Technical Report
NBVME Qualifying Examination
September 2012, January 2013, and May 2013 Test Administrations

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I. Introduction

The primary objective of the NBVME's 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 by the NBVME in cooperation with the National Board of Medical Examiners (NBME). The NBVME identified 12 content experts to write items for examinations to be administered during the 2012-2013 test cycle (Appendix A). An item-writing workshop was conducted at the NBME offices in Philadelphia on February 23, 2011. The purpose of the workshop was to provide the new item writers with guidelines for writing well-structured items and to hold a practice item-writing and review session. Five new QE item writers participated in the workshop, along with eight new NAVLE item writers.

Prior to the workshop, NBME staff prepared item-writing assignments based the five broad categories of the QE blueprint: Anatomy, Physiology, Pharmacology, Microbiology, and Pathology. An item-writing assignment and a list of the guidelines for completing assignments were distributed to each item writer following the meeting.

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 October 5-6, 2011. At that meeting, 493 new items were reviewed. A total of 443 new items were approved for use.

After the meeting, the newly-approved items were updated by NBME staff and entered into the test item library. Two new 200-item examination forms were generated using content and statistical constraints. The September 2012 form consisted of 300 items, and was re-used from the September 2011 administration. Drafts of the two new forms were sent to eight of the item writers in May 2012 for review and approval. The committee members reviewed the forms for quality and content overlap and to ensure content equivalence. A final review of each complete form was conducted by the NBVME Executive Director during July of 2012.

Following final approval, test forms were transmitted to the web-based testing vendor for formatting for web-based administration. The examination, including all test items, tutorial, and survey, was posted to a secure web page and made available to the NBME for proofreading. NBME test development staff proofread the examination, compiled changes, and communicated those changes to the web-based testing vendor. Quality control procedures were implemented at each state of the test development process to ensure accuracy and quality of the test materials.

III. Test Administration

A. Examination Summary

September 13, 2012: The QE was administered to 27 PAVE candidates at nine test sites, including: California (two sites), Illinois (two sites), Georgia, New Jersey, Guam, Grand Cayman, and South Korea.

January 17, 2013: The QE was administered to 31 PAVE candidates at 11 test sites, including: California (two sites), Florida, Georgia, Illinois, Maryland, Massachusetts, New Jersey, Oklahoma, Texas, and Grand Cayman.

One hundred forty-seven students from Iowa State University also took the QE on January 17, 2013 as a standardized assessment of basic science knowledge.

May 16 and May 23, 2013: The QE was administered to 33 PAVE candidates at 10 test sites, including: California (two sites), Georgia, Illinois, Pennsylvania, Texas, Virginia, Grand Cayman, Greece, and South Korea.

One hundred eight students from Western University, and 144 students from Ross University also took the QE on May 16, 2013.

B. Test Administration Incidents

NBME staff received one call from proctors during the September administration and three calls during the May administration; each reporting problems experienced at the test center. Most of the problems involved the secure browser, removing blacklisted items, launching the examination, or issuing examination restarts to examinees experiencing technical issues. Each proctor is asked to complete an incident report at the conclusion of the administration to document any issues encountered by examinees at the testing center. Incident reports were forwarded to the NBME and the NBVME for review after each examination administration.

C. Post-Test Survey

Examinees were asked to complete an optional post-test survey after completing the examination. Results of the survey for each administration were provided to the NBME and the NBVME.

D. Key Validation

When all responses for the examination were received and loaded to the NBME database, examinees' item responses were scored. An item analysis based on the responses of all examinees testing without accommodation for each administration was performed to statistically identify items on the examination with potential defects. Following the January and May administrations, identified items were reviewed during a conference call with members of the

examination committee, the NBVME Executive Director, and NBME staff to ensure that the items were correctly keyed and free of content or structural defects.. Seventeen items (9%) were deleted from the January form, and 13 items (7%) were deleted from the May form following the key validation. One item on the May form was rekeyed.

IV. Scoring and Analysis

A. Summary Statistics

Summary statistics for all forms of the QE administered since September 2006 are provided in Table 1.

The mean item difficulty (p-value) is a measure of the average difficulty of the items on the examination. Both the difficulty of the items and the proficiency of the candidates influence mean p-values; therefore, they cannot be compared meaningfully across administrations. However, mean p-values can be used to compare the average difficulty of the items in different content categories within each administration.

The mean item discrimination index (Rbis) is an indication of how well, on average, items on the examination discriminated between candidates who obtained high scores and candidates who obtained low scores. Item discrimination is measured by the item-total corrected biserial correlation coefficient.

The reliability estimate (KR_{20}) refers to a score's expected consistency. An examination score is reliable to the extent that administration of a different random sample of items from the same content domain 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 the candidates, as well as by the length of the examination.

B. Examinee Performance

Starting with the September 2008 administration, the QE scores were placed on a fixed reference scale. This scale was based on the performance of a Base Reference Group, comprised all candidates who took the QE for the first time under standard conditions beginning with the September 2005 administration through the May 2008 administration. Scores of administrations from September 2008 through January 2011 were equated and placed on the reference scale.

A content-based standard setting study was conducted at the NBME on July 8, 2008. After reviewing the results of the study, the NBVME set a minimum passing score (MPS) on the new equated scale of .07 logits. This MPS was translated into a reported score of 203.

Due to the small number of candidates for the May 2011 and subsequent administrations, these administrations were not equated. Scores were calculated such that the minimum passing raw score was equivalent to a scale score of 203.

Table 2 provides the history of failure rates on QE forms administered since September 2006.

C. Score Reporting

A sample PAVE score report and a sample diagnostic report are included in Appendix C.

Table 1
Summary Statistics

Administration	N	Number of Items Scored (Deleted)	Mean p-Value (Standard Deviation)	Mean Discrimination Index: Rbis (Standard Deviation)	KR_{20} Reliability Coefficient
September 2006	77	278 (22)	.56 (.21)	.17 (.15)	.90
January 2007	56	277 (23)	.60 (.21)	.17 (.15)	.90
May 2007	87	276 (24)	.60 (.22)	.18 (.13)	.91
September 2007	105	288 (12)	.58 (.18)	.20 (.13)	.93
January 2008	114	285 (15)	.58 (.19)	.21 (.14)	.93
May 2008	84	284 (16)	.60 (.22)	.15 (.12)	.88
September 2008	87	290 (10)	.59 (.19)	.22 (.13)	.94
January 2009	119	294 (6)	.61 (.18)	.20 (.12)	.93
May 2009	109	288 (12)	.59 (.20)	.20 (.14)	.93
September 2009	132	288 (12)	.64 (.19)	.27 (.18)	.92
January 2010	132	287 (13)	.62 (.19)	.29 (.17)	.93
May 2010	112	285 (15)	.65 (.20)	.32 (.18)	.94
September 2010	176	266 (34)	.64 (.18)	.30 (.16)	.93
January 2011	149	275 (25)	.63 (.18)	.28 (.16)	.93
May 2011	39	265 (35)	.57 (.19)	.21 (.21)	.89
September 2011	44	280 (20)	.59	.26	.90
January 2012	19	280 (20)	.57	.27	.93
May 2012	30	280 (20)	.58	.23	.90
September 2012	24	280 (20)	.53	.28	.93
January 2013	30	183 (17)	.63	.32	.91
May 2013	33	187 (13)	.59	.23	.87

Candidates who receive test accommodations for a documented disability are given extra time to complete the examination. For security purposes, they are administered a different form of the examination. These candidates are excluded from all summary statistics in this table. Summary statistics prior to May 2011 are based on the reference group (PAVE candidates taking the examination for the first time under standard conditions). Data from May 2011 on are based on the total PAVE group.

Table 2
History of Failure Rates

Administration	Total Group			Reference Group	
	N	Failure Rate		N	Failure Rate
September 2006	25/90	27.8%		16/77	20.8%
January 2007	19/65	29.2%		13/56	23.2%
May 2007	38/100	38.0%		27/87	31.0%
September 2007	49/129	38.0%		35/105	33.3%
January 2008	52/148	35.1%		37/114	32.5%
May 2008	45/117	38.5%		19/84	22.6%
September 2008	41/124	33.1%		25/87	28.7%
January 2009	57/146	39.0%		36/119	30.3%
May 2009	43/154	27.9%		23/109	21.1%
September 2009	45/167	26.9%		27/132	20.5%
January 2010	39/166	23.5%		23/132	17.4%
May 2010	36/134	26.9%		21/112	18.8%
September 2010	59/204	28.9%		43/176	24.4%
January 2011	63/200	31.5%		31/149	20.8%
May 2011	15/39	38.5%		-	-
September 2011	15/44	34.1%		-	-
January 2012	10/19	52.6%		-	-
May 2012	17/30	56.7%		-	-
September 2012	14/24	58.3%		-	-
January 2013	16/30	53.3%		-	-
May 2013	12/33	36.4%		-	-

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Appendix A
2011 Qualifying Examination Item Writers

Dr. Lora Ballweber, Parasitology
Colorado State University College of Veterinary Medicine, Ft. Collins, CO

Dr. Dawn Boothe, Pharmacology
Auburn University College of Veterinary Medicine, Auburn, AL

Dr. Dan Brown, Bacteriology
University of Florida College of Veterinary Medicine, Gainesville, FL

Dr. Terri Clark, Anatomy
Oregon State University College of Veterinary Medicine, Corvallis, OR

Dr. John Dodam, Physiology
University of Missouri College of Veterinary Medicine, Columbia, MO

Dr. Hari Goyal, Histology
Tuskegee University School of Veterinary Medicine, Tuskegee, AL

Dr. Sagar Goyal, Virology
University of Minnesota College of Veterinary Medicine, St. Paul, MN

Dr. James Herman, Physiology
Texas A&M University College of Veterinary Medicine, College Station, TX

Dr. Nongnuch Inpanbutr, Anatomy
Ohio State University College of Veterinary Medicine, Columbus, OH

Dr. F. Charles Mohr, Pathology
University of California College of Veterinary Medicine, Davis, CA

Dr. Karen Russell, Clinical Pathology
Texas A&M University College of Veterinary Medicine, College Station, TX

Dr. Wayne Schwark, Pharmacology
Cornell University College of Veterinary Medicine, Ithaca, NY