

A Narrative Review of the Development and Outcomes of ABMS Member Board Continuing Certification Programs, 2000–2024

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TABLE OF CONTENTS

Introduction	3
Certification and the Evolution of ABMS Recertification	3
Why is it Necessary to Revalidate Certification?	6
Stakeholder Attitudes Toward Maintenance of Certification	7
Continuing Certification, Patient Care, and Patient Outcomes	9
Longitudinal Assessment for Learning	12
Looking Forward	13
References	17

INTRODUCTION

This is a narrative review¹ of research related to the American Board of Medical Specialties (ABMS) program of recertification, which is now referred to as continuing certification.² The purpose of this review is to describe relevant research about the program: what it is, why it exists, how it evolved, how stakeholders feel about it, and its relationship to clinical practice and patient outcomes.

For context, the evolution of ABMS Member Board (Board) recertification programs is traced through three phases. Prior to 2000, recertification took the form of a single point-in-time examination of medical knowledge and clinical skills through a cognitive exam administered every 10 years. In response to changes in medical education and the growth of the quality movement in health care, the Boards adopted a new program in 2000 called Maintenance of Certification (MOC). Although still anchored by a single point-in-time exam, MOC incorporated other elements, including professional conduct and quality improvement (QI). Following a decade of testing new approaches to assessment, and a period of extensive consultation in close collaboration with professional specialty societies and other stakeholders, and drawing on a wide variety of research in the learning and testing sciences, new standards were adopted for a process of longitudinal continuing certification, which became effective in 2024. This review describes the research that informed each phase in the evolution of continuing certification, as well as available research on the relationship between MOC and patient care and outcomes.

Through the three eras of continuing certification programs the purpose has remained the same: to verify that the bearer of a certificate from a Board has demonstrated the knowledge, skills, and conduct required for safe and effective practice in a specialty.

CERTIFICATION AND THE EVOLUTION OF ABMS RECERTIFICATION

Certification is a process for identifying and verifying the knowledge, skills, and behaviors essential to capable performance in a specific job.³ Thus, in the case of specialty physician certification, the Boards develop standards for the knowledge, skills, and behaviors essential to safe and effective specialty practice and assess specialists to validate that these standards have been met. Certification is a public validation that physicians have demonstrated the specific clinical expertise defined by the Boards.⁴

In its origins at the beginning of the 20th century, certification was meant to distinguish physicians with specialty training from those without it. The first medical specialty certification program was developed in Ophthalmology in 1916. Three Boards followed during the next two decades (Dermatology, Obstetrics and Gynecology, and Otolaryngology). These four Boards formed the Advisory Board of Medical Specialties in 1933 (renamed the American Board of Medical Specialties in 1970), which subsequently approved 20 additional Boards, the most recent of which was the American Board of Medical Genetics and Genomics in 1991. The 24 Boards now certify nearly one million physicians in 40 primary specialties and 89 subspecialties.⁵ [Details about ABMS, the [Member Boards](#), and the [specialties and subspecialties certified](#) can be found at abms.org.]

Alongside the certification movement, the science of measurement and testing, known as psychometrics, evolved into a distinct scientific discipline in the social sciences. Today, there are methods for defining the knowledge, skills, behaviors, and competencies necessary to practice in a specialty.⁶ Additionally, there is strong consensus around standards for the development, content validation, administration, and scoring of exams to ensure that they are fair, valid, and reliable.⁷

Initially, physicians were certified at the termination of training and retained certification for their lifetime. In 1968, recertification was introduced by the American Board of Family Medicine, which issued time-limited certification at its founding. The Boards developed guidelines for recertification in 1973, and the American Board of Emergency Medicine required recertification at its founding in 1979. Between 1980 and 1995, all the Boards implemented plans for periodic revalidation of knowledge and clinical skills.

In 2000, the Boards adopted MOC in response to both the growing movement to reform graduate medical education (GME) around core competencies essential to good medical practice⁸ and the public demand to improve quality and safety in health care.⁹

The concept of a competency-based system of medical education emerged in the 1960s with an understanding that skills development is multi-dimensional, developmental, and idiosyncratic.¹⁰ That is, people develop skills at different paces, depending on their personal endowments, interests, and training. In the 1990s, a global effort to define competencies for medical training led to the development of multiple competency frameworks. In the United States, ABMS and the Accreditation Council for Graduate Medical Education (ACGME) agreed in 1999 to a framework of six core competencies that were to become the basis for both training and certification.¹¹ ACGME committed to incorporate the competencies into its accreditation standards for GME, and ABMS likewise committed to incorporate them into programs of specialty certification. Conceptually, MOC sought to reflect this competency framework in an integrated program of learning, assessment, and improvement through four assessment-based elements: professionalism or professional conduct; learning and self-assessment; knowledge and clinical skills; and QI. During the last two decades, ACGME has developed a system of developmental milestones based on these domains as the basis for determining whether programs are adequately preparing candidates for certification in all six competencies.¹²

At the same time, a growing body of research raised serious concerns about the quality and safety of health care in the U.S. Wenneberg demonstrated vast population-based differences in health care use that could not be explained.¹³ Many studies showed widespread overuse of services that were not clinically indicated or were of marginal benefit, and underuse of services that were clinically indicated and might have been helpful to the patient.^{14,15,16} The RAND Health Services Utilization Study showed inappropriate indications for commonly performed procedures. Errors in medicine were also found to be prevalent.¹⁷ Numerous studies demonstrated underuse of proven effective treatment for common conditions.¹⁸ By 1998, the Institute of Medicine had declared an “urgent need” to improve health care quality,¹⁹ placing quality of care squarely on the national policy agenda.²⁰ Quality had been defined by the Institute of Medicine as “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.”²¹ Thus, maintaining current professional knowledge had become a

national policy priority. The Boards believed they could take a leading role in helping the nation reduce the quality gap through MOC.²²

MOC is a demonstration that the standards of knowledge, clinical skills, and conduct represented by certification continue to be met. At its core is a revalidation of the clinical expertise signified by certification, updated to reflect changes in medical science and stakeholder expectations, including the expectation that physicians participate in safety and QI and behave according to professional norms.

Notwithstanding the strengths of a traditional cognitive assessment of clinical expertise,²³ in 2014, the American Board of Anesthesiology began to pilot an alternative form of convenient, online testing as an alternative to the periodic, 10-year, exam.²⁴ That same year, the American Board of Pediatrics convened a technical workshop to assess alternative testing methods. During the next seven years all the Boards adopted alternatives to their point-in-time assessments, reducing time commitments and incidental costs, eliminating the need to take time away from practice to participate, allowing for more content customization, and providing direct feedback to support learning.

Ongoing physician concerns about the cost, burden, and value of MOC led ABMS, in association with the Council of Medical Specialty Societies, to form an independent body to assess and make recommendations to ABMS on a new direction for continuing certification. The Continuing Certification: Vision for the Future Commission (Vision Commission) organized in 2017 in collaboration with the professional specialty societies, collected testimony from a wide variety of stakeholders through 2018, and provided a report with recommendations to ABMS in early 2019.²⁵ Based on the findings, and endorsed by the ABMS Board of Directors, several task forces with engagement of public stakeholders, were created to develop new standards, reflecting the Vision Commission's call for alternative testing options that reduce time and cost burden, provide demonstrable learning value to participating physicians, and create opportunities for remediation. New standards for continuing certification were adopted in 2021 to be implemented by 2024.²⁶

Despite these changes, questions about the value and evidence associated with continuing certification continue to be raised. Some physician organizations have taken the position that individually self-directed continuing medical education (CME) should be sufficient for recertification and have questioned whether it is necessary to demonstrate on an ongoing basis that the specific body of knowledge and skills represented by the certificate have been maintained.²⁷ In 2014, the American Medical Association adopted a policy recommending that ABMS eliminate examinations and QI requirements, and permit physicians to recertify based on self-directed CME. According to industry standards, a program relying exclusively on self-directed CME does not qualify as certification. Certification warrants that specifically defined knowledge, skills, and behaviors have been objectively validated.²⁸ A certificate granted solely on participation in education is simply a "Certificate of Participation."²⁹

The research evidence suggests that self-directed learning through CME activities is insufficient to revalidate certification, and research in medical education and cognitive psychology explains why.

WHY IS IT NECESSARY TO REVALIDATE CERTIFICATION?

Several lines of research suggest the need for an ongoing objective assessment of current professional knowledge.

The Boards had initially judged recertification to be necessary because of the explosive growth in medical science along with evidence that physician knowledge and clinical skills decline over time resulting in some physicians not keeping fully abreast of advances in their specialty.³⁰ Since that time, the volume of research verifying the decline of physician medical knowledge and clinical skills with distance from formal training has grown considerably.^{31,32,33,34} Research on the science of learning and forgetting suggests that all knowledge is subject to decay without a memory challenge to reinforce retention.^{35,36} “Since skills naturally decline over time without actions to prevent decline, determinations about professional competency made years earlier have diminishing predictive association with evolving expectations for professional competency over time.”³⁷

Second, it is widely recognized that the accelerated pace of growth in medical science makes it difficult to keep up to date.^{38,39,40} Certifying bodies are expected to recertify, with a periodicity tied to the rate of changes in knowledge and skills.⁴¹ Moreover, given the pace of change in medicine, a process of targeting, filtering, and curating clinical evidence may help clinicians to direct their learning to the most important advances in their disciplines.

Third, as one medical researcher put it, “a large gap exists between what we know and what we practice.”⁴² Comparing records against guidelines, McGlynn and colleagues found that physicians provide recommended care a little more than half the time, based on a review of medical records.⁴³ Provision of recommended care ranged widely across 25 studied conditions, from a low of 10 percent to a high of 78.7 percent. Research suggests that it takes an average of 17 years for new evidence to move into practice.^{44,45}

Crucially, cognitive science tells us that individuals cannot assess their own skills accurately, and the least skilled among us are the least able to assess themselves accurately.⁴⁶ Since the Dunning-Kruger Effect was first described⁴⁷ this “illusion of competence” has been studied in many disciplines, including medicine. Studies have verified that there is low correlation between self-assessments and external assessments of expertise.^{48,49,50} All but the highest performers tend to overstate their performance and ability, and even the lowest performers perceive themselves to be above average in performance. If physicians do not “know what they don’t know,” the system of self-directed CME, which has traditionally been relied upon to keep physicians up to date, does not fill important knowledge and skill gaps that are unrecognized by physicians themselves.⁵¹ In 2023, Fraundorf et al.⁵² published an extensive review of the cognitive science related to strengths and weaknesses of self-assessment suggesting other cognitive biases that might affect what learners choose to learn. Learners enjoy a “stability bias” that leads them to underpredict how much they no longer know. A “fluency bias” makes learners believe that things that seem easy to learn are actually learned, and they tend to believe that they have internalized information they have accessed from other sources. All these cognitive biases affect the effectiveness of self-directed learning absent assessment and feedback.

Finally, when asked, patients repeatedly say that they prefer physicians who are certified and they expect certification to demonstrate that physicians are up to date on a regular basis.^{53,54} This is discussed more fully below.

STAKEHOLDER ATTITUDES TOWARD MOC

Published individual commentary about MOC during the last 15 years has been both positive⁵⁵ and negative.⁵⁶ The following are systematic studies about participant and patient attitudes toward MOC, and the use of MOC in hospital credentialing.

Physicians – Even as the Boards were implementing their MOC programs, concerns about the new approach to recertification began appearing in professional journals. In 2010, *New England Journal of Medicine* editors Jeffrey M. Drazen, MD, and Debra F. Weinstein, MD, challenged readers with a clinical decision scenario centering on whether physicians with non-time-limited certifications should participate in the new program of recertification.⁵⁷ Pro and con viewpoints were published alongside the editorial.⁵⁸ Since then, many testimonials have been published for and against MOC.⁵⁹ Concerns about MOC programs focused on time and financial cost, relevance to practice, the lack of personal learning benefit from the process, and the perceived lack of evidence that continuing certification is associated with differences in patient care and outcomes.

Cook et al.⁶⁰ conducted a series of focus groups in 2014 to mine the perceptions and attitudes of primary care physicians toward MOC. While generally supportive of its purpose, participants felt that the program needed to be more coherent, more integrated with clinical practice, more relevant to individual needs, and provide more useful feedback to support learning. Overall, respondents felt that MOC was “of little benefit to physicians, patients, or society.”

Freed et al.⁶¹ surveyed pediatricians with non-time-limited certification about their awareness and attitudes toward MOC. Only 28 percent of general pediatricians and 13 percent of subspecialists said that they would be willing to participate in general pediatrics MOC, although half of the subspecialists said they would participate in a subspecialty MOC. Three quarters of respondents thought MOC was necessary to keep up to date in pediatrics.

Using a different framing, Gallagher et al.⁶² conducted a survey of internists’ attitudes about assessing and maintaining clinical competence. Eighty percent of respondents said that it is important to get feedback on their knowledge, but only one quarter reported getting useful feedback most or all the time. While 75 percent agreed that it is important to participate in programs to assess their knowledge to stay up to date, and “58 percent believed that physicians should be required to demonstrate their knowledge via a secure examination every 9-10 years,” fewer than half of respondents said that they had participated in such programs in the previous three years.

In 2016, Cook et al.⁶³ reported on a national survey of more than 4,500 physicians across medical and surgical specialties that found pervasive dissatisfaction and low levels of support for MOC across almost all specialties, citing irrelevance, burden, and lack of support for professional development. Only 24 percent of respondents believed that MOC activities were relevant to their patients and 14 percent said it was worth their time and effort.

A 2018 national survey of physician attitudes by The Physicians Foundation asked whether physicians agreed that “Maintenance of Certification accurately assesses my clinical abilities.” Sixty-eight percent said that they disagreed with that statement.⁶⁴

Patients – When asked, patients consistently say that they expect physicians to demonstrate that they are up to date on a regular basis. Brennan et al.⁶⁵ reported on a survey of patient attitudes confirming that they believe certification to be important and would use it in deciding whom to turn to for treatment. A survey by Freed et al.⁶⁶ found that patients prefer board-certified pediatricians and expect them to participate in MOC. Importantly, respondents to this survey also expect pediatricians with non-time-limited certification to “demonstrate continued competence and mastery of clinical pediatrics by participating in activities included in MOC.”

A survey of 1,792 members of the general public was fielded by the National Opinion Research Center at the University of Chicago on behalf of ABMS in 2018.⁶⁷ Eighty-two percent of respondents said that board certification is important to their choice of physician; 98 percent said they expect their physicians to stay up to date with the latest advances in their field; 95 percent of respondents thought that physicians should be required to demonstrate that they are up to date; and 95 percent agreed that physicians should participate in assessment and education programs to assure that they are up to date.

More recently, in early 2023, the American Board of Emergency Medicine commissioned The Harris Poll to understand the public’s opinions about emergency physician board certification and the frequency of recertification.⁶⁸ The findings show strong support for both board certification and frequent, ongoing certification. Seventy-six percent of respondents said that certification was important; fewer than one percent said it was unimportant. Ninety-eight percent said that physicians should be retested, and more than half said that they should be retested annually.

Hospitals – Although most hospitals require certification as a condition for hospital privileges, about 30 percent do not.

Freed et al.⁶⁹ surveyed hospital credentialing practices for pediatricians to determine whether certification and recertification are required to obtain or maintain privileges. A telephone survey was conducted of 200 non-specialty hospitals. Seven hospitals were ineligible because they did not have any pediatricians on staff. One hundred and fifty-nine hospitals completed the interview for a response rate of 82 percent. At that time, only four percent of hospitals required certification of pediatricians to obtain hospital privileges. One-third did not require certification for privileges. Of 193 hospitals, 124 did not require certification for initial privileges but expected pediatricians to become certified at some point. Thirty-seven percent reported exceptions to their policies at the time of initial certification. Physicians with time-limited certifications were required to participate in MOC in 45 percent of hospitals.

A follow-up study by Freed et al.⁷⁰ examined changes in credentialing practices from 2005-2010. Overall, the percentage of hospitals requiring certification for initial privileges increased from four percent to 24 percent. In 2010, a greater proportion of hospitals reported board certification requirements for general pediatricians at the point of initial privileging (24% vs 4%). Board certification requirements increased for general pediatricians (from 67% to 80%) as

well as for pediatric subspecialists (71% to 86%). However, a greater proportion of hospitals reported exceptions to their board certification policies (99% vs 41%). Fewer than half of the responding hospitals required pediatricians with time-limited certification to enroll in MOC if their certifications expired.

In another study, Freed et al.⁷¹ examined the use of board certification and recertification in hospital privileges for general surgeons, surgical subspecialists, and nonsurgical subspecialists. One-third of responding hospitals did not require surgeons and non-surgical specialists to become board certified. Three-fourths had exception policies for surgeons and 77 percent had exception policies for nonsurgical subspecialists. Eighty-two percent of all hospitals and two-thirds of those requiring MOC participation permitted physicians to retain privileges even after their certifications expired. Few hospitals provided financial incentives for physicians to become or remain certified. In short, hospitals take a flexible approach to implementation of their certification requirements for credentialing.

In 2018, the National Association of Medical Staff Services, jointly with the American Hospital Association (AHA) and the Council of Medical Specialty Societies, surveyed hospital credentialers regarding their certification policies.⁷² Seventy-one percent of 850 respondents said that their hospital required certification; only 40 percent required participation in MOC. More than 40 percent reported that they permit exceptions to these policies, and more than 40 percent reported accepting certifications from boards other than ABMS Member Boards.

CONTINUING CERTIFICATION, PATIENT CARE, AND PATIENT OUTCOMES

The theoretical underpinning of continuing certification was examined in a special issue of the *Journal of Continuing Education in the Health Professions* in 2013,⁷³ including a review and summary of the evidence related to both initial board certification and MOC.⁷⁴ The evidence related to MOC is summarized below.

Most of this research addresses the relationship between cognitive expertise as measured by examination and performance on measures of clinical process or outcomes. MOC examinations do not simply assess medical knowledge. Items are presented in the form of clinical vignettes that test a wide range of patient care skills, including clinical reasoning, diagnostic skills, decision-making, patient management skills, and problem-solving skills.⁷⁵

Because MOC standards incorporated a QI element, some of the research also examines the impact of MOC-related QI activities.

The majority of studies on MOC have been conducted by the primary care Boards (Internal Medicine, Family Medicine, and Pediatrics) and Emergency Medicine, but a few studies have looked at surgical or procedural disciplines such as Anesthesiology, Dermatology, and Physical Medicine and Rehabilitation. Some of the research looks at MOC or exam status, but more recent research also looks at differential performance based on examination scores. A large variety of process measures have been examined, along with some outcome measures, including cost, hospitalizations, emergency department visits, emergency surgery, mortality, and disciplinary action by state medical boards for professional misconduct. The research is

heterogeneous, ranging from studies that find no association to some which clearly demonstrate high correlation of MOC programs with improved outcomes.

A few studies have shown no association between MOC and quality of care measures. For example, Hayes et al.⁷⁶ found no relationship between MOC and performance on 10 common process of care measures in primary care related to cancer screening, and management of diabetes, hypertension, and coronary disease. Khatana et al.⁷⁷ examined whether provider characteristics, including participation in MOC, were related to variation in 30-day mortality following a percutaneous coronary intervention. MOC was not found to have a differential impact on this specific clinical outcome.

Some studies have shown mixed results. One study looking at the association between MOC and ambulatory care-sensitive hospitalizations and health care costs showed no differences in the chosen quality measures, but a small and significant (approximately 2.5%) reduction in total cost of care for physicians participating in MOC mostly through more efficient testing and patient management, with no decrement in quality.⁷⁸ This difference represents an average savings of \$167 per Medicare patient per year compared with patients treated by physicians not participating in MOC, amounting to potentially billions of dollars in health care cost savings per year.

There is, however, growing literature that demonstrates a positive association between MOC and clinical performance.^{79,80} Participation in continuing certification is associated with a number of positive indices of clinical care including lower risk of discipline for professional misconduct; better adherence to clinical guidelines; safer care; more rapid uptake of new evidence; more efficient and accurate diagnosis; lower total cost of care; and improved patient outcomes.

Lower risk of disciplinary action for professional misconduct. Multiple studies in several disciplines have shown a strong inverse relationship between certification and the risk of disciplinary actions by state medical boards.^{81,82,83,84,85,86,87,88,89,90,91} Physicians participating in MOC are less likely to be subject to disciplinary actions by state medical licensing boards than those not participating in continuing certification. This finding has been confirmed in multiple studies across disciplines as diverse as Anesthesiology,^{81,82,83} Emergency Medicine,⁸⁴ Family Medicine,⁸⁵ Internal Medicine,⁸⁶ Ophthalmology,⁸⁷ Physical Medicine and Rehabilitation,⁸⁸ and Surgery.^{89,90} One of these studies in Internal Medicine, looked at the relationship of discipline for misconduct to exam scores. The risk of discipline, in terms of both seriousness and frequency, was found to be inverse to the level of performance on the cognitive exam. In other words, the higher the exam scores, the less likely a physician was to be disciplined, and if disciplined, the less serious the infraction was likely to be.⁹¹

Adherence to clinical guidelines and clinical outcomes. Studies have shown that participation in continuing certification is associated with better adherence to clinical guidelines and treatment protocols,^{92,93} better management of patients with diabetes⁹⁴ and asthma,⁹⁵ and better mammography screening,⁹⁶ as well as more efficient use of chest imaging in the emergency department.⁹⁷ Holmboe et al.⁹⁸ was one of the first studies to examine the association of quality with MOC examination scores, finding that higher performers on the exam – those with a higher degree of cognitive expertise – performed better on all but one of the performance measures, confirming a link between cognitive expertise and clinical

outcomes. A subsequent study by Gray et al.⁹⁹ showed a positive association of performance scores on the MOC exam with process measures capturing treatment for diabetes and coronary disease from the Healthcare Effectiveness Data and Information Set. Eddy et al.¹⁰⁰ projected the potential health impact of improving performance on these measures, which they found accounted substantially for the morbidity and mortality associated with these diseases. They estimated that “if all providers had delivered care consistently at the median level of performance in 2005, almost two million MIs would have been prevented. CHD, strokes, cases of ESRD, and cases of blindness would also have been reduced.”

Safer prescribing practices. In 2021, Vandergrift et al.¹⁰¹ reported on a study of the association between performance on the American Board of Internal Medicine (ABIM) MOC knowledge exam and prescribing of potentially inappropriate medications as identified by the American Geriatric Society. The study found lower rates of potentially inappropriate prescribing among top performers on the ABIM exam.

Accelerated uptake of new evidence. Also in 2021, Gray and colleagues¹⁰² reported on the association between performance on the ABIM MOC knowledge exam and opioid prescribing practices for new onset back pain during a period of change in guidelines for opioid prescribing. They found that “when the standard of care shifted away from routine opioid prescribing, physicians who performed well on an ABIM examination were less likely to prescribe opioids for back pain than physicians who performed less well on the examination.”

More efficient and more accurate diagnosis. Gray and colleagues¹⁰³ studied the association between diagnostic knowledge as measured on the ABIM MOC exam and patient outcomes following an outpatient visit for a condition at risk for diagnostic error. They found that higher knowledge scores on the exam were associated with lower risk of adverse outcomes, including a 35 percent lower risk of death and 30 percent lower risk of hospitalization or subsequent emergency visits, with a significant dose response across terciles. Wilson et al.¹⁰⁴ examined hospital and emergency department factors associated with missed diagnoses and costs associated with Medicare patients with acute myocardial infarction. This study found that certification by the American Board of Emergency Medicine was associated with significantly lower odds of a missed diagnosis.

Engagement in QI. One of the more controversial elements of MOC has been the requirement for demonstrating QI in medical practice.¹⁰⁵ The Boards implemented this component in various ways. Most of the surgical Boards encouraged participation in clinical registries developed by specialty societies. The American Board of Anesthesiology partnered with the American Society of Anesthesiologists to promote engagement in simulation activities that would improve communication, teamwork, and other patient care competencies. The primary care Boards developed structured measurement-based practice improvement activities that required data abstraction from medical records and used standard QI methodologies.¹⁰⁶ The primary care Boards initiated, and eventually ABMS made available to all the Boards, a program permitting diplomates to earn MOC credit for participating in their own hospital-based QI activities.¹⁰⁷ The Boards of Pediatrics and Family Medicine joined with their specialty societies on national and state-wide collaborations,^{108,109} encouraging diplomates to satisfy MOC requirements through participation. Pediatric collaborations resulted in

reduced mortality after heart surgery,¹¹⁰ increased remission rates for inflammatory bowel disease,¹¹¹ and reduced central-line-associated infections among intensive care unit patients.¹¹²

Physicians were engaged effectively in QI activities in Dermatology,¹¹³ Family Medicine,^{114,115,116} Internal Medicine¹¹⁷ Pediatrics,¹¹⁸ and Ophthalmology.¹¹⁹ Nichols¹²⁰ reviewed 25 QI studies in the primary care and Emergency Medicine disciplines where MOC credit was awarded to diplomates engaged in a formal process to improve care. One study showed a reduction in a composite measure of cardiovascular risk in children.¹²¹ Another showed an increase in asthma control and a decline in asthma exacerbations.¹²² Phillips et al.¹²³ tested the impact of an MOC performance in practice module (PPM), a Medicare payment incentive through the Physician Quality Reporting System (PQRS), and a combination of the two (PPM plus PQRS) with respect to 12 quality measures of diabetes and hypertension management from a quality registry. They found positive improvement in all three groups, with independent effects from the PPM and PQRS programs administered alone, suggesting a rationale for better alignment between the programs. Starr et al.¹²⁴ reported a QI project showing improved opioid prescribing in Ophthalmology following the introduction of new prescribing protocols.

LONGITUDINAL ASSESSMENT FOR LEARNING

The value of the single point-in-time examination continued to be contested by physicians and their professional organizations. They found that preparing for the event was not only time consuming and costly, but it interfered with their practice schedule. The exam itself was anxiety provoking. Participating physicians received little feedback on their performance, losing the opportunity to fill whatever knowledge and skill gaps had been identified through examination. Because physicians tend to focus their practices over time, they wanted an exam with content more customized to the patients and medical conditions that they serve currently instead of a one-size-fits-all format. To address these issues, between 2014 and 2021 the Boards developed new forms of “longitudinal assessment” that present test items on a regular basis (some quarterly, some annually) with immediate feedback to support learning. This new approach to recertification has been incorporated into a new program of what is now called “continuing certification.”

Two foundational areas of research informed the development of this new approach to assessment. The first was research in the medical education community about how best to understand, assess, and improve clinical competence.¹²⁵ For example, programmatic assessment holds that a portfolio of assessments, mixing low- and high-stakes formats, will provide a superior picture of clinical competence over time, and better support learning, than a single, intermittent, high stakes event.^{126,127,128,129,130,131}

The revisions were also based on a large body of research in learning science about the value of testing in learning and retention.¹³² Substantial psychological literature in cognitive psychology, educational psychology, and testing science demonstrates how testing can benefit learners and improve long-term retention.^{133,134,135} The beneficial effects of testing, compared with self-study, is well established in numerous disciplines, including medical education.¹³⁶ While the “binge-and-purge” approach to learning associated with point-in-time testing shows high initial learning but low retention, formats with frequent, low-stakes testing better embeds

learning.¹³⁷ Fraundorf et al.¹³⁸ reviewed the cognitive science about using testing physicians to enhance learning and retention.

The Boards have designed their continuing certification programs to take advantage of this science to improve their effectiveness. Challenges to memory improve retention; and specific techniques such as spaced repetition (repeating similar challenges over time) and interleaving (mixing different content areas over time rather than testing different topics in isolated blocks)¹³⁹ are more conducive to long-term learning.¹⁴⁰ Studies confirm the expectations that new forms of formative testing enhance learning in programs developed in Family Medicine,¹⁴¹ Anesthesiology,¹⁴² Pediatrics,¹⁴³ and Physical Medicine and Rehabilitation.¹⁴⁴

More customized assessments. In terms of tailoring the recertification processes more closely to an individual physician's practice, longitudinal assessment programs by several of the Boards permit participating physicians to customize the content of their assessments.^{145,146}

Physician experience. Early results have shown enthusiastic acceptance of the new models by physicians and medical specialists.^{147,148} In a survey of 4,016 pediatricians participating in longitudinal assessment, the vast majority (88%) noted reduced testing anxiety and 93 percent were satisfied with the new longitudinal testing format compared to point-in-time exams.¹⁴⁹ The new approaches appear to offer a less stressful way for physicians to demonstrate that they are keeping up with advances in their specialty while also supporting their practice-relevant learning needs.

Enhanced focus on diagnostic skill. Recent research from the Internal Medicine community showed a direct relationship between cognitive skills and the adoption of new evidence,¹⁵⁰ diagnostic ability and downstream clinical outcomes,¹⁵¹ cost savings due to diagnostic efficiency,¹⁵² and safer prescribing practices.¹⁵³ Because these studies looked at clinical outcomes related to performance on the exam, researchers were able to show incremental improvements (or harms) associated with different levels of clinical expertise. The formative and continuing nature of longitudinal assessment models makes it possible to view certification as an intervention targeted to specific content or practice skills. During the onset of the Zika virus, the American Board of Obstetrics and Gynecology was able to push information to their diplomates (physicians certified by the Board) through the longitudinal assessment program and assess whether they were able to demonstrate that knowledge on an exam. Many Boards did the same through the COVID-19 pandemic.

LOOKING FORWARD

In 2021, the Boards adopted new standards for continuing certification based on the recommendations made in the report from the Vision Commission with a plan for implementation by January 2024.¹⁵⁴ The new ABMS standards require the Boards to offer assessment alternatives to the point-in-time test; evaluate program effectiveness; be more intentional about their program goals; establish quality and safety objectives; and, perhaps most importantly, deliver enhanced perceived value to participating physicians.¹⁵⁵ All of these features of continuing certification suggest new opportunities to continue to research the effectiveness of these programs.

Collaboration with professional societies, academic medical centers, CME providers, and other stakeholders who provide learning and improvement products and services will be key to effectively supporting continuing professional development. Collaborative efforts will focus on building an infrastructure to support physician learning, increase engagement in practice improvement, and reduce redundant activities for diplomates.

Better integration of the systems of CME and continuing specialty certification should benefit learners and improve medical practice. Sharing information about the knowledge architecture underlying the assessment programs may help educators to prioritize their educational offerings. Collaboration between certifying bodies and specialty organizations to address quality and safety problems in the specialties may support learning and assessment to address them. Aggregate data from assessments may help educators and guideline developers to know how well their educational programs and guidelines are altering practice across the specialties.

Nearly all the extant evidence about ABMS recertification programs date from the MOC era, that is, before implementation of continuing certification. While the next phase of research may draw on prior research, it will focus primarily on the objectives of the new programs and the mechanisms built to achieve them.

Enhancing perceived value to participating physicians. The broader certification community is moving toward more flexible, yet still rigorous, recertification programs with continuous assessment that emphasizes formative feedback¹⁵⁶ with the goal of providing more direct value to participating certificants while retaining their value to public stakeholders.¹⁵⁷ However, extensive research is still needed in medical education about how physicians seek (or don't) feedback,¹⁵⁸ how they receive feedback, and use it (or don't) to inform their learning especially experienced physicians with advanced clinical expertise.^{159,160} Moreover, more research is needed to determine how physicians regulate their knowledge gaps in practice, especially as tools for researching clinical problems become ubiquitous and embedded in practice. Another area of the literature has explored the complexities of self-assessment and how physicians regulate their learning needs in practice.^{161,162,163} Here too, a great deal needs to be learned about how to resolve the central paradox that learners must both be autonomous and self-directed while requiring feedback to inform their learning.

Formal program evaluation. The Boards will be continuously evaluating their continuing certification programs. In 2024, the ABMS Research and Education Foundation began funding independent researchers, outside of the ABMS community, to conduct such studies.¹⁶⁴ Ongoing program evaluation will be facilitated by requirements for well-specified program goals and collaboratively developed quality and safety objectives. The Boards will continue to use a variety of evaluation methods to ensure that their programs optimize value to their diplomates, patients, and other stakeholders who rely on the certificate. The Boards will need to develop logic models that map program intent with expected results and draw on multiple methodologies, including evaluation science, implementation science, and health services research, to gain insight into continuing certification programs and inform continued improvement.

Focus on adoption of new evidence and diagnostic excellence. The new forms of longitudinal assessment offer an opportunity to leverage continuing certification as a mechanism for heightening awareness of new science and encouraging the adoption of new

practice guidelines developed by specialty societies. Most of the Boards have incorporated items related to new and emerging science as core features of their longitudinal assessment content. Future research may examine whether continuing certification accelerates the adoption of emerging science and new practice guidelines.

In addition, longitudinal assessment in continuing certification programs has been identified as one of the few available strategies for improving diagnostic accuracy and efficiency.¹⁶⁵ A report from the National Academy of Medicine on improving diagnosis in health care included among its recommendations leveraging board certification as a mechanism for assuring that physicians have and maintain the competencies they need for expert performance in the diagnostic process.¹⁶⁶ While most of the attention in diagnostic research has been on the primary care disciplines¹⁶⁷ and Emergency Medicine, diagnostic expertise is essential in all disciplines, including the surgical disciplines,^{168,169} and involves diverse cognitive competencies.¹⁷⁰ The Boards have hypothesized that a formative program of assessment that provides immediate and ongoing feedback to participating physicians can help them better calibrate what they know, direct their learning to areas of weakness, and perhaps increase their awareness of the limits of their clinical knowledge.^{171,172}

These two issues go hand in hand. For example, guidelines recommending against routine urinalysis testing appeared as early as 2002 and were subsequently updated during the next two decades by the Infectious Disease Society of America, U.S. Preventive Services Task Force, and American Society of Anesthesiologists Task Force on Preanesthesia Evaluation. Twenty years later, Shenoy et al.^{173,174} found no change in the use of urinalysis. It may be possible for the Boards to work collaboratively with their specialty societies to accelerate the uptake of clinical recommendations regarding low-value care as in this example.

Continuing toward competency-based assessment. As previously mentioned, when MOC was adopted in 2000, the Boards incorporated a competency framework into their expectations for continuing certification.¹⁷⁵ However, in practice, lacking direct observation of practicing physicians, certification has leaned heavily on the asynchronous assessment of medical knowledge and patient care skills. Consensus does not yet exist around optimal methods for assessment of the other competencies¹⁷⁶ in/amongst practicing physicians.

Yet consensus does exist that these other competencies are essential to safe and effective practice in today's health system. At the request of ACGME, AHA led the hospital community in a review of the competency framework in 2012.¹⁷⁷ The AHA reported that the framework is still relevant, but that the system of training and certification needs to increase the attention paid to non-knowledge-based skills such as patient engagement, interprofessional communication, teamwork, improvement, and technology skills that the contemporary hospital environment demands. Assessment of all the competency domains is a priority for all stakeholders, including hospitals, physicians, and patients.¹⁷⁸

There is an urgent need to develop new assessment methods that have validity for physicians and address the expectations of other stakeholders for the evaluation of patient care skills and behaviors other than technical skills. For cognitive assessments, physicians have questioned whether the presentation of clinical vignettes in an exam format will fairly represent how they solve clinical problems in practice. It may be possible to create higher-fidelity case presentations that appear like the practice experience, for example by introducing audio and

video to testing platforms or by introducing virtual reality.¹⁷⁹ These technologies may enhance the ability of exams to transform the experience of participating in the program.

Also needed are assessments that capture other domains of clinical competence. A decade ago, Birkmeyer et al.¹⁸⁰ demonstrated the feasibility of using video of surgical procedures to assess surgeon technical skill. Analogously, Weiner and Schwartz¹⁸¹ demonstrated the feasibility of using audio of clinical interviews to assess how well physicians communicate with patients and identify social determinants of health that would affect patient management decisions; a program that has recently been evaluated, with positive results.¹⁸² These techniques are effective but resource intensive and have been felt not to be scalable. But advances in machine learning and generative artificial intelligence suggest that it may soon be possible to score videos and evaluate recordings on a large scale.¹⁸³ If the technical problems can be solved, surgeons may find value in receiving feedback on such video-based assessments for QI.¹⁸⁴ However, concerns have been expressed about the use of this technology to make judgments about clinician competence,¹⁸⁵ suggesting a need for research to explore how to deploy them in ways that will provide value to physicians.

Next Steps. This narrative review tells the story of the evolution of ABMS Member Board recertification programs from periodic reexamination and MOC to the newly implemented continuing certification programs and the research underlying them. The research demonstrates clear associations between the Boards' continuing certification programs and better clinical outcomes and system performance.

These programs will continue to evolve. Ongoing feedback from participating physicians, patients, and public stakeholders; growing research on competency assessment and its relationship to learning and improvement; and further research on the relationship between certification and clinical performance will inform the progress of the Boards' continuing certification programs. As new information becomes available, this document will be updated.

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