MISSION

To protect the health of the public through state of the art assessment of health professionals. While centered on assessment of physicians, this mission encompasses the spectrum of health professionals along the continuum of education, training and practice and includes research in evaluation as well as development of assessment instruments.

NBME ORGANIZATION

The NBME is an independent, not-for-profit organization that provides high-quality examinations for the health professions. Protection of the health of the public through state of the art assessment of health professionals is the mission of the NBME, along with a major commitment to research and development in evaluation and measurement. The NBME was founded in 1915 because of the need for a voluntary, nationwide examination that medical licensing authorities could accept as the standard by which to judge candidates for medical licensure. Since that time, it has continued without interruption to provide high-quality examinations for this purpose and has become a model and a resource of international stature in testing methodologies and evaluation in medicine.

NBME VALUES provide a framework for use by staff members, senior management, committee members and governance in accomplishing their part of our mission.

Insist on EXCELLENCE in my own work and encourage others to do the same. Take personal responsibility for achieving outstanding quality appropriate to the specific work product or service being provided by me and encourage my colleagues to take the same approach.

Maintain high standards for the QUALITY of all products and services. Hold myself to high standards that reflect the degree of excellence appropriate to the specific product or service. In establishing and maintaining these standards, keep in mind the primary mission of the NBME and its role in protection of the public.

Make COMMUNICATION a personal obligation. Take responsibility for listening and remaining open to communication from others and for conducting my own communications fairly, clearly, honestly, appropriately, and in a timely fashion; share all information needed for success.

Act to create an environment that VALUES PEOPLE and RESPECTS DIVERSITY. Take personal responsibility for demonstrating behaviors that reinforce the value of respect for all people, regardless of personal characteristics and role or level at the NBME.

Exercise responsible STEWARDSHIP for the NBME. Act with loyalty, accountability, and commitment, to exercise responsible management of the NBME organization, its resources, and products, and provide fair and accurate representation of its views.

Bring CREATIVITY and INNOVATION to all aspects of our work. Challenge each other to look beyond the usual, test our mental models and assumptions, and encourage experimentation. Cultivate teaching, learning, and imagination, and advocate development of new ideas.

Act together to create a COMMUNITY united in SERVICE at the NBME. Foster teamwork and collegiality, and nurture a service orientation.

Be guided in my work by high ETHICS and PROFESSIONAL CONDUCT. Hold myself to high ethical standards at all levels within the NBME and adhere to professional conduct in my interactions with others regardless of role or level at the NBME.
## TABLE OF CONTENTS

MESSAGE FROM THE CHAIR AND PRESIDENT ................................................................. 3

2015 HIGHLIGHTS ...................................................................................................................... 5

THE NBME ORGANIZATION ................................................................................................... 11

- NBME Governance ........................................................................................................... 12
- Office of Public Engagement ......................................................................................... 23
- The Clinical Skills Evaluation Collaboration ................................................................. 25

PROGRAMS AND SERVICES .................................................................................................. 27

- Medical Education Services for Medical Schools, Students,
  Residents, and Residency Programs .................................................................................. 27
- Services for Health Profession Organizations .................................................................. 32
- Licensure Programs ........................................................................................................ 36
  - The North American Veterinary Licensing Examination .............................................. 36
  - Puerto Rico Medical Licensing Exam ........................................................................... 38
  - Post-Licensure Assessment System ............................................................................ 38
  - The United States Medical Licensing Examination ................................................... 40
- International Programs .................................................................................................. 62

RESEARCH AND FUTURE DIRECTIONS ........................................................................... 69

- 2015 Research Summary ................................................................................................. 74
- Published Papers and Invited Presentations ..................................................................... 78
As 2015 draws to a close and the NBME is beginning its second century of service to the public and the health professions, we would like to take a few moments to reflect on the unique opportunity this past year has provided. Founded in 1915, the NBME administered its first examination to ten young physicians in Washington, DC, in 1916. In 2015, NBME delivered examinations to more than half a million health professionals all over the world. Through our centennial celebration, we looked at the growth and expansion of our organization over 100 years, and we contemplated its future. We asked ourselves, “What will NBME look like 100 years from now?”

The NBME was founded to solve a significant yet rather simple problem: can we ease interstate reciprocity of medical licenses by creating an examination of such high quality that all US medical licensing authorities will accept its results in lieu of their own examinations, thereby eliminating the requirements for re-examination? With a growing reputation for excellence and commitment to purpose, the NBME ultimately achieved success in solving the problem it was founded to solve. Today, all US licensing authorities accept USMLE as the examination that meets requirements for medical licensure. Through our centennial year look back and from our 21st century perspective, we can certainly say, “Mission accomplished,” but we also must ask, “Can we do more?”

The NBME measures its success through mission fulfillment, and like medicine itself, our mission has evolved. The founders of the NBME wanted to solve a problem specific to American medicine as it existed in the early 20th century. The modern leadership of the NBME knows that American medicine does not exist in a vacuum. Healthcare is no longer just within the provenance of physicians; today’s patients are more empowered than ever before; and healthcare delivery systems grow more complex. Given all of this complexity, how does the modern NBME plan for the future and measure its success?

Throughout the past year, we have worked to identify the key components we must quantify to ensure we achieve our mission to protect the public through state of the art assessment. We have talked at length about three overarching institutional objectives—mission fulfillment, financial sustainability, and stakeholder satisfaction—all of which must be carefully defined and measured to ensure that the NBME remains an essential, trusted, and mission-focused organization well into the future. As the work of our organization grows across geography and professions, our staff and governance will continue to identify, define, measure, and balance all factors needed for success.

This past year, we have worked to define a mission impact index, a model intended to measure NBME’s progress toward fulfilling its mission each year and to project mission advancement in future years. The model decomposes the mission statement, “to protect the health of the public through state of the art assessment of health professionals,” into four key measures. These measures include number of tests (as a proxy for the number of patients ultimately affected by NBME assessments), stakes of the assessments, range and depth of competency coverage, and strength of inference (an overarching construct for quality). For each program, a
mission value score is computed by multiplying together the four parameters outlined above. The NBME mission impact index is the summation of mission value scores across all product lines. Because all four components are equally important, each has the same leverage to affect the index. For example, it is possible that a widely adopted low-stakes assessment that thoroughly assesses multiple competencies could provide as much mission impact as a high-stakes assessment that assesses only one competency.

The concept of a sustainability index was introduced as part of the establishment of institutional metrics in 2014. Staff designed the index during the first half of 2015 and demonstrated an initial model of the index at the June 2015 Finance Committee and July 2015 Executive Board meetings. The proposed model focuses on projected inflows and outflows of cash over a five-year period. In 2016, we will continue to refine the model’s assumptions around growth of programs and services, revenues and expenses, expected efficiency gains, and confidence or risk adjustments for newly launched products. The purpose of the sustainability index is to provide evidence that our development of better or new assessments to contribute to our mission fulfillment does not threaten the stability of the NBME. It also allows us to track at increasing the proportion of our resources that can be applied to development for the future.

Stakeholder satisfaction highlights the importance of serving NBME customers and stakeholders. In 2015, we worked toward defining relevant customers and stakeholders. In light of our mission “to protect the health of the public,” we acknowledge that patients (the public) comprise our most important stakeholder group. We have continued to focus on discovering new ways to include patient voices in our work, guided by the NBME’s Public Stakeholders Committee. Vendors and collaborators are key stakeholders whose satisfaction is critical to our success. Customers might encompass the broad spectrum of licensure and certification stakeholders, payers, educators, examinees, and possibly other parties. The context of satisfaction will depend on the role of the stakeholder and may vary from product to product within the broad portfolio of NBME products and services. For stakeholders whose primary connection with NBME is taking or using the results of our exams, assessment quality and delivery quality have been identified as the most crucial. However, for other stakeholders – patients, our volunteers, our sister organizations in the House of Medicine – our attentiveness to their voices will be most critical. We are committed to finding measures that provide certainty that we fully engage these stakeholders as we envision our future. Further work will be undertaken in 2016 to elaborate the definition and measures around this key objective.

While much effort in 2015 was dedicated to understanding and defining the strategic institutional objectives that will ensure our success well into the future, throughout the year over half a million high-quality assessments were delivered around the world. As you read through the updates on programmatic activity in the 2015 Annual Report, you will see the depth and scope of our work, none of which would be possible without the dedication and hard work of our staff and our volunteers. We would like to take this opportunity to express our sincere appreciation for their commitment and contributions to the NBME mission.
2015 HIGHLIGHTS

2015 CENTENNIAL MEETING

Following the shortened Annual Meeting and Hubbard Award luncheon on May 4, 2015 (see page 12), the Membership was joined by approximately 100 individuals for NBME’s Centennial Meeting, which included a summary of the events, programs, and products that comprised NBME’s centennial year; four finalist presentations from the Centennial Prize Competition; and updates from representatives of three Latin American medical school consortia that were recipients of NBME’s Centennial Awards Program for Latin America.

CENTENNIAL PRIZE COMPETITION: FINALISTS’ PRESENTATIONS

The major focus of the Centennial Meeting was the NBME Centennial Prize Competition: Innovation in Future Assessment of Health Professionals, the objective of which was to identify innovative ideas that address future assessment needs for individual health professionals, health professions institutions, licensing and certification bodies, and other domains across the continuum of health professions education and practice. Seventy-two first-round submissions were received; of these, 27 were invited to submit full proposals. Ultimately, 22 full submissions were received and evaluated. At the 2015 Centennial Meeting, four finalist teams competed for the grand prize: an award of $5,000, a pledge that NBME will include the idea in NBME’s new product development process, and an invitation to participate in the development process as NBME’s centennial fellow(s). With Dr. Lewis First serving as emcee, four finalists competed on stage for the prize. The four finalist presentations were:

TOPCATS (Trainee-Oriented Patient Communication Assessment System) presented by Myung Sun Choi, Jennifer Hu, Abby Koff, and Devan Patel

Developed and presented by four undergraduate medical students from the University of Pittsburgh School of Medicine, TOPCATS is a user-friendly, anonymous feedback system that incorporates both patient and trainee perspectives to: (1) empower patients and foster better relationships between patients and healthcare providers, (2) identify trainee strengths and weaknesses to stimulate reflection and motivate self-improvement, (3) provide the training institution with feedback for quality improvement, and (4) identify trainees who need additional assistance.
**Tying Teams Together: The Interprofessional Education Toolkit**  
*presented by Joy Doll*

In connection with the Creighton University Interprofessional Education Collaborative, Dr. Doll and her team proposed the creation and implementation of a toolkit to develop and assess collaborative clinical reasoning for interprofessional teams, both student and professional. This toolkit would include training materials, a clinical reasoning algorithm to assist teams in skill development in collaborative clinical reasoning, and an assessment tool that is able to measure a team’s level of competency in collaborative clinical reasoning. This toolkit would be available and useful across clinical settings and interprofessional education activities. The proposed toolkit provides the roadmap for attaining and maintaining competence in interprofessional collaborative care by developing competence in collaborative clinical reasoning.

**A Next-Generation Style Video Game–based Interactive Simulation to Quantitatively Assess Non-Cognitive Abilities**  
*presented by Gregory Freund*

Along with Mike Kulas (creator of the video game series Saints Row), Dr. Freund of the University of Illinois at Urbana-Champaign School of Medicine proposed the development of a next-generation style video game–based interactive simulation to quantitatively assess non-cognitive abilities. As Dr. Freund noted, with near photorealistic graphics and instanced storytelling, the modern video game can craft immersive interactive simulations with compelling narratives. Of note, most video game–based interactive simulations designed for entertainment purposes already automate the recording and scoring of a variety of non-cognitive abilities. As interactive virtual fiction, video games routinely present players with a variety of moral dilemmas that, depending on player empathy, cultural awareness and/or judgment, change the way the story unfolds. In turn, cooperative and multiplayer games regularly evaluate and reward communication, judgment, psychomotor skills and team skills. Advanced gaming technologies can monitor biometric data like heart rate and facial movement, potentially affording assessment of emotive intelligence and/or situational reactivity.

**The Population Health Assessment Tool**  
*presented by Karen Hauer*

Representing a team from the University of California, San Francisco, Dr. Hauer proposed the Population Health Assessment Tool, a simulated patient population modeled on regional and geographic data, accessed via a virtual electronic health record and clinical quality dashboards to assess management of patient panels in a virtual practice. The assessment incorporates concepts from gaming and crowdsourcing to generate novel decision pathways. Examinees would interpret patients’ preventive health information and identify patients due for services based on established guidelines. For chronic conditions, examinees would interpret patient population reports based on provider and quality measures. Information for patient groups managed by a peer group would enable examinees to identify potential adjustments to their own practice pattern. To enhance assessment, the virtual patient population platform would employ gaming principles, which allow multiple reasonable courses of action for complex, realistic situations. This tool could be used for learners across the continuum.
The competition was designed to allow for two sets of scores: audience and expert panel. The expert panel comprised three former Hubbard Award winners (John Norcini, Glenn Regehr, and Lesley Southgate) charged with evaluating the proposals on scientific merit, impact, and presentation. Each judge provided one score (on a scale of 1 to 10) for each proposal. Audience members were given three votes each, to be used however the audience member wished. These two sets of scores were combined to determine the winning proposal.

On the morning of May 5, Dr. First announced that the winning idea was that of Team TOPCATS (Myung Sun Choi, Jennifer Hu, Abby Koff, and Devan Patel). The NBME was particularly delighted that the winning team was a group of medical students from the University of Pittsburgh School of Medicine. It seems quite fitting that a future-themed competition was won by future physicians.

**CENTENNIAL AWARDS PROGRAM FOR LATIN AMERICA**

Dr. W. T. Williams, Jr. described the NBME Centennial Awards Program for Latin America:

In 2013, NBME announced a call for proposals for its Centennial Awards Program for Latin America, the goal of which is to enhance the quality of student evaluation in medical school education in Latin America. Each of the three awards provides up to $50,000 over a two-year period to foster the development of a regional medical school evaluation consortium. In particular, NBME sought proposals designed to have a broad, sustainable impact in a region by building local capacity to evaluate key learning outcomes and improve program quality at participating schools.

Three consortia of medical schools were recipients of the awards:

**Facultad de Ciencias Biomédicas, Universidad Austral (Argentina); Facultad de Medicina, Universidad de Concepción (Chile); and Facultad de Medicina, Universidad Católica de Córdoba (Argentina)**

*(Assessment of Aspects Related to Medical Humanism in Three South American Medical Schools)*

**Universidad Nacional Autónoma de México Facultad de Medicina (Mexico); Escuela de Medicina Ignacio A. Santos del Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico); and Facultad de Medicina de la Universidad Autónoma de San Luis Potosí (Mexico)**

*(Assessment of Clinical Competence with the Objective Structured Clinical Examination [OSCE] in Undergraduate Medical Internship)*

**Facultad de Medicina, Universidad Católica del Norte (Chile); Facultad de Medicina, Universidad Finis Terrae (Chile); Facultad de Medicina, Universidad del Desarrollo campus Santiago (Chile); Facultad de Medicina, Universidad Mayor (Chile); Facultad de Medicina, Universidad Andres Bello (Chile); Facultad de Medicina, Universidad Diego Portales (Chile); and Facultad de Medicina, Universidad de Concepción (Chile)**

*(Improvement in OSCE Quality in Order to Optimize Clinical Competency Assessment of Medical Students)*
Following Dr. Williams’ description of the project, a representative from each consortium took the stage to report on progress to date and next steps. Each representative thanked the NBME and its staff for support and encouragement.

SUZANNE T. ANDERSON ELECTED CHAIR

At the Annual Meeting of the NBME Membership on May 4, 2015, Suzanne T. Anderson was elected to a two-year term as chair of the NBME. Ms. Anderson is executive vice president, chief financial officer and chief information officer of Virginia Mason Health System, Seattle, Washington. Virginia Mason is a nonprofit comprehensive regional healthcare system that combines a primary and specialty care group practice of more than 480 physicians with a 336-bed acute-care hospital. Ms. Anderson graduated from the University of Notre Dame and received her MBA from Owen Graduate School of Management, Vanderbilt University. She has occupied volunteer positions with other national organizations in a number of different roles, including chair of the Educational Commission for Foreign Medical Graduates (ECFMG®) and public director, American Board of Ophthalmology. Her many roles in serving the NBME include chair of the Public Stakeholders Committee and chair of the governing committee (Composite Committee) of USMLE. Following service as an at-large member of the Executive Board, Ms. Anderson was elected treasurer of the NBME at the 2013 Annual Meeting of the Membership.

TRILATERAL BOARD MEETING: JULY 2015

On July 11, 2015, members of NBME’s Executive Board met with members of the ECFMG Board of Trustees and members of the Federation of State Medical Boards (FSMB) Board of Directors for a series of meetings related to topics of interest to the three organizations. In plenary and small group break-out sessions, participants discussed topics such as: health workforce, interstate medical licensure compact, competency-based assessment,
and international medical education. The meetings were facilitated by senior staff and board members of all three organizations.

The trilateral board meetings are held every few years and provide an opportunity for the leadership of these collaborative organizations to meet and discuss issues important to their missions.

COMMUNITY SERVICE

As a member of the West Philadelphia and University City communities, the NBME and its staff proudly support a number of neighborhood initiatives.

PHILADELPHIA READS

Philadelphia Reads was formed to enhance the literacy experiences of Philadelphia’s students in kindergarten through third grade, ensuring they will be able to read well and independently. Philadelphia Reads works with individuals, schools, community and faith-based organizations, and businesses to provide mentors, resources, and advocacy for in-school, after school, and summer programs. Together, these partners and Philadelphia Reads help to strengthen the literacy skills of the city’s youngest and neediest schoolchildren.

Since joining Philadelphia Reads Power Partners in October 2008, NBME has hosted first-, second-, and third-grade classes from Drew Elementary in University City and Penrose Elementary in southwest Philadelphia. Over the eight years as a Power Partner, 217 students, 127 NBME literacy coaches, and 29 program support staff from NBME, Drew and Penrose, and Philadelphia Reads have participated.

As literacy coaches, staff from various departments volunteer during their lunch hour each Wednesday from October through May to read with students at NBME. Each student is assigned to one coach or a pair of alternating coaches for the school year. For the final session in June, NBME coaches visit the class at school. Staff have donated books to fill several Philadelphia Reads shelves in the NBME library, and held a school supplies drive to benefit Penrose Elementary in the fall of 2015. For more information please visit www.philareads.org/.

INNOVATION PLAZA

In 2015, NBME was proud to support the construction of the University City District (UCD) Innovation Plaza. This outdoor gathering spot (sometimes called a “pocket park”) featuring free WiFi, game tables, lighting, seating, and greenery, runs along 37th Street between Market and Chestnut Streets. The public space can be used for various events, such as concerts, movies, farmers’ markets, and street festivals, and is intended to further vitalize the growing UCD neighborhood. Innovation Plaza also features an Innovators Walk of Fame that showcases “groundbreaking contributions made to the scientific and entrepreneurial communities that have revolutionized the local, regional and global landscape.”
1. Painting of NBME founder Dr. William L. Rodman and his son Dr. J. Stewart Rodman. Commissioned by the ECFMG and the FSMB and given to the NBME in recognition of its centennial. Artist: Garth Herrick.

2. Centennial Competition judging panel: Glenn Regehr (left), Lesley Southgate (center), and John Norcini (right).

3. Dr. Lewis First addressing the Membership.

4. Dr. Don Berwick giving keynote address.

5. Dr. Melnick addressing the Membership.


7. Dr. Ruth Hoppe, chair of the Centennial Steering Committee.

8. Centennial Competition finalist panel responding to questions from the audience.
Two major organizational divisions function in a matrix to produce the NBME’s products and services. Assessment Programs includes the teams managing each product or service area: USMLE, services to medical schools (medical school subject tests and self-assessment tools), services to health profession organizations (testing services for clients), services for practicing doctors (post-licensure assessment activities), international collaborations, and programs in development. These teams are responsible for program planning, budgeting, customer and/or governance interface, and continuous program improvement. In addition, Assessment Program staff supports the Public Stakeholders Committee.

Professional Services includes teams providing the various assessment services that contribute to each product. These include examinee services (registration, disability services, test administration, examinee records), test development (item writing, test form creation, and publishing), scoring, measurement consulting services (special services, such as standard setting, test design, role delineation, analysis of suspected cheating, etc.), and operations research (continuous quality improvement of systems and processes).

These two divisions rest on a foundation of infrastructure services, made up by the NBME’s Operations and IT divisions. Operations encompasses Facilities Services (property management, maintenance, custodial services) and safety and security services (building security, mail, warehouse), Human Resources and Organizational Development, Strategic Planning and Institutional Effectiveness, and Finance. The Legal Services unit completes the support units.

IT encompasses application development, project management, enterprise architecture, infrastructure services (network, internet, and desktop services and the NBME print shop), security and disaster recovery, help desk, and process and service improvement.

Research and Discovery comprises three functions now in development as a result of Renewal projects focusing on new product development and the NBME research enterprise. The Center for Innovation, in place for a dozen years, focuses its efforts on incubating new testing modalities, new forms of test products, and new approaches to assessment. The Center is charged with identifying promising projects and exploring them expeditiously for further development as NBME products. The Product Discovery unit oversees the generation of new ideas and their progression through concept development and prototyping. The Research unit provides coordination for the distributed NBME research activities, assuring their guidance by a strategic research agenda, and supports the Stemmler Medical Education Research Fund grant program.

The Clinical Skills Evaluation Collaboration (CSEC) is a virtual organization. Each staff member is employed either by ECFMG or by NBME, but all work in a single, virtual organization to provide support for assessment of clinical skills using standardized patients. The CSEC executive director reports jointly to the ECFMG and NBME presidents. See page 25 for more information on CSEC.
The Membership of the NBME consists of approximately 80 individuals, with accountability and expertise in the health professions and medical education and evaluation. These individuals are representatives of NBME test committees; representatives of national professional organizations; and members-at-large representing various interests, including the public. The NBME Membership also includes the individuals who serve on the board of directors of the NBME, known as the Executive Board. It consists of the elected officers of the NBME (chair, vice-chair, and treasurer), president, past chair, and seven additional Executive Board members elected by the NBME Membership. The Executive Board usually meets quarterly throughout the year, whereas the NBME Membership meets annually, typically in March or April.

At its Annual Meeting, the NBME Membership exercises its authority by reviewing the activities of the NBME, reviewing and providing advice on policy for the organization approved by the Executive Board, ratifying the annual operating and capital budgets, reviewing all important actions taken by the Executive Board since the last Annual Meeting, and electing at-large members and members of the Executive Board.

Standing committees and special committees as may be required to promote the objectives and interests of the NBME provide additional advice on programs and initiatives to the Executive Board and the NBME Membership.

2015 ANNUAL MEETING

The Membership of the NBME held its 101st Annual Meeting in Philadelphia on May 4, 2015. The 2015 Annual Meeting was limited to a session of approximately three hours on the morning of May 4, during which the NBME Membership focused on business items and a brief small group activity, followed by the Hubbard Award luncheon. Following the May 4 luncheon, the NBME Membership and invited guests participated in NBME’s Centennial Conference (see 2015 Highlights), held on the afternoon of May 4 and morning of May 5, 2015. Of note, May 5, 2015 marked the 100th anniversary of the meeting of organization of the National Board of Medical Examiners.

During its Annual Meeting business session, the NBME Membership acted on Executive Board appointments of representative members, approved the 2014 Annual Meeting minutes, and accepted the reports from the Executive Board, treasurer, and Audit Committee. The Membership received presentations from the NBME chair, president, and treasurer. Dr. Lewis First provided highlights of his four years of service as NBME’s chair; NBME president Dr. Donald Melnick focused on NBME Renewal (a framework adopted by the NBME for continuous improvement) and its attendant culture change; and treasurer Suzanne Anderson summarized 2014 Finance Committee and Audit Committee activities, including 2014 operating performance and 2015 budget development. The Membership divided into small groups to develop and pose questions to panels of NBME members and staff, who discussed NBME’s “State of the Board,” Renewal activities, and new developments in NBME programs and services. As chair of the 2015 Nominating Committee, Dr. W. T. Williams, Jr. presented the report of the Nominating Committee, and the Membership elected the slate of nominees. Of note, Suzanne T. Anderson was elected chair; Lynn M. Cleary was elected to a second term as vice-chair; and Paul M. Wallach was elected treasurer.
REMARKS FROM THE PRESIDENT AND KEYNOTE ADDRESS

NBME President Dr. Donald Melnick took the stage to reflect on the changes in medical education and assessment he has seen since his days as a resident physician. He noted the themes of both the 2014 NBME Annual Meeting (“a look back”) and the 2015 Centennial Meeting (“a look to the future”) and the persistent themes and principles that shaped NBME’s growth and that should not be lost as it moves into the future. Dr. Melnick then introduced the keynote speaker, Dr. Donald Berwick, former administrator for the Centers for Medicare and Medicaid Services and founding CEO of the Institute for Healthcare Improvement.

Dr. Berwick discussed “The Challenge of Change—The Direction of Change,” starting with his own experiences as a young physician and including a brief history of healthcare quality in the United States. He noted the many challenges in the current system as well as opportunities for positive, meaningful change. He implored the audience to “be the change” that is needed and ended with this plea: “The nation needs a rebirth of commitment to social justice, equality, compassion in public and private institutions and stewardship of the limited common pool of resources. Professional organizations, including the NBME, ought to be vocal, passionate, and unified in their insistence on these moral commitments.”

SERVICE AWARDS

Upon a presentation by Nominating Committee member Dr. Linda Margraf, the Membership elected Dr. W. T. Williams, Jr. as an honorary member for life. Dr. First presented the Edithe J. Levit Distinguished Service Award to seven members concluding terms of service: Drs. Joseph Bachicha, Molly Cooke, N. Stacy Lankford, Linda Margraf, Graham McMahon, Walter Ricciardi, and English Willis. In recognition of the conclusion of Dr. Williams’ unusually long and valuable service, including 16 years on the Executive Board, Dr. First announced that the Executive Board had created a new honor, naming Dr. Williams as Chair Emeritus, in tribute to invaluable leadership during an unprecedented tenure of service.
2015 JOHN P. HUBBARD AWARD

Larry D. Gruppen, PhD was selected as the recipient of the 2015 John P. Hubbard Award. The award is given to individuals who have made outstanding contributions to the pursuit of excellence in the field of evaluation in medicine. John J. Norcini, PhD, chair of the 2015 Hubbard Award Committee, announced Dr. Gruppen’s selection at the Annual Meeting of the NBME Membership on May 4, 2015.

In presenting the award, Dr. Norcini stated: “In recognition of outstanding contributions to evaluation in medicine, I am pleased to announce that the recipient of the 2015 Hubbard Award is Larry Gruppen. Of consistent high quality, longevity, breadth and diversity, Dr. Gruppen’s research scholarship has illuminated the development and evaluation of expertise in medicine for decades. He is internationally recognized for his research on the evaluation of cognition, learning, and the development of expertise in medicine. His work has contributed new insights to a wide variety of areas such as the usefulness of adaptive testing, the influence of task format on self-assessment, accuracy of self-assessment, evaluation of self-regulated learning, evaluation of professionalism, evaluation of faculty development programs, assessment of competency-based education, validity of simulations, and assessment of clinical reasoning, to mention just a few. Dr. Gruppen’s most recent assessment work and publications have focused on competency frameworks, particularly, procedures for defining competencies and the special challenge of translating these into measurable outcomes. Many of the competencies describe learner performance in areas that have received little if any prior measurement attention.”

“Agreeing with an independent reviewer, I really cannot say enough about how much I respect Larry as a researcher and colleague. He really has had an impact on the research in medical education enterprise in ways that are both tangible and intangible. The quality and quantity of his research are the tangible parts. His congeniality, non-confrontational leadership style and selfless collaboration are the intangible parts. Together, I think the two parts make for a richly deserving Hubbard Award recipient.”

- Dr. John J. Norcini

Dr. Gruppen is professor, Department of Learning Health Sciences, at the University of Michigan Medical School.

The NBME established the Hubbard Award in 1983 in special tribute to the late John P. Hubbard, MD. Honoring Dr. Hubbard as a principal, guiding force of the NBME, this award acknowledges his creative and inspired leadership of the organization during his 25-year tenure as its chief executive. Dr. Gruppen deservedly joins the ranks of the distinguished individuals whom the NBME has honored over the years with this prestigious award. His selection as the recipient followed a call for nominations published widely in the spring of 2014. The 2015 Hubbard Award Committee, chaired by John J. Norcini, PhD, included as members Freda M. Bush, MD, Kevin W. Eva, PhD, Graham T. McMahon, MD, MMSc, Miguel A. Paniagua, MD, and Mark R. Raymond, PhD.
The Membership of the National Board of Medical Examiners and Members of Board Committees

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Professor & Director of Pathology Education
University of Alabama School of Medicine

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SUZANNE T. ANDERSON
Executive Vice President, CFO and CIO
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Member-at-Large
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President and Chief Executive Officer
American Association for Physician Leadership
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Associate Professor of Pediatrics
Director, Medical Student Education
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Federation of State Medical Boards
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Senior Partner, East Lakeland OB-GYN Associates
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School of Medicine

Test Committee Representative
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Professor of Pediatrics
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Test Committee Representative
LATHA CHANDRAN, MD, MPH
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Vice Dean for Undergraduate Medical Education
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University of California - San Francisco
School of Medicine

Vice-Chair
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Resident and Fellow Section
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“I was so pleased to learn that NBME had a Public Stakeholders group and that I was being asked to serve,” said Karen Feinstein, PhD, of the Jewish Healthcare Foundation and one of the new Public Stakeholders Committee members. “After all, the quality, safety and efficiency of our future medical care depend on the competence of the professionals in charge.”

Dr. Feinstein’s sentiments, along with her valuable input at her first meeting, echoed the reason for the creation of the Office of Public Engagement (OPE) and the Public Stakeholders Committee—to ensure that the voice of the public is included as the NBME strives to meet its mission to protect the health of the public through state of the art assessments. The second year of the OPE’s activities included a plan to refresh the membership of the Public Stakeholders Committee, which resulted in five new committee members joining to share the perspective of the public with the NBME. In addition to Dr. Feinstein, the committee welcomed Kamili Wilson of AARP Foundation; David Zahn of Signal Advertising; Pat Mastors of the Patient Voice Institute, and Kate Fick of Boise, Idaho.

USMLE Management Committee public member Pamela Blizzard notes that the Public Stakeholders meetings allow for research and discussion of topics from a policy perspective and from the perspective of how these issues may be assessed over time, as medicine changes. “Bringing the public’s perspective to the NBME is invaluable,” she said. “It is fascinating work with a fascinating group of experts!”

To help keep the perspective of the public front and center in the minds of staff, the quarterly OPE Speaker Series kicked off this past spring. Leadership from the Health Federation of Philadelphia spoke with staff about adverse childhood experiences (ACEs), their impact on health, and how physicians’ knowledge of ACEs can help improve outcomes with the right interventions. Leadership from the Penn Center for Community Health Workers presented data on how community health workers, acting as a bridge between patients and providers, had a positive impact on patient care, improved communication between patients and providers, and resulted in increased patient satisfaction. In the fall, Dr. David Casarett, author, physician, researcher, and tenured associate professor at the University of Pennsylvania’s Perelman School of Medicine, discussed patients’ experiences with end-of-life care and how the ability to resuscitate patients over time has created a need for more conversations about quality of life. Lastly, OPE and the Center for Innovation cohosted Whitney Zatkin from Flip the Clinic and Matthew Zachary from Stupid Cancer, who talked about ways patients can have more direct influence over their care.

Many of the stories told during this series echoed the issues that the Public Stakeholders Committee has worked to identify as the top issues currently facing the public that might be addressed within the current structure of the USMLE. The list to the right shows the top nine issues the committee agreed were the most important in our current healthcare climate. Next steps include mapping these issues back to the NBME’s assessments, including USMLE, to explore how these issues are being assessed.

In keeping with our focus on the voice of the public, NBME partnered with the Patient Voice Institute to support the creation of a video about the power of patient stories. At the video’s debut during the Leapfrog Group’s Living the Vision Annual Gala, Miguel Paniagua, MD, NBME’s medical advisor

<table>
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<th>Public Stakeholder Committee’s Important Issues List Ranked by Impact</th>
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<tbody>
<tr>
<td>1. Healthcare disparities</td>
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<td>2. End-of-life care</td>
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<td>3. Patients’ health goals</td>
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<td>4. Safety/quality</td>
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<td>5. Consumer as partner</td>
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<td>6. Team assessment</td>
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<td>7. Obesity</td>
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<td>8. Mental health</td>
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<td>9. Ethics</td>
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and a Patient Voice Institute board member, said, “The NBME recognizes the patient voice as a patient-centered driver of quality. And that’s why we’re proud to support the Patient Voice Institute in its mission to strengthen patients’ capacity and impact as improvement partners.”

Additionally, the NBME undertook an internal audit of committees to assess where more can be done to enhance the role of public members. A public member was added to the Finance Committee, and an additional public member joined the USMLE Management Committee in 2015. Social media connections continued to grow over 2015, and environmental scanning continued to be of benefit both to the OPE and to other groups in the organization seeking to ensure that the public’s perspective is taken into consideration on their projects. As the OPE heads into its third year, staff is pleased to continue making more connections between the public and the organization, as voiced by Pat Mastors, a new member of the Public Stakeholders Committee.

“As one of the new members of the NBME Public Stakeholder’s Committee, I was uncertain if my input would seem valuable to a 100-year-old organization. However, both the existing membership and the NBME executive team made us feel our input was not only welcome, but important to their plans. It’s good to know the NBME embraces what good patient care looks like to patients and families. I believe they’re on a path to be thoughtful stewards of their role in this regard for the next 100 years.”
The Clinical Skills Evaluation Collaboration (CSEC) is a partnership between the Educational Commission for Foreign Medical Graduates (ECFMG®) and the NBME and was established to develop and administer clinical skills assessments of healthcare professionals. Because they evaluate critical skills not measured by cognitive exams, clinical skills assessments are essential to safe and effective patient care. CSEC strives to protect the public by ensuring that healthcare professionals meet a standard of competence in clinical and interpersonal skills.

CSEC is an outstanding resource for members of the world’s academic health professions community. CSEC provides full-service development of standardized patient (SP)-based clinical skills examinations that test all aspects of the clinical encounter, including communication and interpersonal skills, patient examination, spoken English proficiency, and clinical reasoning. It also provides customized consultation and faculty development services to clients worldwide that have an interest in developing and administering their own clinical skills assessments. Consultative visits are one-day site visits to medical schools to evaluate the clinical skills teaching program. A report and recommendations follow this evaluation. Faculty development workshops (and others, such as training SPs) are offered to assist medical schools in creating and writing clinical case scenarios.

CSEC operates six US test centers in Atlanta, Chicago, Houston, Los Angeles, and Philadelphia, where there are two centers. The CSEC centers comprise the largest network of dedicated clinical skills assessment centers in the United States and one of the largest in the world. They are specialized facilities that are designed, built, and operated for the express purpose of administering SP-based exams. The CSEC centers are available for customized administration of clients’ clinical skills examination programs.

Since June 2004, CSEC has administered the Step 2 Clinical Skills (CS) component of the USMLE. Since inception, CSEC has administered nearly 400,000 examinations, comprising more than 4,600,000 SP encounters. Each year, CSEC administers examinations to over 35,000 examinees.

**2015 HIGHLIGHTS**

The clinical skills examination has been administered to medical students and graduates of US, Canadian, and international medical schools. In 2015, CSEC administered the Step 2 CS exam to more examinees than ever before; this was the first time more than 21,100 US medical students or graduates were tested in one year. This number exceeded the previous high of 20,265, set in 2014.

Multiple consultative site visits and faculty development workshops were done at a variety of medical schools, and the executive director made presentations at many medical schools during the year.

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PROGRAMS AND SERVICES

MEDICAL EDUCATION SERVICES FOR MEDICAL SCHOOLS, STUDENTS, RESIDENTS, AND RESIDENCY PROGRAMS

NBME provides assessment services globally to medical schools, students, residency programs, and residents. In 2015, over 550,000 assessments were provided through the subject examination program, NBME self-assessment services, customized assessment services, and new Web-based initiatives. This report describes these assessment programs and provides an overview of the NBME medical school liaison activities.

SUBJECT EXAMINATIONS

The NBME developed the medical school subject examination program during the early 1960s to meet the need for standardized examinations that could be used to measure achievement in the traditional basic and clinical science disciplines and to compare student performance with a national reference group of US and Canadian medical students. These examinations are available globally to medical schools and institutions with a legitimate interest in the education of physicians or other health professionals.

As shown in Exhibit A, 2015 saw continued modest growth in the use of subject examinations, with the total number of subject exams administered exceeding 245,000. Use of the basic science exams was slightly increased over 2014 to a volume of approximately 69,000. As with prior years, administrations of the exams in the clinical sciences increased and exceeded a volume of 176,000.

The NBME has provided subject examinations to international medical schools and institutions since 1997. In 2015, approximately 45,000 exams were administered internationally (see Exhibit B).

NBME EXAM REVIEW SERVICE

The NBME exam review service allows medical school faculty to review a representative form of a web-based subject examination online. During 2015, approximately 850 faculty members from 80 US medical schools
took advantage of this service and reviewed a subject examination form during proctored sessions at their school.

TESTING AT PROMETRIC TESTING CENTERS
For schools that have students serving on clinical rotations in a distributed hospital network or who are located at other sites, this service offers additional flexibility for a secure and standardized test administration. Medical schools use Prometric testing centers for the most frequently used subject examinations (comprehensive basic science, comprehensive clinical science, clinical neurology, family medicine modular, medicine, obstetrics & gynecology, pediatrics, psychiatry, and surgery). During 2015, over 27,000 examinees tested using this venue, an increase of approximately 4,000 administrations over 2014.

NEW SCORE SCALE FOR CLINICAL SCIENCE EXAMINATIONS
In August 2015, the NBME introduced a new score scale for clinical science subject examinations in clinical neurology, family medicine, medicine, obstetrics & gynecology, pediatrics, psychiatry, and surgery. Feedback on the previous scaled scores indicated that they could sometimes be misinterpreted as percent correct scores. To improve the interpretation and use of these assessments, a new score scale was devised to resemble the classic "percent correct" metric, which can be easily incorporated into grading schemes alongside other measures. This new equated percent correct score reflects an examinee’s mastery of the content domain calculated as a percentage of items in the total content domain that would be answered correctly based on an examinee’s proficiency level. Inherent in the new design, these scores are equated so that they can be compared across test administrations and examinees over time. In conjunction with introducing this new reporting method, psychometric rescaling was performed to account for recent trends in the performance of examinee populations. Since the introduction of this new score scale, feedback from faculty and administrators has been uniformly enthusiastic.

CUSTOMIZED ASSESSMENT SERVICES
The NBME introduced the customized assessment services (CAS) program in 2007 in response to the use of integrated preclinical curricula at many US medical schools. The CAS program allows faculty to build high-quality, standardized assessments targeted to local curricula using secure NBME item banks.

Faculty members log in to a secure website to create examination specifications to match curriculum. NBME automated test assembly processes then build a draft exam to those specifications with a 100% overage of “substitute” items for faculty to select from when reviewing the draft exam. Faculty users view the initial draft and replace items to further improve the fit to course content. Scoring feedback can then be customized, with feedback provided by content domain and/or user-designated categories. After the examination is finalized, it is made available to the school for web-based administration.
The CAS program continued to experience steady growth in the number and mix of schools using the service. In 2015, 93 medical schools subscribed to CAS, including 18 international schools and 2 consortia of schools. A total of 1,351 examinations were created and administered to over 74,000 examinees in 2015. This is an increase of 30% over 2014. The growth in the number of CAS administrations per year is shown in Exhibit C. The most common use continues to be for evaluation at the end of a discipline- or systems-based course or shorter instructional block. Other uses include end-of-year comprehensive assessments, basic science progress tests administered at set intervals, remedial exams, and tests to evaluate student learning in a case-based curriculum.

CUSTOMIZED TEST BATTERIES
As a result of the feedback from medical school faculty for the need to customize exam components, as well as have the flexibility to design or blend various content areas, the NBME began allowing schools to create their own customized test batteries in September 2015. This software capability enables faculty to create a test battery, comprising any combination of subject examinations and/or customized assessments, to be administered as a single examination session. In a battery, the component examinations are presented to examinees in the sequence that the school determined when configuring the test battery, including the option to add breaks between the test components.

NBME SELF-ASSESSMENT SERVICES

The NBME offers a variety of web-based self-assessments to medical students and graduates. The comprehensive self-assessment series helps students evaluate their readiness to take the USMLE Step 1, Step 2 Clinical Knowledge (CK), and Step 3 examinations. This series includes comprehensive basic science, comprehensive clinical science, and comprehensive clinical medicine.

NBME research has demonstrated that under certain circumstances there is a moderate relationship between performance on the self-assessments and the associated Step 1 or Step 2 CK, with some variation in predictive accuracy across test administration conditions.

The clinical science mastery series includes self-assessments in medicine, clinical neurology, obstetrics & gynecology, pediatrics, psychiatry, and surgery. These assessments allow students to assess their knowledge of the clinical sciences covered during a clerkship or medical education course. They are built to the same content specifications as the NBME clinical science subject examinations.

Exhibit D illustrates the total number of self-assessments administered for the past five years. In 2015, 234,835 self-assessments were taken, including 115,135 for the comprehensive basic science, along with 45,741 for the comprehensive clinical science and 3,238 for the comprehensive clinical medicine. There were 70,721 assessments administered for the clinical science mastery series.

RESEARCH

ACTIVITIES

MEDICAL SCHOOL LIAISON ACTIVITIES
The medical school liaison program provides a designated contact between the NBME and individual medical schools, students, and residency programs. Activities have focused on communication with stakeholders through presentations, exhibit booths, social media, surveys, and web-based conferences as well as attendance at national and regional meetings of the Association of American Medical Colleges (AAMC), academic societies, and medical student organizations.

In addition to presentations and manuscripts that are reported in the NBME Annual Report, specific outreach activities in 2015 included:

- Webcasts with schools interested in learning about the new score scale changes with the clinical science examinations;
- Orientation webcasts for institutions interested in learning about the activities involved in preparing for and administering an NBME web-based examination and visits with medical schools new to NBME services;
- Exhibits highlighting NBME services at conferences, including American Medical Student Association, Student National Medical Association, AAMC, International Association of Medical Science Educators, and Association of Medical Educators in Europe;
- Focus groups to obtain feedback on potential new initiatives as well as to identify underlying needs related to assessments; and
- Surveys to various constituencies about the use of current and new services.

ADVISORY COMMITTEE FOR MEDICAL SCHOOL PROGRAMS
The Advisory Committee for Medical School Programs systematically samples views from various segments of the medical education community. The committee meets once a year and participates in webcasts as needed to help guide the direction of various NBME medical education services and program enhancements. In 2015, a task force was established, consisting of NBME staff and members of the Advisory Committee, to assist with the development of materials for students that will familiarize them with NBME products and services.

NBME UPDATES BULLETIN
In March 2014, NBME implemented the NBME Updates Bulletin, an electronic communication provided to the medical education community. This bulletin is distributed weekly to executive chief proctors and medical school liaison representatives for circulation to faculty and staff at medical schools. It is intended to provide schools with general announcements related to enhancements or changes to NBME and USMLE services, as well as to highlight new initiatives. The release of this publication coincided with the beginning of the NBME’s centennial celebration. There are more than 1,300 subscribers, including domestic and international schools along with NBME committee members and staff.

FACULTY EDUCATIONAL RESOURCES
The NBME offers workshops to faculty to help enhance the quality of test items for use in examinations and programs at the medical school. NBME plans and facilitates a workshop to meet the medical school’s individual needs. The NBME also provides guidance in other test development areas including: interpretation of item analysis results, examination planning and blueprinting, setting pass/fail standards, and organizing a group to write items. More than 15 workshops were offered at medical schools in 2015.

The NBME provides an online item-writing resource, Writing Multiple-Choice Questions: An Introductory Tutorial. It is a self-paced interactive tutorial that offers a foundation for writing multiple-choice questions for examinations and is available at www.nbme.org.
ADVISORY COMMITTEE FOR MEDICAL SCHOOL PROGRAMS

Chair
PAUL R. G. CUNNINGHAM, MD
The Brody School of Medicine at East Carolina University

Association of American Medical Colleges
PRIYANKA CHILAKAMARRI
University of Vermont College of Medicine

American Medical Association
TRICIA K. CRISP, MD
American Medical Student Association

American Medical Student Association
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American Medical Student Association
Washington, DC

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Eastern Virginia Medical School

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National Board of Medical Examiners

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American Medical Association
ROBINNA G. LORENZ, MD, PHD
University of Alabama School of Medicine

American Medical Association
DAVID E. SWEE, MD
Rutgers, Robert Wood Johnson Medical School

American Medical Association
ANDREW ZUREICK
University of Michigan Medical School
SERVICES FOR HEALTH PROFESSION ORGANIZATIONS

NBME’s mission, to protect the health of the public through state of the art assessment of health professionals, encompasses all health professionals throughout the continuum of education, training, and practice. NBME works with a variety of health profession organizations, including medical specialty boards and societies as well as allied health professional organizations, to meet their unique assessment needs. While individual assessment needs may vary, the organizations with whom we work share similar missions. Each organization brings its unique perspectives on healthcare needs and provides deep understanding and content expertise in their particular fields. Working together, our organizations achieve mutual goals through combined expertise and collaboration. Many organizations that work with NBME are listed on our website.

NBME recently worked with one organization to transition its paper in-training examination to web-based delivery. After successful web-based administration this year to over 26,000 residents during a two-week timeframe, program directors responded positively about the overall testing experience and score reporting timeline. Other initiatives include working with organizations to support applications for certification program accreditation or reaccreditation from the American National Standards Institute.

WORKING WITH NBME

NBME is committed to collaborating with individual health profession organizations to understand and meet their unique assessment needs. The figure to the right shows the number and variety of examinations that NBME worked on during the past year.

During 2015, NBME worked with 24 health profession organizations to administer over 70 examinations to more than 70,000 examinees across the continuum of education, training, and practice.

To learn more, visit our website.
NBME brings cutting-edge know-how to every aspect of assessment to design, develop, and deliver customized examination programs. We also provide comprehensive educational, consultative, and research services. NBME assists health profession organizations in all phases of the examination process and offers a variety of internet-based services to support examination development, administration, and scoring.

| EXAMINATION DEVELOPMENT | Conduct practice analyses  
|                         | Develop content specification and examination blueprints  
|                         | Select appropriate examination methods |
| ITEM DEVELOPMENT | Provide item-writing workshops  
|                    | Edit materials for style and clarity  
|                    | Integrate complex multimedia in test questions  
|                    | Facilitate item and form review meetings |
| EXAMINATION PUBLISHING | Compose examination forms  
|                          | Publish examinations for computer administration  
|                          | Prepare tutorials and practice examinations |
| EXAMINATION ADMINISTRATION | Prepare candidate brochures and proctor manuals  
|                                             | Assist in identifying test sites  
|                                             | Implement requested test accommodations  
|                                             | Monitor and assist with test day issues |
| PSYCHOMETRIC SERVICES | Review item statistics  
|                         | Validate answer keys  
|                         | Score examinations  
|                         | Equate test scores  
|                         | Facilitate pass/fail standard setting  
|                         | Prepare and distribute score reports |
| SPECIAL SERVICES | Create and administer surveys  
|                         | Collaborate on research studies and other initiatives  
|                         | Consult on strategic evolution and future plans  
|                         | Prepare for accreditation reviews (ANSI, NCCA)  
|                         | Present seminars on selected topics |
ITEM-WRITING EDUCATION

Good examination items are essential for high-quality assessment. NBME provides item-writing workshops and seminars to train item writers from a wide variety of healthcare disciplines. NBME also offers free, online item-writing resources, including an item-writing manual, *Constructing Written Test Questions for the Basic and Clinical Sciences*, and an interactive item-writing tutorial, *Writing Multiple-Choice Questions: An Introductory Tutorial*. These materials complement more in-depth item-writing workshops and seminars. The online tutorial is self-paced and interactive and provides a foundation for writing quality multiple-choice questions. It introduces some of the main principles of item writing to content experts who write questions for examinations in the field of medicine and across the range of health professions.

ITEM FORMATS

NBME professionals are experts in using advanced multimedia and innovative item formats to meet unique assessment needs while ensuring the highest psychometric standards. Sophisticated multimedia capability enables NBME to publish advanced multiple-choice questions with numerous associated video clips as well as explorable formats for viewing multiple slices/views of diagnostic images (e.g., MRI/CT). Items may contain several associated videos or combinations of videos and static images. NBME’s proprietary computer-based testing software includes customized display features to launch and replay videos, as well as contrast adjustment and zoom features that can be used with images and videos.

ENHANCED EXAMINATION DELIVERY SOFTWARE

NBME is constantly working toward improving the examination experience for examinees. During 2015, NBME pilot tested some enhancements to its computer-based examination delivery software that will provide all examinees with three new user-adjustable display features, including reverse color (color inversion), text magnification, and image magnification. NBME will be introducing these standard features to all computer-based examinations in the future. The computer-based examination delivery software continues to include a very high level of security as well as publication flexibility. Examination information is encrypted, and proctors are not able to access any examination materials in unencrypted form. Individual test items are accessible only in unencrypted form for the brief moment when they appear on screen.
TEST DELIVERY PLATFORMS

NBME works with health profession organizations to administer examinations globally using a variety of delivery methods. In high-stakes examination programs, security is always a priority, regardless of the delivery platform. Low-stakes “take home” examinations, such as self-assessments, may be delivered on demand via the internet.

RESEARCH AND DEVELOPMENT

In addition to its own active research and development initiatives, NBME collaborates with health profession organizations to investigate programmatic research questions or conduct focused experimentation. Initial directions or approaches are often inspired by ongoing research at NBME.

Based on careful review and consultation to define an organization’s needs and expectations, NBME research specialists design a study and associated timeline for data collection and analysis. Findings and recommendations are shared for review and discussion, and staff members often participate in joint presentations at conferences.

NBME is actively collaborating with the American Board of Internal Medicine and a variety of physician in-training programs to conduct longitudinal examination performance and validation research.
LICENSURE PROGRAMS

NBME’s licensure programs include products and services for the NBME/National Board of Veterinary Medical Examiners (NBVME) collaboration, Puerto Rico Board of Medical Licensure and Discipline, and the NBME/Federation of State Medical Boards (FSMB) collaborations.

THE NORTH AMERICAN VETERINARY LICENSING EXAMINATION (NAVLE)

The NAVLE, cosponsored and co-owned by the NBVME and the NBME, is a requirement for licensure to practice veterinary medicine in all licensing jurisdictions in North America. From 1998 until 2014, NAVLE development was governed by a series of contracts between the NBVME and the NBME. In February 2014, the NBVME entered into a collaborative relationship with the NBME with regard to the NAVLE. The NBVME and the NBME have a shared mission of protecting the health of the public. This shared mission has made NBVME an ideal candidate for collaboration with the NBME on the NAVLE program and on other areas of assessment within the veterinary community.

Under the collaboration, the NAVLE is overseen by the Collaboration for Veterinary Assessments (CVA) Governance Committee. The CVA comprises members appointed by the NBVME and the NBME. The purpose of the collaboration is to increase efficiency and facilitate NAVLE enhancements, drawing on the expertise of both organizations. The first major activity under the collaboration is the NAVLE practice analysis. The practice analysis is discussed in further detail below.

The following summary includes highlights of significant collaboration activities in 2015, information on committee structure and activities, and examinee performance.

NAVLE ADMINISTRATION AND MINIMUM PASSING SCORES

NAVLE is available during a four-week testing window in November-December and a two-week window in April. It is administered at more than 360 US/Canadian Prometric test centers in North America and approximately 100 international Prometric centers. The NAVLE is offered in English to examinees applying for licensure in the United States and is offered in both English and French to examinees applying for licensure in Canada. An additional test center is available on a limited basis during the fall NAVLE administration to students at the Atlantic Veterinary College at the University of Prince Edward Island.

A pass or fail result is provided for each examinee. Passing results are based on achievement of specified levels of proficiency established prior to administration of examinations. Statistical procedures are employed to ensure that the level of proficiency required to pass remains uniform across forms of the examination.

PRACTICE ANALYSIS

The NBVME’s interest in rethinking the content dimensions reflected in NAVLE, including information that reflects veterinarian competencies, makes the completion of a practice analysis a high priority. NBME/NBVME staff and senior leaders have sought content experts in the field of veterinary medicine during early 2015 to design the practice analysis survey instrument. A pilot was conducted in late 2015 to gather feedback on the instrument. The response rate was only about 10%. The project is currently on schedule to have the survey administered and the results analyzed by mid-2016. A new blueprint will be developed based on the results, and content should be recoded to reflect changes in the blueprint by the end of 2016. Test design/content changes will appear in the November 2017 examination.
### 2012-2015 NAVLE ADMINISTRATIONS

#### NUMBER TESTED AND PERCENT PASSING

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># TESTED</td>
<td>% PASSING</td>
<td># TESTED</td>
</tr>
<tr>
<td>Criterion*</td>
<td>3,665</td>
<td>91.8%</td>
<td>3,942</td>
</tr>
<tr>
<td>Non-criterion**</td>
<td>651</td>
<td>60.2%</td>
<td>709</td>
</tr>
<tr>
<td>Non-accredited†</td>
<td>640</td>
<td>37.5%</td>
<td>703</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>4,956</td>
<td>80.7%</td>
<td>5,354</td>
</tr>
</tbody>
</table>

* **Criterion group:** senior students of accredited veterinary schools who took the NAVLE for the first time under standard testing conditions.

** **Non-criterion group:** senior students of accredited veterinary schools who had previously taken the NAVLE or took the NAVLE with test accommodations or graduate veterinarians from accredited schools.

† **Non-accredited group:** graduates or senior students of foreign veterinary schools that are not accredited by the American Veterinary Medical Association’s Council on Education.

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### COLLABORATION FOR VETERINARY ASSESSMENTS GOVERNANCE COMMITTEE

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  Woodburn Veterinary Clinic
  Woodburn, Oregon

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  Merck Animal Health
  Brookston, Indiana

- **HEATHER CASE, DVM, MPH, DACVPM, CAE**
  National Board of Veterinary Medical Examiners

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#### 2015 NBME ANNUAL REPORT
PUERTO RICO MEDICAL LICENSING EXAMINATION

The laws of the Commonwealth of Puerto Rico require that the Puerto Rico Board of Medical Licensure and Discipline provide an alternate pathway to licensure (other than USMLE) for Puerto Rican medical students studying abroad or at non-LCME-accredited medical schools on the island. At the request of the Puerto Rico medical board, and with the endorsement of the FSMB, the NBME has prepared a Spanish and English language examination that meets Commonwealth requirements for this alternative pathway to licensure. The Puerto Rico Medical Licensing Examination Program contains both a basic and a clinical science exam and is administered biannually in paper-and-pencil format under secure proctored conditions in San Juan, Puerto Rico. Each examination consists of 200 multiple-choice questions. Since inception in 2009, more than 2,600 candidates have taken the basic science or clinical science examination. In 2015, 300 examinees completed one of the two examinations; 207 examinees took the basic science examination, and 93 examinees took the clinical science examination.

POST-LICENSESRE ASSESSMENT SERVICES

The Post-Licensure Assessment System (PLAS) is a joint activity of the NBME and the FSMB. The PLAS was developed to assist medical licensing authorities in assessing physicians who have already been licensed. Services include the Special Purpose Examination (SPEX®) and resources for clinical competence assessment.

SPECIAL PURPOSE EXAMINATION

The SPEX, administered by computer at Prometric testing centers, is an objective, standardized, cognitive examination of current knowledge requisite for the general, undifferentiated practice of medicine. The examination is intended for physicians who currently hold, or who have previously held, a valid, unrestricted license to practice medicine in a US or Canadian jurisdiction.

Exam volumes for SPEX peaked in 1996, when 961 physicians took the exam. In 2015, 173 physicians took SPEX. Despite staff efforts over the last few years to increase awareness of the SPEX program among potential state board users, there has been no increase in usage. In 2014, the PLAS Governing Committee passed a motion directing staff to develop a proposal for replacing SPEX in the next several years. Staff is currently investigating alternatives.

RESOURCES FOR CLINICAL COMPETENCE ASSESSMENT

NBME and FSMB collaborate to develop and maintain a toolbox of assessment services made available to third-party collaborators. These third-party collaborators have the capability to provide localized, performance-based assessments in conjunction with the standardized assessment tools developed through the PLAS program. Collaboration with local programs allows for a more comprehensive assessment that can be tailored to the individual physician’s practice and enables the physician to obtain assessment at a national center that is more geographically convenient.

The assessments available through the PLAS program include NBME clinical subject examinations, practice-relevant content forms of CCS cases, and modular multiple-choice examinations in ambulatory care, hospital care, ethics and communication, women’s healthcare, and pharmacotherapeutics. In 2015, 165 physicians received assessments through third-party collaborator sites. Contracts are in place to provide a PLAS battery of assessments to the PACE program at the University of California, San Diego; Albany Medical College; the University of Florida; Texas A&M University; the Center for Personalized Education for Physicians (CPEP); Drexel University College of Medicine; and LifeGuard, a subsidiary program of the Pennsylvania Medical Society. CPEP opened a second location in Raleigh, NC, in summer 2014; its original location is in Denver, CO.
PLAS GOVERNING COMMITTEE

Chair
HAROLD J. SAUER, MD
Yale School of Medicine

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Federation of State Medical Boards

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National Board of Medical Examiners

GREGORY B. SNYDER, MD
Minnesota State Medical Board

PATRICIA N. WHITLEY-WILLIAMS, MD
Rutgers, Robert Wood Johnson Medical School

PLAS PROGRAM COMMITTEE

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Well Sense Health Plan
Manchester, New Hampshire

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at Dallas, Southwestern Medical School

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School of Medicine

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Bangor, Maine

SCOTT STEINGARD, DO
Midwestern University, Arizona College of Osteopathic Medicine
The USMLE, cosponsored and co-owned by the NBME and the FSMB, is the largest NBME examination program, accounting for more than 75% of the NBME’s programmatic activity. It is a three-Step examination for medical licensure in the United States. USMLE assesses a physician’s ability to apply knowledge, concepts, and principles, and to demonstrate fundamental patient-centered skills that are important in health and disease and that constitute the basis of safe and effective patient care. The USMLE program supports medical licensing authorities in the United States through its leadership in the development, delivery, and continual improvement of high-quality assessments across the continuum of physicians’ preparation for practice.

The following summary includes highlights of significant activities in 2015; additional information on research initiatives is provided elsewhere in the 2015 Annual Report.

USMLE ADMINISTRATION AND MINIMUM PASSING SCORES

Continuous test administration of the USMLE is available to all examinees. For Step 1, Step 2 Clinical Knowledge (CK), and Step 3, which are the computer-based testing (CBT) components of the USMLE program, test scheduling and delivery are provided by Prometric. These CBT examinations are currently administered at more than 350 US/Canadian Prometric test centers and approximately 100 international Prometric test centers. Additional test centers are located at five medical schools in the United States. The Step 1 and Step 2 CK examinations are administered worldwide; the Step 3 examination is administered in the United States only.

Step 2 Clinical Skills (CS) is a standardized patient examination. Scheduling and test delivery for Step 2 CS are provided by the Clinical Skills Evaluation Collaboration (CSEC). See page 25 for more details about CSEC.

For each Step examination, a pass or fail result is provided as a USMLE program recommendation for each examinee. Passing results are based on achievement of specified levels of proficiency established prior to administration of examinations. Statistical procedures are employed to ensure that for each Step, the level of proficiency required to pass remains uniform across forms of the examination. As noted in the USMLE Bulletin of Information and on the USMLE website, the performance level required to meet the recommended level of proficiency is reviewed periodically and may be adjusted without prior notice. Notice of adjustments is posted on the internet at www.usmle.org. Details on the performance of examinees taking USMLE in the past two years are provided in the following tables.

STANDARD-SETTING ACTIVITIES

Every three to four years the USMLE Management Committee is asked to complete an in-depth review of standards. At its December 2015 meeting, the Management Committee conducted such a review for USMLE Step 3. During the meeting, the Management Committee considered information from multiple sources, including: 1) results of content-based standard-setting exercises conducted in 2015 with three independent groups of physicians; 2) results of surveys of various groups (e.g., state licensing representatives, medical school faculty, samples of examinees) concerning the appropriateness of current pass/fail standards for Step examinations; 3) trends in examinee performance; and 4) score precision and its effect on the pass/fail decision.

As a result of its review, the Management Committee decided to raise the three-digit score recommended to pass Step 3 from 190 to 196. The new minimum passing score was applied to Step 3 examinations for which the first day of testing was on or after January 1, 2016.
### 2014-2015 STEP 1 ADMINISTRATIONS
#### NUMBER TESTED AND PERCENT PASSING

<table>
<thead>
<tr>
<th></th>
<th><strong>2014</strong></th>
<th></th>
<th><strong>2015</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># TESTED</td>
<td>% PASSING</td>
<td># TESTED</td>
<td>% PASSING</td>
</tr>
<tr>
<td>Examinees from US/Canadian Schools that Grant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MD Degree</strong></td>
<td>20,394</td>
<td>95%</td>
<td>21,111</td>
<td>94%</td>
</tr>
<tr>
<td>1st Takers</td>
<td>19,582</td>
<td>96%</td>
<td>20,213</td>
<td>96%</td>
</tr>
<tr>
<td>Repeaters**</td>
<td>812</td>
<td>68%</td>
<td>898</td>
<td>68%</td>
</tr>
<tr>
<td><strong>DO Degree</strong></td>
<td>2,846</td>
<td>93%</td>
<td>3,222</td>
<td>93%</td>
</tr>
<tr>
<td>1st Takers</td>
<td>2,810</td>
<td>93%</td>
<td>3,185</td>
<td>93%</td>
</tr>
<tr>
<td>Repeaters**</td>
<td>36</td>
<td>69%</td>
<td>37</td>
<td>65%</td>
</tr>
<tr>
<td><strong>TOTAL US/CANADIAN</strong></td>
<td>23,240</td>
<td>95%</td>
<td>24,333</td>
<td>94%</td>
</tr>
<tr>
<td>Examinees from Non-US/Canadian Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Takers</td>
<td>15,149</td>
<td>78%</td>
<td>15,030</td>
<td>78%</td>
</tr>
<tr>
<td>Repeaters**</td>
<td>2,889</td>
<td>38%</td>
<td>2,719</td>
<td>38%</td>
</tr>
<tr>
<td><strong>TOTAL NON-US/CANADIAN</strong></td>
<td>18,038</td>
<td>72%</td>
<td>17,749</td>
<td>72%</td>
</tr>
</tbody>
</table>

* Represents data for examinees tested in 2015 and reported through February 3, 2016.
** Repeaters represents examinations given, not number of examinees.

### 2013-2015* STEP 2 CK ADMINISTRATIONS
#### NUMBER TESTED AND PERCENT PASSING

<table>
<thead>
<tr>
<th></th>
<th><strong>2013-2014</strong></th>
<th></th>
<th><strong>2014-2015</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># TESTED</td>
<td>% PASSING</td>
<td># TESTED</td>
<td>% PASSING</td>
</tr>
<tr>
<td>Examinees from US/Canadian Schools that Grant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MD Degree</strong></td>
<td>19,819</td>
<td>96%</td>
<td>21,174</td>
<td>94%</td>
</tr>
<tr>
<td>1st Takers</td>
<td>19,124</td>
<td>97%</td>
<td>20,120</td>
<td>96%</td>
</tr>
<tr>
<td>Repeaters**</td>
<td>695</td>
<td>70%</td>
<td>1,054</td>
<td>65%</td>
</tr>
<tr>
<td><strong>DO Degree</strong></td>
<td>1,908</td>
<td>94%</td>
<td>2,143</td>
<td>92%</td>
</tr>
<tr>
<td>1st Takers</td>
<td>1,886</td>
<td>95%</td>
<td>2,104</td>
<td>92%</td>
</tr>
<tr>
<td>Repeaters**</td>
<td>22</td>
<td>68%</td>
<td>39</td>
<td>67%</td>
</tr>
<tr>
<td><strong>TOTAL US/CANADIAN</strong></td>
<td>21,727</td>
<td>96%</td>
<td>23,317</td>
<td>94%</td>
</tr>
<tr>
<td>Examinees from Non-US/Canadian Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Takers</td>
<td>12,713</td>
<td>80%</td>
<td>12,247</td>
<td>75%</td>
</tr>
<tr>
<td>Repeaters**</td>
<td>2,164</td>
<td>47%</td>
<td>2,409</td>
<td>46%</td>
</tr>
<tr>
<td><strong>TOTAL NON-US/CANADIAN</strong></td>
<td>14,877</td>
<td>75%</td>
<td>14,656</td>
<td>71%</td>
</tr>
</tbody>
</table>

* Data for Step 2 CK are provided for examinees tested during the period of July 1 to June 30.
** Repeaters represents examinations given, not number of examinees.
## 2013-2015 Step 2 CS Administrations
### Number Tested and Percent Passing

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># TESTED</td>
<td>% PASSING</td>
<td># TESTED</td>
</tr>
<tr>
<td><strong>Examinees from US/Canadian Schools that Grant MD Degree</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Takers</td>
<td>19,745</td>
<td>95%</td>
<td>20,190</td>
</tr>
<tr>
<td>Repeaters**</td>
<td>18,874</td>
<td>96%</td>
<td>19,373</td>
</tr>
<tr>
<td></td>
<td>871</td>
<td>84%</td>
<td>817</td>
</tr>
<tr>
<td><strong>DO Degree</strong></td>
<td>56</td>
<td>93%</td>
<td>62</td>
</tr>
<tr>
<td>1st Takers</td>
<td>52</td>
<td>92%</td>
<td>61</td>
</tr>
<tr>
<td>Repeaters**</td>
<td>4</td>
<td>1†</td>
<td>1†</td>
</tr>
<tr>
<td><strong>TOTAL US/CANADIAN</strong></td>
<td>19,801</td>
<td>95%</td>
<td>20,252</td>
</tr>
<tr>
<td><strong>Examinees from Non-US/Canadian Schools</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Takers</td>
<td>11,822</td>
<td>74%</td>
<td>11,782</td>
</tr>
<tr>
<td>Repeaters**</td>
<td>3,041</td>
<td>66%</td>
<td>2,760</td>
</tr>
<tr>
<td><strong>TOTAL NON-US/CANADIAN</strong></td>
<td>14,863</td>
<td>73%</td>
<td>14,542</td>
</tr>
</tbody>
</table>

* Data for Step 2 CK are provided for examinees tested during the period of July 1 to June 30.  
** Repeaters represents examinations given, not number of examinees.  
† Performance data not reported for categories containing fewer than 5 examinees.

### 2013-2015 Step 2 CS Administrations*
**First-Taker Passing Rates** For Subcomponents: Integrated Clinical Encounter (ICE), Communication and Interpersonal Skills (CIS), Spoken English Proficiency (SEP)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ICE</td>
<td>CIS</td>
</tr>
<tr>
<td><strong>All US/Canadian Schools</strong></td>
<td>97</td>
<td>98</td>
</tr>
<tr>
<td><strong>All non-US/Canadian Schools</strong></td>
<td>81</td>
<td>89</td>
</tr>
</tbody>
</table>

* Data for Step 2 CS are provided for examinees tested during the period of July 1 to June 30.  
** ‘>99’ is used to signify those passing rates that would otherwise round up to 100%.
## 2014-2015 STEP 3 ADMINISTRATIONS
### NUMBER TESTED AND PERCENT PASSING

<table>
<thead>
<tr>
<th>Examinees from US/Canadian Schools that Grant</th>
<th>2014</th>
<th>2015*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># TESTED</td>
<td>% PASSING</td>
</tr>
<tr>
<td>MD Degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Takers</td>
<td>21,224</td>
<td>96%</td>
</tr>
<tr>
<td>Repeaters**</td>
<td>20,470</td>
<td>97%</td>
</tr>
<tr>
<td></td>
<td>754</td>
<td>73%</td>
</tr>
<tr>
<td>DO Degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Takers</td>
<td>27</td>
<td>100%</td>
</tr>
<tr>
<td>Repeaters**</td>
<td>27</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>TOTAL US/CANADIAN</td>
<td>21,251</td>
<td>96%</td>
</tr>
</tbody>
</table>

| Examinees from Non-US/Canadian Schools        |        |         |        |         |
|                                               | # TESTED | % PASSING | # TESTED | % PASSING |
| 1st Takers                                    | 9,983   | 87%     | 7,637   | 89%     |
| Repeaters**                                   | 1,781   | 58%     | 1,344   | 57%     |
|TOTAL NON-US/CANADIAN                          | 11,764  | 82%     | 8,981   | 85%     |

* Represents data for examinees tested in 2015 and reported through February 3, 2016.
** Repeaters represents examinations given, not number of examinees.
† Performance data not reported for categories containing fewer than 5 examinees.
N/A Not applicable.
The high quality of the USMLE program is in large part due to the enormous effort of hundreds of volunteers who serve on USMLE committees. In addition to participation in test material development activities, medical school faculty members and practicing physicians serve on committees charged with item review, content-based standard-setting activities, test blueprint construction, form review, overall examination design and policy, and resolution of issues associated with examination security. Select committees developing test materials for the USMLE also provide guidance for staff in the development of the NBME subject examinations. The work of our test committee members in meeting the extraordinary standards of the national licensure examination program exemplifies the medical profession’s tradition of public service.

The USMLE program devotes considerable effort to ensuring that test committee members adequately represent the content areas required for medical practice as well as the realities of clinical practice. As a result, USMLE test committee members constitute a "national faculty of medicine" drawn from medical schools and clinical practice settings across the United States.

In 2015, 43% of committee members were women. Minority racial/ethnic groups made up 19% of members. Sixty-five percent held a medical degree; 27% both a medical degree and another advanced degree; and 7% the PhD degree alone. A small number held degrees in nursing or other related fields. In terms of geographic distribution, 34% were from the south, 24% from the midwest, 29% from the northeast, and 13% from the west. Ten percent of the committee members were either current or former members of state licensing boards. Over the last 10 years, virtually all LCME-accredited medical schools in the United States have been represented on committees supporting USMLE.

It is with great pride that we list the names of the biomedical scientists, educators, and clinicians who served on USMLE committees in 2015. The NBME, and the profession and public served by the USMLE, are indebted to these volunteers who contribute their expertise and energy to the creation of a national licensing examination system that is without equal.

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"Without a doubt, this has been one of the most professionally satisfying experiences of my career. It has all the "right stuff" - working with intelligent and motivated faculty and NBME staff, being well supported from a technical and administrative perspective, and having everyone focused on the common goal of high-quality assessment to protect the public. Sign me up again!"

- Michael A. Barone, MD, MPH
Johns Hopkins University School of Medicine

continued on next page
“This is an amazing opportunity to contribute to specific tests in your field, while at the same time meeting motivated, intelligent, like-minded educators. If you have the opportunity to do this, you should definitely do it.”

- Robin Patel, MD
  Mayo Medical School
“Working on a USMLE test committee has been utterly gratifying. I have learned a great deal from my colleagues on the test committee from around the country and improved my own skills in item and case development. Each meeting is well planned and expectations of committee members are clearly described. Through my work on USMLE test committees, I have gained important skills and built long-lasting friendships.”

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continued on next page
“Being a member of a USMLE test committee gives me the opportunity to make an important contribution to the health of the public by ensuring that only knowledgeable physicians are licensed. I am proud to be a member of the USMLE committees because I know I am making a difference.”

- Paula Termuhlen, MD
  University of Minnesota
  School of Medicine, Duluth
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Volunteering for the NBME is truly a labor of love. The work we do for the NBME is important and incredibly valuable in setting the standards for our profession. Connections and friendships made there are meaningful and lasting.”

- Alex J Mechaber, MD
  University of Miami
  Leonard M. Miller School of Medicine

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School of Population and Broad Health

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Pennsylvania State University College of Medicine

Student and Faculty Member Highlight

Volunteering for the NBME is truly a labor of love. The work we do for the NBME is important and incredibly valuable in setting the standards for our profession. Connections and friendships made there are meaningful and lasting.”

- Alex J Mechaber, MD
  University of Miami
  Leonard M. Miller School of Medicine
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<td>Pennsylvania State University College of Medicine</td>
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<td>Cooper Medical School of Rowan University</td>
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<td>University of Pittsburgh School of Medicine</td>
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<td>Marshall University Joan C. Edwards School of Medicine</td>
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<td>Stony Brook University School of Medicine</td>
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<td>J. MARC MAJURE, MD</td>
<td>University of Mississippi School of Medicine</td>
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<td>Case Western Reserve University School of Medicine</td>
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<td>Mayo Medical School</td>
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<td>University of South Dakota Sanford School of Medicine</td>
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When I was asked to join a USMLE test committee, I did not know that it would be one of the most rewarding professional activities that I could undertake. The NBME staff and the volunteer peer physicians are exceptionally professional, intelligent, and kind. I have felt fortunate to be able to contribute to the assessment of health professionals and my time has been well spent.

- Yasyn Lee, MD
The Medical Associates Clinic, PC

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University of Virginia School of Medicine

“Working on a USMLE test committee is a terrific professional development opportunity for any medical educator. You will learn a lot about test writing and test metrics from a highly talented and collegial staff. The content review in writing and reviewing questions is the best CME activity I do all year. Committee participation is a great addition to a clinician-educator’s CV. And most importantly you will work with, and get to know, incredible colleagues from around the country who share your passion for medical education.”

- Alison Whelan, MD
Washington University in St. Louis
School of Medicine
USMLE STEP 3 STANDARD SETTING

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“Working on a USMLE test committee requires time, effort, and a total commitment to excellence – but the feeling of giving back to the health professions is a huge reward!”

- Peter G. Anderson, DVM, PhD
University of Alabama School of Medicine
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**USMLE TEST COMMITTEE MEMBERS PRACTICE AND TEACH IN EVERY REGION OF THE UNITED STATES.**

**IN 2015, COMMITTEE MEMBERS CAME FROM ALMOST EVERY STATE.**

“Participating in question writing, editing and test evaluation is an incredibly rewarding experience academically, professionally and socially. It is a lot of hard work but well worth the effort.”

- David Head, MD
  University of Utah School of Medicine

In the map above, the number of committee members residing in each state is indicated by color gradation (no shading represents no committee members; darkest shading represents the largest number of committee members). Included in this count are members of the USMLE Management Committee, USMLE test material development committees and task forces, and USMLE interdisciplinary review committees.
INTERNATIONAL PROGRAMS

The NBME protects the health of the public worldwide through assessment. The goal of International Programs is to foster an understanding in many places in the world of the value of assessment to measure knowledge and to evaluate educational programs. The NBME approaches this goal in various ways, through its products such as subject examinations and self-assessments, creation of examinations such as the International Foundations of Medicine exams, consulting services, and collaborations with international organizations. Quality, valid, and reliable assessment is a universal goal for healthcare professionals. Work in the international arena is most rewarding because of the collaborations and the relationships we build with colleagues around the world.

MEDICAL SCHOOL PROGRESS TESTING

INTERNATIONAL FOUNDATIONS OF MEDICINE (IFOM) EXAMINATION

Beginning in 2005, NBME staff had numerous opportunities to talk with faculty members and students in medical schools across Europe. Faculty members expressed a need for a measurement tool that would allow them to evaluate applicants trained in other schools or other countries. Similarly, students spoke about their need for an internationally accepted certificate they could include in their portfolios when applying for residency programs, rotations, or exchange opportunities in other institutions and/or countries.

The NBME brought together a group of faculty members and practicing physicians from various countries to determine a core set of clinical knowledge that all medical students and graduates should possess. This core was vetted with individuals and groups from various countries to determine if it was suitable content for students and physicians in their regions. Once NBME staff was reasonably sure that it represented a list of appropriate core concepts, staff worked with international faculty to design a blueprint for an assessment tool that would meet the needs articulated by both faculty and students.

The NBME team invited a group of international faculty to participate on a committee with a few US faculty members to work with NBME editors to generate multiple-choice items to meet the blueprint. When sufficient items were available, a pilot examination was created and administered at various medical schools in Europe and the United States. Reaction was positive: faculty thought the examination assessed appropriate content, and students responded that it accurately measured what they were learning. The pilot project continued for a few more years; committee members tweaked the content; the number of countries represented on item-writing committees increased; and NBME staff continued to study results to ensure it was a valid and reliable assessment. In this way, the IFOM program was created.

Today, the IFOM program consists of two examinations. The Clinical Science Examination (CSE) covers the core of clinical knowledge in medicine, surgery, pediatrics, obstetrics and gynecology, and psychiatry expected of students in the final year of undergraduate medical education. The Basic Science Examination (BSE) incorporates the common core of knowledge expected of students who have completed the preclinical curriculum and are about to begin the study of clinical medicine. Additional information about the examination content and sample feedback can be found on the NBME website at www.nbme.org/ifom.

IFOM CSE

Officially launched in 2007, the IFOM CSE provides the international medical community with a high-quality assessment tool. A growing number of medical schools, accrediting bodies, and hospitals around the world administer the IFOM exams throughout the year for summative and formative evaluation, residency selection, curriculum evaluation, and local or regional certification purposes. US and international medical students also use IFOM when seeking placement in exchange programs such as the Global Health Learning Opportunities program of the Association of American Medical Colleges.
Most IFOM CSE administrations occur in the medical school setting, but individuals can also take it independently (see the IFOM Individual Administrations section below). For each institutional administration, NBME provides individual examinee score reports as well as a roster of all the examinees’ total-test scaled scores so that faculty and administrators can compare their students’ scores and make promotion, remediation, and other decisions with them. NBME sets “standards of competence” for the IFOM exams that are correlated with and approximate the USMLE Step 1 (for IFOM BSE) or Step 2 (for IFOM CSE) passing standards. However, comparing IFOM scores to the USMLE passing scores can be problematic due to the differing stakes under which the exams are taken and the different curricula, expectations, and requirements in place in medical schools in various parts of the world.

For this reason, NBME staff and the IFOM test committee members strongly encourage the development of regional or national passing standards for IFOM, and NBME staff has assisted interested institutions in setting these standards.

The IFOM CSE continues to gain visibility, trust, and influence among medical schools, health systems, and government officials around the world. In 2015, the CSE was administered to over 4,400 examinees in nearly 30 countries; the chart to the right displays the numbers of examinees by region.

**IFOM BSE**

Because of the strong interest in the IFOM CSE, as well as high usage of the NBME’s other basic science-focused exams, NBME staff thought an IFOM basic science exam would be a good complement to the CSE. The IFOM BSE began as a pilot exam in 2011, but its usage has not grown steadily. Some of the feedback NBME staff has received is that the examination, as provided, is not useful. In an effort to determine the level of interest in and need for an international basic science examination (IBSE), NBME staff conducted a survey during summer 2015 in three regions (Latin America, Australia, and the Middle East). These three regions were selected because they represent the largest number of IFOM CSE users. In addition to questions about the level of interest in and need for an IBSE, the survey requested input about the importance of various exam features (e.g., content customizability, availability of longitudinal results). The survey responses indicated an interest in using an IBSE created by the NBME; however, opinion from the three regions varied widely regarding desired exam features. During 2016, the project team will conduct more extensive market research to determine how or if NBME should redevelop the examination to best serve the needs of international medical schools.

The chart to the left displays the numbers of IFOM BSE examinees by region since its launch in 2011.
IFOM INDIVIDUAL ADMINISTRATIONS

In 2012, to assist international medical school students and graduates who may not have access to institution-based administrations of IFOM, the NBME made the exams available to individuals, who may register to take the exams at a secure testing center located in any of approximately 50 countries. The exams are available for individual administration during two testing windows, one in the spring and one in the fall. In 2015, 780 individual administrations occurred, an increase of 7% over 2014 (728) and an increase of over 400% from 2013 (when there were only 151 individual administrations). Most of this increase is due to the use of the IFOM individual scores for residency selection purposes at particular programs in the Middle East. Information about how to apply for IFOM as an individual is available online at www.nbme.org/ifom.

IFOM CSE SELF-ASSESSMENT

To help students measure their readiness for the CSE, the NBME offers a CSE self-assessment. The feedback provided is similar to the CSE feedback, allowing examinees to see their areas of strength and weakness. In 2015, there were 528 administrations of the IFOM CSE self-assessment compared to 246 in 2014 and 53 in 2013 (its launch year). Additional information about the self-assessment examination and how to order it is available at www.nbme.org/ifom.

RESIDENCY SELECTION/CERTIFICATION EXAMINATION PROGRAMS

The NBME International Programs team works with regulatory agencies on the creation of certification examinations and with medical schools on the development of residency selection examinations.

PANAMANIAN RESIDENCY SELECTION EXAMINATION

For the past 13 years, NBME has worked with executives in the Republic of Panama and the University of Panama School of Medicine to create and administer a valid, reliable, and secure examination for selection of candidates for postgraduate training in Panama. The examination continues to be a valuable tool for residency directors evaluating numerous applicants.

PANAMANIAN CERTIFICATION EXAMINATION

As mentioned above, officials at the University of Panama were interested in administering a certification examination to physicians trained at medical schools outside Panama. The goal was to provide an assessment that shows the physician possesses a minimum level of proficiency in clinical science required to practice in Panama. When International Programs staff met with faculty and administrators to identify appropriate content, they determined that the IFOM CSE would serve their needs.

Following the initial examination, an NBME psychometrician worked with content experts in Panama to set a passing standard for the certification examination. The examination is offered three times a year, and the standard is applied to all administrations.

SINGAPORE ASSESSMENT FOR MEDICAL PRACTICE

NBME staff has worked with the Singapore Ministry of Health (MOH) to develop and administer the Singapore Assessment for Medical Practice (AMP) for the past three years. As part of the test development process, NBME editors traveled to Singapore to conduct item-writing workshops for medical school faculty members and MOH administrators. In addition to generating new items for the AMP, item writers understand procedures for writing good items, which can then be used in their individual assessments.
CONSULTING SERVICES

The NBME offers a portfolio of consultative services. Expert staff will conduct faculty and institutional development workshops and assess programs in international undergraduate medical education, certification and licensure, and graduate medical education environments. Faculty and institutional development activities vary according to need. NBME International Programs staff works with faculty and institutional staff to develop and improve assessment tools, from building an examination blueprint to aiding in the interpretation of scores. During 2015, two consulting programs were concluded.

ITALY

Having recently established an English track curriculum, Humanitas University (HU) expressed interest in an impartial evaluation and sought recommendations for enhancements. HU faculty contacted NBME for assistance. NBME staff with expertise in curriculum and assessment worked with HU faculty and administrators to address the needs. The work began with an on-site visit to define the goals of the educational program; determine the most appropriate approaches for assessment of the students and evaluation of the program; identify implementation methods; and develop a plan for ongoing quality improvement. NBME staff returned months later to discuss the progress made, address obstacles they had encountered, and identify workable solutions. HU staff continues to implement enhancements.

KAZAKHSTAN

The Ministry of Health (MOH) of the Republic of Kazakhstan contracted with the NBME for consulting services to improve the medical education system, establish a licensure/certification framework for health specialists, and advance the healthcare of the population. NBME staff traveled to Astana, Kazakhstan in December (temperature was -4°C) to work with staff of the newly established Republican Center for Knowledge and Skills Assessment (RCKSA). Work continued when the MOH and the RCKSA sent 18 representatives to Philadelphia in June to experience a variety of workshops on item writing, standard setting, identifying inferences, and scoring, to name a few. NBME staff returned to Astana in August (when it was much warmer than December) to focus on topics such as conducting a job analysis and the impact of that on an exam blueprint, developing a coding schema for items, and building an item bank. The team provided a detailed report on its findings and recommendations for next steps.

At the conclusion of this project, the Kazakhstan Health Sector Technology Transfer and Institutional Reform Project team hosted an Implementation Conference. Braving the -10°C weather, one NBME staff member attended the conference and presented a summary of the work accomplished with the RCKSA. The initial work in Kazakhstan was deemed a success by the MOH and recognized the impact quality assessment of health professionals will have on the population of Kazakhstan. The vice-minister of health expressed interest in continuing the working relationship. Future plans will develop in 2016.

MARKET ENGAGEMENT AND COLLABORATIONS

During 2015, the International Programs team continued to apply the overarching framework connecting strategies, solutions, and service metrics to guide the tactical direction of International Programs. Additionally, one of the NBME key performance indicators (KPIs) focused on market and customer engagement. To address this KPI, two markets were identified for exploration and collaborative arrangements.
COLLABORATION WITH THE HOSPITAL SÍRIO LIBANÊS

The leadership and legal staff of the NBME and Hospital Sírio Libanês (HSL) established a collaborative agreement to identify and pursue opportunities to create and foster a culture of high-quality assessment for medical students, healthcare professionals, and healthcare organizations in Brazil. As the Collaboration Council met to identify potential opportunities, NBME staff met with faculty from 18 Brazilian medical schools to begin work on an examination for medical students in Brazil, Avaliação de Desempenho de Estudantes de Medicina (ADEM+) [English translation: Performance Evaluation of Medical Students]. NBME test development experts worked with Brazilian faculty members to design an examination blueprint, develop high-quality items, and build an assessment form. After the initial administration, content experts in Brazil worked with NBME psychometricians to set a standard. This standard has been applied to the more than 3,700 students in years 4-6 who have completed the exam voluntarily since the initial administration. The goal is to have the examination used throughout Brazil to measure progress of medical students before they graduate from medical school.

In addition, executives at HSL saw value in administering the ADEM+ as a residency selection exam. In the two years since its inception, almost 1,700 candidates took the examination and provided their scores to residency directors.

As the culture of assessment grew, HSL executives and administrators created and administered additional examinations using the Global Evaluation Management System (GEMS®). Residency specialty selection examinations are administered on the afternoon following the ADEM+ as a residency selection examination. The Preceptor Selection Examination was unique because it included content from the IFOM CSE complemented with items created by HSL-designated item writers.

One other project currently underway with the Collaboration Council is the development and administration of an examination for anesthesiology residents. Work will continue on this project in the coming year.

COLLABORATION WITH THE SMART HEALTHY CITY ALLIANCE

Smart Healthy City Alliance (SHCA) was organized through Orchestrall, Inc. in response to China’s former five-year plan that prioritizes healthcare. The goal of the SHCA is to combine world-class capabilities to provide integrated solutions that focus on the elderly and aging population in China, on chronic diseases, and on promoting health and wellness in the Chinese population. The program is endorsed by the central government of China, with support from the Ministry of Commerce, the China Association of Health Promotion and Education, and the Ministry of Industry and Information Technology. The NBME is an active member of the SHCA.

Through this collaboration, the NBME has an exciting opportunity to influence the health of the Chinese public with a pilot project to develop a certification examination for a new healthcare professional in China, the health coach. The Chinese government issued a request for proposals for an assessment to assure the competency of healthcare professionals and to address the knowledge and skills needed to motivate people to take responsibility for their improved health and wellness. This certifying examination, Professional Examination of Health Coaches, or PEHC, will combine assessments of Western and Chinese medicine. NBME staff and our Chinese colleagues have worked with other members of the SHCA to develop an educational program for this new healthcare professional. Faculty members from US and Chinese medical schools developed high-quality test questions for the certification examination that will assess the required knowledge. Work is proceeding toward a 2016 administration.
RESEARCH

In an effort to continuously improve assessments and the value of information provided on score reports, NBME staff conducts research on examination programs. Examples include an investigation of pacing on the IFOM CSE for examinees testing in multiple languages. The study examined item latency and item performance data for a form of the IFOM CSE that was administered in international English, Spanish, and Portuguese. Analyses were conducted by item administration sequence separately for each language. Results were similar: examinees were impacted by pacing issues during the first section, regardless of language. Pacing improved for the second section as examinees became more familiar with the format and timing of the examination. In conclusion, study champions recommend that medical schools provide students with practice opportunities prior to taking IFOM CSE using assessments that emulate the format and timing of standardized assessments like the IFOM CSE.

NBME staff also collaborated in a research initiative with colleagues at HSL to conduct a longitudinal assessment involving sequential exams in clinical sciences at the end of years 3, 4, 5, and 6 of the MD program and during the first and second postgraduate years. Results have been encouraging and yielded useful information. One result was that students in higher training levels obtained higher mean scores. Also, mean scores in the second administration were higher than in the first, suggesting that students are getting habituated to this form of assessment. It is likely that this research study will continue with additional administrations of the ADEM+ examination.

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At its 2014 Annual Meeting, the NBME reflected on its past, tracing its roots to William Rodman who, as a transplant to Pennsylvania, was required to sit yet another state-specific medical examination to prove his capabilities despite his previous accomplishments and reputation as a surgeon. This set in motion activities that would create the NBME and define its path for the better part of a century. While cosponsoring USMLE reflects the mainstay of its reputation, the NBME has separately served medical schools, specialty organizations, and other health professions for more than 50 years. To better fulfill its mission in the coming decades, the NBME has been reviewing ways that it can complement existing services and reach a broader global public and better fulfill its promise as an assessment organization. That promise will be met through new ideas for assessment, in existing and new markets, both with standardized tests as well as more novel assessments, and through high-quality research.

The NBME’s research and development enterprise, broadly defined, underpins the NBME brand, reputation, current products, and future prospects. It comprises structures, processes, and individuals throughout the organization and connects with outside experts and institutions: this includes capabilities for exploring disruptive trends and technologies and their implications; new product development using a stage-gate model; and means for prioritizing and driving a research agenda that strengthens the inferences made with existing products and that informs the most promising new product ideas.

LOOKING OUT FOR THE FUTURE

The Center for Innovation was created in June 2001 to identify disruptive technologies and to assist in formulating and actualizing NBME’s vision and strategies. Center responsibilities continue to include identifying environmental trends with implications for our future, exploring new technologies and models for assessment, as well as identifying external thought leaders and nurturing both familiar and new network alliances.

Since its founding, the Center has been guided by several principles that point to desired organizational capabilities and possible future strategic directions; many of these are reflected in NBME’s Renewal efforts. These include broadening the competencies currently assessed; continuous, longitudinal assessment; opportunities offered by increasing availability of data from the workplace; and the importance of collaboration and connecting with outside thought leaders. These principles also suggest that future assessment should build on the foundations of current capabilities. For example, high-stakes, point-in-time assessment can be supplemented by continuous low-stakes assessment, and feedback to learners and practitioners can be customized with highly actionable and specific feedback loops. Center-initiated activities over the years have included investigations of demographic trends, computational linguistics, observational or workplace-based assessment, notions of and mechanisms for sharing healthcare information for research and other applications, and portfolios to support lifelong professional improvement. More recent initiatives have explored the implications for telemedicine,
end-of-life care, ubiquitous recording devices, competencies within medical informatics, gamified education and assessment, and team-based assessment.

FROM IDEAS TO NEW PRODUCTS

The new product development (NPD) process conceptualizes and refines new product and service ideas to meet healthcare assessment needs and to more completely fulfill our mission. It is informed by the engagement of stakeholders and input from potential users and aims to deliver services based on their impact and sustainability. Assessment Programs, Product Discovery, and SPIE units support this effort.

NPD is structured as a funnel-shaped pipeline with five stages: exploration, conception, prototyping and market testing, development, and launch. In between each stage is a decision gate (denoted as “DG” in the figure) where the new product or service idea is evaluated against a standard set of criteria before it is allowed to enter into the next stage of the pipeline. Since each successive stage represents substantially increased investment, the criteria are applied with increasing rigor and with the expectation of increased certainty to ensure that only the most promising ideas are selected.

In 2015, NPD activities included process improvements to pipeline subprocesses and decision making and the continued progression of prioritized early-stage ideas through the pipeline to development and launch. Some examples of exploratory topics included the assessment of metacognition; the potential uses of patient information to improve care; connecting assessment to learning materials; providing longitudinal views of assessment outcomes; and services to emerging health professionals focusing on wellness care. Collectively, these projects reflect NBME efforts to explore new capabilities with current and prospective stakeholders. Projects in development are highlighted below.

ASSESSMENT OF CLINICAL RESEARCH PROFESSIONALS

In 2014, the NBME began to explore providing assessment services to professionals working in clinical research. This effort continued through 2015 with information gathering and outreach to various stakeholders within the clinical research community. A test blueprint was designed and item content developed for a multiple-choice question (MCQ)–based assessment. A successful pilot exam led to the decision to continue investigations into the feasibility and acceptability of this service. Plans for 2016 include delivering the assess-
ment to a wider community to enable research professionals to demonstrate the knowledge needed to conduct safe and effective research.

ASSESSMENT OF URGENT CARE PROFESSIONALS

Urgent care facilities represent a rapidly growing segment of the ambulatory care market. These walk-in clinics focus on the delivery of ambulatory care in a dedicated medical facility outside of a traditional emergency room. Practitioners include a variety of caregivers, including nurse practitioners, physicians, and physician assistants. While practitioners are credentialed in their own professions, there is currently no specific credential for practicing in an urgent care setting. Accordingly, there is now an interest in, and support for, a formative evaluation of practitioners in urgent care that will identify gaps in knowledge, allowing them to be addressed in a focused manner. The NBME has engaged with individuals and representatives of leading organizations in the field to begin the design and formation of an assessment for urgent care professionals. A pilot MCQ-based exam is planned for 2016.

NBME U

NBME U was developed for the NBME centennial celebration as a tool for health professions educators to assist in developing high-quality assessments for their trainees. This online learning center offered 30 lessons through engaging and interactive modules on the principles of assessment, such as test design and blueprinting, test material development, and standard setting. Through 2015, it was used by individuals in 75 countries. Enhancement of NBME U is under way for 2016 offerings that will also provide learners with continuing medical education credit or a certificate of participation for a fee. Additional lessons are also in development to expand the assessment competencies covered, with the aspiration of ensuring a higher level of knowledge and performance of healthcare professionals.

PEDIATRICS MILESTONES ASSESSMENT COLLABORATION

Arising from collaborative work in 2013 between the Center for Innovation and the Association of Pediatric Program Directors, and now including the American Board of Pediatrics, this project represents NBME’s interest and investment in workplace-based assessment. While targeted at the graduate pediatrics space, the broader vision includes a coherent system of competence-based assessment across the continuum of medical education. As the first phase of this project nears closure, several important capabilities have been built. As a foundational step, there is now a technology infrastructure in place to capture data in the workplace, analyze them, and report data/findings back to participants. Analyses are underway to ensure that the reported information is meaningful for learners and will allow program directors to make more informed progression decisions about their residents. While the methods will continue to be evaluated and refined, the collaboration has created the infrastructure and methods that can serve as the basis for workplace-based assessment not only for pediatric residents but for various other workplace environments and stakeholders.

RESEARCH

While NBME’s research enterprise is spread throughout the organization, managing research is the responsibility of the Office of Research (TOR) and the Research Implementation Committee (RIC). These functions were established in late 2014 to support NBME’s research enterprise by promoting a scholarly environment and through the effective administration of NBME’s research efforts. Together TOR and RIC ensure the alignment of NBME research with institutional priorities. TOR supports the RIC, administers the Stemmler Medical Education Research Fund, and ultimately aims to enhance NBME product quality, reputation, and attraction and retention of talent through its research enterprise.
In 2015 the RIC established an institutional research agenda and identified three high-priority programs within that agenda that are germane to NBME’s goals. Those programs include: assessment of teamwork and healthcare team interactions; methods to improve the quality and effectiveness of performance ratings; and criterion-related validation strategies, including studies of the relationships between test scores and practice or patient outcomes. Other research efforts promoted and coordinated by TOR are summarized in a later section.

Periodically, NBME staff members are recognized for their research accomplishments and service to the field. Here are a few from 2015:

- Peter Baldwin – recipient of the 2015 NCME Alicia Cascallar Award
- Kimberly Swygert – recipient of the 2015 Academic Medicine Excellence in Reviewing Award
- Howard Wainer – recipient of the 2015 AERA E.F. Lindquist Award

EDWARD J. STEMMLER MEDICAL EDUCATION RESEARCH FUND

The Stemmler Fund was established in 1995 and subsequently named in honor of Dr. Edward J. Stemmler, who was largely responsible for the conception of the program while chair of the NBME. The goal of the Stemmler Fund is to provide support for research or development of innovative assessment approaches that will enhance the evaluation of those preparing to, or continuing to, practice medicine.

Since its inception, the Stemmler Fund has awarded 80 grants for a total of approximately 7.15 million dollars. During the 2014-2015 grant cycle, 47 proposals were reviewed by the Stemmler Fund Committee. On April 13, the committee met and made three recommendations for awardees, which were announced as follows:

Dr. Matthew Lineberry, University of Illinois at Chicago
Leveraging assessment for learning: Optimizing challenge and engagement in an intelligent formative assessment system

Dr. Todd P. Chang, Keck School of Medicine at University of Southern California
Teaching and assessing cost and time effective patient care using serious gaming strategies

Dr. Kathleen Mary Finn, Harvard Medical School
The assessment of resident decision making and patient safety: A randomized trial of inpatient medical supervision of trainees

Additional information is available on the NBME website.

During the 2015-2016 letter of intent (LOI) cycle, 48 applicants submitted LOIs describing their proposed research projects. LOIs were reviewed by the Stemmler Committee in November, and 10 applicants were invited to submit full proposals. Pending the outcome of content expert review and rating, proposals will be selected for funding in April of 2016.
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2015 RESEARCH SUMMARY

As examination design and content evolve, the USMLE program continues to research approaches for providing meaningful subscores to stakeholders.

THE USE OF MULTIPLE STRATEGIES FOR DEVELOPING SUBSCORES FOR A LARGE-SCALE MEDICAL LICENSURE EXAM

Multiple frameworks exist for evaluating the utility of subscores (Haladyna & Kramer, 2004; Haberman, 2008; Sinharay, 2013). These frameworks have traditionally used statistics based on averages, such as reliability coefficients, standard errors of measurement, and correlations; in addition, the indices from these frameworks tend to ignore variability between examinee groups in terms of profile variability and differential utility. An alternative framework has been suggested by Raymond & Feinberg (2015) that utilizes multivariate generalizability theory to assess differences in profile variability and measurement precision across examinees. The strategies from all of these frameworks were used, along with content expert input and stakeholder expectations, to develop new subscores for the USMLE Step 3 exam, which underwent changes to the timing and content blueprints in 2014. The goal was to develop and document a multistep process that synthesized many of the strategies from the subscore reporting literature and would allow for empirical data to be used to guide subject matter experts and policymakers in subscore development while also addressing the expected needs and concerns of the examinees. The results suggested that some existing subscores could be removed, including all of the subscores related to the setting scheme, with the result being a revised Step 3 score report with 19 subscores (in addition to the small set of subscores not considered for removal, such as CCS). One of the primary challenges in developing the final form of the score report was the perception on the part of stakeholders that examinees were used to receiving many subscores as part of their report; thus, any reduction in reported subscores had the potential to be seen as providing less necessary information, even if that information was not the most psychometrically sound. This meant that the evidence presented to the subject matter experts and stakeholders had to be extremely persuasive before any subscores could be removed. An improvement on this method would be to start from scratch with multiple new report layouts and include focus groups with examinees, so that their understanding and use of the score reports could be documented (Zenisky & Hambleton, 2012; Zapata-Rivera, 2011). The NBME has already begun the process of rethinking the way information is displayed on score reports. Hopefully, in the future, methods such as those described here that leave open the possibility for subscores to have utility for some examinee group, combined with feedback from the examinees themselves, may be persuasive enough to convince stakeholders that a more comprehensive approach to revising score reports is necessary.

The USMLE program continuously monitors and investigates the impact of new item formats on examinee test-taking behavior and performance.

MCQ FORMATTING EYE TRACKING

Although test items written as clinical vignettes provide a useful way to assess clinical reasoning, longer vignettes increase item difficulty and response time, and many examinees become hurried at the end of exam blocks. To address this issue, a high-efficiency format for MCQ items is being examined that includes the following features: 1) a minimalist approach was taken to items, removing all superfluous content; 2) an information hierarchy was introduced to the content with the use of section headers, paragraph spacing, bulleted lists, and other proven formatting techniques for increasing reading and comprehension performance; and 3) a template was created so that specific pieces of information would reside in the same location in every question. These three techniques combined to create a vignette that looked similar to an electronic health record (EHR). An initial pilot was conducted on two recent Step examinations where two versions of the same item were pre-
sented in a pretest slot; one version was the current text-based vignette and the other version was the new EHR-based vignette. While the two versions did not differ in terms of item difficulty or discrimination, examinee response times were faster for the EHR-based items. A second pilot experiment was conducted to further test this design. Subjects were presented with the same content in either the current (text vignette) or new (EHR) format. An eye tracker was used to precisely determine gaze patterns for each item. Data are presently being analyzed; it is predicted that the new format will reduce item response time, decrease the search time when returning to item stems, decrease cognitive workload, and have an increased subjective rating. Two future studies will examine examinee performance on full-length examinations.

Monitoring the current academic and clinical environment ensures that the Step examinations reflect the knowledge and skills required to effectively practice medicine.

USE OF ONLINE REFERENCE MATERIALS DURING TEST ADMINISTRATION

As online reference tools and other decision-support systems increasingly become a part of clinical practice, NBME is likewise considering the extent to which assessments should reflect these changing norms and integrate such tools into the testing environment. In 2015, the NBME conducted a pilot study in collaboration with Drexel University College of Medicine using content from the clinical science medicine subject examination. Two 25-item testing blocks were developed, with 37 minutes allocated for each block. The first block was given under standard conditions, while the second allowed students access to a commercially available, online reference database. Findings indicated that students exercised limited use of the database, accessing it for an average of four to five questions on the second block, and use diminished as students progressed through the exam. Although there was some hint that students performed slightly better on the block with access to the online database, the difference was not significant. Follow-up comments from students suggested that the time required to complete a search during a timed test administration limited their use of the online database, particularly toward the end of the test. This project is part of a larger effort to look at methods to assess the ability to define a clinical problem, obtain clinically relevant information from appropriate decision-support systems (e.g., online references, computer-aided diagnosis), and to interpret and apply the acquired information. This project is the first of these efforts to be undertaken. While such systems could potentially have application to a variety of assessment contexts, they seem especially relevant for examinations linked to competencies such as practice-based learning and instruction.

The following three studies investigate the relationship between examination outcomes and other measures of performance and competence that are available in the continuum of education and practice for physicians. Results of these studies have implications for establishing the validity of decisions based on USMLE results.

THE RELATIONSHIP BETWEEN COMMUNICATION SCORES FROM THE USMLE STEP 2 CLINICAL SKILLS EXAMINATION AND COMMUNICATION RATINGS FOR FIRST-YEAR INTERNAL MEDICINE RESIDENTS

This study extends available evidence about the relationship between scores on the Step 2 Clinical Skills (CS) component of the USMLE and subsequent performance in residency. It focuses on the relationship between Step 2 CS communication and interpersonal skills scores and communication skills ratings that residency directors assign to residents in their first postgraduate year of internal medicine training. It represents the first large-scale evaluation of the extent to which Step 2 CS communication and interpersonal skills scores can be extrapolated to examinee performance in supervised practice. Hierarchical linear modeling techniques were used to examine the relationships among examinee characteristics, residency program characteristics, and residency director-provided ratings. The sample comprised 6,306 examinees from 238 internal medicine residency programs who completed Step 2 CS for the first time in 2005 and received ratings during their first year of in-
ternal medicine residency training. The findings suggest that although the relationship is modest, Step 2 CS communication and interpersonal skills scores predict communication skills ratings for first-year internal medicine residents after accounting for other factors. The results of this study make a reasonable case that Step 2 CS communication and interpersonal skills scores provide useful information for predicting the level of communication skills that examinees will display in their first year of internal medicine residency training. This finding demonstrates some level of extrapolation from the testing context to behavior in supervised practice, thus providing validity-related evidence for using Step 2 CS communication and interpersonal skills scores in high-stakes decisions.

EVALUATING VALIDITY EVIDENCE FOR USMLE STEP 2 CLINICAL SKILLS DATA GATHERING AND DATA INTERPRETATION SCORES: DOES PERFORMANCE PREDICT HISTORY-TAKING AND PHYSICAL EXAMINATION RATINGS FOR FIRST-YEAR INTERNAL MEDICINE RESIDENTS?

To add to the small body of validity research addressing whether scores from performance assessments of clinical skills are related to performance in supervised patient settings, the authors examined relationships between USMLE Step 2 CS data gathering and data interpretation scores and subsequent performance in history taking and physical examination in internal medicine residency training. The sample included 6,306 examinees from 238 internal medicine residency programs who completed Step 2 CS for the first time in 2005 and whose performance ratings from their first year of residency training were available. Hierarchical linear modeling techniques were used to examine the relationships among Step 2 CS data gathering and data interpretation scores and history-taking and physical examination ratings. The findings show that Step 2 CS data interpretation scores were positively related to both history-taking and physical examination ratings. Step 2 CS data-gathering scores were not related to either history-taking or physical examination ratings after other USMLE scores were taken into account. Step 2 CS data interpretation scores provide useful information for predicting subsequent performance in history taking and physical examination in supervised practice and thus provide validity evidence for their intended use as an indication of readiness to enter supervised practice. The results show that there is less evidence to support the usefulness of Step 2 CS data-gathering scores. This study provides important information for practitioners interested in Step 2 CS specifically or in performance assessments of medical students’ clinical skills more generally.

USMLE SCORES AND BOARD ACTION

Physicians must pass the USMLE to obtain an unrestricted license to practice allopathic medicine in the United States. Yet, little is known about how well USMLE performance relates to physician behavior in medical practice, particularly in terms of conduct inconsistent with safe and effective patient care. In this study, the extent to which USMLE Step 1 and Step 2 Clinical Knowledge (CK) scores predict the likelihood of receiving a disciplinary action from a state medical board in the United States was investigated. Non-nested multilevel logistic regression analyses were used to examine the relationships between USMLE scores and future disciplinary action, controlling for specialty area and licensing jurisdiction. A binary variable indicating if a physician had ever received a disciplinary action from a state medical board was the dependent measure. The sample included 152,561 physicians who graduated from US medical schools between 1994 and 2006; 16 specialties and 51 licensing jurisdictions were represented. Findings showed that physicians with higher Step 2 CK scores tended to have lower odds of receiving a disciplinary action, controlling for the other factors. After accounting for Step 2 CK scores, Step 1 scores were unrelated to the likelihood of receiving a disciplinary action. Thus, USMLE Step 2 CK scores provide useful information about the likelihood that a physician will receive an official sanction for problematic behavior in practice. These results provide some validity evidence in support of current uses of Step 2 CK scores.
In postgraduate medical education, assessment results can be important to guiding professional development when both the assessment and feedback can support a formative model. When individuals cannot directly access the test questions/responses, one way of using assessment results formatively is to provide item keyword feedback. The purpose of this study was to investigate whether exposure to item keyword feedback helped remediation. Participants included residents who completed a medical subspecialty in-training exam (ITE) in 2012 as a first-year fellow and one year later in 2013 as a second-year fellow (n = 319). Performance on items in which keywords were or were not exposed as part of the 2012 ITE score feedback was compared across groups based on the amount of time studying (preparation). For the same items common to both 2012 and 2013 ITEs, response patterns were analyzed to investigate changes in answer selection. There was a nonsignificant interaction between preparation and performance by keyword exposure (p = .88). The response pattern analysis substantiated overall growth in performance from the 2012 ITE, although for items responded to incorrectly on both attempts, examinees selected the same option 58% of the time. In summary, results from the study were unsuccessful in supporting the use of item keywords in aiding remediation. Unfortunately, the results did provide evidence of examinees retaining misinformation.
PUBLISHED PAPERS AND INVITED PRESENTATIONS

The list of published papers and invited presentations in 2015 reflects the scholarly work of NBME staff members, who are sought-after speakers and panel members at meetings and conferences throughout the world.

2015 PUBLICATIONS

Anderson MB. Really good stuff: lessons learned through innovation in medical education: a peer-reviewed collection of short reports from around the world on innovative approaches to medical education. Medical Education. 2015;49:1137-1138.


Peterson LN, Rusticus SA, Ross LP. Comparability of the National Board of Medical Examiners Comprehensive Clinical Science Examination and a set of five clinical science subject examinations. *Academic Medicine*. 2015;90:684-690.


Wainer H. Truth or Truthiness: Distinguishing Fact from Fiction by Learning to Think Like a Data Scientist. New York: Cambridge University Press; 2015.


2015 PRESENTATIONS

Aagaard E, Haist SA, Windish D. TEACH 201 Precourse. Society of General Internal Medicine; April, 2015; Toronto, Canada.

Anderson MB. Best practices in knowledge and skills assessment of health professionals. Medical Education Reform Conference; November, 2015; Astana, Republic of Kazakhstan.

Anderson MB. Essential skills in medical education assessment course. Association for Medical Education in Europe; September, 2015; Glasgow, United Kingdom.

Anderson MB. Formative and summative assessment: striking the balance. International Conference on Medical Education; October, 2015; Istanbul, Republic of Turkey.

Anderson MB. Fundamentals of educational leadership skills to lead change in healthcare. International Conference on Medical Education; October, 2015; Istanbul, Republic of Turkey.

Anderson MB. The professional evaluation of health coach. Smart Healthy City; September, 2015; Hangzhou, People's Republic of China.

Anderson MB. Professionalism and the language of medicine. Lee Kong Chian School of Medicine; March, 2015; Singapore.

Anderson MB. The value(s) of assessment. Laureate International Universities; June, 2015; Miami, FL.

Anderson MB, Crow S, Perkowski L, Simpson D. Advancing the scholarship of medical education. Association of American Medical Colleges; November, 2015; Baltimore, MD.

Anderson MB. Glicken A. Catalyzing change: successful strategies for wicked problems. Association for Medical Education in Europe; September, 2015; Glasgow, United Kingdom.

Baldwin P. Toward an optimal proficiency estimator. National Council on Measurement in Education; April, 2015; Chicago, IL.

Butler A, Raymond MR. Developing a high-quality item pool to support integrative basic science exams. Annual Meeting of the International Association of Medical Science Educators; June, 2015; San Diego, CA.

Chaffinch C, Rebecchi T. Surviving the next 100 years: what NPD success looks like for a well-established NFP organization. Back End of Innovation; October, 2015; San Jose, CA.

Cuddy MM, Michalec B, Bell AV. “You kind of have to be a little bit of a mother hen.” An examination of gender socialization in medicine. Eastern Sociological Society; February, 2015; New York, NY.

Cuddy MM, Michalec B, Swanson DB. Restricted opportunities: an exploration of electronic health record use by women in medical school. Pacific Sociological Association; April, 2015; Long Beach, CA.

Cuddy MM, Ouyang W, Phung J, Swanson DB. Effects of prior clerkship experience on end-of-clerkship performance in pediatrics and psychiatry. American Educational Research Association; April, 2015; Chicago, IL.

Denton E, Furman GE, LeBlanc KE, Lehrman A, Salt J. Clinical skills overview. Quinnipiac University School of Medicine; February, 2015; Hamden, CT.

Feinberg RA, Soto AC. Can item keyword feedback help remediate knowledge gaps? American Educational Research Association; April, 2015; Chicago, IL.

Feinberg RA, Wainer H. When can we improve subscores by making them shorter? The case against subscores with overlapping items. National Council on Measurement in Education; April, 2015; Chicago, IL.

Fitz M, Ross LP. NBME shelf exam: what do we (and our students) really know: past, present, and future. Alliance for Academic Internal Medicine; October, 2015; Atlanta, GA.

Furman GE. Case development. NBME Centennial Awards Program for Latin America; January, 2015; Santiago, Chile.

Furman GE. Clinical skills assessment and faculty development. Saint Louis University School of Medicine; April, 2015; St. Louis, MO.

Furman GE. Faculty development. Tbilisi State Medical University; October, 2015; Tbilisi, Georgia.

Furman GE, LeBlanc KE. Clinical skills assessment. Western Michigan University School of Medicine; September, 2015; Kalamazoo, MI.

Furman GE, LeBlanc KE. Clinical skills assessment and faculty development. University of Puerto Rico School of Medicine; December, 2015; San Juan, Puerto Rico.

Furman GE, LeBlanc KE, Lehrman A. Clinical skills assessment and faculty development. Texas A&M College of Medicine; March, 2015; Bryan, TX.

Furman GE, LeBlanc KE, Lehrman A. Clinical skills assessment; case writing; SP training; and faculty development. Texas Tech University; May, 2015; Lubbock, TX.

Gessaroli ME. Want to report subscores? Some things to think about. Innovations in Testing; March, 2015; Palm Springs, CA.

Haist SA. Accelerating change in medical education. American Medical Association; February, 2015; Chicago, IL.
Haist SA. The changing United States Medical Licensing Examination (USMLE): what medical educators need to know. University of Oklahoma College of Medicine; October, 2015; Oklahoma City, OK.

Haist SA. Coding items and building an item bank. Ministry of Healthcare and Social Development of the Republic of Kazakhstan; August, 2015; Astana, Republic of Kazakhstan.

Haist SA. Comprehensive Review of USMLE: where are we today? Association of Biochemistry Course Directors; May, 2015; Santa Fe, NM.


Haist SA. Writing examination questions: How to do it RIGHT. University of Oklahoma College of Medicine; October, 2015; Oklahoma City, OK.

Haist SA, Subhiyah R. Creation of an examination program: it is best to start at the beginning. Ministry of Healthcare and Social Development of the Republic of Kazakhstan; August, 2015; Astana, Republic of Kazakhstan.

Katsufrakis PJ, Raymond MR, Melnick DE, Butler A. Updates in medical education: NBME and USMLE. Association of American Medical Colleges Medical Education Meeting; November, 2015; Baltimore, MD.

Kochersberger AO, King AM, Mazor KM, Hoppe RB. Using examinees' observable behaviors versus raters' subjective evaluations to assess communication skills. International Conference on Communication in Healthcare; October, 2015; New Orleans, LA.


Lane S, Raymond MR, Haladyna TM, Wise L. Handbook of test development: advances in item development. National Council on Measurement in Education; April, 2015; Chicago, IL.

LeBlanc KE. Clinical skills examination update. University of Alabama College of Community Health Sciences; January, 2015; Tuscaloosa, AL.

LeBlanc KE. Current trends in clinical skills training and examination. Medical College of Georgia of Georgia Regents University; August, 2015; Augusta, GA.

LeBlanc KE. Exercise prescription. Sidney Kimmel Medical College of Thomas Jefferson University; May, 2015; Philadelphia, PA.

LeBlanc KE. Exercise prescription. Sidney Kimmel Medical College of Thomas Jefferson University; October, 2015; Philadelphia, PA.

LeBlanc KE. Hip fracture: diagnosis; treatment; and secondary prevention. Susquehanna Health Williamsport Regional Medical Center; March, 2015; Williamsport, PA.

Melnick DE. Collaboration and assessment. Institute of Medicine Global Forum on Innovation in Health Professional Education; April, 2015; Washington, DC.

Melnick DE. The future of competency-based assessments across the continuum of medical education and practice. American Medical Student Association; February, 2015; Arlington, VA.

Melnick DE, Dillon GF, Johnson DA, Katsurakis PJ. NBME/USMLE/FSMB update. Association of American Medical Colleges; November, 2015; Baltimore, MD.

Melnick DE, Dillon GF, Johnson DA, Katsurakis PJ. USMLE update. Federation of State Medical Boards; April, 2015; Fort Worth, TX.

Melnick DE. Personalized education. Innovations in Global Medical & Health Education Forum; January, 2015; Doha, Qatar.

Melnick DE. The role of assessment in accrediting competency development for emerging health professionals. Smart Healthy City; September, 2015; Hangzhou, People’s Republic of China.


Morrison CA, Phebus J, Anderson B, Brown-Hunter N. An investigation of pacing on the International Foundations of Medicine (IFOM) Clinical Science Examination for examinees testing in multiple languages. Association for Medical Education in Europe; September, 2015; Glasgow, United Kingdom.

Morrison CA, Ross LP, Vasinda J, Smith C, Butler A. Relationship between performance on the National Board of Medical Examiners Comprehensive Clinical Medicine Self-Assessment and United States Medical Licensing Examination Step 3 for US and international medical school graduates. American Educational Research Association; April, 2015; Chicago, IL.

Paniagua M. Challenges for faculty and trainees: the functional anatomy of high stakes assessment. Workshop. Saint Louis University School of Medicine; April, 2015; St. Louis, MO.

Paniagua M. Evaluation and feedback: the Stanford clinical teaching program. The University of Pennsylvania School of Medicine; October, 2015; Philadelphia, PA.

Paniagua M. Holding court on exams: taking steps without foul; crashing the boards; and beyond. Saint Louis University School of Medicine; April, 2015; St. Louis, MO.

Paniagua M. How do they know I know what I know? “Steps” to becoming a competent physician. Saint Louis University School of Medicine; April, 2015; St. Louis, MO.

Paniagua M. How do they know I know what I know? “Steps” to becoming a competent physician. University of Illinois College of Medicine; April, 2015; Chicago, IL.

Paniagua M. Interactive case: dementia and end-of-life care. University of Pennsylvania School of Medicine; September, 2015; Philadelphia, PA.

Paniagua M. Standard of care or business as usual? Applying research to the practice of HPM education. University of Pennsylvania School of Medicine; December, 2015; Philadelphia, PA.
Paniagua M. Writing high quality multiple choice questions. Saint Louis University School of Medicine; April, 2015; St. Louis, MO.

Raymond MR. Identifying sources of construct-irrelevant variance in performance testing. Association of Test Publishers; April, 2015; Rancho Mirage, CA.

Raymond MR. Cavallin N. The development of knowledge requirement scales in the health professions. National Council on Measurement in Education; April, 2015; Chicago, IL.

Raymond MR, Feinberg RA. Subscores aren’t for everyone: alternate strategies for evaluating subscore utility. National Council on Measurement in Education; April, 2015; Chicago, IL.

Subhiyah R, Smith C, Dupras D, McDonald E, Jurich D, Gallegher A. Will changing the testing medium affect performance? Association for Medical Education in Europe; September, 2015; Glasgow, United Kingdom.


Wainer H. Arguing for more experimentation in education: four studies that need doing. American Educational Research Association; April, 2015; Chicago, IL.

Wainer H. Arguing for more experimentation in education: four studies that need doing. Department of Educational Psychology; University of Kansas; March, 2015; Lawrence, KS.


Wainer H. Causal inference and happiness. Princeton University; April, 2015; Princeton, NJ.

Wainer H. Causal inference, happiness and experiments in testing. Educational Testing Service; March, 2015; Princeton, NJ.

Wainer H. Discussion of David Thissen’s item response theory; serendipity; and bad questions. National Council on Measurement in Education; April, 2015; Chicago, IL.

Wainer H. For want of a nail: why worthless subscores may be seriously impeding the progress of Western civilization. University of Kansas; March, 2015; Lawrence, KS.

Wainer H. Pictures at an exhibition: sixteen visual conversations about one thing. ICSA/Graybill; June, 2015; Ft. Collins, CO.

Wainer H. Uneducated guesses: three examples of how mistreating missing data yields misguided educational policy. Drexel University; January, 2015; Philadelphia, PA.