NBME®

SUPPORTING MEDICAL LEARNERS IN THE DEVELOPMENT OF KEY CLINICAL COMPETENCIES

SUMMARY OF RECENT NBME RESEARCH DEDICATED TO ASSESSMENT FOR LEARNING AND FEEDBACK

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Supporting Medical Learners in the Development of Key Clinical Competencies

Introduction

Developing clinical competence requires more than mastery of medical knowledge. While a deep understanding of basic science is critical, practicing physicians also need to be able to apply that knowledge to diverse clinical scenarios and perform complex clinical skills and behaviors.[1] As part of our mission to advance the assessment of health care professionals to achieve optimal patient care, NBME is committed to creating educational assessment solutions that address a broad range of clinical competencies.

Beyond broadening the scope of *what* is assessed, NBME is committed to delivering solutions that provide actionable insights to learners to support the development of desired skills and behaviors over time. That is, in addition to developing the high-stakes United States Medical Licensing Examination (USMLE), NBME is dedicated to creating formative assessments for learning and feedback solutions that offer future health care professionals the opportunity to practice and improve their skills, helping them realize their full potential.

Grounded in empirical evidence and aligned with national medical education competency frameworks such as the Accreditation Council for Graduate Medical Education (ACGME) core competencies, NBME's current research and development efforts focus on the following three key domains: patient-centered communication, clinical reasoning, and teamwork. The following sections describe NBME's work underway in each area.

Patient-Centered Communication

Given the strong link between patient-centered communication, health outcomes, and patient satisfaction, NBME researchers have dedicated nearly two decades[2] to advancing NBME's assessment in this area. Their work is grounded in the six-function model of patient-centered communication as a guiding conceptual framework, which categorizes communication skills the following six functions[3]:

1. Fostering the relationship
2. Gathering information
3. Provisioning information
4. Decision-making
5. Enabling disease- and treatment-related behavior
6. Responding to emotions

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[1] Miller, G. E. (1990). "The assessment of clinical skills/competence/performance." *Academic Medicine*, 65(9), S63-7.

[2] King, A., & Hoppe, R. B. (2013). "'Best practice' for patient-centered communication: A narrative review." *Journal of Graduate Medical Education*, 5(3), 385-393.

[3] De Haes, H., & Bensing, J. (2009). "Endpoints in medical communication research, proposing a framework of functions and outcomes." *Patient Education and Counseling*, 74(3), 287-294.

As a result of this extensive body of research, NBME has developed a prototype assessment of patient-centered communication (referred to as Video-Based Communication Assessment, or VCA) that provides health care professionals the opportunity to practice and improve their oral communication skills for future patient encounters.[4] In these simulated encounters, learners are presented with background information about a patient and watch a short video of the patient speaking directly to them. At the end of the video, the learner records a spoken response to the prompt "What would you say next?" Based on ratings provided by analog patients (crowdsourced raters), learners are provided with immediate feedback on their communication skills along with exemplary responses to guide their skill development (see Figure 1 as an example of the feedback provided). An experimental study examining the efficacy of video-based communication assessment demonstrated initial evidence for its effectiveness in improving patient-centered communication skills.[5]
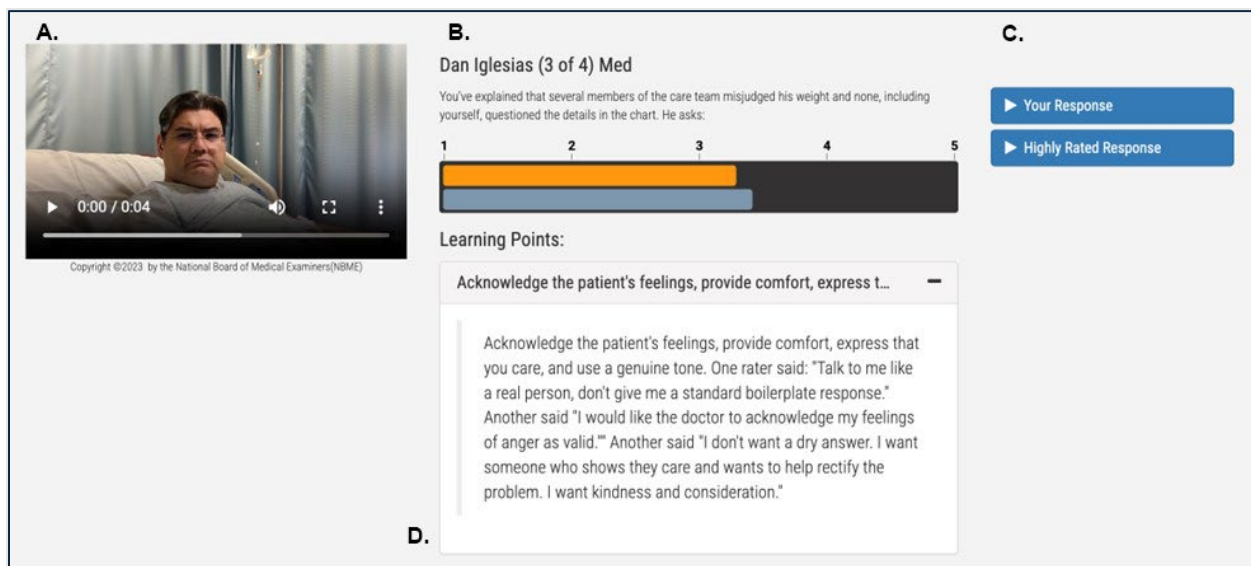
Figure 1

Feedback elements for VCA: **A)** Case text and video prompt available for review, **B)** Personal overall rating from the panel of crowdsourced raters (in orange) and peer average (in grey). **C)** Buttons that play your recorded response to this vignette and an exemplary response from a highly rated peer, **D)** Learning points derived from crowdsourced advice about what patients would like the physician to say in this situation.

[4] Mazor, K. M. *et al.* (2021). "Using crowdsourced analog patients to provide feedback on physician communication skills." *Patient Education and Counseling*, *104*(9), 2297-2303. Mazor, K. M. *et al.* (2019). "Video-based communication assessment: Development of an innovative system for assessing clinician-patient communication." *JMIR Medical Education*, *5*(1), e10400.
[5] White, A. A., *et al.* (2024). "Crowdsourced feedback to improve resident physician error disclosure skills: A randomized clinical trial." *JAMA Network Open*, *7*(8), e2425923-e2425923.
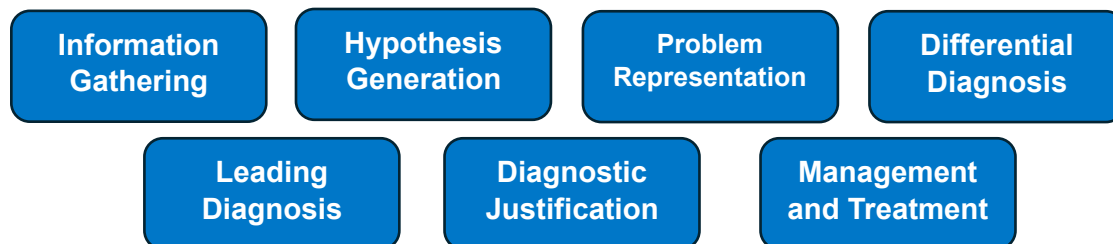
Clinical Reasoning

Clinical reasoning is a multifaceted and complex domain encompassing both diagnostic and management reasoning. It is an essential component of medical education and practice, yet most assessments of clinical reasoning focus on a single facet of clinical reasoning: diagnostic accuracy, or whether the learner obtained the correct diagnosis or reached the correct conclusion. Though this outcome-oriented approach may be valuable for specific purposes or contexts, it falls short when it comes to being able to provide learners with feedback necessary for improving the reasoning process because it does not provide insight into *how* learners reached their conclusions.

Over the last several years, NBME researchers have been working to address this gap by developing novel item types and assessment methods that measure a broader range of clinical reasoning skills. The conceptual framework adopted by NBME, which is based on the work of J. L. Bowen and further elaborated on by M. Daniel and colleagues,[6] categorizes clinical reasoning into the following components or skills:

Information Gathering	Hypothesis Generation	Problem Representation	Differential Diagnosis

Leading Diagnosis	Diagnostic Justification	Management and Treatment

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[6] Bowen, J. L. (2006). "Educational strategies to promote clinical diagnostic reasoning." *New England Journal of Medicine*, *355*(21), 2217-2225. Daniel, M. *et al.* (2019). "Clinical reasoning assessment methods: A scoping review and practical guidance." *Academic Medicine*.; 94(6):902-912. Bowen, J. L. (2006). "Educational strategies to promote clinical diagnostic reasoning." *New England Journal of Medicine*, 355(21), 2,217-2,225.

Two promising NBME research initiatives that have sought to further explore and understand the clinical reasoning space are the development of the SHARP (SHort Answer, Rationale Provision) item type and the OSCE for Clinical Reasoning Creative Community.

SHARP: With this novel item type, examinees review a patient's chart and are required to complete two tasks. First they are asked to respond to an open-ended question, such as "What is the most likely diagnosis?" (This is the "short answer" component of the item format.) Next they are asked to provide a rationale (the "rationale provision" component), or justification, for their short answer response by selecting specific details in the medical record to support their reasoning (see Figure 2 for a sample SHARP item). This item type was designed to capture evidence of students' clinical reasoning process beyond just the outcome. Results from an initial pilot study indicate that the SHARP item type demonstrates adequate reliability.

Figure 2
Example of the second step in the SHARP (SHort Answer, Rationale Provision) item format. In this second step, the learner's short answer response to the question "What is the most likely diagnosis?" is presented alongside the same patient medical record presented in the first step. The learner is tasked with selecting the specific information from the patient medical record that best supports their clinical decision. The shaded boxes represent the information that the learner has selected on the patient's medical record.

OSCE for Clinical Reasoning Creative Community: Recognizing the challenges with assessing clinical reasoning, NBME launched its first Creative Community initiative in January 2022.

"The most important thing I've taken away from this [creative community] experience with NBME is that focus and importance on formative feedback and how do we structure that in a way that's valuable and actionable for the students? And from learning about the evidence-centered design process, I've been able to think more deeply about all of the pieces critical to constructing a good assessment." ~ Candace Pau, MD, Kaiser Permanente School of Medicine

This initiative leveraged the expertise of NBME staff, medical education leaders from 10 schools, and learners to research innovative clinical reasoning assessments aimed at providing specific feedback to support learner growth. Using the evidence-centered design (ECD) framework,[7] the Creative Community explored process-oriented assessments that evaluated hypothesis-driven information gathering (HDIG) and problem representation in the context of Objective Structured Clinical Examinations (OSCEs). A pilot study with 76 post-clerkship medical students confirmed the alignment of cognitive processes with the intended design, providing initial validity evidence for these assessments.

> **LEARN MORE**
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> Hear more about the use of ECD to support construct and assessment development from Su Somay, senior measurement scientist, plus more about this initiative from our Creative Community members. →

Teamwork

The provision of health care in the U.S. largely relies on a team-based practice where multiple health care professionals work together to provide safe and effective patient care. Better understanding and assessing of the teamwork skills that learners need to develop over the course of their medical education can aid in ensuring optimal health care for all.

"The current NBME efforts are exciting, as they build from what we already know to advance how we think about and how we assess the wide range of multifaceted skills required for effective teaming in increasingly complex health care contexts. This, now more than ever, is critical to creating a workforce that enables safe, high-quality, patient-centered care while maintaining health care provider wellness." ~ Michael Rosen, PhD, Associate Professor, Dept. of Anesthesiology and Critical Care Medine, Johns Hopkins University School of Medicine

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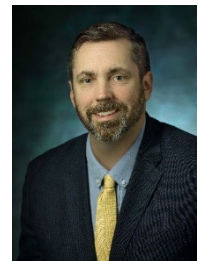
[7] Mislevy, R. J., Almond, R. G., & Lukas, J. F. (2003). "A brief introduction to evidence-centered design." *ETS Research Report Series*, *2003*(1), i-29.

NBME is currently working on an exploratory project focused on the formative assessment of teamwork in graduate medical education (GME), the formal specialty-specific training in the clinical environment that occurs after completion of a medical degree. The initial focus of this exploratory project is internal medicine. Through collaboration with external subject matter experts, including physician educators and team scholars, this work seeks to identify the elements of teamwork most important for learners to demonstrate in GME, along with the skills and behaviors that best represent them. The collaboration is exploring a model of teamwork specific to medical education and grounded in existing conceptual frameworks and empirical research.

To date, NBME researchers have conducted an extensive literature review, extending beyond the health care spectrum to incorporate insights from several academic fields (e.g., business, psychology, sociology) and various non-health care professions (e.g., aviation, the military). Additionally, NBME researchers have conducted multiple focus groups and working meetings with physician educator and team scholar subject matter experts. Monica Cuddy and Marci Winward, as leading experts in this space, are spearheading these efforts. In addition, they also are currently working on an edited volume discussing the assessment of teams across professional contexts. Both constructs and approaches to the unique challenges of team assessment will be examined, with the objective of providing insights to advance team assessment theory and practice. Publication is scheduled for 2026. Stay tuned!

"NBME has put together a group of outstanding national leaders in education to define the complexities of teamwork in medicine and translate this into thoughtful and practical assessment tools. It has been a tremendous experience working with NBME and an incredible group of educators to further our understanding of teamwork training and assessment." ~ Aashish Didwania, MD, Vice Chair of Education, Dr. John Sherman Appleman Professor of Medical Education, Feinberg School of Medicine, Northwestern University

In Summary

NBME has an extensive history of conducting research that supports the development of innovative assessment solutions to meet changing medical education and practice needs. Our current focus is on helping learners prepare for clinical practice; to that end, the formative solutions described above are those that address identified needs and provide specific and actionable feedback to facilitate the development of key clinical competencies. NBME's research follows a theory-driven, principled approach to construct development and underscores our commitment to collaborating with the medical education community to cocreate meaningful and relevant assessments of complex skills and behaviors. We also ensure that these solutions are supported by robust efficacy evidence to demonstrate their effectiveness.

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    NBME has advanced the state of the art of assessment in medical education and beyond with the inclusion of novel simulation-based components on USMLE. The next phase of our innovation journey promises to be equally exciting as we continue to explore authentic, high-fidelity educational solutions with the goal of helping learners to develop through practice and feedback."

Melissa Margolis
Lead Measurement Scientist

Clauser, B. E., Margolis, M. J., & Swanson, D. B. (2002). "An examination of the contribution of computer-based case simulations to the USMLE Step 3 examination." *Academic Medicine*, 77(10 Suppl), S80–S82.

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