
Job Analysis for the General Examination

Conducted on behalf of



American College of Veterinary Internal Medicine (ACVIM)
5500 Greenwood Plaza Blvd. Suite 130
Greenwood Village, CO 80111

November 2023

Prepared by:



Jillian Nelson
Test Development Solutions

ACKNOWLEDGEMENTS

We would like to thank the many individuals who provided invaluable assistance throughout the conduct of the ACVIM's General Examination Job Analysis Study.

Above all, we thank the many dedicated professionals who generously contributed their time and expertise. Over 150 individuals participated in different phases of the job analysis including Task Force members, survey pilot test participants, survey respondents, and Test Specifications members.

At the ACVIM, Nicole Finn, Senior Director, Certification & Accreditation, provided excellent support throughout the project.

At Prometric, Jillian Nelson, Senior Test Developer, provided oversight and guidance throughout the job analysis process.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	i
TABLE OF CONTENTS	ii
LIST OF FIGURES AND TABLES	iii
LIST OF APPENDICES	iv
EXECUTIVE SUMMARY	v
SURVEY RATINGS	vi
INTRODUCTION	1
JOB ANALYSIS STUDY AND ADHERENCE TO PROFESSIONAL STANDARDS	1
METHOD	1
1. CONDUCT OF A PLANNING MEETING	1
2. DEVELOPMENT OF THE SURVEY	1
Conduct of the Job Analysis Study Task Force Meeting	1
Survey Construction and Review Activities	2
Survey Construction	2
Survey Review by Task Force Committee	3
Final Version of the Survey	3
3. DISSEMINATION OF THE SURVEY	5
4. ANALYSIS OF THE SURVEY DATA	5
Criterion for Interpretation of Mean Importance Ratings	5
5. DEVELOPMENT OF THE TEST SPECIFICATIONS	6
6. ASSESSMENT DESIGN MEETING AND UPDATES	6
RESULTS	7
SURVEY RESPONSES	7
DEMOGRAPHIC CHARACTERISTICS OF SURVEY RESPONDENTS	7
KSA OVERALL RATINGS	13
SUBGROUP ANALYSIS OF RATINGS	16
CONTENT COVERAGE RATINGS	16
TEST CONTENT RECOMMENDATIONS	18
WRITE-IN COMMENTS	19
DEVELOPMENT OF TEST SPECIFICATIONS FOR THE ACVIM GENERAL EXAMINATION	20
PRESENTATION OF THE JOB ANALYSIS PROJECT AND RESULTS TO THE TEST SPECIFICATIONS COMMITTEE	20
IDENTIFICATION OF THE TASK, KNOWLEDGE, AND SKILL STATEMENTS TO BE INCLUDED ON THE ACVIM GENERAL EXAMINATION	20
TASKS RECOMMENDED FOR INCLUSION	20
DEVELOPMENT OF TEST CONTENT WEIGHTS	21
FINALIZING THE EXAM STRUCTURE	21
SUMMARY AND CONCLUSIONS	23

LIST OF FIGURES AND TABLES

Figure 1. Demographic Question *1. How many years of experience do you have practicing specialty medicine (post-residency)?	8
Figure 2. Demographic Question *2. Was your residency program primarily academia or private practice?	8
Figure 3. Demographic Question *3. In which type of practice do you primarily work?	9
Figure 4. Demographic Question *4. How much of your time is spent on clinical management of animals?	9
Figure 5. Demographic Question *5. What is your primary ACVIM certification?	9
Figure 6. Demographic Question *6. Do you work WITH any of these ACVIM specialists? (Select all that apply)	10
Figure 7. Demographic Question *7. On average, how many cases do you see or supervise per year?	10
Figure 8. Demographic Question *8. With which species do you predominantly work?.....	10
Figure 9. Demographic Question *9. Including yourself, how many ACVIM board certified professionals do you work with daily (on-site or virtually)?	11
Figure 10. Demographic Question * 10. On which of the following ACVIM Committees have you served? (Select all that apply.).....	11
Figure 11. Demographic Question *11. Does your employer/institution currently have an ACVIM-approved residency training program?.....	11
Figure 12. Demographic Question *12. How many residents within your specialty have you trained within the last 5 years?	12
Figure 13. Demographic Question *13. Where do you currently practice?	12
Figure 14. Demographic Question *14. What is your race/ethnicity?	12
Figure 15. Demographic Question *15. What is your age?	13
Figure 16. Demographic Question *16. What is your gender identity?	13
Table 1A. General Domains by Pass, Borderline, and Fail categories	14
Table 1B. SAIM Domains by Pass, Borderline, and Fail categories	14
Table 1C. LAIM Domains by Pass, Borderline, and Fail categories	15
Table 3. Mean, Standard Deviation, and Frequency Distribution Percentage of General Content Coverage	17
Table 4. Mean, Standard Deviation, and Frequency Distribution Percentage of SAIM Content Coverage	17
Table 5. Mean, Standard Deviation, and Frequency Distribution Percentage of LAIM Content Coverage	18
Table 6. Survey Respondents' Test Content Recommendations by Mean Percentages and Standard Deviations -General Section	18
Table 7. Survey Respondents' Test Content Recommendations by Mean Percentages and Standard Deviations -General Section	19
Table 8. Survey Respondents' Test Content Recommendations by Mean Percentages and Standard Deviations -SAIM Section	19
Table 9. ACVIM General Examination-General Section Test Content Weights Recommended by the Test Specifications Committee	21
Table 10. ACVIM General Examination-SAIM Section Test Content Weights Recommended by the Test Specifications Committee	21
Table 11. ACVIM General Examination-LAIM Section Test Content Weights Recommended by the Test Specifications Committee	22

LIST OF APPENDICES

Appendix A. Participants

Appendix B. Online Survey

Appendix C. Demographic Characteristics of Respondents

Appendix D. Task Means, Standard Deviations, and Frequency Percent Distributions

Appendix E. Indices of Agreement

Appendix F. Task Content Coverage Write-In Comments

Appendix G. Role Change Write in Comments

Appendix H. Test Specification Approvals

Appendix I. Test Specifications

EXECUTIVE SUMMARY

The American College of Veterinary Internal Medicine's (ACVIM) mission is "Being the trusted leader in veterinary education, discovery and medical excellence."¹The ACVIM requested a job analysis study from Prometric for the General Examination.

A job analysis study is designed to obtain descriptive information about the tasks performed on a job and the knowledge needed to adequately perform those tasks. The purpose of the job analysis study was to:

- validate the tasks and knowledge important for VETERINARIANS; and,
- develop test specifications for the ACVIM GENERAL Examination.

Conduct of the Job Analysis Study

The job analysis study consisted of several activities: background research, collaboration with subject matter experts to ensure representativeness of the knowledge, skill and ability (KSA) statements; survey development; survey dissemination; compilation of survey results; and test specifications development. The successful outcome of the job analysis study depended on the excellent information provided by veterinary professionals.

Survey Development

Survey research is an effective way to identify the tasks and knowledge that are important for veterinary generalists. The KSA statements included on the survey covered seven domains of practice. The development of the survey was based on a draft of KSA statements developed from a variety of resources, including the existing content outline provided to Prometric by ACVIM.

Survey Content

The survey, disseminated in April of 2023, consisted of four sections. ACVIM distributed the survey to veterinary professionals.

Survey Sections
Section 1: Background and General Information
Section 2: Knowledge, Skills & Abilities (KSAs)
Section 3: Domain Weighting
Section 4: Additional Comments

¹ [About \(acvim.org\)](https://www.acvim.org) retrieved 6/22/2023.

Results

Survey Response

A total of 254 veterinary professionals submitted completed surveys. Based on the analysis of survey responses, a representative group of veterinary professionals completed the survey in sufficient numbers to meet the requirements for statistical analysis of the results. This is evidenced by review of the responses for each of the background and general information questions as well as confirmation by the Test Specifications Committee.

Survey Ratings

Participants were asked to rate the task statements by the importance for a veterinarian using a five-point scale (0 = Of no importance to 4 = Very important).

Content Coverage

Evidence was provided for the comprehensiveness of the content coverage within the domains. If the KSA statements within a domain are adequately defined, then it should be judged as being well covered. Respondents indicated that the content within each domain was well covered, thus supporting the comprehensiveness of the defined domains.

Test Specifications Development

On Monday, March 13, 2023, a Test Specifications Committee convened to review the results of the job analysis and to create the test content outline that will guide the development of the ACVIM General Examination.

Summary

In summary, this study used a multi-method approach to identify the tasks and knowledge that are important to the competent performance of the role of a veterinarian. The job analysis process allowed for input from a representative group of veterinarians and was conducted within the guidelines of professionally sound practice. The results of the job analysis can be used by the ACVIM to develop the ACVIM General Examination.

RESULTS AT A GLANCE

WHO COMPLETED THE SURVEY?

A total of 254 responses were used for analysis. Most respondents worked full time in private practice.

TASK IMPORTANCE RATINGS

GENERAL: A total of 74 of the 78 tasks achieved high importance ratings for the overall group in the General section of the survey.

SMALL ANIMAL: A total of 85 of the 89 tasks achieved high importance ratings for the overall group in the General section of the survey.

LARGE ANIMAL: A total of 61 of the 66 tasks achieved high importance ratings for the overall group in the General section of the survey.

INTRODUCTION

The ACVIM’s mission is “Being the trusted leader in veterinary education, discovery and medical excellence.”²The ACVIM requested a job analysis study from Prometric for the ACVIM General Examination.

This report describes the job analysis study including the:

- rationale for conducting the job analysis study;
- methods used to define tasks and knowledge;
- types of data analyses conducted and their results; and
- results and conduct of the test specifications meeting.

Job Analysis Study and Adherence to Professional Standards

A job analysis study refers to procedures designed to obtain descriptive information about the tasks performed on a job and the knowledge, skills, or abilities requisite to the performance of those tasks. The specific type of information collected during a job analysis study is determined by the purpose for which the information will be used.

For purposes of developing the ACVIM General Examination, a job analysis study should identify important tasks, knowledge, skills, or abilities deemed important by veterinary generalists.

The use of a job analysis study (also known as practice analysis, role and function study, or role delineation) to define the content domain(s) is a critical component in establishing the content validity of the certification. Content validity refers to the extent to which the content covered by an examination is representative of the scope of a job (tasks, knowledge, skills, or abilities).

A well-designed job analysis study should include the participation of a representative group of subject matter experts who reflect the diversity within the profession. Diversity refers to regional or job context factors and to factors such as experience, gender, and race/ethnicity. Demonstration of content validity is accomplished through the judgments of subject matter experts. The process is enhanced by the inclusion of large numbers of experts who represent the diversity of the relevant areas of expertise.

*The Standards for Educational and Psychological Testing*³ (2014) (*The Standards*) is a comprehensive technical guide that provides criteria for the evaluation of tests, testing practices, and the effects of test use. It was developed jointly by the American Psychological Association (APA), the American Educational Research Association (AERA), and the National Council on Measurement in Education (NCME). The guidelines presented in *The Standards*, by professional consensus, have come to define the necessary components of quality testing. Consequently, a testing program that adheres to *The Standards* is more likely to be judged to be valid and defensible than one that does not.

² [About \(acvim.org\)](https://www.acvim.org) retrieved 6/22/2023.

³ American Educational Research Association, American Psychological Association, National Council on Measurement in Education. (2014). *The Standards for Educational and Psychological Testing*. Washington, DC: American Psychological Association.

As stated in Standard 11.13,

“The content domain to be covered by a credentialing test should be defined clearly and justified in terms of the importance of the content for credential-worthy performance in an occupation or profession. A rationale and evidence should be provided to support the claim that the knowledge or skills being assessed are required for credential-worthy performance in that occupation and are consistent with the purpose for which the credentialing program was instituted.... Typically, some form of job or practice analysis provides the primary basis for defining the content domain...” (pp 181-182)

The job analysis study for the ACVIM General Examination was designed to follow the guidelines presented in *The Standards* and to adhere to accepted professional practice.

METHOD

The job analysis study for veterinary generalists involved a multi-method approach that included meetings with subject-matter experts and a survey. This section of the report describes the activities conducted for the job analysis study.

First, experts identified the tasks and knowledge they believed were important to the practice of veterinarians. Then, a survey was developed and disseminated to veterinary professionals. The purpose of the survey was to obtain verification (or refutation) that the tasks and knowledge identified by the experts are important to the work of veterinarians.

Survey research functions as a “check and balance” on the judgments of the experts and reduces the likelihood that unimportant areas will be considered in the development of the test specifications. The use of a survey is also an efficient and cost-effective method of obtaining input from large numbers of experts and makes it possible for analysis of ratings by appropriate subgroups of respondents.

The survey results provide information to guide the development of test specifications and content-valid examinations. What matters most is that a certification examination covers the important knowledge needed to perform job activities.

The steps of the job analysis study are described in detail below:

STEPS OF THE JOB ANALYSIS STUDY

1. Conduct of a planning meeting
2. Development of the survey instrument
3. Dissemination of the survey
4. Analysis of the survey data
5. Development of the test specifications

1. Conduct of a Planning Meeting

On December 5, 2022, ACVIM representatives and the Prometric staff responsible for the conduct of the job analysis held a planning meeting via web conference. During the planning meeting, the selection of the Task Force Committee members and Test Specifications Committee members, meeting dates and logistics, and survey delivery were topics of discussion.

2. Development of the Survey

Conduct of the Job Analysis Study Task Force Meeting

The Task Force Committee was comprised of a representative group of veterinarians. In total, 14 veterinarians comprised the committee. A list of the Task Force Committee members appears in Appendix A. The Task Force meeting was conducted in Denver, CO on December 16-17, 2022. The purpose of the meeting was to develop the survey content. Prometric staff facilitated the meeting.

Activities conducted during the meeting included reviewing and, as needed, revising the major domains, knowledge, skills, and abilities that are necessary for the competent performance of the role of a veterinarian. The draft list presented to the Task Force was developed using the existing examination blueprint. Survey rating scales and background and general information questions were presented, discussed, and revised as needed.

It was also explained during this meeting that the ACVIM General Examination is administered in two parts; candidates first complete the General section of the exam and then move on to either the Small or Large Animal section of the exam, depending on their focus. It was determined the survey would be set up similarly, with all respondents rating the General section KSAs, then rating either the Small or Large Animal KSAs.

Survey Construction and Review Activities

Survey Construction

Upon the completion of the Task Force Meeting, Prometric staff constructed the draft survey. The survey covered the following domains for the three sections of the General Examination:

General Domains:

- Cardiology
- Endocrine
- Gastrointestinal/Hepatobiliary
- Hemolymphatic/Immunology
- Nephrology/Urology
- Neurology/Musculoskeletal
- Nutrition/Metabolism
- Respiratory
- Pan-Systemic
- Epidemiology

Small Animal Domains:

1. SAIM Cardiology
2. SAIM Endocrine
3. SAIM Gastrointestinal/Hepatobiliary
4. SAIM Hemolymphatic/Immunology
5. SAIM Nephrology/Urology
6. SAIM Neurology/Musculoskeletal
7. SAIM Nutrition/Metabolism
8. SAIM Respiratory
9. SAIM Pan-Systemic
10. SAIM Epidemiology

Large Animal Domains:

1. LAIM Cardiology
2. LAIM Endocrine
3. LAIM Gastrointestinal/Hepatobiliary
4. LAIM Hemolymphatic/Immunology
5. LAIM Nephrology/Urology
6. LAIM Neurology/Musculoskeletal

7. LAIM Nutrition/Metabolism
8. LAIM Respiratory
9. LAIM Pan-Systemic
10. LAIM Epidemiology

Survey Review by Task Force Committee

Each Task Force member received a copy of the draft survey. The purpose of the review was to provide the Committee with an opportunity to view their work and recommend any revisions.

Comments provided by the Task Force Committee for the online survey were compiled by Prometric staff and reviewed with the Task Force members via web conference on March 13, 2023. Refinements, as recommended by the Task Force, were incorporated into the online survey in preparation for the live survey.

Final Version of the Survey

The final version of the online surveys consisted of five sections: Section 1: Background and General Information; Section 2: Knowledge, Skills, and Abilities; Section 3: Domain Weighting; Section 4: Additional Comments.

In Section 1: Background and General Information, survey participants responded to general and background information about themselves and their professional activities.

In Section 2: Knowledge, Skills, and Abilities, survey participants rated the statements using the importance scale shown below.

Considering both importance and frequency, how important is each knowledge, skill, or ability (KSA) statement for a resident taking the ACVIM General Examination?
0 = Of no importance
1 = Of little importance
2 = Of moderate importance
3 = Important
4 = Very important

Survey participants were asked to provide a rating measuring the representativeness of each knowledge and task domain. Respondents made their judgments using the five-point rating scale shown below.

Content Coverage
How well do the statements in Domain (#) cover important aspects of (the domain) for residents taking the General Exam?
1 = Very Poorly
2 = Poorly
3 = Adequately
4 = Well
5 = Very Well

Respondents could note any topics that were not covered within a specific domain in an open response field.

In Section 3: Domain Weighting, survey participants indicated the content weights that the domains below should receive on each section of the exam:

General Domains:
<ul style="list-style-type: none"> Cardiology Endocrine Gastrointestinal/Hepatobiliary Hemolymphatic/Immunology Nephrology/Urology Neurology/Musculoskeletal Nutrition/Metabolism Respiratory Pan-Systemic Epidemiology
Small Animal Domains:
<ul style="list-style-type: none"> 1. SAIM Cardiology 2. SAIM Endocrine 3. SAIM Gastrointestinal/Hepatobiliary 4. SAIM Hemolymphatic/Immunology 5. SAIM Nephrology/Urology 6. SAIM Neurology/Musculoskeletal 7. SAIM Nutrition/Metabolism 8. SAIM Respiratory 9. SAIM Pan-Systemic 10. SAIM Epidemiology
Large Animal Domains:
<ul style="list-style-type: none"> 1. LAIM Cardiology 2. LAIM Endocrine 3. LAIM Gastrointestinal/Hepatobiliary 4. LAIM Hemolymphatic/Immunology 5. LAIM Nephrology/Urology 6. LAIM Neurology/Musculoskeletal 7. LAIM Nutrition/Metabolism 8. LAIM Respiratory 9. LAIM Pan-Systemic 10. LAIM Epidemiology

This was accomplished by distributing 100 percentage points across the 10 domains of each section of the exam (General, SAIM, and LAIM each had 100 percentage points). These distributions represented the allocation of examination items survey participants believed should be devoted to each domain on each section of the exam.

In Section 4: Write in Comments, survey respondents were given the opportunity to answer open-ended questions: “What additional professional development and/or continuing education could you use to improve your performance in your current work role?” and “How do you expect your work role to change over the next few years? What tasks will be performed and what knowledge will be needed to meet changing job demands?”

3. Dissemination of the Survey

ACVIM distributed the survey to members in April of 2023. Appendix B contains a copy of the online survey.

4. Analysis of the Survey Data

As previously noted, the purpose of the survey was to validate the tasks and knowledge that relatively large numbers of veterinarians judged to be relevant (verified as important) to their work. This objective was accomplished through an analysis of the mean importance ratings for knowledge, skill, and ability statements. The derivation of test specifications from those statements verified as important by the surveyed veterinarians provides a substantial evidential basis for the content validity of credentialing examinations. For the purposes of this study, the overall group was included in the analysis.

Based on information obtained from the survey, data analyses by respondent subgroups (e.g., practice setting) are possible when sample size permits. A subgroup category is required to have at least 30 respondents to be included in the mean analyses. This is a necessary condition to ensure that the mean value based upon the sample of respondents is an accurate estimate of the corresponding population mean value.

The following quantitative data analyses were produced:

- Means, standard deviations, and frequency (percentage) distributions for task and content coverage ratings
- Means and standard deviations for test content recommendations
- Index of agreement values for designated subgroups

Criterion for Interpretation of Mean Importance Ratings

Since a major purpose of the survey is to ensure that only validated knowledge, skill, and ability statements are included in the development of test specifications, a criterion (cut point) for inclusion needs to be established.

A criterion used in similar studies is a mean importance rating that represents the midpoint between moderately important and important. For the importance rating scale used across many studies, the value of this criterion is 2.50.

Definition of Pass, Borderline and Fail Categories for Task and Knowledge Importance Mean Ratings

	<u>Means</u>
Pass:	At or above 2.50
Borderline:	2.40 to 2.49
Fail:	Less than 2.40

This criterion is consistent with the intent of content validity. Therefore, for this job analysis, Prometric recommended the value of this criterion should be set at 2.50. Accordingly, the knowledge, skill, and ability statements were grouped into one of three categories: Pass, Borderline, or Fail as determined by their mean importance ratings. The skill criticality ratings used the same criterion.

- The Pass Category contains those statements whose mean ratings are at or above 2.50 and are eligible for inclusion in the development of test specifications.
- The Borderline Category contains those statements whose mean ratings are between 2.40 and 2.49. The Borderline Category is included to provide a point of discussion for the Task Force to determine if the statement(s) warrant(s) inclusion in the test specifications.
- The Fail Category contains those statements whose mean ratings are less than 2.40. It is recommended that statements in the Fail Category be excluded from consideration in the test specifications.

5. Development of the Test Specifications

A meeting was facilitated by Prometric staff to develop the test specifications based on the job analysis study results. The meeting was conducted on May 5-6, 2023, in Denver, CO. This meeting focused on:

- finalizing the KSA statements for inclusion based on the survey results;
- establishing the percentage test content weights for each area on the examination.

These percentage test weights guide examination development activities.

6. Assessment Design Meeting and Updates

At the conclusion of the job analysis process, Prometric, ACVIM, and a group of veterinary specialists met to finalize the exam structure. During this meeting it was determined that candidates would no longer take each General Examination section separately. It was decided that there would be one General Examination for candidates specializing in small animal internal medicine (consisting of both general and SAIM specific questions) and one exam for candidates specializing in large animal internal medicine (consisting of both general and LAIM specific questions).

RESULTS

Survey Responses

The survey link was distributed to 4050 participants, and a total of 366 responses were submitted. Data obtained from respondents who completed less than 55% of the survey was removed. The sample size used in the analysis of the General Section was 254. The response rate for this survey was 9.04%.

Based on the analysis of survey responses, a representative group of veterinarians completed the survey in sufficient numbers to meet the requirements to conduct statistical analysis. This was evidenced by the distribution of responses for each of the background information questions and was confirmed through discussion with the Test Specification Committee.

Of the 254 respondents, 211 completed the survey and were used for analysis on the Small Animal Section of the examination. Based on the analysis of survey responses, a representative group of veterinarians completed the survey in sufficient numbers to meet the requirements to conduct statistical analysis. This was evidenced by the distribution of responses for each of the background information questions and was confirmed through discussion with the Committee.

Of the 254 respondents, 31 completed the survey and were used for analysis on the Large Animal Section of the examination. It was determined that, while there was a small sample size, it was reflective of the number of Large Animal veterinarians compared to Small Animal and to be expected. Additional Large Animal SMEs were included in the discussion of the Large Animal section survey data.

Demographic Characteristics of Survey Respondents

The profile of survey respondents is below. All responses to the background and general information section of the survey are provided in Appendix C1. Write in responses to “Other, please specify” options are provided in Appendices C2 through C3. The results in the figures below reflect the sample size used for analysis (254).

Figure 1. *Demographic Question *1. How many years of experience do you have practicing specialty medicine (post-residency)?*

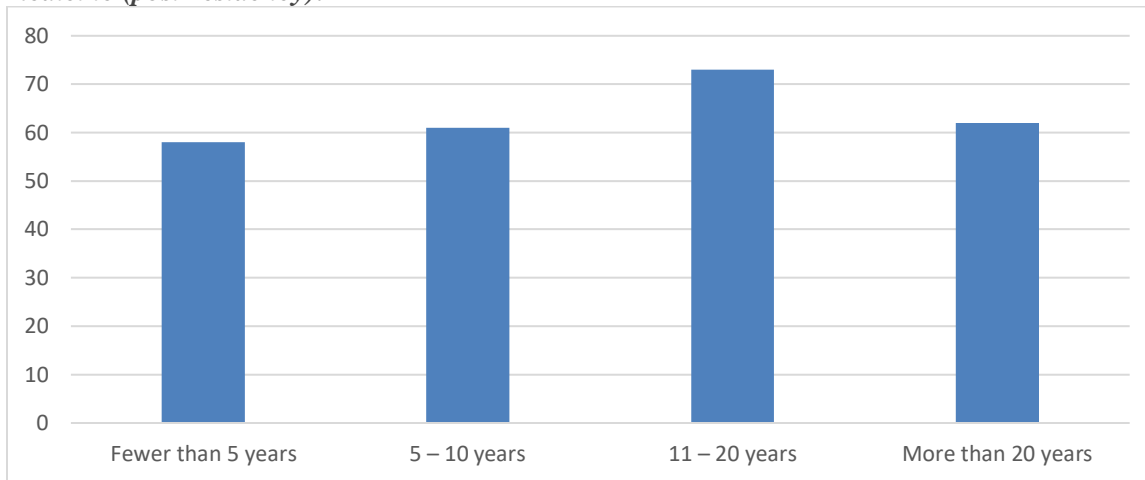


Figure 2. *Demographic Question *2. Was your residency program primarily academia or private practice?*

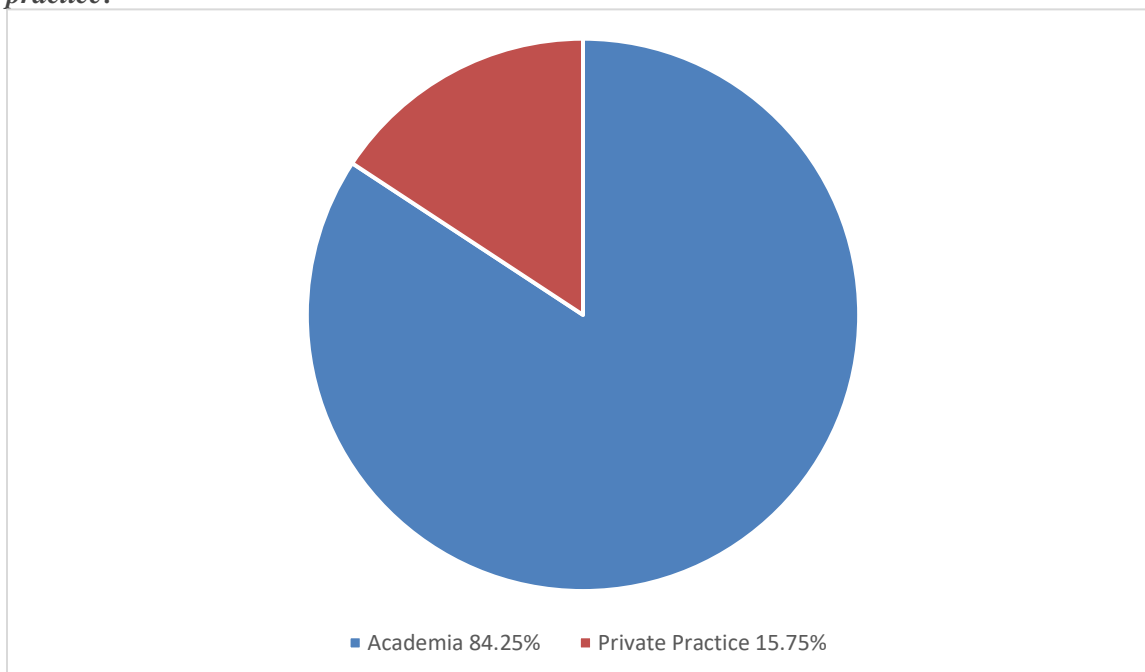


Figure 3. Demographic Question *3. In which type of practice do you primarily work?

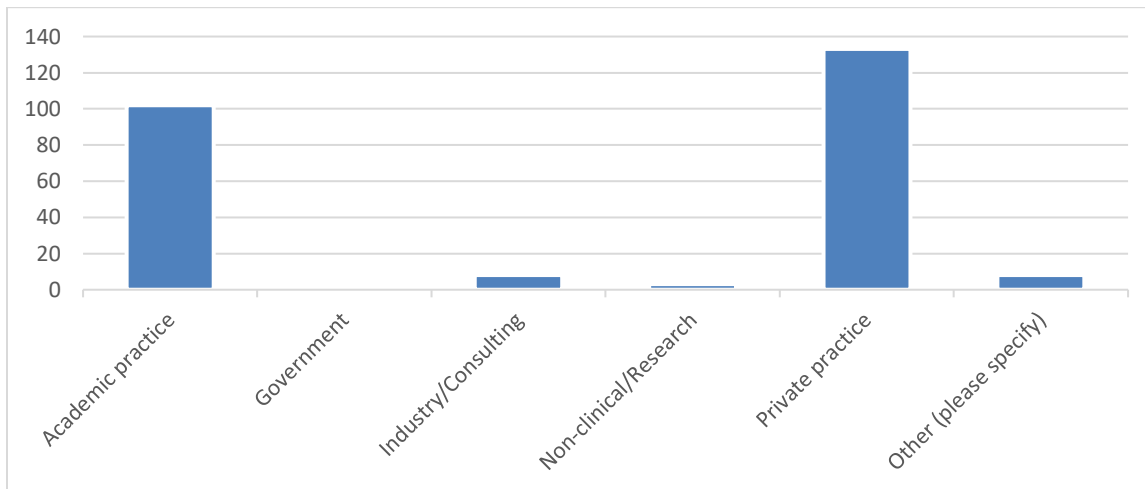


Figure 4. Demographic Question *4. How much of your time is spent on clinical management of animals?

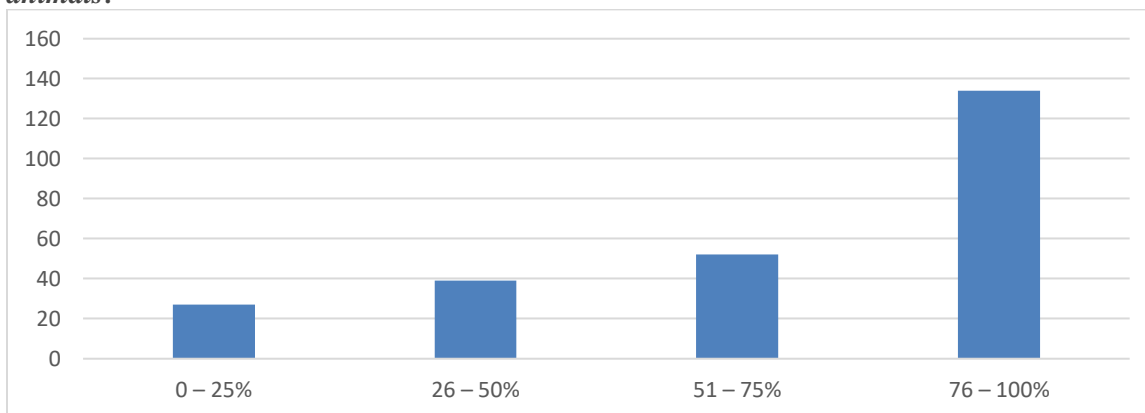


Figure 5. Demographic Question *5. What is your primary ACVIM certification?

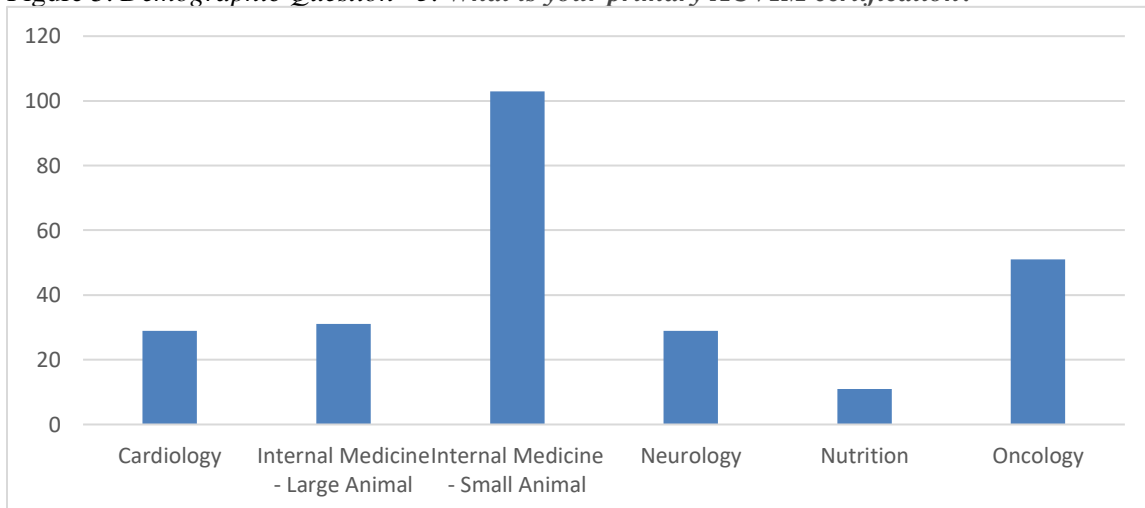


Figure 6. Demographic Question *6. Do you work WITH any of these ACVIM specialists? (Select all that apply)

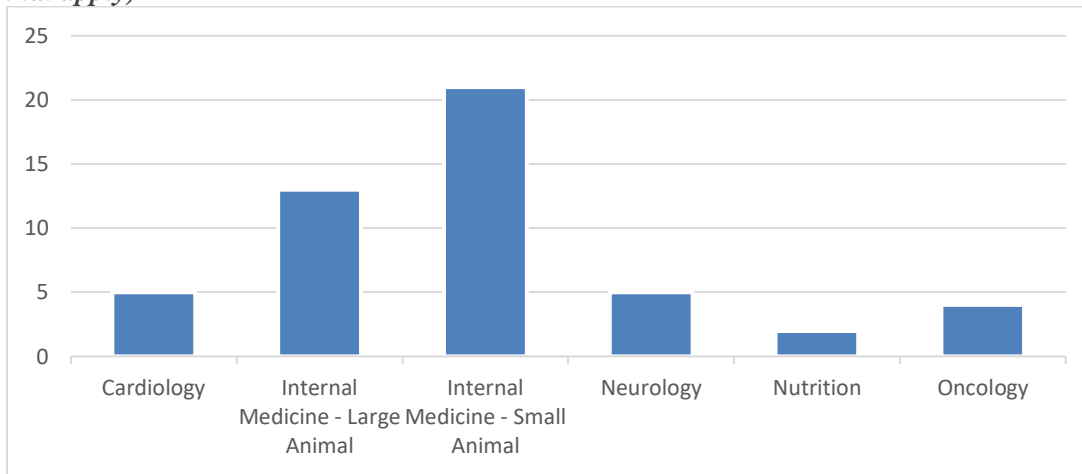


Figure 7. Demographic Question *7. On average, how many cases do you see or supervise per year?

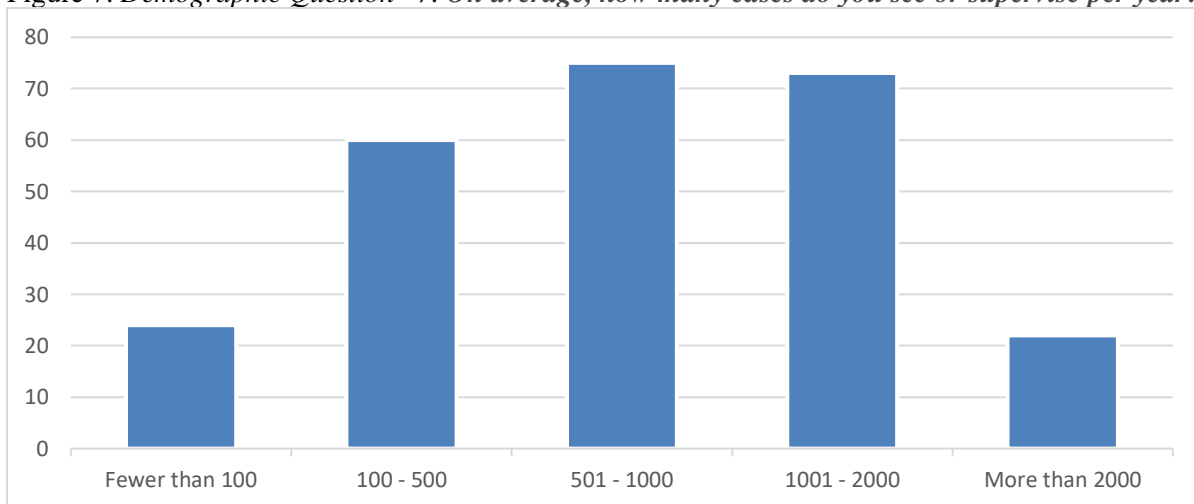


Figure 8. Demographic Question *8. With which species do you predominantly work?

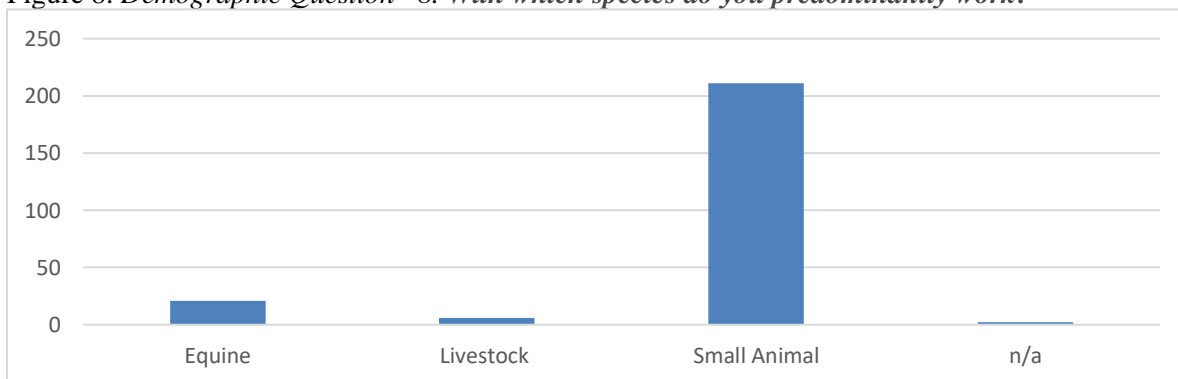


Figure 9. *Demographic Question *9. Including yourself, how many ACVIM board certified professionals do you work with daily (on-site or virtually)?*

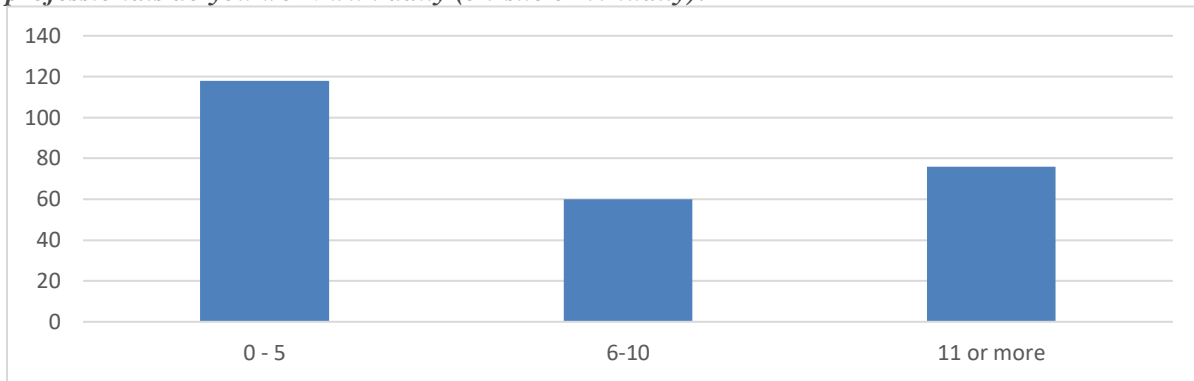


Figure 10. *Demographic Question * 10. On which of the following ACVIM Committees have you served? (Select all that apply.)*

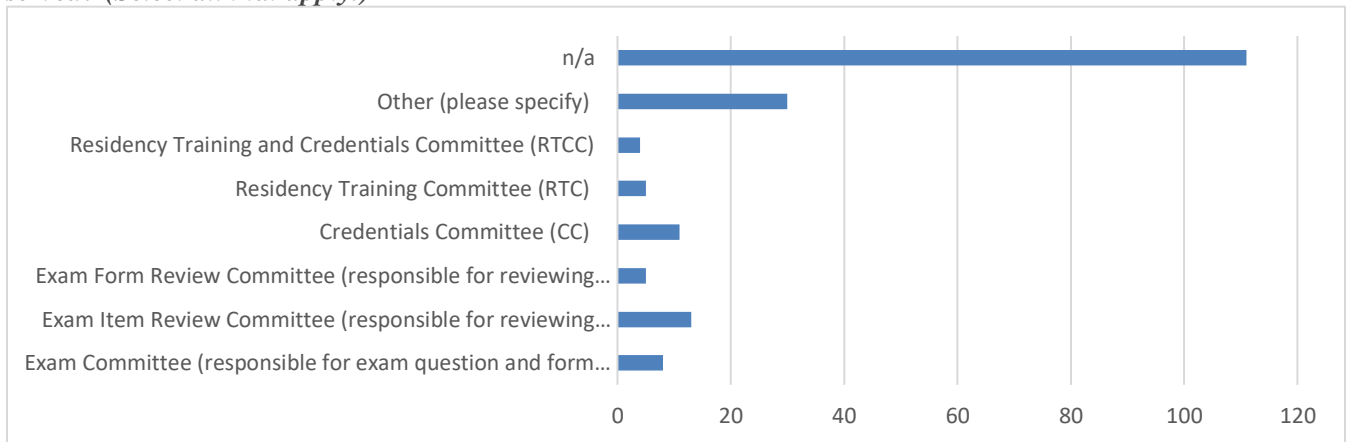


Figure 11. *Demographic Question *11. Does your employer/institution currently have an ACVIM-approved residency training program?*

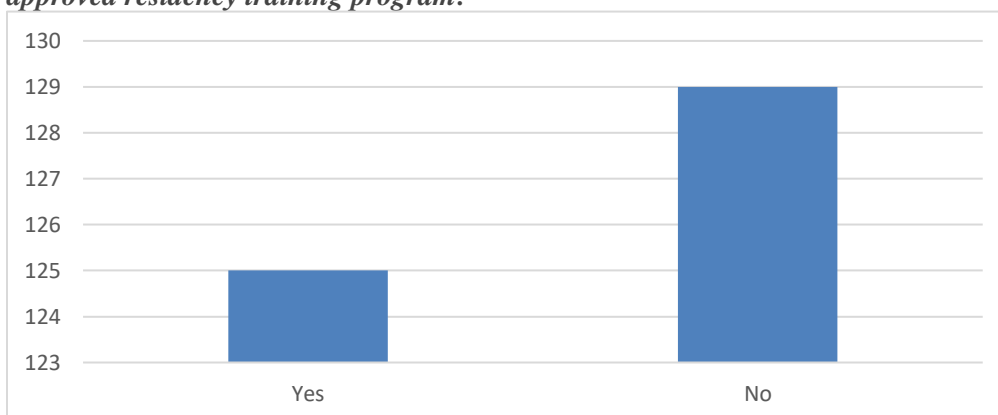


Figure 12. *Demographic Question *12. How many residents within your specialty have you trained within the last 5 years?*

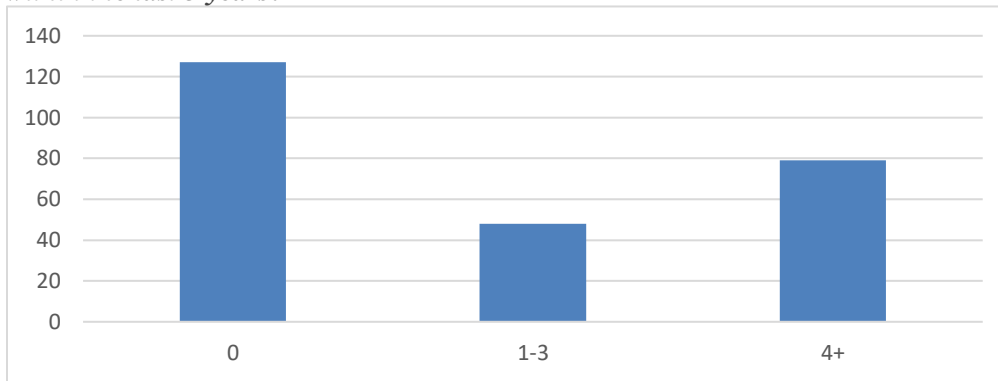


Figure 13. *Demographic Question *13. Where do you currently practice?*

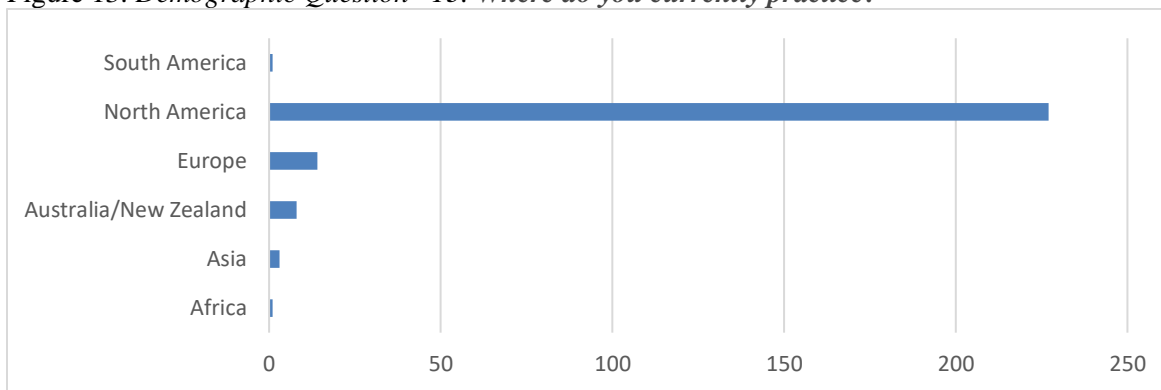


Figure 14. *Demographic Question *14. What is your race/ethnicity?*

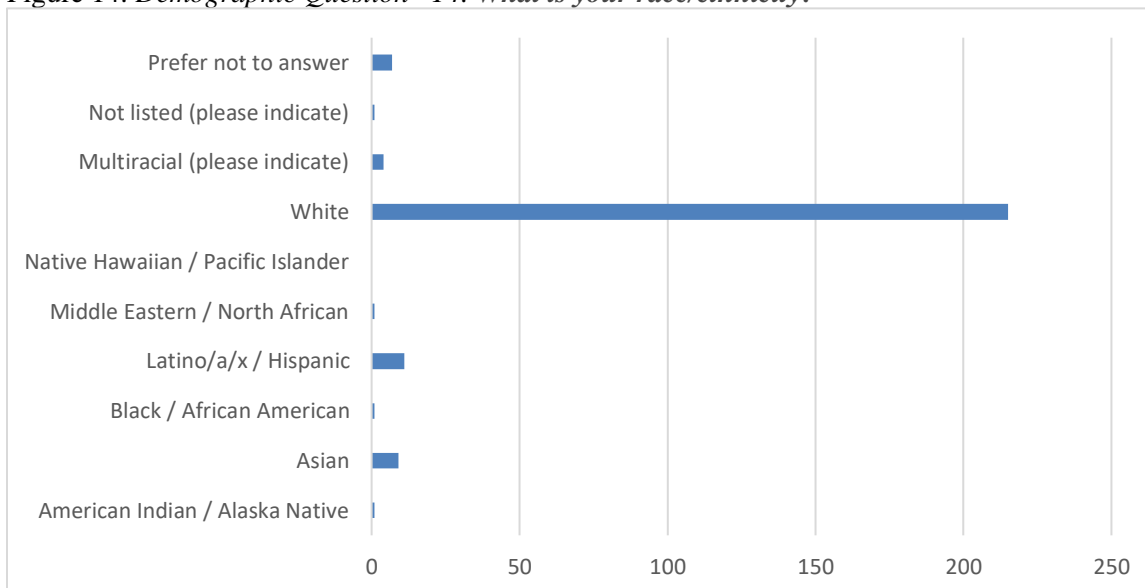


Figure 15. *Demographic Question *15. What is your age?*

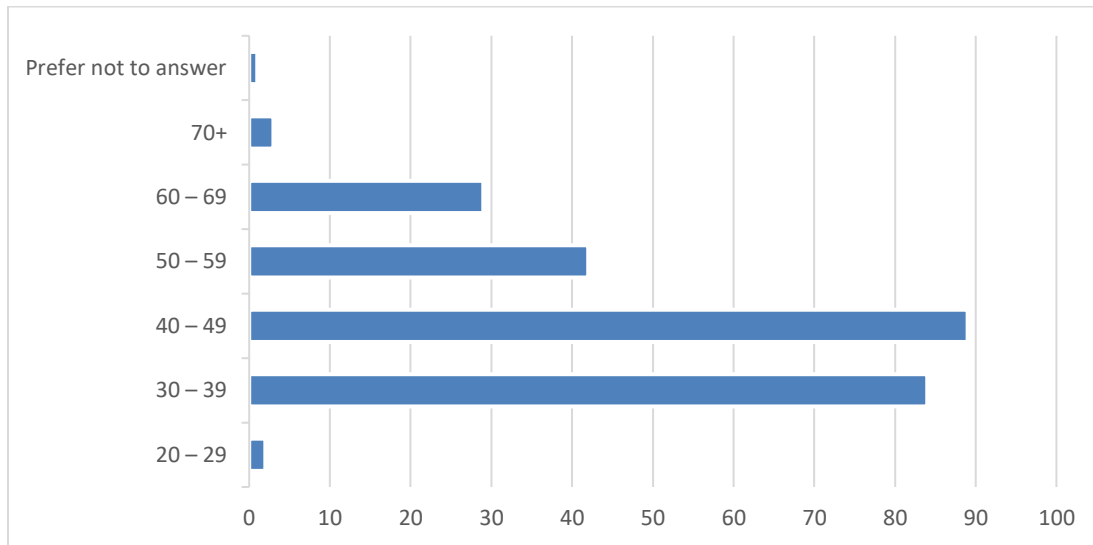
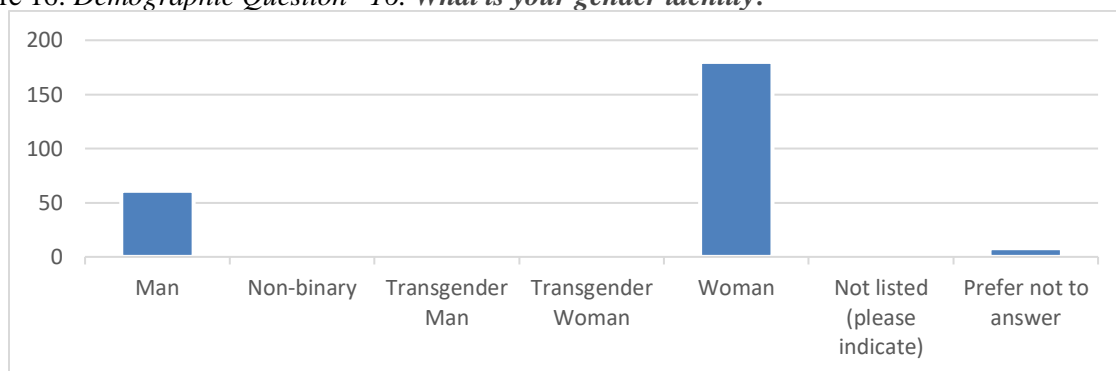


Figure 16. *Demographic Question *16. What is your gender identity?*



KSA Overall Ratings

The following provides a summary of survey respondents' ratings. The survey respondents passed 74 (95%) of the 78 General knowledge, skill, and ability statements, 85 (95%) of the 89 SAIM knowledge, skill, and ability statements, and 61 (92%) of the 66 LAIM knowledge, skill, and ability statements. Means and standard deviations for the tasks included on the survey are in Appendix D. Tables 1A-1C show the delineation of tasks in Pass, Borderline, and Fail categories by domain for each section of the survey.

Table 1A. General Domains by Pass, Borderline, and Fail categories

General Domains	# KSAs	Pass	Borderline	Fail
Cardiology	8	7	0	1
Endocrine	7	7	0	0
Gastrointestinal/Hepatobiliary	12	12	0	0
Hemolymphatic/Immunology	16	13	0	3
Nephrology/Urology	10	10	0	0
Neurology/Musculoskeletal	6	6	0	0
Nutrition/Metabolism	6	6	0	0
Respiratory	6	6	0	0
Pan-Systemic	5	5	0	0
Epidemiology	2	2	0	0
Total	78	74	0	4
Percentage		95%	0%	5%

The 4 task statements rated failing are:

Domain I: Cardiology

- Task 3. Describe excitation/contraction coupling

Domain IV: Hemolymphatic/Immunology

- Task 10. Describe the role of viruses in malignant transformation
- Task 12. Identify various pathways of cell death
- Task 13. Describe the mechanism of angiogenesis

Table 1B. SAIM Domains by Pass, Borderline, and Fail categories

SAIM Domains	# f KSAs	Pass	Borderline	Fail
1. SAIM Cardiology	11	11	0	0
2. SAIM Endocrine	10	10	0	0
3. SAIM Gastrointestinal/Hepatobiliary	11	11	0	0
4. SAIM Hemolymphatic/Immunology	13	13	0	0
5. SAIM Nephrology/Urology	11	11	0	0
6. SAIM Neurology/Musculoskeletal	12	12	0	0
7. SAIM Nutrition/Metabolism	9	6	1	2
8. SAIM Respiratory	7	7	0	0
9 SAIM Pan-Systemic	4	4	0	0
10. SAIM Epidemiology	1	0	0	1
Total	89	85	1	3
Percentage		96%	1%	3%

The 1 task statement rated borderline is:

Domain VII: SAIM Nutrition/Metabolism

- Task 7. Recognize the methods to determine nutritional adequacy for pet diets and supplements

The 3 task statements rated failing are:

Domain VII: SAIM Nutrition/Metabolism

- Task 6. Recognize clinical features of cachexia and sarcopenia
- Task 8. Recognize U.S. regulatory requirements for pet food and supplements

Domain X: Epidemiology

- Task 1. Develop a biosecurity protocol for a given agent

Table 1C. LAIM Domains by Pass, Borderline, and Fail categories

Task Domains	# of Task Statements	Pass (Mean 2.50 or above)	Borderline (Mean 2.40 to 2.49)	Fail (Mean Less than 2.40)
1. LAIM Cardiology	4	4	0	0
2. LAIM Endocrine	5	3	1	1
3. LAIM Gastrointestinal/Hepatobiliary	13	13	0	0
4. LAIM Hemolymphatic/Immunology	12	11	1	0
5. LAIM Nephrology/Urology	9	9	0	0
6. LAIM Neurology/Musculoskeletal	7	7	0	0
7. LAIM Nutrition/Metabolism	5	5	0	0
8. LAIM Respiratory	3	3	0	0
9. LAIM Pan-Systemic	7	5	0	2
10. LAIM Epidemiology	1	1	0	0
Total	66	61	2	3
Percentage		92%	3%	5%

The 2 task statement rated borderline are:

Domain II: Endocrine

- Task 4. Describe normal anatomy and physiology of the placenta

Domain IV: Hemolymphatic/Immunology

- Task 8. Describe congenital immunodeficiencies

The 3 task statements rated failing are:

Domain II: Endocrine

- Task 3. Describe the normal physiology associated with the estrus cycle

Domain IX: Pan-Systemic

- Task 6. Manage ocular neoplasias
- Task 7. Manage dermatologic neoplasias

Subgroup Analysis of Ratings

The index of agreement (IOA) is a measure of the extent to which subgroups of respondents agree on which tasks and knowledge are important. Using the mean importance ratings for knowledge, skill, and ability statements, indices of agreement were computed:

- If the subgroup means are above the critical importance value (mean ratings at or above 2.50), then they agree that the content is important.
- If the subgroup means are below the critical importance value (mean ratings less than 2.50), then the subgroups agree that the content is considered less important.
- By contrast, if one subgroup's (for example, female) mean ratings are above the critical importance value and another subgroup's (for example, male) means are below the critical importance value then the subgroups disagree as to whether the content is important.

The index of agreement provides a method of computing the similarity in judgments between groups and is tailored to the purpose of a job analysis study more than the correlation coefficient. Although the correlation coefficient measures the tendency toward agreement along the full range of possible ratings, the agreement index focuses on whether two groups agree that the content should (or should not) be included in an examination.

As one of the major purposes of this job analysis study is to identify appropriate test content, the agreement index provides a statistical method to address this question at the subgroup level. Furthermore, the agreement index requires only 30 respondents per subgroup for computation, whereas the correlation coefficient requires at least 100 respondents per subgroup to provide a reliable measure of agreement.

An illustrative example for two groups on a survey with 100 knowledge areas shows how to compute the index. If two groups passed the same 96 knowledge areas and failed the same 2 knowledge areas (out of the 100 total knowledge areas in the survey), the consistency index would be computed as $Agreement = (96 + 2)/100 = 0.98$. Values of 0.80 or less show less than optimal agreement and therefore additional mean analyses are required.

The index of agreement coefficients are in Appendix E. Agreement coefficients were produced on the following background questions:

- In which type of practice do you primarily work?
- How much of your time is spent on clinical management of animals?
- What is your primary ACVIM certification?
- Does your employer/institution currently have an ACVIM-approved residency training program?
- Please indicate your specialty.

The agreement coefficients ranged from 0.92 to 1.00. All the subgroups achieved strong agreement (coefficients of 0.80 or higher) and additional mean analysis was not necessary.

Content Coverage Ratings

The survey participants indicated how well the statements within each of the domains covered important aspects of that area. These responses provide an indication of the comprehensiveness of the survey content.

The five-point rating scale included 1= Poorly, 2=Adequately, 3=Well, and 4=Very Well. For the task domains, the means ranged from 2.21 to 3.11.

Table 2. Mean, Standard Deviation, and Frequency Distribution Percentage of General Content Coverage

General Section: Domain/Subdomain	Content Coverage					
	Mean	SD	Frequency Percentage			
			1= Poorly	2=Adequately	3=Well	4=Very well
1. Cardiology	2.98	0.8	0%	1.57%	27.56%	39.76%
2. Endocrine	2.88	0.82	0%	3.54%	28.35%	41.34%
3. Gastrointestinal/Hepatobiliary	3.01	0.77	0%	1.18%	24.80%	42.52%
4. Hemolymphatic/Immunology	2.85	0.84	0%	3.54%	31.50%	37.01%
5. Nephrology/Urology	3.11	0.78	0%	0.39%	23.23%	38.19%
6. Neurology/Musculoskeletal	2.83	0.82	0%	3.54%	32.28%	39.37%
7. Nutrition/Metabolism	2.63	0.85	0%	7.09%	37.80%	34.65%
8. Respiratory	2.89	0.83	0%	3.15%	29.92%	38.98%
9. Pan-Systemic	2.8	0.83	0.39%	2.36%	35.43%	36.61%
10. Epidemiology	2.73	0.88	1.18%	3.94%	34.25%	35.43%

Table 3. Mean, Standard Deviation, and Frequency Distribution Percentage of SAIM Content Coverage

SAIM Section: Domain/Subdomain	Content Coverage					
	Mean	SD	Frequency Percentage			
			1= Poorly	2=Adequately	3=Well	4=Very well
1. SAIM Cardiology	3.04	0.78	0%	0%	27.01%	37.44%
2. SAIM Endocrine	3.00	0.81	0%	0.95%	27.96%	36.49%
3. SAIM Gastrointestinal/Hepatobiliary	3.01	0.79	0%	0.47%	27.01%	37.44%
4. SAIM Hemolymphatic/Immunology	2.93	0.84	0%	2.84%	28.44%	36.49%
5. SAIM Nephrology/Urology	3.02	0.77	0%	0.47%	25.59%	40.28%
6. SAIM Neurology/Musculoskeletal	2.91	0.86	0%	2.84%	30.81%	32.70%
7. SAIM Nutrition/Metabolism	2.62	0.92	0.47%	8.53%	36.02%	30.81%
8. SAIM Respiratory	2.88	0.80	0%	0.47%	35.07%	35.07%
9 SAIM Pan-Systemic	2.78	0.89	0.95%	4.74%	29.86%	36.97%
10. SAIM Epidemiology	2.21	1.03	3.79%	18.01%	34.60%	23.22%

Table 4. Mean, Standard Deviation, and Frequency Distribution Percentage of LAIM Content Coverage

LAIM Section: Domain/Subdomain	Content Coverage					
	Mean	SD	Frequency Percentage			
			1= Poorly	2=Adequately	3=Well	4=Very well
1. LAIM Cardiology	2.52	0.94	0%	9.68%	38.71%	22.58%
2. LAIM Endocrine	2.64	0.87	0%	9.68%	25.81%	41.94%
3. LAIM Gastrointestinal/Hepatobiliary	2.96	0.88	0%	3.23%	25.81%	32.26%
4. LAIM Hemolymphatic/Immunology	3.03	0.72	0%	0%	22.58%	48.39%
5. LAIM Nephrology/Urology	2.93	0.74	0%	3.23%	19.35%	54.84%
6. LAIM Neurology/Musculoskeletal	2.79	0.73	0%	0%	35.48%	41.94%
7. LAIM Nutrition/Metabolism	2.9	0.71	0%	0%	29.03%	48.39%
8. LAIM Respiratory	2.76	0.87	0%	6.45%	29.03%	38.71%
9. LAIM Pan-Systemic	2.6	0.62	0%	0%	45.16%	45.16%
10. LAIM Epidemiology	2.69	0.89	0%	6.45%	35.48%	32.26%

Survey respondents could write in elements that they believe should be included in the listing of important knowledge, skills, and abilities. See Appendices F1 through F3 for the content coverage write-in comments. The Test Specifications Committee reviewed the comments to determine whether there were important statements not covered on the survey that should be included in the test specifications.

Test Content Recommendations

In survey Section 4: Recommendations for Test Content, participants were asked to assign a percentage weight to each knowledge domain. The sum of percentage weights was required to equal 100. This information guided the Test Specifications Committee in making decisions about how much emphasis the domains should receive on the test content outline. The mean weights across all survey respondents for each section of the exam are in Tables 5-7.

Table 5. Survey Respondents' Test Content Recommendations by Mean Percentages and Standard Deviations -General Section

Domain	Mean (%)	SD (%)
Domain 1. Cardiology	10.52	3.29
Domain 2. Endocrine	12.5	3.37
Domain 3. Gastrointestinal/Hepatobiliary	13.68	3.24
Domain 4. Hemolymphatic/Immunology	10.68	2.91
Domain 5. Nephrology/Urology	12.39	3
Domain 6. Neurology/Musculoskeletal	10.01	2.83
Domain 7. Nutrition/Metabolism	6.83	3.01
Domain 8. Respiratory	11.67	3.06
Domain 9. Pan-Systemic	7.04	3.75
Domain 10. Epidemiology	4.67	2.72

Table 6. *Survey Respondents' Test Content Recommendations by Mean Percentages and Standard Deviations -General Section*

Domain	Mean (%)	SD (%)
Domain 1. Cardiology	11.16	3.39
Domain 2. Endocrine	13.27	2.99
Domain 3. Gastrointestinal/Hepatobiliary	13.31	3.03
Domain 4. Hemolymphatic/Immunology	11.46	2.73
Domain 5. Nephrology/Urology	12.55	2.71
Domain 6. Neurology/Musculoskeletal	9.77	3.21
Domain 7. Nutrition/Metabolism	6.64	3.28
Domain 8. Respiratory	11.32	2.68
Domain 9. Pan-Systemic	6.62	3.42
Domain 10. Epidemiology	3.89	2.70

Table 7. *Survey Respondents' Test Content Recommendations by Mean Percentages and Standard Deviations -SAIM Section*

Domain	Mean (%)	SD (%)
Domain 1. Cardiology	11.16	3.39
Domain 2. Endocrine	13.27	2.99
Domain 3. Gastrointestinal/Hepatobiliary	13.31	3.03
Domain 4. Hemolymphatic/Immunology	11.46	2.73
Domain 5. Nephrology/Urology	12.55	2.71
Domain 6. Neurology/Musculoskeletal	9.77	3.21
Domain 7. Nutrition/Metabolism	6.64	3.28
Domain 8. Respiratory	11.32	2.68
Domain 9. Pan-Systemic	6.62	3.42
Domain 10. Epidemiology	3.89	2.70

Write-In Comments

Many survey respondents provided responses to the open-ended questions in Section 5: Comments about expected changes in their field over the next few years and professional development/continuing education needs. See Appendix G for write-in comments.

DEVELOPMENT OF TEST SPECIFICATIONS FOR THE ACVIM GENERAL EXAMINATION

The test specifications meeting for the ACVIM General Examination occurred on May 5-6, 2023, in Denver, CO. The steps involved in the development of test specifications included the following:

- presentation of the job analysis project and results to the Test Specifications Committee;
- identification of the knowledge, skill, and ability statements to be included on the ACVIM General Examination test specifications for all three sections of the exam; and,
- development of the test content weights for all three sections of the exam.

Presentation of the Job Analysis Project and Results to the Test Specifications Committee

The first activity development of the test specifications was to provide the Test Specifications Committee an overview of the job analysis activities that were conducted and to present the results of the study.

Identification of the Task, Knowledge, and Skill Statements to be Included on the ACVIM General Examination

The Test Specifications Committee reviewed the survey results to make final recommendations about the areas that should be included on the exam.

The survey results served as the primary source of information used by the Test Specification Committee members to make test content decisions. Recommendations were based on the following criteria:

- the mean importance ratings for all respondents;
- the frequency distribution of ratings for all respondents; and,
- the appropriateness of the content for the examination.

Appendix H outlines the approval decisions.

Tasks Recommended for Inclusion

General Section:

- A total of 74 of the 78 tasks achieved mean ratings at or above 2.50 (Pass category).
- 4 task statements achieved mean ratings less than 2.40 (Fail category). 1 was included on the test specifications after editing based on committee recommendations.
- 1 new task was added to Domain 10 based on respondent comments.

SAIM Section:

- A total of 85 of the 89 tasks achieved mean ratings at or above 2.50 (Pass category).
- 1 task statement achieved mean ratings between 2.40 and 2.49 (Borderline category). It was included on the test specifications after editing based on committee recommendations.
- 3 task statements achieved mean ratings less than 2.40 (Fail category). 1 was included on the test specifications after editing based on committee recommendations.

LAIM Section:

- A total of 61 of the 66 tasks achieved mean ratings at or above 2.50 (Pass category).
- 2 task statements achieved mean ratings between 2.40 and 2.49 (Borderline category).
- 3 task statements achieved mean ratings less than 2.40 (Fail category). 2 were included on the test specifications after editing based on committee recommendations.

Development of Test Content Weights

The Test Specifications Committee participated in an exercise that required each member to assign a percentage weight to each of the knowledge domains. Weights were then entered into a spreadsheet and shown to the committee. The committee members were able to compare the test content weights derived from the survey responses to their own estimates. This resulted in a productive discussion among the committee members regarding the optimal percentages for the exam.

Table 9 shows the test specifications recommendations including the percentage content.

Table 9. ACVIM General Examination-General Section Test Content Weights Recommended by the Test Specifications Committee

General Section	No. of State-ments	% Weight
Domain 1. Cardiology	7	11%
Domain 2. Endocrine	7	12%
Domain 3. Gastrointestinal/Hepatobiliary	12	13%
Domain 4. Hemolymphatic/Immunology	14	11%
Domain 5. Nephrology/Urology	10	12%
Domain 6. Neurology/Musculoskeletal	6	10%
Domain 7. Nutrition/Metabolism	6	8%
Domain 8. Respiratory	6	11%
Domain 9. Pan-Systemic	5	7%
Domain 10. Epidemiology	3	5%

Table 10. ACVIM General Examination-SAIM Section Test Content Weights Recommended by the Test Specifications Committee

SAIM Section	No. of State-ments	% Weight
Domain 1. SAIM Cardiology	11	12%
Domain 2. SAIM Endocrine	10	13%
Domain 3. SAIM Gastrointestinal/Hepatobiliary	11	13%
Domain 4. SAIM Hemolymphatic/Immunology	13	12%
Domain 5. SAIM Nephrology/Urology	11	13%
Domain 6. SAIM Neurology/Musculoskeletal	12	11%
Domain 7. SAIM Nutrition/Metabolism	8	8%
Domain 8. SAIM Respiratory	7	11%
Domain 9 SAIM Pan-Systemic	5	7%

Table 11. *ACVIM General Examination-LAIM Section Test Content Weights Recommended by the Test Specifications Committee*

LAIM Section	No. of State-ments	% Weight
Domain 1. Cardiology	4	9%
Domain 2. Endocrine	4	9%
Domain 3. Gastrointestinal/Hepatobiliary	13	17%
Domain 4. Hemolymphatic/Immunology	10	9%
Domain 5. Nephrology/Urology	9	10%
Domain 6. Neurology/Musculoskeletal	7	11%
Domain 7. Nutrition/Metabolism	5	9%
Domain 8. Respiratory	3	14%
Domain 9. Pan-Systemic	6	8%
Domain 10. Epidemiology	1	5%

Finalizing the Exam Structure

After the Test Specifications Meeting, Prometric, ACVIM, and a group of veterinary specialists met to determine the final exam structure. This group determined that candidates should no longer take each General Examination section separately. The new exam structure would now consist of one General Examination for candidates specializing in small animal internal medicine (consisting of both general and SAIM specific questions) and one exam for candidates specializing in large animal internal medicine (consisting of both general and LAIM specific questions).

The finalized test specifications are in Appendix I.

SUMMARY AND CONCLUSIONS

The job analysis study for veterinary general practice identified knowledge, skill, and ability statements that are important to the work performed by veterinary generalists. Further, the data collected will guide the development of the test specifications that will be used to develop the examination.

The knowledge, skill, and ability statements were developed through an iterative process involving the combined efforts of ACVIM, subject matter experts, and Prometric staff. These statements were entered into a survey format and subjected to verification/refutation through the dissemination of a survey to veterinary professionals. The survey participants were asked to rate the importance of knowledge, skill, and ability statements.

The results of the study support the following:

- All the knowledge, skill, and ability statements that were verified as important through the survey provide the foundation of empirically derived information from which to develop the test specifications for the ACVIM General Examination.
- Evidence was provided in this study that the comprehensiveness of the content within the domains was well covered.
- The process utilized and all the information that resulted from the analysis supported the development of the test specifications.

In summary, the study used a multi-method approach to identify the tasks and knowledge that are important to the work performed by veterinary generalists. The results of the study were used to develop the test specifications for the three sections of the ACVIM General Examination.