

**Technical Report**  
**NBVME Qualifying Examination**  
**September 2011, January 2012, and May 2012 Test Administrations**

**National Board of Veterinary Medical Examiners**  
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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 2011-2012 test cycle (Appendix A). An item-writing workshop was conducted at the NBME offices in Philadelphia on February 24, 2010. 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.

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 September 29-30, 2010. At that meeting, 506 new items were reviewed. A total of 484 new items and 77 new pictorials associated with those items were approved for use.

After the meeting, the newly-approved items were updated by NBME staff and entered into the test item library. Three 300-item examination forms were generated using content and statistical constraints. Nine of the 12 item writers met in Philadelphia on February 25, 2011 to review the forms. The committee was divided into three groups according to their areas of expertise: Anatomy and Histology; Physiology and Pharmacology; and Microbiology and Pathology. Each group reviewed items across all three forms for quality and content overlap and to ensure content equivalence. Approximately 3 - 4% of the items in each form were replaced to accomplish this goal. Following the meeting, NBME staff replaced the items and created updated forms. A final

review of each complete form was conducted by the NBVME Executive Director during April of 2011. The list of participants in the Form Review meeting is shown in Appendix B.

### **III. Test Administration**

#### **A. Examination Summary**

September 15, 2011: The QE was administered to 44 PAVE candidates at 12 test sites, including: California (2 sites), Illinois, Maryland, Mississippi, New Jersey, Oklahoma, Texas, Antigua, Grand Cayman, Grenada, and South Korea.

January 20, 2012: The QE was administered to 21 PAVE candidates at 9 test sites, including: California, Indiana, Maryland, Missouri, New Jersey, Oklahoma, Washington, Grand Cayman, and South Korea.

One hundred thirty-nine students from Iowa State University and 59 students from Tuskegee University also took the QE on January 19, 2012 as an outside assessment of basic science knowledge.

May 17, 2012: The QE was administered to 33 PAVE candidates at 11 test sites, including: California, Florida, Maryland, Minnesota, New Jersey, New York, Oklahoma, Washington, Grand Cayman, India, and South Korea.

Ninety-six students from Western University, one student from Tuskegee University, and two faculty members from Michigan State University also took the QE on May 17, 2012.

#### **B. Test Administration Incidents**

Each proctor is asked to complete an incident report at the conclusion of the administration to document issues, if any, 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. Identified items were submitted for review to ensure that they were correctly keyed and free of content or structural defects. Items were reviewed during a conference call with members of the examination committee, the NBVME Executive Director, and NBME staff. Twenty items (15%) were deleted from each of the three forms following the key validation. One item on one 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 (R<sub>bis</sub>) 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 coefficient (KR<sub>20</sub>) is a measure of internal consistency that provides an estimate of the accuracy or stability of scores. A 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 an examinee's rank order in the group. Reliability is affected, among other things, by the length of the examination and the homogeneity of the items and examinees. Possible values of the coefficient range from 0 to 1.

### **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. This 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 considering results of the study and other information and considerations, 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 forms of the QE 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**

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

Candidates who receive test accommodations for a documented disability are given an extra day 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**

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

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**Appendix A**  
**2010 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

**Appendix B**  
**2011 Qualifying Examination Form Reviewers**

**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. 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**

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