession as a whole. These include moving the timing of EMS (AHEMS and CEMS) to the end of the veterinary degree -this way a block of placement would transition into the professional development phase or PDP (compulsory

for all new graduates governed by the RCVS). Other options suggested were creating externships and moving clinical EMS to earlier within the course (allowing AHEMS and CEMS to run concurrently). As of yet, there is no clear outcome, although there is a general acceptance that EMS in some forms needs to stay part of the wider undergraduate curriculum as the value of experiential learning is still recognised (RCVS, 2020). The BVA have made their position on the matter clear; identifying a change in both veterinary education and the “professional landscape”, as well as identifying the increasing number of veterinary schools resulting in an increasing number of students searching for EMS placements. They have called for an overhaul of the EMS system and have made several demands of the RCVS including: a wholly outcomes based approach for veterinary degree accreditation; removal of the set requirements for AHEMS and EMS; an allowance for each undergraduate to be able to tailor their choices regarding experience to their own personal areas for development and allowing structured objectives to put in place before placements begin, with structured feedback mechanisms in place; asking the RCVS to reduce the administrative efforts required to support the various different training schemes currently available; any changes to be evaluated for equality impact and a zero tolerance stance to be taken on harassment and discrimination; delivery of training to providers of EMS; using the structure of the Practice Standards Scheme to incorporate some quality assurance into practice structure with respect to placements; exploration of the possibility of nationalising the EMS service rather than individualised within each school; Veterinary schools to give training to placement providers including support and guidance on discrimination, harassment and bullying (BVA, 2022b).

EMS experiences are clearly demonstrated to be highly influential and often polarising with respect to decision making regarding the choice of discipline when undergraduates consider their future career. EMS will almost certainly remain a significant contributor to the experiential learning of the undergraduate veterinary degree and therefore implementing some of the suggestions posed by both the governing body for the veterinary profession and the representative membership associations could help to create more positive, informative and comparable experiences across the undergraduate population. It is also vital that universities remain as accessible contacts for students undergoing EMS, particularly making themselves available should any problems arise during placements. The work described in this thesis clearly demonstrates EMS is important to undergraduates when considering career perspectives and decision making regarding future career choices, changes to the system should not ignore this.

4.2. Working conditions of farm animal veterinary surgeons

When contemplating factors that do not appeal to students considering a career in farm animal or mixed practice, salary and working hours/out of hours were the two most selected options. The lifestyle and fear themes both echo these findings. Salary had very negative connotations as a subtheme of the lifestyle theme, with working and out of hours being discussed as part of the composition of the working day and issues raised relating to the sustainability of out of hours work (particularly in comparison to small animal work, where there are numerous job opportunities that do not involve any out of hours work (Robinson et al., 2019)). Within the fear theme concerns were raised from respondents with regards to aspects of lone working, personal safety, lack of support and increased responsibility associated with out of hours work. These findings demonstrate some similarities and differences between undergraduate veterinary surgeons and practising production animal or mixed veterinary surgeons. An Irish study looking at factors affecting retention of veterinary practitioners found salary, working hours and work life balance to all be important when attempting to retain veterinary surgeons (Ryan et al., 2022). A recent study looking into retention of farm animal veterinary surgeons in UK practice found standard working hours to be weakly associated with retention but out of hours to have a strong association (Adam et al., 2015). Adam and colleagues suggested that when considering issues regarding retention, out of hours and contracting working hours should be considered independently. In addition to this, the study found that veterinary surgeons that earned a higher salary were more likely to be retained within the production animal sector, suggesting that undergraduates share the concern that salary is an important driver for retention. Both papers highlight the importance of good remuneration and validate salary as a concern for undergraduates. Adam et al. (2015) also commented that educational factors in relation to preparation of undergraduates for a career in farm/mixed animal practice were of “limited importance” when considering retention within the field. This suggests that the issues raised by undergraduates within this survey are valid when considering their future career however, that the appreciation of what the working conditions are differ slightly between undergraduates and farm practitioners. This could imply decision making is influenced by factors beyond those purely based in education (for example those demonstrated within the perception of fit theme); allowing students transparent access to these conditions is vital for decision making.

In the *Farmers Weekly* study mentioned above, of the 426 veterinary surgeon respondents, 49% said being on call was one of the worst aspects of being a farm veterinary surgeon. The same study

also identified improved salary/remuneration (most chosen option out of a list including better “flexible working opportunities”, “better support/mentoring”, “greater inclusivity” amongst others) as having the most impact with regards to what could improve retention of veterinary surgeons (Price, 2021). Vet Futures (in a collaboration between the BVA and RCVS) surveyed BVA members (n = 623 respondents; 20% of whom were in either mixed or production animal practice) and found that 41% of respondents described their career as only meeting some or not meeting any of respondents’ expectations. When further analysing this data, reasons for careers not meeting expectations included reduced progression opportunities, salary and working hours/out of hours (Vet Futures, 2015). In a project developed from the Vet Futures research, a report published in 2018 revealed that having a “lesser endorsement of long hours within the work culture” and “burnout” (physical and or emotional exhaustion, often attributed to long term stress) were factors that contributed towards decision making for those veterinary surgeons considering alternate career options outside of the profession (Begeny et al., 2018). In the most recent RCVS study of the profession to look at working hours, it was revealed that, on average, a sole production animal practitioner works 42.1 hours per week (44.2 hours per week for a mixed animal practitioner) with an additional 23.6 hours of on call time per week (24.5 hours per week for a mixed animal practitioner). Compared with a comparable small animal practitioner this is an increase in hours (42.5 hours per week with 9 hours on call on average), but considerably less than a comparable equine only practitioner (average 50.5 hours per week with 35.2 hours per week on call) (Robinson et al., 2019). In addition to identifying the recruitment of experienced vets as an issue, Hagen et al. (2020) showed that work life balance was the most common reason given by veterinary surgeons who were seeking to leave their current role. This suggests that a more flexible approach to employment than the traditional full time plus out of hours role could be beneficial when considering not just future veterinary surgeons, but those already in the role. Interestingly, the latest RCVS Workforce action plan report identifies seven different “ambitions” aimed at identified problems and coming up with solutions to resolve these issues, an aspect of one of which is how to help those who have left the profession to return (RCVS, 2022a). The work described in this thesis highlights the potential these approaches will have, not just on retention, but on the perceptions undergraduate students have of farm vet lifestyles; considering career choices from an earlier part in the undergraduate degree programme could help to aid undergraduates with decision making; for those already farm keen, open discussions facilitating conversations around salary would be beneficial, for those currently not interested pursuing a

career in farm animal, facilitating discussion surrounding the anticipated working hours (including on call) could help alleviate concerns. In addition to this, it is essential that any changes managed within the profession are communicated at an undergraduate level, the communication theme discussed the impact of hearsay on student decision making and if any changes for the better do occur but are not communicated, then this will remain an issue.

Post graduate support, and in particular lone working, need to be recognised as influencing factors that are concerning prospective farm animal veterinary surgeons. This is not a finding unique to this study, with Robinson and colleagues (Robinson et al., 2004) detailing the aforementioned “spiral of disillusion”; although it is worth highlighting that the Robinson study was biased by several universities only providing students who had chosen to track either entirely farm or mixed for the small discussion groups used to provide data. Recent suggestions from the Federation of Veterinarians of Europe (the representative body for the veterinary profession within Europe) include the provision of “career roadmaps” for recently graduated and undergraduate students, managing expectations of newly qualified veterinary surgeons and assess their satisfaction within their career (Federation of Veterinarians of Europe, 2017). Whilst these are admirable objectives, they do not solve the fundamental issue that undergraduates are concerned about. *Veterinary Women* recently interviewed a small number of veterinary surgeons (n=5, all female) who all expressed anxiety with regards to feelings associated with lone working and described “near misses” – they all also admitted to trying to devalue their apprehensions (Veterinary Women, 2023). In an Association of Government Vets review of health and safety within the workplace and mental health related to veterinary surgeons completing government work, lone working was identified as an issue that could be improved with regards to support by a fifth of respondents (total respondents n>700), with text quotes including admissions that although there are policies in place in some practices they are ignored or not followed by most of the team. The report revealed that only 50% of practices had a lone worker policy, another 30% of respondents did not know if there was a policy in place and 20% worked in practices without lone working policies. Solutions to lone working that were either being implemented in practices or that could be implemented by respondents included: use of tracking devices, scheduled calendars accessible by all; only undertake visits with clients that are known; implementing a “buddy system” where by two members attend calls together; code words; training on lone working and how to reduce associated risks etc (Association of Government Veterinarians, 2019). Clearly some of these solutions are more suited to ambulatory practice than others (and the selection highlighted here

were picked as being more appropriate out of a larger list). Lone working appears to be a larger problem than just that of prospective farm veterinary surgeons as highlighted within this thesis and ensuring all practices have an easily accessible and realistic lone working policy in place, that all staff members (not just new graduates) and EMS students are aware of, could aid in reducing some of the concern surrounding this topic.

The majority of respondents were not from a farm or farming community (table 1) and figure 4 shows that nearly 20% of respondents had never considered a career with farm animals before starting university. The National Centre for Universities and Business (NCUB) commissioned a survey study to look at attitudes towards careers within the agriculture and food sectors in the UK. They surveyed both relevant undergraduate students (n=500) and recently qualified entrants into the agriculture and food sectors (n=154). Of their survey populations there were a small percentage of respondents studying veterinary medicine (0.8% pre-clinical veterinary medicine, 0.8% "others" in veterinary medicine and dentistry, 0.6% clinical veterinary medicine and dentistry). As part of the key findings, they concluded both that knowledge of the agricultural and food sectors was low and that there was an image issue with the industry resulting in it being an "unattractive career option" (Hughes et al., 2015). This is supported by Vet Futures who found that veterinary surgeons believe that there is a lack of recognition from the general public with regards to veterinary contribution to the food supply chain (including its security) and protecting public health (Vet Futures, 2015). This thesis echoes these conclusions. Considering that the majority of undergraduates were not from a farm or farming community, there is evidence of undergraduates feeling uncomfortable with communicating with clients due to a lack of confidence and understanding of the field (demonstrated in the relationships theme and figure 6a where undergraduates not considering a career in farm animal are more likely to pick working with farmers/in the agricultural industry as something that does not appeal about a career in farm animal practice). However, the Royal Veterinary College, surveyed first year, final year and gateway (course aimed at widening participation) students to try and answer research questions surrounding motivations for students selecting veterinary medicine as a career, whether there are gender differences between these motivations and whether gateway and traditional entry students have the same motivations for veterinary careers. One of their findings was that the ninth most popular reason for wanting to become a vet was having a family member or friend in farming (Tomlin et al., 2010b). The relationship theme within this thesis demonstrates just how much of an impact these interactions can have with regards to decision making. This signifies the

importance of having open and transparent conversations, to ensure that undergraduate students are accessing information on all aspects of farming careers to allow them to make informed decisions. Despite these concerns, figure 4 shows that there is a huge decrease in respondents that have never considered a career in farm animal from before university to the stage they were currently at when answering the survey (from nearly 20% down to <2%). This shows that the current system (complete with its identified issues) is allowing the vast majority of students to consider farm career as an option - even if they then choose that it is not the career path for them or if the other barriers discussed here preventing them from pursuing this choice.

4.3. Feeling of 'fit' and representation

Feelings of "fit" and representation were clear from the construction of the perception of fit theme, with subthemes of family, upbringing and discrimination. In a similar vein a sense of "fit" was also a predictor for retention within some of the vet futures findings (Vet Futures, 2015). The narrative of not feeling able to pursue a career in farm animal practice if an individual hasn't been raised in a traditional "farming background" is a theme that is not restricted to UK undergraduates only, with Jelinski and colleagues (2009) finding that graduates from an agricultural background were twice as likely to continue working with farm animals when compared with their urban raised counterparts. The same FAVS survey discussed with regards to EMS found that 50% of students felt that there was a lack of diversity in the farm veterinary profession, with Owen (2022) finding the following reasons being listed as examples as to why they felt underrepresented: "male-dominated industry" was the most common and "from a non-farming background" was the second most frequently chosen reason. Other reasons listed included race and ethnicity and gender identity and sexual preference as well as dietary choices (veganism/vegetarianism) and low-income background and disability (Owen, 2022). Further analysis published from the data within the survey discussed in this thesis, has shown that there are (within the wider veterinary society) still biases and that these do have an influence on decision making surrounding career discipline. Particularly highlighting that females, marginalised ethnic groups and those from an urban/suburban background all identified as feeling significantly less able to pursue a career within the farm animal discipline (Payne et al., 2023). These findings contrast with work performed looking at behaviours of Australian veterinary students, which found that gender and "farming parent(s)" had no impact of career intent; although a far higher percentage of respondents in this survey came from a farming background compared to this research's respondents (25.7% of the respondents in the Australian study compared with 15.5% from a farm/farming community in this

thesis's study). They found that species preference was a strong driver for discipline choice, concluding that "attitudes and beliefs" were drivers for career sector selection rather than demographic groupings or experience with animals (Feakes et al., 2019). This dissertation finds that, whilst species preference is absolutely involved with the decision-making process, the process itself is more complex than just species preference and is multifactorial considering a range of academic, practical, intrinsic and extrinsic considerations.

From female respondents within this thesis, there were concerns raised regarding gender and physical stature. Generally, there were concerns raised with regards to personal safety on farm. This is seemingly a valid fear with the BVA reporting 6/10 vets working with farm animals suffered injuries on farm within a 12-month window (BVA, 2019b). Reinforcements of these concerns regarding physical size, strength and gender are unfortunately recognised within the production animal field, with derogatory themes of females being not "cut out" to be farm veterinary surgeons, likely to have career breaks to have a family and being physically unable to perform the tasks required all been identified by comments made by both veterinary surgeons and farmer clients being identified when surveying UK undergraduate veterinary students that have started their CEMS (McCarroll, 2020).

Discrimination within the wider veterinary community is increasingly being highlighted as an issue to seek resolution to (BVA, 2019a). Within this dissertation alone, quotes featured either describe or allude to issues relating to gender, sexual orientation and race, all of which are protected characteristics in UK law (GOV.UK, 2023). In the same *Farmers Weekly* survey discussed earlier, one in two veterinary surgeons revealed they had, whilst at university or work, been discriminated against (Price, 2021). Of these declared experiences, gender-based discrimination was the most common (82% of reported experiences) with age being the second most common (47%) – this was further clarified to be more likely in females compared to males and veterinary surgeons less than 35 years of age (Price, 2021). This dissertation has unfortunately found similar results in undergraduates, with regular references to discrimination helping to generate the perception of fit theme and regular concerns raised due to on farm safety within the fear theme. This must be viewed with a zero-tolerance policy and students that experience this must be fully supported by the veterinary peers and the wider profession. Open discussions surrounding undergraduate concerns must be facilitated.

A lack of role models is also discussed within the perception of fit theme. Previous research has found that role models have an influence on veterinary undergraduates from even before they attend university, with their presence being important throughout the veterinary degree (Twyford, 2021). When surveying undergraduate students, Twyford (2021) also found that appropriate role models are required to denote similar characteristics and attributes to those that the student wishes to emulate. Another study describes role models as “incit[ing] admiration and provid[ing] inspiration” and describe them as having a key role in student learning (Schull et al., 2012). Schull and colleagues (2012) describe core attributes in role models to include skills such as being accomplished at managing relationships and interactions (colleagues, owners and patients); being proficient at all aspects of their job and being respected/demonstrating respect for those they interacted with. These sentiments regarding the requirement for role models are echoed in key opinion pieces published from within the veterinary profession, with a deficiency in suitable role models being apparent within some demographic groups (Charles, 2019). Human medicine has identified that positive encounters can lead to positive outcomes with regards to career choice and concluded that “defining and promoting perceptions” with regards to role models may help the wider community (surgical in this case) to ensure a plentiful supply of high quality surgeons (Ravindra & Fitzgerald, 2011). Extrapolating this to the veterinary sector suggests that making a more diverse range of farm veterinary surgeons more widely available to undergraduates and even students considering a veterinary career (prior to university) could aid in helping farm animal careers to become more accessible to all.

4.4 Applications in clinical practice and academia

The seven themes discussed and identified within this thesis were Lifestyle, Relationships, Ethics and Values, Fear, Direct Experience, Fit and Preferences and Interests. When considering each of these and the literature explored within this thesis several suggestions are presented below for assisting in overcoming these barriers to undergraduates pursuing a farm animal career. For the Lifestyle theme more transparent conversations, informing undergraduates about the true nature of farm careers will allow farm animal practice to be considered more fully. Taboo topics, such as salary, as well as fundamentals of the job (out of hours commitments and support, career progression opportunities and practice structures) must be discussed freely. For the relationships theme it is vital that old information is not conveyed, in addition to this the impact that bad experiences of veterinarians in an advisory or “power” position have on undergraduate decision making must be appreciated. Positive stories and associations must be shared as freely as negative

ones. The impact of hearsay must be recognised. Tying the lifestyle and relationships themes together, resources could be provided for all disciplines of veterinary medicine, explaining about farm animal careers.

Ethics and values are fundamental and integral as part of the veterinary undergraduate degree. Projecting production animal careers as an opportunity to improve health and welfare, industry standards and sustainability should allow undergraduates to see the potential impact possible by choosing to work in this discipline. The fear theme demonstrates the importance of the transition between undergraduate and newly qualified status. Adequate support must be provided from both academia to best prepare students and by practices prepared to hire new graduates. Newly graduated veterinary students should be seen as an asset to the practice in terms of knowledge and potential and not a burden to carry until they are either self-sufficient or choose to leave. Direct experience and in particular EMS have been discussed in depth but the value of experiential learning and allowing these opportunities to be available throughout the undergraduate degree must not be underestimated. Finally, when considering preferences and interests, it is key to identify that not every undergraduate will want to become a production animal specialist and in fact the sector does not require this. However, all students should be able to consider production animal practice as a possibility and discount it out of choice, not because of perceived barriers. The quantitative work in this thesis (figure 4) goes part of the way to demonstrating that this last point is beginning to be achieved within academia and is supported by comments such as *"I will consider working with farm animals throughout my vet school education."* #260, year 1, 22. With respect to the quantitative work, it is interesting that there were differences between respondents that were considering a career involving some farm animal practice and those that were not. When considering appealing factors, those that wanted a career involving production animal work were interested in the agricultural sector itself as well as involvement with the animals. Additionally, students not wanting to do farm animal work picked different factors that appealed about the job to those who anticipated farm work. Future research could investigate this in more detail to determine if there are different approaches needed for different subsets of students.

4.5. Limitations

The response rate to the survey discussed within this thesis was 21.2% (n=1146). Despite the large number of respondents to the survey presented within this thesis, caution must be exercised when generalising the findings of any research to the wider population (in this case undergraduate

veterinary surgeons). In a study of online survey response rates in educational research, it was found that participants were more likely to respond if they were interested in the subject matter, received the invitation from another student, colleague or authority figure (compared with people from outside of their organisation); if the survey took less than 15 minutes to complete, if there was reassurance of anonymity and confidentiality, for male participants, if a reminder was sent and for older participants, if a reward was offered (Saleh & Bista, 2017). For this survey, there could be an element of bias that students only very strongly considering a career in farm animal medicine, or alternatively those with strong opinions with regards to why they would not wish to choose this career path would respond. However, the survey was piloted (although time to complete the survey was not in the introduction), anonymity was confirmed, it was circulated by members of the farm department within each university and a prize reward was offered. The survey was also open for four weeks, during the Autumn term, where classically there are not examination periods, reducing the effect of student workload on response rate. In addition to this the uptake for free text contributions was 92.3% this suggests that this subject is something that all students have an opinion on that they would like to share and the findings within this thesis complement similar research within the field. Respondents often volunteered large volumes of information and expanding outside of a direct answer in response to the question, giving a wealth of data to be interpreted; this was not limited by any character restrictions within the collection software. This resulted in free articulation from respondents about how their experiences have informed their answers to the survey and indeed current career decision and aids in defending against one of the major criticisms of mixed methods analysis, that in depth data analysis cannot be performed. This same criticism, however, is often applied to thematic analysis, where experts in the field describe a loss of “depth and complexity” when attempting to accurately reflect and entire dataset (Braun & Clarke, 2006), this in itself is also a risk given the free text survey approach used for qualitative data collection. It is possible that given the large volume of data available, despite double coding sections of the data, that some of the finer nuances and individual accounts within the dataset could have been missed.

Researcher subjectivity is a possible source of bias within this type of research. However, reflexivity has been discussed as an essential reflective process required to perform mixed method research correctly and this author has spent considerable time reflecting on herself as a researcher (see [Appendix 6](#)); this is to ensure best practice and that a consideration and articulation of this author’s own background and experiences are transparent (King et al., 2021).

4.6. Future work

This work has identified a number of barriers to entry within the production animal discipline of veterinary medicine, as well as assessing attitudes of undergraduates towards a career in this sector. Future work within this dataset could include continuing analysis of trends of interest level of respondents towards a career before veterinary school versus the stage in which they answered the survey and ascertaining if any common variables or themes evolve, allowing a system of predicting students likely to pursue a career in farm animal or identify groups of students at risk of being put off a production animal career. More broadly, further research into how to best improve information surrounding career paths and career choices, with specific focus on the production animal sector, would be beneficial to ensure that this information is coming from reliable, non-biased sources – this would aid in removing the passage of out of date or prejudiced opinions to impressionable undergraduates. Further research using this data has also looked into demographic data collection within the survey discussed here and identifying whether undergraduates feel like they “fit” in farm animal practice and reasons for their answer.

4.7. Conclusion

Seven themes have been identified as influencing undergraduate attitude when considering a career in production animal veterinary surgery. These are Lifestyle, Relationships, Ethics and Values, Fear, Direct experience, Perception of fit and Preferences and interests. These are supported by personal interest and EMS being the most commonly selected factors influencing first job expectation (as well as previous work experience by those who are intending to do some production animal work). Factors that make a career appealing vary between respondents who intend to do farm animal work, with those who do intend on a career with production animals involved valuing working with farm animals, farmers or within the agricultural industry and those that do not wish to pursue a career involving farm animals valuing working outside, a varied day and working with farm animals. Barriers to undergraduates who wish to follow a career in farm or mixed practice include salary and out of hours, whereas their non-farm or mixed counterparts selected hours/working hours, working conditions and working with farmers/within the agricultural industry.

Whilst there will always be an element of preference and species partiality, there are clearly barriers for undergraduates considering a farm animal career that can and should be addressed by the profession. Delivery of production animal veterinary surgeons that are then retained within the sector throughout their career is a multifaceted issue faced by the industry. It is apparent from

this study that the factors listed above are paramount when undergraduates are considering career discipline. EMS has been presented as a very polarising and influencing experience for undergraduate students, with its merits and flaws identified by the wider profession. Despite this, it remains a fundamental and important part of experiential learning and provides an ideal environment for veterinary surgeons to open conversations regarding undergraduate concerns. It is vital that these are non-biased, factually accurate and transparent and give students the opportunity to discuss topics such as working hours, salary, lone working policies and new graduate support (including dispelling myths surrounding protected characteristics). Reassurance must be offered where appropriate and positive role models identified for undergraduates to emulate, allowing the individual to visualise themselves successful in their future role.

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Appendix 1: Copy of Survey on Attitudes to Farm Practice

Attitudes to farm practice

Page 1: Introduction

Exploring veterinary student attitudes towards careers in farm animal practice

Researchers:

Jack Oldham, third year veterinary student, University of Nottingham

Emily Payne, Resident in Farm Animal Health and Production, University of Nottingham

John Remnant, Clinical Assistant Professor in Farm Animal Health and Production, University of Nottingham

Email contact: John.Remnant@nottingham.ac.uk

Purpose of the study:

We are interested in understanding why veterinary undergraduate students may decide to follow or not follow a career in farm practice. We are particularly interested in how these attitudes may be influenced by the student's background and by their experiences at vet school. The results of this study may influence teaching practices as well as recruitment strategies by the profession.

Please only complete the survey if you are currently a veterinary student and over 18years old.

Consent:

This consent form is a formal way of indicating that you agree to participate in this study and that you understand that any information collected by the researchers:

- will be used for a research study
- may be written in a report for publication
- may be presented at research conferences or meetings
- will be anonymised and treated confidentially
- will only be accessed by research colleagues or examiners
- will be aggregated in any reports or outputs where low numbers of respondents may enable individuals to be identified
- will be stored and destroyed securely and in compliance with current data protection legislation (GDPR)

Comments you make will be anonymous unless you identify yourself in the text and you may stop the survey at any point and all questions are optional.

Prize draw:

All respondents have the option to enter a prize draw to win one of three £50 shopping vouchers, if you choose to enter the draw you will need to give us a contact email address, these will be collected with the survey data but separated when the survey closes and deleted once winners have been contacted.

If you have any queries regarding this study, please contact the researchers via e-mail (details above).

Thank you very much for participating in this study

Page 2: University Questions

These questions have been asked to understand your university background.

1. What School of Veterinary Medicine are you attending?

- University of Bristol
- University of Cambridge
- University College Dublin
- University of Edinburgh
- University of Glasgow
- University of Liverpool
- University of Nottingham
- Royal Veterinary College
- University of Surrey
- Other

1.a. If you selected Other, please specify: *<free text box>*

2. What year of study are you in?

- Preliminary/Gateway/Year 0
- Year 1
- Year 2
- Year 3
- Year 4
- Year 5/6
- Intercalating

3. Is this your first degree?

- Yes
- No

3.a. If no, please state what you studied previously

4. Are you a mature student?

- Yes
- No

Page 3: Attitudes towards Farm Animal Practice

These sets of questions have been asked to understand your attitude towards and interest in the farm animal side of the veterinary profession.

5. How would you describe your experience with farm animals prior to starting vet school?

- None
- Limited
- Intermittent
- Regular
- Extensive

6. How would you describe your interest with working in farm animal veterinary practice as a career before vet school?

- I had never considered farm work
- I intend not to do some farm work (i.e. an active decision)
- I intend to do some farm work
- I intend doing mainly farm work
- I intend doing entirely farm work

7. How would you describe your interest with working in farm animal veterinary practice as a career currently?

- I have never considered farm work
- I intend to do no farm work (i.e. an active decision)
- I intend to do some farm work
- I intend to do mainly farm work
- I intend to do entirely farm work

8. What area of the veterinary profession do you expect to work in for your first job?

- Equine
- Exotics/Wildlife
- Farm animal

- Mixed
- Research
- Small animal
- Teaching
- Other

8.a. If you selected Other, please specify: *<free text box>*

8.b. Which, if an, of the following factors have influenced this expectation?

- Teaching on the vet course
- Extra-mural studies (EMS)
- Work experience i.e. before vet school
- Working environment
- Working conditions
- Personal interest
- Family history/experience/expectation
- Other

8.c. Please give any other reasons or explain your answer *<free text box>*

9. To what extend do you agree with the following statement: *I enjoy farm animal teaching at university.*

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

10. When considering a career in farm animal practice: What do you think, if anything, **is appealing** about a career in farm animal practice?

- Working outside
- Varied working day
- Working with farmers/in the agricultural industry
- Working conditions
- Working hours/Out of hours
- Salary
- Working with farm animals

- Role in society/community
- Type of clinical work
- Nothing
- Other

10.a. Please give any other factors or explain your answer here <free text box>

11. When considering a career in farm animal practice: What do you think, if anything, would **put you off** a career in farm animal practice?

- Working outside
- Varied working day
- Working with farmers/in the agricultural industry
- Working conditions
- Working hours/Out of hours
- Salary
- Working with farm animals
- Role in society/community
- Type of clinical work
- Nothing
- Other

11.a. Please give any other factors or explain your answer here <free text box>

12. What has been your most positive farm or farm careers related experience? <free text box>

13. What has been your most negative farm or farm careers related experience? <free text box>

Page 4: Demographics

These questions have been asked to see whether different demographics of people are more or less interested in working in farm animal practice or feel more or less able to work in farm animal practice.

Please remember, data will be anonymised, and where there are very few respondents in a given group data will only be presented in an aggregated form to avoid the possibility of individuals being identified.

14. Which gender do you identify most with?

- Female
- Male
- Prefer not to say
- Another gender identity

14.a. I identify as... <free text box>

15. What is your current age?

- 18-21
- 22-25
- 26-30
- >30
- Prefer not to say

16. Which best describes your background?

- From a farm/farming community
- From a rural area but not a farming community
- From an urban or suburban area
- Prefer not to say

17. What social class do you identify most with (based on chief income of head of household e.g. parent)?

- Aristocracy, Sociality
- Higher managerial, administrative or professional
- Intermediate managerial, administrative or professional
- Supervisory/Clerical/Junior managerial, administrative or professional
- Skilled manual workers
- Semi-skilled or unskilled manual workers
- Casual or lowest grade worker, pensioners and others who depend on the welfare state for their income
- Prefer not to say

18. Which category best describes your ethnic group or background?

- White
- Mixed/Multiple ethnic groups
- Asian/Asian British
- Black/African/Caribbean/Black British
- Prefer not to say
- Other

18.a. If you selected Other, please specify: <free text box>

19. What is your religion?

- No religion
- Buddhism
- Christianity
- Hinduism
- Isla,
- Judaism
- Sikhism
- Prefer not to say
- Other

19.a. If you selected Other, please specify: *<free text box>*

20. What is your nationality? *<free text box>*

21. Taking into account the demographic information you have provided above, to what extent do you agree with the following statement: *I feel able to pursue a career in farm animal practice*

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

21.a. Please explain your answer *<free text box>*

Page 5: Further comments and prize draw

22. Is there anything else you would like to comment on in relation to your future career or working in the farm animal practice? *<free text box>*

23. If you would like to enter a prize draw to win one of three £50 shopping vouchers please enter a contact email address below. *This information will be separated from your responses when the survey is closed, once winners have been contacted all email addresses will be deleted.* *<free text box>*

Page 6: Thank you

Thank you very much for participating in our survey.

If you have any questions please feel free to contact john.remnant@nottingham.ac.uk

Key

- Best fit answers
- Select all that apply

<free text box> Space for free text responses to be typed by respondents.

Appendix 2: Codebook

Confidence: references to knowledge, experience, or ability or having more in a different discipline.

Death: references to slaughter/cull/euthanasia.

Discrimination: references to gender, sexism, physical size/stature/strength, sexuality, new grad, personal lifestyle choices (e.g. vegetarian, vegan etc), not from a farming background etc.

EMS: any reference to preclinical or clinical EMS; including factors relating to finding and booking, through to receiving feedback at end of placement.

External experiences: refers to job or work experience outside of vet school (i.e. not EMS); young farmers etc.

Family: references to having children/pregnancy.

Generic experience: no reference to where or when; purely positive or negative. Includes experiences with colleagues, peers, clients.

Home location: as an influence on job and job opportunities.

Industry objection: anti-farming due to lifestyle choices (vegetarian, vegan), issue with food production practices, ethical or welfare-based beliefs or wanting to have a direct influence on these things.

Job opportunities: prospects, opportunities, security or lack of these.

Job satisfaction: viewing farm animal practice as fulfilling this; including attitudes towards agricultural sector and its economic importance.

Lack of individual animal: includes financial constraints/economical decision making; lack of clinical work up and variety of cases and repetition.

Lifestyle: relates to work-life balance and quality of life.

Non-farm focused motivators: e.g. research, education, food safety, improvement of sustainability and profitability

Non-veterinary specific job factors: relates to aspects of job not involving animals or clients i.e. working hours, on-call, driving etc.

On farm communication: relates to the relationship between vet and client; communicating and working with farmers. Include farmer attitude and willingness to follow advice (actual and perceived).

Preference: choice; either want or don't want to pursue farm animal career; interests-based career choice.

Responsibility: in relation to the pressures of the job and expectations on the veterinary surgeon.

Safety: both in terms of with animals, type of work, facilities, zoonosis and lone working.

Salary: Pay either in a positive or negative light.

Skill development: wanting to develop transferable skills, being undecided on career path or specialism, looking for a variety.

Species of animal: references to working with specific species and the bonds created.

Support: fear of lack of this compared to other disciplines, includes lone working references.

Teaching: including rotations, references to sufficient or insufficient, as a factor discouraging and as a role in promoting farm animal careers.

Upbringing: refers to being from a farming background/community or not and the suitability of a farm career based on this.

Veterinary related job factors: reference to aspects of the job that appeal/put off that are veterinary skills e.g. herd health, tb testing.

Word of mouth: opinions directly related to information received from peers/colleagues regarding experience of farm animal practice.

Work environment: relates to both the physical environment and the atmosphere of workplace.

Working outside: positive or negative references relating to working outside, weather etc.

Appendix 3: Requirement of Standard Residency for entrance to European College of Bovine Health Management examinations (completed)

The Residency and Masters Programme in Dairy Herd Health and Production is a senior clinical training scholarship. Alongside completing the Master of Veterinary Medicine, there is a clinical element to the residency. The European college of Bovine Health Management requires residents to complete a three-year training programme before obtaining approval to sit examinations. The requirements of the residency are laid out in the table below. Approval of this author's residency was achieved in Spring 2021, with part B of the examination processed passed in Summer 2021 and part A passed in Summer 2022. Upon passing of Part A this author was awarded Diplomate of European College of Bovine Health Management (DipECBHM).

Requirements of SRP	Detail
3 years full time minimum	<ul style="list-style-type: none"> •65% spent in clinical activity <ul style="list-style-type: none"> ○ 33% individual animal ○ 33% herd level ○ 5 x case reports (minimum 1 individual animal); submitted to ECBHM for marking by two diplomates on residents committee •20% research/scholarly activities, preparation of scientific manuscripts, graduate degree studies, external rotations
Veterinary anatomic and clinical pathology	<ul style="list-style-type: none"> •Minimum 1 week active participation in clinical pathology laboratory <ul style="list-style-type: none"> ○ 30 necropsies on bovine cases
Conferences	<ul style="list-style-type: none"> •Attend "in house" sessions e.g. rounds •2 X ECBHM residents workshops •3 national or international conferences relevant to bovine health management
Seminars	<ul style="list-style-type: none"> •Minimum 6 x 45 minute scientific presentation •1 x presentation/paper at national/international meeting/conference
Teaching	<ul style="list-style-type: none"> •Participate in clinical education of graduate veterinarians and/or undergraduate students
Research	<ul style="list-style-type: none"> •>12 months, investigative project contributing to the advancement of bovine health management
Scholarly output	<ul style="list-style-type: none"> •Two publications <ul style="list-style-type: none"> ○ One original research paper as principle author

	<ul style="list-style-type: none"> ○ One of the following: <ul style="list-style-type: none"> ▪ Case report (principle author) ▪ Additional research paper (not necessarily principle author) ▪ Review paper on topic related to main research focus (principle author)
Evaluation of progress	<ul style="list-style-type: none"> • Minimum 2 x formal evaluations with primary supervisor • Progress report (including case logs) and case logs to Education and Residency Committee yearly

Appendix 4: Publications and conference presentations

Throughout the Residency and Masters Programme in Dairy Herd Health and Production there have been multiple opportunities to present at GHJt conferences, publish peer reviewed articles and contribute to clinically relevant literature.

- **Payne, E.,** Morton, E., Lally, C., Remnant, J. (2023). "Farm animal careers and perception of 'fit' in undergraduate veterinary students: A mixed methods study". *Veterinary Record*; 192(4); DOI: 10.1002/vetr.2339
- **Payne, E.,** Oldham, J., Cobb, K., Remnant, J. (2021). "Attitudes of UK veterinary students to farm animal careers: A mixed methods approach". *Veterinary Record*; 189(8); DOI: 10.1002/vetr.455
- Sherwin, V., Hyde, R., Green, M., Remnant, J., **Payne, E.,** Down, P. (2021). "Accuracy of heart girth tapes in the estimation of weights and daily liveweight gain of pre-weaned calves." *Veterinary Record Open*; 8(1); DOI: 10.1002/vro2.16
- Breen, J. and **Payne E.** (2020). "The administration of lactating cow intra-mammary therapy in dairy herds: a checklist." *UK-Vet Livestock*, 23(6); DOI: 10.12968/live.2018.23.6.278
- **Payne, E.** and Brennan, M. (2020). "Does giving dairy calves with diarrhoea a combination of milk and rehydration fluids result in a faster recovery?" *Veterinary Record*, 187, 358-360. DOI: 10.1136/vr.m4031
- Wapenaar, W., **Payne, E.,** Jackson, R., Pooley, F. and Cresswell, E. (2018). "The role of the vet in improving biosecurity on beef, dairy and sheep farms in the UK: a clinical forum." *UK-Vet Livestock*, 23(6); DOI: 10.12968/live.2018.23.6.278

Conference presentations

I have presented my research and represented the University at both national and international conferences. These include:

- Payne, E., Cobb, K., Oldham, J., Remnant, J. 2022. *Veterinary student attitudes towards careers in the production animal sector. World Buiatrics Congress.* Madrid, Spain. 4-8th September 2022. (John Remnant presented)

- **Payne, E.**, Oldham, J., Cobb, K. Remnant, J. 2021. *Factors influencing undergraduate attitudes towards a career in farm veterinary medicine*. **VetEd2021**. International Symposium of the Veterinary Schools Council. University of Surrey (Virtual). 7-9th July 2021.
- **Payne, E.**, Oldham, J., Cobb, K. Remnant, J. 2020. *Attitudes of UK veterinary students to farm animal careers: a thematic analysis*. **Teachfest 2020**. University of Nottingham (Virtual). 15th September 2020.
- **Payne, E.**, Oldham, J., Cobb, K. Remnant, J. 2020. *Factors affecting undergraduates willingness to enter a career in farm animal veterinary practice*. **ECBHM Resident's Scientific Session**. Universidad Europea de Madrid (Virtual). 29th September 2020.
- **Payne, E.**, Oldham, J., Cobb, K. Remnant, J. 2019. *Factors affecting undergraduates willingness to enter a career in farm animal veterinary practice*. **British Cattle Veterinary Association conference**. Southport 7-9th October 2019.

Appendix 5: European Board of Veterinary Specialisation Certificate



THIS IS TO CERTIFY THAT

Dr Emily Payne

has met the standards to be awarded the title
EBVS[®] European Veterinary Specialist in Bovine Health Management

ECBHM President's Signature

for the period: 2022 - 2027

Dr Susana Astiz Blanco
President ECBHM



Prof Zoe Polizopoulou
President EBVS



Validation Code: hjcmgq7q

Appendix 6: Reflection on myself as a researcher

The figure below was submitted as part of a reflective assignment for module three of the PGCHE that focused on how the research discussed in this thesis is relevant to educational inquiry:

