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A North American Study of the Entry-Level Veterinary Practitioner

A Job Analysis to Support the North American Veterinary Licensing Examination (NAVLE®)

Prepared by Applied Measurement Professionals, Inc.
for the
National Board of Veterinary Medical Examiners

July 2003

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The report that follows is an edited version of the printed job analysis report that was sent to NBVME constituent organizations, veterinary schools, and other interested parties on July 31, 2003. This version includes most of the text of the report, the final [list of activities and diagnoses](#), and the approved [NAVLE test specifications](#). Printed copies of the report are available from the NBVME office upon request.

EXECUTIVE SUMMARY

The job analysis described in this report was conducted in 2002-2003 at the request of the National Board of Veterinary Medical Examiners (NBVME). The purpose of the study was to describe the job activities of entry-level veterinary practitioners in sufficient detail to provide evidence of validity for the North American Veterinary Licensing Examination (NAVLE®).

The NBVME Job Analysis Committee (JAC) conducted the activities necessary to identify job activities and develop the test specifications for the entry-level veterinary practitioner. The JAC represented varied species-oriented practices, national regions, and practice settings. All JAC members were experts in the duties and activities associated with the profession.

The study involved developing a job activity list and a list of clinical diagnoses arranged by species, and then combining them into a survey. The survey was distributed to potential respondents from the United States and Canada. Survey responses were then analyzed. The JAC was responsible for the following tasks regarding job analysis survey development:

- developing a sampling plan for the survey,
- identifying activities and diagnoses for the survey instrument,
- determining the survey rating scales,
- determining the relevant demographic variables of interest, and
- integrating activities and diagnoses, rating scales, and demographics into a survey instrument.

The draft job analysis survey was distributed to JAC members. Based on comments, Applied Measurement Professionals, Inc. (AMP) project staff modified and printed the final survey for distribution to a random sample of 2601 veterinarians in the United States and 497 veterinarians in Canada, for a total of 3098 potential respondents.

Surveys were mailed to a sample of 3098 practitioners across a variety of specialties. Six hundred seven (19.6% return rate) subjects responded with surveys suitable for analysis. Thirty-six (36) surveys were returned either incomplete, past the extended deadline, or not deliverable. Therefore, the corrected return rate was 19.8%, which is satisfactory and typical for a survey of this type. Responses to the demographic questions indicated that there were sufficient numbers from relevant groups for subsequent analyses.

More than 95% of the respondents felt both the job activity list and the species-specific diagnoses lists adequately or completely addressed the responsibilities of the entry-level practitioner. A relatively large respondent group is associated with minimal rating error. The activity/diagnosis ratings and raters were reliable (consistent). The JAC felt that relevant demographic subgroups were adequately represented. Therefore, the job analysis proceeded to the next phase.

Survey data were presented to the JAC, who subsequently developed and used exclusion decision rules to identify activities and diagnoses appropriate for the NAVLE. Proposed specifications for the examination were constructed from the remaining tasks. The resulting examination matrices will be presented to NBVME members by the JAC for guidance in assembling future NAVLE test forms.

INTRODUCTION

The job analysis described in this report was conducted in 2002-2003 at the request of the NBVME. The purpose of the job analysis was to describe the entry-level veterinary practitioner's job in sufficient detail to provide substantial validity evidence for a North American licensing examination, and to ensure that the content of the examination was job-related.

The NBVME appointed a Job Analysis Committee (JAC) to assist in the preparation and review of the job analysis survey instrument. The JAC developed a comprehensive inventory of activities that practitioners may perform by (1) reviewing the results of a job analysis conducted in 1997 by Professional Examination Service (PES), (2) conducting telephone interviews with licensed practitioners, and (3) collecting practice job activity logs from veterinarians throughout North America. The JAC also developed a list of clinical diagnoses or problems that may be addressed in practice. In addition, demographic variables and a rating scale were selected for use on the survey. After pilot

testing, the job analysis survey was distributed to a random sample of 3098 veterinarians. The returned surveys were analyzed to determine the significance of each activity and each diagnosis to the entry-level veterinary practitioner's job.

Job Analysis Survey (JAS) data were evaluated to determine the degree of consensus among veterinarians on critical aspects of the job. Data were specifically analyzed to answer the following questions:

- Which activities are more significant to the entry-level veterinarian?
- Which clinical diagnoses or problems are more significant to the entry-level veterinarian's practice?

These questions helped identify the more significant activities and diagnoses from which the content of the examinations can be derived.

METHODOLOGY

Forming the Advisory Committee

The JAC was consulted throughout the survey development stages to ensure that expert judgment was available to AMP staff. The responsibilities of the JAC are listed below. The members of the JAC were experienced veterinarians, all thoroughly familiar with the skills and activities of an entry-level practitioner. The JAC members are listed below:

Norman LaFaunce, DVM (UC Davis 1970), DACT
Private bovine (dairy) practice, Turlock, CA, NBVME member

R. Michael Thomas, DVM (Auburn 1968)
Private companion animal practice, Indianapolis, IN, NBVME member

Jay Hedrick, DVM (Kansas State 1972)
Private mixed animal practice, El Dorado, KS

Jeff Tyler, DVM (Minnesota 1981), DACVIM
Food animal clinician, University of Missouri, Columbia, MO

Lorraine Jarboe, DVM (Ohio State 1979), DABVP
Private companion animal practice, Silver Spring, MD

John A. Wood, Sr., DVM (Texas A&M 1965)
Private mixed animal practice, Lufkin, TX

Ted Vlahos, DVM (Ohio State 1988), DABVP
Private equine practice, Sheridan, WY

Alice Marie Gerty, DVM (Colorado State 2000)
Private mixed animal practice, Gardiner, NY

Mara Doughty, DVM (Iowa State 1996)
Private companion animal practice, Marinette, WI

Cary Hashizume, DVM (Saskatchewan 1999)
Private companion animal practice, Edmonton, Alberta

John R. Boyce, DVM (Michigan State 1974), PhD
NBVME Executive Director, Bismarck, ND

Advisory Committee Responsibilities

- Provide AMP with current information about the job.
- Develop the Job Analysis Survey (JAS):
 - develop a sampling plan for the survey,
 - identify tasks (i.e., activities, clinical diagnoses, problems) for the survey instrument,
 - determine the survey rating scales,
 - determine the relevant demographic variables of interest, and
 - integrate the definition, tasks, rating scales, and demographics into a survey instrument.
- Review the final form of the JAS for completeness, relevance to the profession, appropriate language, and clear instructions.
- Interpret and review survey results, determine task exclusion criteria, and recommend final examination specifications.

A significant investment of time by the JAC ensured a successful job analysis study. We are grateful to each of these professionals for their guidance, expertise and devotion to this complex project.

Developing the Task List

With the assistance of AMP project staff, the JAC drafted an inventory containing a comprehensive list of tasks, including activities, and clinical diagnoses or problems. The lists were drafted from current examination blueprints, a previous entry-level veterinary practitioner job analysis, and job activity logs and telephone interviews with current practicing veterinarians. The job activity logs were mailed to 31 practicing veterinarians selected by the NBVME and asked that they document their daily activities for a period of 5 days. Each log was divided into 8-hour days, during which veterinarians were asked to keep track of the animal species they worked with during each hour, the activities performed, the conditions seen, and the diagnostic tests/interventions/treatment/surgeries used. Activity logs were returned by 6 of the veterinarians and reviewed by the JAC. Specific activities and diagnoses were discussed and added to the lists, or used to edit existing activities or diagnoses on the list. After a comprehensive review of all resource materials, a significant number of additional activities and diagnoses were incorporated into the final survey.

Telephone interviews were also conducted with practicing veterinarians and educators throughout the United States and Canada. Twenty-five key constituents were included on the original list of individuals to be contacted, and of those, 11 were available to participate in a telephone interview. Those individuals interviewed were asked two open-ended questions: 1) In your opinion, what are the most important tasks that entry level veterinarians need to be able to perform in a competent manner?, and 2)

The NAVLE is a comprehensive objective examination designed to help licensing boards ensure that veterinarians demonstrate a specified level of knowledge and skills before entering private clinical practice. What are your recommendations on how the NAVLE should be structured to best meet that objective? Respondents provided 54 unique additional tasks for JAC consideration. Although many of these were already addressed in the survey, several edits to the original list of activities were made to incorporate their suggestions. Similarly, for the second question, twelve specific comments were made. Most dealt with the mechanics of the NAVLE, i.e., improved graphics, adding a "practical" section, and administering the examination in one day. Most thought the existing format was adequate, but felt it could be improved by including more clinically oriented questions, and items written at a higher cognitive complexity - not just recall of specific information. In summary, all responses were reviewed, and their implications for the wording of the existing and additional activities and diagnoses were considered in the development of the final survey.

The final survey document consisted of 53 activities presented in content order and 901 clinical diagnoses presented in alphabetical order, organized by species. Survey respondents were allowed to suggest additional activities and diagnoses.

Selecting Rating Scales

The JAC also assisted in the development of the rating scales used in the job analysis study. The scales were based on similar scales used in previous national job analysis studies by other professions. Separate scales were developed for the two task sections of the survey. A significance scale was selected by the JAC to include on the survey to rate the activities. A significance scale similar to the one used to rate activities was developed for the diagnoses section.

These scales were designed to identify the most significant tasks to achieving entry-level practitioners' job objectives. Such information was necessary to demonstrate that the examination will measure significant aspects of the job and cover appropriate content. The following scales were used:

In your working environment, considering both **importance** and **frequency**, how significant is this activity to competent and effective performance for the **first-year practitioner with entry-level skills**?

- 4 = Extremely Significant
- 3 = Quite Significant
- 2 = Somewhat Significant
- 1 = Not Significant
- 0 = Not Performed

In your working environment, how **significant** is this clinical diagnosis or problem to competent and effective performance for the **first-year practitioner with entry-level clinical skills**?

- 4 = Extremely Significant
- 3 = Quite Significant
- 2 = Somewhat Significant
- 1 = Not Significant

Selecting Background Information Questions

This section was designed to gather information about the respondents' demographic characteristics. Demographic questions were used to help the JAC evaluate potential bias in the respondent group. Therefore, the following information about the survey respondents was available:

- Geographic region
- Practice emphasis
- Years of experience
- Professional role
- Educational degrees
- Specialty board certifications
- Gender

Integrating the Definition, Tasks, Rating Scales, and Demographics into a Survey

Following the JAC meeting, survey components were compiled into draft form. The draft survey was reviewed by the JAC. The pilot job analysis survey was distributed to participants chosen by the JAC members for review and comment. The purpose of the pilot study was to determine (1) if any important activities or diagnoses were missing from the survey, (2) if the directions were clear, and (3) if the rating scales were easy to use and understand. The chairperson reviewed comments from the pilot study participants and made any necessary modifications to the survey prior to distribution.

Sample Selection

The JAC developed a sampling plan in order to obtain information from a diverse group of veterinary practitioners throughout the United States and Canada.

Mailing labels for veterinarians in the United States were obtained from the American Veterinary Medical Association (AVMA) member database. A selection pool consisting of all veterinarians in private, academic, and government practice was created by selecting records according to various employment codes, as specified in the 2003 AVMA Membership Directory. From the selection pool, 2601 labels were chosen randomly, to ensure a diverse and representative sample with regard to species focus, employment function, medical discipline, employer type, geographic location, age, school and year of graduation, and gender.

Mailing labels for Canadian veterinarians were obtained from the Canadian Veterinary Medical Association (CVMA). The selection pool included veterinarians in various private practice categories, as well as selected academic and government employment categories. From this pool, 497 labels were chosen randomly.

AMP signed agreements with both the AVMA and CVMA in order to obtain these mailing labels for use in the survey. A total of 3098 surveys were mailed in late November and early December 2002.

RESULTS

Return Rate and Sample Size

Of the 3098 surveys mailed, the practitioners returned 607 usable surveys for an initial response rate of 19.6%. Thirty-six (36) were returned as non-useable (i.e., incomplete data, past the extended deadline, or not delivered). Therefore, the corrected response rate was 19.8%. Results based on this sample are stable and were judged sufficient for the job analysis.

A general approach was incorporated to evaluate the standard error of the ratings. An approximate standard error was calculated for the rating scale and determined to be .041. This indicates that ratings were relatively stable and reflective of the population of veterinary practitioners.

Task and Respondent Rating Reliability Estimates

To find the extent to which tasks were consistently rated within each survey section, a statistic known as coefficient alpha was used. Coefficient alpha is an estimate of the amount of error reflected by the scores associated with the instrument. Higher estimate values (e.g., .90 or higher) reflect smaller amounts of error. To determine the extent to which the respondents were consistent in rating inventory activities and diagnoses, a statistic known as the intraclass correlation was used. Separate reliability estimates were calculated for the sections of the survey. Since a maximum reliability coefficient is represented by a value of 1.00, and the total reliability estimates for the whole activity list were .98 (intraclass) and .96 (alpha), the respondents' activity ratings were considered statistically reliable. Reliability estimates for clinical diagnoses are also statistically reliable. Based on these data, it is likely that a different sample from the same population would have produced similar task ratings.

After respondents finished rating the activity list section of the survey, they indicated how well they thought the task list covered the entry-level veterinary practitioner's job. They could select one of the following responses: inadequately, adequately, or completely. Seventeen respondents (2.8% of total respondents) did not answer this question. Of 590 professionals responding to the question, 95.4% thought the survey completely or adequately described the entry-level practitioner.

Respondents had an opportunity to rate how comprehensive they thought the clinical diagnosis list section of the survey was, given the choice of inadequately, adequately, and completely. A total of 97.7% of the respondents thought the diagnoses adequately or completely covered the diagnoses encountered by an entry-level practitioner. Forty-two people (6.9% of total respondents) did not answer this question.

Demographic Analyses

Respondents were distributed across ten geographic regions of the United States and Canada. The typical respondent was a practice owner or employee, had more than 11 years of experience as a licensed veterinarian, and held a DVM, VMD, or equivalent educational degree. Respondents were equally divided between males and females.

Mean Task Ratings

To determine which activities and diagnoses were more significant, descriptive data were calculated for each activity and diagnosis, and the JAC used the results to determine which tasks should remain on the final examination specifications. As noted above, the significance scales had values ranging from 1 (Not significant) to 4 (Extremely significant). The scale used for the list of activities also included a value of 0 for "Not performed".

The JAC reviewed the data for each task. They concluded that the ratings obtained from the job analysis survey were in agreement with their judgments about the job. Consequently, the JAC also concluded that the job analysis survey data adequately defined the entry-level practitioner's job in North America. Moreover, the JAC judged the results sufficient for the purpose of delineating the structure and content of a North American licensing examination.

It is critical that the test specifications reflect the responsibilities of those who might be eligible to take the examination. Therefore, the proposed test specifications and resulting examination content should include activities and diagnoses considered significant to the job by those for whom the examination was intended. To ensure this, the mean rating for each activity and diagnosis was determined for two survey respondent subgroups: geographic region and years of experience.

The final information used by the committee to determine task eligibility was respondent comments. After review of this information, the JAC determined no additional tasks should be included in the final content outlines.

The JAC was encouraged to consider how best to limit the content eligible for the test specifications to only the broadly performed critical tasks. Therefore, the JAC adopted decision rules to identify tasks ineligible for assessment. Ineligible activities and diagnoses were not found significant enough by the sample or resulting subgroups or did not meet the threshold criteria.

The JAC used data collected from the survey to develop recommended test specifications, listing how many items to include for each major content area. The goal was to distribute items in accordance with observed working patterns across the various activity and animal species areas. These recommendations were presented to the NBVME for consideration in developing revised NAVLE test specifications.

CONCLUSIONS

The job analysis described in this report was undertaken to provide evidence supporting the content validity of the North American Veterinary Licensing Examination. The study was conducted to determine and comprehensively describe the entry-level veterinary practitioner's job, to evaluate this description through the ratings of job experts, and to define areas that should be assessed in this examination.

The NBVME formed a Job Analysis committee (JAC), who prepared comprehensive lists of activities describing the job and diagnoses treated on the job by species. A representative sample of practicing veterinarians completed the survey. The JAC reviewed the survey results and used the survey task ratings to provide a foundation for developing test specifications directly related to the important activities that practitioners perform. These test specifications will represent the development plan for a job-related examination program. Each form of the examination should contain the specified number of

items distributed across the content areas. Because each test form should be developed to match these job-related test specifications, valid content-related inferences can be drawn about candidates' abilities to perform the entry-level practitioner job.

Using the results from this study, collected professional judgment, and direction from AMP project staff, the JAC developed a framework that can be used to establish test specifications. This framework outlines the content domain and suggested distribution of items across critical content categories. The specifications can be used to guide test development and provide content-related evidence that examination scores relate to the job. This evidence can then be used to support valid inferences from examination scores that candidates can perform the job of a practicing veterinarian.

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