AMERICAN ACADEMY™ OF OPHTHALMOLOGY

The Evolution of the American Board of Ophthalmology Written Qualifying Examination

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Since the inception of board certification in ophthalmology in 1916, a written assessment of candidates' knowledge base has been an integral part of the certification process. Although the committee structure and technique for writing examination questions has evolved over the past 100 years, the written qualifying examination remains an essential tool for assessing the competency of physicians entering the workforce. To develop a fair and valid examination, the American Board of Ophthalmology builds examination questions using evidence-based, peer-reviewed literature and adheres to accepted psychometric assessment standards. *Ophthalmology 2016;123:S15-S19 © 2016 by the American Academy of Ophthalmology.*

Ophthalmology was the first branch of medicine to develop a certification process, and 2016 marks the centennial of the establishment of the American Board of Ophthalmology (ABO). The purpose of board certification is the same now as it was in 1916—to provide assurance to the public that a practitioner has achieved a standard of expertise defined by the profession as that which is needed to provide the highest level of patient care. Board certification remains the only evaluation and standardized certification of a physician's specialty knowledge and skills.

The willingness of ophthalmology and other medical specialties to define this standard of expertise is what sets them apart as professions rather than trades, a distinction championed by Thomas Percival[1] and adapted into the Code of Conduct of the American Medical Association.[2] The standard of certification is accepted widely within ophthalmology and is used extensively as a criterion for verification of a physician's knowledge and skills for hospital credentialing, renewal of state licensure, and participation in health care plans. At the heart of the certification process is the assessment of knowledge and skills through the use of examinations. It is essential, then, that the examination process is one that is valid, reliable, and transparent.

Since the inception of board certification in ophthalmology, the examination has included some type of written assessment of a candidate's knowledge base. This article traces the history, current status, and future innovations of written examinations in the ABO's certification process.

History of the Written Qualifying Examination

The initial written examination was in essay format. The test consisted of 6 questions and was administered in a classroom setting. Examinations were graded by ABO directors, and candidates were given a grade of pass or fail. The candidates were informed of the outcome of the examination in person the day after the examination.

In 1952, the examination was changed from an essay format to a multiple-choice examination. Questions were written by ABO directors. Members of the Written Committee of the ABO reviewed a pool of questions and selected the questions that would be used for the examination. The initial review process was colorful, based on the firsthand accounts of directors who were present, and proceeded without formal consideration of psychometric principles. For many years, the Written Committee convened in a conference room at the Del Monte Hotel in Pebble Beach, California. Committee members reviewed binders containing paper copies of the questions. The conference room was outfitted with a fireplace. According to oral tradition, questions not meeting with the approval of the committee were torn from the binder and tossed into the fireplace with the pronouncement, "Someone else's life work has just gone up in smoke."

In the 64 years since the introduction of the multiple-choice format examination, what is now known as the written qualifying examination (WQE), there have been notable steps in its evolution. In 1968, the first Ophthalmic Knowledge Assessment Program (OKAP) examination was administered by the American Academy of Ophthalmology to assess the knowledge base of ophthalmology residents.[3] For many years, questions for the OKAP and the WQE were prepared and evaluated at a joint meeting of the OKAP Committee of the American Academy of Ophthalmology and the Written Committee of the ABO. For the years 1980 through 1992, the OKAP and WQE were identical examinations, with the WQE administered

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on Friday and the OKAP on Saturday. By 1992, it was determined that the purpose of the 2 examinations and the appropriate content differed substantially, so they reverted to separate examinations.

Increasingly, psychometric principles were incorporated into the WQE to insure the validity of the test in assessing the knowledge base of candidates for board certification. Psychometric consultants instructed the ABO directors and staff on the proper methods for determining subject matter, content outline design, construction of questions, and post-test assessment of item performance. Implementation of these recommendations was the responsibility of the board, but relied enormously on the extremely capable board staff. The Written Committee chairs and their associated staff are listed in Table 1. Patricia J. Dillon was a central figure in bringing the WQE to its current state, and served as written exam coordinator from 1984-2012 and played a critically important role in improving the examination.

Current Written Qualifying Examination

The current WQE is a 250-question computer-administered multiple-choice examination. Before 2006, it was a paper-based examination. At each administration, there are 4 versions of the test, consisting of the same 220 scored items and 30 different pretest items. All of the scored items have been used previously so that the performance of the item is known. The test items are written by subject matter experts selected by the ABO, with input from the American Academy of Ophthalmology and ophthalmic subspecialty societies. The items are reviewed and selected in a process that combines electronic evaluation and in-person meetings.

Test items are designed to assess at least 3 different categories of knowledge and skills. Some test basic information, recall of clinically relevant facts, or both. Others address interpretation of visual images or a clinical scenario.

Table 1. Written Examinations Committee Leadership and Personnel Since 1955, When the Board Formed a Committee to Develop Multiple-Choice Questions

Year(s)	Written Chair
1955–1957	Francis H. Adler, MD
1958–1959	Kenneth C. Swan, MD
1960–1961	Kenneth C. Swan, MD C. Wilbur Rucker, MD
1962	Francis H. Adler, MD C. Wilbur Rucker, MD
1963–1965	A. Edward Maumenee, MD
1966–1967	Frank J. Newell, MD
1968–1974	Irving H. Leopold, MD
1975–1977	David Shoch, MD
1978–1983	Melvin L. Rubin, MD
1984–1986	Froncie A. Gutman, MD
1987–1990	William S. Tasman, MD
1991–1994	Denis M. O'Day, MD
1995–1999	William E. Benson, MD
2000–2004	William F. Mieler, MD
2005–2008	Gregory L. Skuta, MD
2009–2012	David J. Wilson, MD
2013–2016	Philip L. Custer, MD

Another category of test items assesses clinical management and decision making.

Items for the WQE are not written randomly, but rather are based on a content outline that was developed by the ABO in 2012 to organize the content of all of the ABO examinations: the WQE, the oral examination, and the Maintenance of Certification Demonstration of Ophthalmic Cognitive Knowledge (DOCK) examination.

The purpose of the content outline is to identify the knowledge, skills, and abilities necessary for competent performance by practicing ophthalmologists throughout the continuum of practice. Standard 11.13 of the Standards for Educational and Psychological Testing states, "The content domain to be covered by a credentialing test should be defined clearly… [and] support the claim that the knowledge or skills being assessed are required for credential-worthy performance in that occupation and are consistent with the purpose for which the credentialing program was instituted."[4]

The ABO used expert consensus based on the review of evidence-based literature and analysis of existing content outlines to develop its own content outlines for the assessment of ophthalmologists. The ABO examined and incorporated content from the American Academy of Ophthalmology's Practicing Ophthalmologists Curriculum and the OKAP, along with the International Council of Ophthalmology's Residency Curriculum. To accomplish this project, the ABO was assisted by 78 practicing ophthalmologists representing the following 10 subspecialties: cataract and anterior segment, cornea and external disease, glaucoma, neuro-ophthalmology and orbit, oculoplastics and orbit, oncology and pathology, pediatric ophthalmology and strabismus, refraction and optics, retina and vitreous, and uveitis. The committee members were organized by subspecialty into committees. Each committee included at least 1 comprehensive ophthalmologist, 1 ophthalmologist practicing a different subspecialty from that of the committee, and 1 representative from the American Academy of Ophthalmology. The committees were constituted to represent diversity in gender, age, type of practice (academic, private, group, military, etc.), and geography. As is the case with all ABO examination development volunteers, committee members were required to be participating in Maintenance of Certification. The committees worked closely under the direction of a project manager from Prometric, a test development and delivery provider to more than 400 organizations worldwide, with expertise in psychometric principles.

The year-long process consisted of several activities, including the following: the combination of multiple existing outlines and other sources of content to create a comprehensive base document, or primary source outline; analysis and summarization of the primary source document to create a smaller, more focused, condensed outline, or summary source outline; translation of the summary source outline into knowledge and task statements, that is, what an ophthalmologist needs to know and what an ophthalmologist needs to know how to do; and individual review and rating of knowledge and task statements to classify the importance of that statement to 4 different examinee groups,