# Technical Report
# NBVME Qualifying Examination
# September 2007, January 2008, and May 2008 Test Administrations

National Board of Veterinary Medical Examiners
P.O. Box 1356
Bismarck, ND 58502
701-224-0332
*www.nbvme.org*

## 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 14 content experts to write items for examinations to be administered on September 13, 2007, January 17, 2008, and May 15, 2008 (the 2007-2008 test cycle) (Appendix 1). An item-writing workshop was conducted at the NBME offices in Philadelphia on February 28, 2006. 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 26-27, 2006. At that meeting, 690 new items and 190 new pictorials were reviewed; 644 new items and 160 new pictorials were approved for use.

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. Fourteen participants, including 6 new item writers for the 2007-2008 cycle and eight returning item writers from the 2006-2007 cycle, met on March 2, 2007 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. Final versions of the

examination forms were reviewed, revised as necessary, and approved by the Executive Director of the NBVME in April 2007.

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. Test Administration

### A. Examination Summary

September 13, 2007: The examination was administered via the Internet on September 13, 2007 to 129 of the 137 eligible candidates at eleven sites, including: California, Georgia, Indiana, Louisiana, Massachusetts, North Carolina, Texas, Washington, Grand Cayman, Grenada, and St. Kitts.

January 17, 2008: The examination was administered via the Internet to 150 of the 158 eligible candidates at twenty-two sites, including: Alabama, California (2), Florida, Georgia, Illinois, Indiana, Louisiana, Massachusetts, Missouri, New Jersey, Oklahoma, Oregon, Texas (2), Washington, Washington DC, Australia, Grand Cayman, Guam, Grenada, and St. Kitts.

May 15, 2008: The examination was administered via the Internet on May 15, 2008 to 119 of the 124 eligible candidates at fourteen test sites including; Alabama, Georgia, Illinois, Indiana, Louisiana, Massachusetts, Michigan, New Jersey, Oklahoma, Oregon, Texas, Washington, Grand Cayman, Grenada, and St. Kitts.

### B. Test Administration Incidents

Calls for Test Day Support: NBME staff members received seven calls from proctors during the September administration, twenty calls during the January administration, and twenty-one calls during the May administration; each reporting problems experienced at the test center during the administration. Most of the calls were to request assistance with installation of the secure browser software, launching examinations for examinees with incorrect biographic data, or issuing examination restarts to examinees experiencing technical issues.

Test Center Incident Reports: 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 NBVME for review shortly after each examination administration.

Proctor Resource Site Issue: A software issue occurred during the May administration that prevented proctors at several sites from monitoring the exam via the proctoring software for intermittent periods during the say. All examinees were able to complete testing.

### 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 NBVME.

## IV. Scoring and 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 (PAVE 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 candidates who correctly answered the average item. 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 September 2007, January 2008, and May 2008 forms of the QE are .93, .93, and .88, 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. Examinee Performance

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: $r_{p\text{-}bis}$ (Standard Deviation) | $KR_{20}$ Reliability Coefficient |
|---|---|---|---|---|---|
| **August 2002**[1] | 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** | 29 | 297 (3) | .59 (.23) | .22 (.21) | .93 |
| **August 2004** | 116 | 286 (14) | .61 (.21) | .21 (.13) | .92 |
| **January 2005** | 49 | 282 (18) | .64 (.20) | .19 (.16) | .90 |
| **May 2005** | 49 | 277 (23) | .62 (.22) | .19 (.17) | .92 |
| **September 2005** | 125 | 272 (28) | .60 (.21) | .17 (.14) | .90 |
| **January 2006** | 65 | 279 (21) | .60 (.21) | .17 (.14) | .90 |
| **May 2006** | 75 | 283 (17) | .60 (.22) | .19 (.15) | .92 |
| **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 |

[1] Summary statistics are based on the total group of candidates. All others are based on the 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% |
| **September 2006** | 25/90 | 27.8% | 16/77 | 20.8% |
| **January 2007** | 19/65 | 29.2% | 13/56 | 23.2% |
| **May 2007** | 30/100 | 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% |

## Appendix 1
## 2006 Qualifying Examination Item Writers

**Dr. Linda Blythe, Anatomy and Physiology**
Oregon State University College of Veterinary Medicine, Corvallis, OR

**Dr. Thomas Caceci, Histology**
Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, VA

**Dr. Jérome del Castillo, Pharmacology**
Université de Montréal Faculté de biomédecine vététerinaire, St-Hyacinthe, QU

**Dr. Ronald Green, Principles of Radiology and Radiographic Anatomy**
Animal Radiology Clinic, Dallas, TX

**Dr. Aslam Hassan, Physiology**
University of Illinois College of Veterinary Medicine, Urbana, IL

**Dr. Gayle Johnson, Pathology**
University of Missouri College of Veterinary Medicine, Columbia, MO

**Dr. Lynne Kushner, Pharmacology**
University of Pennsylvania School of Veterinary Medicine, Philadelphia, PA

**Dr. Phillip Nelson, Immunology**
Western University College of Veterinary Medicine, Pomona, CA

**Dr. Tom Phillips, Virology**
Western University College of Veterinary Medicine, Pomona, CA

**Dr. Marc Ratzlaff, Anatomy**
Washington State University College of Veterinary Medicine, Pullman, WA

**Dr. Dean Schwartz, Physiology and Pharmacology**
Auburn University College of Veterinary Medicine, Auburn, AL

**Dr. Jean Whichard, Bacteriology**
U.S. Centers for Disease Control and Prevention, Atlanta, GA

**Dr. W. Lee Wilkie, Physiology**
Colorado State University College of Veterinary Medicine, Ft. Collins, CO

**Dr. Darren Wood, Clinical Pathology**
Ontario Veterinary College, Guelph, ON

**Dr. Anne Zajac, Parasitology**
Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, VA

## Appendix 2
## 2007 Qualifying Examination Form Reviewers

**Dr. Thomas Caceci, Histology**
Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, VA

**Dr. Jérome Del Castillo, Pharmacology**
Université de Montréal Faculté de biomédecine vététerinaire, St-Hyacinthe, QU

**Dr. Paul Davenport, Physiology**
University of Florida College of Veterinary Medicine, Gainesville, FL

**Dr. Anton Hoffman, Anatomy**
Texas A&M University College of Veterinary Medicine, College Station, TX

**Dr. Gayle Johnson, Pathology**
University of Missouri, Columbia, MO

**Dr. Ron Johnson, Physiology**
Ontario Veterinary College, University of Guelph

**Dr. Lynne Kushner, Pharmacology**
University of Pennsylvania College of Veterinary Medicine, Philadelphia, PA

**Dr. Susan Little, Parasitology**
Oklahoma State University College of Veterinary Medicine, Stillwater, OK

**Dr. Abdelfattah Nour, Physiology**
Purdue University School of Veterinary Medicine, West Lafayette, IN

**Dr. Jon Patterson, Pathology**
Michigan State University College of Veterinary Medicine, East Lansing, MI

**Dr. Tom Phillips, Virology**
Western University College of Veterinary Medicine, Pomona, CA

**Dr. Marc Ratzlaff, Anatomy**
Washington State University College of Veterinary Medicine, Pullman, WA

**Dr. Elizabeth Springer, Clinical Pathology**
Auburn University College of Veterinary Medicine, Auburn, AL

**Dr. Jean Whichard, Bacteriology**
Centers for Disease Control and Prevention, Atlanta, GA