A Descriptive Study of Rural Community Veterinary Practice in Ontario, Canada

by

Heidi Elizabeth Eccles

A Thesis
presented to
The University of Guelph

In partial fulfillment of requirements
for the degree of
Master of Science
in
Population Medicine

Guelph, Ontario, Canada
© Heidi Eccles, April, 2018
ABSTRACT

A DESCRIPTIVE STUDY OF RURAL COMMUNITY VETERINARY PRACTICE IN ONTARIO, CANADA

Heidi Eccles Advisor: University of Guelph, 2018 Dr. Terri O’Sullivan

Veterinary licencing data from 2017, along with human and animal population data was used to describe rural community veterinary practice (RCP) in Ontario, Canada. There were 4545 licenced veterinarians and 1579 accredited practices. Practice type where employed and veterinarian graduation year were associated with being a rural community veterinary practitioner (RCVP). Classification as an RCP was associated with human and animal population, number of veterinary practices in the region, and number of practitioners per practice. Focus group methodology was used to explore the perceptions of veterinary students, faculty, and veterinarians regarding the definition of RCPs and RCVPs in Ontario and the curriculum at the Ontario Veterinary College (OVC). Thematic analysis revealed themes related to the definition of RCVPs, RCPs, entry-level clinical skill requirements, and OVC curriculum recommendations. This thesis contributes to the understanding of RCP in Ontario and presents curriculum considerations for the OVC with the RCVP in mind.
Acknowledgements

Firstly, thank you Dr. Terri O’Sullivan for your help in every stage of this process. Your guidance has helped me throughout my Masters Degree. Thank you Drs. Dale Lackeyram and Kerry Lissemore for your input, knowledge and guidance for this project. It was great to have your support through the whole project.

Thank you, Karen Richardson for all your hard work helping me organize the focus groups and recruit volunteers. I am very grateful to have had your assistance with anything I needed. Also, thank you for being a great road trip buddy on our trip to Kemptville.

This project would not have been possible without funding from Ontario Ministry of Food and Rural Affairs-Veterinary Clinical Education Program.

I am very thankful to all participants that were a part of the focus groups. I appreciate that you all took time out of your busy schedules to participate. I need to acknowledge the College of Veterinarians of Ontario. They provided the veterinary practitioner and practice data for this project and I am grateful for that.

Thank you to all my friends and family who has supported me along my journey through my Masters degree. Mom, Dad, Connie and Hazel, you have all had an integral part in helping me through this process. Mom you were always there when I came home from a rough day at the office to talk to me. Dad although you had no idea what I was doing the past two years, you have always been proud of me. Connie, although you are in another country, I loved our BBM chats. Hazel, my four-legged best friend, thank you for all those long walks and for always listening and loving me. Your support and love has helped me every step of the way.

Lastly, I have to thank my best friend, Travis. I am lucky to have had you by my side for the past two years. You were always there to be my rock for the tough days and celebrate with me on the great days. I could not have done this without you.
Contributions

Heidi Eccles co-coordinated the project, moderated all focus groups, oversaw data management and analysis of qualitative and quantitative data, interpreted the results and was principal author of all chapters.

Dr. Terri O’Sullivan led the research project, oversaw all aspect of project including participation recruitment and coordination/planning of the qualitative research, data acquisition, interpretation of data and provided critical feedback on all chapters.

Dr. Dale Lackeyram contributed to the development of qualitative methods, helped moderate focus groups and provided critical feedback on all chapters.

Dr. Kerry Lissemore secured funding for this project, data acquisition, and provided critical feedback on all chapters.

Karen Richardson helped coordinate focus groups, data management, participant recruitment and moderation of focus groups.

Dr. Jennifer Renier helped moderate focus groups and with interpretation of thematic analysis.

Funding for this research was provided by the Ministry of Agriculture, Food and Rural Affairs (OMAFRA)-Veterinary Clinical Education Program.
# Table of Contents

List of Tables ........................................................................................................... viii  
List of Figures ............................................................................................................. ix  
Chapter 1 ................................................................................................................... 1  
  1.1 Introduction ........................................................................................................ 1  
  1.2 Qualitative research ............................................................................................ 2  
    1.2.1 Focus groups in education ........................................................................... 3  
    1.2.2 Thematic analysis ...................................................................................... 4  
  1.3 Stakeholder opinion on curriculum ..................................................................... 5  
    1.3.1 Students .................................................................................................... 5  
    1.3.2 Faculty ...................................................................................................... 5  
    1.3.3 Private practitioners ............................................................................... 6  
  1.4 Rural Community .............................................................................................. 6  
  1.5 Veterinary medicine .......................................................................................... 8  
    1.5.1 Veterinary licensing ................................................................................ 8  
    1.5.2 Veterinary demographics ...................................................................... 9  
  1.6 Veterinary medical education ............................................................................ 10  
    1.6.1 A history ................................................................................................ 10  
    1.6.2 Canadian education ............................................................................. 11  
    1.6.3 Current education .................................................................................. 12  
  1.7 Conclusion ......................................................................................................... 14  
  1.8 Research objectives ............................................................................................ 15  
  1.9 References ........................................................................................................ 17  
Chapter 2 .................................................................................................................. 22  
  2.1 Abstract ............................................................................................................ 22  
  2.2 Introduction ....................................................................................................... 23  
  2.3 Materials and methods ..................................................................................... 25  
    2.3.1 CVO data variables used and generated: .............................................. 26  
    2.3.2 Population data used and variables generated: .................................. 29  
    2.3.3 Statistical methods .............................................................................. 31  
  2.4 Results ............................................................................................................. 32  
    2.4.1 Descriptive statistics ............................................................................. 32
5.3 Recommendations for DVM curriculum at the OVC ........................................ 130
5.4 General research limitations .............................................................................. 133
5.5 Future research ..................................................................................................... 134
5.6 References ........................................................................................................... 136
Appendix I ............................................................................................................... 137
Appendix II ............................................................................................................... 141
Appendix III .............................................................................................................. 142
List of Tables

Table 2.1: Glossary of Census terms to describe regions in Ontario, Canada...............................45

Table 2.2 Human population, farms reporting livestock (minimum - maximum), and total number of all accredited veterinary practices (mean, range) stratified by human population quartiles in Ontario, Canada.................................................................46

Table 2.3 Veterinarians licensed to practice veterinary medicine in the province of Ontario in 2017 by self-reported employment type.................................................................47

Table 2.4 Veterinary practitioners classified as RCVPs (n=180) in Ontario, Canada categorized by animal species serviced.................................................................48

Table 2.5 Univariable analyses examining factors associated with being classified as a rural community veterinary practitioner in Ontario, Canada.................................................................49

Table 2.6 The final model investigating factors associated with being classified as a rural community veterinary practitioner (yes=1, no=0) in Ontario, Canada.................................................................51

Table 2.7 Univariable analyses of factors associated with being classified as rural community veterinary practice (RCP) in the province of Ontario, Canada.................................................................52

Table 2.8 The final model of factors associated with being classified as a rural community veterinary practice (RCP) (yes=1, no=0) in Ontario, Canada.................................................................54

Table 3.1 Sampling frame, number of focus groups, total number of participants, number of men and woman participants for each cohort group.................................................................97

Table 3.2 Summary of themes for the topic of the definition of a rural community veterinary practitioner noting similarities and differences for each cohort group.................................................................98

Table 3.3 Summary of themes for the topic of the definition of a rural community veterinary practitioner noting similarities and differences for each cohort group.................................................................99

Table 4.1 Summary of themes surrounding skills needed to be a rural community veterinary practitioner and similarities and differences for each cohort group.................................................................124
List of Figures

Figure 2.1 Location of rural community veterinary practices and location of census agriculture regions in Ontario, Canada.................................................................56

Figure 2.2 Map of Ontario, Canada representing human population by census division and location of rural community veterinary practices divided into census agriculture regions ……57

Figure 2.3 Map of Ontario, Canada displaying the number of farms with livestock aggregated by provincial census division and location of rural community veterinary practices displayed by census agriculture region...............................................................59

Figure 3.1 The connectivity of themes from both over-arching topics: definition of RCVP…..100
List of Abbreviations

CAR- Census Agriculture Region
CCS- Census Consolidated Subdivision
CD- Census Division
CA- companion animal
CVO- College of Veterinarians of Ontario
DVM- Doctor of Veterinary Medicine
FA- food animal
FT- faculty focus group
OMAFRA- Ontario Ministry of Agriculture, Food and Rural Affairs
OVC- Ontario Veterinary College
PA- practitioner focus group
RCP- rural community practice
RCVP- rural community veterinary practitioner
ST- student focus group
Chapter 1

Introduction and Literature Review

1.1 Introduction

The Doctor of Veterinary Medicine (DVM) program at the Ontario Veterinary College (OVC), University of Guelph is a four-year program dedicated to educating the animal health care professionals of the future. The years are referred to as “phases” (i.e. Phase-1 is equivalent to the first year of the DVM program). In Phase-1, the DVM curriculum is focused on teaching students about normal anatomy, physiology, husbandry and animal systems, etc. The curriculum progressively builds from Phase-1 to Phase-3 and all students take the same curriculum during these three phases. In Phase-4 the students “stream” their education into one of four paths so they can tailor their education to their specific career interests. The stream options include small animal, rural community practice (RCP), food-animal and equine. The research presented in this thesis and literature review is focused on the RCP stream. The RCP stream is designed for students who have an interest in obtaining learning experiences and entry-level competencies to provide veterinary care for multiple animal species in a rural setting.

Some Phase-4 stream restructuring occurred for the 2014-2015 academic year at the OVC. Specifically, the RCP stream was modified to increase flexibility within the stream to enable students to choose learning opportunities suited to their career goals and a name change was introduced e.g. the stream name changed from the historical Mixed-animal practice stream to the RCP stream. The first cohort of students to complete the RCP stream in its new format occurred in April 2015. At that time (April 2015) a focus group was conducted with these students to gather their feedback and perceptions of the newly structured RCP stream. The
students’ feedback verified that the stream changes were indeed beneficial but there needs to be continued changes incorporated into the stream structure to increase their clinical competency and/or confidence upon entry into RCP.

The OVC impact study (2014), illustrates that 30% of veterinary students trained in Canada obtain their DVM degree from the OVC.\(^1\) This represents the largest number of DVM graduates of the five veterinary colleges across Canada. With the mandate to educate and train future veterinarians it is important that the DVM curriculum at the OVC continues to meet the needs of the DVM students and the veterinary profession. The RCP stream is of particular interest due to the perceived changing demographics of veterinary practice in rural communities in Ontario. Hence, to continue embedding quality experiences within the RCP stream there is interest in understanding the experiences of not only the DVM students, but also OVC faculty and Ontario private practitioners on how to improve the entry-level competency of new graduates embarking on a career in RCP.

1.2 Qualitative research

A focus group is a structured discussion about a predetermined topic with a group of individuals.\(^2,3\) Focus groups are a popular method of data collection when individual opinions are not required or necessary as a whole, when a topic has not been researched in great detail, and to help structure a big picture perspective on a topic.\(^2\) In a focus group, the interaction between the participants contributes to a deeper level of meaning to the answers provided and discussion generated.\(^4\) The differing opinions allow for participants to understand and consider different points of view and therefore a consensus is not needed for a particular question or topic. Hence, the opinion of the minority is important when analyzing the data.\(^4\)
Advantages of using focus groups include being able to gain data from more participants in a time efficient manner versus individual interviews or questionnaires, and it can be a cost efficient exercise to carry out and often, participants report that they feel as though they have an active role in the research being conducted as well as providing a real voice.\textsuperscript{4,5}

The optimal number of participants for a focus group is 6-8 people, but the method can work with more or less. The maximum number of participants that should be included in a single focus group is 10.\textsuperscript{2} When focus groups are small there can be an increase in the depth of the information obtained because each participant has a longer period of time to discuss each question. However, small group sizes can sometimes lead to less active discussion and subsequently less rich data. When larger group sizes are used, there is the potential to run fewer focus groups and hence can be more cost efficient. However, when more participants are engaged in a focus group it can be more challenging for the moderator to manage the larger group.\textsuperscript{5,6} This can lead to participants not being heard and the researcher will not obtain feedback from all participants.

1.2.1 Focus groups in education

Focus groups with students have been used to inform and describe curriculum in both academic and non-academic focused research for many decades.\textsuperscript{7–11} Focus groups have been used to discover whether or not nursing students felt the course objectives were met.\textsuperscript{8} Undergraduate student perceptions on class sizes were also explored using focus groups.\textsuperscript{11} The researchers found that students felt intimidated when asking questions in a large class which would not have come out in regular written course evaluations.\textsuperscript{11} Participation in focus groups allow students to feel as if they can contribute to their curriculum and hence appreciate a feeling
of increased ownership of their learning and curriculum. Researchers have reported that qualitative research methods, such as focus groups, are a more appropriate tool to understand and document the student perspective regarding curriculum.

1.2.2 Thematic analysis

Thematic analysis is an analytic method based on the identification of patterns in large transcripts or within a smaller body of data. These patterns are referred to as themes. It is a method that focuses on the rich detail of the data. A benefit of using thematic analysis is its inherent flexibility to be adaptable to many topics. Hence, thematic analysis has been applied to many research topics. Thematic analysis can further be divided into inductive and deductive approaches. Inductive thematic analysis is when the data is coded openly and not to fit into predetermined themes. When the researcher codes the data with their own research questions in mind it is considered the deductive approach. Thematic analysis starts with coding the transcript of the focus group. When coding, researchers will note interesting aspects of the transcript that are related to the research questions. This can be done with software or manually on paper using highlighters or sticky notes. Once the codes are selected, codes are organized into broader themes. This may entail reorganizing the codes multiple times to see how they best fit together. The next step in thematic analysis is choosing a descriptive theme name and refining the codes that fit under that themes.
1.3 Stakeholder opinion on curriculum

1.3.1 Students

When students are able to share their experiences regarding the curriculum specific to their education, they report having an increased satisfaction with school as a whole and increases student’s attachment to the school.\textsuperscript{1.5} The increase in student satisfaction can lead to overall increased student academic performance.\textsuperscript{1.6} Evidence shows that not only when sharing their experiences do students feel greater satisfaction but students also have an increased satisfaction in the course after implementing suggestions from student feedback.\textsuperscript{1.7}

The literature derived from student feedback on curriculum and education documents many examples of areas of higher education that can be improved. These improvement suggestions have included items such as improvements to university buildings or services, improvements in specifics of the lecture or lecturing style, specific program curriculum aspects, and overall student satisfaction.\textsuperscript{1.8,1.9} When asked, students would prefer to have more ways to evaluate the course and give feedback to improve it.\textsuperscript{2.0} The OVC has already adopted student feedback and opinion into discussion to improve curriculum\textsuperscript{1.2} As an example, the OVC has student entrance surveys and year-end surveys to collect longitudinal data regarding student career aspirations and program experiences, as well as specific course evaluations at the end of each course.

1.3.2 Faculty

Faculty opinion has been shown in literature to be an important consideration for improved curriculum development.\textsuperscript{2.1} Faculty perspective on curriculum is useful to gain an appreciation of the strengths and weaknesses on how courses are run.\textsuperscript{2.2} Greenfield \textit{et al} (2004),
studied faculty feedback on skills required for graduating students focusing on small animal medicine. This feedback on important skills helps inform curriculum outcomes so that they align with the veterinary profession. The Greenfield et al. (2004) study also explored private practitioner feedback and it was noted that the faculty had high agreement with the veterinary practitioner participants. Overall this shows that college faculty understand the needs of the veterinary professional even though they are not currently private practitioners.

1.3.3 Private practitioners

Achieving an understanding of veterinary practitioner’s perspectives is useful in comprehending how the curriculum affects practitioners later in their career. The OVC utilizes employer feedback surveys to understand and gauge the satisfaction of the employers of the new veterinary graduates. It is important to ask practitioners from a variety of backgrounds to gain an adequate picture of the practitioner opinions’ for example, the number of years in practice can make for differing opinions regarding curriculum requirements. Cary et al (2017) reported that new graduates tend to have low expectations of their own skills whereas veterinary practitioners who have been in the profession for many years score student’s skills as higher than the students’ perception.

1.4 Rural Community

The term rural community is very difficult to define. It has different meanings to many different groups of people. The government of Canada itself has numerous ways to define a rural community. The definition published by the Statistics Canada Census says “Census rural is defined as the population outside settlements with 1,000 or more population and with a
population density of 400 or more inhabitants per square kilometre.” 27 This definition is based on density and population, which is a common way to define rural. This definition is used frequently in rural veterinary medicine studies.28,29

In Ontario, there has been a declining number of farms, decreased land used for agricultural purposes and increased farm size.30,31 This has led to an increase in technology to meet the demand for higher commodity yields with fewer resources available. In Canada, there has been an increase of over a million pets in less than 10 years32,33 and a shift in how the public sees companion animals to be more of a family member.33 Companion animals have become an important part in the lives of humans and that can be seen by the fact that money spent on pets has increased significantly in the last ten years.34 These shifts in society’s values of animal populations affect the way veterinarians service their patients.

There are many factors that attract people to come or stay in a rural community. In rural communities, the population often feels more connected to each other for example, and professionals report that they enjoy having a close relationship with clients and the community.35,36 Appreciation of a rural lifestyle is another factor that keeps people in a rural community.37,38 Appreciation for the services that professionals personally bring to the community has been cited as an important factor for improving professionals wanting to be a part of that community.36 This retention of professionals within the community is very important to rural communities because of the contributions of professional services that are needed locally.39

Unfortunately, rural communities often have difficulty keeping a variety of professionals such as nurse practitioners in the medical profession, dentists and dental hygienists in the dental profession, and veterinarians in veterinary medicine.37,38,40,41 Professionals often have to expand
their scope of work because there are limited people and resources beyond what they can provide themselves. From the perspective of incoming professionals, there is a disadvantage to residing in a rural community such as the potential for geographic and social isolation. In addition, more prosperous employment opportunities in larger city centers are a common cause for new professionals to leave a rural community in addition to limited career opportunities for spouses. Rural communities often see a high turnover of veterinarians for many reasons such as the amount of time that a rural community veterinarian has to be on-call and the limited amount of vacation time for practitioners to leave this type of practice. From a professional standpoint, the atmosphere of team work and the salary are also important factors. It is not surprising that this lack of appeal for rural community practice was alluded to in a study performed by Jelenski and Campbell (2009) where they found that food-animal and mixed-animal practices had job vacancies for a longer period of time when compared to companion-animal practices.

1.5 Veterinary medicine
1.5.1 Veterinary licensing

Veterinary medicine is a self-regulated profession. The main regulatory body for veterinarians in Ontario is the College of Veterinarians of Ontario (CVO). This college’s council is composed of veterinarians as well as other members of the public. The CVO acts to protect the interest of the public in relation to the practice of veterinary medicine in the province. All practicing veterinarians in Ontario must be licensed by the CVO and all Ontario veterinary practices must be accredited by the CVO. The licensing and accreditation process and legislation allows the CVO to inform professional policies and to enforce a standard for veterinary care. During the licensing process, the CVO collects information from each individually licensed
Veterinary practitioner i.e. as graduation year, veterinary college attended, primary location where licensee practices veterinary medicine and the species serviced.

1.5.2 Veterinary demographics

Canadian veterinary medicine demographics has not been studied or reported in detail. The limited data identifies companion-animal practitioners as the largest group of practitioners. Similarly, there has been an increase in the ratio of female to male veterinarians which is reflected in the increase number of female students enrolled in veterinary programs. This increase in female graduates is felt to have the potential to affect veterinary medicine in the future in the following ways. Female veterinarians are considered more likely than males to work part-time presumably because they are more likely to stay home with other family member i.e. children. This could lead to an overall increase in the number of veterinarians in practice as a practice would potentially need to hire multiple part-time veterinarians. Jelenski and Campbell (2010), compared and reported veterinary demographics for western Canada from 1991 to 2007 and found that there was an overall increase in practitioners per practice as they reported an increase in multi-person practices. This supports the hypothesis that the veterinary medicine is moving towards larger practices employing more veterinarians compared to the solo practitioner model. Companion-animal veterinarians are reported to work less hours and have less after-hours on-call responsibilities per month compared to rural community practitioners, food-animal practitioners and equine practitioners. However, there is not a large difference in base salary for the various practice types.
1.6 Veterinary medical education

1.6.1 A history

The first veterinary schools were established in the 18th century in France and Germany. They were followed by a large number of veterinary schools in various countries in the 1800’s including London, United States of America and Australia. The first two Canadian veterinary schools were established in the late 19th century. The OVC was one of those first schools established originally in 1870. But, it went by different names until 1922 before settling on the name Ontario Veterinary College. These early veterinary schools had all male graduates until the early to mid-1900’s. The first Canadian woman to graduate veterinary medicine was not until 1936.

Following WWII there was a large number of veterans enrolled at the OVC. This resulted in larger class sizes than previous years. Equine medicine has always been a significant portion of the OVC curriculum but was the primary species taught at the OVC until after the first world war. With the use of horses evolving from a necessity for farming and mode of travel to a more companion-animal and pet-like status, coupled with the increase in livestock species in the province, caused the OVC curriculum to switch their main focus to livestock species. As North America experienced urbanization there were more pets in the home and owners were increasingly seeking veterinary care for their pets. Although working in private veterinary clinics outside of the OVC private veterinary practitioners have always contributed to the curriculum. And, as pet ownership became more common it was obvious to the profession that there was a need for more hands-on clinic-based learning in Doctor of Veterinary Medicine programs. Hence, an increase in preceptorship and internship experiences were deemed important to allow the students to learn from skilled professionals.
1.6.2 Canadian education

The OVC originally served the veterinary training needs for all of Canada because it was the first English speaking veterinary school in Canada. Now, the OVC is one of five veterinary schools across Canada. In order to apply to a Canadian veterinary college as a domestic student the applicant must reside in the region where the college is located. Residency regulations are dictated by each of the colleges for example, in order to qualify to apply to the OVC an applicant must have established Ontario residency either through parentage or by residing in Ontario for a set period of time. Additionally, all of the Canadian schools except for University of Calgary accept applications from international students. Upon graduation, Canadian veterinary graduates generally practice in the region where they attended veterinary college. This employment trend has informed curriculum at the different schools by encouraging them to take regional or provincial needs into consideration when training entry-level veterinarians.

The east coast is home to the Atlantic Veterinary College (AVC). The first two years of the curriculum structure are similar to the OVC because the students begin in first year focusing on normal structure and function of animals and then abnormalities and disease are introduced in the second and third year. The AVC does not stream in the fourth year and their clinical rotations are defined and are comprised of core and elective rotations.

The University de Montreal is the only French speaking veterinary school in Canada. This school has a 5-year program which is different than the other four universities. Similar to the other four schools, University de Montreal uses the final year of the curriculum for clinical education. They do not have any streaming or career emphasis options in the curriculum at the University de Montreal.
The Western College of Veterinary medicine is located in Saskatchewan. It is the veterinary school that accepts domestic students from the western provinces and the territories. The curriculum is very similar to OVC but they do not stream during the final year. Instead, all students must take 20 weeks of mandatory rotations then they can choose their own electives up to 12 weeks.

University of Calgary is home to the newest veterinary school in Canada. They admit approximately 30 students per year with a program very similar to the program at the OVC and AVC. The first three years are focused on hands-on experience to prepare them for their clinical experience in fourth year. At this school, students can choose one of four areas of emphasis (Production animal health, Ecosystem and public health, Equine health and Investigative medicine) which is a similar structure to streaming. One main difference between OVC and University of Calgary is the fact that University of Calgary does not have a veterinary hospital on site, and instead uses other privately owned clinics off campus for fourth year rotations.

1.6.3 Current education

The OVC, and all the Canadian schools, are accredited by the America Veterinary Medicine Association Council of Education. This governing body has a list of 13 competencies that need to be addressed in order for a veterinary school to be accredited. The current OVC curriculum is built upon learning outcomes and competency-based learning. Outcome based education focuses on the end-point of education and how best to get there.\(^{54}\) In 1993, the DVM 2000 curriculum was established at the OVC with competency-based learning as the objective. The three competency domains that are currently in effect were established by taking the original
DVM 2000 competencies and modifying them in 2009 and are: planning and analysis, professionalism, and conducting veterinary activities.

The Phase-1 students focus on what is “normal” in animals. When they move to Phase-2 they learn about abnormal conditions. Phase 1, 2 and most of 3 are didactic in nature and introduce hands-on experiences. At the start of Phase-4 students need to complete the Externship course. During this time, they spend eight weeks in a rural community practice working directly in a clinic with practicing veterinarians. This is their first formal learning experience requirement external to the OVC. This element of their education is funded by Ontario Ministry of Agriculture, Food and Rural Affairs. Phase-4 (final year) is the clinic year for students. The students spend 30 weeks in varying rotations within OVC and external rotations (outside of OVC). The external placement of students in clinical settings in private practice has been a popular form of teaching in veterinary schools and found to be beneficial to student learning. These placements have been reported by students and externship hosts to increase student confidence due to the ability to practice clinical skills more often. Longer external experiences have been felt to be even more beneficial because knowledge and trust can be built allowing the student to practice more complex procedures during the time spent at the host clinic. External experiences also allow students to be involved in practice management as well as be directly involved in practices where there may be an employment opportunity in the future. These insights into clinical practice can also foster students and help them to choose a career path more easily.

As reported previously, the OVC curriculum is divided into four streams. These include: Equine, Food-animal, Rural Community Practice and Companion-animal. The overall goal of offering four stream options is to allow students to choose a stream that aligns with the field of
veterinary medicine they are most interested in. The students have to choose one of these streams in the middle of Phase-3. Once they choose a stream the rest of their education is more tailored to their specific career aspirations. The four streams have a different amalgamation of core rotations that each student must complete to fulfill the specific stream guidelines. Then, in addition to the core rotations the students have stream priority electives and regular electives they can select (Appendix I). Almost three quarters of the students choose the companion-animal stream every year. The rural community practice stream, equine stream and food animal practice stream make up the rest of the 25% of students with approximately equal numbers of students per stream.

1.7 Conclusion

Given that the demographics of Canadian pet ownership and livestock rearing have been changing and it is important to understand how veterinary demographics are changing as well. Although the term rural does not have a clear definition it is known that rural and urban locations have different characteristics that influence the practice of veterinary medicine. Rural is a term that does not have one set definition but has various definitions and subsequent interpretations. Due to this demographic shift and trying to understand the role of the rural community practitioner, curriculum reform should be used to ensure optimum preparation of students for veterinary medicine in rural communities. Also, there is limited data available on veterinary demographics in Ontario, Canada.
1.8 Research objectives

Given that information describing the demographics of Ontario veterinarians is sparse coupled with the changing human and animal demographics in Canada which affects veterinary medicine, there is a need to understand the rural community veterinary practitioner and rural community practice. The specific objectives of chapter 2 were to describe for the province of Ontario, Canada:

1. the demographic profile of licensed veterinarians;
2. the location of clinics classified as a rural community practices (RCP);
and to examine factors associated with:

3. veterinarians being classified as an RCVP; and,
4. a veterinary practice servicing multiple animal species and hence be classified as an RCP.

Chapter 3 focuses on understanding stakeholder perceptions about the rural community veterinary practitioner and the Ontario Veterinary College (OVC) curriculum. There is anecdotal evidence that the role of the rural community practitioner has changed. Therefore, understanding this role is important to keep practitioners in rural communities. Continuing to revise and reform curriculum to fit the veterinary profession is key to training successful veterinarians and has always been an important consideration of the OVC. The specific objectives of this chapter were to explore the opinions and perceptions of the OVC Phase-4 DVM students, OVC faculty, and Ontario private veterinary practitioners regarding:

1. the definition of being an RCVP and
2. the training provided by the Ontario Veterinary College (OVC) curriculum.
Finally, chapter 4 focuses on the skills considered necessary to be a successful entry-level RCVP and the objective of chapter 4 was:

1. to investigate the perceptions of DVM students, OVC faculty and Ontario private veterinary practitioners about the entry-level skills requirements of an RCVP.
1.9 References


40. Villarroel A, McDonald SR, Walker WL, Kaiser L, Dewell RD, Dewell GA. A survey of


Chapter 2

Demographics and factors associated with being classified as a rural community veterinary practice and practitioner in Ontario, Canada

Formatted for submission to the
Canadian Veterinary Journal

2.1 Abstract

Information describing the demographics of Ontario veterinarians is lacking. The objective of this study was to describe the demographics of practices and veterinarians in Ontario, Canada, and specifically to explore factors associated with being classified as a rural community veterinary practice (RCP) and rural community veterinary practitioner (RCVP). Veterinary provincial licencing data for 2017 and 2016 human and livestock population data were used. In total, 4545 veterinary practitioners and 1579 veterinary practices were licensed in Ontario in 2017. The odds of being an RCVP decreased as the graduation year of the practitioner increased (OR= 0.005; P=0.02). An RCVP was more likely to practice in an RCP than a companion-animal practice (OR=65; P<0.001). Rural community practices were 1.8 times more likely to have >1 practitioner per practice (P<0.001), be in livestock dense areas (OR= 6.29; P<0.001), be in less populated regions (OR=2.5; P=0.02) and be surrounded by fewer clinics (OR=7.78; P<0.01).
2.2 Introduction

There are advantages and disadvantages associated with the practice of veterinary medicine in a rural setting. These challenges have been attributed to the practice of veterinary medicine itself such as, long working hours, and have also been related to factors more specific to living in a rural community. For example, the social isolation of living in a small community may be considered less desirable by some individuals (1). There has been anecdotal evidence to support that the primary role of the rural community veterinary practitioner (RCVP) is to focus on servicing multiple animal species, to be a general practitioner, and to be a person who lives in a small or rural community. However, little information has been published regarding this characterization of an RCVP. Furthermore, very little work has explored and examined characteristics of veterinary clinics and veterinarians that are related to being classified as a rural community practice (RCP) and an RCVP, specifically for the province of Ontario.

Jelinski et al. (2008) reported, that in western Canada, rural community veterinary practitioners (RCVPs) cover a wide geographical area and will spend a long time in their vehicle either driving to work or driving to attend animals (2). Additionally, RCVPs from western Canada have reported working longer hours than companion-animal practitioners and often have to share after hours on-call work with colleagues (3). It has also been reported in the literature that veterinary practitioners who enter RCP immediately after graduation, typically do not stay in this type of practice (4). Often RCVPs leave rural and multi-species practice and move into companion-animal practice or government roles (4,5). Some cited reasons for poor attraction and retention of new veterinary graduates in RCP include: long working hours (including emergency work), family concerns i.e. spouse finding a career or job, non-competitive salary, and that the work can be physically challenging (4,5). This difficulty in attracting new veterinary
graduates to RCP was also documented by Jelinski and Campbell (2009) where they reported that food-animal and multi-species practices had a job vacancy for a longer period when compared to companion-animal practices (6). The distinct differences between rural and urban veterinary practice are not unique to veterinary medicine. Similar challenges have been reported in the medical literature for rural community human health practitioners such as low-income potential and long work hours (7,8).

There has been some research focused on veterinary practice and the demand for veterinary services in western Canada. In western Canada, including British Columbia, Alberta, Saskatchewan and Manitoba, it has been reported that 46% of veterinarians practice on companion-animals exclusively, which was reported to be 15 times higher than that of both food-animal and equine exclusive veterinarians (9). It was also reported that most veterinary clinics were operated by solo practitioners (6,9).

In 2016, there was an estimated 13,000 veterinarians practicing veterinary medicine in Canada (10). Thirty-six percent of all the veterinary practitioners in Canada were licensed in Ontario (10) which is the province where the largest percentage (38%) of the Canadian population reside (11). Although there is a large proportion of veterinarians practicing in Ontario, demographic data regarding veterinarians and veterinary clinics is lacking in the literature, especially for rural communities. Rural communities are typically defined based on factors such as the geographic region within the province including proximity to city centres, population size, and population density i.e. people per square km (12). For the province of Ontario, Statistics Canada considers a rural community to be one that has at least 1000 people residing in the community and with a density of 400 people/km² or less (13). In the context of the practice of veterinary medicine, rural communities have been considered to be geographical
areas where food-animal and mixed-animal veterinary practitioners reside and work (2).

However, Statistics Canada has no information available regarding veterinarians and veterinary clinics in such communities. Specifically, for the province of Ontario, a detailed understanding (definition) of what constitutes an RCVP is lacking and a detailed understanding of the differences of veterinary practices and practitioners across regions of Ontario is not well described. Demographic information is needed to further inform the demand for veterinarians in rural communities, to describe what the current landscape looks like for rural community veterinary practice, and to provide guidance for any considerations that should be accounted for within the veterinary curriculum when training veterinarians interested in rural community practice.

Hence, the objectives of this study were to describe for the province of Ontario, Canada:

1. the demographic profile of licensed veterinarians;
2. the location of clinics classified as a rural community practice (RCP);

and to examine factors associated with:

3. veterinarians being classified as an RCVP; and,
4. a veterinary practice servicing multiple animal species and hence classified as an RCP.

2.3 Materials and methods

A list of the provincial licencing data containing all licenced veterinarians and a list of all accredited veterinary practices in Ontario for 2017 were obtained from the College of Veterinarians of Ontario (CVO). Veterinary medicine is a self-regulated profession in Canada and the CVO is the regulatory body that licenses and oversees the practice of veterinary
medicine and accreditation of practices in Ontario. Hence, the primary role of the CVO is to
serve the public’s interest in relation to the practice and delivery of veterinary medicine. All
veterinarians practicing in Ontario must be licenced with the CVO and are required to practice in
a veterinary practice that is also accredited by the CVO. The process of licensing allows
veterinarians to self-report on various types of information specific to their primary practice
activities e.g., veterinarians report on the primary animal species that they service, location of
their primary practice, year of graduation, and the university where their degree was obtained.
The animal species serviced can be reported and the species that are available for veterinarians to
select are categorized by the CVO as: small animal, food animal, equine, other (i.e. public
health, wildlife or zoo animals), or any combination of categories. Therefore, these datasets
were considered to represent a census of all licensed veterinarians and veterinary practices in
Ontario.

Each licensed veterinarian was assigned a unique identifier. Each unique identifier
represented one licensed veterinarian, and was used as one observation in the analyses. Practice
data were merged with the veterinarian data and matched by the primary clinic name that the
veterinarian was associated with, which was a common variable between these two datasets.
Data were inspected for completeness of information and data fields that had missing values or
were inconsistent i.e. address, or specialization area, were dropped from the final dataset used for
the analyses.

2.3.1 CVO data variables used and generated:

The variables that were utilized and generated from the provincial CVO licensing data,
and their definitions were:
1. School and graduation year: the data included the *graduation year* for each veterinarian as well as the *university* that awarded their veterinary degree.

2. Clinic and veterinarians per clinic: The variable *company* was defined as the clinic or *company* the practitioner reported as their primary practice location. The dataset did not include any secondary (or tertiary) practices that a veterinarian may be associated with. The *number of veterinarians per clinic* was generated by summing all the licenced practitioners in the veterinarian data for each accredited veterinary practice (*company*) in the practice data.

3. Practice city, company city and city size: *Practice city* was considered the primary location where a veterinarian reported they practiced. However, there were inconsistencies in the way the variable *practice city* was reported. For example, veterinarian X may have reported they practiced at clinic A in the city of Brampton but clinic A reported that they were located in the city of Toronto. These inconsistencies were identified by manually comparing the practice city from the veterinarian data and company city from the practice data after merging the two datasets. Due to these inconsistencies and to facilitate the classification of veterinarians to an appropriate geographical practice location, the reported company city location (*company city*) was considered correct and hence was the location used. Subsequently, the size of city where the company city was located was obtained from Statistics Canada 2016 census data (14). *Company city size* was generated and categorized into population centre sizes based on Statistic Canada definition (13): a city with <30,000 people was considered “small”; 30,000-99,999 was considered a “medium” sized city; and a “large” city was classified as a city with 100,000 or more people.
4. **Employer type:** Each veterinarian reported what type of employment *(employer type)* they were engaged in. The options that veterinarians could select included: private practitioner, various government roles, academic institution, industry, other, and inactive members.

5. **Patient Group:** The variable *patient group* represented the overall group of animals the veterinarian serviced. Veterinarians could choose any combination of companion-animal, food-animal, equine, and “other”. The “other” category could include patient groups such as wildlife, zoo animal, and public health. Companion-animal (CA) practitioners were classified as a veterinarian who self-identified as working with strictly companion-animals or companion-animals and “other”. A food-animal (FA) practitioner serviced food-animal species or food-animal and “other”. Equine (EQ) practitioners serviced equines or equine and “other”. For the purpose of this research, and to define a category to represent a rural community veterinary practitioner (RCVP), an RCVP variable was generated. An RCVP was classified as a practitioner who self-reported that they serviced companion-animals and food-animals, and may not or may not service equine species and “other” groups of animals.

6. **Patient Type:** Veterinarians were required by the CVO to report on the animals they service by species *(patient type)* and could identify as many as were appropriate. The species options consisted of: 5 companion-animal options (bird, cat, dog, pocket pet and reptile), 4 horse options (performance horse, breeding, pleasure horse and racing breeds), and 6 large animal options (beef, dairy, poultry, swine, small ruminant and small flock). There were categories under “other” which included human health, wildlife, and zoo
animals. The category ‘other’ for the variable patient type was subsequently dropped because it did not include work associated with regular clinical veterinary practice.

7. Practice Species: Each practice (company) that provides veterinary care in Ontario is accredited based on the species serviced. Hence in the practice dataset, each practice indicated which species were serviced (practice species): companion-animal, food animal, and/or equine. For the purpose of this research, 6 categories were subsequently defined. A companion-animal practice was defined as practice that was accredited as a companion-animal only practice. A food-animal practice was defined as a practice that was accredited as a food-animal only practice. If a practice was accredited as an equine only facility it was define as an equine practice. If the practice was accredited as a companion-animal and equine practice, then it was classified as small animal/equine. A food-animal and equine practice accredited practice was classified as food-animal/equine. Lastly, if a practice was accredited as: 1. a companion-animal and food-animal practice or; 2. as companion-animal, food-animal and equine practice they were classified as a rural community practice (RCP).

2.3.2 Population data used and variables generated:

To examine characteristics associated with clinic and practitioner classification categories, population and agriculture data were obtained from Statistics Canada 2016 census data (15-21). The Statistics Canada variables included in the analysis, and their definitions, were:

1. Census Agriculture Region: There are 5 census agriculture regions (CAR) in Ontario which include northern, southern central, western, and eastern and are represented in
Figure 2.1. These regions are made up of aggregations of neighbouring census divisions (CDs). The boundaries of these regions are defined by Statistics Canada (16-21).

2. Census Division Population: Statistics Canada defines 49 CDs for Ontario which are considered counties or regional districts. The range of human population for the census division (CD) population variable was 18062-2731571. This variable was categorized into quartiles: <68000, 68000-102000, 102001-222000, and >222000 for data analysis.

3. Farm Population: Farm population information was also collected from Statistics Canada (16-21). Farm refers to the use and reporting of the housing of livestock species on a premise with the intent to sell or generate income i.e. horses, dairy cattle, swine and sheep. The farm population data were obtained for each CD in Ontario. For statistical analysis farm population by CD was categorized into quartiles: <350, 350-800, 801-1280, and >1280.

4. Census Consolidated Subdivision population: Census consolidated subdivisions (CCS) consist of a group of adjacent towns and villages (15). For statistical purposes CCS population was categorized into quartiles: <3066, 3066-7644, 7645-17259, >17259.

5. Number of farms in each CCS: Data on the number of farms by CCS was collected from Statistics Canada (16-21). The census data for CCS was the smallest geographical census category area used because it is the lowest category that farm census data is collected. The number of farms by CCS was categorized into quartiles <51, 51-112, 113-221, and >221.

The CVO derived data were merged with the Statistics Canada data matched by the CD identification number where the practice (company) was located and a variable representing the number of practices per CD, was generated. The variable number of practices per CD
was subsequently categorized into quartiles: <26, 26-73, 74-104, and >104 for statistical analysis.

A summary of the definition of the Statistics Canada defined variables can be found in Table 2.1.

2.3.3 Statistical methods

Linearity of continuous variables were assessed visually using a lowess smoother and then evaluated for significance of a quadratic term. Collinearity of variables were assessed using Pearson correlation analysis.

Univariable associations between being classified as an RCVP (dependent variable: 1=yes, 0=no) and year of graduation, school where obtained DVM (or equivalent) degree, number of practitioners per clinic, practice species serviced, CD and CCS population, and number of farms in a CD and CCS were examined. Random effects for CD and CCS were also considered at this stage for each univariable association.

Similarly, univariable associations among factors associated with being classified as an RCP (1=yes, 0=no) and CD and CCS population, farm population density in a CCS and CD, number of practices per CD, census agriculture region, and practitioners per practice were investigated where CD and CCS were modelled as random effects.

Statistical software STATA 14 (StataCorp LLC, Texas 2015) was used for statistical analyses. Variables with a univariable association of $P<0.2$ were considered for inclusion in the multivariable model. Backwards elimination model building was utilized to assemble the final model. A likelihood-ratio test was performed by removing each variable individually and comparing it to the full model. Variables with a significant result from the likelihood-ratio test ($P<0.05$) remained in the final model. A $P$-value $<0.05$ was considered significant for variables
to be included in the final mixed multivariable model. Pearson residuals were assessed for outliers and the outliers were considered for removal from the model. Homoscedasticity and normality of best linear unbiased predictions were assessed. Variance partition coefficients were calculated for each level of random effect to show the proportion of total variance accounted for by each level. This was calculated by dividing the variance of the level of interest by the sum of all the random effect variance.

To visualize location of RCPs and RCVPs and to aid in the characterization of geographical location where an RCP or RCVP are located, dot and chloropleth maps were generated (Arc GIS 10.5, Redlands 2016). One Ontario boundary file was obtained from Scholars Geoportal (22) and was divided into CDs. As described above, the population data for each CD and CCS in Ontario from the 2016 Canadian census (15) and farm data for each CD and CCS were obtained from Statistics Canada (16-21).

2.4 Results

The mean human population, mean number of farms and mean number of all veterinary clinics (regardless of practice type) represented by human population quartile in Ontario is summarized in Table 2.2.

2.4.1 Descriptive statistics

In the complete dataset, there were 4545 veterinarians and 1579 veterinary practices licensed in Ontario in 2017, however one veterinarian observation was dropped due to a lack of complete information. The veterinary (n=4544) self-reported employment types are displayed in Table 2.3. Private practitioners accounted for 80.2% (n=3645) of the licensed veterinarians in Ontario. The veterinarians licensed in 2017 graduated between 1947 and 2016 with 50% the
veterinarians having graduated in the last twenty years. For all licensed veterinarians, companion-animal practitioners consistently represented the predominant species serviced. The veterinarians licenced in Ontario in 2017 (n=4544) obtained their DVM degree (or equivalent) from 186 different universities. Most of the practitioners (78.4%, n=3567) obtained their degree from a Canadian university. Seventy percent (n=3186) reported obtaining their degree from the Ontario Veterinary College (OVC). Four percent (n=182) of veterinarians self-reported obtaining their DVM degree from the Atlantic Veterinary College (AVC). The remainder 4.4% (n=199) of veterinary practitioners obtained their DVM degree from the Western College of Veterinary Medicine (WCVM), Faculté de médecine vétérinaire (FMV) Université de Montréal or University of Calgary - Faculty of Veterinary Medicine. The location of the 5 most frequent international universities where veterinarians reported obtaining their DVM degree were India (2 universities), Pakistan, United Kingdom, and Ireland and accounted for 5.9% (n=267) of the observations. There were 176 other different universities that were self-identified by practitioners which accounted for the remainder 15.6% (n=710) of the participants.

2.4.2 Veterinary private practitioners

When considering only private practitioners who completed all fields (n=3349) in the CVO licensing data such as patient group, 82.8% (n=2772) of the private practitioners reported that they practice on what was categorized by the CVO as strictly companion-animal. Veterinarians who were defined as exclusively food-animal or equine only were 3.0% (n=99) and 4.3% (n=143), respectively. An RCVP who serviced companion- and food-animal with or without equine, comprised 5.4% (n=180) of the private practitioners. The number of RCVPs by the patient type they service is displayed in Table 2.4. For RCVPs, 53.3% (n=96) of these practitioners serviced 3-6 species and only 2 practitioners serviced 2 or less species. Rural
community veterinary practitioners were the only type of practitioners who serviced more than 10 different species. Fifty percent (n=1675) of private practitioners licenced in Ontario, practiced veterinary medicine in large city centres compared to small and medium-sized cities. When looking at RCVPs specifically, 88.3% (n=159) of the private practitioners practiced in city centres with less than 30,000 people. When examining the species serviced, 62.9% (n=2107) of all private practitioners serviced only one or two species regardless of species serviced. For strictly companion-animal private practitioners and companion-animal/equine private practitioners, dogs (n=2792) and cats (n=2827) were the species most serviced. Cattle (beef and dairy) represented the predominant species serviced by food-animal practitioners. Lastly, of the equine practitioners, they serviced a large percentage of all horse types with performance horse veterinarians (n=112) being the most represented. Most food-animal practitioners, as defined by researchers being a food-animal and equine veterinarian, serviced pleasure horses and cattle species.

2.4.3 Veterinary practices

There were 1579 practices licenced in Ontario based on the CVO 2017 accredited practice data. Upon considering the variable practice species, companion-animal practices were the most common practice type (72.6%, n= 1146). The remainder of the accredited practices included: 14.0% (n=221) RCP, 6.0% (n=95) equine practice, 3.8% (n=60) companion-animal/ equine practice 3.4% (n=54) food-animal practice, and 0.2% (n=3) food-animal/ equine practice. The average number of private practitioners per clinic was 4.7 and ranged from 1-36. Veterinary clinics that had a solo practitioner (n=655) accounted for 41.5% of all the veterinary clinics in Ontario. Solo practitioner practices were the most common for all patient groups.
2.4.4 Geographical location of rural community practices (RCP)

The location of the CARs in Ontario and the location of Ontario clinics classified as an RCP are displayed in Figure 2.1. Figure 2.2 displays the human population of Ontario CDs and locations of RCPs separated by CAR. Visually, RCPs were distributed fairly evenly across each CAR and they were not grouped near CDs with large populations (<222000 people per CD). Figure 3 displays the number of farms reporting livestock and the location of all RCPs separated into CARs. Western Ontario contained the largest number of RCPs (n=65) followed by southern Ontario (n=57). Visually, there appears to be more RCPs in areas with more farms with livestock. The CAR of Northern Ontario, is a large geographical area but also contains a low human population and a low number of farms and not surprisingly contains the fewest RCPs.

2.4.5 Univariable and multivariable analyses: dependent variable - rural community veterinary practitioner (RCVP)

The results of the univariable analyses examining factors associated with being classified as an RCVP, with CD and CCS modelled as random effects (per factor), are shown in Table 2.5. The results of the final mixed logistic regression model with CD and CCS modelled as random effects are described in Table 2.6. Comparing the univariable analyses in Table 2.5 to the final multivariable model in Table 2.6 it can be seen that only graduation year and the practice species variables were associated with being classified as an RCVP in the final multivariable model. The relationship between being an RCVP and the graduation year of the veterinary practitioner was not linear but instead it was a curvilinear relationship (Appendix II, figure 1). As year of graduation increased (i.e. practitioner graduated more recently) the odds of being classified as an RCVP decreased (OR= 0.005, P=0.02) until 1993 then the odds of being an
RCVP increased again with increasing graduation year however, not to the same degree.
Practitioners working in clinics classified as RCPs were more likely to be classified as an RCVP than those working in companion-animal practices (OR=50, \( P<0.001 \)), food-animal practices (OR=12.5, \( P<0.001 \)) or companion-animal/ equine practices (OR=50, \( P=0.001 \)). Practitioners working in food-animal practices did not have different odds of being classified as an RCVP compared to companion-animal/equine practitioners (\( P=0.28 \)) but were 5.5 times more likely to be classified as an RCVP than a veterinarian working in a companion-animal practice (\( P=0.02 \)). The odds of being classified as an RCVP was not different for companion-animal practitioners compared to companion-animal/equine practitioners (\( P=0.78 \)). The greatest variation of being classified as an RCVP can be explained by the CCS level at 46%, and with 35.4% of the variation of being classified as an RCVP explained by the veterinarian level, and the CD level explained 18.6% of the variation of being an RCP when accounting for the random effects.

2.4.6 Univariable and multivariable analyses: dependent variable - rural community veterinary practice (RCP)

Univariable analyses describing factors associated with being classified as an RCP are shown in Table 2.7. Factors associated with being classified as an RCP in the final mixed logistic regression model with CD and CCS as random effects are presented in Table 2.8. Veterinarians per practice, Practices per CD, CCS population and number of farms in a CCS were found to be associated with being an RCP. There was a quadratic relationship between being classified as an RCP and the number of veterinarians in a practice. The odds of being an RCP increased with increasing number of practitioners per practice (OR=1.8; \( P<0.001 \)) until 9 practitioners per clinic then the odds decreased (Appendix II, figure 2). Practices in a CD with <27 practices were more
likely to be RCPs (OR= 7.78; $P<0.01$) compared to practices in CDs with >104 practices. Practices in CCSs with <3066 people had 2.5 odds ($P=0.02$) of being classified as an RCP than practices in CCSs with >17259 people. The odds of being an RCP was greater for practices in CDs with 113-221 farms (OR=3.46; $P<0.01$) and >221 farms (OR=6.29; $P<0.001$) compared to CDs with <51 farms. The most variation of being an RCP was explained by the clinic level at 53%, and 44% of the variation of being an RCP was explained by the CCS level and the CD level explained 3% of the variation of being an RCP when accounting for the random effects.

2.5 Discussion

This study presents the demographics of practicing Ontario veterinarians, with an emphasis on factors associated with being classified as an RCVP, which has not previously been described.

The number of companion-animal practitioners licenced in Ontario, in 2017, is similar to previous reports as being the most common type of practitioner (6,9,23,24). Perhaps not surprising then, for any practitioner providing veterinary care for companion-animals (CA, RCP, CA/EQ), the most common two species serviced were cats and dogs. Similarly, dairy and beef cattle were the most common species serviced by any food-animal practitioners (FA, FA/EQ, RCP) which was also expected. There has been anecdotal evidence to suggest that RCVPs are more likely to work on small ruminants. The results from this study support this theory because it reports that practitioners who identified as practicing on small ruminants were more common (70-80%) among practitioners who self-identified as a multi-species practitioner (FA/EQ, CA/FA/EQ, CA/FA) and less likely in strictly food-animal only practitioners (39%). Being a single practitioner in a practice was found to be more common than multi-practitioner practices in this study which is in agreement with the results reported by Jelinski and Campbell (2009).
regarding the most common number of veterinarians in a single clinic in western Canada (6). In this study, there was an average of 4.7 practitioners per practice regardless of species serviced. This is larger than a more recent 2015 study from western Canada that reported the mean number of practitioners in a practice was 2.4 (9). The larger average number of practitioners per practice identified in this study may support claims that veterinary practices are becoming larger with more veterinarians working at a clinic (9).

The maps illustrate the location of RCPs in Ontario, in 2017, which also has not been described before. A low proportion of RCPs were located in Northern Ontario which is not surprising given the low human and animal population density of this region of Ontario. Rural community practices were not centralized around largely populated areas (i.e. Toronto in central Ontario) but were found to be more common in areas with a higher number of farms with livestock. This is an important finding for the improved understanding of what constitutes an RCP in Ontario and documents that RCPs are located and are geographically linked with animal agriculture. This further supports that practitioners in these areas will likely need to be able to service livestock species common to those regions. This finding also has the potential to help inform the demand for veterinary medicine in rural communities and can also be of benefit to curriculum developers and aid in the understanding of the unique education needs specific to training RCVPs for Ontario.

The results of this study also show that an area with a small human population is more likely to contain an RCP (which was defined as a clinic that services multiple species). This supports the hypothesis that RCVPs are more likely to practice in a rural community. Hence, the authors propose that practicing in a remote area and servicing multiple species are important to consider when characterizing (defining) what an RCVP is for the province of Ontario. The odds
of being an RCVP were greater for a Canadian graduate than an international graduate. This coincides with reports from the western provinces where there were more veterinarians from international schools in companion-animal practices (88%) than those trained at Canadian schools (9). This could be because most immigrants settle in major cities where companion animals are the predominant species serviced (22).

This study identified a few important factors that are associated with being an RCP. Being located in northern Ontario was associated with being an RCP and was supported by the location of the practices. Being a smaller practice (fewer practitioners per clinic) was also associated with being classified as an RCP. There has been anecdotal evidence to support that people perceive this to be changing but the examination of this 2017 licensing data shows that smaller practice size is still the predominant type in a rural community setting.

When considering the distribution of farms in the province, there were a greater number of RCPs in areas that have a dense livestock (farm) population. This is likely due to the demand for food-animal servicing practitioners in those areas. In areas where there are very few recorded farms there were few RCPs. Interestingly, this research also illustrates that RCPs and RCVPs are dispersed across Ontario. This means they could also be located in areas with a larger population and can be close to other practice types which contradicts the normal portrayal of an RCP and an RCVP. For example, there are RCPs located in Toronto which has the largest population in Ontario. These RCPs are likely to travel outside of the Toronto area to area(s) where there is a lower population. This contributes to the challenge of defining an RCP and RCVP, in the Ontario context.

The results from this study also document that the veterinarians practicing veterinary medicine in Ontario graduated predominately from the OVC and supports past literature which
has shown that Canadian veterinary students are more likely to practice veterinary medicine in the region from where they graduated (23). This finding is noteworthy as it can help to inform the demand for veterinarians in certain regions but it is also of note from the standpoint of education and training of veterinarians. Knowing that the graduates from OVC will most likely practice in Ontario is information that can be used to inform veterinary curriculum and suggests a continued focus on the common animal species serviced, veterinary education needs, and demographics specific to Ontario is warranted.

2.5.1 Limitations

There are certain limitations inherent in self-reported data. For example, the self-reported classification of animal group or species serviced could have been unknowingly misclassified by the practitioner. Since this was de-identified data this could not be investigated further. Any potential misclassification at the practitioner level could have influenced our classification of practitioners into RCP vs non-RCP categories. Another limitation is that there was no report of the percentage of time spent on each species that the practitioner serviced. For example, a practitioner could report they service both large and small animals but may in fact only see one farm dog once per year. This would not fall under the expectation that an RCVP truly services multiple species. Another weakness to this study was that not all of the practices in the practice dataset were listed (and hence matched) in the practitioner data set which made it impossible to merge those practices and include them into the merged data set. This lack of detailed information also has the potential to alter the interpretation for the practice species data if the relationship between being an RCP and the practice species differs for the practices that were not included in the study and that would affect the direction or magnitude of the association.
2.5.2 Conclusion

In summary, this study, to the authors’ knowledge, is the first to describe demographic information of Ontario licenced veterinary practitioners. The proportion of companion-animal practitioners was higher than for other species serviced. Most practices, regardless of practice type, are located in the southern portion of Ontario but the northern portion contains mostly RCPs, based on our definition structure. The distribution of RCPs follows the density of farms with livestock in the province. Rural community veterinary practitioners were found to more likely be Canadian graduates who practice in an area with a smaller human population, who practice in an RCP, and are more recent graduates (graduated after 2010) or veterinarians who have been in the profession for many years (graduated before 1965). Rural community practices were more likely to be in a less populated area with less practices surrounding them, be closer to regions with farms and have more veterinarians in the clinic.

The landscape of veterinary medicine is continuing to change at a fast pace. Given the constant advancement of knowledge in veterinary medicine and the actively changing human population demographics of Ontario and Canada i.e. growing human population (26), human movement from rural communities to larger city centres (27) and decreasing number of farms (28), the changes in the veterinary demographics over time should be assessed.
2.6 References


16. Statistics Canada. Table 004-0221 - Census of Agriculture, cattle and calves on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

17. Statistics Canada. Table 004-0222 - Census of Agriculture, sheep and lambs on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

18. Statistics Canada. Table 004-0223 - Census of Agriculture, pigs on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

19. Statistics Canada. Table 004-0224 - Census of Agriculture, other livestock on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

20. Statistics Canada. Table 004-0225 - Census of Agriculture, poultry inventory on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)


Table 2.1: Glossary of Census terms to describe regions in Ontario, Canada

<table>
<thead>
<tr>
<th>Term</th>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Census Agriculture Region</td>
<td>CAR</td>
<td>5 regions in Ontario which make up groups of neighbouring census divisions</td>
</tr>
<tr>
<td>Census Division</td>
<td>CD</td>
<td>Groups of neighbouring census subdivisions usually defined by counties or large cities</td>
</tr>
<tr>
<td>Census Consolidated Subdivision</td>
<td>CCS</td>
<td>Groups of adjacent towns, villages (census subdivisions)</td>
</tr>
</tbody>
</table>
Table 2.2: Human population\(^a\) (mean, range), farms reporting livestock\(^{b-h}\) (mean, range), and number of all accredited veterinary practices (mean, range)\(^i\) stratified by human population quartiles\(^a\) in Ontario, Canada

<table>
<thead>
<tr>
<th>Human population quartiles</th>
<th>Number of CDs</th>
<th>CD population(^a)</th>
<th>Number of farms with livestock(^{b,c,d,e,f,g,h})</th>
<th>Number of all accredited veterinary clinics(^i)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;68000</td>
<td>12</td>
<td>38,570 (13255-65533)</td>
<td>515 (72-2355)</td>
<td>7 (1-19)</td>
</tr>
<tr>
<td>68000-102000</td>
<td>11</td>
<td>82,744 (68147-100546)</td>
<td>1329 (108-3093)</td>
<td>20.5 (1-19)</td>
</tr>
<tr>
<td>102001-222000</td>
<td>13</td>
<td>126,685 (102042-161647)</td>
<td>872 (132-1827)</td>
<td>16.5 (1-27)</td>
</tr>
<tr>
<td>&gt;222000</td>
<td>13</td>
<td>802,198 (222726-2731571)</td>
<td>1158 (47-3132)</td>
<td>86.2 (45-196)</td>
</tr>
</tbody>
</table>

\(^a\) Statistics Canada, 2016 Census of Population, Statistics Canada Catalogue no. 98-400-X2016003
\(^b\) Statistics Canada. Table 004-0221 - Census of Agriculture, cattle and calves on census day, every 5 years (number), CANSIM (database). (accessed: January 30\(^{th}\) 2018)
\(^c\) Statistics Canada. Table 004-0222 - Census of Agriculture, sheep and lambs on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)
\(^d\) Statistics Canada. Table 004-0223 - Census of Agriculture, pigs on census day, every 5 years (number), CANSIM (database), (accessed: January 30\(^{th}\) 2018)
\(^e\) Statistics Canada. Table 004-0224 - Census of Agriculture, other livestock on census day, every 5 years (number), CANSIM (database). (accessed: January 30\(^{th}\) 2018)
\(^f\) Statistics Canada. Table 004-0225 - Census of Agriculture, poultry inventory on census day, every 5 years (number), CANSIM (database). (accessed: January 30\(^{th}\) 2018)
\(^g\) Statistics Canada. Table 004-0228 - Census of Agriculture, commercial poultry hatcheries in the year prior to the census, every 5 years (number), CANSIM (database). (accessed: January 30\(^{th}\) 2018)
\(^h\) Livestock = sheep, cattle, pigs, goats, horses, mink, wild boar, chickens, turkeys, llamas, rabbits, bison, elk, deer.
\(^i\) Based on 2017 veterinary clinic licensing data obtained from the College of Veterinarians of Ontario.

CD = census division
Table 2.3: Veterinarians licensed to practice veterinary medicine in the province of Ontario in 2017 by self-reported employment type

<table>
<thead>
<tr>
<th>Employment type</th>
<th>Count</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private practice</td>
<td>3645</td>
<td>(80.2)</td>
</tr>
<tr>
<td>Federal government</td>
<td>227</td>
<td>(5.0)</td>
</tr>
<tr>
<td>University of Guelph</td>
<td>203</td>
<td>(4.5)</td>
</tr>
<tr>
<td>Industry</td>
<td>143</td>
<td>(3.2)</td>
</tr>
<tr>
<td>Other</td>
<td>110</td>
<td>(2.4)</td>
</tr>
<tr>
<td>Inactive</td>
<td>104</td>
<td>(2.3)</td>
</tr>
<tr>
<td>Other academic institutions</td>
<td>70</td>
<td>(1.6)</td>
</tr>
<tr>
<td>Provincial government</td>
<td>35</td>
<td>(0.8)</td>
</tr>
<tr>
<td>Municipal government</td>
<td>7</td>
<td>(0.2)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4544</td>
<td>(100)</td>
</tr>
</tbody>
</table>

a. 2017 veterinary licensing data collected by the College of Veterinarians of Ontario
Table 2.4: Veterinary practitioners classified as RCVPs\textsuperscript{a} (n=180) in Ontario, Canada categorized by animal species serviced\textsuperscript{b}

<table>
<thead>
<tr>
<th>Companion-animal Species</th>
<th>Cat</th>
<th>Dog</th>
<th>Pocket Pet</th>
<th>Other\textsuperscript{c}</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCVP (%)</td>
<td>180</td>
<td>179</td>
<td>46</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>(100)</td>
<td>(99.4)</td>
<td>(25.6)</td>
<td>(16.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Food-animal Species</th>
<th>Beef</th>
<th>Dairy</th>
<th>Small Ruminant</th>
<th>Other\textsuperscript{d}</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCVP (%)</td>
<td>154</td>
<td>152</td>
<td>133</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>(85.6)</td>
<td>(84.4)</td>
<td>(73.9)</td>
<td>(43.3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equine Species</th>
<th>Breeding</th>
<th>Performance</th>
<th>Pleasure</th>
<th>Racing</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCVP (%)</td>
<td>45</td>
<td>30</td>
<td>133</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>(25.0)</td>
<td>(16.7)</td>
<td>(73.9)</td>
<td>(4.4)</td>
</tr>
</tbody>
</table>

\textsuperscript{a} RCVP-Defined as a veterinary practitioner who self-identified as a food-animal and companion-animal practitioner, or a food-animal and/or companion-animal and/or equine practitioner.

\textsuperscript{b} Based on 2017 veterinarian licensing data obtained from the College of Veterinarians of Ontario.

\textsuperscript{c} Includes reptiles and birds

\textsuperscript{d} Includes swine, small flock and poultry

RCVP = rural community veterinary practitioner.
Table 2.5: Univariable analyses\(^a\) examining factors associated with being classified as a rural community veterinary practitioner in Ontario, Canada

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR [CI]</th>
<th>(P)-value</th>
<th>CD variance</th>
<th>CCS variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practitioners per clinic</td>
<td>0.99 [0.99-0.996]</td>
<td>0.001</td>
<td>2.05</td>
<td>3.36</td>
</tr>
<tr>
<td>Graduation year of veterinarian</td>
<td>0.003 [0.00-0.15]</td>
<td>0.003</td>
<td>2.01</td>
<td>2.99</td>
</tr>
<tr>
<td>Can university</td>
<td>1.74 [0.93-3.24]</td>
<td>0.08</td>
<td>2.03</td>
<td>3.01</td>
</tr>
<tr>
<td>City centre</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referent=(&lt;30000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30000-100000</td>
<td>4.87 [1.37-17.25]</td>
<td>0.014</td>
<td>1.38</td>
<td>1.99</td>
</tr>
<tr>
<td>(&gt;100000)</td>
<td>14.14 [5.12-39.05]</td>
<td>&lt;0.001</td>
<td>1.38</td>
<td>1.99</td>
</tr>
<tr>
<td>Practice species</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referent=companion-animal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCVP</td>
<td>66.68 [30.56-145.51]</td>
<td>&lt;0.001</td>
<td>0.56</td>
<td>1.35</td>
</tr>
<tr>
<td>Companion</td>
<td>1.43 [0.15-13.54]</td>
<td>0.76</td>
<td>0.56</td>
<td>1.35</td>
</tr>
<tr>
<td>Animal/Equine Equine</td>
<td>1 [-]</td>
<td>-</td>
<td>0.56</td>
<td>1.35</td>
</tr>
<tr>
<td>Food Animal</td>
<td>6.00 [1.42-25.45]</td>
<td>0.015</td>
<td>0.56</td>
<td>1.35</td>
</tr>
<tr>
<td>Food Animal/Equine</td>
<td>1 [-]</td>
<td>-</td>
<td>0.56</td>
<td>1.35</td>
</tr>
<tr>
<td>Population in CD(\text{c})</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referent= (&lt;68000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>68000-102000</td>
<td>2.22 [0.68-7.22]</td>
<td>0.18</td>
<td>0.25</td>
<td>2.83</td>
</tr>
<tr>
<td>102001-222000</td>
<td>0.59 [0.17-1.99]</td>
<td>0.39</td>
<td>0.25</td>
<td>2.83</td>
</tr>
<tr>
<td>(&gt;222000)</td>
<td>0.09 [0.03-0.29]</td>
<td>&lt;0.001</td>
<td>0.25</td>
<td>2.83</td>
</tr>
<tr>
<td>Number of farms in CD(\text{d,e,f,g,h,i})</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referent= (&gt;1280)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(&lt;350)</td>
<td>0.92 [0.19-4.48]</td>
<td>0.92</td>
<td>2.21</td>
<td>2.82</td>
</tr>
<tr>
<td>350-800</td>
<td>0.42 [0.10-1.78]</td>
<td>0.24</td>
<td>2.21</td>
<td>2.82</td>
</tr>
<tr>
<td>801-1280</td>
<td>0.33 [0.07-1.57]</td>
<td>0.16</td>
<td>2.21</td>
<td>2.82</td>
</tr>
<tr>
<td>Population of CCS(\text{c})</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3066-7644</td>
<td>1.23</td>
<td>0.75</td>
<td>1.52</td>
<td>3.18</td>
</tr>
<tr>
<td>Referent= &lt;3066</td>
<td>[0.35-4.32]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7645-17259</td>
<td>1.78</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.55-5.72]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;17259</td>
<td>0.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.12-1.54]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of farms in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCS&lt;sup&gt;d,e,f,g,h,i&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;51</td>
<td>0.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.03-0.39]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referent= &gt;221</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-112</td>
<td>0.58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.20-1.64]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>113-221</td>
<td>0.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.16-1.15]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Footnotes:

a. Univariable logistic regression with CD and CCS modelled as random effects

b. 2017 veterinary licensing data collected by the College of Veterinarians of Ontario. Rural Community Veterinary Practitioner (RCVP) - Defined as a veterinary practitioner who self-identified as a food-animal and companion-animal practitioner, or a food-animal and companion-animal and equine practitioner


d. Statistics Canada. Table 004-0221 - Census of Agriculture, cattle and calves on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

e. Statistics Canada. Table 004-0222 - Census of Agriculture, sheep and lambs on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)
f. Statistics Canada. Table 004-0223 - Census of Agriculture, pigs on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)
g. Statistics Canada. Table 004-0224 - Census of Agriculture, other livestock on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)
h. Statistics Canada. Table 004-0225 - Census of Agriculture, poultry inventory on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)
i. Statistics Canada. Table 004-0228 - Census of Agriculture, commercial poultry hatcheries in the year prior to the census, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

OR = Odds ratio  
CI = confidence interval  
Can University = Canadian university  
CD = Census division  
CCS = Census consolidated subdivision
Table 2.6: The final model\textsuperscript{a} investigating factors associated with being classified as a rural community veterinary practitioner\textsuperscript{b} (yes=1, no=0) in Ontario, Canada

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR [CI]</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduation year</td>
<td>0.01 [0.00-0.37]</td>
<td>0.02</td>
</tr>
<tr>
<td>Graduation year (squared)</td>
<td>1.001 [0.001-1.002]</td>
<td>0.02</td>
</tr>
<tr>
<td>Practice species</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referent = RCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Companion-animal/equine</td>
<td>0.02 [0.02-0.19]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Equine</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Food-animal</td>
<td>0.08 [0.02-0.30]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Food-animal/equine</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Companion-animal</td>
<td>0.02 [0.007-0.03]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Variance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variance CD</td>
<td>0.55 [0.15-2.00]</td>
<td>-</td>
</tr>
<tr>
<td>Variance CCS</td>
<td>1.36 [0.68-2.72]</td>
<td>-</td>
</tr>
</tbody>
</table>

Footnotes:
\textsuperscript{a} Multi-level mixed effects logistic regression with CD and CCS modelled as random effects
\textsuperscript{b} Based on 2017 veterinary clinic licensing data obtained from the College of Veterinarians of Ontario. Rural Community Veterinary Practitioner (RCVP) - Defined as a veterinary practitioner who self-identified as a food-animal and companion-animal practitioner, or a food-animal and/or companion-animal and/or equine practitioner

OR = Odds ratio
CI = Confidence interval
CD = Census vision
CCS = Census consolidated subdivision
RCP = Rural community veterinary practice (RCP)
Table 2.7: Univariable analyses\textsuperscript{a} of factors associated with being classified as rural community veterinary practice (RCP) in the province of Ontario, Canada\textsuperscript{b}

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR</th>
<th>CI</th>
<th>P-value</th>
<th>CD variance</th>
<th>CCS variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practices per CD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referent: &gt;104</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;27</td>
<td>30.49</td>
<td>[6.55-141.81]</td>
<td>&lt;0.001</td>
<td>0.33</td>
<td>1.001</td>
</tr>
<tr>
<td>27-73</td>
<td>4.68</td>
<td>[0.92-23.95]</td>
<td>0.064</td>
<td>0.33</td>
<td>1.001</td>
</tr>
<tr>
<td>74-104</td>
<td>4.04</td>
<td>[0.76-21.60]</td>
<td>0.102</td>
<td>0.33</td>
<td>1.001</td>
</tr>
<tr>
<td>CD population\textsuperscript{c}</td>
<td>68000-102000</td>
<td>[0.79-6.13]</td>
<td>0.13</td>
<td>0.41</td>
<td>1.16</td>
</tr>
<tr>
<td>Referent = &lt;68000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>102001-222000</td>
<td>0.75</td>
<td>[0.27-2.06]</td>
<td>0.58</td>
<td>0.41</td>
<td>1.16</td>
</tr>
<tr>
<td>&gt;222000</td>
<td>0.17</td>
<td>[0.07-0.44]</td>
<td>&lt;0.001</td>
<td>0.41</td>
<td>1.16</td>
</tr>
<tr>
<td>CAR\textsuperscript{d,e,f,g,h,i}</td>
<td>Eastern</td>
<td>3.83</td>
<td>0.04</td>
<td>0.99</td>
<td>1.27</td>
</tr>
<tr>
<td>Referent = Central</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern</td>
<td>4.58</td>
<td>[1.05-20.04]</td>
<td>0.04</td>
<td>0.99</td>
<td>1.27</td>
</tr>
<tr>
<td>Southern</td>
<td>1.04</td>
<td>[0.33-3.24]</td>
<td>0.95</td>
<td>0.99</td>
<td>1.27</td>
</tr>
<tr>
<td>Western</td>
<td>4.04</td>
<td>[1.15-14.15]</td>
<td>0.03</td>
<td>0.99</td>
<td>1.27</td>
</tr>
<tr>
<td>CD Farm population\textsuperscript{d,e,f,g,h,i}</td>
<td>350-800</td>
<td>0.31</td>
<td>0.49</td>
<td>1.20</td>
<td>1.12</td>
</tr>
<tr>
<td>Referent = &lt;350</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>801-1280</td>
<td>0.68</td>
<td>[0.19-2.44]</td>
<td>0.003</td>
<td>1.20</td>
<td>1.12</td>
</tr>
<tr>
<td>&gt;1280</td>
<td>1.54</td>
<td>[0.46-5.18]</td>
<td>0.13</td>
<td>1.20</td>
<td>1.12</td>
</tr>
<tr>
<td>CCS population\textsuperscript{e}</td>
<td>3066-7644</td>
<td>1.20</td>
<td>0.67</td>
<td>1.03</td>
<td>1.22</td>
</tr>
<tr>
<td>Referent = &lt;3066</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7645-17259</td>
<td>1.10</td>
<td>[0.50-2.44]</td>
<td>0.81</td>
<td>1.03</td>
<td>1.22</td>
</tr>
<tr>
<td>&gt;17259</td>
<td>0.36</td>
<td>[0.15-0.86]</td>
<td>0.02</td>
<td>1.03</td>
<td>1.22</td>
</tr>
</tbody>
</table>
### Number of Farms in CCS

<table>
<thead>
<tr>
<th>CCS (d,e,f,g,h,i)</th>
<th>Referent = &lt;51</th>
<th>51-112</th>
<th>113-221</th>
<th>&gt;221</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4.75</td>
<td>7.27</td>
<td>8.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[2.68-8.41]</td>
<td>[4.22-12.55]</td>
<td>[5.24-14.01]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.03</td>
<td>&lt;0.01</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.34</td>
<td>1.34</td>
<td>1.34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.77</td>
<td>0.77</td>
<td>0.77</td>
</tr>
</tbody>
</table>

### Number of Practitioners Per Clinic

|                     | 1.87  | <0.001 | 1.62  | 1.51 |
|                     | [1.51-2.32] |       |       |      |

**Footnotes**

a. Univariable logistic regression

b. Based on 2017 veterinary clinic licensing data obtained from the College of Veterinarians of Ontario. Rural community veterinary practice (RCP) defined as: a veterinary practice accredited as a food-animal/companion animal practice or a food-animal/companion animal/equine practice.


d. Statistics Canada. Table 004-0221 - Census of Agriculture, cattle and calves on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

e. Statistics Canada. Table 004-0222 - Census of Agriculture, sheep and lambs on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

f. Statistics Canada. Table 004-0223 - Census of Agriculture, pigs on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

g. Statistics Canada. Table 004-0224 - Census of Agriculture, other livestock on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

h. Statistics Canada. Table 004-0225 - Census of Agriculture, poultry inventory on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

i. Statistics Canada. Table 004-0228 - Census of Agriculture, commercial poultry hatcheries in the year prior to the census, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

CD= Census division

CAR= Census agriculture region

CCS= Census consolidated subdivision
Table 2.8: The final model\(^a\) of factors associated with being classified as a rural community veterinary practice (RCP)\(^b\) (yes=1, no=0) in Ontario, Canada

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR [CI]</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practitioners per practice</td>
<td>1.80 [1.45-2.23]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Practitioners per practice squared</td>
<td>0.97 [0.95-0.99]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Practice per CD Referent = &gt;104</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;27</td>
<td>7.78 [2.08-29.05]</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>27-73</td>
<td>1.79 [0.46-6.93]</td>
<td>0.40</td>
</tr>
<tr>
<td>74-104</td>
<td>1.18 [0.29-4.81]</td>
<td>0.81</td>
</tr>
<tr>
<td>CCS population(^c) Referent = &lt;3066</td>
<td>1.21 [0.56-2.66]</td>
<td>0.62</td>
</tr>
<tr>
<td>3066-7644</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7645-17259</td>
<td>0.83 [0.41-169]</td>
<td>0.60</td>
</tr>
<tr>
<td>&gt;17259</td>
<td>0.40 [0.19-0.84]</td>
<td>0.02</td>
</tr>
<tr>
<td>Number of farms in CCS (^d,e,f,g,h,i) Referent = &lt;51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-112</td>
<td>2.27 [0.95-5.39]</td>
<td>0.06</td>
</tr>
<tr>
<td>113-221</td>
<td>3.46 [1.53-7.82]</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>&gt;221</td>
<td>6.29 [2.89-13.70]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Variance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD</td>
<td>0.07 [0.00-6.42]</td>
<td>-</td>
</tr>
<tr>
<td>CCS</td>
<td>0.87 [0.42-1.81]</td>
<td>-</td>
</tr>
</tbody>
</table>

Footnotes:
- Multi-level mixed effects logistic regression
- Based on 2017 veterinary clinic licensing data obtained from the College of Veterinarians of Ontario. Rural community veterinary practice (RCP) defined as: a veterinary practice accredited as a food-animal/companion animal practice or a food-animal/companion animal/equine practice.
- Statistics Canada. Table 004-0221 - Census of Agriculture, cattle and calves on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)
e. Statistics Canada. Table 004-0222 - Census of Agriculture, sheep and lambs on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)
f. Statistics Canada. Table 004-0223 - Census of Agriculture, pigs on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)
g. Statistics Canada. Table 004-0224 - Census of Agriculture, other livestock on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)
h. Statistics Canada. Table 004-0225 - Census of Agriculture, poultry inventory on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)
i. Statistics Canada. Table 004-0228 - Census of Agriculture, commercial poultry hatcheries in the year prior to the census, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)

OR= Odds ratio
CI= Confidence interval
CD= Census division
CCS= Census consolidated subdivision
Figure 2.1: Location of rural community veterinary practices and location of census agriculture regions in Ontario, Canada

Footnotes:

a. Based on 2017 veterinary clinic licensing data obtained from the College of Veterinarians of Ontario. Rural community veterinary practice (RCP) defined as: a veterinary practice accredited as a food-animal/companion-animal practice or a food-animal/companion-animal/equine practice.

Legend
- Central Ontario
- Eastern Ontario
- Northern Ontario
- Southern Ontario
- Western Ontario
- Rural Community Veterinary Practice
Figure 2.2: Map of Ontario, Canada representing human population\textsuperscript{a} by census division and location of rural community veterinary practices\textsuperscript{b} divided into census agriculture regions\textsuperscript{c}

Footnotes:

\textsuperscript{a} Statistics Canada, 2016 Census of Population, Statistics Canada Catalogue no. 98-400-X2016003.

\textsuperscript{b} Based on 2017 veterinary clinic licensing data obtained from the College of Veterinarians of Ontario. Rural community veterinary practice (RCP) defined as: a veterinary practice accredited as a food-animal/companion animal practice or a food-animal/companion animal/equine practice.

\textsuperscript{c} Scholars Geoportal 2011-2017 Ontario Council of University Libraries
Legend

- <68000 people
- 68000-102000 people
- 102001-222000 people
- >222000 people
- Rural Community Veterinary Practice
Figure 2.3. Map of Ontario, Canada displaying the number of farms with livestock\textsuperscript{a,b,c,d,e,f,g} aggregated by provincial census division\textsuperscript{b} and location of rural community veterinary practices\textsuperscript{i} displayed by census agriculture region\textsuperscript{i}

Footnotes:

a. Livestock-sheep, cattle, pigs, goats, horses, mink, wild boar, chickens, turkeys, llamas, rabbits, bison, elk, deer.
b. Statistics Canada. Table 004-0221 - Census of Agriculture, cattle and calves on census day, every 5 years (number), CANSIM (database). (accessed: January 30\textsuperscript{th} 2018)
c. Statistics Canada. Table 004-0222 - Census of Agriculture, sheep and lambs on census day, every 5 years (number), CANSIM (database). (accessed: January 30th 2018)
d. Statistics Canada. Table 004-0223 - Census of Agriculture, pigs on census day, every 5 years (number), CANSIM (database). (accessed: January 30\textsuperscript{th} 2018)

e. Statistics Canada. Table 004-0224 - Census of Agriculture, other livestock on census day, every 5 years (number), CANSIM (database). (accessed: January 30\textsuperscript{th} 2018)

f. Statistics Canada. Table 004-0225 - Census of Agriculture, poultry inventory on census day, every 5 years (number), CANSIM (database). (accessed: January 30\textsuperscript{th} 2018)

g. Statistics Canada. Table 004-0228 - Census of Agriculture, commercial poultry hatcheries in the year prior to the census, every 5 years (number), CANSIM (database). (accessed: January 30\textsuperscript{th} 2018)


i. Based on 2017 veterinary clinic licensing data obtained from the College of Veterinarians of Ontario. Rural community veterinary practice (RCP) defined as: a veterinary practice accredited as a food-animal/companion animal practice or a food-animal/companion animal/equine practice.


Legend

- <350 farms
- 350-800 farms
- 801-1280 farms
- >1280 farms
- Rural Community Practice
Chapter 3

A qualitative study investigating the perceptions of students, faculty and veterinarians about rural community veterinary practice and veterinary curriculum in Ontario, Canada

Formatted for submission to the Journal of Veterinary Medical Education

3.1 Abstract

Many advancements have been made in veterinary medicine and there has been shifts in practice and practitioner demographics. This includes the shift to a female dominated work force and a move to larger clinics and more species-focused practitioners within clinics. With shifting demographics, there is a need for curriculum to adapt. The Ontario Veterinary College (OVC) changed their Mixed-Animal stream to Rural Community Practice (RCP) stream to adapt with the evolution of the profession. The objectives of this study were to explore the perceptions of Doctor of Veterinary Medicine (DVM) students, OVC faculty that deliver DVM curriculum, and private veterinary practitioners about the definition of a rural community veterinary practitioner (RCVP) in Ontario Canada and their perception regarding the OVC curriculum specific to the RCP stream. Focus groups with three cohorts: OVC students, faculty, and private practitioners were conducted from April 2016 to April 2017. Thematic Analysis was used to analyse the transcripts to uncover underlying themes in the data. There were 2 student groups, 5 faculty focus groups and 6 practitioner focus groups which included 63 participants in total. The RCVP was defined as a practitioner who lives and works in a remote community and practices on all types of small and large species. The external experiences and primary care rotations were some
of the major strengths associated with the RCP stream and the OVC would benefit from including more hands-on experience and more general practice rotations in their curriculum.
3.2 Introduction

Currently in Ontario, companion-animal practitioners make up the largest group of practicing veterinarians as seen in the results of chapter 2 and this trend has been reported from other Canadian provinces.\(^1\) There is evidence to suggest that the practice of veterinary medicine has evolved from a predominant multi-species practice type to a predominant companion-animal practice type.\(^2\) This change in clinical practice type however, is not the only change that has occurred in veterinary medicine. Historically, veterinary medicine was a male dominated profession\(^2\) but there has been a reported shift to a larger proportion of practicing female veterinarians versus male.\(^3\) Due to the greater number of female veterinarian students enrolled in veterinary school versus male, it is also predicted that the female-to-male ratio of practicing veterinarians will continue to grow which could influence the roll(s) and hence definition of a veterinarian.\(^4\) There is also a general belief within the Ontario veterinary community, that the practice model of “traditional” multi-species practice has changed both in terms of types of animals serviced and veterinarian expertise. The traditional multi-species clinic model typically employed veterinarians that worked as general practitioners servicing multiple animal types, hence the term multi-species practice. However, it is presently thought that a multi-species clinic typically employs many veterinarians each with their own area of focus instead of employing the typical general practitioner. To reflect these beliefs and practice style changes that have anecdotally been reported in the rural veterinary community, the term rural community practice (RCP) has been coined by the profession.\(^5\) Hence, with this shift in the profession’s viewpoints and practice styles, consideration of potential requirement(s) for changes in strategies related to how veterinary professionals are trained for these rural communities needs to be evaluated.
In the Ontario context, what is considered to be rural, or rural practice, is not strictly defined. This coupled with human population growth, urban sprawl, and declining number of farms in the province makes defining the term “rural” a challenge, especially when considering traditional rural veterinary practice. A clinic that once may have been considered a rural practice may now be considered an urban practice if their home town demographics have changed over the years or decades. There are however, definitions used at the human population level for the term rural which is defined by Statistics Canada by population count, population density, and distance (km) from a city center.

There are notable differences between practicing veterinary medicine in a rural community versus an urban community and one of these important differences is the breadth of medical services the practitioner provides to the community. This requirement for broad expertise is often attributed to the large distances required to travel from a rural community to a larger city center making accessibility to specialized medical care challenging. Another difference between urban and rural veterinary practice is that people offering a professional service in rural communities, such as a veterinarian, are typically immersed in the community pushing them to develop relationships outside of the workplace. Some individuals find this lack of anonymity a deterrent to working in a rural community while others embrace it. Longer work hours in western Canada have been expected of rural, multi-species veterinary practitioners versus companion-animal practitioners. In addition to rural lifestyle and long work hours, rigorous on-call requirements, and less competitive salaries are major reasons veterinarian leave rural communities and rural community practice. Hence, it is not surprising that rural areas have a difficult time retaining practicing veterinarians in their communities. Due to these changes in the delivery styles of veterinary medicine, especially with respect to rural community
practice, it is imperative that veterinary schools re-evaluate curriculum needs specific to their region i.e. province, and specific to the needs of rural community veterinary practice.

There are 5 veterinary schools across Canada including the Ontario Veterinary College (OVC) in Ontario, Western College of Veterinary Medicine (Saskatchewan, SK), University of Calgary Faculty of Veterinary Medicine (Calgary, AB), Faculté de médecine vétérinaire Université de Montréal (Montreal, QC) and the Atlantic Veterinary College (Charlottetown, PEI). To qualify to apply to one of these schools as a Canadian (domestic) student, the student must have regional residency status in the region the school is located.\textsuperscript{17} Hence, graduating students are more likely to stay in the same regional area where they obtained their veterinary degree as this is usually their home province.\textsuperscript{4} This highlights the importance of the continued understanding of curriculum requirements for different veterinary practice types when training veterinarians, as well as understanding unique provincial demographics and provincial veterinary service needs. Hence, for Ontario and the OVC, it is important to consider the current provincial landscape with respect to: what is a rural community, what does rural community veterinary practice look like today, and how should veterinary curriculum reflect these considerations when training veterinarians for entry into rural community veterinary practice.

The OVC has a four-year doctor of veterinary medicine (DVM) program. In the first three years (Phase-1 through Phase-3) of the DVM program, all students complete the same curriculum with minor exceptions in phase 3, but in their final year (Phase-4), students choose a stream (career emphasis) based on their own career interests. The stream choice dictates the Phase-4 clinical rotation requirements for the student and the rotations are stream specific. The stream choices include: small animal (SA), food animal (FA), equine (EQ), and the rural community practice (RCP) stream. There is college interest in the RCP stream because it
recently underwent stream restructuring which included changes to core and elective clinical rotation structure and requirements. Additionally, the RCP stream was previously referred to as the mixed-animal practice stream and the name change to the RCP stream was informed by previous feedback received from OVC students\textsuperscript{18} as well as an effort to make the stream more relatable to the currently perceived rural community veterinary professional environment. The stream name used to be defined by the species serviced, i.e. mixed-animal, but anecdotally some people in the profession felt that the name may not fully encompass the current landscape of what it is like to practice veterinary medicine in a rural area hence the name change to RCP.

Face-to-face focus group derived feedback was used in this study because the opinions of Ontario veterinary practitioners, as well as those involved directly with the Ontario veterinary curriculum (students and faculty), were desired, and to allow for broad and deep rich data to be obtained and explored. Focus-group derived data are also useful when addressing a topic that lacks significant prior research in order to inform change and because focus group data are useful for hypothesis generation.\textsuperscript{19} Student feedback has been used in multiple different forms, in many schools, including the OVC.\textsuperscript{20,21,22} Tinga et al (2001) investigated student survey responses about their technical and professional skills they have received at OVC.\textsuperscript{20} Focus groups to obtain student perceptions on course redesign and development have also been utilized at the OVC.\textsuperscript{21} When further exploring the published literature on curriculum development, there are examples of student feedback being used to inform medical curriculum.\textsuperscript{22} The DVM students at the OVC have been exposed to regular opportunities to provide feedback related to the OVC curriculum and so the concept of providing feedback was not novel within the OVC community. However, there is very little literature that considers the combined perceptions of students, faculty, and private practitioners to inform veterinary curriculum. The objectives of this study were to
explore the opinions and perceptions of the OVC Phase-4 DVM students, OVC faculty, and Ontario private veterinary practitioners regarding the definition of an Ontario rural community practice (RCP), a rural community veterinary practitioner (RCVP) in Ontario, and regarding the OVC curriculum specific to the RCP stream.

3.3 Materials and methods

This study was reviewed and approved by the University of Guelph Research Ethics Board (REB #16JN034).

3.3.1 Focus group cohort recruitment

It was considered important to recruit a sample of students and faculty who have personally and recently been exposed to, or experienced, the curriculum at the OVC to share their opinions. Deemed additionally important were the opinions of Ontario practitioners who have worked recently with OVC students and who have a current clinical understanding (i.e. are currently in practice) of the demands, skill requirements, and climate of veterinary practice. Hence, in order to obtain as broad of a perspective as possible, three separate cohorts of participants were recruited: Phase-4 DVM students (ST) enrolled in the RCP or FA streams, OVC faculty (FT) who deliver lectures or clinical rotations in the DVM curriculum, and private practitioners (PA) who hosted DVM students during their external rotation/clinical experiences in the past 1-2 years.

All cohort participants were recruited by e-mail which included a document of the study outline as well as date options to select and indicate availability to voluntarily participate in their respective focus group session. A list of all the Phase-4 students enrolled in the RCP and FA streams was compiled and ST participants were personally e-mailed by a member of the research
team. Dates for the ST focus groups were chosen by the researchers and set to correspond with the end of final exams (April 2016, 2017) and occurred on campus. The ST participants were offered beverages and snacks for their participation. Administrative assistants for each department in OVC were provided with a scripted e-mail invitation to distribute to their faculty via e-mail. The dates for the FT focus groups were set for the fall (4 sessions between September-December 2016) and winter (1 session in January 2017) semester and also occurred on campus. All FT participants were offered beverages, snacks, and a gift card for their participation. A list of all the veterinary clinics and practitioners who hosted a Phase-3 student for the Externship course, which is a core academic requirement that occurs during the summer between the Phase-3 and Phase-4 academic years, was compiled. All clinics were contacted, by e-mail, and any veterinarian who mentored an OVC, DVM Externship student at that clinic (within the past 1-2 years) was invited to participate. Based on participant indicated availability and geographical location, the focus group dates and venues were determined for the PA focus groups (Nov 2016-April 2017). Follow up email invitations were sent to non-respondents in the PA cohort once the focus group dates were sent. All PA participants were offered beverages, snacks, and monetary compensation for their participation.

3.3.2 Data collection

The focus groups were conducted between April 2016 and April 2017. There were two ST focus groups with the first one occurring in April 2016 and consisted of 2016 graduating DVM students and the second focus group occurred in April 2017 and consisted of 2017 graduating DVM students. There were 5 FT focus groups and 6 PA focus groups in total. Each focus group lasted 1.5-2.0 hours. The PA groups were held in various locations across Ontario to
enable participation and to attempt to capture the opinions of practitioners from different geographical regions. These locations included: Kemptville, Mount Forest, Guelph (2) and Woodstock (2). Southern and western Ontario has been shown to have the most Rural Community Veterinary Practitioners (RCVPs) in 2016 as seen in chapter 2, which corresponds to the locations selected for the PT focus groups. Northern Ontario was not represented by the focus group participants because there were not sufficient host practitioners located in this region combined with a low response rate from that region. Another reason those locations were chosen was because the population of externship host private practitioners are heavily clustered near the southern and western areas of Ontario and hence are popular Externship clinic choices due to the convenience for students living near the OVC (Guelph, Ont).

At least two members of the research team attended each focus group with one acting as the primary moderator and the other member(s) acting in a supportive capacity. A semi-structured focus group guide containing the questions was developed by the research team (Appendix III). The research objectives, as well as information obtained from previous OVC student focus groups, were used to inform question development. The focus group guide contained questions that were similar for all cohorts with a few subtle differences, for example, all questions were written appropriately for each cohort. The focus group guide was circulated to all participants a week before the focus group but after participants volunteered to participate.

The participants were asked about their perceptions surrounding what constitutes an RCP and RCVP, and what constitutes as a food-animal practice and FA practitioner (Appendix III focus group guide 1-3, question section 1). They were asked to describe entry-level competencies they felt were important for a FA practitioner or RCVP to have and whether or not they believe OVC curriculum fulfilled these descriptions (Appendix III focus group guide 1-3,
They were also asked questions about their opinions of the RCP stream which included queries related to curriculum strengths, weaknesses and improvements needed (Appendix III focus group guide 1-3, question section 3).

Supplementary notes were taken on paper and white boards by the secondary moderator(s) during each focus group. All sessions were digitally audio-recorded and subsequently transcribed verbatim by a professional transcriptionist and validated by the researchers for accuracy.

3.3.3 Data analysis

To address the project objectives, data derived from questions in sections 1 and 3 (Appendix III, focus group guide 1-3) were used for analysis which were the sections that focused on informing the definition of an RCVP and RCP, and on improvement of OVC curriculum specific to RCP.

Thematic analysis was conducted on the transcripts of each focus group session using NVivo 11 (QSR International 2017). Each cohort was initially analyzed separately. An inductive approach was used to explore the results that emerged from the data. Open coding was performed line-by-line for each of the transcripts with the research objectives and focus group guide in mind. All open codes were then placed into themes. The identified themes were then subdivided into different subgroups of the primary themes. Subsequently, the themes and subgroups were compared between the various cohorts to identify similarities and differences within the data. The themes were also compared within each cohort other to identify relationships between focus group sessions (by cohort) and to determine if data saturation was achieved at the cohort level.
3.4 Results

In total, there were 63 participants across the three cohorts. Table 3.1 depicts the number of people in the sampling frame and sample sizes for each cohort group. There were a total of 5 FT, 2 ST, and 6 PA focus groups conducted with 4 to 9 participants per focus group. Participants in the FT cohort represented the four departments of the OVC: Population Medicine (n=8), Pathobiology (n=5), Clinical Studies (n=4), Biomedical Sciences (n=3), and one OVC staff veterinarian. Most of the FT participants were acquainted with the other members in their focus group which made for comfortable and open group dynamics and participants seemed very willing to share their opinions and experiences.

Analysis of the ST, FT, and PA data identified 4 common themes focused on the topic of the definition of an RCVP and included: remote area, community, multi-species general practitioner, and veterinary practice. Four themes centered around the topic of OVC curriculum were identified and included: reasons for choosing stream, strengths, weaknesses, and areas for improvements. There was an abundance of similar perceptions interpreted from the data for each of the themes under each of the two topics which was the rationale for listing the results of data analysis as themes. Subthemes were discussed under each theme and differences in the perceptions of each cohort was noted.

3.4.1 Definition of a rural community veterinary practitioner (RVCP) and rural community practice (RCP)

Table 3.2 shows the comparison of the themes related to the definition of an RCVP from the ST, FT and PA cohorts.
Remote

One major theme identified encompassing the perceptions of a definition of an RCVP was an emphasis on practicing in a remote area.

FT participant: “when you say rural community, I see it outside the big centres.”

ST participant: “I think it’s like you’re kind of in a small town. You might be an hour or two hours plus away from a larger city.”

When discussing the remote aspect of the RCVP, all focus group cohorts acknowledged that the practitioner may be the only practitioner in the area who can service the community; which necessitates that an RCVP be able to handle any animal species in the area. Specifically, the FT participants proposed that this could result in an RCVP being required to be open to offering more services since they are likely the only local option for current or prospective clients. The FT participants connected community isolation to how close to other amenities that an RCVP would like. The FT participants thought that this notion of social isolation could be difficult to those that were not used to it i.e. there is not an abundance of activities to do in their free time without driving a large distance.

One FT group composed of small animal practitioners believed that there could be a negative connotation associated with using the term rural because it means they may be a more disadvantaged clinic. They also felt that adding or changing the name to include “rural” would not be helpful to draw new graduates to mixed-animal practice.
PA participant “I was a country kid, it was termed rural kids, it was negative connotation”.

The PA and ST participants made a link between remote areas and the potential for residents with less economic resources to live there and hence be the likely source of clients. This led them to believe that an RCVP needs to be able to diagnose and treat medical and surgical conditions with limited monetary resources available to them.

Community

The PA, FT, and ST participants consistently brought up the viewpoint concerning community considerations for the RCVP. The majority of this theme centered around an RCVP being considered as a part of the community outside of work and business time, and included aspects such as taking on leadership roles within the community. Participants from all cohorts mentioned that they perceived that the requirement to be a part of a tightly-knit community outside of work is potentially a problem for veterinarians who are not accustomed to, nor prefer, that type of lifestyle. The ST and PA participants both shared the opinion that an RCVP would likely be viewed as a community leader and looked-up to by other community members. There was agreement among all focus group cohort participants that this leadership responsibility likely results in a perceived increased obligation by RCVPs and that some may not wish to take on that kind of community role.

PA participant: “You have a really good relationship with the community as well, I would like to think, in a rural community setting, so yeah, they respect you.”
PA participants expressed that in small towns, the veterinarian is considered one of the more highly educated members of the community. Multiple PA participants then went on to postulate that it could be difficult for new veterinarians to integrate into a community that is not familiar with them or their family. And, that if they do not embrace an active role in the community it can be even more difficult to be accepted.

PA participant: “For some rural communities who are more remote, where there’s not a lot of people from away who come into the community, takes a generation to break into the community and earn the respect of others. You could live and practice there for your entire lifespan and still be seen as that boy that came from so and so, right? So it’s a really important thing to prepare yourself for, if that’s important to you.”

Interestingly, one FT group, composed of primarily small-animal veterinarians, discussed and agreed unanimously, that the community aspect should not be included in the definition of an RCVP because veterinary practice is not defined that way by other types of veterinarians and they all have to be a part of their respective communities. This one FT group also talked about the different cultural views regarding animals and pets in remote communities such as a farm dog potentially having different perceived worth compared to a house pet. This one group of FT participants thought that the different views on pets could be related to economy in a remote area and interpreted that to mean that rural clients do not have as much disposable income for the high-priced services associated with veterinary care.
Multi-species, general practitioners

All cohort participants were of the opinion that an RCVP was defined as a multi-species, general practitioner and was considered to be the “traditional veterinarian”. Additionally, an RCVP was perceived by all of the participants as being a practitioner who practices on any species. Many participants elaborated on the concept of any animal species to include companion-animals, food-producing animals, horses, pocket pets, exotics, etc.

FT participant: “...it’s not just like the common domestic species that they deal with, it’s whatever comes. I’ve got this lion that I’m working with, and then there’s this pig, and here’s a raccoon.”

ST participants: “If there’s a bird in town they’re more likely to bring it to you. Very mixed practice.”

PA participant: “It’s sort of the jack of all trades. up to the challenge of treating everything.”

Most participants across the cohorts understood that the species serviced would be directly related to the animals in the service area of the clinic. This could include servicing a species they are unfamiliar with or having to stop servicing a species because it has been phased out of that geographical area.
The concept that the RCVP was a general practitioner was also discussed in the context that an RCVP would mainly perform basic medical and surgical tasks but not perform specialty medicine. Contrary to that, the all the participants also presumed the RCVP would try anything that a client or patient needed. They may try to execute a specialty procedure because of the distance to a referral center.

PA participant: “I have a farmer friend. He practised in northern Ontario, and his closest referral was three hours down in Sudbury. Guelph was like seven and a half hours. So he learned to say we got to buck up and do this.”

ST participant: “They don’t have the resources to necessarily refer things all the time, so if you like - you’re kind of really relying on yourself and on your team that’s at your practice, in a way, that’s just kind of how I interpret it.”

Rural community practice (RCP)

All the participants in all stakeholder groups were in agreement that an RCP must have certain features. An RCP is a practice that is required to provide service for any animal type in the practice area and must provide care for both small and large animals. Additionally, it was discussed among all cohort participants that an RCP employs veterinarians capable of providing after-hours services for both small and large animals. The participants went on to talk about two practice models of how an RCP may accomplish this type of service. One FT focus group pointed out that these practices have similar equipment to a small animal practice and requirements to be licensed by the CVO. A contradictory and interesting additional comment of
note is that the ST participants agreed across the groups that RCPs are less likely to have specialty equipment i.e. advanced diagnostic imaging equipment than big city clinics and were less likely to be a referral center.

Although there were specific aspects that were required by RCPs to have for accreditation there was also discussion that there are two different types of RCP models. The first type of RCP practice model discussed was a practice that conforms to the traditional mixed-animal practice. This practice was thought by all participants to employ veterinarians that each can independently service all animal species. The participants in a few of the focus groups across all cohorts hypothesized that this is more likely to be seen in small clinics (few veterinarians) who have a low number of veterinarians to distribute the work load i.e. small clinics in remote areas.

The other type of RCP model type commented on by the participants was one that had several veterinarians who practice in one RCP but each veterinarian serviced only one species or commodity type. This RCP practice model type of multiple veterinarians working within one RCP each with their own area of focus, was thought to have one (or two) person who was able to focus on their preferred species or commodity type.

FA participant: “I think there's lots of rural community practices as defined and with food animal practitioners and small animal practitioners and equine practitioner, I think there's very few rural community practitioners who do multiple species.”

ST participant: “You’re less likely to be a GP as you get into those practices, but
it also seems to becoming more what clients want, because they want to know that their equine vet only does equine for whatever reason.”

One PA group discussed that this veterinarian-centric practice type could be for convenience. For example, the participants discussed that the small and large animal components within an RCP are in fact operated as separate clinics, or business entities, but share a building, support staff and other necessities for convenience and economic reasons.

PA participant: “We’re really two separate business.... Like if all of the small animal vets quit tomorrow... we’d just close that door.”

3.4.2 Curriculum
A summary of the comparison of perceptions identified between the cohorts on the sub-themes related to curriculum is displayed in Table 3.3.

Choosing stream
The FT and PA participants considered stream content as the primary rationale for why a student chose a particular stream. They postulated that students choose their stream predominately based on what the student perceives as what they want, or need, at the present moment as opposed to thinking about the future. The FT and PA participants also viewed the RCP stream in general as a stream option for students who were undecided about their future career goals i.e. the predominate species, or geographical area where they wished to practice. They also suspected that students who wanted to keep all their options open for the future would be more likely to pick the RCP stream.
FT participant: “They really want to start with mixed because if they change their minds they want to feel like they at least had a chance to consolidate what they learned in vet school and feel more comfortable with various species so they could change directions later if they needed to.”

FT participant: “They don’t really know but they don’t want to really put all their eggs in one basket quite yet, so they just kind of go right down the middle.”

PA participant: “I always feared that the RCP stream becomes the place for people who don’t know what they want to do.”

Many participants in the FT and PA cohorts also discussed if offering a stream-based curriculum was in the best interest of the students and for training new graduates in general. However, to have a stream-based curriculum versus a non-stream-based curriculum was not agreed upon by the participants within these two cohorts. FT and PA participants expressing support of a non-stream curriculum model believed that all students should have the same education because they all graduate with the same DVM degree. They also recognized that unpredicted changes in a veterinarian’s future lifestyle or practice interests could result in a change of practice focus and hence result in a change of practice type or species serviced. These participants felt that the potential for change in practice type supports using a non-stream model in DVM curriculum so that veterinarians receive a well-rounded education. Yet, some FT and PA participants believed that if a student was truly only interested in one species that it would be
unreasonable to require them to engage in other species i.e. if the student truly knew they would only practice on a specific species or commodity group why force them to take rotations not of interest. Some FT participants considered the non-stream model as a potential disservice to clients because new veterinarians would not have the high level of skills required for entry-level practice. Whereas some PA participants expressed concern that OVC students were choosing a stream before they experienced all species and practice options.

PA participant: “They never touched anything until they made their decision, and by then there’s a whole bunch of them that could be mixed practice or a rural practice. They’re not going to do that because they’ve chosen the last year because they have never touched an animal, so to speak.”

PA participant: “They got out and they got a real taste of what practice was. We spent three years doing it and you’re like oh, this is what you guys actually do? ...But by that point, you’ve already made up your mind, you’ve already chosen your stream, and you’re out.”

The ST data were derived from Phase-4 students who had recently made their stream choice i.e. the year before while in Phase-3. The ST participants also discussed that stream content (e.g. rotations offering as well as core and elective requirements) as one of the major reasons for choosing a stream. The low number of elective week options was considered a drawback of the RCP stream. The students agreed that the RCP stream is usually a stream choice for students who could not decide on a species or career path. However, they also discussed that
for some participants, this was because they wanted to keep their options open as they could see themselves ending up in any type of practice and didn't want to limit their options. ST participants added that the information sessions held as lunchtime talks during Phase-3 were integral to informing their stream selection as was obtaining personal mentorship from a faculty member.

ST participant: “It was also more of a practical point for me is when last year we had a lunch talk about trying to decide between these two streams and they were talking about like you can’t really go small and then backfill with large.”

Strengths

All participants, across all cohorts, considered the rotations that contained a focus on primary veterinary care to be important for training the entry-level veterinarian. Ruminant health management, theriogenology, anesthesia, pathology, the primary healthcare (PHC) rotation and external experiences were rotations the participants specifically described as strengths of the RCP stream and OVC curriculum in general. The participants all agreed that the experiences students obtain while on external rotations and their externships were a marked strength of the curriculum at the OVC. This was felt to be because the students are exposed to day-to-day veterinary skills and business skills related to operating a veterinary practice.

ST Participant: “I think Primary Health Care rotation has a great, great rotation... because you’re actually getting to practice running appointments and doing things for independently and running as a practice.”
The participants discussed and shared the understanding that having core and elective rotations held at the OVC (i.e. internal rotations) was a benefit to student training because they get exposed to specialty medicine they may not see in a general practice. Additionally, it was felt to be an asset as students obtain a strong foundation of skills and knowledge while taking the rotations held at the OVC versus external rotations because they are learning from faculty who are trained to teach and have extra training in those specific skills.

Participants in one FT group discussed the RCP swine health management (SHM) rotation as a specific strength of the RCP stream. Specifically discussed was that the focus of the rotation was tailored to train a veterinarian entering an RCP situation i.e. the food-animal SHM rotation is 2 weeks and the RCP-SHM rotation is 1 week with the curriculum in each stream slightly more focused to a specific practice type. The FT participants, in this particular group, discussed that they believed that this curriculum structure unique to the RCP-SHM rotation teaches the skills RCVPs would need to service small swine herds in small remote communities. The FT participants of this group agreed this could be a rotation model consideration to improve many other RCP stream rotations.

One other of the FT groups discussed the changes that were made when the stream was restructured. They considered the changes and believed that overall the stream had increased flexibility and had more strengths.

The students in both the 2016 and 2017 graduating cohorts discussed that they were satisfied with their stream experience overall which was interpreted as a strength. They discussed and were of the opinion that they were provided with opportunities to establish a solid
base of knowledge in their final year from which to build upon when they go out and start to practice.

ST participant: “I think I have the basics, I think I have enough to go on. Like I think it’s going to be hard and I’m going to struggle for sure, but I think we all have the basics and the knowledge that I think we’ll be just fine, all of us.”

ST participants: “Yeah, I feel like we do all have a solid base knowledge and know where to look for more.”

Weaknesses

A very noticeable weakness identified by all the participants, across all cohorts, was a shortage of opportunities for hands-on experience for the students. The majority of participants discussed the importance for the need to practice clinical hands-on skills to facilitate overall competency and confidence of entry-level veterinarians.

PA participant: “It’s been mentioned a couple times about if you’re at OVC, it’s not necessarily the best place to get practical experience in a number of different species.”

PA participant: “Yeah. I feel badly, but when learning surgery, they can’t even work on a live animal anymore. Like working on a cadaver is pretty different than working on something that bleeds.”
FT participant: “They definitely get some hands on you know, in some of those rotations, but, but I agree that probably not enough.”

All the participants mentioned that while there are primary healthcare rotation options, that the OVC did not offer enough primary care rotations and focused too heavily on referral medicine. Most of the participants believed that the specialty medicine rotations, i.e. large and small animal medicine, were over-represented in the curriculum and did not provide focus on the important skills needed to be a successful entry-level RCVP. However, one argument presented by participants across all cohorts for leaving these types of specialty rotations in the curriculum was that they provide exposure to another type of medicine (specialty) which is important in veterinary education overall.

Another weakness that was discussed by both the FT and ST participants, was the lack of certain rotation options that were felt to be beneficial to train the entry-level RCVP. These included rotations on behavior, dermatology, outreach medicine, equine primary care and emergency critical care. All these rotations were thought to be critical options to teach the skills required of an RCVP. Additionally, the limited flexibility of rotation options within the RCP stream in comparison to the other streams was thought to be a weakness by the FT participants. The FT participants identified the large breadth of knowledge the RCVP requires and not including that in the curriculum is a disadvantage to the stream. They proposed that it would be beneficial that the RCP stream have the most flexible schedule of all the streams to enable students with the time and options to seek opportunities for exposure to as many species as possible.
The PA participants discussed the fact that there is limited live-animal surgery in the curriculum at the OVC, which they also felt was a large disservice to the students and society. These beliefs were interpreted to be stemmed from the PT participants knowledge of how many routine surgeries entry-level veterinarians will need to preform once they enter practice. Additionally, business economics was a topic that the PT participants felt was not emphasized in the curriculum enough. Additionally, as host practitioners, many felt that the expectations that the OVC has of externship clinics were not explicit and some of the participants were not sure of legalities of having students working under their supervision. Timing of external experiences were also a large weakness discussed with the practitioners. All the participants discussed that the timing was too short to have a host practitioner fully trust students and the students didn’t get the true feel of the remote community they were involved in.

The variation in reported student experiences, while at an external rotation or Externship host practice, was brought up as a curriculum weakness of the RCP stream by the ST participants. The ST participants felt the external or Externship host clinics were highly variable in their teaching and medicine styles which introduced too much variation in student experiences. A suggestion that emerged from the discussion was that perhaps more direction, regarding curriculum and mentoring expectations, from the OVC to host practices would be of benefit in standardising external rotation experiences. The length of external rotations was also a topic that emerged within this theme. The ST participants discussed that while some rotations could be shortened that most external rotations and externships should be longer to enable relationship building between the student and host practitioner(s). Most ST participants expressed that by the time a host practitioner was comfortable with a student, that the rotation
was over. They postulated that the experience may potentially be enhanced if the student was at the clinic for more time consecutively.

**ST participant:** “*If you’re only there for a week, their level of investment in you and your level of investment in them is not the same as if you’re going to spend at least two weeks there.*”

**Improvements**

All the participants across cohorts focused on the importance of external and elective rotation options. For the RCP stream specifically, participants expressed the belief that as a referral hospital, OVC could not provide enough opportunities for students to practice skills required of entry-level veterinarians. The participants proposed a greater proportion of the rotations should be electives to provide students the chance to participate in more external experiences. Another improvement suggested was a longer Externship. Specifically, this was hypothesized by many participants, to help the students understand life and practice in a remote community as well as enable relationship building to gain trust and hence attain skills while being mentored by the practice. Participants understood there are some skills that are entry-level requirements i.e. being able to spay and neuter cats and dogs. The participants wanted OVC to provide more opportunities to practice these skills i.e. having OVC directed spay-neuter clinics to enable more student-centric live surgical experiences. The quality of the Externship was a discussion with all cohorts. To ensure the quality of these external experiences the FT and PT discussed having the students complete a log of their activities as a way to improve learning outcome expectations. The FT and PT participants suggested that this could be used to verify
whether the students were gaining the experiences needed. Having a list of Externship host clinic expectations and learning outcome requirements would help ensure the quality of the external experience students would have and in turn improve entry-level competence and confidence.

The PT and FT felt the students were lacking general animal handling experience as well as industry knowledge. In an effort to suggest ways to improve this, most of the participants explored the idea of a requirement for students to work within various industry sectors (i.e. work on a farm) during their summers between years while enrolled in veterinary school.

The PA participants had many improvement suggestions based on their experiences being a host Externship clinic. They discussed being able to have students choose an Externship that is not an RCP (i.e. companion-animal only). This was interpreted to suggest that the students would potentially enjoy their time more and they could combine large and companion animal clinic experiences that will give the students a tailored experience but are not RCP specific. The objection to this by many participants from all cohorts was this externship model would result in a large proportion of students entering practice without any or significant exposure to large animals.

In their discussion, the SA participants expressed the desire for equine primary care, dentistry, and dermatology to be core requirements in the curriculum as well as more spays, neuter, and palpation experiences. These experiences were all interpreted as being considered important for the development of a competent entry-level RCVP by the ST participants. The removal of species specific (i.e. swine) or specialty type rotations (i.e. small animal medicine) was expressed by ST participants to be a reasonable solution to open up room in the timetable for electives and more primary care rotations.
3.5 Discussion

This study collected and interpreted focus-group derived data to characterize and define an RCVP and an RCP in Ontario, based on the perceptions of three major cohorts with an invested interest in veterinary medicine: veterinary students, university faculty, and private practitioners. The data also revealed unique and shared perspectives which identified strengths, weaknesses and opportunities for improvement of the OVC DVM curriculum. Among the participants, there was a large proportion of male veterinarians (faculty and private practitioners) compared to female veterinarians but this ratio was the opposite in the ST cohorts. The trend of more female to male veterinarians mirrors what is currently reported in the Ontario population of veterinarians.\(^1\) Having the focus group participant demographics (sample population) mirror the target population (Ontario veterinarians) adds strength to the external validity of the data allowing for valid inferences to be made to the target population.

The thematic analysis suggests that pinpointing a specific definition for what constitutes an RCVP and RCP is extremely difficult because the perceptions around the topic were found to be very context specific. Although the data revealed a general definition should include practice species, location, and a personal aspect of community, it wasn’t clear if any one of those aspects of the definition was considered more important than another when defining an RCVP. For example, if a veterinary practitioner practiced in a remote area but only serviced companion-animals, thus satisfying only one aspect of the characterization, it was not clear whether or not that practitioner would be classified as an RCVP or a companion-animal practitioner. The variability in the perceptions identified has highlighted how challenging it is to tailor veterinary curriculum specific to the training of entry-level RCVPs because of how diverse the roles and responsibilities of an RCVP are interpreted.
The RCP stream at the OVC underwent stream restructure and a name change from mixed-animal practice stream to the RCP stream 2014. The current study identified that students, faculty and private practitioners perceive that an RCVP would practice in a remote setting, service multiple species and support the stream name change to more fully encompass the definition of an RCP. Previous literature has reported similar support for adopting this definition and also reported that most practitioners who service multiple species work in a remote setting.\textsuperscript{12}

This study found that an RCVP is located in a remote community. Being in a remote area was considered difficult in the present study for some new veterinarians to cope with due to the social isolation and potential struggle for family members (e.g. spouse finding a career). This challenge is one of the cited reasons in the literature supporting why remote communities have trouble keeping veterinary practitioners and other health professionals.\textsuperscript{13,15,16}

In the literature, veterinary practitioners have often been named and grouped together by the species group they service, for example, Jelinski et al (2009) described veterinarians in western Canada by the species-specific groups (food-animal, equine, companion-animal) they serviced.\textsuperscript{23} Similarly, chapter 2 described the demographics of Ontario veterinarians reporting that most RCVPs service 3-6 different species and that all domestic species of animals are serviced by RCVPs in Ontario. These examples resemble how OVC historically defined stream options. The multispecies theme that emerged from the data in the present study supports the concept that servicing multiple animal species continues to be an important aspect of practicing as an RCVP. This theme also supports curriculum evaluation and potential reform because it highlights that training entry-level veterinarians with the appropriate skills to practice on many species is important to their success as a veterinary practitioner.
There were two types of practices discussed in the data: one practice-type employing RCVPs and one practice-type with species-focused veterinarians. The analysis suggested that although there will always be veterinary practices with RCVPs, veterinary practices are trending to larger practices with more species-focused veterinarians at a clinic or location which is opposite to results in chapter 2. A 2009 study, from western Canada reported the average people per clinic is 2.2 practitioners.¹ Then in 2015 there was an average of 2.4 veterinarians in a practice.³ In the 6-year span there was only a small increase of veterinarians (0.2) in a clinic which does not support what was extracted from the focus group data of the present study. When looking at various geographical locations there is a variable number of practitioners per clinic. For example, in the US it has been cited in the literature that there were 2.8 practitioners per clinic²⁴ but in chapter 2, it was reported that there were 4.7 practitioners on average in a single veterinary clinic. There needs to be further research to explore the trends in clinic size and factors that have affected the number of veterinarians practicing at a clinic to accurately understand this potential trend.

The analysis of all of the participant data with all cohorts combined was interpreted to conclude that it would be an improvement for student learning if the curriculum allowed for an increase in the number of external practice experiences coupled with increased OVC-derived guidance for host practices. The support of increased external opportunities has been reported elsewhere in the literature for veterinary schools, and other professions such as lawyers, as crucial for professional development and acquisition of pertinent skills.²⁵,²⁶

The themes that emerged around the concept of what defines an RCVP were: remote, community and general mixed-animal practitioner. Strengths, weaknesses and opportunities for curriculum improvements and reasons for choosing the stream were all sub-themes identified
with respect to the OVC curriculum. These themes were considered deeply connected to each other and hence were difficult to tease apart. The connectivity of these emergent themes is illustrated in Figure 3.1. Remote areas tend to have more social cohesion between community members. Due to the remoteness of such communities the veterinary professional may be the only practitioner in the area and hence, they would need to service any of the species in that area. This remote theme has a direct link to the mixed species practitioner theme which supports that the RCVP is a practitioner that resides or practices in a remote area and needs skills to service both large and small species. General practitioners perform basic routine procedures which has the potential to bring clients to the clinic more often, enabling a deeper connection between the RCVP and community members to develop.

Another connection within the themes were the reasons students identified as factors when choosing the RCP stream, which was strongly related to wanting to be a general practitioner in a remote area. The curriculum improvements that emerged from the data were strongly related to the identified strengths and weaknesses of the RCP stream i.e. the strength of the PHC rotation prompted the participants to suggest more primary care rotations be added to the curriculum. The aspect of practicing and residing in a remote geographical area was identified as a challenge RCVPs faced. The inclusion of curriculum opportunities where students can seek experiences in remote settings will enable students to truly understand this aspect of their potential career path and help them amalgamate into the community upon arrival. The uniqueness and yet the strong connections between the identified themes help to illustrate how the improved understanding of what constitutes an RCVP can help improve and inform veterinary curriculum in general.
Although they have a different frame of reference and experiences that help mold their feedback, there were very few disagreements between the cohort groups. The biggest disagreement identified in the data was related to reasons why the students choose the RCP stream. The PT and FT groups expressed a negative opinion regarding the students' choice rationale because they felt students were basing their decision on their current wants and not thinking about their future needs. However, the analysis of the student data revealed that the students thought they were choosing their stream based on opportunities they may want in the future. This difference in opinion is likely due to the various life experiences within each cohort as well as the age differential between the cohorts. This highlights a continued need for integration of multiple stakeholder opinions when informing professional degree programs.

Due to the nature of focus groups, the participants tended to represent practice regions that were in proximity to the location of the focus groups. This introduced a limitation to this study as it was difficult to solicit participation and hence feedback from veterinarians in northern Ontario. Practitioners from northern Ontario likely have a different perspective compared to practitioners from southern Ontario. Hence, the lack of participation from veterinarians in northern Ontario may have introduced a selection bias into the data and influenced the subsequent interpretation of emergent themes. Qualitative research provides the opportunity to explore a broad and rich source of data regarding the perceptions of the participants. However, the interpretation of the data is limited in its ability to extrapolate beyond Ontario, meaning it is difficult to generalize these results to other provinces or species specializations. Future research should focus on the acquisition of opinions and perceptions from practitioners in northern Ontario to gain a more complete understanding of the provincial picture of what constitutes an RCVP and RCP.
In conclusion, DVM students, faculty and private practitioners perceive RCVPs as those who practice in a remote area, are involved in the community, and are a general practitioner working with multiple species. There are two different types of rural community practice-types which contain RCVPs or species-focused veterinarians. The participant identified strengths, weaknesses and suggested potential improvements that could help improve the OVC curriculum and hence help improve the competency and confidence of entry-level RCVPs.
3.6 References


Table 3.1: Sampling frame, number of focus groups, total number of participants, number of men and woman participants for each cohort group

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Sampling frame</th>
<th>Number of Groups</th>
<th>Total number of participants</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students (ST)</td>
<td>29</td>
<td>2</td>
<td>13</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Faculty (FT)</td>
<td>100</td>
<td>5</td>
<td>21</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Population Medicine</td>
<td>35</td>
<td></td>
<td>8</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Clinical Science</td>
<td>25</td>
<td></td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Pathobiology</td>
<td>20</td>
<td></td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Biomedical Science</td>
<td>15</td>
<td></td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Staff Veterinarians</td>
<td>5</td>
<td></td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Practicing Veterinarians (PA)</td>
<td>60</td>
<td>6</td>
<td>29</td>
<td>9</td>
<td>20</td>
</tr>
</tbody>
</table>
Table 3.2: Summary of themes for the topic of the definition of a rural community veterinary practitioner noting similarities and unique themes for each cohort group

<table>
<thead>
<tr>
<th>Similarities</th>
<th>Students</th>
<th>Faculty</th>
<th>Host practitioners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote area</td>
<td>- Only practitioner in area</td>
<td></td>
<td>- Practitioner must offer more services to clients</td>
</tr>
<tr>
<td></td>
<td>- Social isolation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clients with less financial resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>- Leader to community</td>
<td></td>
<td>- Community shouldn’t be included in definition</td>
</tr>
<tr>
<td></td>
<td>- Responsibility to community members because a professional figure</td>
<td></td>
<td>- More likely to be economically disadvantaged</td>
</tr>
<tr>
<td></td>
<td>- Difficult integration if new to community</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multispecies General practitioner</td>
<td>- Traditional veterinarian</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Services any species</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Basic tasks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Try anything</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice</td>
<td>- See all types species</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- May have RCVP who sees all species</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- May have species specialists who each only see one or two species</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Less equipped than companion animal practices</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3.3: Summary of themes for the topic of the definition of a rural community veterinary practitioner noting similarities and differences for each cohort group

<table>
<thead>
<tr>
<th></th>
<th>Similarities</th>
<th>Students</th>
<th>Faculty</th>
<th>Host practitioners</th>
</tr>
</thead>
</table>
| Choosing stream     | -Content of stream most important  
                     | -Higher number of elective is beneficial  
                     | -Keep options open                          | -Students are undecided                      | -Students are undecided  
                     |                                                                |                                                             | -Students choosing too soon  
                     |                                                                |                                                             | and have not had a chance to understand all options  
| Strengths           | -Primary veterinary care rotations  
                     | -External experiences                  | -Overall students are happy with stream     | -Certain rotations geared toward RCVPs           | -Good foundation from OVC  
                     |                                                                |                                                             | -2014 stream changes were an improvement  
| Weaknesses          | -Lack of hands on experience  
                     | -Too much referral medicine at OVC     | -Not teaching skills students will use after graduation  
                     |                                                                | -Rotation quality can be poor  
                     |                                                                | -Length of externship is too short, not enough time to gain trust and experience  
| Improvements        | -More external rotations  
                     | -Work on farm  
                     | -Making sure experiences are rural  
                     | -Longer externships                      | -More equine experience  
                     |                                                                | -Add dentistry rotation  
                     |                                                                | -Take out referral rotations at OVC  
                     |                                                                | -Having externship requirements to ensure quality of experience  
|                     |                                                                | -Verify student external experiences     | -Run spay/neuter clinics  
                     |                                                                | -Need to be able to experience life in rural community  
                     |                                                                | -Log external experiences  
                     |                                                                | -Let small or large clinics be a part of externship  

Figure 3.1: The connectivity of themes from both over-arching topics: definition of RCVP

Footnote:
1. Themes in blue circles are under the topic: definition of RCVP
2. Themes in green circles are under the topic: OVC curriculum
3. The direction of the arrow shows the direction of the relationship between the themes
Chapter 4

Student, faculty and private practitioner perceptions regarding entry-level competency requirements for rural community veterinary practitioners in Ontario, Canada

4.1 Abstract

Rural community veterinary practitioners (RCVPs) are considered multi-species general practitioners who practice in small communities. Such communities often have difficulty retaining veterinary practitioners in their rural areas. Practitioners entering rural community practice (RCP) require a broad skill set to be successful in practice and if they are successful it is more likely they will remain in the rural community. The objective of this study was to investigate the perceptions of Doctor of Veterinary Medicine (DVM) students, Ontario Veterinary College (OVC) faculty engaged in teaching DVM students, and private veterinary practitioners about the entry-level skills required to be a rural community practitioner in Ontario, Canada. Cohort specific focus groups were conducted with OVC DVM students, OVC faculty and Ontario private veterinary practitioners. The cohort opinions expressed and analysed identified challenges that new graduates would face when starting a career in RCP. Clinical and non-clinical skills were identified for RCVPs and compared to skills of food-animal only practitioners. The analysis of the data and comparison of the opinions of all cohorts, confirmed that broad professional competencies as well as professional confidence are important skill attributes that an RCVP should have upon entry into RCP.
4.2 Introduction
At the Ontario Veterinary College (OVC), University of Guelph, Ontario, Canada, all Doctor of Veterinary Medicine (DVM) students choose an area of emphasis referred to as a stream for their final year (Phase-4) clinical rotations. The stream choice prescribes the core and elective rotations and hence the curriculum experiences the student will be exposed to. This is an important point to highlight because it has been shown in the literature that students who focus on one species specialization will not be as skilled in the other species due to the lack of practice and exposure.\textsuperscript{1} Although there is a lack of comprehensive knowledge of all species, streaming allows for greater depth of knowledge on the species chosen to study.\textsuperscript{2} It was also reported by Pritchard (1989) that it is not possible for veterinary students, at the present time, to be competent in every species implying the streaming is necessary to provide the public with competent veterinarians\textsuperscript{3}.

At the OVC there are currently four stream choices which include: small animal (SA), food animal (FA), equine (EQ), and the rural community practice (RCP) stream. In 2014, the OVC renamed the mixed-animal practice stream to the RCP stream and this name change was accompanied with some changes in core and elective rotation requirements. This stream restructuring was informed by perceived changes occurring in Ontario veterinary demographics (Chapter 2). Previous work conducted by the authors identified that OVC students, OVC faculty and private practitioners perceived a rural community veterinary practitioner (RCVP) to be in a remote area, a general multispecies practitioner, and to engage in non-professional related community activities (Chapter 3). Other work conducted by the authors identified that working in a practice that services multiple species, being in an area with a low human population, and graduating from a Canadian school, were factors associated with being an RCVP (chapter 2). The authors also reported that RCVPs were considered general medical practitioners who work
on multiple species (chapter 3) however, working in an RCP (i.e. a clinic that services multiple species) is not always associated with being an RCVP (chapter3). The rationale behind this seemingly contradictory finding is felt to be because some practices service many species but each individual veterinarian may service only food- or companion- animals. These identified professional demographics and associated factors are hypothesized to influence skill and attributes requirements for entry-level RCVPs.

Historically, veterinary competencies have been focused on clinical veterinary skills and it was not until 1993 that non-clinical skills, such as communication, were identified as being important for veterinary curriculum and added into the curriculum in 2000. In 2001, 27 North American veterinary colleges were surveyed about their communication courses and skills. More than half of these veterinary colleges did not have dedicated oral or written communication courses (74% and 89% respectively). Although they did not have dedicated courses there was still a majority of veterinary colleges that had those skills incorporated into learning exercises in many other courses. A study published in 2011 revealed that fourth year students and recent graduates had different views on what they considered to be important skills for new veterinarians. The authors reported that fourth year students focussed on the general factual knowledge of veterinary medicine as an important skill whereas recent graduates placed higher value on non-clinical skills i.e. integrity and compassion. Communication, medical skills, and practice management skills have all been identified as important skills for a successful transition into a career in veterinary practice. Currently practicing veterinarians and academics have deemed many skills to be considered important for entry-level graduates to acquire while at veterinary school.
The employment rate for new graduates from Canadian veterinary schools is very high\textsuperscript{11}. Hence, entry-level competency expectations should be continually revisited to ensure that Canadian veterinary schools and their supporting curriculum continue to produce highly employable graduates. It has been documented that new graduates are more likely to take jobs in the province where they went to school.\textsuperscript{11} Hence, understanding current perceptions surrounding entry-level competency requirements and any curriculum considerations are important aspects supporting continual improvement for veterinary schools.\textsuperscript{11} At the OVC, seven general competencies and six veterinary specific competencies were identified as being important during the last major curriculum restructure.\textsuperscript{12} These competencies are the same for all streams in OVC but there is evidence that the competencies and skills could be different for different types of veterinarians.\textsuperscript{13}

Faculty, alumni and student perceptions have been effectively studied to understand professional competency for veterinarians\textsuperscript{10,14} as well as for other professions.\textsuperscript{15,16} There is evidence to support that the opinions of private practitioners and faculty should be sought, specific to their species or skill specialty, in order to best understand competency requirements for their respective industry.\textsuperscript{17} A study involving alumni veterinarians who graduated from veterinary college two years prior, identified that these recently graduated, practicing veterinarians were able to give meaningful feedback calling upon their experiences as practicing veterinarians and yet still also relate to their experiences as students themselves.\textsuperscript{17} Jaarsma et. al, (2008), postulated that the relatively recent experiences as both a student and new alumni allowed the practitioners to identify gaps in the curriculum i.e. identify gaps in learning experiences while at school that they needed for transition into practice as well as having an understanding specific to the rotations they took in school.\textsuperscript{18} This study was also able to
investigate perceptions on the changes recently implemented in curriculum by comparing alumni satisfaction in different cohorts who had received different aspects of curriculum. This type of feedback is a key component to effecting positive curriculum change. Given the recent changes to the phase-4 DVM RCP stream structure described in chapter 2 as well as the provincial veterinary demographic highlighted in chapter 2, the objective of this study was to investigate the perceptions of DVM students at the OVC, OVC faculty, and Ontario private veterinary practitioners about entry-level competency requirements for an RCVP in Ontario, Canada.

4.3 Materials and methods

This project was reviewed and approved by the University of Guelph research ethics board (REB #16JN034).

4.3.1 Focus group cohort recruitment and data collection

Complete details regarding participant recruitment and data collection are described in detail in chapter 2. In summary, there were 63 participants across 13 focus group sessions divided into three cohorts: OVC faculty (FT) with 21 participants, Ontario private practitioners (PA) with a total of 29 participants, and soon to graduate DVM students enrolled in the RCP stream (ST) at the OVC with 13 participants. The FT cohort invitees included any faculty member who was involved with teaching in the DVM program at the OVC in any aspect of the four-year program. The PA participants invited to the focus groups included those who hosted OVC students during their Phase-3 Externship course or for any Phase-4 external rotation. Lastly, all Phase-4 DVM students of the OVC 2016 and OVC 2017 graduating cohorts were invited to participate. The focus groups were conducted between April 2016 to April 2017.
Participants were also asked to express their opinions regarding entry-level competency requirements for both food-animal practitioners and RCVPs (Appendix III question 1-3, section 2). Each focus group was audio recorded and professionally transcribed.

4.3.2 Data analysis

To address the project objectives, data derived from questions in section 2 were used for analysis which were the sections that focused on entry-level RCVP graduates and the skills needed and challenges these practitioners will face. Thematic analysis was performed on each focus group transcript using NVivo 11 (QSR International 2017). The transcripts were open coded and then all codes were examined to uncover major themes related to entry-level skill requirements for an RCVP.

4.4 Results

Analysis of the ST, FT, and PA data identified 5 themes focused on the topic of identifying entry-level competency requirements for an RCVP and included: challenges facing entry-level RCVPs, clinical skills required of an entry-level RCVP, non-clinical skills required of an entry-level RCVP, skill differences between FA practitioners and RCVPs and confidence versus competence. Table 4.1 summarizes the themes that emerged from the data and highlights the similarities and differences between the perceptions of the ST, FT and PA cohorts.

Challenges facing entry-level RCVPs

All the participants across all the cohorts agreed that an entry-level RCVP will be faced with several challenges and believed that these challenges played an integral role in why
practitioners do not remain in rural communities. More specifically, the main challenges discussed across all cohorts were related to living in a rural community and working in the rural practice. All the participants identified multiple challenges that are associated with living in a remote area. Specifically, the participants from each cohort thought that the limited social interaction in a smaller community can be difficult for a new veterinarian to get accustomed to and this can lead them to experience loneliness. All participants expressed that the rural community lifestyle can be difficult to get used to. In particular, a new veterinarian may have difficulty adjusting to interactions with clients in a social setting i.e., fall fair. The issue of social pressure to take on leadership roles within a rural community could also be difficult to become accustomed to.

FT participant: “Just the limited social opportunities. Looking after yourself, and balancing your work life and personal life is challenging in a remote and rural location.”

PA participant: “They need to know what’s limiting in a small town that, you know, there’s not necessarily a Wal-Mart on every corner.”

Working in veterinary medicine in a rural community was believed by all the participants, across all focus groups, to have its own unique challenges as well. All the participants mentioned that an RCVP (especially new graduates) must work long hours and carry more of the on-call, after-hours emergency responsibilities. Most cohort participants felt that the on-call and long hour requirements were deterrents to attracting the new generation of
practitioners. This opinion seemed to be informed by the participants collective perception that the new generation seeks a more balanced work-life schedule and doesn’t want to work the traditional long hours expected of an RCVP. The requirement for a vast factual knowledge base was also thought to be a challenge for RCVPs. All the participants identified that veterinary students feel pressure to be the best at everything but in reality, may not be able to learn effectively about all species they would have to service prior to graduation.

ST participant: “I feel like there’s such a wide breadth of species that you might be expected to look at, it’s hard to wrap your head around that.”

Minor challenges that a new graduate might face were believed by all cohorts to be making clinical mistakes, business ownership and the potential job market. The PA participants understood that being a new veterinary practitioner involves making mistakes. They believed that an entry-level practitioner may find this difficult which might subsequently lead to a persistent lack of confidence. Many PA participants owned their own practice and these participants presumed that newly graduating veterinarians did not understand how to own a business and are not prepared for that reality.

PA participant: “I know quite a few of my classmates, I know a couple of them that own clinics now. And they were like, “Oh yeah, I’m going to own a clinic. It’s going to be great. It’s so amazing. I’m going to make all these decisions.” And then three days in, they’re like, “This was not what I expected.” And then it became a I’ve got to provide for all of my employees, I’ve got to pay the hydro
bill. It was all these things they didn’t think about. They just thought I get to make the decision.”

Lastly, all the participants agreed that the future job market poses a challenge for new RCVPs because there may not be jobs as a traditional RCVP. All the participants hypothesized that choosing a stream that is focused on a broad species range but not depth of knowledge might make them miss job opportunities. The ST participants understood that finding a job as an RCVP can be difficult if their life needs to not fit in that community and they may have to make sacrifices for the lifestyle the students prefer.

PA participant: “There’s not a true 50/50 mixed job; they just truly don’t exist.”

ST participant: “It’s hard to find a mixed animal job especially in a specific area, if that’s what you’re looking for.”

Clinical skills required of an entry-level RCVP

All the participants identified that the necessary entry-level clinical skills are basic skills at an introductory level on an individual animal basis. Clinical skills for all species were recognized by the participants in each cohort as being imperative competencies for RCVPs. All the participants anticipated that these entry-level RCVPs would not be able to know all the needed skilled for all species due to the division of time spent on each animal.
FT participant: “My opinion is that our expectation of having someone competent in all species is dooming them to some kind of failure.”

ST participant: “You can’t. It’s hard to know everything, like if you’re going to be a vet that does all species it’s really hard to know all the stuff.”

All the participants believed that the clients expected the newly graduated practitioner to possess the specific clinical skills to handle any situation. Animal handling and restraint was a very basic level skill the participants in each cohort felt was necessary to be a successful RCVP. Preventative care and emergency care were skills that all participants expected of, and were necessary, for entry-level RCVPs. Some examples provided were vaccination knowledge and trauma care i.e. tending an animal after being hit by a car. Some of the PA focus groups considered that the specific preventative medicine skills needed were mainly a companion-animal focus and the emergency skills would be required predominately for large animals. They explained that there were often going to be referral clinics that would take companion-animal emergencies but the large-animal emergencies would still be the responsibility of an RCVP. Diagnosis and treatment of all common diseases were other skills participants deemed important for an entry-level RCVP and this was consistent across all cohorts. Common surgeries were also considered important by all the participants, which included spays/neuters and dental procedures.

PA participant: “I mean realistically the expectation is that those new graduates should be able to diagnose and treat medically or surgically the common diseases that we’re going to see across the species that we ask them to touch.”
The participants from all cohorts collectively understood that an RCVP could potentially have less resources at their disposal implying that RCVPS would have to be able to diagnose and treat with less medical information available i.e. no availability of advanced imaging equipment.

PA participant: “I think the diagnostic skills without resorting to fancy equipment will be helpful like just doing – just a thermometer and stethoscope kind of trying to figure something out.”

Non-clinical skills required of an entry-level RCVP

The major non-clinical skills described by all the participants were communication, industry knowledge and problem-solving skills. Communication was perceived as the most important non-clinical skill that the graduating veterinarians need to have and this was consistent across all cohorts of participants. Participants in each cohort pointed out that the companion-animal and food-animal clients have diverse attitudes and different expectations. They thought it is necessary for a new practitioner to be able to communicate with all types of clients.

ST participant: “Excellent communication skills are going to be pretty important, especially communicating what you’re comfortable about or not.”

FT participant: “I think there’s a much broader requirement for communication skills training, you know, how you would communicate with a small animal owner versus a large animal, you know, farmer. They expect different things of you.”
Due to the importance of communication, all the participants deducted that livestock industry knowledge would aid in the successful transition of students into RCPs. This knowledge of the various livestock industries was felt to be an important catalyst to enabling RCVPs to converse with livestock producers on a personal level as well as having an understanding of the physiology of the animals they are treating.

PA participant: “If they can have a conversation with a client about the dairy business or the beef business....if they can't talk to the farm, there are already up against it.”

FT participant: “I almost wonder too if ....you’re in an agricultural setting, you know, can you converse with the farmer about his new tractor because that might come up in conversation.”

The participants in all cohorts did not think that a new graduate would have all the clinical skills they needed in every species but that new graduates could transfer these skills across species. When considering problem solving all the participants assumed that the practitioners needed to be flexible i.e. if one solution would not work or if the client did not have the financial resources they would have to find another solution very quickly. A component of problem solving was being able to find information ie. reading scientific literature.

Resilience and an understanding of economics and business were minor skills all the participants thought that new veterinarians would need to be successful RCVPs. All the
participants expressed the potential for rural clients to have variable socioeconomic statuses and/or limited financial resources and the practitioners would have to be understanding of this potential. The FT participants speculated that the new graduates could face rejection by clients and this could perpetuate self-doubt and subsequently lead to the need for resiliency skills.

FT participant: “I think that’s why we’re needing resilience and sort of how you, you have a lot of students who are very happy, enthusiastic, which is great, um, but can they deal with rejection, being rejected by a client.”

Skills of an RCVP versus food-animal practitioner

Within focus groups the participants could not agree whether the entry-level skills of an RCVP should be similar or different to that of a food-animal practitioner. Some participants in all the cohorts considered that the entry-level skills should be the same but will develop differently as the practitioner grows in their career. Many of the PA and FT participants argued that FA stream students have more opportunities to gain skills related to the food-animal industry and be better prepared to go out into food-animal veterinary positions.

ST participant: “We’re graduating with the same degree, it all comes back to that, like you’re licensed with the same diploma so I don’t know, if you should somehow be less good at your job.”
Whereas other participants across the cohorts expected that the food-animal focused new graduate had a more in-depth knowledge of the livestock animal industry because they would be expected to service larger farms.

PA participant: “the food animal practitioner, is they need to know way more about the industry, and way more about how to run that farm, because they’re looking to the food animal person as being, you know, someone that can optimize, their operation.”

FT participant: “I think for the rural community vet it’s like the scope is broader, whereas for the food animal vet the scope is deeper.”

The predominant differences in clinical skills were agreed upon by all participants and they were related to companion-animal skills. The participants in each cohort felt that the food-animal stream graduates should be required to have the companion-animal skills the RCP stream graduates need. When it comes to non-clinical skills the participants overall insisted that both the RCVP and the food-animal practitioners would need the same skills due to both of them being in a rural community.

Although many participants believed the graduating competencies should be the same for both the RCP and FA stream students, most of the participants were of the impression that the FA stream students would have more practical experience opportunities during veterinary school to work specifically on food-producing animals and would therefore be more competent at the time of graduation.
ST participant: “I think there is some expectation based on vets in practice already, they have some idea of what you would have taken based on what stream you’re in, so I think if you’re in the food animal stream, they expect your palpation skills to be in a different place.”

Confidence versus competence

All the participants understood the importance of being both confident and competent to be a successful veterinarian. These participants felt the only way to gain confidence and competence is through exposure and practice and lead to a successful career as an RCVP.

PA participant: “The ones that are successful have gone and got all the practical, or that exposure and experience themselves.”

The FT participants had a difficult time defining what it truly meant to be competent. Competence was described by FT participants as basic level skills in some instances but mastery of a skill in other instances. All the participants agreed that the level of confidence is an individual student characteristic and is not something the university nor the curriculum can address uniformly across all students. However, all the participants agreed that the clinical competency level of students should be a key learning outcome of the OVC curriculum.
FT participant: “There’s so much about lifestyle that’s either going to make or break that experience in the first couple of years, that it almost sounds to me like it’s as much the student as it is the institution and the curriculum.”

The PA participants stated that the students graduating from OVC were competent but it was their confidence that they felt was lacking. Interestingly, the ST participants overall, felt that they were not competent in their own personal veterinary skills but they perceived their peers as being competent veterinarians by the end of Phase-4 thus, supporting that individual students have low self-confidence upon graduation.

ST participant: “I honestly feel that most people are way more competent. Like I am a hundred percent sure you guys are way more competent than you think you are, but like it just doesn’t feel that way, but I think you will be fine in practice. That’s the really kicker, like it’s going to be fine; just you don’t feel that way, but you will.”

4.5 Discussion

The challenges of being an RCVP identified in the present study are reflected in the current literature. Work hours and on-call time have been cited in the literature as one of the major challenges facing RCVPs. In a national study involving veterinarians from Australia, it was found the work hours and on-call time were the most important reason for veterinarians to transition from rural practice to urban practice. Living in a remote area was also identified in this study as a challenge that entry-level RCVPs would have to face. In a survey that investigated
reasons for leaving a rural community, the remote community lifestyle was indicated for a reason for leaving. The reason remote lifestyle was perceived as a disadvantage seemed stemmed to the belief that living in a remote area can be socially and professionally isolated and due to limitation in career or employment options for other family members i.e. spouse New veterinary graduates in western Canada ranked family considerations as one of the most important factors that impact their decision on their first job. Although working in a remote community has been seen as a disadvantage in this study, there has also been evidence that veterinary practitioners who work in rural communities are drawn to the remote location. These challenges can have an effect on veterinary retention in rural communities and understanding these challenges can help veterinary colleges inform students considering these career options.

Entry-level competency skills of an RCVP were focused around multiple species in this study. This was expected because RCVPs have been defined by the authors (Chapters 2 and 3) in as being considered a multi-species general practitioner. Some clinical skills were identified as similar across all species such as animal handling and venipuncture skills, but other skills were considered to be species specific i.e. spays and neuters for companion-animals and left displaced abomasum (LDA) surgeries in cattle. Having a well-rounded curriculum that includes factual knowledge and hands-on practice across all, or multiple species would be valuable for RCP stream students and hence the entry-level RCVP.

Communication has been a focus in veterinary medicine in recent years. This research provided the data to support that communication skills is considered a necessary skill for entry-level veterinarians regardless of practice type. Amongst veterinarians surveyed in the UK and US, many recognized that communication was as important or more important than clinical knowledge when dealing with clients. Coe et al (2008) investigated client and veterinary
perceptions on veterinary communication. They presented evidence that when a client perceives that communication with the veterinarian is poor then the client is unhappy and the relationship between the veterinarian and client can be negatively impacted. To improve curriculum, it would be beneficial to give the students ample practical experience in communication with various clientele under various situations.

Resilience was a minor sub-theme identified in the data. This could be because it recently has been a focus of research and curriculum in veterinary medicine as well as specifically at the OVC. Resilience is found to promote good mental health which is important in veterinary medicine. Although it has been said to be important for all veterinarian this study identified that there is a perception that RCVPs can find living in a remote setting difficult potentially needing to develop resiliency skills perhaps more-so than companion-animal practitioners. Improving mental health is important for veterinarians in their careers and personal lives. Making mental health and wellbeing a greater focus in curriculum can be advantageous to OVC students and new graduates.

Non-clinical skills were perceived to be equally important for both food-animal practitioners and RCVPs. The ability to gain trust was identified as a necessary non-clinical skill for both these types of veterinary practitioners. New practitioners in particular, can experience difficulty in gaining trust from farmers and is the case for both RCVPs and food-animal practitioners. A study investigating the challenges for food-animal practitioner found that having a personal relationship with clients is beneficial for their professional relationship and the farmers will stay loyal to one veterinarian they have known a long time. Long standing loyalty to one veterinarian can make it difficult for a new veterinarian to gain the trust of these farm clients. This further supports the importance of a curriculum focus on communication skills.
The data from this study revealed that having both competence and confidence is important in for the successful entry-level RCVP and this has been reported in past literature.\textsuperscript{27} The data analysis from this study revealed that if a practitioner was competent that this does not immediately imply that the practitioner is confident or vice versa. Similar results have been reported in the literature where comfort level of the skills was lower than the competence level\textsuperscript{27}. This study found that the students graduating from OVC are perceived as being competent but lack the confidence in their own skills. There has been evidence that performing a skill multiple times leads to an increase in confidence in that skill which is consistent with the present study. It was identified in a chapter 3 that students, faculty and private practitioners believed that OVC did not provide enough technical practice for the RCP students. To improve curriculum at OVC it is beneficial to expend the opportunities for student to practice technical skills they will need in rural veterinary practice. This can increase both their competence and confidence in those skills to aid in their success in being an RCVP.

**Limitations**

The research methods of this study were performed using a qualitative method. Qualitative research methods by nature have a low external validity. This limits the ability for the conclusion to be generalized to other veterinary colleges. Another deficiency for this study is that there was only one coder so there could be no reliability test done on the themes found. This can lead to data being mis-classified into certain themes. A selection bias could have been introduced in the data because of the recruitment of participants. The participants who chose to come to focus groups could have feedback that is different from the non-responding participants. It is also important to note that northern Ontario veterinary practitioner were not represented in this study.
because this study was done using convenience sampling and the distance was too large to include those practitioners.

Conclusion

The stakeholder opinions found were able to identify challenges that new graduates would face when starting to practice veterinary medicine. Clinical and non-clinical skills were identified for RCVPs and compared to food animal practitioners. The stakeholders confirmed that both competency and confidence are important to RCVPs. All themes identified by this research can be used to inform curriculum at OVC to improve aspects of education. This includes increasing the amount of hands on practice students receive in their four years of education, including more communication in the curriculum and having a curriculum that includes multiple species.

This research only looks at RCVPs. For future studies, it would be advantageous to compare the skills needed for food-animal, companion-animal, RCVPs and equine practitioners. Future research could use the themes and perform quantitative methods across Canada to see if the themes carry across the country. Using information gathered from this research can be used with quantitative measures in the future to increase the external validity to skills found.
4.6 References


Table 4.1: Summary of themes surrounding skills needed to be a rural community veterinary practitioner and similarities and differences for each cohort group

<table>
<thead>
<tr>
<th>Themes</th>
<th>Similarities</th>
<th>Student</th>
<th>Faculty</th>
<th>Private practitioners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenges</td>
<td>- Limited social interaction&lt;br&gt;-Will be seeing clients in social setting&lt;br&gt;-Leader in community&lt;br&gt;-Long work hours&lt;br&gt;-Work on-call after regular business hours&lt;br&gt;-Vast multispecies knowledge base</td>
<td>- May not want to change lifestyle to fit in with a rural community</td>
<td>- Students cannot manage making mistakes&lt;br&gt;- Do not understand aspects of veterinary clinic ownership</td>
<td></td>
</tr>
<tr>
<td>Clinical skills</td>
<td>- Basic skills at an introductory level&lt;br&gt;-Animal handling and restraint&lt;br&gt;-Skills related to preventative medicine&lt;br&gt;-Emergency medicine skills&lt;br&gt;-Students cannot have skills for all species</td>
<td>- Students will face rejection by clients having the need for resilience</td>
<td></td>
<td>- Considered skills for small and large animals to be different</td>
</tr>
<tr>
<td>Non-clinical skills</td>
<td>- Communication is most valued skill&lt;br&gt;-Have knowledge of agriculture industries to enhance communication and build trust&lt;br&gt;-Transfer skills across species&lt;br&gt;-Solve problems and find various solutions&lt;br&gt;-Understand economic ability of clients</td>
<td>- Perceived own competence as low&lt;br&gt;-RCP students to be competent</td>
<td>-Difficult to define true competence&lt;br&gt;- Believed students were competent but their confidence was lacking</td>
<td></td>
</tr>
<tr>
<td>Versus food-animal practitioner</td>
<td>- Cannot agree if they should be different due to having the same degree&lt;br&gt;- Believe the skills are different currently&lt;br&gt;-RCVP would have more companion animal knowledge</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence versus competence</td>
<td>-Both very important&lt;br&gt;- Individual for each student&lt;br&gt;-School responsible teaching for competence</td>
<td>-</td>
<td>-</td>
<td>- Believed students were competent but their confidence was lacking</td>
</tr>
</tbody>
</table>
Chapter 5

Conclusion

5.1 Summary of findings

A major component of the research presented in this thesis evaluated focus-group derived qualitative data of the individual and comparative perceptions of three groups of veterinary professional stakeholders: veterinary students, academic faculty, and private veterinary practitioners. The perceptions analyzed from these stakeholders were related to rural community practice (RCP) and rural community veterinary practitioners (RCVP), in the province of Ontario. Veterinary licensing and veterinary clinic accreditation data, for the province of Ontario, was also evaluated to aid in the development of an understanding of RCP and a definition for RCVPs specific to Ontario. Combined, the results that emerged from the analyses of the qualitative and quantitative datasets were taken into consideration to present curriculum considerations to the Ontario Veterinary College related to preparing entry-level veterinarians for RCP.

Development of a deeper understanding of the species serviced and entry-level competency requirements for an RCVP in Ontario has the potential to aid in the retention of new professionals in rural communities. It has been previously reported that veterinary practitioners will often leave rural community practice within a couple years of entry into the profession\textsuperscript{1,2}. This lack of retention has been attributed to difficult work hours, lack of career prospects for spouse, and lack of social interactions within the community\textsuperscript{1,2}. Anecdotally, the practice model of an RCP in Ontario has changed. It is believed within the profession, that rural practices now typically employ veterinarians that each have their own species of interest or area of emphasis. This is believed to represent a move from the more traditional practice model where a veterinarian working in a rural practice has been considered a general practitioner and services
multiple species types. There is limited data to substantiate this belief for the province of Ontario. If substantiated, these changes could imply curriculum considerations for the training of entry-level RCVPs which in turn has the potential to enhance job satisfaction of new professionals embarking on a career in a rural community.

The focus of chapter 2 was to contribute to the veterinary profession’s understanding of: the geographic distribution of clinics in Ontario, factors associated with veterinarians being classified as RCVPs, and of factors associated with clinics being classified as an RCP. Veterinary licensing data were obtained from the College of Veterinarians of Ontario (CVO). From the CVO licensing data, an RCVP was categorized as a practitioner who services companion-animals and food-animals and an RCP was categorized as a veterinary practice which was accredited to provide veterinary service for companion- and food-animals. Chapter 2 further presented choropleth and dot maps to illustrate geographic location of RCPs and highlighted that veterinary practices are distributed across southern Ontario and not strictly aggregated around areas with higher human populations i.e. Toronto. The RCPs did tend to be located in areas with a higher number of farms housing livestock. Results also supported that RCPs are associated with being located in an area with a lower human population (P=0.02) and higher number of livestock animals (P<0.001), having fewer other veterinary practices in their census district (P=<0.001). It was discovered in chapter 2 that newer graduates of veterinary college, and practitioners practicing in a rural community are more likely to be an RCVP (all P<0.05)

Chapter 3 utilized a qualitative approach, focus group sessions, to explore the perceptions of various veterinary profession stakeholders (students, faculty, private practitioners) regarding RCP and RCVPs. Additionally, there was a component of the focus-group which solicited participant’s perceptions regarding the Doctor of Veterinary Medicine (DVM) program
curriculum at the OVC. Analysis of the data supported that the three stakeholder groups defined an RCP in one of two ways: an RCP could be a practice that employed RCVPs who each serviced all species or, could be a practice that employs veterinarians who each service one or two species but the clinic, collectively, provides veterinary service for all species. In both cases participants believed the RCP was located geographically in a rural community, serviced all species in that area, and could be less equipped with newer medical technology. The students, private practitioners and faculty participants all described an RCVP as a veterinary practitioner living and working in a remote setting, who practices general medicine on all species and is an integral member of the community where they are located.

In order to continually improve and meet the needs of society and the veterinary profession in general, it important to gain feedback on veterinary curriculum to enable the continual improvement of veterinary education. Hence, an objective of chapter 3 was to also investigate the focus group participant’s perceptions of the DVM program curriculum at OVC specific to RCP and training an RCVP. Perceptions surrounding the rationale behind why students choose a certain stream emerged from the data. It was identified that students, faculty and private practitioners think stream and rotation content is the major reason why students pick their stream, regardless of what stream a student chooses. This information can be used to improve the RCP stream specifically, by further tailoring rotation learning outcomes with the entry-level RCVP in mind, and offering more stream flexibility so that students can customize their own learning based on their personal professional goals. More specifically to the rotations themselves, rotations that focus on primary care were found to be one of the greatest strengths of the DVM program at the OVC. These types of rotations allow the students to gain the experience that all participants felt a new graduate would need for successful transition into the profession.
Having more rotation offerings that focus on primary care learning objectives, and learning outcomes, was considered an important required curriculum adjustment to attract more students to the RCP stream and to provide the practical skills that students interested in RCP require. The other main strength of the RCP stream identified was the external experiences, such as the Approved External Practice (AEP) requirement or rotations external to OVC. These external experiences not only exposed students to the wide range of necessary clinical skills in a “real-world” environment but also expose students to non-clinical skills, i.e. business management, rural community living, and facilitate student understanding of what it is like to work in an RCP. There were, however, some concerns raised about quality, length and organization of external rotations. Improvement suggestions that emerged from the data were: to require students to spend longer consecutive periods of time at external clinics thus allowing more time for relationship building between host clinic and student; to require students to log their experiences and reflect upon them; to subsequently review student logs to ensure consistency amongst external experiences specific to RCP; and for OVC to provide more mentorship to host practitioners as to expectations and responsibilities. Additionally, the requirement for students to gain more agriculture industry knowledge (i.e. working on a farm as mandatory curriculum requirement) was a major subtheme identified when discussing RCP stream improvements. The participants felt that this type of experience, would improve a new veterinary practitioner’s ability to connect with clients on a deeper level than just veterinary medicine such as, discuss agricultural related topics e.g. crop yield.

The stakeholders also perceived that the OVC required too many rotations in RCP stream structure that taught referral medicine and surgery and that these rotations did not provide learning experiences or skill development that the students needed immediately upon graduation.
The participants felt that referral rotations are structured in such a way as limit hands-on or practical experiences such that the participants felt the rotations were not an efficient use of curriculum time.

Chapter 4 explored competency requirements for entry-level RCVPS to promote successful transition into the profession. Challenges of being an RCVP were identified as topics regarding social interactions within the community, long working hours, requirement for a vast knowledge base, and the potential perceived poor job market. The clinical skills required for a new veterinary graduate were described as being basic introductory level skills. Specifically, animal handling, preventative and emergency care were types of skills that the data identified as important for the entry-level RCVP. Communication skills were considered, unanimously across the participants, to be the most important non-clinical skill for an RCVP. Acquiring agriculture industry knowledge was thought to be a benefit for an RCVP to attain and to improve their ability to communicate with clients in a rural setting. Due to the potential for access to less client financial resources in order to diagnose and treat patients, problem solving without advanced diagnostics was also identified as an important non-clinical skill. The analysis in chapter 4 also identified that individual confidence as well as clinical skill competence is very important for the entry-level RCVP. Participants felt that repeated exposure to, and practice of, clinical skills were the best approach to improve both student confidence and competence in their skills. The data analysis revealed that the DVM curriculum at the OVC is very successful at building entry-level competency in the DVM graduates. However, individual student confidence in their clinical skills is a student dependent.
5.2 The definition of a RCVP

The definition of a RCVP was investigated in this thesis. Living in a remote area was a component of being a RCVP and remote areas were identified as geographical areas with less people and more farm land containing livestock. The veterinarians in this area were described as veterinarians who have to work with less diagnostic and treatment options available to them hence, forcing them to have excellent problem solving skills. These veterinarians must work on multiple species which include companion-animal and food-animal species. Being involved in their rural community was reported to be an important concept in this thesis thus expanding the veterinarians role beyond veterinary care to include community leadership activities. Hence, an RCVP will be encouraged to take on more responsibility in the town that is not related to veterinary medicine. There is a large portion of very new graduates and also veterinarians who have been in the field for at least 40 years. Fitting into the remote community can be difficult for the new veterinarians because the clients are used to being serviced by the same veterinarian(s) and themselves are often resistant to change, which can be a challenge to an RCVP new to a community.

5.3 Recommendations for DVM curriculum at the OVC

This work presented in this thesis had another overarching goal to provide DVM curriculum recommendations, if needed, for the OVC and with a specific focus on training the RCVP. Solidifying a definition for rural and RCVP was an initial step taken to help reach the overall goal. By using the RCP definition shaped by analyses of the CVO data and various stakeholder perceptions as well as their perceptions on OVC curriculum and skills an entry-level
RCVP requires, some key recommendations to help inform curriculum improvement of the DVM program at the OVC.

Rural community veterinary practitioners were defined as general practitioners who service multiple species in a remote community. The focus group data highlighted the positive aspects of student experiences external to OVC e.g. the Approved External Practice (AEP) requirement to help students build their own competence and confidence of fitting into this definition. This data highlighted some key improvements to help enhance the external experiences. Which were:

- to increase the number of weeks required of elective experiences external to OVC thus opening up more time in the curriculum for students to spend time being engaged in a rural area gaining practical experience;
- to lengthen the requirement of consecutive time spent at external rotations and externships to allow for trust to build between host practitioners and the visiting student as well as allow students to be incorporated into the rural community and understand rural life, and;
- to ensure consistency among the quality of the external experiences by either providing a required list of skills or competencies requiring completion and by requiring the students to log their experiences to document exposure to learning opportunities and skill development.

The importance of the development of competence and personal confidence in skills required of an entry-level RCVP were also investigated and presented in this research. An increase in hands-on experience opportunities for the students will enable more successful
development of student’s competence and confidence. Methods suggested to improve hands-on experiences are:

- the requirement for canine/feline spay/neuter clinics at the OVC where the students are the primary surgeon performing the surgeries would significantly improve surgical skill development. These experiences in a controlled environment such as the OVC, would promote consistent mentorship at this stage of student training., and;

- the restructuring of internal rotations and removal of some core internal specialty rotations (i.e. medicine and surgery) to allow students to be more engaged in decision making and career planning pertaining to their own career goals.

The data described the primary reason students choose their specific stream was due to the rotation requirements (core and elective) and rotation specific content. The improvement of the stream structure (i.e. rotations required) and specific rotation content within the RCP stream would make the stream more attractive to students and allow them to tailor their own development. Considerations to improve the content of the RCP stream are:

- provide more primary care rotations to expose the students to more practice and experience performing the tasks and skills they believe they will be expected to perform immediately upon graduation;

- decrease the number of referral medicine rotations and replace them with rotations that will allow the students to attain skills they will be expected to perform immediately upon graduation;
- reorganize rotations to be more RCP stream specific to allow more focus on the development of an RCVP. This could include making stream specific content in the rotations (as they do in the swine health management RCP rotation)
- open up time to allow for more external elective weeks to introduce more flexibility into the stream and hence enable students to be exposed to multiple species and RCP in general.

5.4 General research limitations

The CVO licensing data are self-reported licensing data. The data did not provide information on how much time a veterinarian spends on each species. This could mean a practitioner may only work on a specific species once a year but still self-report that they service that species. This can lead to a misclassification bias. The practice the veterinarians report as their practice location is their primary practice and the data may not account for any time a veterinarian works at a secondary practice such as an emergency clinic. This resulted in a small number of the accredited clinics in the data set to have zero licenced veterinary practitioners associated with that clinic. This resulted in those types of practices being dropped from the analysis.

Chapter 3 and 4 were qualitative studies which inherently introduces limited ability to extrapolate to other populations (i.e. external validity). Thus, the conclusions drawn from these data are limited in their ability to be extrapolated to other schools and veterinary profession context. Due to geographical limitations (i.e. large distances of some host practitioners from focus group location), host private practitioners were only able to participant if they were within a closer proximity to OVC or other chosen focus group location. This did not allow for any
perceptions of practitioners in northern regions of Ontario to be incorporated into the data. Northern and southern Ontario have different population and agriculture demographics which could be reflected as potential differences in the veterinary needs of those communities. The veterinary practitioners from those communities could possibly have a different perceptions of definition structure of an RCVP than veterinary practitioners from other regions of Ontario such as southern Ontario.

5.5 Future research

This research was only intended to take a snapshot of the Ontario veterinary practitioner demographics by using 2017 CVO licensing data. It would benefit the profession to investigate veterinary demographics over multiple years to identify trends that are seen over time. The third and fourth chapter investigates perceptions of three different stakeholder groups. To enhance this research the perceptions of veterinary clients on their expectations of the rural community practitioners and skills necessary to be a successful RCVP should be investigated. This would allow for the consumer’s opinion to be heard and incorporated into curriculum decisions as well as to make sure the profession is providing the Ontario public with the appropriate services. Using the rich information gathered during the stakeholder focus groups in the current research to compile a questionnaire that can be used to survey further perspectives of private practitioners who are living in the most remote portions of Ontario would help inform a larger picture on the definition structure of an RCVP for the province of Ontario.

The OVC has used student feedback in the past and would benefit from continued use of feedback from all stakeholder groups for ongoing curriculum development. Tailoring focus groups or survey questions to the specific knowledge of the stakeholder group would allow for
deeper insight to be incorporated into the DVM curriculum e.g. asking private practitioners, who are unfamiliar with stream and rotation content, about specific rotations does not allow them to provide rich thought and information on the topic. If they are asked about external rotations, which they are involved in can allow them to give richer and more informative data.

The Ontario veterinary demographics was described in the present study which has not been done recently in the literature. This research specifically focuses on the definition of the RCVP and RCP and factors associated with practicing in an RCP. Strengths, weaknesses and improvements of the OVC RCP curriculum were identified.
5.6 References


## Appendix I

### A: Summer "OVC" Rotations

<table>
<thead>
<tr>
<th>Rural Community Practitioner</th>
<th>Food Animal Practitioner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermatology (Ottawa)- 1w</td>
<td>Swine Industry- 2w</td>
</tr>
<tr>
<td>Dermatology (Toronto)- 1w</td>
<td>Therio Equine 2w</td>
</tr>
<tr>
<td>Emergency/Critical Care- 1w</td>
<td>Acupuncture (AVC)- 3w</td>
</tr>
<tr>
<td>LA Cardiology &amp; Performance Medicine- 1w</td>
<td>Chiropractic Techniques (AVC)- 3w</td>
</tr>
</tbody>
</table>

### B-1: Declared External Elective Rotations

#### B-2: Core Rotations

<table>
<thead>
<tr>
<th>Study -1w</th>
<th>Anatomic Pathology- 1w</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic Pathology Mixed- 1w</td>
<td>Diagnostic Pathology FA- 1w</td>
</tr>
<tr>
<td>SA Primary Care- 3w</td>
<td>SA Primary Care- 3w</td>
</tr>
<tr>
<td>Therio Mixed- 1w</td>
<td>Therio FA- 1w</td>
</tr>
<tr>
<td>Anesthesia Mixed- 2w</td>
<td>RumH Farm Service- 2w</td>
</tr>
<tr>
<td>Radiology- 2w</td>
<td>Swine Health- 1w</td>
</tr>
<tr>
<td>SA Med- 2w</td>
<td>Approved External Mixed Practice(s)- 4w</td>
</tr>
<tr>
<td>LA Med- 2w</td>
<td></td>
</tr>
<tr>
<td>RumH Farm Service- 2w</td>
<td></td>
</tr>
<tr>
<td>Swine Health- 1w</td>
<td></td>
</tr>
<tr>
<td>Approved External Mixed Practice(s)</td>
<td>Approved External FA Practice(s)- 6w</td>
</tr>
</tbody>
</table>

#### B-3: Stream Priority Rotations

**Get up to 2 of:**
- Any rotations that will be offered as "OVC"- Elective rotations in Part B-4.

**Get 4 of the following 11:**
- Fish Health- 1w
- Heartland Dairy Practice- 1w
- Poultry Health- 2w
- Ruminant Health Beef- 2w
- Ruminant Health SM ruminant- 1w
- Ruminant Health Dairy- 2w
- Ruminant Health Dairy Nutrition- 1w
- Ruminant Health Dairy herd problem solving 2w
- Ruminant Surgery- 2w
- Swine Industry- 2w
- Swine Production- 1w

### B-4: OVC Elective Rotations

<table>
<thead>
<tr>
<th>Core</th>
<th>#Rotations</th>
<th>#Weeks</th>
<th>S-P</th>
<th>#Rotations</th>
<th>#Weeks</th>
<th>Elective</th>
<th>#Rotations</th>
<th>#Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥12</td>
<td>22</td>
<td>0</td>
<td>≥ 8</td>
<td>16</td>
<td>?</td>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td></td>
<td>4</td>
<td>4-8</td>
<td>?</td>
<td>6-10</td>
<td>30</td>
</tr>
</tbody>
</table>

### C: Manual Scheduling ("OVC" Rotations & External-Elective Rotations)

- Core
- S-P
- Elective
<table>
<thead>
<tr>
<th>A: Summer “OVC” Rotations</th>
<th>Small Animal</th>
<th>Equine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Welfare - 2w</td>
<td></td>
<td>LA Medicine- 2w</td>
</tr>
<tr>
<td>Avian/ Exotic Animal Medicine - 2w</td>
<td></td>
<td>LA Surgery-2w</td>
</tr>
<tr>
<td>Cardiology- 1w</td>
<td></td>
<td>Neuro-1w</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ophtho- 2w</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA Primary Care</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B-1: Declared External Elective Rotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-2: Core Rotations</td>
</tr>
<tr>
<td>Study -1w</td>
</tr>
<tr>
<td>Anatomic Pathology- 1w</td>
</tr>
<tr>
<td>Diagnostic Pathology Equine- 1w</td>
</tr>
<tr>
<td>SA Primary Care- 3w</td>
</tr>
<tr>
<td>Anesthesia SA- 2w</td>
</tr>
<tr>
<td>Radiology- 2w</td>
</tr>
<tr>
<td>SA Med- 2w</td>
</tr>
<tr>
<td>SA surgery- 2w</td>
</tr>
<tr>
<td>Emergency/ Critical Care- 1w</td>
</tr>
<tr>
<td>Neurology- 1w</td>
</tr>
<tr>
<td>Study -1w</td>
</tr>
<tr>
<td>Anatomic Pathology- 1w</td>
</tr>
<tr>
<td>Diagnostic Pathology</td>
</tr>
<tr>
<td>Equine- 1w</td>
</tr>
<tr>
<td>SA Primary Care- 3w</td>
</tr>
<tr>
<td>Therio Equine- 1w</td>
</tr>
<tr>
<td>Anesthesiology Mixed- 2w</td>
</tr>
<tr>
<td>Radiology- 2w</td>
</tr>
<tr>
<td>Neuro-1w</td>
</tr>
<tr>
<td>LA Med I- 2w</td>
</tr>
<tr>
<td>LA Surgery I- 2w</td>
</tr>
<tr>
<td>LA Med II- 2w OR LA Surgery II- 2w</td>
</tr>
</tbody>
</table>

| B-3: Stream Priority Rotations           |
| Cardiology- 1w                           |
| Dermatology- 12 (external)               |
| Ophthalmology- 2w                        |
| Therio SA- 1w                            |
| Eq Aneth Surg- 1w                        |
| Eq Lameness- 2w                          |
| Eq Primary Care- 1w                      |

| B-4: OVC- Elective Rotations             |
| C: Manual Scheduling (“OVC” Rotations & External- Elective Rotations) |
| #Rotations | #Weeks | #Rotations | #Weeks |
| Core       | 10     | 11         | 18     |
| S-P        | 1      | 2-3        | 2-4    |
| Elective   | ?      | ?          | 8-10   |
A: Summer "OVC" Rotations
Optional. Maximum of 2 summer "OVC" rotations via the computer scheduling program. The student will rank specific rotation/date offerings (e.g. Ophtho/Jun 09-22). All students will be given equal priority (independent of their stream). "OVC" rotation(s) that the student obtains during the summer will apply toward core, stream-priority or elective requirements, dependent on the student's stream. "OVC" rotation(s) that the student obtains during the summer will become unavailable to that student during the regular academic year via the computer scheduling program. However, if offered as electives, they may be available via manual scheduling.

B-1: Declared External-Elective Rotations
Optional. Maximum total of 6 weeks. A unique external elective during the regular academic year that is only offered at a specific time (must be arranged far in advance). Each declared external elective must be approved by the external-elective coordinator. Conferences do not qualify as declared external electives.

B-2: Stream Selection → Core Rotations
Core rotation(s) that the student obtained during the summer will apply toward the following requirements in each of the streams; & will become unavailable to that student during the regular academic year via the computer scheduling program. However, if also offered as electives, they may be available via manual scheduling.

B-3: Stream Selection → Stream-Priority Rotations
Within their chosen stream, the student must rank all of the listed stream-priority rotations. Stream-priority rotation(s) that the student obtained during the summer will apply toward the following requirements in the SA, Rural-Community-Practice & Equine streams; & will become unavailable to that student during the regular academic year via the computer scheduling program. However, if also offered as electives, they may be available via manual scheduling.

B-4: OVC-E elective Rotations
The student may rank any "OVC" rotation that is offered as an elective. These may include core rotations, unfilled stream-priority rotations, & rotations offered only as electives. Students from all streams will be given equal priority. "OVC" rotations that the student obtained during the summer or in Parts B-2 & B-3 will become unavailable to that student during the regular academic year via the computer scheduling program. However, if offered as electives, they may be available via manual scheduling.

C: Manual Scheduling ("OVC" Rotations & External-Elective Rotations)
The student's schedule must contain a total of 30 weeks of academic credit (i.e. rotations). After computer scheduling is completed, any "Open" weeks in the student's schedule during the 30-week regular academic year must be filled with "OVC"-elective or approved external-elective rotations. Students may also fill Open weeks, using academic credit obtained from:
1) Summer "OVC" rotations (see Part A), or
2) Approved external-elective rotations (separate from the Veterinary Externship) that were taken during the summer between Semesters 6 & 7.
Students may receive up to a total of 5 weeks of academic credit for all summer-rotation activity ("OVC" rotations or external-elective rotations)

***APPROVED EXTERNAL PRACTICES – FOOD ANIMAL: FA Stream Core Rotations

- Total of 6 weeks, in blocks 1-4 weeks in duration.
- Maximum duration of 4 weeks at any one location/practice.
- Students in the FA stream must arrange a total of 6 weeks of external rotations in primary-care FA practice (beef cattle, dairy cattle, small ruminants, swine, commercial poultry or fish production). Although each of the Approved External Practice (AEP-FA) rotations must be in a practice that provides primary care to food animals, the practice may be an exclusively FA practice, a large-animal practice, or a mixed practice. It cannot be a university-affiliated practice. Similar to other external rotations, the student may not spend more than 4 weeks at any specific practice.
- PD DAYS WILL NOT BE GRANTED DURING THIS ROTATION

***APPROVED EXTERNAL PRACTICES – RCP: RCP Stream Core Rotation(s)

- Total of 4 weeks, in blocks 1-4 weeks in duration.
- Maximum duration of 4 weeks at any one location/practice.
- Students in the RCP stream must arrange a total of 4 weeks of external rotations in primary-care “rural” mixed practice. Each of the Approved External Practice (AEP-Mixed) rotations must be in a practice that provides primary care to a good mix of small- & large-animal cases. Rural does not have to be located “in the middle of nowhere”. It cannot be a university-affiliated practice. Similar to other external rotations, the student may not spend more than 4 weeks at any specific practice.
- PD DAYS WILL NOT BE GRANTED DURING THIS ROTATION.
Appendix II

Figure 1: Predicted probability of being a rural community veterinary practitioner by graduation year

Figure 2: Predicted probability of being a rural community practice by number of veterinarians per clinic
Appendix III

Focus Group Guide 1: DVM Phase-4 Rural Community Practice Stream Student Focus Group Feedback Session

**Background and Rationale:**

Curriculum changes were implemented in the 2014-2015 academic year to the Food-animal (FA) and Mixed-animal streams. One major change was the renaming of the Mixed-animal stream to the Rural Community Practice (RCP) stream. Rural community veterinary practitioners work in a similar cultural environment to food animal veterinary practitioners however there is often a blurred line between what can be classified as rural community practice and food animal practice. In April 2015 and 2016 focus groups were conducted to capture the opinions of the students enrolled in the RCP stream and to reflect on the curriculum changes specific to that stream. The valuable feedback obtained identified the need for continued improvement of the RCP and FA streams. There is a need to further develop an understanding of what the curriculum differences are for training entry-level RCP and FA practitioners. Thus, in order to continue to inform improvements of both streams, focus group sessions are being conducted with the students enrolled in the RCP and FA streams from the 2017 graduating class.

**Objectives:**

The objectives of this focus group are to seek the opinions of, and to obtain feedback from, the students enrolled in the RCP stream who will be graduating from OVC in 2017 in order to:

- inform stream development, understand why students select to enroll in the RCP stream,
- seek their opinions of their RCP stream experiences,
- and to seek their opinion(s) on the FA stream option.

**Focus Group Questions:**

*Section 1: Setting the context*

1. How would you define a Rural Community Practitioner?

2. In your mind what is a Rural Community Practice?

3. What is the difference between Rural Community Practitioner and Food Animal Practitioner?

*Section 2: Rural Community Veterinary Practice*

4. What types of clinical skills do you feel an entry-level rural community practitioner should have in order to be technically competent?
5. What types of non-clinical skills do you feel an entry-level rural community practitioner should have?

6. Are the required entry-level clinical competencies different between graduating rural community practitioners versus food-animal practitioners?

7. What strengths or challenges do you think are associated with practicing veterinary medicine in a rural community and in rural community practice?

8. Now that you are at the end of your program and given your experience, how would you describe your ability to be a competent rural community practitioner in Ontario/Canada?

9. Is there a difference between being technically competent and technically confident in your skills?

Section 3: The Rural Community Practice Stream Experience

10. What influenced your decision to enroll in the RCP stream?

11. What rotations were beneficial and in your opinion helped prepare you for rural community practice? What rotation(s) need improvement(s) or to be taken out of the curriculum?

12. What rotations or clinical experiences do you feel should be added to the curriculum to enhance your competency upon entering rural community practice?

13. Why did you choose the Approved External Practice(s) that you did?

14. Based on your responses and opinion on what you think a rural community veterinary practitioner should be – do you think that the experience you obtained at the AEP met those expectations?

15. Now that we have discussed all these items are there any additional strengths and/or weaknesses of the stream you would like to bring up?

Section 4: Recommendations and Future Plans

16. What do you think are opportunities to improve this stream based on your experience and our discussion of what a RCP is? Within the 4-year curriculum?

17. Do you have a job lined up? And, what were the major difficulties associated with trying to find a job in a rural community practice?
Focus Group Guide 2: DVM Phase-4 Rural Community Practice Stream Faculty Focus Group Feedback Session

**Background and Rationale:**
Curriculum changes were implemented in the 2014-2015 academic year to the Food-animal (FA) and Mixed-animal streams. One major change was the re-naming of the Mixed-animal stream to the to the Rural Community Practice (RCP) stream. Rural community veterinary practitioners work in a similar cultural environment to food animal veterinary practitioners. There is often a blurred line between what can be classified as rural community practice and a food animal practice. In April 2015 a focus group was conducted to capture the opinions of the students enrolled in the RCP stream and to reflect on the curriculum changes specific to that stream. The valuable feedback obtained identified the need for continued improvement of the RCP and FA streams. There is a need to further develop an understanding of what the differences are in the curriculum needs for training entry-level RCP and FA practitioners. Thus, in order to continue to inform improvements of both streams focus group sessions are being conducted with the Food animal and rural community practice stream faculty.

**Objectives:**
The objectives of this focus group are to seek the opinions of, and to obtain feedback from, the faculty of the RCP stream who teach graduating students from OVC in order to: inform stream development, understand why students select to enroll in the RCP stream, to seek their opinions of their RCP stream experiences, and to seek their opinion(s) on the FA stream option.

**Focus Group Questions:**

*Section 1: Setting the Context*

1. How would you define a Rural Community Practitioner?
2. What do you think a Rural Community Practice is?
3. What is the difference between Rural Community Practitioner and Food Animal Practitioner?

*Section 2: The Rural Community Practice and Practitioner*

4. What types of clinical skills do you feel an entry-level rural community practitioner should have in order to be technically competent?
5. What types of non-clinical skills do you feel an entry-level rural community practitioner should have?
6. Are the required entry-level clinical competencies different between graduating rural community practitioners versus food-animal practitioners?
7. What Strengths or challenges do you expect a new graduate to encounter when going into a career as a rural community practitioner?

8. Do you think new graduates from the rural community practice stream are technically competent and culturally prepared to be a rural community practitioner?

9. Is there a difference between being technically competent and technically confident in skills?

Section 3: The Rural Community Practice Stream Experience

10. What rotation(s) do you think are the most beneficial for a rural community practice stream student? What rotation(s) do you think need improvements or to be removed from the curriculum?

11. Are their rotation(s) or clinical experiences that you think could be added to the curriculum to enhance the learning of the rural community practice students?

12. Do you think the Approved External Rotation (AEP) provides an experience that is beneficial?

13. How would you mentor a student who may want to pursue the rural community practice stream?

14. Now that we have discussed all items are there any additional strengths or weaknesses of the stream you would like to bring up?

Section 4: Recommendations

15. Do you think there are opportunities to improve the RCP stream based on what you have experienced as a host AEP and working with new graduates?

16. Are you more, less or equally likely to hire an RCP graduate versus a student who enrolled in one of the other streams?
Focus Group Guide 3: DVM Phase-4 Rural Community Practice Stream Practitioner Focus Group Feedback Session

**Background and Rationale:**
Curriculum changes were implemented in the 2014-2015 academic year to the Food-animal (FA) and Mixed-animal streams. One major change was the re-naming of the Mixed-animal stream to the Rural Community Practice (RCP) stream. Rural community veterinary practitioners work in a similar cultural environment to food animal veterinary practitioners. There is often a blurred line between what can be classified as rural community practice and a food animal practice. In April 2015, a focus group was conducted to capture the opinions of the students enrolled in the RCP stream and to reflect on the curriculum changes specific to that stream. The valuable feedback obtained identified the need for continued improvement of the RCP and FA streams. There is a need to further develop an understanding of what the differences are in the curriculum needs for training entry-level RCP and FA practitioners. Thus, in order to continue to inform improvements of both streams focus group sessions are being conducted with the practitioners in rural community practices and food animal practices.

**Objectives:**
The objectives of this focus group are to seek the opinions of, and to obtain feedback from the Approved External Practice host practitioners, in order to: inform stream development, understand why students select to enroll in the RCP stream, to seek their opinions of their RCP stream experiences, and to seek their opinion(s) on the FA stream option.

**Focus Group Questions:**

*Section 1: Setting the Context*

1. How would you define a Rural Community Practitioner
2. What do you think a Rural Community Practitioner is?
3. What is the difference between Rural Community Practitioner and Food Animal Practitioner?

*Section 2: The Rural Community Practice and Practitioner*

4. What types of clinical skills do you feel an entry-level rural community practitioner should have in order to be technically competent?
5. What types of non-clinical skills do you feel an entry-level rural community practitioner should have?
6. Are the required entry-level clinical competencies different between graduating rural community practitioners versus food-animal practitioners?
7. What Strengths or challenges do you expect a new graduate to encounter when going into a career as a rural community practitioner?

8. Do you think new graduates from the rural community practice stream are technically competent and culturally prepared to be a rural community practitioner?

9. Is there a difference between being technically competent and technically confident in skills?

Section 3: The Rural Community Practice Stream Experience

10. What rotation(s) do you think would be the most beneficial for a rural community practice student? What rotation(s) do you think need improvements or to be removed from the curriculum?

11. Are their rotation(s) or clinical experiences that you think could be added to the curriculum to enhance the learning of the rural community practice students?

12. Do you think the Approved External Practice (AEP) rotation provides an experience that is beneficial?

13. How would you mentor a student who may want to pursue the rural community practice stream?

14. Are there any additional strengths or weaknesses of the stream you would like to bring up?

Section 4: Recommendations

15. Do you think there are opportunities to improve the stream based on what you have seen with the AEP and new graduates?

16. Are you more, less or equally likely to hire an RPC graduate versus the other three streams?