

Technical Report
Qualifying Examination
September 2005, January 2006, and May 2006 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 10 content experts to write items for examinations to be administered on September 15, 2005, January 19, 2006, and May 11, 2006 (the 2005-2006 test cycle) (Appendix 1). An item-writing workshop was conducted at the NBME offices in Philadelphia on February 23, 2004. 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.

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 associated pictorials were reviewed by the item writers at a meeting at the NBME offices on September 27-28, 2004.

After the meeting, new approved items were reviewed again by NBME staff and added to the item pool for the Qualifying Examination. Three new 300-item examination forms were generated using content and statistical constraints. Nine participants, including five new item writers for the 2005-2006 cycle and four returning item writers from the 2004-2005 cycle, met on March 1, 2005 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 three 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. Final versions of the examination forms were reviewed, revised as necessary, and approved by three members of the NBVME and the NBVME Executive Director in June 2005.

III. Examination Analysis

A. Summary Statistics

Summary statistics for all forms of the Qualifying Examination administered to date are provided in Table 1. Statistics for the 2002 and 2003 administrations were based on the total group; statistics for subsequent administrations are based on the reference group (candidates taking the examination for the first time under standard conditions).

The mean P-value in Table 1 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-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-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 September 2005, January 2006, and May 2006 forms of the QE are .90, .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.

Table 1
Summary Statistics

Administration	N	Number of Items Scored (Deleted)	Mean P- Value (Standard Deviation)	Mean Discrimination Index: <i>r_{p-bis}</i> (Standard Deviation)	KR₂₀ Reliability Coefficient
August 2002¹	33	290 (10)	.60 (.26)	.13 (.19)	.84
January 2003¹	36	287 (13)	.55 (.25)	.10 (.18)	.81
August 2003¹ Form 1	11	292 (8)	.59 (.24)	.14 (.32)	.87
August 2003¹ Form 2	7	297 (3)	.59 (.26)	.17 (.36)	.91
January 2004²	29	297 (3)	.59 (.23)	.22 (.21)	.93
August 2004²	116	286 (14)	.61 (.21)	.21 (.13)	.92
January 2005²	49	282 (18)	.64 (.20)	.19 (.16)	.90
May 2005²	49	277 (23)	.62 (.22)	.19 (.17)	.92
September 2005²	125	272 (28)	.60 (.21)	.17 (.14)	.90
January 2006²	65	279 (21)	.60 (.21)	.17 (.14)	.90
May 2006²	75	283 (17)	.60 (.22)	.19 (.15)	.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

	Total Group		Reference Group	
Administration	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%
September 2005	29/135	21.5%	26/125	20.8%
January 2006	21/85	24.7%	13/65	20.0%
May 2006	19/79	24.1%	15/75	20.0%

Appendix 1
2004 Qualifying Examination Item Writers

Dr. Shelley Burton, Clinical Pathology
Atlantic Veterinary College, Charlottetown, PEI

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

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

Dr. Patricia Heine, Histology
Indianapolis, IN

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. Erle Murphey, Physiology
University of Texas, Galveston, TX

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

Appendix 2
2005 Qualifying Examination Form Reviewers

Dr. Sheila Grimes, Pathology
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Dr. Aslam Hassan, Physiology
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Dr. Tomas Martin-Jiminez, Pharmacology
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