Shortage of livestock veterinary services in Colorado: results from producer, veterinarian, and veterinary student surveys

September 2024

Authors: Catie Cramer, MS, PhD[1], Kristen Davenport, DVM, PhD[2], Lily Edwards-Callaway, MS, PhD[1], Melinda Frye, DVM, MS, PhD, DACVIM[3], Kayleigh Keller, MS, PhD[4], Noa Román-Muñiz, MS, DVM[1], Lorann Stallones, PhD[5], Malei Tipton, MS[1], Sue VandeWoude, DVM[6]

[1]Department of Animal Sciences, College of Agricultural Sciences, Colorado State University

[2]College of Veterinary Medicine and Biomedical Sciences, Colorado State University

[3]Department of Biomedical Sciences, College of Veterinary Medicine and Biomedical Sciences, Colorado State University

[4]Department of Statistics, College of Natural Sciences, Colorado State University

[5]Department of Psychology, College of Natural Sciences, Colorado State University

[6]Department of Microbiology, Immunology and Pathology, College of Veterinary Medicine and Biomedical Sciences, Colorado State University

Executive Summary

In early 2023, CSU Chancellor Tony Frank convened a meeting of stakeholders to examine the issue of workforce shortages in the Colorado livestock/rural veterinary sector. Subsequently, Colorado State University (CSU) College of Veterinary Medicine and Biomedical Sciences (CVMBS) leadership partnered with College of Agricultural Sciences faculty to conduct several surveys to specifically identify the extent of the perceived shortage, and pinpoint short- and long-term solutions to this critical issue.

This summary document provides a comprehensive overview of surveys disseminated to Colorado livestock producers, veterinarians, and veterinary students in the summer and fall of 2023[1].

Over 65% of producers reported difficulties in obtaining veterinary services, which led to delayed or forgone services that negatively impacted animal health, welfare, and/or productivity.

Significant findings are summarized below.

1. **Producers** supported several solutions, including partnerships between veterinary schools and rural communities, financial incentives for veterinarians, and increased training of veterinary technicians.
2. **Rural Colorado veterinarians** highlighted challenges such as long working hours, large caseloads, and inadequate compensation. They supported enhanced continuing education, financial support for hiring staff, and mentorship programs.
3. Approximately 80% (~130) of the veterinary students who responded to the survey, representing all four years of the veterinary curriculum (approximately 30/class), indicated an interest in livestock medicine. Similarly, approximately the same number of respondents indicated an interest in rural veterinary medicine at some point during their studies. Extracurricular activities, hands-on learning, and mentorship were crucial in building and maintaining their interest in livestock medicine. Students felt well-prepared by their education, particularly in problem-solving, adaptability, collaboration, and empathy, but indicated a desire for more hands-on experiences. Mentorship from livestock/rural veterinarians was deemed critical for their success in interacting with livestock owners.

Overall, the surveys underscore the need for interventions to address the shortage of veterinary services in rural areas, emphasizing the importance of education, authentic experience, financial support, and mentorship in fostering a sustainable veterinary workforce.

The Livestock Veterinary Workforce Task Force convened in May and August 2024 to discuss these results and develop action items. CVMBS stakeholders worked with the research team to develop the accompanying report to describe the findings of these surveys and summarize the recommendations of the Task Force.

Specifically, CVMBS has specific plans to:

(1) increase opportunities for hands-on experiences, (2) partner with producer and veterinarian stakeholders to provide additional mentorship opportunities with funding support where possible, (3) revisit their engagement with undergraduate students in CVMBS and other colleges to foster early and sustained interest in livestock/rural veterinary medicine, and (4) continue to study the workforce shortage and the effectiveness of interventions. Robust engagement from those living and practicing within rural communities, and a

commitment to welcoming and supporting new veterinarians, will be critical for the success of these initiatives.

The attached report details the current state of the livestock veterinary shortage in Colorado, and tangible efforts being undertaken by CVMBS, with support from stakeholders, to prepare veterinary students to thrive within livestock/rural practice.

Table of Contents

1. Task Force Background

Chancellor Tony Frank, DVM, PhD (Colorado State University System) convened a task force in 2023 to address the shortage of livestock veterinary services in Colorado. The initial task force determined that data from stakeholders (e.g., producers, veterinarians, and CSU veterinary students) should be collected.

Members of the initial task force:

- Curtis Crawford, DVM (Alpine Veterinary Hospital and American Veterinary Medical Association Delegate for the Colorado Veterinary Medical Association)
- Melinda Frye, DVM, MS, PhD, DACVIM (Department of Biomedical Sciences and Associate Dean for Veterinary Academic and Student Affairs, CSU)
- Landon Gates, BS (Director of Public Policy, Colorado Farm Bureau)
- Erin Karney, MS (Executive Vice President, Colorado Cattlemen's Association)
- Zach Riley, BS (CEO, Colorado Livestock Association)
- Keith Roehr, DVM (former state veterinarian, Colorado Department of Agriculture)
- Kate Siegel Shimko (Assistant Vice Chancellor for Community Engagement; CSU System)
- Sue VandeWoude, DVM (Dean, CSU College of Veterinary Medicine and Biomedical Sciences)

2. Producer and Veterinarian Survey

2.1 Abstract

Surveys were completed by 202 producers, 34 veterinarians, and 9 individuals that identified as both a producer and a veterinarian. Over 65% of producer respondents indicated that they had difficulties obtaining veterinary services within the past year (Section 2.6.4).

When surveying Colorado livestock producers, surgical procedures, obtaining veterinary drugs, disease diagnoses, regulatory testing, and assistance with live birth (obstetrics) were the most challenging veterinary services to obtain. Nearly half of the producers reported that services were forgone or delayed due to a lack of veterinarian presence in their area, limited access to specialists and/or to the present veterinarians' lack of timely response to their needs. Producers indicated that animal health, access to preventative care, animal welfare, financial concerns, operation profitability, animal productivity, and involuntary culling were the biggest concerns related to the shortage of livestock veterinary services. When asked about their perspectives on potential solutions to remedy this shortage, producers supported ideas of forming partnerships between veterinary schools and producers in rural communities, increasing financial support and incentive for veterinarians practicing rural medicine, allowing veterinary students to perform services at a reduced cost, increasing producer and veterinary technician training on animal care skills, and establishing a telehealth program for remote veterinary consultations.

When surveying Colorado livestock veterinarians, most respondents indicated that the following are challenges that impact their ability to practice livestock veterinary medicine: having to work outside of business hours, having a large and overwhelming caseload, earning inadequate compensation, supply shortages, lack of funding to hire support staff, and compassion fatigue. In addition to these specific challenges, almost one-third of respondents indicated that their job was made more difficult by bias against

their gender. When asked about resources that could help address challenges, veterinarians listed solutions including enhanced continuing education for veterinary procedures, programs to supplement financial costs of hiring additional veterinarians and staff, having additional veterinary staff in their practice, and receiving mentorship from other veterinarians in the community or professional sector. Furthermore, most veterinarians indicated that additional professional staff (i.e. DVM, veterinary technician, or other qualified individuals) and advanced training for veterinary technical staff would significantly improve the delivery of veterinary care to clients. Veterinarians' interests in type of clinical practice or specialization were largely unchanged prior to veterinary school and upon graduation; this may be due to the population of veterinarians who took the survey, which included individuals currently practicing livestock veterinary medicine.

Regarding preparing new graduates for careers in livestock veterinary medicine, producers valued the following skills and attributes in their veterinarians: the ability to teach/train farm personnel on animal care procedures, access to modern equipment and technology, empathy for animals, hands-on experience with the species they work with, strong interpersonal skills, and a willingness to collaborate with other specialists. Most veterinarians reported that their veterinary education prepared them well to provide veterinary care for livestock and to interact with livestock producers. Most veterinarians indicated that the following curricular offerings are essential to help graduates be successful in providing veterinary care to livestock: practical training/hands-on learning, practicing diagnostic procedures, instruction and practice of herd health management and preventative medicine techniques, and exposure to diverse production systems.

2.2 Survey Development and Dissemination:

A team of researchers well-versed in surveys developed a questionnaire. The questionnaire was reviewed by the select members of the task force prior to dissemination.

Members of the survey development team:

- Catie Cramer, MS, PhD (Principal Investigator, Department of Animal Sciences, CSU)
- Lily Edwards-Callaway, MS, PhD (Department of Animal Sciences, CSU)
- Kayleigh Keller, PhD (Department of Statistics, CSU)
- Noa Román-Muñiz, DVM, MS (Department of Animal Sciences, CSU)
- Lorann Stallones, MPH, PhD (Department of Psychology, Director, High Plains Intermountain Center for Agricultural Health and Safety)

Members of the task force and questionnaire review team:

- Maggie Baldwin, DVM (current state veterinarian, Colorado Department of Agriculture)
- Curtis Crawford, DVM (Alpine Veterinary Hospital and American Veterinary Medical Association Delegate for the Colorado Veterinary Medical Association)
- Sarah Dideriksen, MS (Industry Advancement Director, Colorado Cattlemen's Association)
- Melinda Frye, DVM, MS, PhD, DACVIM (Department of Biomedical Sciences and Associate Dean for Veterinary Academic and Student Affairs, CSU)
- Jenna Gotte, MPH/DVM Candidate (Colorado School of Public Health and College of Veterinary Medicine and Biomedical Sciences, CSU)
- Wayne Jensen, DVM, MBA (Department of Clinical Sciences, CSU)
- Erin Karney, MS (Executive Vice President, Colorado Cattlemen's Association)
- Erica Machuca, BS (Department of Animal Sciences)

- Rhyannon Moore-Foster, DVM (Department of Clinical Sciences, CSU)
- Sarah Raabis, DVM, PhD (Department of Clinical Sciences, CSU)
- Keith Roehr, DVM (former state veterinarian, Colorado Department of Agriculture)
- Sue VandeWoude, DVM (Dean, CSU College of Veterinary Medicine and Biomedical Sciences)

2.3 Survey Inclusion Criteria

Participants for the producer survey were over the age of 18 and owned and/or cared for livestock (i.e. cattle, sheep, pigs, goats), poultry, horses, and/or camelids in Colorado. Participants for the veterinarian survey were over the age 18 and were licensed veterinarians currently providing veterinary services for livestock (i.e. cattle, sheep, pigs, goats), poultry, horses, and/or camelids in Colorado. In addition, graduates of CSU veterinary school within the last 5 years were also invited to participate, regardless of current role.

2.4 Survey Objectives

Producer Survey

1. Determine the skills and characteristics necessary for veterinarians/veterinary practices to be successful in rural Colorado.
2. Identify services, skills, and characteristics livestock producers desire in veterinarians.
3. Describe current and future cultural, economic, and societal trends that new veterinary graduates need to be prepared to manage.
4. Describe producers' challenges associated with a shortage of livestock veterinary services (e.g. animal welfare, financial, stress).

Veterinarian survey

1. Describe if, how and why Colorado veterinarians' interests in practicing rural livestock medicine change.
2. Identify factors that limit employment of veterinarians in rural CO.
3. Describe current and future cultural, economic, and societal trends that new veterinary school graduates need to be prepared to manage.
4. Identify skills needed to be successful in livestock practice in CO.
5. Describe veterinarians' challenges associated with a shortage of livestock veterinary services (e.g. animal welfare, finances, stress).

2.5 Survey Distribution

The survey was distributed online from July-September 2023 via the following organizations and list-servs: Colorado Cattlemen's Association (CCA), Colorado Livestock Association (CLA), Colorado Veterinary Medical Association (CVMA), American Association of Bovine Practitioners (AABP), CSU Extension, Colorado Beef Quality Assurance (BQA), and via personal and professional networks. In addition, graduate students traveled to county fairs in Colorado to recruit participants. A $10 gift card incentive was provided to participants for completing the survey.

2.6 Results from Producer Survey

2.6.1 Demographics of producer respondents

There were 202 producers who responded, and 9 individuals who identified as both producers and veterinarians. Results below, unless otherwise stated, include producers and producer-veterinarians. Fifty-four percent of respondents were female (n=114) and 86% were white. The most common age group for respondents was 45-54 (23%, n=48), followed by 65-75 (20%, n=42), 35-44 (18%, n=38), 55-64 (17%, n=35), and 25-34 (10%, n=22). Most respondents were on a commercial operation that raises animals with the intent to sell the animals or animal products (63.1%, n=130), followed by 4-H or hobby farm (26.7%, n=55), and other (10.2%, n=21). Examples of responses for "other" included sanctuary, equine boarding, training, and showing, and rodeo. Most respondents were owners of their operation (90.4%, n=179); a smaller proportion of respondents identified as managers (26.3%, n=52) and caretakers (13.6%, n=27). These categories were not mutually exclusive. Approximately half of respondents had 20+ years of experience (Table 2.6.1).

Table 2.6.1: Proportion of respondents in each experience category.

Years of experience	% (n)
Less than 5 years	7.3% (15)
5-10 years	15.5% (32)
11-20 years	21.8% (45)
21-30 years	21.4% (44)
More than 30 years	34% (70)

2.6.2 Species

Most respondents (71%, n=150) had beef cattle on their operation (Table 2.6.2a). There was a range in operation size across species, with the largest operations being those with beef cattle (Table 2.6.2b).

Table 2.6.2a: Proportions and counts of producers with each species on their operation (Proportion sum exceeds 1 due to most producers having multiple species).

Species	% (n)
Camelids	4% (9)
Cattle (Beef)	71% (150)
Cattle (Dairy)	7% (14)
Goats	15% (31)
Horses	65% (137)
Pigs	12% (26)
Poultry	35% (74)
Sheep	13% (27)
Other	9% (19)

Table 2.6.2b: Number of animals for which respondents reported having primary responsibility and overseeing daily care, limiting the quintiles to the producers with ≥1 of each species.

Species	Median	Min, Max	1st quartile, 3rd quartile
Camelids	2	1, 36	2, 20
Cattle (Beef)	130	1, 27000	35, 300
Cattle (Dairy)	3	1, 7000	1.25, 7.5
Goats	8	1, 90	2, 20
Horses	5	1, 40	3, 8
Pigs	3	1, 530	2, 7.5
Poultry	20	2, 3000	10, 40
Sheep	18	1, 150	5, 37.5
Other	4	1, 100	2, 5

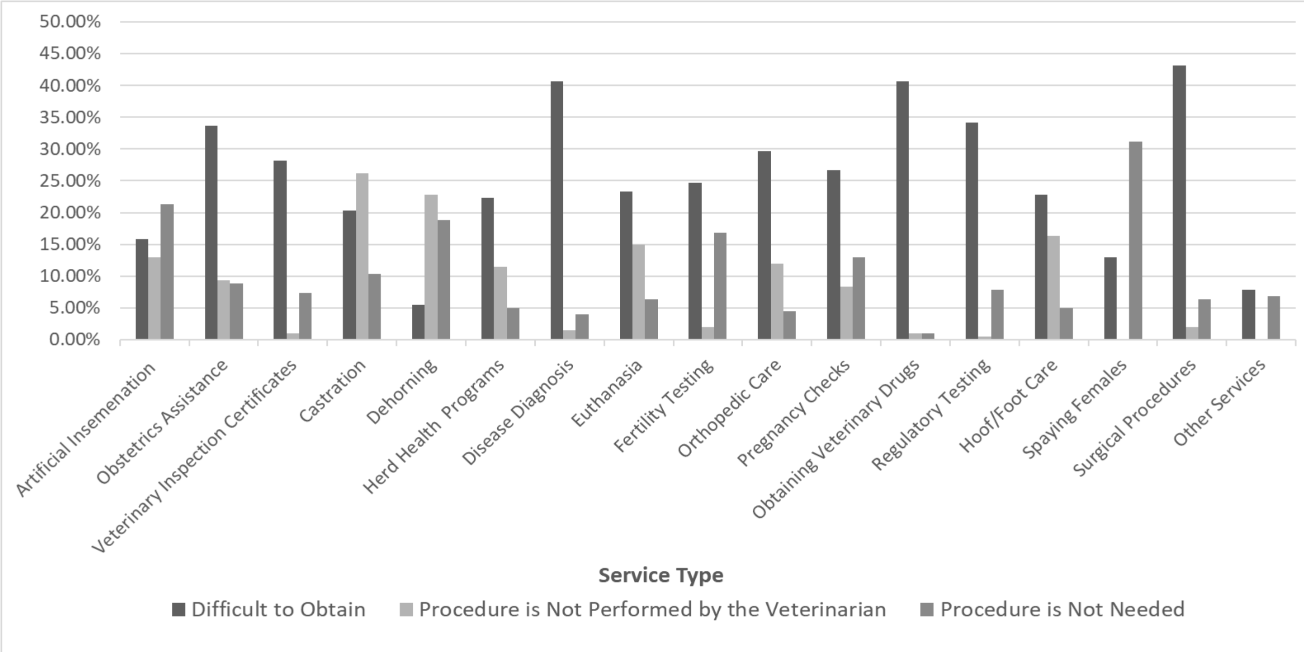
2.6.3 County of operation

At least one response was received from every county in Colorado, with Montezuma (9.9%, n=27), La Plata (6.2%, n=17), Larimer (5.1%, n=14), Weld (4.8%, n=13), and Pueblo (4.4%, n=12) being the most common. The region of Colorado most frequently represented was the Western region (33.3%, n=91), followed by the Southern region (25.3%, n=69), the Eastern region (17.9%, n=49), the Front Range region (16.1%, n=44), and the Mountain region (7.3%, n=20).

2.6.4 Difficulty Obtaining Services

The majority (66.8%, n=133) of respondents reported they had difficulty obtaining veterinary services for livestock in the past year. Procedures that were challenging or very challenging for over half of the respondents to obtain were surgical procedures (74%), veterinary drugs (68%), disease diagnosis (68%), regulatory testing (59%), obstetrics assistance (57%), and orthopedic care (52%; Figure 2.6.4).

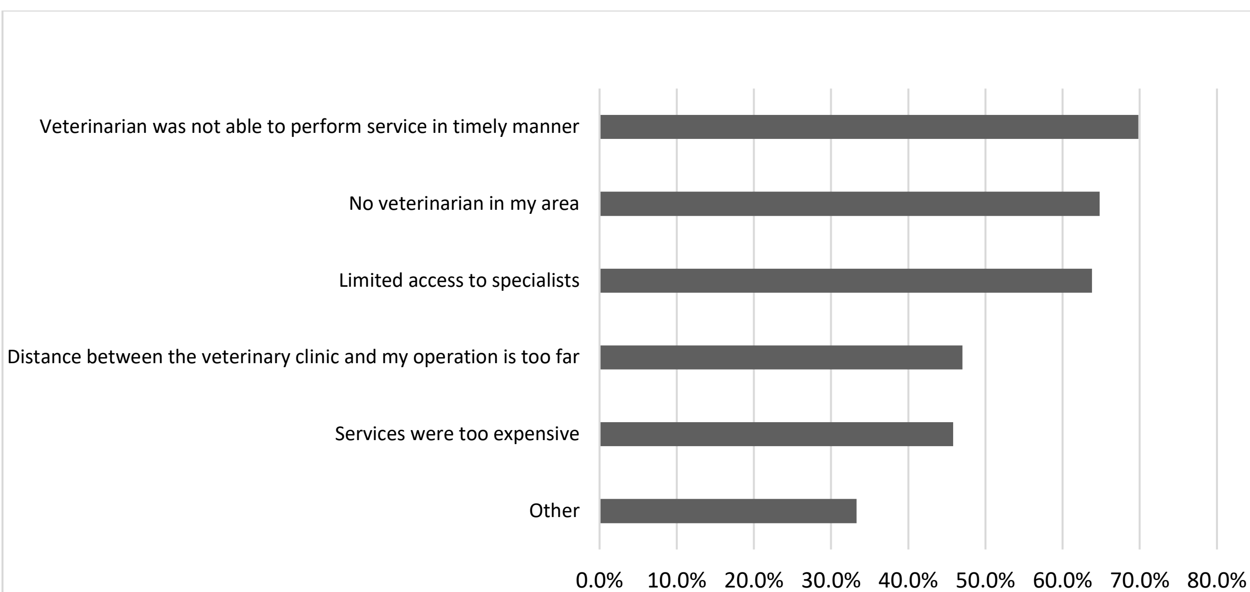
Figure 2.6.4: Proportion of producers who indicated a given procedure was "challenging" or "very challenging" to obtain within the last year, not needed for the operation, or not performed by a veterinarian.



2.6.5 Reasons for delayed veterinary care

The most common reason (70%; n=88) that veterinary care was delayed or forgone over the past year was that a veterinarian was not able to perform the service in a timely manner (Figure 2.6.5).

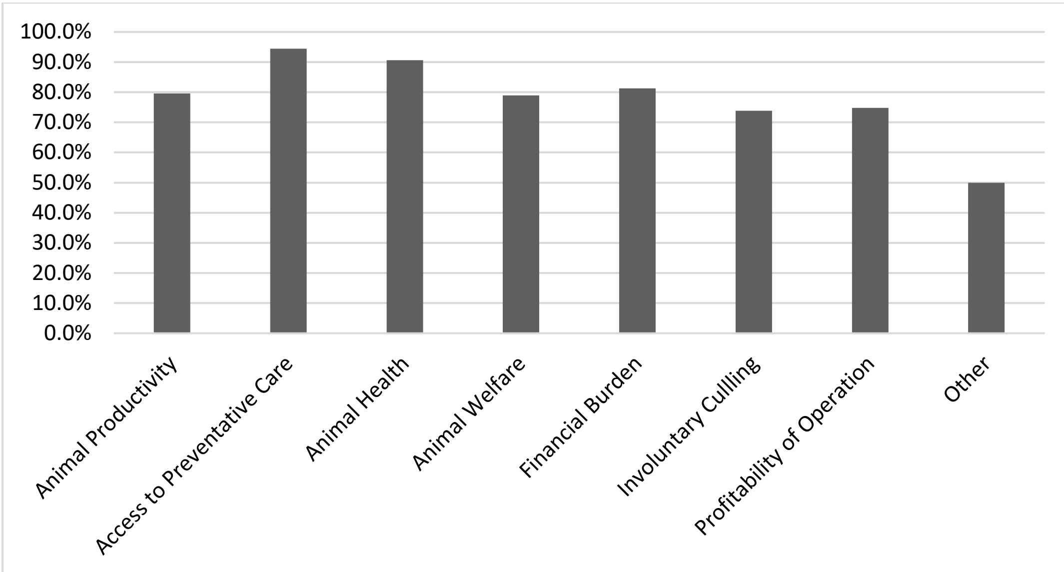
Figure 2.6.5: The proportion of respondents who indicated veterinary care was delayed or forgone "fairly often" or "very often" over the past year, by reason for delay.



2.6.6 Producers' concerns related to the veterinary shortage

The most frequently reported concerns due to the veterinary shortage were "access to preventative care" and "animal health" (Figure 2.6.6).

Figure 2.6.6: Proportion of producers who reported they were "somewhat concerned" or "very concerned" about various consequences of the veterinary shortage.



2.6.7 Animal diseases exacerbated by shortage

Over half of respondents reported that digestive, reproductive, and respiratory disease were exacerbated by the shortage of livestock veterinary services (Table 2.6.7).

Table 2.6.7: Proportion and counts of producers who indicated diseases were exacerbated by the shortage of livestock veterinary services.

Diseases	**Proportion that responded 'yes', % (n)**
Digestive	59.3% (67)
Respiratory	58.4% (66)
Reproductive	52.2% (59)
Musculoskeletal	44.2% (50)
Dental	36.3% (41)
Ocular	35.4% (40)
Cardiovascular	33.6% (38)
Mammary	30.1% (34)
Neurologic	23.0% (26)
Dermatologic	22.1% (25)
Metabolic	22.1% (25)
Urinary	18.6% (21)
Other	8.0% (9)

2.6.8 Level of satisfaction with veterinary services received in the past year

Overall, most producers were satisfied by the services provided by their veterinarian (Table 2.6.8).

Table 2.6.8: Proportion of producers who were "dissatisfied", "neither satisfied or dissatisfied", or "satisfied" with a procedure or service performed by their veterinarian; denominator includes those who did not respond with "n/a" for a given procedure.

Procedure or service	Dissatisfied, % (n)	Neither dissatisfied or satisfied, % (n)	Satisfied, % (n)
Artificial insemination	8% (2)	0% (0)	92% (22)
Obstetrics	36% (27)	0% (0)	64% (48)
Veterinarian Inspection Certificates	17% (22)	0% (0)	83% (107)
Castration	12% (6)	0% (0)	88% (45)
Dehorning	17% (4)	0% (0)	83% (19)
Herd Health Programs	28% (26)	0% (0)	72% (68)
Disease Diagnosis	35% (44)	0% (0)	65% (80)
Euthanasia	34% (25)	0% (0)	66% (48)
Fertility testing	27% (22)	0% (0)	73% (60)
Orthopedic care	36% (28)	0% (0)	64% (49)
Pregnancy checking	27% (27)	0% (0)	73% (74)
Obtaining veterinary drugs	34% (48)	0% (0)	66% (92)
Regulatory testing	22% (28)	0% (0)	78% (99)
Hoof/foot care		0% (0)	57% (40)
Spaying female livestock		0% (0)	45% (10)
Surgical procedures		0% (0)	60% (53)
Other		85% (33)	5% (2)

2.6.9 Skills that producers desire in veterinarians

Veterinarians' skills and offerings that were very important to most producer respondents included: affordable pricing (52.1%, n=101), availability for emergency situations (80.2%, n=154), empathy/compassion for animals (57.0%, n=110), and hands-on experience with livestock, poultry, horses, and/or camelids (71.4%, n=137). Veterinarians' skills and offerings that were designated as moderately or very important to a majority of respondents included the ability to teach/train farm personnel on animal care procedures (82.3%, n=158), access to modern diagnostic equipment and technology (84.9%, n=163), good interpersonal skills (81.8%, n=158), and willingness to collaborate with other specialists (83.9%, n=161).

2.6.10 Characteristics that producers desire in veterinarians

The majority of respondents reported that age, gender, identity, and race were not important. However, being part of the local community was moderately or very important to a majority of respondents.

2.6.11 Producers' perceptions towards potential solutions

The potential solutions viewed most favorably by respondents were developing partnerships between veterinary schools and livestock producers to provide hands-on livestock experience for veterinary students and increasing financial support and incentive for veterinarians to practice in rural areas (Table 2.6.11). When asked if they would be willing to pay more for veterinary services or contribute to a fund to support the recruitment and retention of veterinarians to practice livestock medicine in rural areas, 29.2% (n=56) said 'yes', 47.4% (n=91) said they were 'unsure', and 23.4% (n=45) said 'no'. Three-quarters (73%, n=141) of respondents would be willing to host veterinary students on their operation so that they could obtain training and hands-on experience, and possibly establish community networks. Similarly, 68% (n=131) of respondents would be willing to provide training to veterinary students for non-veterinary procedures such as animal handling.

Table 2.6.11: Proportions of respondents who reported that a given solution would be helpful in addressing the shortage of livestock veterinary services in Colorado.

Potential Solution	% (n)
Develop partnerships between veterinary schools and livestock producers to provide hands-on livestock experience for veterinary students	83.0% (161)
Increase financial support and incentive for veterinarians to practice in rural areas	80.4% (156)
Develop partnerships between veterinary schools and rural communities to provide veterinary services at reduced costs while training veterinary students	72.7% (141)
Develop outreach or training programs for undergraduate students to increase their interest in practicing livestock medicine	69.6% (135)
Implement training programs to educate livestock producers about basic animal care skills, while still having veterinary oversight	61.9% (120)
Advanced training for veterinary technical workforce to perform certain services with appropriate veterinary oversight	57.7% (112)
Establish telemedicine programs that allow livestock producers to consult with veterinarians remotely	52.1% (101)

2.7 Results from Veterinarian Survey

2.7.1 Demographics of veterinarian respondents

There were 34 veterinarians who responded, and 9 individuals who identified as both producers and veterinarians. Results below, unless otherwise stated, include veterinarians and producer-veterinarians. Seventy-one percent of respondents were female (n=24) and 86% were white. The most common age group for respondents was 45-54 (23%, n=9), followed by 65-75 (20%, n=8). An equivalent proportion of respondents were 25-34 (18%, n=7), 35-44 (18%, n=7), and 55-64 (18%, n=7). Most of the veterinarians surveyed (70.7%) attended Colorado State University for veterinary school (Table 2.7.1a) and 42% of respondents had over 25 years of experience in the field of veterinary medicine (Table 2.7.1b). The veterinarians surveyed spanned 50 of the 64 counties in Colorado, with Weld County (11.0%), Adams County (6.8%), Larimer County (6.2%), and Arapahoe County (4.1%) having the highest percentage of surveyed veterinarians.

Table 2.7.1a: Proportion of respondents, by veterinary school attended.

School	Proportion, %(n)
Colorado State University	70.7% (29)
Iowa State University	4.9% (2)
Kansas State University	4.9% (2)
Texas A&M University	2.4% (1)
Tuskegee University	2.4% (1)
University of California, Davis	2.4% (1)
University of Missouri-Columbia	4.9% (2)
University of Tennessee	2.4% (1)
Washington State University	4.9% (2)

Table 2.7.1b: Proportion of respondents, by years in practice.

Years of experience	% (n)
Less than 5 years	20.9% (9)
5-10 years	4.7% (2)
10-15 years	11.6% (5)
15-20 years	9.3% (4)
20-25 years	11.6% (5)
Over 25 years	41.9% (18)

2.7.2 Practice characteristics

The species for which most veterinarians provided care were horses (92.9%) and beef cattle (90.5%; Table 2.7.2a). Seventy-four percent (n=32) and 65.1% (n=28) of veterinarians indicated that they provide individual animal care/herd health for small to medium scale producers and individual animal care for backyard/hobbyist producers, respectively (the categories were not mutually exclusive; Table 2.7.2b).

Table 2.7.2a: Proportion of respondents that provide veterinary care for the following species.

Species Cared For	Proportion of respondents that provide veterinary care for a species, % (n)
Horses	92.9% (39)
Cattle (Beef)	90.5% (38)
Goats	73.8% (31)
Dogs	69.0% (29)
Cattle (Dairy)	66.7% (28)
Sheep	66.7% (28)
Cats	64.3% (27)
Pigs	59.5% (25)
Poultry	52.4% (22)
Camelids	52.4% (22)
Exotics	42.9% (18)

Table 2.7.2b: Proportion of respondents for each practice type.

Practice type	Proportion that provided veterinary services, %(n)
Individual animal care/herd health for small to medium scale producers	74.4% (32)
Individual animal care for backyard/hobbyist	65.1% (28)
Consultation for large scale livestock producers	32.6% (14)
Other	23.3% (10)

2.7.3 Experience with animals prior to veterinary school

Most veterinarians had prior experience with dogs (97.6%), horses (97.6%), beef cattle (80.5%), cats (75.6%), and goats (56.1%) before entering veterinary school (Table 2.7.3a). Respondents most frequently indicated they obtained experience from an agricultural or farm background (73.2%, n=30; Table 2.7.3b)

Table 2.7.3a: Proportion of respondents with experience with each species prior to veterinary school.

Species	Proportion of respondents, % (n)
Dogs	97.6% (40)
Horses	97.6% (40)
Cattle (Beef)	80.5% (33)
Cats	75.6% (31)
Goats	56.1% (23)
Cattle (Dairy)	43.9% (18)
Sheep	43.9% (18)
Poultry	39.0% (16)
Camelids	24.4% (10)
Exotics	22.0% (9)
Other	2.4% (1)

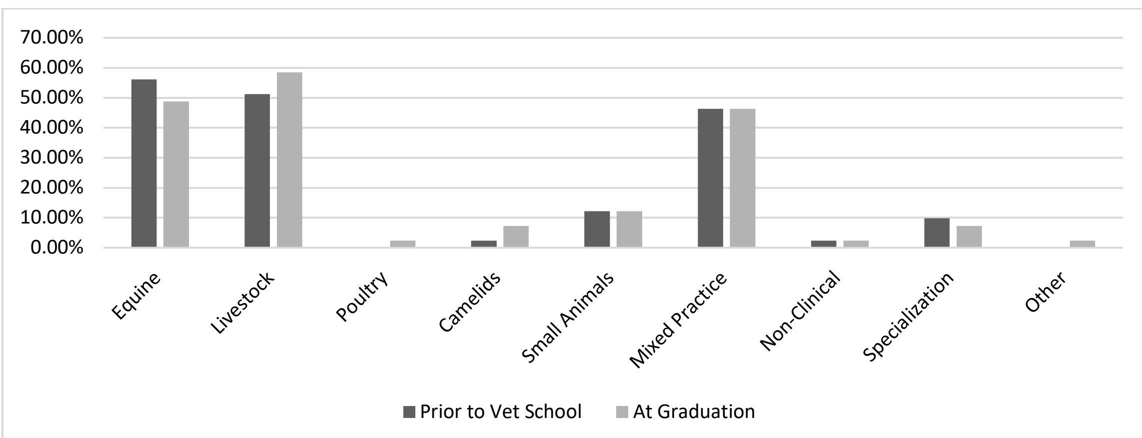
Table 2.7.3b: Method of obtaining experience with animals prior to veterinary school, by proportion of respondents.

Method of Obtaining Experience	% (n)
Agricultural/Farm Background	73.2% (30)
Owned Livestock, Poultry, Horses, and/or Camelids Growing Up	68.3% (28)
Working in a Veterinary Clinic (Livestock, Poultry, Horses, and/or Camelids)	63.4% (26)
4-H/FFA	61.0% (25)
Undergraduate Opportunity	48.8% (20)
Formal Education/Training in Veterinary Medicine	43.9% (18)
Internships/Externships	41.5% (17)
Workshops, Conferences, or Seminars Focusing on Providing Care	26.8% (11)
Other	9.8% (4)

2.7.4 Planned Practice Area – Prior to School vs At Time of Graduation

Respondents' areas of practice remained similar prior to veterinary school and at graduation (Figure 2.7.4).

Figure 2.7.4: Respondents' planned area of practice prior to and at graduation from veterinary school.



2.7.5 Loan forgiveness programs

Sixty-six percent of veterinarians did not participate in any type of loan forgiveness or repayment options (Table 2.7.5). Of those, most of them (68.0%) have been in the practice for at least 20 years. The 5.3% of veterinarians that received assistance through the PSLF have all been practicing for less than 20 years.

Table 2.7.5: Proportion of respondents that participated in loan forgiveness or repayment plans.

Loan Forgiveness Program	%(n)
Income-Driven Repayment Plans	23.7% (9)
Other	7.9% (3)
Public Service Loan Forgiveness (PSLF)	5.3% (2)
Veterinary Medicine Loan Repayment Program (VMLRP)	5.3% (2)
State-Specific Loan Forgiveness Programs	2.6% (1)
Employer-Sponsored Loan Repayment Plans	2.6% (1)
Did not participate in student loan forgiveness/repayment	65.8% (25)

2.7.6 Perceived level of preparedness after veterinary school

Seventy-six percent of veterinarians felt prepared to provide veterinary care for livestock, poultry, horses, and/or camelids after veterinary school and 56.1% of veterinarians felt prepared to interact with producers after veterinary school.

Figure 2.7.6a: Number of respondents that felt prepared to provide veterinary care after their veterinary education, by years of experience in the field.

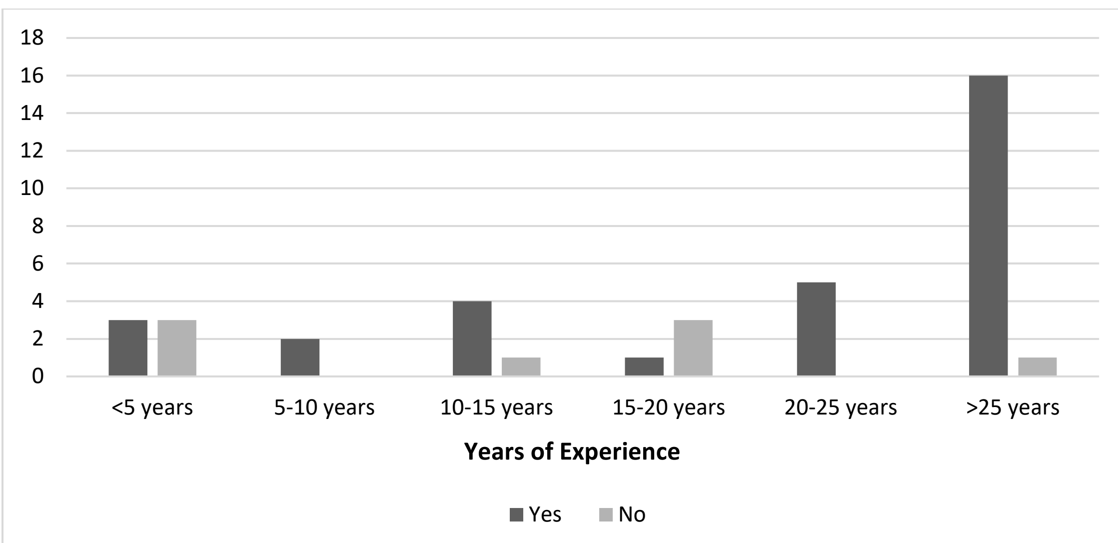
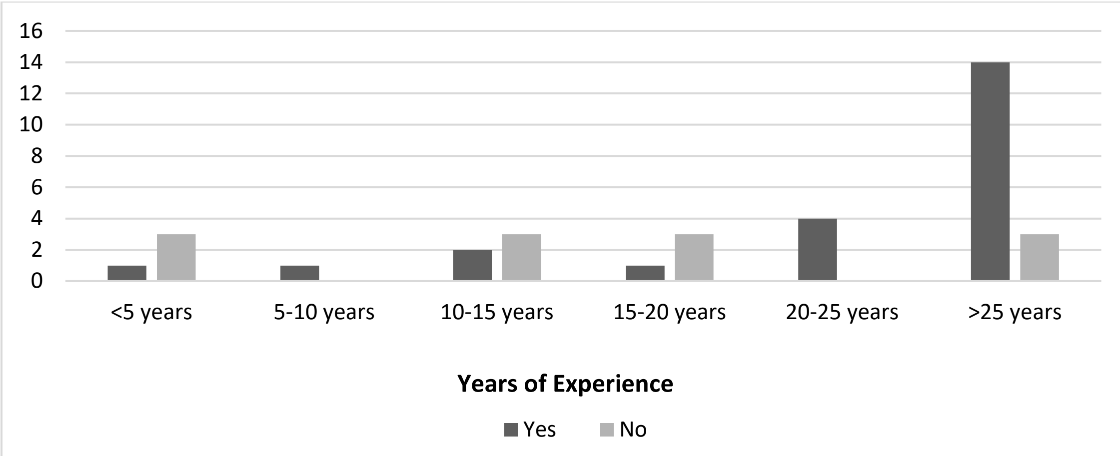


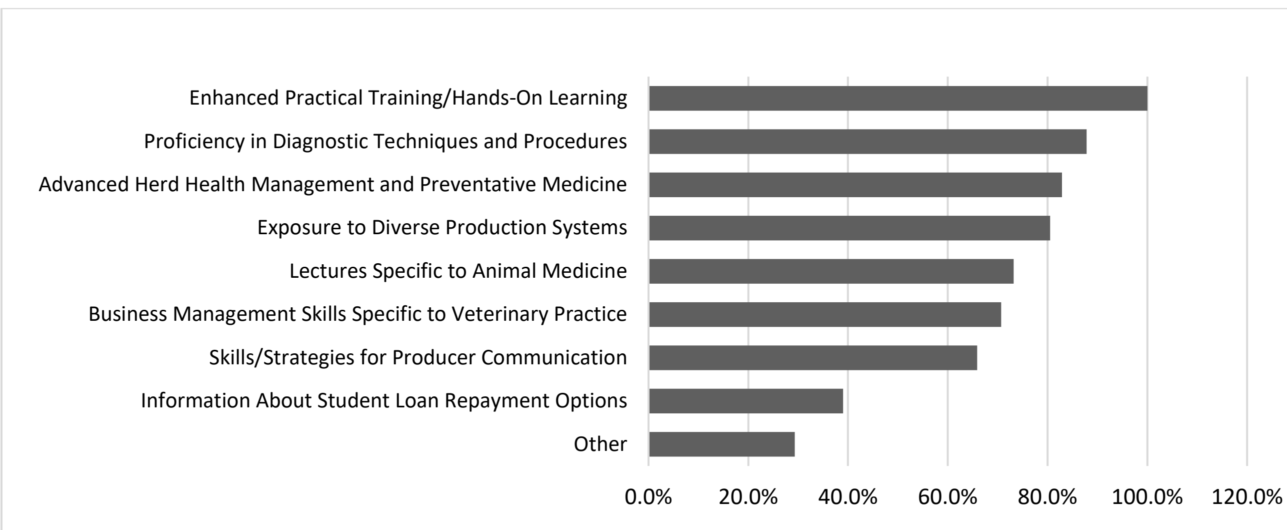
Figure 2.7.6b: Number of respondents that felt prepared to interact with producers after their veterinary education, by years of experience in the field.



2.7.7 Curricular elements viewed as essential components of veterinary education

All respondents (100%, n=41) indicated that enhanced practical training or hands-on learning should be an essential component of veterinary school curriculum (Figure 2.7.7).

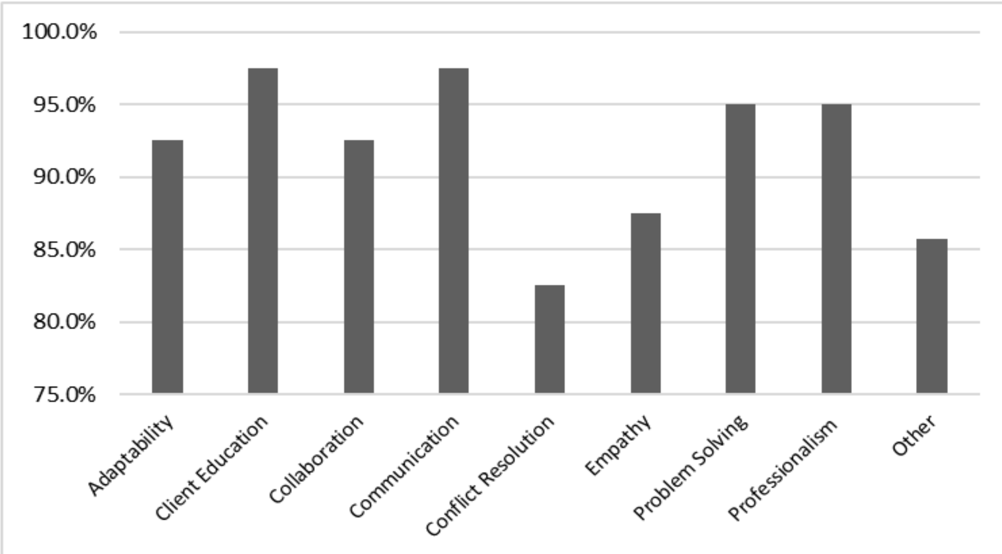
Figure 2.7.7: Proportion of respondents that indicated a given curricular component should be an essential part of the veterinary school curriculum.



2.7.8 Importance of interpersonal skills

Over 95% of respondents indicated that key interpersonal skills for professional success are client education, communication, problem solving, and professionalism (Figure 2.7.8).

Figure 2.7.8: Proportion of respondents that indicated each interpersonal skills were important to be successful in livestock veterinary medicine.



2.7.9 Factors impacting veterinarians' ability to practice veterinary medicine for livestock

Some of veterinarians' concerns that impact their ability to practice livestock veterinary medicine include working outside of business hours (81%, n=30), caseload/amount of work (71%, n=27), inadequate salary/compensation (69%, n=24), supply shortages (68%, n=23), and compassion fatigue (64%, n=23; Table 2.7.9).

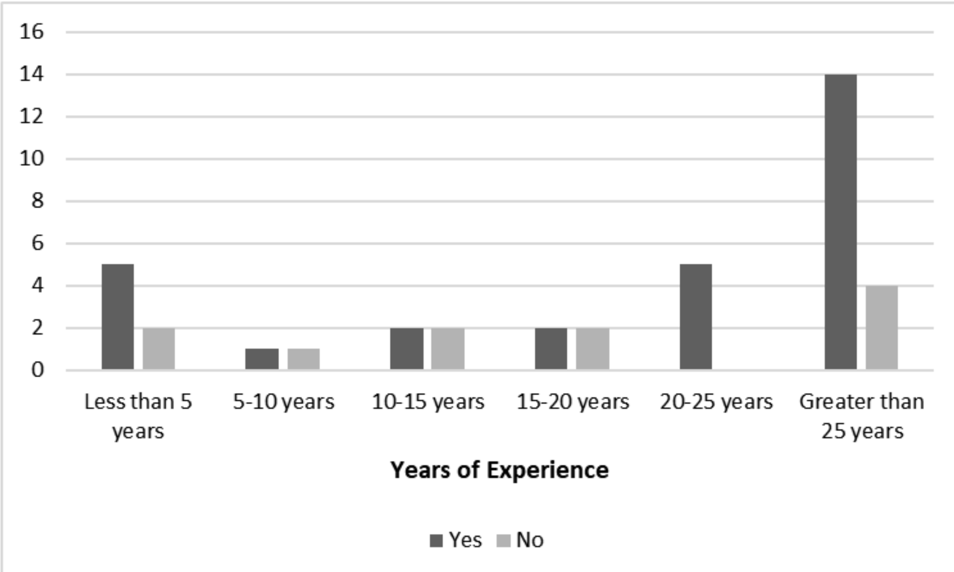
Table 2.7.9: Proportion of respondents that indicated a given factor impacted their ability to practice livestock veterinary medicine.

Impact on Ability to Practice	**Proportion Affected, %(n)**
Working Outside of Normal Business Hours	81.0% (30)
Caseload/Amount of Work	71.0% (27)
Inadequate Salary/Compensation	68.6% (24)
Supply Shortages	67.6% (23)
Funding to Hire Support Staff	65.8% (21)
Compassion Fatigue	63.9% (23)
Lack of Support Staff	62.9% (22)
Veterinary Salary	60.5% (23)
Student Loan Repayment	58.3% (14)
HR Management of Staff in Veterinary Practice	50% (14)
Lack of Mentors/Mentorship from Other Veterinarians	48.5% (17)
Location of Practice Relative to Clients	48.5% (17)
Clerical and Billing Tasks	45.9% (17)
Lack of Equipment	42.4% (14)
Disagreements with Clients About Animal Care Decisions	40.5% (15)
Availability of Medical Care, Childcare, etc.	39.2% (11)
Animal Welfare Concerns	35.1% (13)
Delegating Tasks to Other Staff in my Practice	33.3% (11)
Interactions with Clients	28.2% (11)
Mental Health and/or Access to Mental Health Resources	28.6% (8)
Communicating with Animal Caretakers	27.5% (11)
Access to Schools	27.3% (6)
Conflicts with other Veterinarians	22.6% (7)
Other	66.7% (2)

2.7.10 Respondents' perceptions about a career in livestock veterinary medicine in Colorado being sustainable

Most respondents (72.5%; n=29) indicated that being a livestock veterinarian in Colorado is a sustainable career choice for them in the long-term. The proportion of respondents that indicated a career in livestock veterinary medicine is sustainable was greatest among those that have been in the career for longer (≥ 20 years; Figure 2.7.10).

Figure 2.7.10: Number of respondents that felt a career in livestock veterinary medicine was a sustainable career choice, by years of experience.



2.7.11 Respondents' perceptions about resources to address the challenges of providing veterinary care to livestock

The majority (66.7%) of veterinarians felt that continuing education programs for veterinary procedures would be beneficial in addressing the challenges they face in providing veterinary care (Table 2.7.11). Forty-nine percent, 46.2%, and 46.2% of veterinarians also felt that programs to supplement financial costs of hiring additional veterinarians and staff, having additional veterinary staff in their practice, and getting mentorship from other veterinarians in the community or professional sector, respectively, would be helpful in addressing the challenges they face in providing veterinary care (Table 2.7.11). These categories were not mutually exclusive.

Table 2.7.11: Proportions of respondents that indicated a given resource would be helpful to address the challenges experienced when providing veterinary care to livestock.

Resource	**% (n)**
Continuing education for veterinary procedures	66.7% (26)
Programs to supplement financial costs to hire additional veterinarians/staff	48.7% (19)
Additional veterinary staff in this practice	46.2% (18)
Mentorship from other veterinarians in the community	46.2% (18)
Financial education programs (veterinary practice management)	41.0% (16)
Additional veterinary technical staff in this practice	38.5% (15)
Student loan forgiveness options	38.5% (15)
Training programs to help veterinarians train producers/caretakers	30.8% (12)
Financial education programs (personal finances, investments, estate planning)	25.6% (10)
Additional veterinary practices in my community	23.1% (9)
Training to help veterinarians communicate and/or resolve conflicts with caretakers or producers	23.1% (9)
Financial education programs (student loans)	12.8% (5)
Training about human resource management	12.8% (5)
A co-op model where corporate oversees clerical, billing, and HR	10.3% (4)
Mental health services/support	10.3% (4)
Mentorship or assistance developing relationships in the community	0.0% (0)
Other	15.4% (6)

2.7.12 Additional Training & Staff

Most respondents (67.5%, n=27) felt that having additional professional staff in their practice would improve their delivery of veterinary care to livestock. In addition, approximately half of respondents (51.3%, n=20) felt that having advanced training for veterinary technicians would improve their delivery of veterinary care to livestock.

2.7.13 Personal characteristics and their perceived impact on respondents' ability to perform job duties

Forty-one percent (n=13), 31.2% (n=10), and 3.1% (n=1) of veterinarians "agreed" or "strongly agreed" that their jobs are made more difficult due to biases against their gender, age, and race/ethnicity, respectively (these categories were not mutually exclusive). No respondents indicated their job was made more difficult due to biases against religion or sexual orientation.

The majority of respondents (85%) felt that their personal background with livestock, poultry, horses, and/or camelids, outside of formal veterinary school training, is important to producers.

2.8 Task Force Discussion Regarding Potential Solutions: Producer and Veterinarian Survey

2.8.1 Earlier Student Touchpoints

Many of the veterinarians that responded to the survey indicated that hands-on experiences during their time in veterinary school helped equip them with the skills and confidence to be successful in their careers. Thus, the task force identified a priority to expose students early in their training to hands-on learning opportunities. The CSU veterinary school will implement a new curriculum, starting in the Fall of 2026, which focuses on enhancing hands-on skills and Day 1 Readiness. It was suggested that engagement with undergraduate students of any major that are planning on applying to a DVM program upon graduation could be increased to begin building interest in rural and/or livestock veterinary medicine. One way this could be facilitated would be in the form of an elective course that allows students to shadow a producer or livestock veterinarian to gain insight into responsibilities and duties.

The overarching goal of these efforts is to identify students with an existing interest in pursuing or exploring rural and/or livestock medicine so that hands-on opportunities specific to these career paths are readily available to them.

Next steps: The associate dean for veterinary academic and student affairs is currently working with the DVM Curriculum Renewal Committee and DVM faculty to realize a new curriculum beginning in the Fall of 2026. Features of the new curriculum include earlier hands-on experiences, more opportunities for observed practice, and greater opportunity for selecting training experiences consistent with individual professional aims. Associate deans of undergraduate and graduate (non-DVM) education will partner with the CVMBS Chief of Staff, as well as CSU pre-health advisors, to identify undergraduate learners interested in veterinary medicine and develop a selection of livestock-specific experiences and mentors. Leadership from CVMBS and the College of Agricultural Sciences will consider how best to restore the Food Animal Veterinary Career Incentive Program to better support students in developing networks, identifying mentors, and gaining authentic experiences. Implementation to begin in Fall 2024, coordinated by the CVMBS Chief of Staff.

2.8.2 Partnerships Between Veterinary School and Rural Producers and Veterinarians

The task force suggested that the CSU Doctor of Veterinary Medicine program begin building and developing additional relationships with rural and livestock veterinarians and producers in Colorado to facilitate hands-on experience and mentorship. Such partnerships between CSU and rural and/or livestock veterinarians and producers would provide many benefits, in addition to improved industry knowledge, training, and community building for students. Specifically, practicing veterinarians would have more opportunities to recruit new graduates with requisite skills and community connections and producers and veterinarians would have ready access to CSU faculty consultants.

Next steps: The livestock section at CSU, the DVM Practicum Coordinator, and individuals overseeing DVM Career Services will collaborate with task force members to identify interested livestock producers and veterinarians, develop relationships based on mutually agreeable expectations, and help students gain knowledge and access to the opportunities. The CVMBS Chief of Staff will coordinate and be accountable for these efforts. The first step will be to establish a timeline and deliverables for academic year 2024-2025.

2.8.3 Changes to Veterinary School Curricula and Program Offerings

As part of the new curriculum that will be implanted in Fall 2026, and in accordance with previous external reviews, students will have earlier and more hands-on, authentic experiences to better prepare them for an array of professional roles consistent with their individual aims. Emphasis will be placed on repeatable laboratory training, field rotations, and herd health incorporating data analysis and epidemiology in forming recommendations around diet, reproductive, health, and other strategies. Additionally, existing Spanish language and communication training, in addition to targeted skill development, will equip students to train a larger population of workers and producers to perform routine monitoring and procedures, and provide relevant educational opportunities to community members. The task force also discussed development of a sustainable model of large animal emergency services to relieve regional veterinarians of emergency coverage while training students in the management of commonly encountered conditions. Importantly, features of the new curriculum are being integrated into the existing program so that current students may benefit from these experiences.

To leverage faculty expertise in providing progressive livestock care and management, grow relationships, and optimize service to the regional community, the CSU livestock section must develop a new curriculum based on contemporary competencies. Further, a visionary leader of this group is critical in restoring credibility within the regional and national landscape and directing the livestock group in providing state-of-the art services and exceptional quality highly valued by key stakeholders.

Next steps: The livestock faculty, Associate Dean, and Curriculum Renewal Committee will continue to develop the aforementioned curricular changes. Veterinary Health System (VHS) leadership will continue to investigate sustainable models for emergency livestock services. CVMBS leaders and faculty are reviewing and reconsidering the structure and organization of the livestock department to protect the wellbeing of the staff and maximize teaching and clinical effectiveness, including the recruitment of a leader for the clinical team.

3. Veterinary Student Survey

3.1 Abstract

Completed survey responses (n= 158) representing approximately 25% of students currently enrolled in the DVM program during the fall 2023 semester are included in this report. All years of the veterinary program were represented, and students from small animal, general, and large animal tracks were included. A greater proportion of survey respondents reported tracking, or an intent to track, large animal or general than the population enrolled in the CSU veterinary program. This is likely due to the survey topic, which may have attracted more students with an interest in livestock compared to other species.

When asked about their career interests, over 50% of respondents in years 1, 2, and 3 of the veterinary program said that that they had, at some point, been interested in a career in rural veterinary medicine**.** Of the 60.7% of respondents (n=91) that indicated an interest in practicing livestock or mixed animal medicine upon entering veterinary school, 85.7% (n=78) **persisted in that same interest**. For the remaining 14.3% (n=13) of respondents that changed their species of interest since entering veterinary school, 46.2% (n=6) now have an interest in practicing small animal veterinary medicine, 38.5% (n=5) now have an interest in practicing equine veterinary medicine, 30.8% (n=4) now have an interest in practicing specialized veterinary medicine, and 7.7% (n=1) now have an interest in practicing poultry veterinary medicine. Although a small number overall, the

student group that most frequently reported a change in species interest included students in year 3 of the veterinary program (26.9%, n=7), followed by students in year 4 of the program (23.1%, n=3); (Section 3.5.5).

The most frequently reported factors that influenced **students' interests in practicing rural veterinary medicine** were the level of compensation, access to financial support adequate for desired quality of life, and the presence of veterinary support in the case of personal injury or illness. The most common factors that influenced **respondents' interest in practicing livestock medicine** were excessive workload, lack of work-life balance, and the risk of physical harm or disability. The majority of respondents said that extracurricular activities or DVM student clubs, experiential and hands-on learning opportunities in livestock medicine, and connections with mentors and faculty increased their interest in pursuing livestock medicine.

Regarding students' self-assessed preparedness, the majority of respondents, regardless of track or species of interest, felt that the current course offerings successfully equipped them with problem solving skills, adaptability, collaboration, and empathy (Table 3.5.12). Over 80% of respondents reported that mentorship from rural and/or livestock veterinarians was critical for their success in interacting with clients who own livestock and/or poultry (Figure 3.5.7c). Among students enrolled in the 4th year of the DVM program, 32% agreed or strongly agreed that their veterinary education thus far had prepared them to provide veterinary care to livestock and 23% agreed or strongly agreed their veterinary education thus far had prepared them to interact with clients who own livestock or poultry after their coursework thus far.

3.2 Survey development and dissemination

A team of researchers experienced in conducting surveys developed a draft questionnaire. The questionnaire was reviewed by members of the task force prior to dissemination and modified based on the feedback received.

Members of the survey development team:

- Catie Cramer, MS, PhD (Principal Investigator, Department of Animal Sciences, CSU)
- Lily Edwards-Callaway, MS, PhD (Department of Animal Sciences, CSU)
- Kayleigh Keller, PhD (Department of Statistics, CSU)
- Noa Román-Muñiz, MS, DVM, (Department of Animal Sciences, CSU)
- Lorann Stallones, MPH, PhD (Department of Psychology, Director, High Plains Intermountain Center for Agricultural Health and Safety (HICAHS), Human-Animal Bond Research Coordinator, One Health Institute)

Members of the task force and questionnaire review team:

- Maggie Baldwin, DVM (current state veterinarian, Colorado Department of Agriculture)
- Curtis Crawford, DVM (Alpine Veterinary Hospital and American Veterinary Medical Association Delegate for the Colorado Veterinary Medical Association)
- Sarah Dideriksen, MS (Industry Advancement Director, Colorado Cattlemen's Association)
- Melinda Frye, DVM, MS, PhD, DACVIM (Department of Biomedical Sciences and Associate Dean for Veterinary Academic and Student Affairs, CSU)
- Jenna Gotte, MPH/DVM Candidate (Colorado School of Public Health and College of Veterinary Medicine and Biomedical Sciences, CSU)
- Wayne Jensen, DVM, MBA (Department of Clinical Sciences, CSU)

- Erin Karney, MS (Executive Vice President, Colorado Cattlemen's Association)
- Erica Machuca, BS (Department of Animal Sciences)
- Rhyannon Moore-Foster, DVM (Department of Clinical Sciences, CSU)
- Sarah Raabis, DVM, PhD (Department of Clinical Sciences, CSU)
- Keith Roehr, DVM (former state veterinarian, Colorado Department of Agriculture)
- Sue VandeWoude, DVM (Dean, CSU College of Veterinary Medicine and Biomedical Sciences)

The survey was sent to the Program Effectiveness Coordinator for DVM Student Services at CSU and distributed online in the fall of 2023 via the CSU DVM student list-serve. The survey was open to all currently enrolled DVM students to allow the research team to understand if and how interests in livestock medicine changed. The invitation to complete the survey included the title of the research project, *Addressing the livestock veterinary shortage in Colorado*, and outlined the key objectives. In addition, the project team contacted faculty in the livestock section of the CSU DVM program and asked them to share the survey invitation with their students. Hence, veterinary students with livestock medicine interested might have been more inclined to participate than students not interested in livestock medicine. The survey was kept open for one month, with two reminder emails sent out during that time to encourage participation. A $10 gift card incentive was provided to participants.

3.3 Survey inclusion criteria

Survey participants were over 18 and enrolled in the DVM program at CSU. The survey was open to all students. However, analysis for certain questions only included respondents with livestock or mixed medicine interests; these are noted throughout.

3.4 Objectives

1. Characterize changes in CSU veterinary students' interests in practicing in a rural and/or livestock medicine during the veterinary curriculum.
2. Identify factors that affect students' interests in livestock medicine throughout veterinary school.
3. Determine students' self-assessed preparedness to be successful in livestock practice.

3.5 Results

3.5.1 Demographics of respondents

A total of 162 veterinary students responded to the survey, out of 623 who received the survey (26.0% response rate). Most respondents were white females between 25-34 years old. Approximately one quarter of respondents were in each year of veterinary school. Not included in the analysis were responses from two students in year 0 of the veterinary program, the first year of a combined program (e.g., MS-DVM, PhD-DVM, MPH-DVM), which is before the start of veterinary school (Table 3.5.1).

Table 3.5.1: Respondent demographics.

	n	Percentage
Gender		
Male	18	13.3%
Female	113	83.7%
Other	2	1.5%
Prefer not to indicate	2	1.5%
Race		
American Indian or Alaska Native	3	2.3%
Asian	9	6.8%
Black or African American	1	0.8%
White	106	80.3%
Other	3	2.3%
Prefer not to indicate	8	6.1%
Age Group		
18-24	54	33.3%
25-34	74	45.7%
35-44	4	2.5%
45-54	1	0.6%
Prefer not to indicate	2	1.2%
Year in DVM Program		
Year 0	2	1.2%
Year 1	45	28.0%
Year 2	35	21.7%
Year 3	43	26.7%
Year 4	36	22.4%

CSU veterinary students choose an emphasis or 'track' for the third- and fourth-year curriculum; until then, they take the same courses with some options for elective courses as described in Section 3.7. Respondents were asked "in which track are you enrolled, or do you anticipate enrolling?". Survey respondents reported tracks as follows: general (mixed animal; 46.7%, n=71), large animal (28.3%, n=43), and small animal (25.0%, n=38). While these tracks are mutually exclusive, there is crossover in content/species covered. Data from the CSU DVM program indicate that the most common track selected is small animal (42.2%), followed by general (22.8%) and large animal (21.7%). Therefore, the population of students surveyed includes more students tracking general or large animal compared to the wider CSU DVM program population. This is likely due to the topic of the survey, which attracted those students interested in livestock medicine.

3.5.2 Intended location of practice

Respondents were asked about their intended location of practice after degree completion. Colorado was the most frequently chosen state, with 69.4% (n=111) of respondents intending to practice there, followed by Wyoming (16.9%, n=27), Montana (15%, n=24), California (13.4%, n=22), and Texas (11.2%, n=18). These responses were not mutually exclusive, as respondents could select more than one state. The survey further asked about factors that influenced their selection (Table 3.5.2).

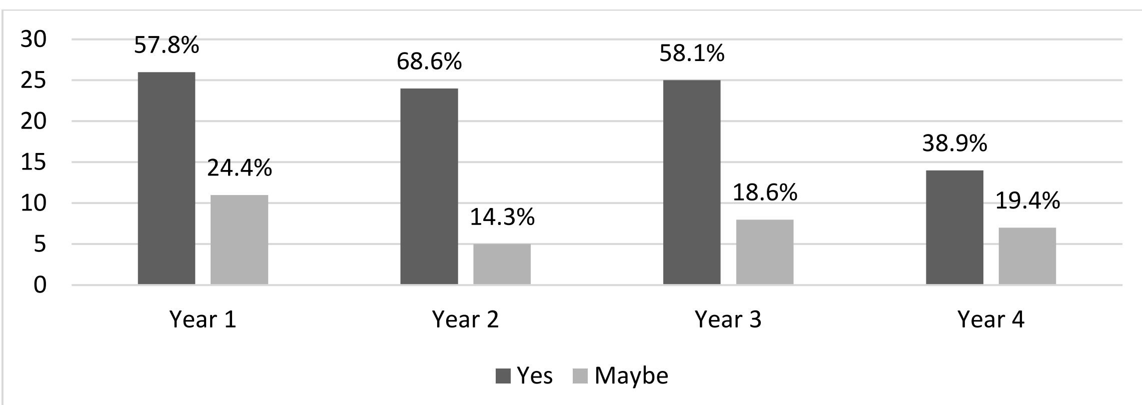
Table 3.5.2: Factors influencing choice of practice location (proportion sum exceeds 1 due to respondents selecting multiple factors). *Note.* Only thirty-one percent (n=59) of survey respondents answered this question.

Influencing Factor	**Proportion that responded 'yes', % (n)**
Near family or friends	67.3% (33)
Home state	55.1% (27)
Availability of jobs	44.9% (22)
Western Interstate Commission for Higher Education (WICHE)	10.2% (5)
Other	16.3% (8)

3.5.3 Career Interests

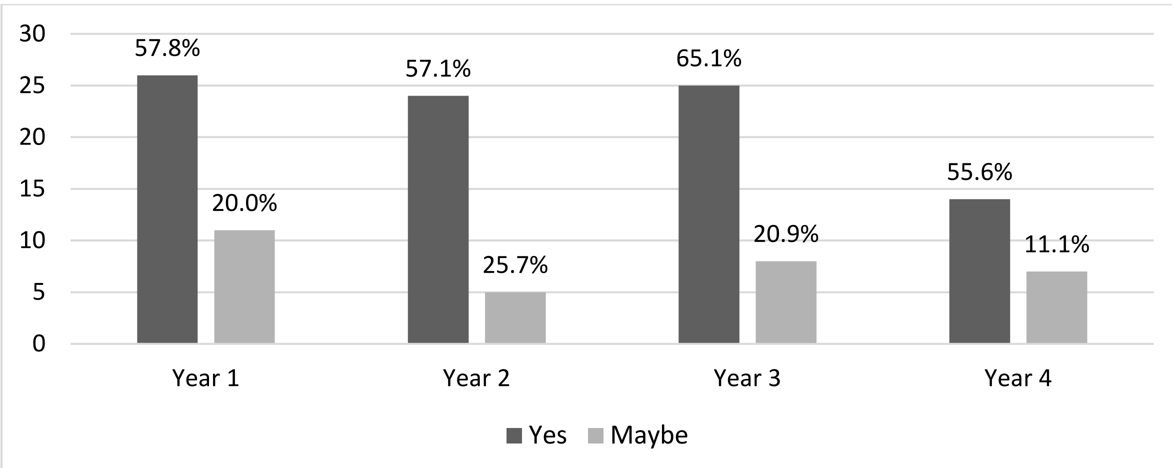
Rural veterinary medicine. Across all respondents, 59.7% (n=89) indicated that they had, at some point, been interested in a career in rural veterinary medicine, and an additional 19.5% (n=31) said that they might be interested (Figure 3.5.3a).

Figure 3.5.3a: Number of respondents in each year of the DVM program that indicated "yes" or "maybe" when asked if they have ever been interested in pursuing a career in rural veterinary medicine, with data labels indicating the proportion of responses in each category. Not included in the figure are the number of respondents who indicated "no" when asked if they had ever been interested in pursuing rural veterinary medicine.



Livestock medicine. Across all respondents, 61.0% (n=94) indicated that they had, at some point, been interested in a career in veterinary medicine involving livestock, and an additional 20.1% (n=31) indicated that they might be interested (Figure 3.5.3b).

Figure 3.5.3b: Number of respondents in each year of the DVM program that indicated "yes" or "maybe" when asked if they have ever been interested in pursuing a career in livestock veterinary medicine, with data labels indicating the proportion of responses in each category. Not included in the figure are the number of respondents who indicated "no" when asked if they had ever been interested in pursuing livestock veterinary medicine.



3.5.4 Experience with animals prior to veterinary school

The majority of veterinary students entered veterinary school with prior experience working with dogs, cats, and horses (Table 3.5.4).

Table 3.5.4: Proportion of respondents with experience with each species prior to veterinary school.

Species	**Proportion that responded 'yes', %(n)**
Dogs	94.0% (141)
Cats	88.0% (132)
Horses	69.3% (104)
Beef Cattle	49.3% (74)
Goats	44.7% (67)
Sheep	44.0% (66)
Exotics	40.7% (61)
Dairy Cattle	35.3% (53)
Poultry	34.0% (51)
Swine	29.3% (44)
Camelids	24.0% (36)
Other	8.7% (13)

3.5.5 Species/Specialty Interests

Of the 60.7% of respondents (n=91) that indicated an interest in practicing livestock or mixed animal medicine upon entering veterinary school, 85.7% (n=78) were still interested in doing so at the time of the survey. For the 14.3% (n=13) of respondents that changed their species of interest since entering veterinary school, 46.2% (n=6) now have an interest in practicing small animal medicine, 38.5% (n=5) now have an interest in practicing equine medicine, 30.8% (n=4) now have an interest in practicing specialized medicine, and 7.7% (n=1) now have an interest in practicing poultry medicine.

Although a small number overall, the student group that most frequently reported a change in species interest included students in year 3 of the veterinary program (26.9%, n=7), followed by students in year 4 of the program (23.1%, n=3), year 2 of the program (8.7%, n=2), and year 1 of the program (3.45%, n=1). The most common new species of interest for students in each year of the program are as follows: equine (100%, n=1) for year 1; equine (100%, n=2) and small animal (50%, n=1) for year2; small animal (57.1%, n=4), equine (28.6%, n=2), and specialized practice (14.3%, n=1) for year 3; and specialization (66.7%, n=2), small animal (33.3%, n=1), and poultry (33.3%, n=1) for year 4.

To view these data for all respondents, see Appendix A.

3.5.6 Influence of program offerings on choice of species/specialty practices

Respondents were asked to describe how various program and curriculum-related factors influenced their interest in practicing livestock medicine following graduation. The most frequently reported program components that increased interest in practicing livestock medicine after graduation were extracurricular activities (61%), experiential and hands-on learning opportunities in livestock medicine (60%), and connection with mentors and faculty (53%; Table 3.5.6). The most frequently reported curriculum components that decreased interest in practicing livestock veterinary medicine after graduation were: courses or offerings about business management skills specific to livestock practice (17%), courses on herd health and preventative medicine (14%), and courses dedicated to livestock medicine (12%; Table 3.5.6).

For breakdown by year, see Appendix B.

Table 3.5.6: Influence of program offerings on respondents' choice of intended species/specialty practices denoted in proportion of responses.

Program Offering	**Increased interest, % (n)**	**Decreased Interest, % (n)**	**No impact on interest, % (n)**	**No exposure to offering, % (n)**
Extracurricular activities or DVM student clubs	61.3% (84)	2.9% (4)	26.3% (36)	9.5% (13)
Experiential/Hands-On learning opportunities in livestock medicine	59.9% (82)	7.3% (10)	14.6% (20)	18.2% (25)
Connection with mentors and faculty	52.6% (72)	5.1% (7)	27.7% (38)	14.6% (20)
Information shared by instructors in the DVM program	44.1% (60)	7.4% (10)	31.6% (43)	16.9% (23)
Courses dedicated to livestock medicine	42.3% (58)	11.7% (16)	19.0% (26)	27.0% (37)
Courses on herd health and preventative medicine	32.8% (45)	13.9% (19)	27.7% (38)	25.5% (35)
Information about student loan repayment options and/or state or federal loan assistance programs	31.4% (43)	8.8% (12)	33.6% (46)	26.3% (36)
Exposure to diverse livestock production systems	27.0% (37)	5.8% (8)	26.3% (36)	40.9% (56)
Communication training specific to livestock producers	11.7% (16)	9.5% (13)	22.6% (31)	56.2% (77)
Business management skills specific to livestock practice	9.5% (13)	16.8% (23)	19.0% (26)	54.7% (75)
Other	13.6% (3)	13.6% (3)	40.9% (9)	31.8% (7)

3.5.7 Program Assessment

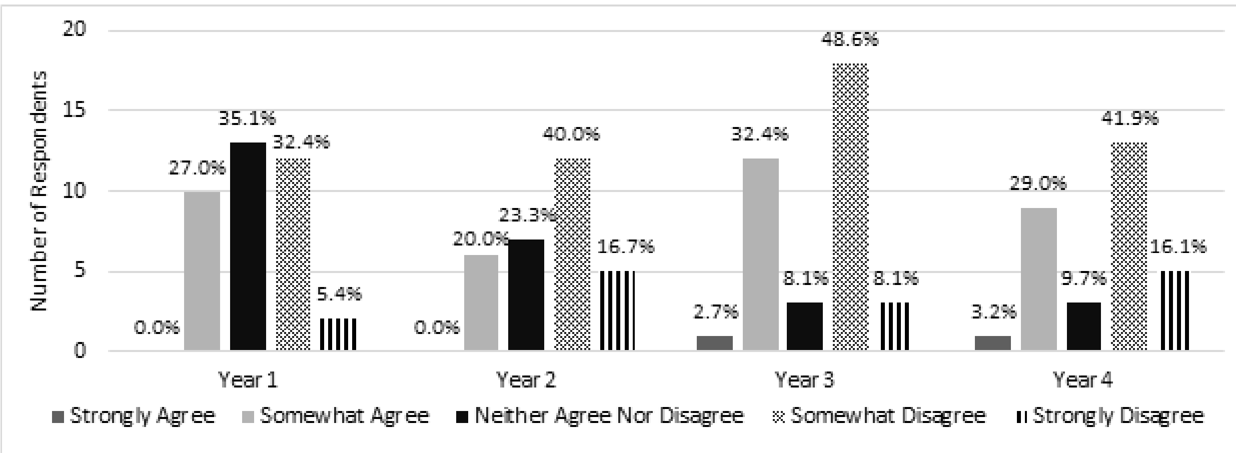
Students in each year of the veterinary program have unique exposure to livestock-specific curriculum offerings, which warrants description due to possible impact on individual responses.

- First-year respondents had no exposure to livestock-specific courses.
- Second-year students completed a "Food Animal Production and Food Safety" course in the spring of year one, with elective enrollment in an online swine medicine course.
- Third year students additionally had exposure to livestock topics within cross-species Clinical Sciences courses, with elective enrollment in a "Food Animal Clinical Problems" course. Third year students also had exposure to livestock-focused laboratories and clinical rotations.
- Fourth year students completed two additional Clinical Sciences courses. Students who declared a general or large animal track also completed "Bovine Herd Medicine" and "Equine Medicine and Surgery" courses. Fourth year students had additional exposure to livestock-focused laboratories and clinical rotations.

Survey participants were asked questions about their perceptions of the DVM program offerings and curricula and how those views impacted their careers. Results are disaggregated by respondent's year in the program (Figures 3.5.7a – 3.5.7f).

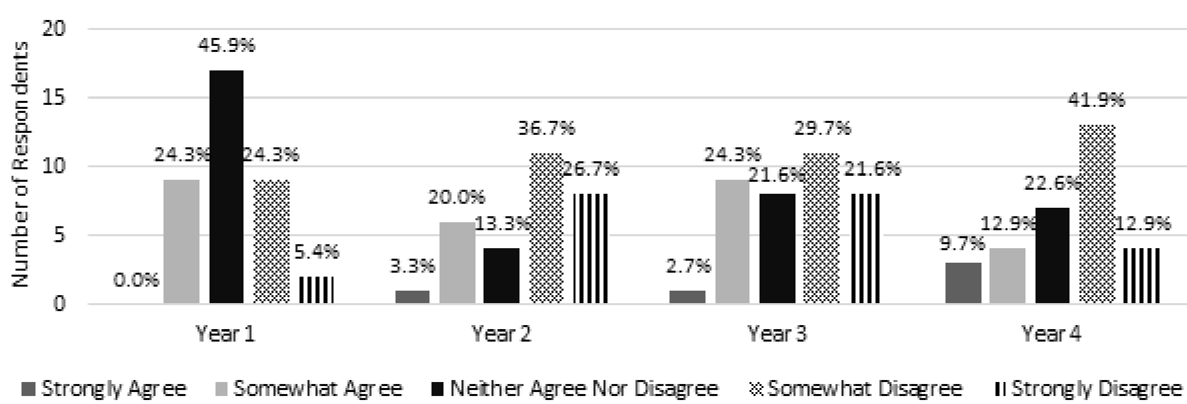
Overall, 28.9% (n=39) of all respondents strongly agreed or somewhat agreed that their veterinary education so far had adequately prepared them to provide veterinary care for livestock and/or poultry (Figure 3.5.7a).

Figure 3.5.7a: Number of respondents in each level of agreement with the statement: "My veterinary education thus far has prepared me well to provide veterinary care for livestock and/or poultry," separated by year in program, with data labels representing the proportion of responses in each category.



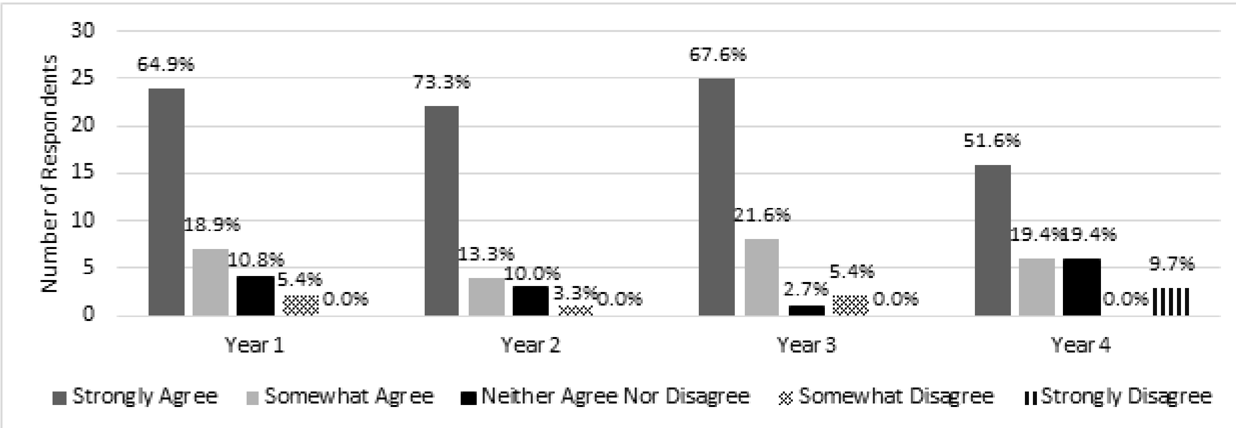
Twenty-four percent (n=33) of all respondents strongly agreed or somewhat agreed that their veterinary education so far had adequately prepared them to interact with clients who own livestock and/or poultry (Figure 3.5.7b).

Figure 3.5.7b: Number of respondents in each level of agreement with the statement "My veterinary education thus far has prepared me well to interact with clients who own livestock and/or poultry," separated by year in program, with data labels representing the proportion of responses in each category.



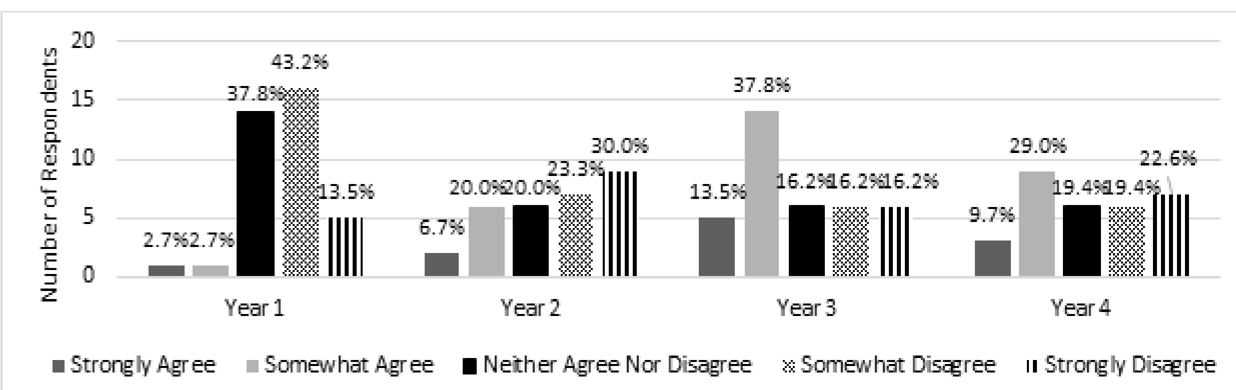
Eighty-three percent (n=113) of all respondents strongly agreed or somewhat agreed that mentorship from rural/livestock veterinarians would be essential for their success in interacting with clients who own livestock and/or poultry (Figure 3.5.7c).

Figure 3.5.7c: Number of respondents in each level of agreement with the statement "Mentorship from other rural/livestock veterinarians will be essential for my success in interacting with clients who own livestock and/or poultry," separated by year in program, with data labels representing the proportion of responses in each category.



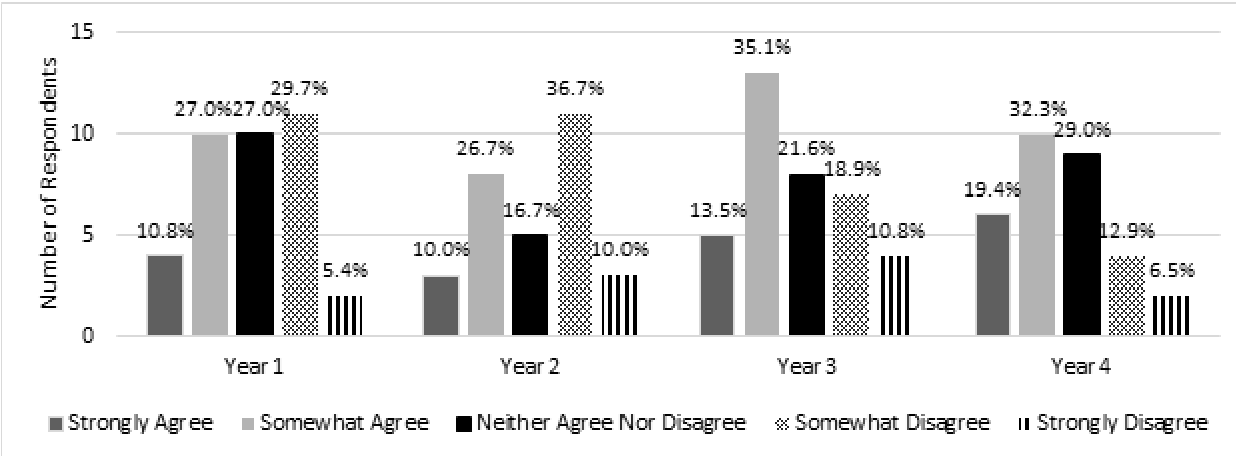
Thirty percent (n=41) of all respondents strongly agreed or somewhat agreed that they have been discouraged from choosing the large animal track because of coursework requirements (Figure 3.5.7d). A greater proportion of respondents in years 3 and 4 somewhat or strongly agreed, compared to years 1 and 2, which corresponds to greater exposure to livestock-specific coursework in the latter two years of veterinary school.

Figure 3.5.7d: Number of respondents in each level of agreement with the statement "I have been discouraged from tracking large animal because of coursework requirements," separated by year in program, with data labels representing the proportion of responses in each category.



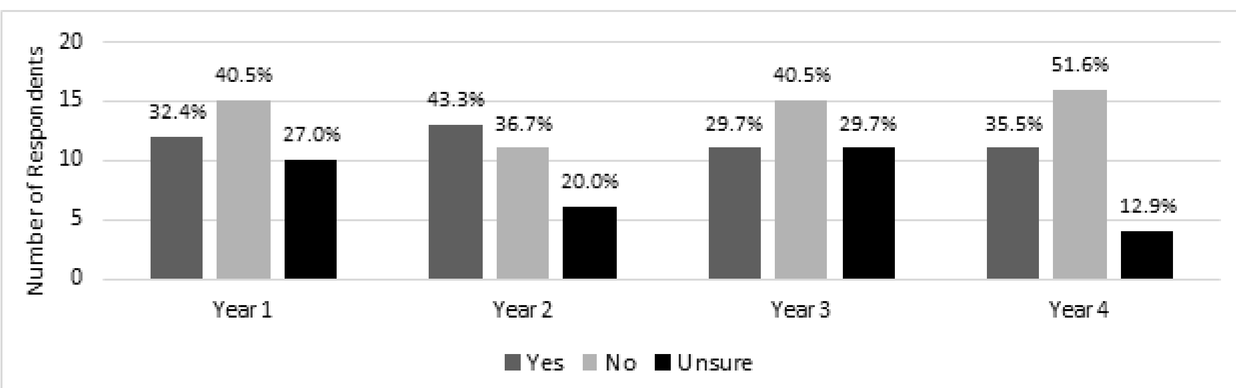
Forty-four percent (n=60) of all respondents strongly agreed or somewhat agreed that they have access to CVMBS livestock faculty who advise them about curricular choices, externships, and career opportunities (Figure 3.5.7e).

Figure 3.5.7e: Number of respondents in each level of agreement with the statement "I have access to CVMBS livestock faculty who advise me about curricular choices, externships, and career opportunities," separated by year in program, with data labels representing the proportion of responses in each category.



Thirty-four percent (n=47) of all respondents indicated that they have access to livestock experts other than CVMBS faculty who can advise them about curricular choices, externships, and career opportunities (Figure 3.5.7f).

Figure 3.5.7f: Number of respondents that indicated each response to the statement of "I have access to livestock experts other than CVMBS faculty who can advise me about curricular choices, externships, and career opportunities," separated by year in program, with data labels representing the proportion of responses in each category.



3.5.8 Messaging

The most frequently reported communication that increased veterinary students' interest in pursuing livestock came from veterinarians outside of CSU (40%). The most frequently reported communication that decreased veterinary students' interest in pursuing livestock medicine came from DVM faculty at CSU in years 1-2, (16%; Table 3.5.8).

Table 3.5.8: Proportion of respondents that indicated their interest in practicing livestock medicine was altered due to correspondence with various groups.

Correspondent	Increased interest, % (n)	Decreased Interest, % (n)	Both Increased and Decreased interest, % (n)	No correspondence, % (n)
Veterinarians outside of CSU	39.7% (54)	10.3% (14)	20.6% (28)	29.4% (40)
Family or community members	34.1% (46)	8.1% (11)	17.0% (23)	40.7% (55)
Representatives of professional organizations, producers, and other livestock owners	33.8% (46)	7.4% (10)	11.8% (16)	47.1% (64)
Undergraduate counselors or instructors	33.8% (46)	7.4% (10)	9.6% (13)	49.3% (67)
DVM faculty in preclinical training years (years 1-2)	27.2% (37)	16.2% (22)	33.8% (46)	22.8% (31)
DVM faculty in training years (years 3-4)	25.0% (34)	5.9% (8)	11.0% (15)	58.1% (79)
High school counselors or instructors	12.6% (17)	3.7% (5)	4.4% (6)	79.3% (107)
Other	15.6% (5)	3.1% (1)	3.1% (1)	78.1% (25)

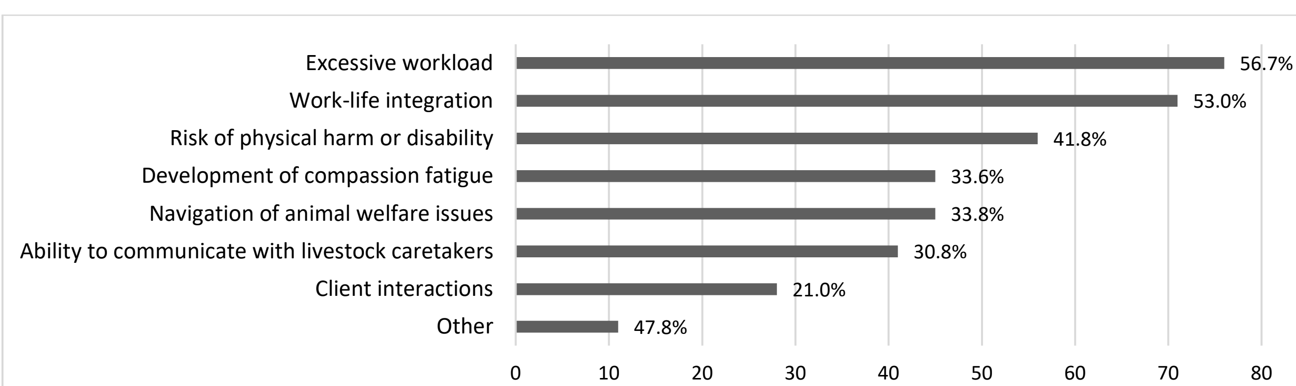
3.5.9 Interests and Perceptions – Personal Background

Of the respondents that reported having an interest in pursuing livestock or mixed animal veterinary medicine, 80.5% (n=74) indicated that they strongly agree or somewhat agree that their personal background with livestock outside of formal veterinary school training is important to producers.

3.5.10 Interest and Perceptions – Impacts on Interest in Livestock Medicine

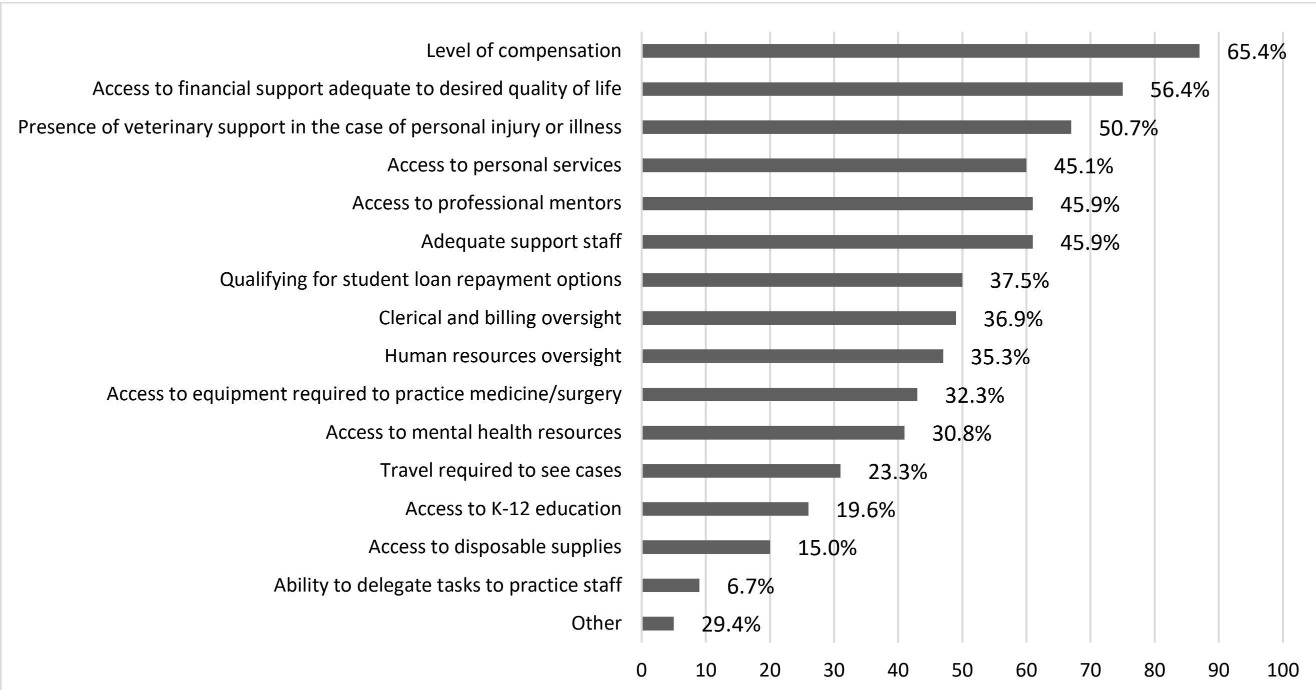
The most frequently reported factors impacting respondents' interests in performing livestock medicine that were extremely or very concerning were excessive workload and work-life integration (Figure 3.5.10).

Figure 3.5.10: Number of respondents that indicated they were extremely or very concerned that a particular issue or factor would impact their interest in performing livestock medicine, with data labels showing the proportion of responses in each category. These options were not mutually exclusive.



3.5.11 Interest and Perceptions – Impacts on Interest in Rural Medicine

Figure 3.5.11: Number of respondents that indicated they were extremely or very concerned about each listed factor in relation to their interest in practicing rural medicine after graduating from veterinary school, with data labels showing the proportion of responses in each category. These options were not mutually exclusive.



3.5.12 Preparedness for career in veterinary medicine

Table 3.5.12: Perceived preparedness of those respondents that indicated interested in pursuing livestock or mixed animal veterinary medicine in various skills after any DVM training they received to date.

Skill	**Proportion of respondents that felt completely or fairly prepared, % (n)**	**Proportion of respondents that felt somewhat or slightly prepared, % (n)**	**Proportion of respondents that felt they were not prepared at all, % (n)**
Adaptability	60.5% (55)	34.1% (31)	5.5% (5)
Client Education	36.3% (33)	59.4% (54)	4.4% (4)
Collaboration	57.2% (52)	40.7% (37)	2.2% (2)
Conflict Resolution	36.3% (33)	53.9% (49)	9.9% (9)
Empathy	52.8% (48)	46.2% (42)	1.1% (1)
Problem Solving	63.7% (58)	33.0% (30)	3.3% (3)
Other	44.4% (4)	0% (0)	55.6% (5)

3.6 Task Force Discussion Regarding Potential Solutions: Veterinary Student Survey

3.6.1 Earlier Student Touchpoints

Data from the student survey reinforced the conclusions from the veterinarian and producer survey that early exposure of students to hands-on experiences and rural practice are the most important actions to building student interest in livestock and/or rural practice.

In consideration of student survey results in the context of findings of the veterinarian/producer survey, the task force expanded the initial proposed solutions (section 2.8): 1) implement the new DVM curriculum in Fall 2026, launching 2026, which features earlier hands-on experiences and more opportunities for observed practice of livestock and rural veterinary medical procedures, 2) partner among CVMBS and College of Agricultural Sciences (CAS) associate deans of undergraduate and graduate education, outreach staff, and pre-health advisors to identify and provide livestock-specific experiences to undergraduate learners interested in livestock or rural medicine, and 3) collaborate with CAS to revive the Food Animal Veterinary Career Incentive Program.

Partnership among CVMBS leadership to identify interested undergraduates will be developed in collaboration with CAS, specifically the Department of Animal Science, which typically has many pre-vet undergraduates. CVMBS and CAS will share resources and ideas to maximize opportunities for undergraduate students interested in livestock/rural veterinary medicine. The student survey data prompted further discussion of the importance of mentorship, early exposure to authentic livestock/rural practice, and experiential learning. With that in mind, the revamping of the Food Animal Veterinary Career Incentive Program will emphasize mentorship and experiential opportunities for enrolled undergraduate and DVM students, with the goal of supporting students with an interest in livestock/rural medicine throughout their veterinary education and increasing retention in the field.

These efforts will be designed to capture *any* learner with an interest in livestock/rural veterinary medicine. While 80.5% of students participating in the taskforce survey agreed that their personal background with livestock is important to producers, 71% of producers indicated that hands-on experience with livestock was important, but not necessarily that a personal background with livestock was necessary. It is essential that learners without a personal background in livestock are as welcome and well-prepared to enter livestock/rural practice as those students with that background.

3.6.2 Partnerships Between Veterinary School and Rural Producers and Veterinarians

Data from the student survey supported the conclusions of the veterinarian/producer survey that connections between veterinary students and rural producers and veterinarians are critical to promoting student interest in rural/livestock veterinary careers. Students cited veterinarians outside of CSU, family and community members, representatives of professional organizations, producers, and livestock owners as the most powerful positive influences on their interest in livestock medicine (Table 3.5.8).

These additional data and discussion among the task force underscored the importance of building a network of livestock/rural practitioners and livestock producers who are willing and able to provide a variety of experiences to interested students, from short undergraduate visits to week-long independent study experiences during the first three years of veterinary school, to formal, graded externships during students' fourth year of veterinary school. Such a list of opportunities already exists, but it underutilized. The CVMBS Chief of Staff will work with the DVM Student Services team and livestock faculty to better curate livestock/rural opportunities and increase visibility and accessibility to interested students.

In addition, CVMBS leadership will explore opportunities for increased funding for veterinary student rural/livestock experiences. These may include efforts to fundraise for this initiative among interested stakeholders, and revisiting existing sources to determine whether funds are available to support experiential opportunities for students.

3.6.3 Continued Study of Veterinary Workforce Shortage

The combined data from these three surveys underscore the shortage of livestock veterinary professionals in Colorado and reinforce anecdotal evidence of challenges facing veterinarians and producers. The data also prompt questions that remain unanswered. Future data gathering and analysis include: 1) surveys of veterinary student career interests at enrollment for comparison to application data; 2) additional querying of fourth year DVM students who were in their third year when the current survey was distributed, to reveal any changes that may have occurred in career trajectories; and, 3) collecting qualitative data from a focus group of recent graduates who intended to practice livestock/rural medicine, but changed their career plans post-graduation, as well as those recent graduates who are currently practicing livestock/rural medicine.

4. Appendix

4.1 Appendix A: Species/Specialty Interest of Entire Veterinary Student Respondent Population – Breakdown by Year

The species/specialty interest cited by respondents stayed relatively similar between the start of veterinary school and their current year in veterinary school, with only interest in companion/small animal practice largely declining over time (Figures 4.1.1 - 4.1.5).

Figure 4.1.1: Number of respondents that indicated a desired species/specialty interest upon entering and during their current year in veterinary school, with data labels indicating the proportion of responses in each category. Note that these respondents include students in all four years of veterinary school.

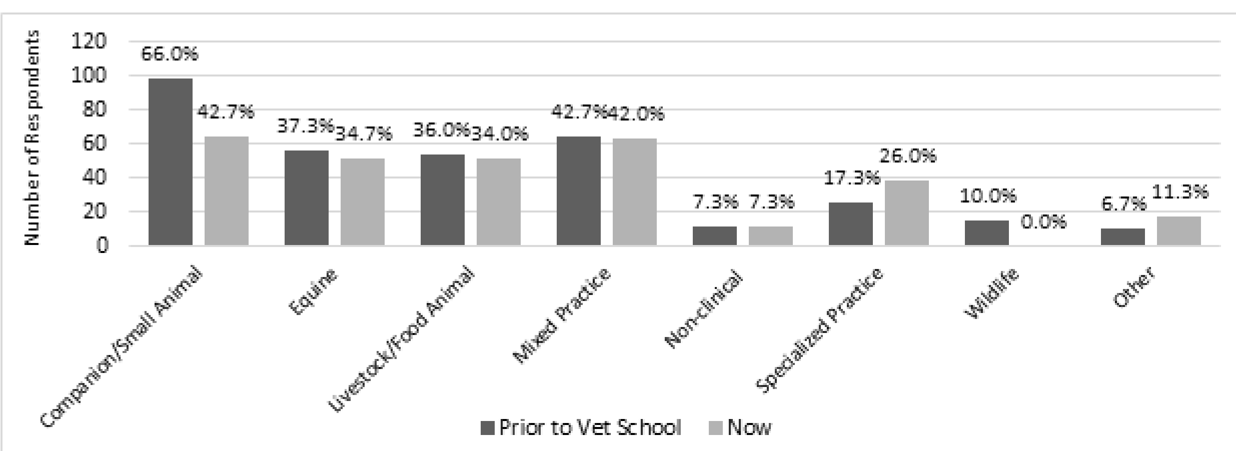


Figure 4.1.2: Number of respondents in year 1 that indicated a desired species/specialty interest upon entering and during their current year in veterinary school, with data labels indicating the proportion of responses in each category.

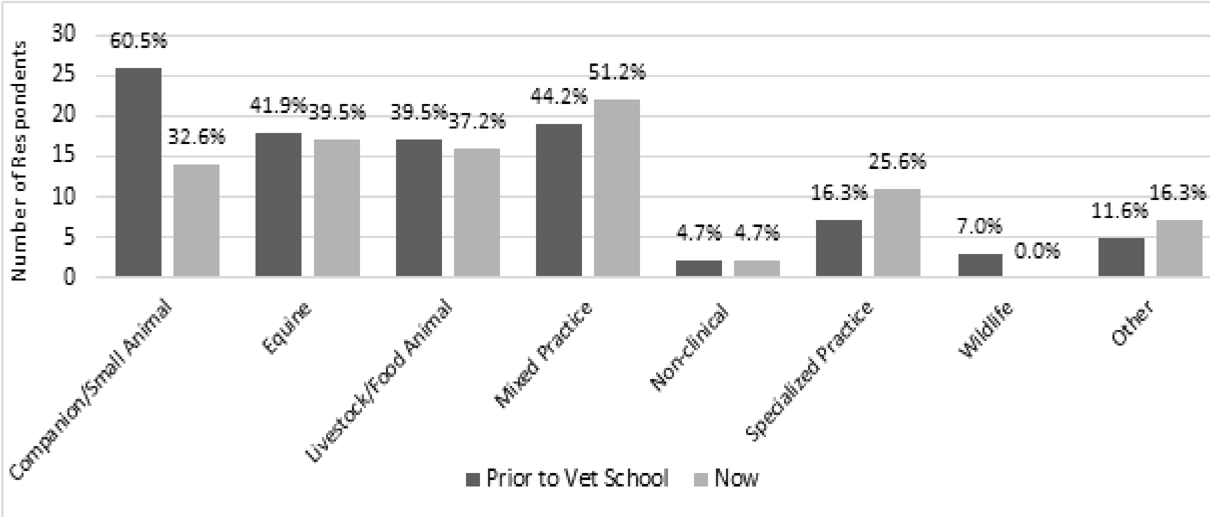


Figure 4.1.3: Number of respondents in year 2 that indicated a desired species/specialty interest upon entering and during their current year in veterinary school, with data labels indicating the proportion of responses in each category.

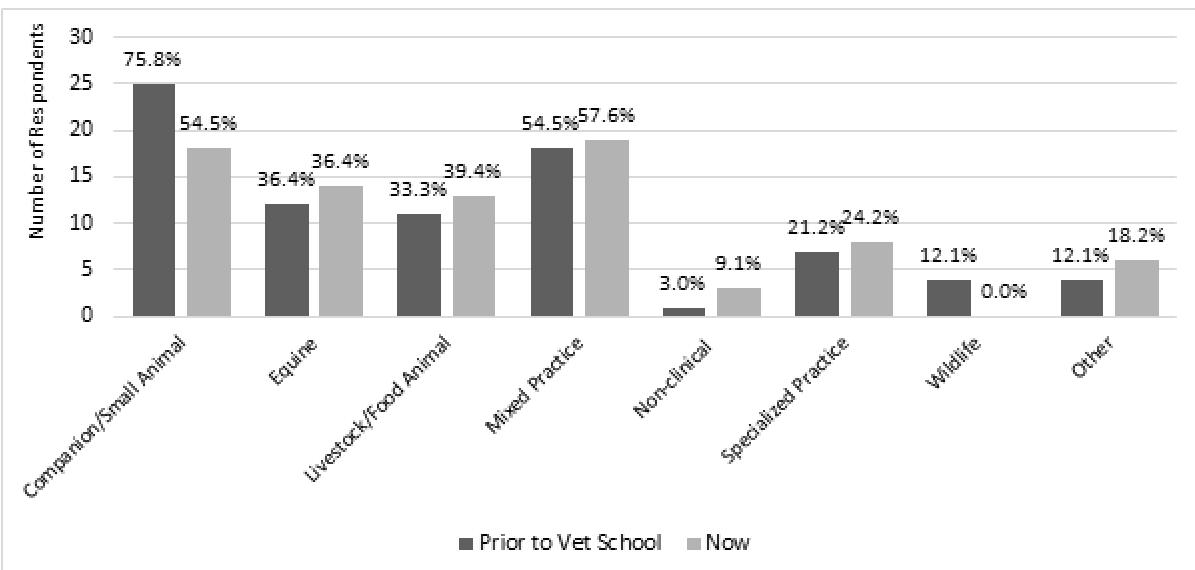


Figure 4.1.4: Number of respondents in year 3 that indicated a desired species/specialty interest upon entering and during their current year in veterinary school, with data labels indicating the proportion of responses in each category.

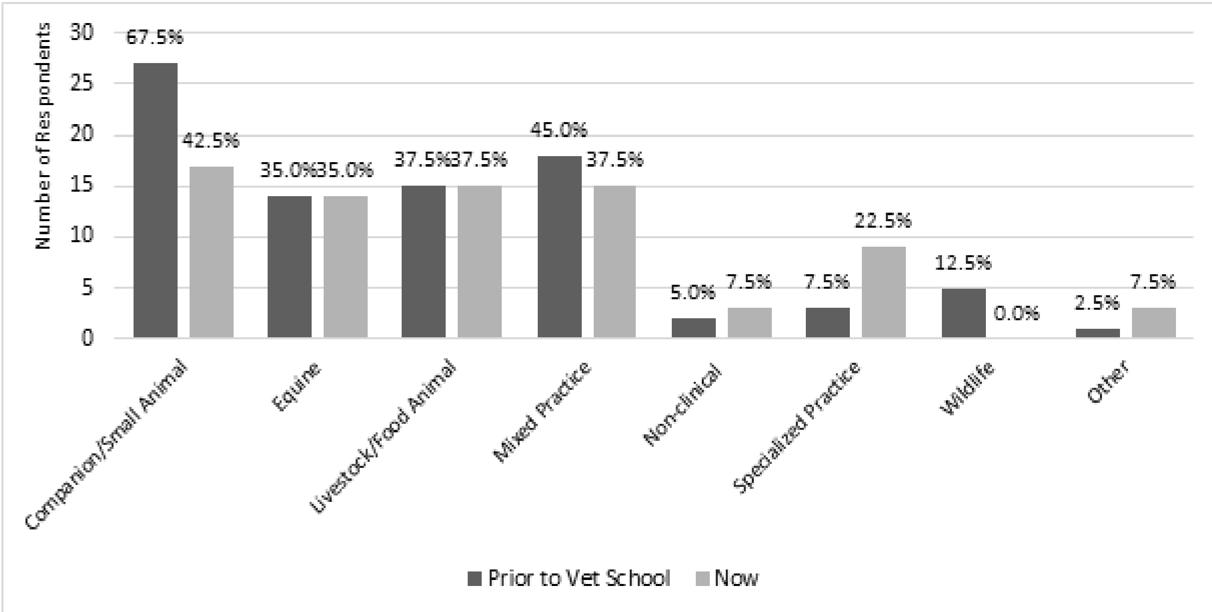
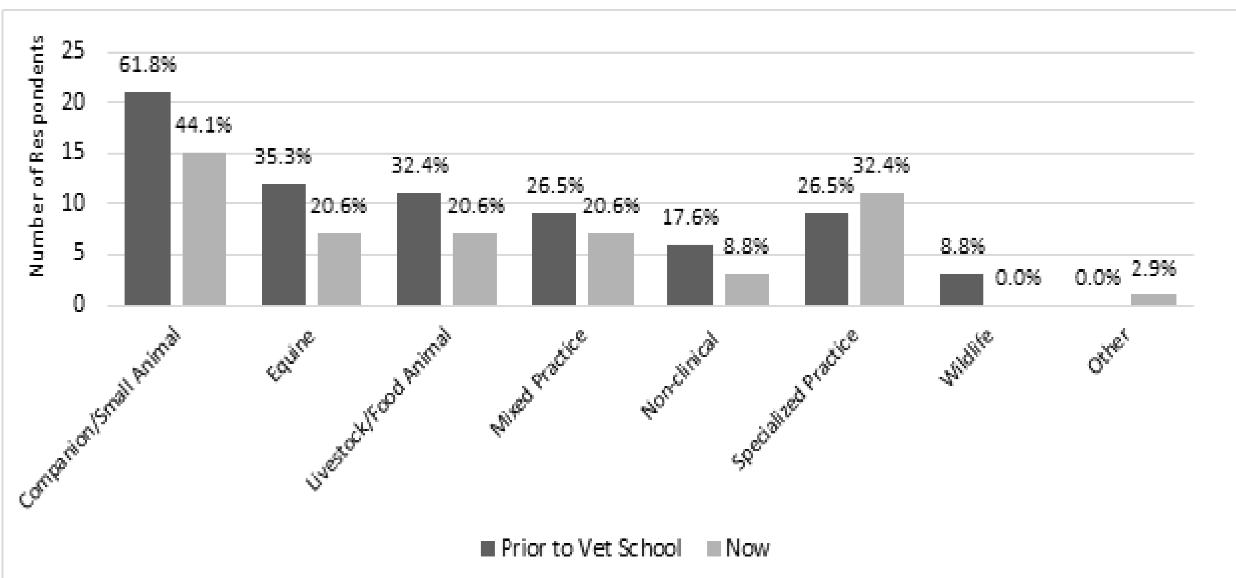


Figure 4.1.5: Number of respondents in year 4 that indicated a desired species/specialty interest upon entering and during their current year in veterinary school, with data labels indicating the proportion of responses in each category.



4.2 Appendix B: Influence Program Offerings – Breakdown By Year

Figure 4.2.1: Number of respondents in all years of the program that indicated an influence of a particular program offering on their desire to practice livestock veterinary medicine following graduation, with data labels indicating the proportion of responses in each category.

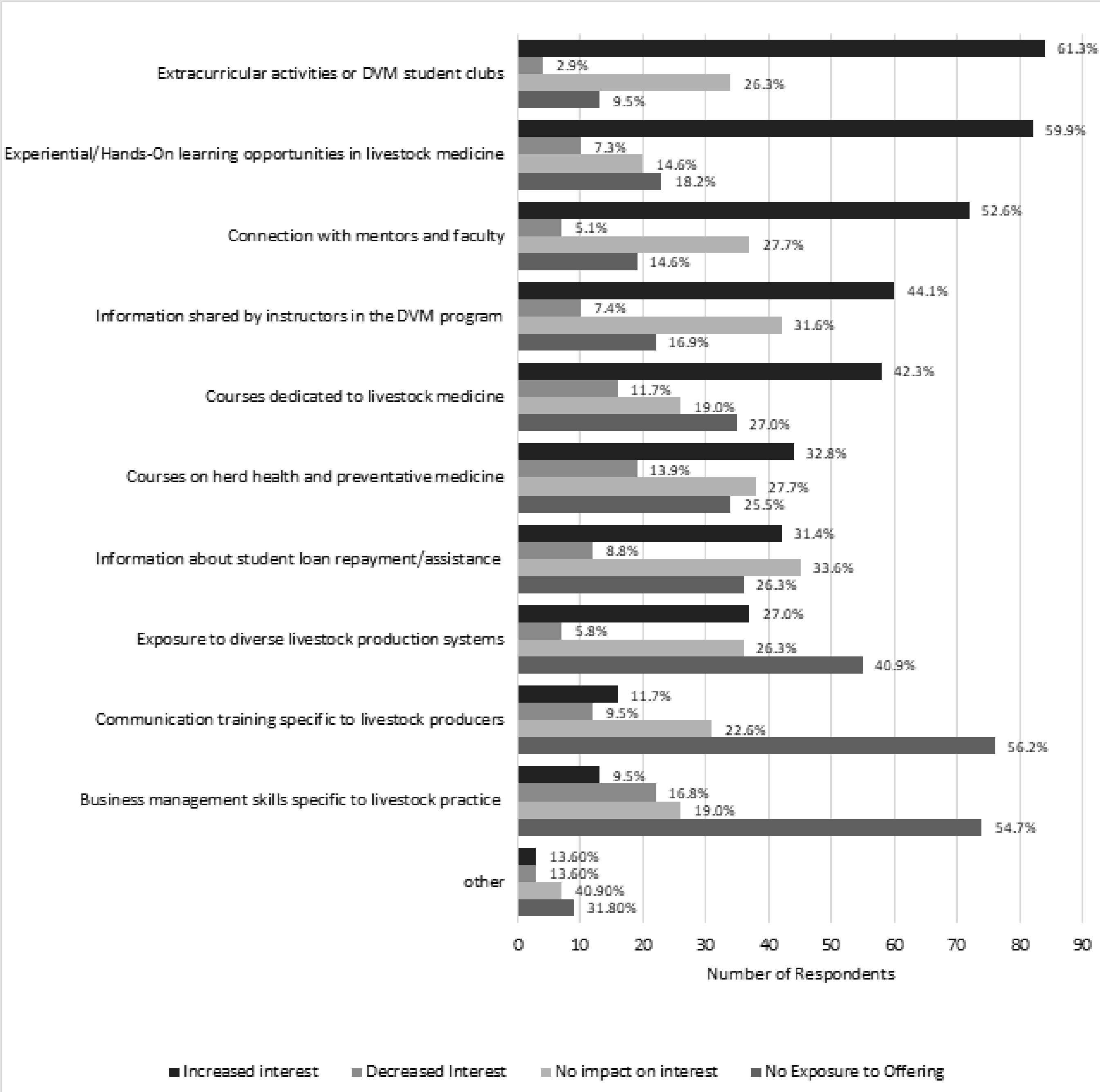


Figure 4.2.2: Influence of various program offerings on interest in practicing livestock medicine of students in year 1 of the DVM program.

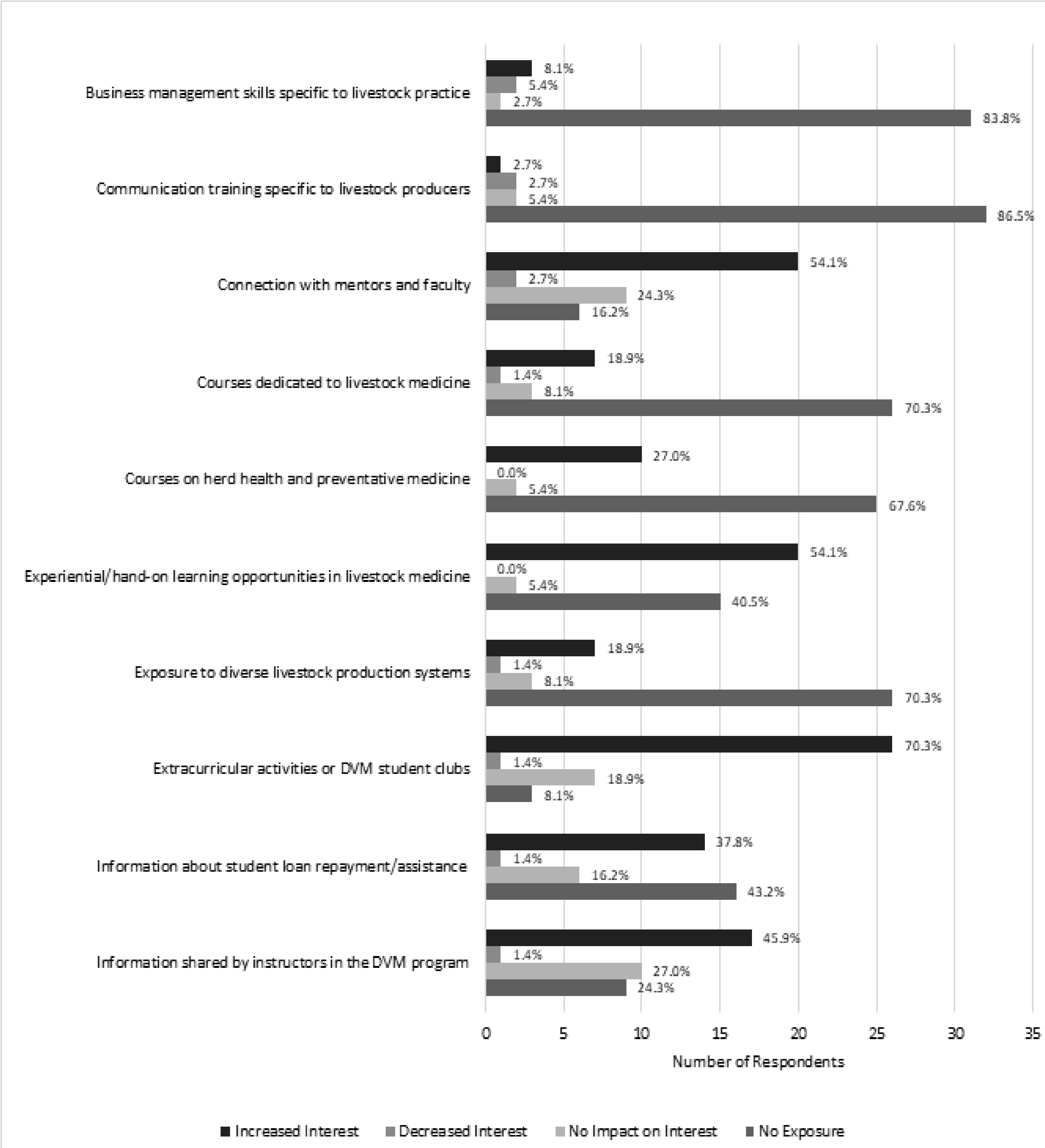


Figure 4.2.3: Influence of various program offerings on interest in practicing livestock medicine of students in year 2 of the DVM program..

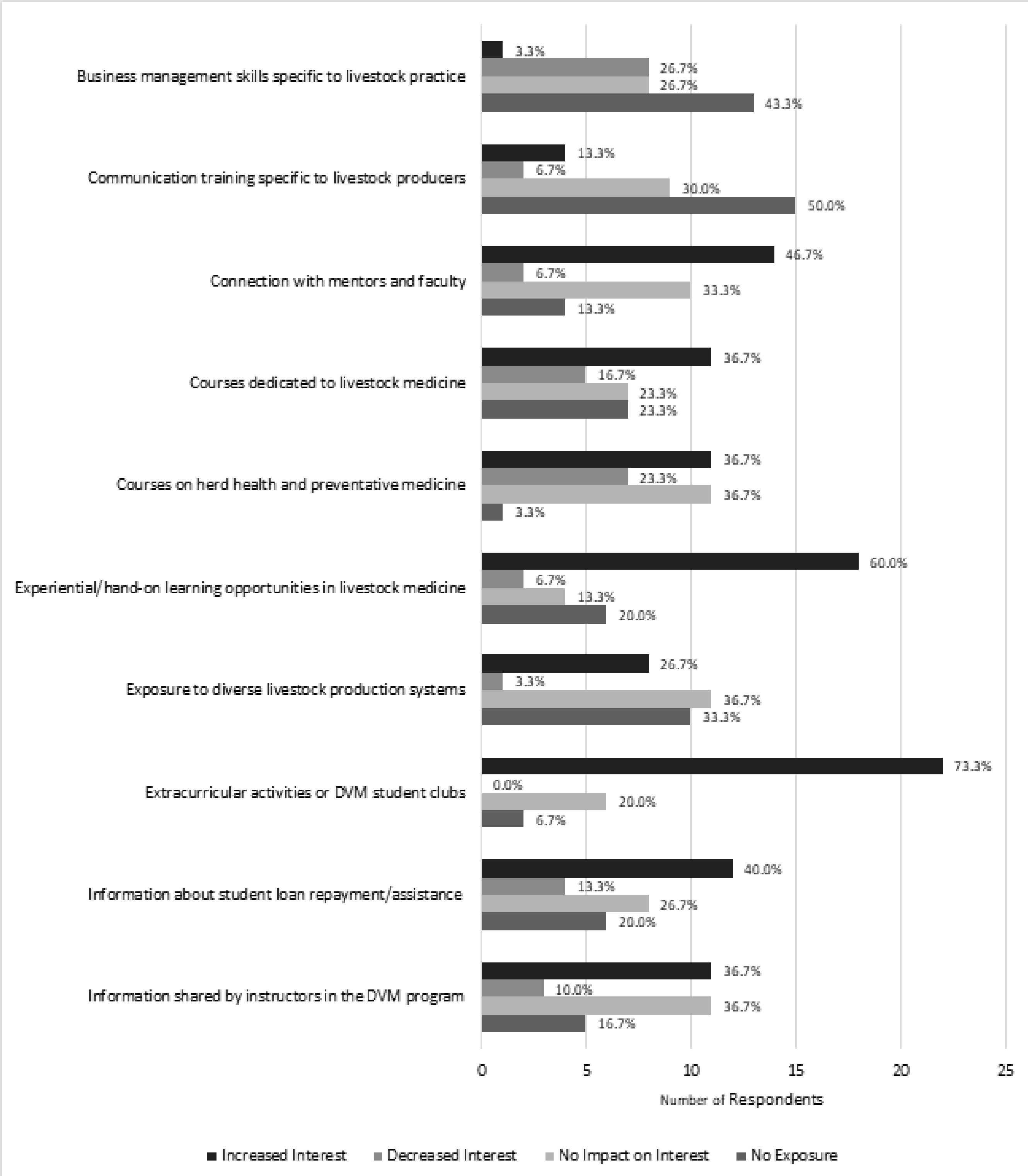


Figure 4.2.4: Influence of various program offerings on interest in practicing livestock medicine of students in year 3 of the DVM program.

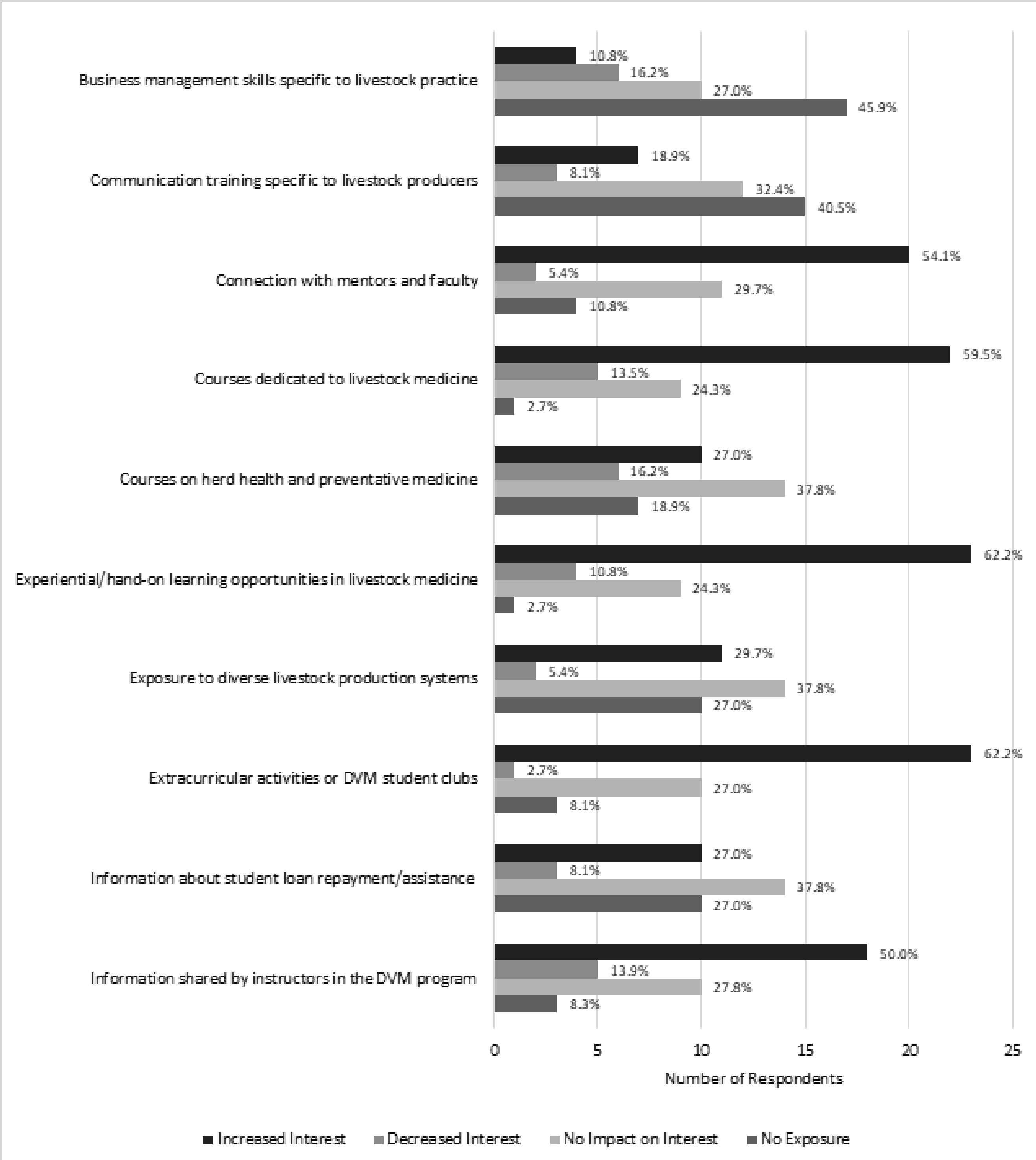
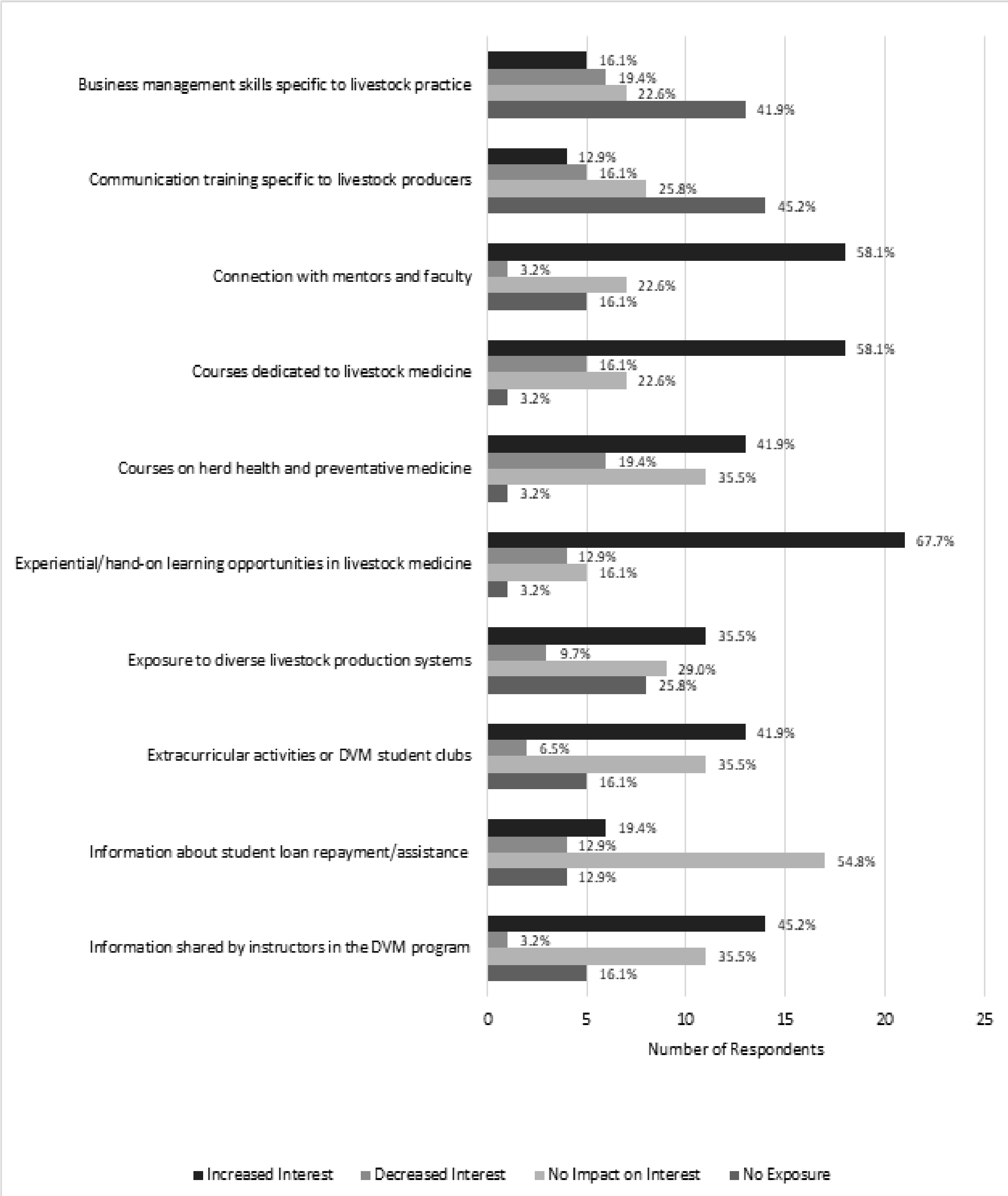


Figure 4.2.5: Influence of various program offerings on interest in practicing livestock medicine of students in year 4 of the DVM program.



4.3 Appendix C: Messaging – Breakdown by Year

Figure 4.3.1: Impact of correspondence from various groups on veterinary student interest in performing livestock and/or poultry medicine.

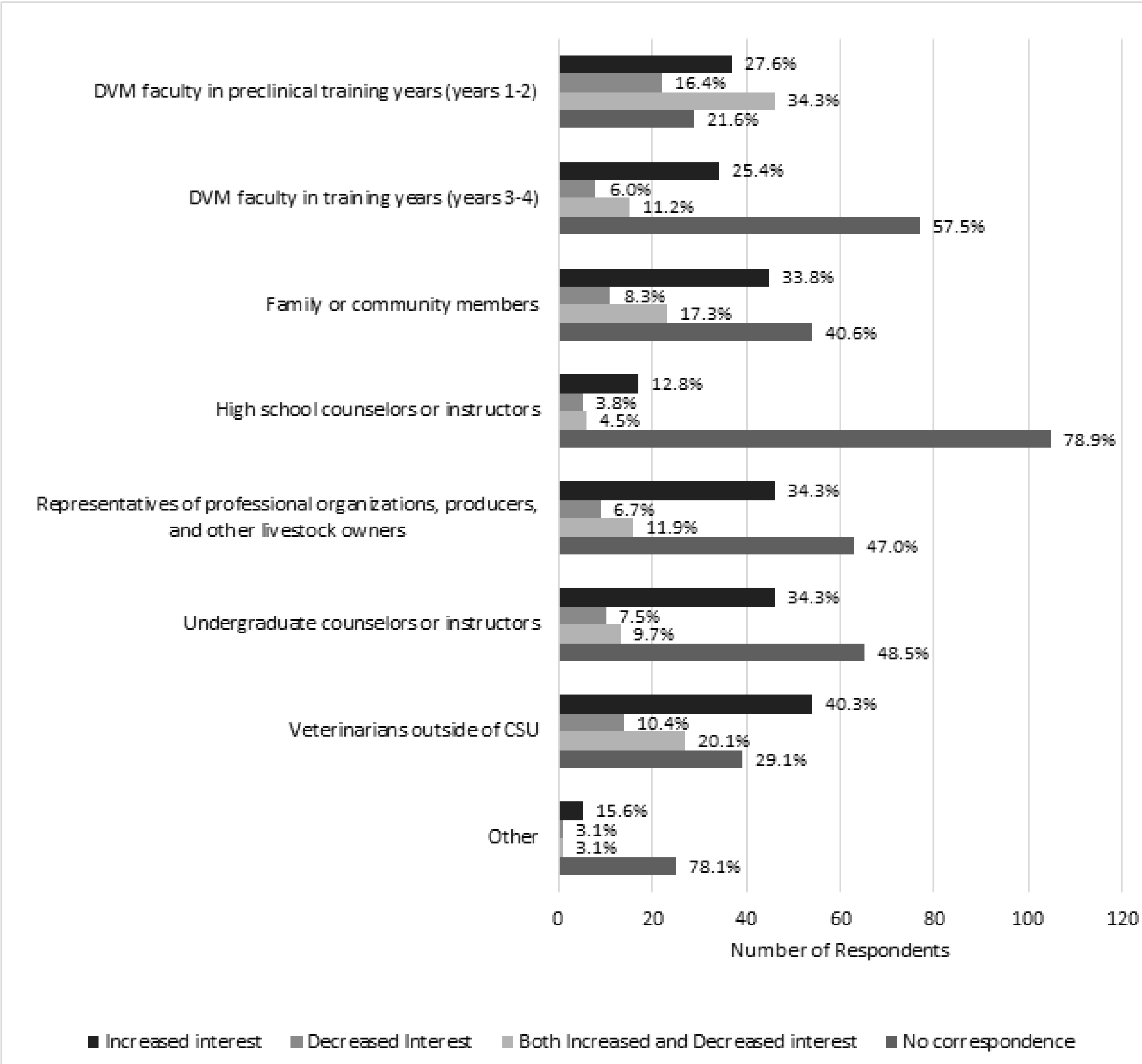


Figure 4.3.2: Impact of correspondence from various stakeholder groups on the interest of students in year 1 of the program in performing livestock and/or poultry medicine following graduation.

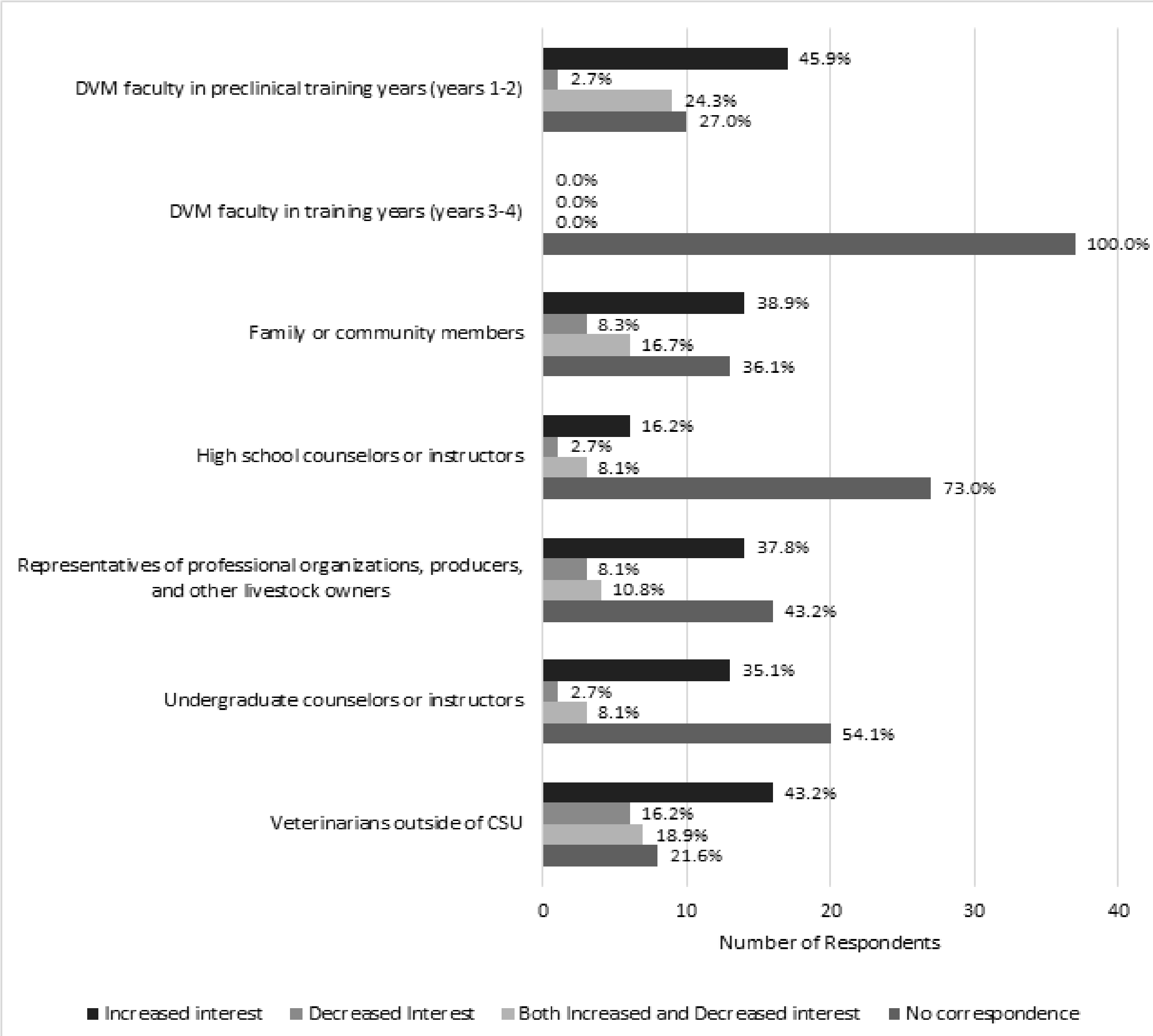


Figure 4.3.3: Impact of correspondence from various stakeholder groups on the interest of students in year 2 of the program in performing livestock and/or poultry medicine following graduation.

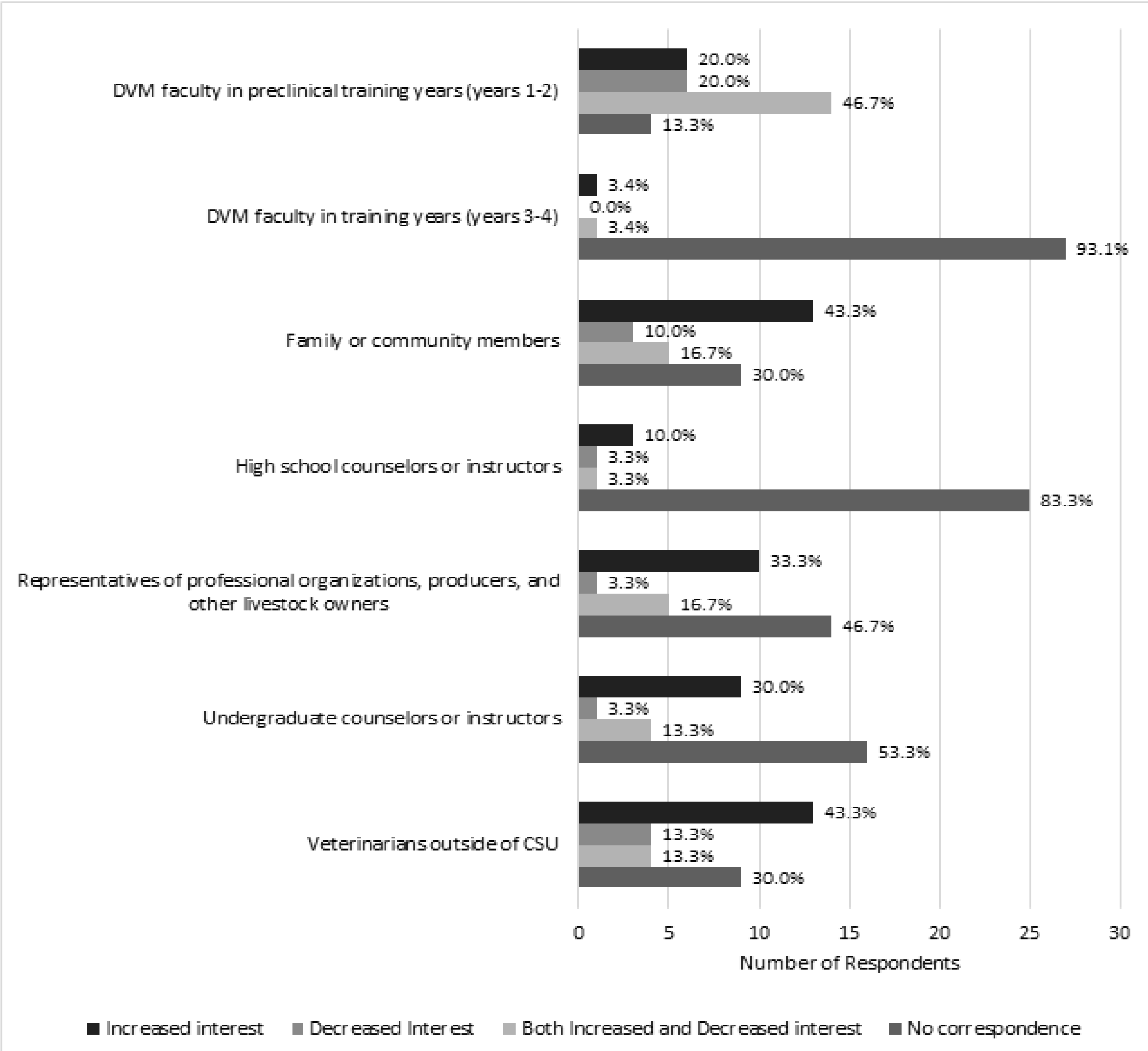


Figure 4.3.4: Impact of correspondence from various stakeholder groups on the interest of students in year 3 of the program in performing livestock and/or poultry medicine following graduation.

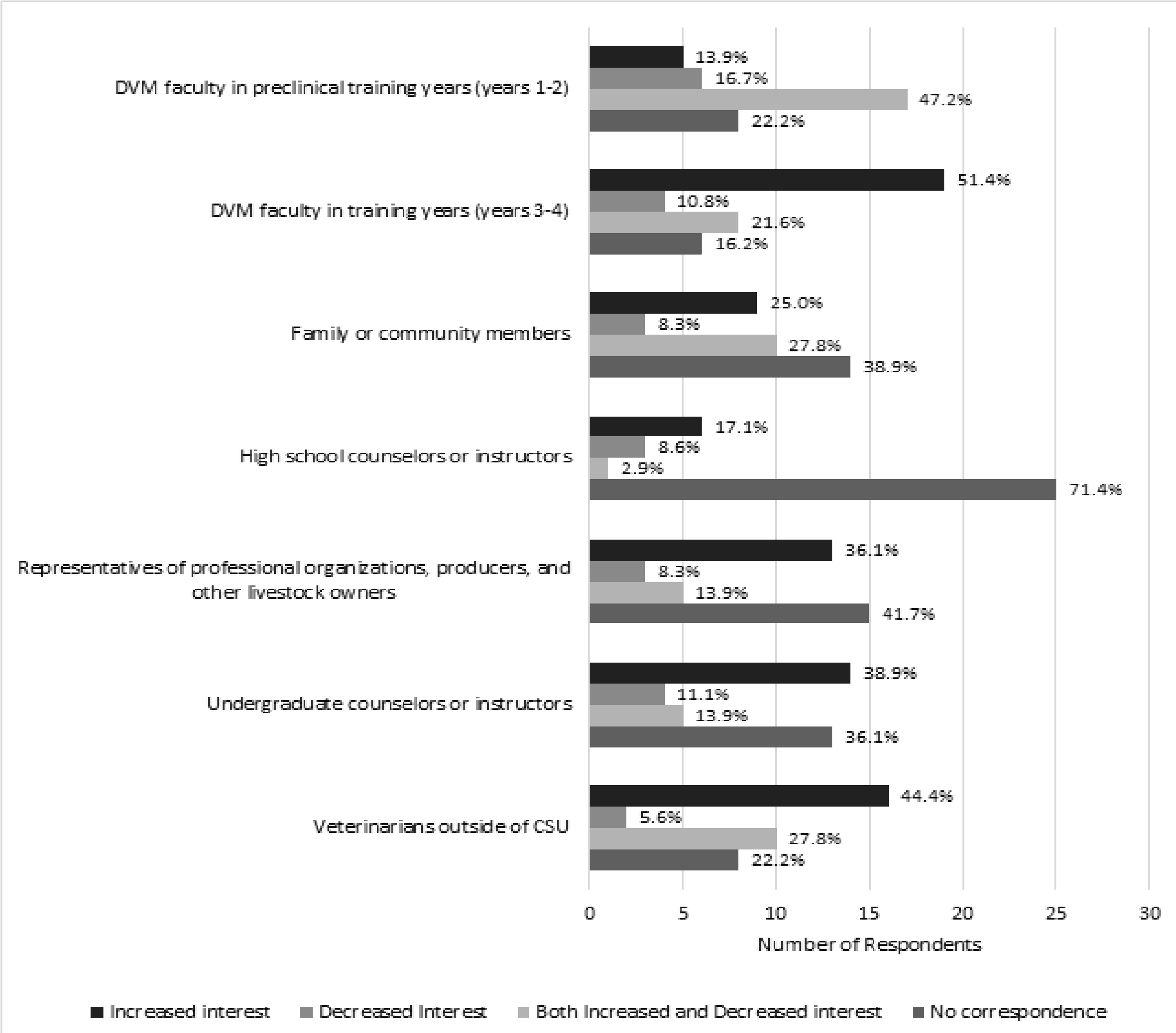
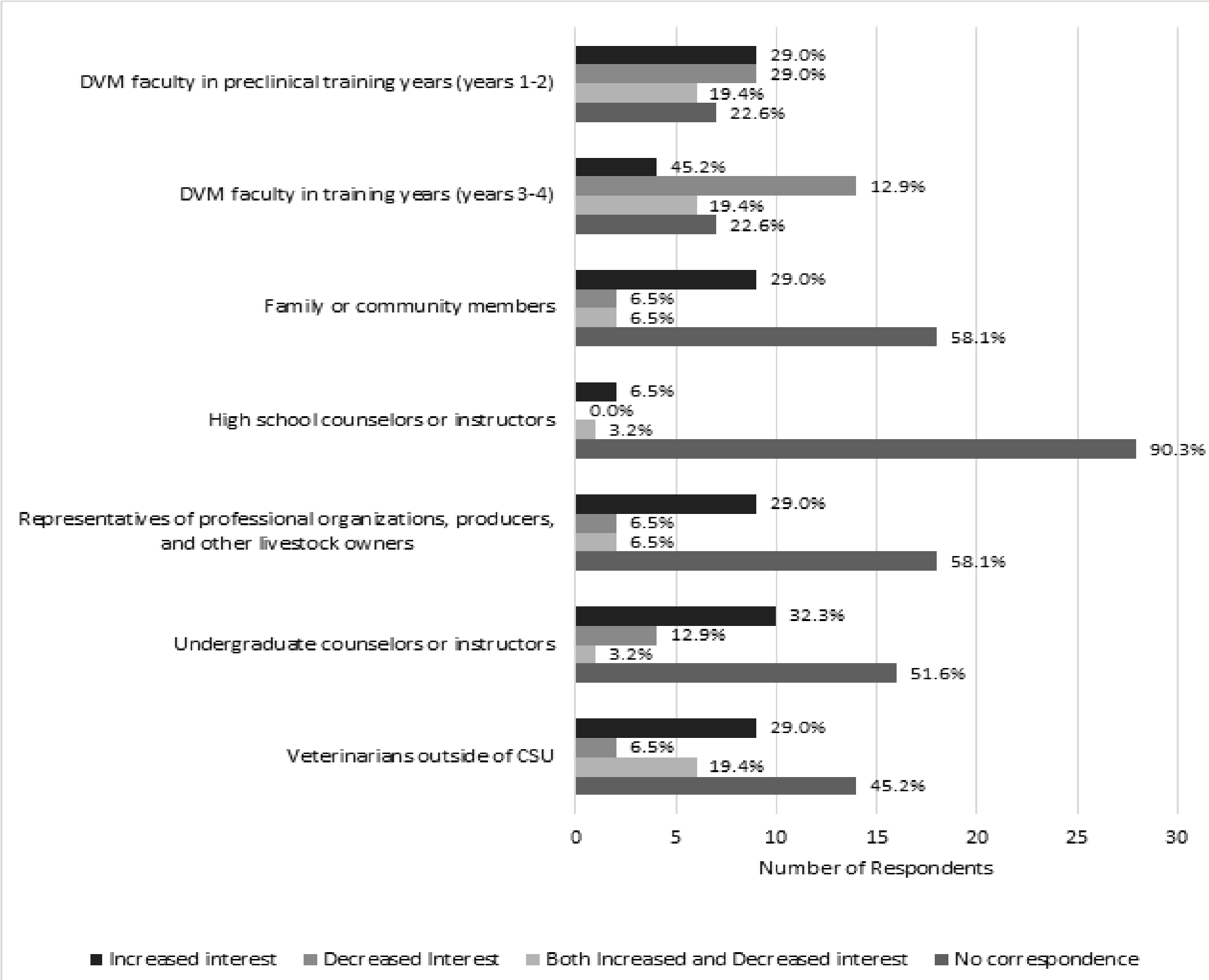


Figure 4.3.5: Impact of correspondence from various stakeholder groups on the interest of students in year 4 of the program in performing livestock and/or poultry medicine following graduation.



4.4 Appendix D: Preparation breakdown by year

Figure 4.4.1: Number of respondents interested in pursuing livestock or mixed animal veterinary medicine that indicated they felt "completely prepared" or "fairly prepared" in realizing each skill in the context of livestock practice, separated by year in program. Data labels indicate the proportion of responses in each category.