Technical Report
Qualifying Examination
August 2004, January 2005, and May 2005 Test Administrations

National Board of Veterinary Medical Examiners
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I. Introduction

The primary objective of the Qualifying Examination (QE) is to provide a comprehensive objective examination in basic veterinary medical sciences for use by the Program for the Assessment of Veterinary Education Equivalence (PAVE) of the American Association of Veterinary State Boards in evaluating the education equivalence of veterinarians who are graduates of veterinary schools not accredited by the Council on Education of the American Veterinary Medical Association. In addressing this objective, the QE also protects the public by ensuring that veterinarians demonstrate a specified level of knowledge and skills before entering veterinary practice, and provides a common standard in the evaluation of candidates that will be comparable from jurisdiction to jurisdiction.

II. Test Development

Qualifying Examination test development is done in cooperation with the National Board of Medical Examiners (NBME). The NBVME identified 11 veterinarians to write items for examinations to be administered on August 19, 2004, January 20, 2005, and May 5, 2005 (the 2004-2005 test cycle) (Appendix 1). An item-writing workshop was conducted at the NBME offices in Philadelphia on February 24, 2003. The purpose of the workshop was to provide the new item writers with guidelines for writing well-structured items and to hold a mock item review to demonstrate how to review items effectively. All QE item writers and form reviewers have experience teaching in their respective disciplines at AVMA-accredited veterinary schools.

After the workshop, NBME staff prepared item-writing assignments based on each item writer's specialty and the content categories. These assignments as well as an item-writing guide and instructions for submitting items were sent to each item writer.

All new items received from the item writers were edited and reviewed for technical item flaws by NBME staff. The edited and annotated items were returned to the item writers for initial revision and approval. All of the newly written items and and associated pictorials were reviewed by the item writers at a meeting at the NBME offices on December 4-5, 2003.

After the meeting, new approved items were reviewed again by NBME staff and added to the item pool for the Qualifying Examination. Two new 300-item examination forms were generated using content and statistical constraints. Nine participants, including seven new item writers for the 2004-2005 cycle and two returning item writers for the 2003-2004 cycle, met on February 24, 2004 to review the forms (Appendix 2). Small groups of writers reviewed items within their area of expertise, evaluating the quality of the items, identifying content overlap between items, and assessing the content equivalence of the two forms. NBME staff incorporated the committee suggestions and prepared updated forms.

After the forms were finalized, items were prepared for web-based presentation, and files containing item text, pictorials, and associated information were created for delivery by Internet Testing Systems, LLC. Quality control procedures were implemented at each stage of the test development process to ensure that standards were being met.

III. Examination Analysis

A. Summary Statistics

Summary statistics for all forms of the Qualifying Examination administered to date are provided in Table 1. The mean P-value is an indication of the difficulty of the test and represents the proportion of items answered correctly by the average candidate. The standard deviation represents the variability of item difficulties around the mean.

P-values are influenced both by the inherent difficulty of the items and by the ability of the candidates. Because changes in mean P-value from one year to the next could reflect item difficulty, candidate ability, or both, comparisons across years have limited value and should be made with caution.

Also shown in Table 1 is the mean discrimination index. This index is the point-biserial correlation coefficient ($r_{p\text{-}bis}$) between the item score and the total test score and indicates how well an item separates high scoring from low scoring candidates. The standard deviation of $r_{p\text{-}bis}$ represents the variation in item discriminations around the mean value.

The reliability coefficient (KR_{20}) is a measure of internal consistency that provides an estimate of the accuracy or stability of scores. An examination is reliable to the extent that administration of a different, random sample of items of the same size and from the same content area would result in little or no change in a candidate's rank order in the group. Reliability is affected by the homogeneity of the items and candidates, as well as by the length of the examination. In general, long examinations of items with similar content administered to a diverse group of candidates yield high reliabilities. Possible values of the coefficient range from 0 to 1. The reliability coefficients for the August 2004, January 2005, and May 2005 forms of the QE are .92, .90, and .92, respectively.

Key validation takes place after the examination is administered and before scores are derived. Items that are flagged by the computer as potentially flawed or mis-keyed are reviewed by content experts, and such items are re-keyed or deleted from the scoring key, as appropriate.

B. Pass/Fail Rates

The NBVME Executive Committee reviews and approves the passing standard via conference call following each test administration. Table 2 provides the history of failure rates for all forms of the Qualifying Examination administered to date.

C. Appendices

Appendix 1 - 2003 QE Item Writers
Appendix 2 - 2004 QE Form Reviewers

Table 1
Summary Statistics

Administration	N	Number of Items Scored (Deleted)	Mean P-Value (Standard Deviation)	Mean Discrimination Index: $r_{p\text{-}bis}$ (Standard Deviation)	KR_{20} Reliability Coefficient
August 2002[2]	33	290 (10)	.60 (.26)	.13 (.19)	.84
January 2003[1]	36	287 (13)	.55 (.25)	.10 (.18)	.81
August 2003[1] Form 1	11	292 (8)	.59 (.24)	.14 (.32)	.87
August 2003[1] Form 2	7	297 (3)	.59 (.26)	.17 (.36)	.91
January 2004[2]	29	297 (3)	.59 (.23)	.22 (.21)	.93
August 2004[2]	116	286 (14)	.61 (.21)	.21 (.13)	.92
January 2005[2]	49	282 (18)	.64 (.20)	.19 (.16)	.90
May 2005[2]	49	277 (23)	.62 (.22)	.19 (.17)	.92

[1] Summary statistics based on total group of candidates
[2] Summary statistics based on reference group (candidates taking the examination for the first time)

Table 2
History of Failure Rates

Administration	Total Group		Reference Group	
	N	Failure Rate	N	Failure Rate
August 2002	5/33	15.2%	5/33	15.2%
January 2003	11/36	30.6%	9/31	29.0%
August 2003 Form 1	1/11	9.1%	1/11	9.1%
August 2003 Form 2	1/7	14.3%	1/7	14.3%
January 2004	9/30	27.6%	8/29	27.6%
August 2004	29/123	23.6%	26/116	22.4%
January 2005	18/75	24.0%	5/49	10.2%
May 2005	9/57	15.8%	7/49	14.3%

Appendix 1
2003 QE Item Writers

John R. Boyce, DVM, PhD, Bacteriology
Bismarck, ND

Earl Dixon, PhD, Physiology
Tuskegee University School of Veterinary Medicine, Tuskegee, AL

Amanda Fales-Williams, DVM, PhD, DACVP, Pathology and Clinical Pathology
Iowa State University College of Veterinary Medicine, Ames, IA

Paul Gibbs, BVSc, PhD, FRCVS, Virology
University of Florida College of Veterinary Medicine, Gainesville, FL

Patricia Heine, DVM, PhD, Histology
Indianapolis, IN

Walter H. Hsu, DVM, PhD, Pharmacology
Iowa State University College of Veterinary Medicine, Ames, IA

Lola Hudson, DVM, PhD, Anatomy
North Carolina State University College of Veterinary Medicine, Raleigh, NC

Melissa Kennedy, DVM, PhD, DACVM, Immunology
University of Tennessee College of Veterinary Medicine, Knoxville, TN

Clifton M. Monahan, DVM, PhD, Parasitology
The Ohio State University College of Veterinary Medicine, Columbus, OH

Paul Thomas Purinton, DVM, PhD, Anatomy
University of Georgia College of Veterinary Medicine, Athens, GA

John F. Van Vleet, DVM, PhD, DACVP, Pathology
Purdue University School of Veterinary Medicine, West Lafayette, IN

Appendix 2
2004 QE Form Reviewers

Dr. Shelley Burton, Clinical Pathology
University of Prince Edward Island, Atlantic Veterinary College, Charlottetown, PEI

Dr. Sheila Grimes, Pathology
Ohio Department of Agriculture, Reynoldsburg, OH

Dr. Paul Gibbs, Virology
University of Florida College of Veterinary Medicine, Gainesville, FL

Dr. Patricia Heine, Histology
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Dr. Judy Klimek, Anatomy
Kansas State University College of Veterinary Medicine, Manhattan, KS

Dr. Tomas Martin-Jiminez, Pharmacology
University of Illinois College of Veterinary Medicine, Urbana, IL

Dr. Michael Sims, Physiology
University of Tennessee College of Veterinary Medicine, Knoxville, TN

Dr. Bonnie Smith, Anatomy
Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, VA

Dr. Robert Walker, Bacteriology
U.S. Food and Drug Administration, Laurel, MD