

Identification of Alternative Physician Assistant Recertification Models

An Analysis of the Landscape and Evidence
Surrounding Approaches to Recertification in
the Health Professions

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Preface

To maintain professional certification, physician assistants (PAs) in the United States must complete National Commission on Certification of Physician Assistants' recertification requirements, which include a secure closed-book exam called the Physician Assistant National Recertifying Exam (PANRE) that is focused on general medical knowledge. PA certification is a requirement for initial licensure for PAs in all states, and current certification is a requirement for practice in 19 states (required for license renewal in 17 states and for prescribing privileges in two additional states). Over the past few years, changes to PA recertification requirements have included lengthening the recertification cycle length from six to ten years and considering (with a planned pilot) a periodic longitudinal assessment of core medical knowledge in lieu of the general medicine PANRE exam. Additional changes, including more frequent take-home exams for general medical knowledge coupled with secure closed-book exams in specific clinical specialties, were considered but not adopted.

To inform ongoing discussions regarding potential changes to recertification requirements, the American Academy of PAs (AAPA) contracted with the RAND Corporation to research the evidence and landscape surrounding health professional recertification requirements. This report presents an environmental scan of the landscape of requirements for certification for health professionals in the United States and other countries, a literature review of the evidence regarding the impact of recertification requirements on patients and health professionals, and a qualitative analysis of semi-structured interviews with representatives from health professional certifying organizations about their approaches to recertification.

The intended audiences for this report are PAs and other health professionals, health professional societies, and health professional certifying bodies. The research was conducted in RAND Health, a division of the RAND Corporation. A profile of RAND Health, abstracts of its publications, and ordering information can be found at www.rand.org/health.

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Summary

Periodic health professional recertification aims to ensure that professionals stay up-to-date with advances in clinical knowledge and practice; to identify professionals who might benefit from additional training; and to designate a professional who has met a certifying organization's standard to patients, peers, health systems, insurers, and other stakeholders. Concerns have been raised regarding the burden and relevance of recertification requirements by every type of health profession subject to recertification, particularly when recertification is tied to licensure or ability to practice or when it involves high-stakes closed-book exams. Physician assistants (PAs) in the United States are subject to recertification as a requirement for licensure and the ability to practice and high-stakes closed-book exams as a required component of recertification. There have been recent proposed changes to closed-book high-stakes recertification exam requirements for PAs in the United States, and changes are in progress for many U.S. allopathic physician specialty boards. To inform considerations for recertification requirements for PAs in the United States as well as other health professionals, this report provides an assessment of the landscape of recertification requirements in the United States and other countries; the evidence regarding the implications of closed-book exams and other recertification requirements for health professionals and patients; and the experience of certifying bodies implementing recertification requirements that may not include a closed-book exam.

Assessment of the Landscape of Recertification Requirements

We reviewed published information from certifying bodies regarding the recertification, maintenance of certification (MOC), or revalidation requirements for PAs, physicians, and advanced practice nurses (APNs) in the United States and in other countries with a context and activities of practice comparable to PAs in the United States.

Requirements for maintaining, renewing, continuing, or updating certification over the course of a health professionals' practice career vary by profession and country. Recertification requirements may involve exams or assessments, continuing education (CE) or continuing professional development (CPD), and other requirements (e.g., practice improvement activities, self-assessment activities, practice hours or case logs, and/or peer or patient reviews).

For PAs in the United States, recertification is required for continued PA licensure or prescribing privileges in 19 states. Current PA recertification requirements include a high-stakes closed-book exam called the Physician Assistant National Recertifying Exam (PANRE). A pilot of a lower-stakes longitudinal assessment as an alternative to the PANRE is planned for 2019. Longitudinal assessments require smaller batches of multiple-choice questions at regular intervals over time, as alternatives to high-stakes, once-per-cycle, closed-book exams, and are

considered lower-stakes because professionals do not lose certification status if a single assessment is not passed, as is the case with a once-per-cycle exam.

Among U.S. APNs, only certified registered nurse anesthetists (CRNAs) have a closed-book exam requirement for recertification, which is required for either licensure or practice under the title of nurse anesthetist in all states. Although certification is required for nurse practitioners (NPs) in 47 states and in most states for certified nurse midwives (CNMs), they may be recertified by completing CE and satisfying a clinical practice component in lieu of an exam and are not required to take high-stakes closed-book exams for recertification.

For physicians in the United States, neither initial nor ongoing board specialty certification is required for licensure. Closed-book recertification exams have been required for allopathic physician specialty board certification in the United States, but many specialty boards are implementing or piloting lower-stakes longitudinal assessments. Closed-book exams are a more recent mandated recertification requirement for osteopathic physician specialty boards in the United States.

Internationally, recertification exams are not required for health professionals, except in the United Kingdom, where voluntary registration for physician associates requires passing an exam. An exam is also a rarely used option for physicians lacking other means to complete revalidation requirements.

CE or CPD is also required for PAs in the United States and is required by most certifying bodies in the United States and internationally, with some exceptions (e.g., some U.S. APN organizations with flexible requirements and some physician certifying organizations outside the United States). Other recertification requirements vary substantially by profession, setting, and certifying body and may include reporting practice hours or cases, self-assessment activities, practice improvement activities, and multisource feedback (MSF) activities with peer or patient reviews.

Review of the Literature Surrounding Recertification Requirements

We conducted a structured search of the literature regarding recertification requirements, including closed-book exam-based approaches versus alternative or complementary requirements and their effect on patients and health professionals.

The peer-reviewed literature surrounding recertification requirements for health professionals is dominated by MOC requirements for allopathic physicians in the United States. Evidence regarding the impact of recertification requirements of U.S. PAs and APNs is limited; our review did not identify any studies that directly addressed the impact of these requirements on health-care quality or outcomes.

The literature revealed that U.S. physicians report burden and barriers to MOC participation including time, expense, and inconvenience and also professional benefits such as demonstration of competence and engagement in lifelong learning. Some studies found associations between

MOC program participation overall and improvements in patient care quality and outcomes. For the exam component of MOC requirements, in particular, physicians in group practice tended to perform better on the exam; greater use of educational activities and resources was associated with better exam performance; and among internal medicine physicians, higher scores were associated with better performance on some clinical quality process or intermediate outcome measures. Evidence regarding longitudinal assessment alternatives to closed-book exams was not found in the literature reviewed. A sizeable literature addressed self-assessment or practice improvement activities undertaken for MOC credit. Views regarding these self-assessment and practice improvement activities varied by specialty and situation, reflecting a tension between the positive aspects of these requirements (i.e., relevance to practice, ability to improve practice) and the negative aspects (i.e., participant cost and time burden or confusion regarding requirements). Multiple studies of self-assessment and practice improvement activities found improvements in care process or quality relative to voluntary participants' own baselines in self-selected activities; however, studies that employed a control group had mixed findings, with modest improvements in some measures, but not others.

Internationally, implementation of MSF from peers and patients for physicians in Canada resulted in mixed ratings of relevance and impact on practice, with some physicians finding activities relevant and likely to change practice and others not. Studies reflecting the recent implementation of a comprehensive “revalidation” program to recertify physicians in the United Kingdom indicated that the requirements may be increasing engagement with quality and safety data, but the burden and quality of peer appraisals is greater for physicians in some practice types and settings (e.g., more transient or nontraditional employment). Moreover, identification of physicians not fit to practice has not been impacted, and inpatient quality indicators have not improved. The literature about a parallel revalidation program for nurses, including APNs and midwives, was more limited in size and scope given the regency of implementation of the nursing revalidation program, but revalidation activities appeared to enhance one's reflection on one's clinical practice and resulted in inconsistent burden experienced by nurses with different employers.

The literature reviewed regarding CME activities revealed that interactive, multimodal, longitudinal, and sequenced activities that allowed for reflection and practice improved knowledge and clinical practice more effectively than passive, single-session techniques. The literature also noted that health professionals' ability to accurately assess their own knowledge gaps is limited, which could affect the ability of CME activities to improve practice.

Interviews with Health Professional Certifying Organizations

We conducted interviews with leaders or other representatives of ten health professional certifying organizations, preferentially including organizations whose scope of practice had substantial overlap with PAs in the United States and/or who had or were planning alternative

requirements to closed-book exams for recertification. Several themes emerged from our interviews. First, interviewees reported that organizations carefully considered the balance between summative (i.e., evaluative) and formative (i.e., instructive) goals of their recertification requirements, particularly regarding assessment or exam requirements. Interviewees said they carefully weighed the types and degrees of burden from recertification requirements, including exams or longitudinal assessments, and sought to ensure relevance of requirements to practice. Interviewees also discussed the balance between the organizations' duty to the public to ensure health professional knowledge and competence and a desire to address health professional needs, preferences, and concerns. Interviewees from organizations transitioning from an exam to a longitudinal assessment perceived this transition as serving both the public and health professionals by providing effective formative education, informed by learning theory, to better ensure professionals' competence through a more collaborative and supportive approach and a more continuous assessment of knowledge. Finally, organizations who made recent transitions in their requirements shared the following recommendations: ensure adequate time and budget to address inevitable technology or platform challenges; conduct robust multimodal communication with health professionals to address outliers, slower adoption, and interaction with new technology platforms; and seek feedback and input from health professionals.

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Abbreviations

AACNCC	American Association of Critical-Care Nurses Certification Corporation
AANPCB	American Association of Nurse Practitioners Certifying Board
AAPA	American Association of Physician Assistants
ABFM	American Board of Family Medicine
ABIM	American Board of Internal Medicine
ABMS	American Board of Medical Specialties
AMA	American Medical Association
AMCB	American Midwifery Certification Board
ANCCCC	American Nurse Credentialing Center Commission on Certification
AOA	American Osteopathic Association
APN	advanced practice nurse
CE	continuing education
CME	continuing medical education
CNM	certified nurse midwife
CPD	continuing professional development
CRNA	certified registered nurse anesthetist
GMC	General Medical Council
MOC	maintenance of certification
MOCA	maintenance of certification in anesthesiology
MSF	multisource feedback
NBCRNA	National Board of Certification and Recertification for Nurse Anesthetists
NCC	National Certification Corporation
NCCPA	National Commission on Certification of Physician Assistants
NP	nurse practitioner
OCC	Osteopathic Continuous Certification
OECD	Organisation for Economic Co-operation and Development
ONCC	Oncology Nurse Certification Corporation
PA	physician assistant
PANRE	Physician Assistant National Recertifying Exam
PNCB	Pediatric Nursing Certification Board
QI	quality improvement

Chapter One: Introduction

Programs to periodically recertify health professionals can, in theory, serve as an important component of professional self-regulation by helping certificate holders stay up-to-date with advances in clinical knowledge and identifying professionals who might benefit from additional training.¹⁻³ Recertification requirements are also used to identify professionals who have met a certifying organization's standard for competence, knowledge, skill, or fitness to practice and for stakeholders, including patients, other health professionals, health systems, and insurers. The Institute of Medicine has recommended that:

Certification bodies should require their certificate holders to maintain their competence throughout the course of their careers by periodically demonstrating their ability to deliver patient care that reflects the five [core] competencies [for health professionals].⁴

Similarly, the International Association of Medical Regulatory Authorities recommended that:

A well-constructed Continued Competency system should aim to enhance confidence that doctors holding a license to practise are in fact, fit to practise and meet established professional standards. It should also contribute to the development of a culture of improvement in medical practice.⁵

With regard to the use of exams or other assessments as a component of recertification requirements, a summary of a conference convened by the American Medical Association (AMA) Council on Medical Education and the American Board of Medical Specialties (ABMS) identified a tension between two distinct views on the purpose of exams or assessments as either a high-stakes pass/fail knowledge and judgment threshold or an organized approach to support professional development and improvement.⁶ The former represents a primarily summative perspective (i.e., an evaluative intent against a standard of performance) and the latter a formative perspective (i.e., an instructive intent aiming to identify and address knowledge gaps for subsequent education). These multifaceted goals and purposes for recertification of health professionals have implications for the form and function of recertification requirements. Recertification requirements, in turn, have significant implications for health professionals. Current certification is generally required for credentialing or employment for health professionals in the United States. It is required in all states for initial physician assistant (PA) licensure, and current certification is required in 19 states for PA license renewal or prescribing privileges.⁷⁻¹¹ Patient surveys also reflect preferences for specialty board-certified physicians.^{12,13}

Health professionals subject to recertification requirements have voiced skepticism and concern about their relevance to practice and the time, burden, and expense required to complete these requirements, particularly closed-book high-stakes exam requirements, where failing the exam would result in loss of certification, license, or ability to practice.¹⁴⁻¹⁷ Public statements or

recommendations from professional organizations, including the AMA, the American Academy of Family Physicians, and the American Association of Physician Assistants (AAPA), reflect health professionals' frustrations with current recertification requirements, with some exploring possibilities of alternate certification mechanisms or bodies.¹⁸⁻²⁰

Relative to other health professions, recertification for PAs is particularly challenging because PAs can work in a broad array of clinical areas initially and change clinical areas over the course of a career.²¹ Recertification requirements for PAs involve continuing medical education (CME) requirements every two years and a closed-book high-stakes exam called the Physician Assistant National Recertifying Exam (PANRE) reflecting general medical knowledge content once per ten-year recertification cycle. Changes related to the PANRE exam were recently proposed and subsequently abandoned after they garnered considerable concern and outcry from the practicing PA community. A pilot of a longitudinal assessment, requiring sets of 50 questions on a quarterly basis for two years and being considered as an alternative to the PANRE, is now planned for 2019.

Recertification requirements for other health professionals inside and outside the United States provide useful comparators for PA recertification in the United States. PAs and physicians alike have raised concerns regarding burden and clinical relevance of high-stakes exams. In this report, we use the term recertification to encompass processes based on taking a high-stakes exam, continuing certification, or maintenance of certification (MOC) processes that incorporate other components or requirements in addition to an exam or assessment, as well as renewal or revalidation processes that do not require an exam or assessment. This report aims to provide AAPA, other professional societies, and other stakeholders with an assessment of current recertification requirements for health professionals; current knowledge regarding the implications of closed-book exams and other recertification requirements for health professionals and patients; and the experience of certifying bodies implementing recertification requirements that may not include a high-stakes exam.

Chapter Two: Assessment of the Landscape of Recertification Requirements

Understanding the requirements of other health professional certifying bodies is important when evaluating existing and proposed PA recertification requirements. To assess the landscape of recertification requirements, we conducted an environmental scan by reviewing published information from certifying bodies regarding the recertification, MOC, or revalidation requirements for PAs, physicians, and advanced practice nurses (APNs) in the United States and in other countries with a context and activities of practice comparable to PAs in the United States. We focused on PAs, physicians, and APNs because these professions have both prescribing and treatment authority, while other classes of health professionals do not. For each type of health professional, we obtained information about the presence or absence of exams and complementary or alternative requirements, such as continuing education (CE) or continuing professional development (CPD), practice improvement activities, peer review, patient review, and documentation of practice, as well as other features and aspects of the recertification requirements.

To ensure comparability to U.S. PAs, we focused our environmental scan on health professionals with similar breadth, depth, and type of practice activities, including physicians, PAs, and APNs. For physicians in the United States, we focused our environmental scan on allopathic and osteopathic specialty board requirements. To enhance comparability to U.S. PAs, our international environmental scan included Organisation for Economic Co-operation and Development (OECD) countries with established professional regulatory frameworks and recertification requirements. Thus, our environmental scan included recertification requirements for PAs, APNs, and physicians in the United States and abroad. Details of these recertification requirements are available in the Appendix (Tables A.1 and A.2).

U.S. Health Professionals

U.S. Physician Assistants

The PA recertification process in the United States is developed and implemented by the National Commission on Certification of Physician Assistants (NCCPA). PAs in every state must pass an initial certification exam to be licensed, and in 19 states PAs must be recertified as required by NCCPA to retain their license to practice or for prescribing privileges. Most employers and insurers require PAs to be recertified by NCCPA to continue to practice, regardless of state licensing requirements. The closed-book written PANRE recertification exam was introduced in 1981 by the National Board of Medical Examiners and NCCPA, covered

general medical knowledge, and required successful passage every six years for recertification; the exam could be retaken within two years if not passed, and certification was maintained as long as attempts were continued.²² In 1998 the NCCPA began requiring PAs to pass the PANRE exam within two attempts.²³ The PANRE exam was offered along with a take-home exam option that could be taken instead of the exam (Pathway II) from 1998 until 2010.²⁴ PA recertification transitioned from a six- to ten-year cycle in 2014, and performance improvement activities and self-assessment activities were added as recertification requirements.²⁵ In 2016, NCCPA eliminated the requirement for performance improvement and self-assessment activities. The current recertification process requires PAs to pass the PANRE, a multiple-choice closed-book exam testing general medical knowledge once per cycle, and to pay a \$350 exam fee; up to four total attempts total to pass the PANRE during year 9 and 10 of the cycle are permitted. To maintain certification, every two years PAs must pay a \$130 certification maintenance fee and log 100 hours of CME; while no longer required after 2016, PAs receive an additional 50 percent weighting for self-assessment credits logged with NCCPA, and the first 20 performance improvement CME credits logged during every two-year cycle are doubled. In 2019, NCCPA will pilot an open-book longitudinal assessment alternative to the PANRE. It will consist of multiple-choice questions about core medical knowledge on a quarterly basis and will be available for completion on a device and in a place of the examinee's choosing.²⁶ A different set of potential changes to the PANRE was proposed in 2015 and subsequently abandoned in light of the response of the PA practicing community; these changes would have coupled more frequent take-home exams on core medical knowledge with a secure proctored exam in one of several clinical specialty areas every ten years.²⁷⁻³⁰ In total, direct costs for PA recertification excluding the cost of CME credits or exam preparation are \$1,000 per ten-year cycle, which corresponds to a cost of \$100 per year when averaged across the cycle.

U.S. Advanced Practice Nurses

We evaluated the recertification requirements for nurse practitioners (NPs), certified nurse midwives (CNMs), and certified registered nurse anesthetists (CRNAs) in the United States. Certification is required for licensure and legal practice in most states: 47 states require certification for NP licensure; 49 states require certification for CRNA licensure and one state requires certification for practice under the title “nurse anesthetist”; and most states require American Midwifery Certification Board (AMCB) certification for CNM licensure. The recertification of NPs is conducted independently by six professional organizations that offer programs in several different specialization areas. The American Association of Nurse Practitioners Certifying Board (AANPCB) offers recertification in adult practice, adult-gerontology practice, gerontology practice, and family practice; recertification for emergency practice will be offered in 2020. The American Nurse Credentialing Center Commission on Certification (ANCCCC) provides recertification in acute care, adult practice,

adult psychiatric-mental health practice, adult-gerontology acute care, adult-gerontology primary care, emergency practice, family practice, gerontological practice, pediatric primary care, psychiatric-mental health practice across the life span, and school nurse practice. The American Association of Critical-Care Nurses Certification Corporation (AACNCC) offers recertification for adult and adult-gerontology acute care. The Pediatric Nursing Certification Board (PNCB) provides recertification in pediatric primary care and acute care, the National Certification Corporation (NCC) offers recertification in neonatal and women's health care specialties, and the Oncology Nurse Certification Corporation (ONCC) offers certification in oncology.

The AANPCB, ANCC, and AACNCC recertify on a five-year cycle. The ONCC uses a four-year cycle. Each of these four organizations has a set of options for recertification: a closed-book exam or a combination of 800–1,000 clinical practice hours and 100–125 CE contact hours per cycle in lieu of an exam. The PNCB and NCC require recertification every seven and three years, respectively, and do not include a closed-book exam in their processes. Each of these organizations includes a CE component, and the PNCB allows some practice hours to replace a portion of the required CE hours. Both NCC and ONCC offer multiple-choice self-assessments to individually tailor CE requirements for recertification, from which an NP may opt out.

CNMs in the United States recertify every five years through the AMCB, and they have the option of either taking a closed-book exam or pursuing CE requirements in lieu of the exam. The CE requirements incorporate three scored, open-book modules with assessment questions based on peer reviewed literature selected by the AMCB and an additional 20-hour CE requirement. Thus, NPs and CNMs in the United States can choose to recertify without taking high-stakes closed-book exams.

CRNAs are in the process of adopting a new recertification process called Continuing Professional Certification. Recertification for CRNAs is overseen by the National Board of Certification and Recertification for Nurse Anesthetists (NBCRNA) and previously consisted of biennial requirements of 40 CE credits and practice hours equivalent to quarter-time practice. The new requirements that went into effect in 2016 are on an eight-year cycle and require passing a closed-book written exam once per cycle, which will first be administered in 2020. In addition to an exam, the process includes two four-year cycles during which CRNAs must complete CE and practice improvement requirements. Every two years, CRNAs must pay credentialing fees, confirm continuing practice, validate state licensure, update their contact information, and report their progress toward meeting the four- and eight-year cycle requirements.

Recertification fees for APNs in the United States vary from \$100 to \$775 per cycle, excluding the costs of CE credits. The structure of fees varies substantially across organizations (e.g., once-per-cycle renewal fees; renewal fees that vary by professional society membership, activity type, submission date, age, or certificate; annual or biannual fees; exam fees; or a combination thereof). When averaged across the length of a cycle, recertification fees for APNs vary from \$24 to \$170 annually.

U.S. Allopathic Physicians

The ABMS oversees MOC for U.S. allopathic physicians. ABMS member boards have varied in the timing of implementation of recertification exams and requirements. Some member boards have always required recertification exams (i.e., family medicine, emergency medicine). The American Board of Internal Medicine (ABIM) replaced lifetime certificates with time-limited certificates in 1990, with the first recertification exams in 2000. ABMS formally adopted MOC, including an exam, as the official certification policy for all member boards in 2000. Neither initial nor ongoing board specialty certification is required for licensure to practice as an allopathic physician in the United States. In 2009, ABMS member boards adopted four common MOC components or “Parts,” which are summarized in Table 2.1.³¹

Table 2.1: American Board of Medical Specialties Maintenance of Certification Framework

Part I	Professionalism and professional standing Behave in a professional manner, act in the patient’s best interest, and hold a valid, unrestricted medical license.
Part II	Lifelong learning and self-assessment Participate in high quality, unbiased educational and self-assessment activities as determined by each Member Board. Examples: Continuing medical education credits; self-assessment modules.
Part III	Assessment of knowledge, judgment, and skills Pass a written examination and other evaluations. Examples: Closed-book exams; longitudinal assessments.
Part IV	Improvement in medical practice Engage in ongoing assessment and improvement activities to improve patient outcomes. Demonstrate use of evidence and best practices compared to peers and national benchmarks. Examples: Practice improvement projects; chart or case log review; peer assessment.

The ABMS member board specialty MOC programs generally occur on a ten-year cycle as defined by the length of time between high-stakes exams, except for pediatrics (on a five-year cycle) and obstetrics and gynecology (on a six-year cycle). However, cycle lengths are currently evolving with the implementation of longitudinal assessments as an alternative to a high-stakes exam. All ABMS member boards require that physicians be licensed to practice and in good professional standing. Specialty boards typically require completion of 20 to 30 CME credits per year to fulfill the lifelong learning requirement. Many, but not all, boards require self-assessment activities as a component of lifelong learning through activities such as chart audits, assessments following CME activities, and peer-reviewed literature modules. Most boards require practice improvement activities, such as case log or chart reviews; participation in practice improvement modules approved by the specialty board; attestation to participation in local quality improvement (QI) activities; or morbidity and mortality conferences, peer reviews, patient reviews, or other initiatives to enhance quality and safety.

Specialty boards’ approaches to fulfilling the third component of MOC vary more. Historically, ABMS boards have required closed-book exams for recertification. In light of physicians’ views and preferences, trends in adult learning theory, and boards’ goals of a more

continuous MOC process, many boards are using or piloting longitudinal assessment platforms that require the physician to answer smaller batches of multiple-choice questions at regular intervals over time. As of 2016, ABMS has sponsored an online longitudinal assessment platform (CertLink™) as an exam alternative.

At present, three member boards have fully implemented longitudinal assessments as alternatives to high-stakes exams (anesthesia, pediatrics, and obstetrics and gynecology), and almost all other member boards are currently implementing, piloting, or planning longitudinal assessments. In 2016, the ABA piloted its Maintenance of Certification in Anesthesiology (MOCA) Minute® longitudinal assessment, which requires physicians to answer a selection of 30 multiple-choice questions on a quarterly basis. This has now been fully implemented as the MOC mechanism, and to remain certified anesthesiologists must maintain a Measurement Decision Theory score of < 0.1 (a statistical model that estimates likelihood that an anesthesiologist is keeping up with knowledge based on their performance) based on their periodic assessments. Also in 2016, the American Board of Obstetrics and Gynecology piloted the option of an exam exemption for physicians who reach a high-performance threshold (i.e., 86 percent correct) on 120 reading assessment questions related to 30 peer-reviewed journal articles that can be selected from 150 options annually for self-assessment (Part II) activities. Other exam alternatives being piloted are open-book online longitudinal assessment tools that allow physicians to periodically answer short sets of questions and are lower stakes, in that failing to pass one of the periodic assessments does not immediately result in loss of certification. Some boards will evaluate performance over the course of multiple rounds of longitudinal assessments to determine passage, while passing standards are still being developed by many boards piloting these tools. CertLink and other similar longitudinal assessment formats enable diplomats to complete the requirement from their office or home rather than at a proctored testing center and receive instantaneous feedback on their answers, with directions to educational resources to close knowledge gaps.

Recertification fees for ABMS member boards vary from \$1,200 to \$6,100 per cycle (i.e., \$120 to \$610 per year averaged across the cycle), not including any fees for CME credits, self-assessment activities, or practice improvement activities. The structure of fees varies among boards and includes exam or assessment fees, application fees, annual fees, or some combination thereof.

U.S. Osteopathic Physicians

The American Osteopathic Association (AOA) Department of Certifying Board Services administers recertification for osteopathic physicians in the United States. The AOA is also the U.S. osteopathic physicians' professional association. This is distinct from most other U.S. health professions, where professional certification and professional association membership are administered by separate or independently administered organizations. As with allopathic

physicians, certification of osteopathic physicians is not required for licensure to practice medicine in the United States. As mandated by the AOA in 1995, there are 18 primary osteopathic specialty boards, each with their own process for recertification. Many began offering time-limited specialty certifications after this mandate, and time-limited certificates were required by the AOA in 2004. Most specialty boards (16 of 18) conduct recertification on a ten-year cycle, but some use eight-year and six-year cycles. The current AOA Osteopathic Continuous Certification (OCC) program went into effect in 2013 and has five components: (1) active licensure, (2) lifelong learning/CME with a requirement to complete no less than 50 credit hours in their specialty every three years, (3) cognitive assessment, (4) practice performance assessment and improvement (e.g., participation in quality improvement projects, submission of case logs, submission of practice assessment modules), and (5) continuous AOA membership. The cognitive assessment component of AOA OCC currently requires that specialty boards administer a proctored exam, so all primary specialty recertification programs include an exam. Most (17 of 18) of these are a closed-book written or computer-based exam; some also incorporate a practical or oral exam. In 2019, the American Osteopathic Board of Radiology will pilot the use of 15 self-assessment modules in lieu of the exam. Recertification costs vary from \$500 to \$6,795 per cycle (i.e., \$50 to \$680 per year, averaged across a cycle), excluding costs for CME credits, annual AOA membership dues, and CME reporting and specialty fees invoiced annually with AOA membership dues. As with ABMS boards, the structure of AOA boards' fees varies among boards, including exam or assessment fees, application fees, annual fees, module fees, or some combination thereof.

International Health Professionals

International Physician Assistants

The PA profession is relatively nascent outside of the United States. There are practicing PAs in Canada, Australia, Netherlands, the United Kingdom, Ghana, South Africa, and Taiwan. However, the number of practicing PAs remains low in these countries, in both absolute terms and as a percentage of the health professional workforce. Only Canada and the United Kingdom have established regulatory frameworks for recertifying PAs.

In Canada, the Physician Assistant Certification Council of Canada oversees certification and recertification of PAs. Recertification occurs on a five-year cycle, and PAs are required to complete 400 CPD credits in the five-year period, with a minimum of 40 credits earned each year. There is no exam or assessment required for recertification. However, PAs who fail to complete the CPD credits must retake the certification exam to remain certified.

The Royal College of Physicians Faculty of Physician Associates oversees recertification for PAs (physician associates) in the United Kingdom. This profession is still relatively new in the United Kingdom, and PAs are not yet statutorily registered; certification, recertification, and

professional registration are voluntary and encouraged, but not required for practice. Recertification is granted on a six-year cycle. PAs have three chances to pass a closed-book recertification exam every cycle and complete 50 hours of CPD credits annually to remain in the Voluntary Register.

International Advanced Practice Nurses

The field of advanced practice nursing is still in its early stages outside of the United States, and, in most countries, there are no APNs with a scope of practice that includes prescribing rights comparable to those granted to APNs in the United States. Exceptions include Australia, Canada, Netherlands, New Zealand, and the United Kingdom, which give APNs prescribing rights and have an established regulatory framework with recertification or licensure renewal processes. Ireland is developing a revalidation process to occur on a five-year cycle, but its requirements have not yet been determined.³²

In Canada, the renewal process is conducted at the provincial level and varies across the country; no province requires an exam, all provinces require documentation of practice hours, most require identification and execution of a CPD learning plan, most require self-assessment or self-reflection activities, some require peer review, and one requires patient review. Renewal cycle lengths are one year in Australia and most Canadian provinces, three years in New Zealand and the United Kingdom, and five years in the Netherlands. In all five countries, this maintenance of registration process is required for licensure or ongoing practice. All countries require APNs to complete CE and report their practice hours, but none require an exam. Peer review is required in Australia, New Zealand, and many provinces in Canada and is one option for the feedback requirement in the United Kingdom. Patient review is an option for the feedback requirement in the United Kingdom and is required in Manitoba, Canada.

International Physicians

The recertification processes for physicians vary across the OECD countries we evaluated. The role and distribution of requirements among specialty organizations and licensing or registration bodies also vary and are generally not analogous to health professional certifying organizations in the United States. Recertification cycles range from three to seven years in length, and the role of recertification in licensure requirements varies across countries. For example, recertification is required to practice medicine in Austria and France, but is only required of government-employed physicians in Germany and Greece. In no countries are physicians required to pass closed-book exams as part of their recertification process outside of the United States. Recertification requirements include some form or amount of CE in all countries. In several countries, recertification includes a peer review process, and a patient review is included in the United Kingdom and Netherlands.

Chapter Three: Review of the Literature Surrounding Recertification Requirements

Approach

We conducted a structured search of the peer-reviewed evidence regarding recertification requirements, including closed-book exam-based approaches versus alternative or complementary requirements and their effect on patients (i.e., outcomes, safety, access) and health professionals (e.g., burden and costs, stress, experience). To identify original research and review articles we searched PubMed, PsychInfo, CINAHL, Embase, Web of Science, and Scopus for English language articles published from 2000 (i.e., when MOC exams were first administered for many ABMS member boards) through January 2018. We incorporated the search terms “recertification,” “maintenance of certification,” “maintenance of licensure,” “relicensure,” and “revalidation” (in the United Kingdom, in particular) and excluded editorials, comments/replies, letters, opinions/columns, news, and articles without authors. To ensure that we had not missed the use of the term “revalidation” outside of the United Kingdom, we ran an additional search on this term coupled with physician and nurse search terms in the same databases. Because inclusion of “continuing medical education,” “continuing education,” or “continuing professional development” as search terms returned a prohibitively large number of results, we performed a focused search of the Web of Science database to identify articles that were rated “highly cited” in their field (i.e., the top 1 percent of papers in a subject area in a given year by citation counts) or cited more than 100 times.

To review the gray literature, we performed a structured search of conference proceedings from the Web of Science and Scopus databases and dissertations from the PsychInfo database from 2014 to 2018 to incorporate early evidence not yet represented in the peer-reviewed literature. We focused on articles about actual or piloted recertification requirements, as opposed to initial certification, certification overall, or theoretical preferences and views regarding potential requirements. We did not include literature addressing the psychometric properties of recertification requirements that did not also address some element of their effect on health professionals or patients. Two researchers independently reviewed titles and abstracts to identify publications potentially relevant to our research questions. We also scanned bibliographies of articles identified by our literature search, as well as the ABMS Continuing Certification Reference Center, to reduce the likelihood of missing relevant articles.^{33,34}

Our structured search identified 3,051 articles, of which 1,687 were duplicates. Of the remaining 1,364 articles, 132 were relevant to our topic and met our inclusion criteria; an additional 46 articles were identified via bibliographic review or other means, for a total of 178 articles included in our review.

U.S. Health Professionals

U.S. Physician Assistants

The evidence regarding the impact of recertification requirements for PAs in the United States is limited. One study evaluated PANRE performance and found it was correlated with initial certifying exam performance, with 7 percent of performance variation attributable to practice focus (surgical PAs scored lower on average than PAs with other practice foci) and no correlation between clinical experience with an organ system and exam performance on that system.³⁵ Our review did not identify any published studies that have estimated the effects of PA recertification requirements on patient care quality or outcomes or addressed the individual or health system costs of recertification requirements.

U.S. Advanced Practice Nurses

The evidence regarding the impact of recertification requirements for APNs in the United States is also limited, with studies primarily focused on APN views regarding requirements. Surveyed NPs viewed CE as important to professional development and competency and as improving patient care, but there is limited evidence linking CE to improvements in professional competence or patient care among NPs and no studies reflecting patient outcomes. One study showed that most participants in a state NP CE symposium self-reported changes in practice thereafter, and a survey of nurses including NPs revealed that they rated CE a more minor contributor to their clinical abilities than other factors (i.e., basic professional education, work experience, mentorship) and revealed no difference in rated growth in clinical abilities between nurses subject to CE mandates and those who were not.^{36–38} In 2016, the NBCRNA announced a new recertification program that will include written exams for CRNAs beginning in 2020. A survey of practitioner and educator nurse anesthetists revealed opposition to written exams but reflected support for the use of lectures accompanied by assessments as a mechanism of CE.³⁹ Our review did not identify any published studies that estimated the effects of APN recertification requirements on patient care quality or outcomes or that addressed the individual or health system costs of recertification requirements.

U.S. Physicians

Much of the literature about recertification reflects MOC for U.S. allopathic physicians. The newer OCC program for osteopathic physicians in the United States was not represented in original research or review articles. While our review focused specifically on MOC requirements, the broad literature regarding specialty board certification overall among U.S. allopathic physicians (not distinguishing between initial certification and MOC, or between time-limited certificates subject to MOC requirements and time-unlimited certificates not subject to MOC) has been previously reviewed. It is challenging to generalize conclusions from these

studies to MOC requirements in particular because of this heterogeneity and because physicians who choose to board certify in a specialty in the first place are likely systematically different than those who do not. A 2004 review summarized the evidence regarding specialty board certification overall (i.e., not distinguishing between initial certification and MOC, and not distinguishing between the effect of exams versus other components of MOC) in three distinct bodies of literature: (1) demonstration of the validity of the testing and question development process and standards, (2) consistent correlation of exam scores with physician characteristics likely indicative of quality (i.e., location and amount of training, program directors ratings, practice features), and (3) better clinical outcomes associated with certification.³ A 2013 review addressing ABMS specialty board certification overall, including some studies reflecting MOC, concluded that: patients and employers valued specialty board certification, but physicians' own opinions were mixed; MOC practice improvement and self-assessment activities were consistently associated with self-reported improvement in knowledge, communication, and care; initial certification exam performance was correlated with other markers of quality (i.e., malpractice claims and disciplinary action, training length and location, program directors' ratings); and most, but not all, studies showed an association between physician board certification and performance on measures of clinical quality.⁴⁰ While most studies did not distinguish between initial certification and MOC, a few studies addressed MOC specifically and are addressed in our review below.

With regard to reviews more specifically addressing MOC, another 2013 review concluded that the individual components of the ABMS MOC framework were based on a sound theoretical rationale and evidence-based foundation.⁴¹ A 2017 review of the literature surrounding MOC participation overall and specific MOC components, including MOC exams and activities done for MOC credit (i.e., self-assessment and practice improvement), concluded that many but not all studies show a positive effect of MOC in many but not all cases and also notes that methodologic challenges are particularly relevant for the included studies that address practice improvement activities (i.e., Part IV practice improvement requirements).⁴² A 2018 review of the literature regarding MOC and activities done for MOC credit (i.e., self-assessment and practice improvement) concluded that most studies showed a positive association between MOC components (i.e., MOC exams, self-assessment activities, practice improvement activities) and physician knowledge, learning, changes in practice, and changes in patient outcomes but acknowledges that findings are concentrated among a few specialty boards, and many studies of activities done for MOC credit (i.e., self-assessment and practice improvement) are based on small local interventions.⁴³

Our review focused specifically on MOC requirements and included those studies that addressed MOC overall, performance on MOC exams in particular, or other activities done for MOC (i.e., self-assessment and practice improvement). The findings are detailed below.

MOC in General

MOC Participation and Views

Studies addressing physicians' participation and views about MOC activities overall used methods such as surveys, focus groups, and analyses of administrative data. Surveys and administrative data for internists and family physicians revealed high levels of participation in MOC, with lower participation rates among certain subgroups (e.g., solo practice, non-U.S. medical training, lower initial certification scores).⁴⁴⁻⁴⁹ Surveys and focus groups of physicians in various specialties and settings revealed that professionalism, demonstration of competence or knowledge, engagement in lifelong learning, and employer requirements were cited across specialties as rationales for and benefits of participation. Conversely, barriers or reasons for not participating were time, expense, lack of support for participation, absence of employer requirements or monetary benefit of participation, and skepticism regarding relevance or benefit to patient care.⁵⁰⁻⁵⁸ While burden and expense were commonly cited barriers, only one study concretely assessed this. A Markov-model analysis of the 2015 ABIM MOC cycle revealed that associated costs represented less than 1 percent of a typical physician's salary but in aggregate summed to \$5.7 billion over ten years across all participating internal medicine physicians and subspecialists, with \$5.1 billion attributable to 32.7 million physician hours spent on MOC requirements and \$561 million in direct exam expenses.⁵⁹ These cumulative cost calculations also included the time costs of fulfilling CME requirements, which are also separately required for continued licensure in most states and for credentialing and staff privileges by many hospitals or employers.

In summary, studies of physician views of MOC overall have generally found that physicians balance professional benefits (i.e., demonstration of competence, lifelong learning, meeting requirements) against the time, expense, and burden of requirements. We identified only one study, limited to internists, that systematically assessed the cumulative burden and expense of MOC requirements;⁵⁹ this study found that physician time spent completing the requirements was the major driver of cumulative MOC-related expense. Our review did not identify studies that systematically assessed burden and expense among other specialties or that included the newer longitudinal assessment requirements.

Association of MOC Participation with Quality and Outcomes

The literature exploring the impact of MOC requirements cumulatively (i.e., not distinguishing between specific requirements therein) on patients and outcomes was based on cohort analyses of administrative data that mostly focused on general internists. National, quasi-experimental analyses of Medicare data revealed small but statistically significant increases in mammography rates, decreased spending, and no difference in admission rates for ambulatory care sensitive conditions.^{60,61} A small retrospective analysis of data from four Veterans Affairs medical centers revealed no differences in performance on process and intermediate outcome

quality measures.⁶² An analysis of electronic medical record data at two academic hospitals revealed that a longer time since one's last board certification was associated with less treatment intensification when warranted for diabetic patients with uncontrolled hypertension.⁶³ Among physicians of multiple specialties in a single health system, a cross-sectional study of patient experience survey data revealed that active participation in MOC activities was associated with increased likelihood of patients to recommend a physician compared to physicians enrolled but not actively participating in MOC activities. However, it found no difference in patient experience scores for board certified physicians enrolled in MOC, regardless of participation, compared to board certified physicians not enrolled in MOC (i.e., those whose initial certification did not require MOC).⁶⁴ Finally, a cross-sectional study of Medicare data revealed that treatment in an emergency room with more board certified emergency medicine physicians (for whom only time-limited certificates exist) was associated with fewer missed myocardial infarctions but higher costs for emergency department evaluation and the resulting care.⁶⁵

In summary, published studies assessing the implications of physicians' overall MOC participation for patient care and outcomes have focused predominantly on general internists, except for one small single-institution multispecialty study and one study addressing emergency physicians. Our review did not identify studies that addressed other specialties' MOC requirements. Among published studies, participation in MOC was associated with improvements in some process-based quality measures and diagnostic accuracy, but not with improvements in intermediate outcome measures. Only one identified study at a single institution addressed patient experience, and only two studies addressed MOC and costs of care, with mixed findings. These studies addressed MOC as a whole and did not attribute findings to any single component requirement thereof. Below, we review the literature on specific components of MOC requirements.

MOC Exams and Assessment of Knowledge, Judgment, and Skills (Part III)

The literature on ABMS MOC Part III exams or assessments of knowledge, judgment, and skills included studies that addressed physician characteristics and activities associated with performance, clinician views and ratings of exam relevance and burden, association of exam performance (i.e., higher exam scores or passing the exam) with quality or outcomes, and analyses related to alternative features of the exam or assessment.

Characteristics and Activities Associated with MOC Exam (Part III) Performance

Studies assessing physician characteristics and performance on MOC exams included general internists, surgeons, and family medicine physicians. These studies found that group rather than solo practice is associated with better performance on MOC exams.⁶⁶⁻⁶⁸ Evidence regarding the association between age and MOC exam performance was mixed. Among internists, surgeons, and anesthesiologists, taking an MOC exam for the first time at a younger age was associated with higher exam scores.^{66,69} Among family physicians, passage rates were higher among initial

certifiers, but overall mean scores were higher among recertifiers and progressively increased with successive cycles.^{70,71} Exam scores were maintained over three successive cycles among emergency medicine physicians.⁷² Among psychiatrists, neurologists, and forensic psychiatry subspecialists, performance on common items on the initial certifying exam and recertifying exams was equivalent.^{73,74} Better scores on initial certifying exams were associated with better MOC exam scores for internists, surgeons, and anesthesiologists.^{66,69} Other characteristics associated with MOC exam performance were U.S. medical training for internists and surgeons;^{66,75} rural practice location or broader scope of practice for family physicians,^{68,76} and for anesthesiologists, the male sex, a lack of disciplinary action, and taking the exam earlier in cycle.⁶⁹ A survey of emergency medicine physicians found that the vast majority of participants identified a benefit to preparing for the exam (e.g., increasing or reinforcing knowledge); in addition, identification of knowledge reinforcement as a benefit of the exam was associated with a small but significant difference in exam performance.⁷⁷

Other studies assessed the association between participation in CME activities or use of educational resources and MOC exam performance. Participation in more CME activities appears to be associated with better performance on MOC exams, as evidenced by greater performance on the MOC exam among surgeons with more CME credits, as well as by an association between states' implementation of more rigorous CME requirements and internists' performance on the MOC exam.^{78,79} General internists' MOC exam performance was associated with their use of electronic clinical reference resources in the year preceding the exam.⁷⁵ Anesthesiologists who participated in a longitudinal self-assessment and study program (MOCA Minute) scored higher on the MOC exam;⁸⁰ MOCA Minute subsequently evolved to become the basis of the longitudinal assessment itself, replacing the Part III exam in anesthesiology.

In summary, for physicians, studies assessing predictors of performance on Part III MOC exams addressed several specialties but did not consistently address the same characteristics. However, group practice and U.S. medical training were associated with better exam performance, while the association of age with exam performance was variable. Greater engagement with CME or educational resources was associated with better MOC exam performance. From these studies, it was not possible to determine whether physicians who engage more with CME or educational resources may also be separately devoting more time or effort to exam preparation. Our review did not identify studies that examined performance on the longitudinal assessments being implemented or piloted by multiple ABMS member boards as alternatives to closed-book high-stakes exams.

MOC Exam (Part III) Performance and Clinical Quality or Outcomes

The association between MOC exam performance and quality was studied among internists in observational studies. Some studies demonstrated a positive association between exam scores and performance on a diabetes composite quality measure (process and intermediate outcome) and patient experience measures via self-reported data from ABIMs practice improvement

module.^{81,82} In Medicare claims data, MOC exam performance was associated with greater likelihood to perform recommended diabetes care and mammography but not lipid assessment for cardiovascular disease patients.⁸³ These studies among internists reveal improvement in some, but not all, process quality measures. Two identified studies addressed intermediate outcome measures and patient experience, finding a positive association. These studies do not necessarily indicate that exams or preparation for them result in improvements in care; the same physicians may have performed better regardless of an exam requirement. For example, those physicians who prepare more comprehensively for exams and consequently score better may coincidentally have more guideline-concordant practice styles. Our review did not identify studies that examined the association between exam performance and process quality measures or outcome measures in other specialties or the association between exam performance and costs of care. Nor did our review identify studies that examined associations between performance on longitudinal assessments and clinical quality or outcomes.

Ongoing or Anticipated Evolution of the MOC Exam Requirements (Part III)

Some of the literature reflected ongoing or anticipated evolution in MOC exam or assessment requirements. Some ABMS boards offered modular components to their exams that focused on more specific clinical areas selected by the examinee. An analysis of American Board of Family Medicine (ABFM) exam performance revealed that having examinees select one module, rather than two, improved scores for most and improved standardization of scoring of the examination across all examinees.⁸⁴ Radiation oncologists were more likely to rate a newly implemented modular component as relevant to their practice than the general exam.⁸⁵ As ABIM considered open-book options for their exam, an experiment that randomized examinees to open-book versus closed-book exams found that closed-book exams took less time; however, exam performance was not adversely affected by use of an open-book resource, nor was the skill or factor targeted by the exam changed.⁸⁶

The literature also revealed adult learning theory underpinnings for longitudinal assessments as an alternative to high-stakes closed-book exams (i.e., spaced, repeated testing and interleaving of related content can improve knowledge retention).⁸⁷ However, given the still nascent implementation of longitudinal assessments among ABMS boards, there was no published evidence regarding their impact on patient care, outcomes, or costs of care.

In summary, studies related to changes in MOC exam requirements addressed a limited number of specialties. Two studies found that modular components might increase relevance of the exam to a physician's practice, but they may make scoring less standardized across examinees. One study found that open-book exams do not meaningfully change exam scoring properties.

MOC Practice Improvement Activities (Part IV)

A general survey of internists and family physicians revealed mixed opinions regarding the balance of burden and relevance and the potential to improve or advance clinical practice of practice improvement (Part IV) requirements, with most acknowledging the time intensive nature of the requirements and lack of benefit for career advancement.⁸⁸ Surveys of pediatricians and neuroradiologists revealed greater confusion about requirements, greater burden related to activities, and lower impact ratings for practice improvement (Part IV) requirements compared to self-assessment (Part II) MOC requirements.^{58,89} Most family physicians, internists, and dermatologists participating in web-based practice improvement (Part IV) modules rated them as relevant to their clinical practice and likely to either change or reaffirm their clinical practice.⁹⁰⁻⁹² Findings with regard to specific activities for practice improvement (Part IV) MOC credit were mixed: family physicians participating in modules collaboratively with facilitation via coaches valued this support and reported increased self-rated competence in QI and confidence to undertake another QI project;⁹³ radiation oncologists participating in an online safety module rated it easy to use but not likely to enhance practice;⁹⁴ and anesthesiologists participating in simulation activities for credit found them relevant and likely to change practice;⁹⁵⁻⁹⁷ but, anesthesiologists participating in a pilot or patient and peer review activities found them burdensome and providing limited actionable information.⁹⁸

Most studies addressing practice improvement (Part IV) MOC credit activities used self-selected participants' self-reported data with a comparison to the participants' baseline, as opposed to a concurrent control group. These included small, single-institution studies with universal improvement on targeted process measures, improvement on some outcome measures, self-reported increases in QI engagement and application, or improvements in knowledge.⁹⁹⁻¹⁰⁷ However, one local study of inpatient pediatricians showed that improvements made in body mass index documentation were not sustained after the intervention.¹⁰⁸ Small, single-institution QI interventions designed to meet both ACGME and practice improvement (Part IV) MOC requirements demonstrated universal improvement on targeted process measures reflecting the care delivered by trainees.¹⁰⁹⁻¹¹² Other initiatives providing practice improvement (Part IV) MOC credit undertaken by multiple practices or hospitals through local or state QI collaboratives demonstrated improvements in many process measures and some intermediate outcome measures (e.g., low-density lipoprotein [LDL] control, A1c control, blood pressure control).¹¹³⁻¹²³ For pediatrics in particular, other initiatives offering practice improvement (Part IV) MOC credit have incorporated multiple institutions across the country that are engaged in national QI collaboratives and have demonstrated improvements on process measures, intermediate outcome measures, and outcome measures.¹²⁴⁻¹³³ Other studies focused on activities completed through web-based practice improvement (Part IV) modules that incorporated larger numbers of self-selected participants and their self-reported chart-audit data and found improvements relative to baseline in most documentation and process measures, as well as improvements on some

intermediate outcome measures.¹³⁴⁻¹⁴⁴ Other analyses of web-based specialty board modules were associated with self-assessed improvements in care or knowledge but did not report remeasurement of outcomes after the intervention.¹⁴⁵⁻¹⁴⁷ Web-based modules constructed by other organizations and approved by specialty boards to provide practice improvement (Part IV) MOC credit showed improvement in most process and intermediate outcomes.¹⁴⁸⁻¹⁵⁰

However, the impact of participation in practice improvement (Part IV) MOC activities was mixed or modest in more rigorous studies that compared intervention groups to controls. Improvements were noted for pediatric practices' delivery of HPV vaccines.¹⁵¹ Improvements on some measures, but not others, were found relative to a control group for an asthma care intervention among internists,¹⁵² for an asthma care intervention among pediatricians,¹⁵³ and for a cardiovascular risk reduction program among pediatric practices.¹⁵⁴ No difference in the use of recommended rating scales for attention deficit hyperactive disorder care was found among pediatric practices participating in an improvement initiative.¹⁵⁵

In summary, the literature on practice improvement (Part IV) activities for MOC credit included a broader array of specialties than the literature addressing other components of MOC. Physicians viewed these activities as generally relevant to practice but described significant burdens and time required. Many of the studies in this area were of lower methodological quality, comparing voluntary participants in self-selected activities to their own baseline performance. These studies reported improvement in the vast majority of process and documentation quality measures and on some intermediate outcome or outcome measures. However, these studies could not identify why participants selected a given activity or whether they would have improved similarly absent the activity. More rigorous studies that incorporated a control group (which were limited to internists and pediatricians) had more mixed or modest findings, with improvements in only some process and outcome measures.

MOC Self-Assessment Activities (Part II)

There are fewer studies addressing physician participation in MOC self-assessment (Part II) activities, compared to practice improvement (Part IV) activities. Most family physicians, internists, and emergency physicians participating in a variety of online self-assessment (Part II) modules through their specialty board rated them favorably and noted them to be relevant and likely to change practice.¹⁵⁶⁻¹⁵⁹ The views of internists participating in specific self-assessment (Part II) activities have been mixed: those participating in a patient and peer rating activity rated it as likely to improve care and a valuable learning experience;¹⁶⁰ however, a minority of those participating in a specific professionalism module rated it as providing new information or insights,¹⁶¹ and those participating in an alternate self-assessment module based on point-of-care questions (as opposed to the standard multiple-choice assessment format) rated it as more time intensive and likely to change practice less than half of the time.¹⁶²

With regard to the effect on patient care, family medicine physicians participating in a group self-assessment (Part II) module for asthma care had improvements from baseline in guideline knowledge, process based quality measures, and comfort assessing control.¹⁶³ Analyses of web-based self-assessment (Part II) modules demonstrated knowledge gaps among neurosurgeons and family physicians,^{164–166} identified trends in evidence-based hypertension care among family physicians,¹⁶⁷ and increased knowledge for pulmonologists.^{168–170} However, self-assessment (Part II) modules selected by family physicians did not appear to consistently reflect knowledge gaps demonstrated by MOC exam performance.¹⁷¹ Participants in ABFM self-assessment (Part II) or practice improvement (Part IV) modules improved in some diabetes process and intermediate outcomes relative to nonparticipants, but improvements were not greater for those participating in diabetes-specific modules compared to other modules.¹⁷²

In summary, studies reflecting self-assessment (Part II) MOC activities were more limited than those reflecting practice improvement (Part IV) requirements and included a narrower array of specialties. While many activities were rated favorably or relevant to practice, this was not true of some specific activities. While studies of self-assessment activities described the potential to identify knowledge gaps and increase knowledge or guideline-based care, these activities were self-selected, and studies of family physicians reported that physicians might not be selecting self-assessment activities in areas of care where improvement is most needed.

International Health Professionals

The literature regarding recertification in other countries is more limited than that in the United States and is dominated by the recent implementation of a comprehensive “revalidation” program to recertify licensed physicians for practice in the United Kingdom. Our review did not identify any studies that addressed the impact of recertification requirements for PAs outside of the United States.

The literature identified in our review regarding the impact of recertification requirements for APNs outside of the United States was limited to the recent implementation of a revalidation procedure for nurses, including advanced practice nurses, in the United Kingdom. This process involves documentation of practice hours; completion of CPD; a log of practice-related feedback from patients, colleagues, and management; a written reflective account on CPD, feedback, or an event; a reflective discussion with another nurse; and confirmation from a manager or other colleague that requirements have been met. The literature regarding nursing revalidation is nascent, given that these requirements began in 2016, with studies largely restricted to the experience of single sites or pilot sites. Local case studies and surveys found some positive professional and educational experiences from revalidation and more positive experiences among more experienced nurses; however, there also existed uneven experiences of anxiety and burden about the required reflective accounts and trying to find a colleague to act as one’s revalidation confirmer.^{173–175} The Nursing and Midwifery Council has engaged an independent third-party

evaluator to assess the process, outcomes, impact, and balance of benefits and burden of the revalidation process for nurses and midwives, incorporating stakeholders in reviews, analysis of monitoring information, literature and context reviews, surveys, case studies, and interviews.¹⁷⁶ The first-year interim report for the ongoing evaluation highlights that the revalidation process has been well received and has potential to enhance a culture of reflection and improvement, but that health professionals would benefit from more guidance on the required content of reflective accounts and discussions, and that the burden of participation appears to be inconsistent for nurses with different employers.

In Canada, a new MOC and CPD framework was implemented by the Royal College of Physicians and Surgeons for specialty certification in 2011, offering simplification from six sections to three (i.e., group learning, self-learning, and assessment), simplified templates for recording activities, and broadening of activities and greater emphasis on self-learning and self-assessment activities. Surveyed specialists rated the framework as less burdensome and complex than the prior framework but not necessarily resulting in change to learning practices and lacking in readily available assessment activities.^{177,178} An analysis of vascular surgeons' CPD activities revealed little change in those selected after the change.¹⁷⁹ Some Canadian provinces have piloted or implemented multisource feedback (MSF) questionnaires from patients and peers in their registration and licensing requirements, but findings regarding the utility of this feedback to change or improve care were mixed. While pilot tests of MSF for physicians and surgeons in Alberta prompted contemplation or initiation of change among a majority of participants,^{180,181} few surgeons ultimately changed their practice in response to feedback received once the program was implemented.¹⁸² Further, an MSF pilot among family physicians in Nova Scotia found mixed reactions to perceived utility and actionability of feedback, but physicians who received negative feedback from patients reported making changes in response.^{183,184}

In the United Kingdom, revalidation through the General Medical Council (GMC) for licensed physicians began in 2012, incorporating a professional portfolio of supporting information to inform annual appraisals and MSF from peers and patients during the five-year cycle. The process of peer appraisal is conducted through a physician's "designated body" (an organization that is most often the physician's employer), and the revalidation recommendation to the GMC is made by that designated body's "responsible officer," whose role in the organization is related to quality assurance and fitness to practice. Before revalidation, the National Health Service already required annual formative appraisals for its employed general practitioners (GPs). The literature reflecting those preexisting appraisals was generally based on physicians' perceptions rather than measurable outcomes; perceived benefits of appraisal included self-reflection, education, changes in practice, mentorship, and motivation, and mechanisms for appraisals' effects included dissonance, denial, or self-affirmation.¹⁸⁵⁻¹⁸⁷ The bulk of the literature about the UK physician revalidation process also involved the views and experiences of physicians subject to the requirements or pilots, either through surveys or qualitative analyses of semi-structured interviews, survey comments, or focus groups. Findings suggest that certain types of physician

practice types or settings (e.g., practice in secure environments including prisons or other institutions, locum tenens practice, occupational medicine practice outside of large medical organizations)^{188–190} faced disproportionate difficulties and burdens meeting revalidation requirements; and the process was perceived by physicians planning to leave practice to be bureaucratic, inflexible, and of questionable relevance to education or care improvement.¹⁹¹ Studies regarding the appraisal component found that officers overseeing appraisal at their own institutions felt that appraisal quality varied and could be improved with training, support, and flexibility¹⁹² but believed that the appraisals they received themselves were valuable for development and improvement.¹⁹³ Benefits of revalidation included standardization of appraisals, broadening of appraisal to more physicians, increased self-reflection, and potential to improve practice, while negatives included increased bureaucracy, increased burden, and unclear intended goals.^{194–197}

Multiple third-party independent evaluations of physician revalidation have been completed. An evaluation commissioned by the GMC incorporated surveys of physicians, responsible officers, and the public; interviews with doctors and patient representatives; and review of appraisals and doctors' portfolios.¹⁹⁸ Key findings included: greater burden for physicians working outside existing governance structures to meet specific appraisal and supporting information requirements, limited translation of reflection on supporting information into ongoing reflective practice style, change in practice due to appraisal for a minority of physicians, and a lack of impact on referral of physicians not fit to practice. The evaluation commissioned by the Department of Health Policy Research Programme incorporated surveys, interviews, and case studies, as well as analyses of secondary data.¹⁹⁹ The report concluded that revalidation may be inducing organizations and health professionals to engage more with safety and quality data; however, it is more burdensome for some categories of physicians and organizations, has not been associated with differences in performance on inpatient quality indicators, and may negatively impact access by increasing the likelihood of the consultant (specialist) workforce leaving practice (though it is unclear what portion of those leaving practice were actively practicing at the time). An independent report has been published by the chair of the former Revalidation Advisory Board, based on interviews with physicians, professional bodies, patients, and medical leaders across the United Kingdom, as well as operational data and reports, surveys, and public comments on the GMC website.²⁰⁰ This report highlights that revalidation has bolstered reflection practices for physicians and strengthened clinical governance structures in organizations (e.g., formalized responsible officer role, appraisals as a mechanism to identify concerns), which may improve quality and safety. The report notes that burdens of revalidation and quality of appraisals are uneven for physicians with nonstandard employment arrangements and acknowledges that many physicians still believe that the process is burdensome and ineffective.

In summary, much of the literature regarding recertification requirements for health professionals outside the United States reflects the experience with the recent implementation of

revalidation requirements for physicians and nurses in the United Kingdom. These requirements incorporate CPD requirements, peer appraisals or discussions, MSF, and reflective activities, and they differ substantially in content from the recertification requirements for PAs in the United States. Studies also reflect some recertification requirements in Canada (e.g., CPD requirement changes or MSF) that are different than those for PAs in the United States. The burden of these requirements was a concern for health professionals subject to these requirements. Notably, the international recertification requirements reflected in the literature do not incorporate exams. In the studies we reviewed, no evidence linking these recertification requirements to improvements in measured quality or outcomes was found.

Continuing Education or Professional Development

Because CE, CME, and CPD only constitute a subset of the requirements for recertification of health professionals in many instances, our search focused on highly cited studies and reviews within this broad literature. Most CE activities are self-selected, so health professionals' ability to accurately assess their knowledge needs and gaps is important. A systematic review found that most studies found weak or no association between a physician's or health professional's self-rated assessments of competence with external observations, consistent with findings in prior studies and in other professions (e.g., law, engineering, psychology), as also noted in other reviews.^{201–203}

Several reviews address the effectiveness of CME techniques or educational methods. A narrative review concluded that CME is most effective in inducing change in clinical practice when it includes needs assessments to motivate change, fosters interaction among learners with opportunities to practice new skills, and features multiple educational techniques or steps as opposed to a single, passive intervention.²⁰⁴ A review of studies of online CME delivery revealed that while the majority of studies primarily addressed participant satisfaction, few addressed changes in clinical practice, and none addressed effects on health outcomes.²⁰⁵ A systematic review commissioned by the Agency for Healthcare Research and Quality concluded that most studies suggested that CME is effective at achieving and maintaining knowledge, attitudes, skills, behaviors, and clinical outcomes, but much of the contributing evidence base is of low methodological rigor.²⁰⁶ A review of 26 systematic reviews and meta-analyses assessing the effectiveness of CME tools and techniques found that interactive techniques (e.g., interactive education, audit/feedback, academic detailing, reminders) had the greatest effects on practice change and patient outcomes; expert opinions and practice guidelines had less; and didactic lectures or printed information had little or no effect.²⁰⁷ Lastly, a review of studies on the impact of educational meetings and workshops found a small positive effect on professional practice and patient outcomes and reported that mixed interactive and didactic interventions appeared to be more effective than either technique alone.²⁰⁸

A few studies on individual CME interventions were also highly cited, and all were randomized trials with a control group. A study of an online CME intervention and an equivalent live CME workshop on cholesterol management among primary care providers in Texas found that knowledge was equivalently increased and sustained in both groups; screening rates were high and did not change in either group; and treatment of high-risk patients significantly increased in the online group only.²⁰⁹ A study of a multimodal CE intervention for GPs in Australia addressing adolescent health resulted in substantial gains in knowledge, clinical skills as assessed via randomized patients, and self-assessed competency.²¹⁰ Two studies of asthma CME interventions for pediatricians in the United States revealed that one to two years after the interventions, CE participation was associated with improved processes of care, better-rated communication by parents, mixed effects on hospitalizations and ED visits, and no change in office visits.^{211,212}

In summary, published studies report that CME activities can improve knowledge and clinical practice; and interactive, longitudinal, sequenced, and multimodal techniques appear to be more effective than passive modalities and single session activities. Reviews also noted that much of the evidence base surrounding the impact of CME is of low methodological rigor and that participant satisfaction is more commonly addressed than changes in clinical care. Furthermore, CME activities are mostly self-selected by health professionals, and evidence shows that health professionals are not adept at identifying gaps in knowledge, which may modulate the potential impact of CME on improvements in care. However, the randomized trials that were reviewed found that CME activities were associated with improvements in knowledge and processes of care; only one study addressed health outcomes and found mixed effects.

Chapter Four: Interviews with Health Professional Certifying Organizations

Approach

We conducted interviews with leaders or representatives of health professional certifying organizations in the United States and other countries to explore the rationales, alternatives, and future plans regarding recertification requirements. We identified organizations from the environmental scan whose scope of practice overlapped with that of PAs in the United States and preferentially sought out organizations who were planning, piloting, or implementing recertification requirements that included an alternative to a secure closed-book exam. These organizations included health professional recertifying bodies in the United States and English-speaking countries abroad. We then chose organizations meeting our inclusion criteria that varied in location (i.e., United States, international), profession (i.e., PA, physician, APN), and whether the organization's requirements had undergone recent changes or not.

We invited organizations to participate in this study through a hard-copy recruitment letter mailed to the chief executive or highest-ranking administrator at the organization. The recruitment letters described the study's objectives and requested that a representative of the organization knowledgeable about the recertification requirements participate in a one-hour telephone interview. Study staff then contacted each organization by phone and/or email up to three times to pursue recruitment. Of the 17 organizations contacted, ten agreed to participate. To protect interviewee confidentiality, we list participating interviewee's organizations by professional type (i.e., PA or APN versus physician) and by country (United States vs. other country).

Study staff conducted 60-minute telephone interviews using a semi-structured interview guide that can be found in Appendix B. We asked interviewees about their organizations' experiences with (1) developing recertification requirements and (2) assessing knowledge or competence through exams versus alternative means. We also asked interviewees to describe the benefits and challenges of their current recertification requirements, including any feedback received from health professionals.

We recorded and transcribed interviews with interviewee consent and coded interview transcripts for thematic content using computer-assisted qualitative analysis software (Dedoose).²¹³ Two researchers independently coded each transcript, and we analyzed the union of their codes. Our initial code tree was based on the interview guide and was revised during the coding process via consensus discussions among three members of the research team. As is standard in qualitative research, we report findings as described by interviewees, thus reflecting their experiences, thinking, and opinions.

Findings

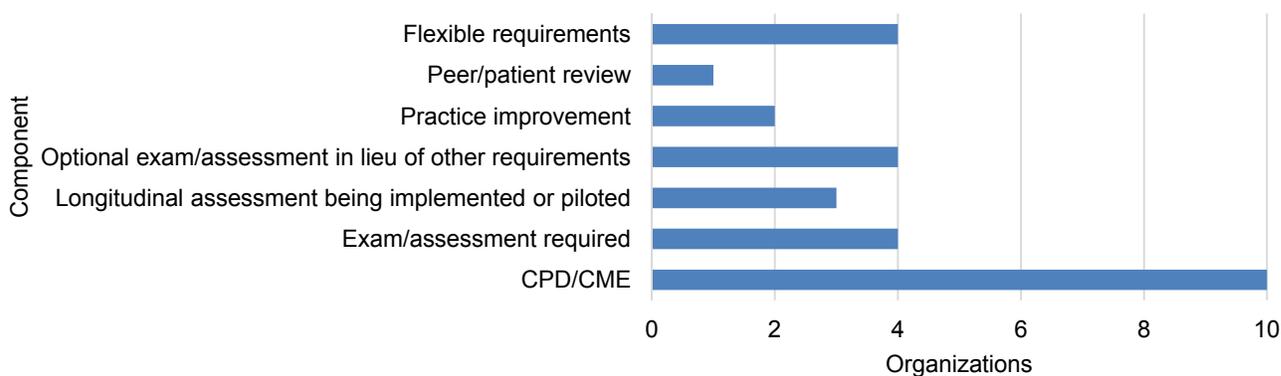
Included Organizations

We interviewed representatives of ten organizations: six in the United States and four in other countries. Five organizations recertified PAs or APNs, and five recertified physicians.

Range of Exam-Alternative Recertification Requirements

The participating organizations had varied recertification requirements and levels of flexibility for health professionals (see Figure 4.1). Some had never required a closed-book exam, while others were implementing or piloting an exam alternative, and still others intended to continue to require or offer an exam in the future. Six of the organizations interviewed had made changes to their recertification requirements since 2012. At the time of our interviews, all ten participating organizations required CME/CPD as part of recertification; only a subset had additional requirements, such as practice improvement, peer and/or patient reviews, or an exam or other assessment.

Figure 4.1. Primary Recertification Components of Interviewed Organizations



The length of recertification cycle varied among the participating organizations: five used a five-year cycle, one used a three-year cycle, one used a six-year cycle, and three used a ten-year cycle. Eight organizations had exams or assessments in their recertification frameworks. Of these, four required some form of recertification exam or assessment (e.g., a longitudinal assessment), and four offered the initial certifying exam or another exam as one option for recertification in lieu of other requirements. Among the four organizations requiring an exam or assessment, three either offered or were piloting a remotely administered longitudinal assessment in lieu of an exam. Six organizations had fixed recertification requirements that were the same for all professionals; four offered professionals flexibility in selecting among requirement options.

Range of Considerations and Rationales

Interviewees described considerations and rationales for the recertification requirements of their respective organizations that broadly grouped into five themes: (1) formative versus summative intent, (2) tension between health professional views and responsibility to the public, (3) managing health professional burden, (4) ensuring applicability to practice, and (5) considerations specific to the transition from a high-stakes exam to a longitudinal assessment.

Formative Versus Summative Intent of Recertification Requirements

Most interviewees described their organization's recertification requirements as serving a combination of formative (i.e., instructive intent aiming to identify and address knowledge gaps for subsequent education) and summative (i.e., evaluative intent against a standard of performance) goals, though the relative emphasis on summative and formative intent varied. Interviewees from organizations transitioning from a high-stakes exam emphasized the formative goals of longitudinal assessments as a reorientation, compared to prior high-stakes exams that had greater emphasis on summative goals. One interviewee noted that the longitudinal nature of these assessments was intended to generate knowledge via continuing education, studying, and preparation for the ongoing assessments through self-directed study of knowledge gaps identified in a given assessment, as well as through repetition of questions or content answered incorrectly in previous assessments. Compared to a traditional once-per-cycle high-stakes exam, longitudinal assessments include more frequent assessments, fewer questions in each assessment, and lower stakes for the health professional, because not passing a single assessment does not result in loss of certification. One interviewee implementing a longitudinal assessment described it as a continuous evaluation with ongoing formative benefits:

The idea is that it is not intended to be a snapshot in time, which is what a typical exam is. This is really meant to help [health professionals] and help us sort of see where the state of their knowledge is over time. More of a video than a photograph.

Interviewees from three organizations mentioned that adult learning theory supported their organizations' evolving emphasis on a more formative approach to recertification requirements. Two further described formative benefits of longitudinal requirements at regularly spaced intervals, because allowing individuals to self-determine when to complete the requirements often leads to a scenario in which the bulk of requirements are completed in a short time immediately prior to the deadline. One interviewee with experience with transitioning from requirements that were once-per-cycle to more frequent intervals, described this "cram" as "humans being humans" and felt it to be unavoidable. Further, interviewees expressed that once-per-cycle requirements could constitute a barrier to long-term knowledge retention. Interviewees who emphasized adult learning theory as a rationale for requirements indicated that learning through experience or feedback over the course of a longitudinal assessment could have more lasting educational benefits than a once-per-cycle high-stakes exam. One interviewee noted:

A secure, proctored exam does give this marker, at intervals, of somebody's cognitive expertise in an area. But that's all it really gives. And a lot of the information that is studied to get ready for an examination like that disappears very quickly after the exam is taken. . . . The adult learning theory which is guiding all of this . . . would suggest that more frequent assessments that build on knowledge a subject has, and also help somebody acquire knowledge and retain it, is a much better way to both assess cognitive expertise, and also to maintain it.

An interviewee from an organization implementing longitudinal assessments cited the ability to repeat questions or maintain a sustained focus on particular content areas over time as a beneficial facet of this more formative approach:

That's an important part of the system, in that it creates the opportunity for spaced repetition, both of important things that they may or may not have gotten wrong in the past, and reinforcement of items where they've shown that they didn't have the correct information at the first time the item was delivered, so that they can show improvement.

The balance of perceived summative and formative intent in recertification requirements influences how interviewees conceptualized assessments and requirements. Interviewees from organizations with a more summative focus emphasized quantitative analyses done to validate questions and scoring of assessments and to ensure assessment and content security. One interviewee—who was from an organization implementing a longitudinal assessment instead of a high-stakes exam and who emphasized the intended summative intent of that assessment—felt it was important to acknowledge that evaluative intent had implications for exam format and security driven by a few:

You have to be fair and make sure that everybody's getting the same challenge and nobody is, as much as we don't like to hear about [health professionals] cheating, there is a portion of folks that will cheat.

The same interviewee also saw the evaluative function of their organizations' assessment as an important motivator for health professionals' learning:

What's the best thing for patients and for you, actually, in general to get you motivated? There's a lot of theory in the medical education literature about [how] people don't self-assess really well. CME is not enough. Motivation is really important, and the test does do that for people.

An interviewee from another organization implementing longitudinal assessments instead of high-stakes exams expressed a stronger formative than summative emphasis, and was less concerned about question security, stating:

This is really about having this be an opportunity for our [health professionals] to really function as a learning community, so the feedback that they get, and the items, they are free to share those. Because if down the line, [if] another [professional] gets the same or similar question, and knows the answer because they were exposed to that critique previously, we see that as a good thing.

Finally, an interviewee from another organization indicated that they were in an earlier pilot stage of a longitudinal assessment and had yet to determine the appropriate balance between formative and summative intent and what that would mean for exam security. When comparing themselves to other organizations with a more open approach, they stated:

You talk about it with your colleagues and so on. I think there will be data to support what eventually is the decision we make, but you know, we're somewhere in between right now.

Tension Between Health Professional Preferences and Responsibility to the Public

Most interviewees described the perspectives of health professionals as highly valued in their organizations' consideration of recertification requirements. Regardless of the type of organization or requirements, as one interviewee expressed, they aimed to set requirements that are not only consistent with "trend[s] within the profession" but also are "doable" for professionals. Interviewees across organizations consistently emphasized that their organizations encouraged health professionals to share their experiences, suggestions for improvement, and information about what is relevant to their practice, so that the content of recertification requirements is aligned with their work. Interviewees described mechanisms for collecting health professionals' feedback on requirements, including surveys, dialogue at conferences, focus groups, and individual written correspondence. Several interviewees from organizations who had experience implementing exams or longitudinal assessments noted that their organizations included health professionals in the process of developing questions and reference materials for the assessments.

Interviewees noted that recertifying organizations also considered the perspectives of the public and patient safety in developing requirements, with interviewees from most organizations expressing that their "mission is to serve the public." Interviewees from some of these organizations noted that while health professionals are often viewed as the primary stakeholder in recertification, they were conscious of a dual obligation to both health professionals and patients. This resulted in tension as interviewees from some organizations weighed both health professional preferences and their organization's duty to the public. As one interviewee implementing a longitudinal assessment stated:

I think we often forget about the public when we're in these [recertification] programs because [health professionals] can be very vocal and convincing, and "I know what I know and you don't need to tell me what I need to know" arguments. And it's hard to change minds, so it's easy to sort of fall into that groove of "all we have to do is let [health professionals] do what they have been doing." We just have to be aware that there's another group out there—the public—that is important as well.

Several organizations emphasized their duty to the public to ensure that health professionals holding their certification have adequate knowledge. While health professionals may "specialize in one area," it is important that "they're held to the competency of that entire" clinical certification, because they can pivot their practice within that certification and

“they represent themselves to the public” as a professional with the full range of knowledge commensurate with their certification. Thus, interviewees from several organizations whose requirements did not involve an exam emphasized that their recertification process was designed so that it “reflects their whole scope of practice,” with the organization aiming toward “ensuring a competency across all the [areas] for [their] certification.” Several interviewees from organizations that included assessments (i.e., exams, longitudinal assessments, or other assessment types) among their requirements described conscientious and systematic mechanisms to ensure a breadth of content covered within recertification activities, such as algorithms that populate evaluations with a minimum number of questions from each category in the scope of the professional certification.

More rigorous or more frequent assessments were both viewed by interviewees as a mechanism to enhance recertifying organizations’ confidence in the competency of the health professionals with their certification. However, interviewees were cognizant that increasing the burden of recertification requirements is unpopular with health professionals. Interviewees reported that they perceived it to be a delicate task to strike a balance between attending to the preferences of recertifying professionals and addressing what they view as a responsibility to provide assurance to patients. One interviewee from an organization that recently implemented new requirements that do not include a required exam said that:

We didn’t want to introduce something that would be overly burdensome, but it also needed to deliver that patient assurance that we were looking for. . . . Patients actually thought that was already happening, so there was something about bringing the process to meet the standards of patients and their expectations.

The tension between addressing health professional needs, preferences, and concerns and public assurance was perceived by interviewees to be elevated as the stakes of failing a recertification requirement or assessment are raised. An interviewee from an organization transitioning from an exam to a longitudinal assessment noted that they perceived that for health professionals, the summative aspect of assessment is “not the most comfortable place to be, but it is important from a patient/payer perspective.” Interviewees from organizations working to enhance or emphasize the formative aspect of recertification requirements still perceived an important public value in the summative aspect of recertification requirements.

Managing Health Professional Burden

In general, interviewees from all types of organizations reported that managing health professional burden was a key issue when developing requirements. This was particularly relevant for interviewees from organizations that were currently changing or had recently changed their requirements. As stated by one organization that had recently implemented new requirements that did not involve a high-stakes exam, “we are doing significant amounts of work to make sure that the process isn’t burdensome.” Interviewees described several sources of burden for health professionals associated with recertification processes, whether the

requirements involved a required exam or assessment: obtaining peer and patient feedback, traveling for an exam or assessment, studying or other preparation required to pass an exam or complete an assessment, navigating unintuitive technology/systems, and accumulating required credits or activities. Several interviewees from organizations with various types of requirements mentioned their organizations' desire to keep costs of recertification to the health professional low, offer flexibility in the nature of requirements, and minimize the time it takes to complete the requirements as ways to manage the burden imposed on health professionals.

Some interviewees reported that context influenced the perceived burden of recertification requirements. Interviewees from half of the participating organizations said that the prior requirements were influential in whether and what type of assessments or other requirements would be included in new recertification processes. Several organizations who did not require a high-stakes exam in their requirements thought of reasonable burdens as requirements that could be undertaken with minimal deviation from what health professionals do on a regular basis. For example, one interviewee said that CE requirements were calculated based on estimated clinic time per week, and that the CE credit volume requirement was determined by the amount of CE a professional could get from a single conference. Interviewees from organizations transitioning from high-stakes exams to longitudinal assessments noted reduced burden and costs to health professionals to be a benefit of this change, as stated by one interviewee:

We think it's going to be easier for people to do it. They don't have to travel any place. . . . All of the processes that go along with going to a computer-based . . . location will be eliminated, and that's a lot of costs associated with that.

All interviewees mentioned peer organizations' requirements as a contextual factor that shaped their perception of burden or reasonable requirements, as stated by two interviewees from organizations that had never required high-stakes exams:

Interviewee A: That's what most other medical professionals do. . . . We weren't the ones setting that bar. That bar, that had been set by other organizations.

Interviewee B: We didn't invent the wheel. It wasn't broken. We didn't fix it. We saw a system that was already in place, it worked for [other health professionals]. We thought if it's good enough for them, it's good enough for us, and we implemented it.

Aspects of the recertification process that were determined with peer organization requirements in mind included the structure of the recertification process overall, presence and type of assessment or exam, CE credits, clinical hours, and other requirements. Interviewees believed it was important to look to peers when setting their recertification requirements and assess whether peers' requirements seemed reasonable for their health professionals, in part to maintain perceptions of public integrity of their organization's certification relative to comparable peer organizations. As stated by one interviewee whose organization did not require an exam:

It's looking at trends within the profession itself. . . . We look at trends when we make these types of decisions, and again, what's doable for people . . . and our job is to keep the public face.

Regarding ABMS member boards transitioning from a high-stakes exam to longitudinal assessments, one interviewee explained how an early adopter organization was influential in beginning a conversation among other boards:

Was the ten-year exam really a good way of assessing the third component of maintenance of certification? I think that the 24 member boards gradually came to the conclusion that there were better ways. So, with that, a number of the boards decided to go into a similar longitudinal assessment model.

In summary, certifying organizations were cognizant of and working to manage burden on health professionals in their recertification processes and used comparisons to prior requirements and peer organizations to contextualize burden.

Ensuring Applicability to Practice

Regardless of whether an organization had an exam or assessment as a part of its recertification requirements, a common sentiment expressed by interviewees was an intention to set recertification requirements and standards that are relevant to the daily practice of the health professionals. Applicability to daily practice was framed as an issue of both format and content. Organizations transitioning from a high-stakes exam to longitudinal assessments considered relevance to practice with regard to format by employing open-book assessments that allow health professionals to use the same resources they would in daily practice, such as colleagues and reference materials, in addition to memorized information. As stated by one interviewee:

If you think about the typical high-stakes exam, it's what would be considered a test of maximal performance. People cram. They study like crazy. They have this exam experience hoping to get as high a score as they can, and then pass the exam. This is more, because of the ongoing nature of this [longitudinal assessment], and [because] it's integrated within their day to day practice, it's more a measure of where they typically perform.

In terms of content, several interviewees described wanting to address knowledge that is reflective of competency to practice. Several noted that their organizations strive to include only content that is relevant to ongoing practice in recertification assessments and drew distinctions between the content included in certification and recertification assessments along these lines. One interviewee from an organization implementing a longitudinal assessment referred to this practice-relevant content as “walk-around knowledge.” Another interviewee from an organization that did not require a high-stakes exam explained that when they consider assessment content, they ask themselves:

Is this something a practicing, competent professional would have to know at the moment in time that they were confronted with it and saw it with a patient, or is this something that they would consult [a specialist] for?

Among interviewees from organizations transitioning from high-stakes exams to longitudinal assessments, both the learning format and content were perceived to be benefits of the transition. Regarding content, one interviewee stated:

We're going to allow [health professionals] to identify areas in their practice that are the most relevant, and we think this is going to be a big factor for [health professionals] who want these ongoing assessments to reflect what they're actually doing in practice.

Attention to the applicability and relevance of the content and delivery format of the recertification requirements to health professionals' practice were common areas of emphasis noted by our interviewees, regardless of whether the organization had ever employed a high-stakes exam in its requirements.

Transitioning Away from Closed-Book Exams

Several interviewees referenced recent transitions in evaluation occurring at ABMS member boards. Historically, high-stakes closed-book proctored exams taken at testing centers once per recertification cycle were the standard assessment mechanism used by ABMS boards. As of 2016, the ABMS has supported pilots of its CertLink platform and other platforms to support member boards in transitions to longitudinal assessments that can be taken remotely at health professionals' convenience. One interviewee described this transition and its fulfillment of the dual role of serving both health professionals and the public:

That has evolved somewhat, I think, over the years to be, again, attending to the mission of serving the public very much, but also recognizing that in doing that, some adult learning theories apply, and, actually, there may be a better way to serve the public and also demonstrate cognitive expertise, and an important component of that is to demonstrate learning.

Through this new, alternative approach to evaluation in recertification, organizations perceive an opportunity to foster more learning among health professionals without substantially increasing burden and potentially decreasing burden, presenting a win-win for health professionals and the public. One interviewee described the benefits of this approach for all stakeholders, stating that

When we work well with the [health professional] and try to partner with them, and help keep them up-to-date over what is going to be that 30-year career, the public benefits from that, and they're the beneficiary.

Interviewees described the benefits of the transition away from closed-book exams with respect to applicability of the learning format to daily practice and adult learning theory. They described how the new process of longitudinal assessments might facilitate better retention of information in accord with adult learning theory and could be better matched to how health professionals typically acquire new knowledge, by consulting resources during the normal course of their practice as compared to what typically happens with once-per-cycle high-stakes exams. As stated by one interviewee:

So, a lot cramming was occurring, and we thought that having a continuous longitudinal assessment system allowed our [health professionals] to learn continuously rather than cramming for that once-every-10-years exam.

This interviewee also described the transition away from closed-book exams as an opportunity to reevaluate requirements and processes. They recognized that many health professionals view the current closed-book exam as a challenge to overcome and not germane to the type of continuous learning with accessible resources that health professionals engage in as a part of their practice and that longitudinal assessments provide an alternative mechanism to better serve health professional needs. They stated:

Tests by their very nature, and particularly high-stakes exams, are a bit adversarial. And this [longitudinal approach] felt more collaborative, more supportive, more that we care about our [health professionals].

In its redesign work, the organization adopted a set of principles consistent with the organization's mission and the dual goals of enhancing health professionals' knowledge for the good of patients and not creating undue burden for health professionals. As summarized by one interviewee:

There were a set of design principles that the board identified in advance. And one was incorporating adult learning theory and incorporating longitudinal assessment, that it should be relevant, and it should be engaging. It should be whatever we need it to be, both professionally and publicly credible.

Organizations transitioning away from high-stakes exams typically framed this transition in the context of fulfilling the goals of their organization to monitor and facilitate health professionals' maintenance of knowledge and to be in sync with trends both in the profession and in adult learning theory.

Considerations for an Organization Planning a Change

Interviewees from organizations that recently implemented changes to recertification requirements—whether this was a transition from a high-stakes exam to a longitudinal assessment or another change—acknowledged common challenges with implementing technology platforms and addressing subpopulations of health professionals. Cognizant that change can be challenging for organizations and health professionals alike, interviewees from organizations that did not require a high-stakes exam for recertification, but had recently changed their requirements, offered recommendations that included: performing an “upfront needs assessment” with an “environment scan; a [literature] search; getting feedback from members before you even start designing” the process; and looking to other “like-minded organizations.” Interviewees also advised defining a set of goals and a plan to achieve them, as well as communicating extensively to establish vendor understanding, to level health professional expectations, and to achieve stakeholder buy-in.

Technology challenges were common across organizations and types of recertification requirements, as computer interfaces were needed both for longitudinal assessments and for other requirement platforms. Interviewees described challenges that included access to content (i.e., images or external resources for open-book assessments), operating system compatibility, and transitions of data from an old system to new. More importantly, interviewees reported that health professionals vary in their ability to learn a new system; while some professionals adapt quickly, new online systems often receive polarized feedback from health professionals. To address these challenges, half of interviewees noted that it was important to ensure sufficient time for change and implementation. One interviewee from an organization that did not require a high-stakes exam, but that had recently made a platform change, noted that they wished they had:

Either started earlier or delayed the launch date, and had more budget for user acceptance testing and involve[d] more members and [health professionals] . . . to actually work with the application.

Recommendations to allow enough time were also applied to the content. One interviewee with experience with exams and assessments noted that, specifically for assessments, “it takes much longer to write a good question than one would expect.” However, the recommendation to ensure time for content development came from interviewees from organizations both with and without exam or assessment requirements.

One theme prevalent across interviews was the need to be cognizant of and address the needs of health professionals who were outliers in some regard or slow adopters. Interviewees from organizations whose requirements did not require high-stakes exams often described outliers as those not engaged in or having difficulty with recertification, and “those . . . who work in all sorts [of] weird and wonderful practice” that affects their ability to achieve clinical practice requirements or meet the clinical governance and oversight requirements. Spending time and resources on outliers was viewed as inevitable by these interviewees. An interviewee transitioning from a high-stakes exam to a longitudinal assessment noted that even with a formative open-book assessment, there were likely to be professionals who were slow adopters, either due to inability or resistance, stating:

There will be people who fall out of that process for reasons of . . . inability. That would have to be at a very fundamental level, foundational. . . . It’s either they can’t or they won’t, which is a more likely . . . scenario, I think. Either way, there will be people who fall off that train.

An interviewee who was from an organization that does not require a high-stakes exam but who had recent experience implementing new requirements noted that outliers should be accounted for in planning for implementation. They said, “we spend 99 percent of our time on 1 percent,” and recommended having a specific team focused on working with those who have challenges navigating the recertification process.

Half of those interviewed emphasized the importance of communication with health professionals and stakeholders as a mechanism to improve implementation of new recertification requirements. An interviewee from an organization implementing a longitudinal assessment platform emphasized the importance of communicating with stakeholders as follows:

You can't communicate enough. When you think you've communicated enough, communicate a little bit more.

Interviewees from organizations with various types of requirements reported that their organizations were simultaneously using multiple communication channels to explain and message recertification processes and changes, including: talks at regional and national conferences, publications in the organization's journal, electronic articles, membership newsletters, emails, and videos. However, it was also noted that communication will not eliminate the need to assist health professionals who are slow to adapt to the new process.

While communication from organizations to health professionals was underscored as a key priority by interviewees, so too was obtaining input and feedback from health professionals to the organizations. Interviewees across organizations emphasized using "feedback from the participants of the system" to inform assessment questions and the recertification process overall. Most interviewees stressed that the recertification process will and should continue to change as clinical practice, technology, and the integration of the two evolve. Nearly all interviewees shared the view that their organization was looking "continuously to identify areas where we can improve" and "constantly enhancing" the recertification process. As stated by an interviewee at an organization implementing a longitudinal assessment, "if you wait until you have the perfect thing, by the time you roll it out, it's obsolete"—highlighting the perceived role of continuous improvement and enhancement efforts. Interviewees reported an emphasis on evaluations of their recertification process through regular committee meetings, working groups, surveys, and focus groups of health professionals to inform ongoing improvement and changes to requirements.

Chapter Five: Conclusion

This report used three methods—an environmental scan, literature review, and semi-structured interviews—to identify and describe recertification options relevant to PAs and other health professionals as well as to identify and describe the evidence regarding the impact of recertification requirements on providers and patients.

The environmental scan revealed a broad array of recertification requirements for health professionals across countries, professions, and organizations. Notably, recertification exams were most common in, but not exclusive to, the United States. Certifying organizations in the United States varied in their recertification requirements. The NCCPA—and most ABMS specialty boards—had required exams for many years but at the time of this study were considering or implementing alternative assessment formats. Most APN organizations, on the other hand, had not required exams for recertification and instead offered them as one among several options to meet recertification requirements; however, AOA specialty boards and the NBCRNA recently instituted exams as mandatory requirements. Internationally, high-stakes recertification exams were required only for those PAs in the United Kingdom who chose to voluntarily register. While CE and CPD are common requirements across health professions and settings, other types of requirements varied widely and could include self-assessment and reflective activities, practice improvement projects, MSF from patients and peers, and records or counts of practice hours or cases.

The literature review found limited evidence on how recertification requirements for U.S. PAs, U.S. APNs, and U.S. osteopathic physicians affect patients and health professionals. In particular, our review found no empirical evidence concerning the effects of PA recertification (including high-stakes exams) on patient care. However, the review found more evidence regarding U.S. allopathic physician recertification, for which the effects on patient care were evaluated among a subset of physician specialties. These studies generally found that participation in MOC overall was associated with improvements in some process-based quality measures, but not with intermediate outcomes, and had mixed associations with costs of care, with one study finding increased costs and another finding decreased costs. A few cross-sectional studies, limited to internists, addressed the association between high-stakes exam performance and quality or outcomes. These studies found that higher scores were associated with better performance on some (but not all) of the process-based quality measures assessed, with higher patient experience scores, and with better performance on diabetes intermediate outcomes. Studies of practice improvement and guided self-assessment activities found that health professionals' views of these requirements reflect both their potential to improve practice or knowledge and the burden of these requirements. Numerous studies of these requirements found improvements in care, but the majority were of low methodological rigor. Our review did not

identify any published evidence regarding the impact on health professionals and patients of the newer longitudinal assessments being planned, piloted, or implemented as alternatives to high-stakes closed-book exams. The evidence regarding the impact of recertification requirements in other countries was more limited in size and scope than for U.S. allopathic physicians. It reflected mixed positive and negative physician views about the MSF requirements and the likelihood that these requirements would result in practice change in some Canadian provinces as well as the implementation of new revalidation requirements in the United Kingdom. These international recertification requirements do not incorporate an exam, but burden was still a concern expressed by health professionals. No studies have linked these requirements to improvements in measured care quality or outcomes. Lastly, interactive, multimodal, longitudinal, sequenced CME activities appear to improve knowledge and clinical practice more effectively than passive modalities and single activities. However, the impact of CME may be limited by the fact that these activities are generally self-selected, and health professionals' ability to accurately assess their own knowledge gaps has been demonstrated to be limited.

Finally, interviews with health professional certifying organization representatives provided context about how organizations conceptualize their recertification and assessment requirements. These interviews either focused on health professional certifying organizations not well represented in the literature and on assessments that are not yet represented in the literature, providing a perspective distinct from the literature reviewed. Emphasis on formative and summative goals of recertification requirements varied, even for organizations using the same types of alternatives to high-stakes closed-book examinations. Common themes emerged regarding attention to the burden on health professionals associated with requirements and the relevance of requirements to health professionals' practice. A tension between responsibilities to assure the public of the health professionals' competence and a desire to account for the burdens on and preferences of health professionals was commonly expressed. The use of longitudinal assessments—which were viewed as a mechanism to enhance formative knowledge, judgment, and skills, while providing a summative assessment—was suggested by some to simultaneously address these dual goals.

Appendix A: Maintenance of Certification, Recertification, or Revalidation Requirements

Table A.1. U.S. Health Professionals

Certifying Board	Profession	Cycle ^a	Required for Licensure	Exam Requirement	Longitudinal Assessment Requirement	CME/CPD/CE Required	Self-Assessment Activities Required	Practice Improvement Required	Peer or Patient Review Required	Practice or Case Report Required	Cost	Failure and Consequence
National Commission on Certification of Physician Assistants ²¹⁴	PA	10 year	In 17 states for licensure and in 2 additional states for prescribing privileges	Current: Secure computer-based exam (4 hour, 240 questions)	Piloting longitudinal assessment in 2019 (25 questions quarterly for 2 years)	Yes: 100 CME credits every 2 years	No	An option for CME credits	No	No	\$350 to take PANRE, \$130 fee every 2 years	Can retake PANRE up to 4 times in 9th and 10th years of cycle. Passing standard for longitudinal assessment TBD.
American Association of Critical-Care Nurses Certification Corporation ²¹⁵	NP	5 year	In 47 states	Option with either CE or practice hours (3.5 hour, 175 questions)	No	Yes: all options require pharma CE. CE points options also required 150 credits per cycle	No	No	No	Primary option with CE or with exam and pharmacology CE (1,000 hours per cycle)	Adult-Gero member /nonmember fee: \$120/\$200–\$220 for (exam/practice hours option \$20 less for nonmembers) Adult member /nonmember fee: \$180–\$200/\$260–\$305 (exam options \$20 more for members, \$45 more for nonmembers)	For exam option, can take exam up to 4 times in a 12-month period.
American Association of Nurse Practitioners Certifying Board ²¹⁶	NP	5 year	In 47 states	Option: Secure computer-based exam in lieu of practice hours and CE (150 questions)	No	Primary option: 100 CE credits per cycle	No	No	No	Primary option (1,000 hours)	Exam renewal fee member /nonmember: \$240/\$315, Practice hour and CE renewal fee member /nonmember: \$120/\$195	Upon exam failure, take 15 credits of CE in the failed content area. Eligible to take exam twice per year.
American Nurse Credentialing Center Commission on Certification ²¹⁷	NP	5 year	In 47 states	Option: Secure computer-based exam (4 hour) in lieu of activity hours	No	Yes: 75 CME credits per cycle	No	One of several activity hour categories	No	One of several activity hour categories (1,000 hours per cycle)	\$200–\$375 renewal fee; varies by certificate and membership in ANA or other professional societies	Must apply to retest upon exam failure. Eligible to retest within 60 days and can test three times per year.

Table A.1. U.S. Health Professionals—Continued

Certifying Board	Profession	Cycle ^a	Required for Licensure	Exam Requirement	Longitudinal Assessment Requirement	CME/CPD/CE Required	Self-Assessment Activities Required	Practice Improvement Required	Peer or Patient Review Required	Practice or Case Report Required	Cost	Failure and Consequence
National Certification Corporation ²¹⁸	NP	3 year	In 47 states	No	No	Yes: 10–45 CE hours per cycle	Assessment to tailor CE (can opt out)	No	No	No	\$100 renewal fee	
Oncology Nursing Certification Corporation ²¹⁹	NP	4 year	In 47 states	Option with practice hours or CE (3 hour, 165 question)	No	Option with exam or practice hours: 25–100 hours based on assessment	Assessment to tailor CE (can opt out)	No	No	Option with exam or CE (1,000 hours per cycle)	Practice hours and CE option renewal fee \$240–\$375, Practice hours and exam option renewal fee \$396–\$616. Discounts for AONS/APHON members, age 65+, early application	Only eligible to take test once per 90-day period.
Pediatric Nursing Certification Board ²²⁰	NP	7 year	In 47 states	No	No	Option for contact hours: 15 hours per year	4 update modules required per 7-year cycle	No	No	Option for contact hours (400 practice hours = 7.5 CE hours)	Varies by year's activities: \$65 for record review, \$85 for 15 contact hours, \$130 for 7.5 contact hours and 1 update module, \$170 for 2 modules	
National Board of Certification & Recertification for Nurse Anesthetists ²²¹	CRNA	8 year	In 49 states for licensure; in 1 state for practice under title nurse anesthetist	New requirement starting 2020 (4 hour, 150 question)	No	Yes: 60 credits every four years	4 core modules with assessments (worth 60 CE credits every 4 years)	Option for meeting activity requirements	No	No, but 60 credits for professional, nonpractice activities	\$110 every two years	2020–2025: no impact on certification, passing standard TBD thereafter.
American Midwifery Certifying Board ²²²	CNM	5 year	In most states ^b	Optional in lieu of modules and CE (4 hour, 175 questions)	No	Primary option: 20 CE hours per cycle	Primary option: 3 modules based on 15–20 journal articles with 70–75 questions	No	No	No	\$70 annual fee, \$500 exam fee	Retake certifying exam if certification lapses or requirements not met. Certifying exam if certification lapses or requirements not met.
American Board of Allergy and Immunology ²²³	M.D.	10 year	No	Required if longitudinal assessment passing standard not met	Longitudinal assessment as of 2018 (40 questions every six months)	Yes: 25 CME credits per year	Optional	Yes	No	No	\$400 annual fee	Upon failing longitudinal assessment, must take closed-book proctored exam.

Table A.1. U.S. Health Professionals—Continued

Certifying Board	Profession	Cycle ^a	Required for Licensure	Exam Requirement	Longitudinal Assessment Requirement	CME/CPD/CE Required	Self-Assessment Activities Required	Practice Improvement Required	Peer or Patient Review Required	Practice or Case Report Required	Cost	Failure and Consequence
American Board of Anesthesiology ²²⁴	M.D.	10 year	No	Option in lieu of longitudinal assessment or if longitudinal assessment passing standard not met	Primary option: Longitudinal assessment as of 2016 (120 questions per year)	Yes: 250 CME per cycle	Optional	Yes	No	No	\$210 annual fee	Passing determined by Measurement Decision Theory with historical MOCA Minute and exam score associations as performance standard.
American Board of Colon and Rectal Surgery ^{225,226}	M.D.	10 year	No	Option of secure computer-based exam (130 minutes) in lieu of longitudinal assessment, or if passing standard for longitudinal assessment not met	Option of longitudinal assessment pilot in 2018 (18 questions per quarter, 5 minutes permitted per question) in lieu of exam	Yes: 90 CME hours every 3 years	Yes	Yes	No	Yes: submit operative record	\$500 annual fee, \$350 application fee, \$750 exam fee	If longitudinal assessment score below 70%, then must take secure exam. Secure exam only offered once per year.
American Board of Dermatology ^{227,228}	M.D.	10 year	No	Current: Secure computer-based exam (100 clinical images with multiple-choice questions, plus 50 additional multiple-choice questions)	Future: Pilot of longitudinal assessment for a subset of diplomates planned for 2019	Yes: 25 CME hours per year	Optional	Yes	No	No	\$150 annual MOC fee, \$900 exam fee if not paying MOC fee	Allowed to retake exam to pass in years 3–10 of the cycle.
American Board of Emergency Medicine ^{229,230}	M.D.	10 year	No	Current: Secure computer-based exam (205 multiple-choice questions)	Future: Option of alternative longitudinal assessment TBD planned for 2020	Yes: 25 CME hours per year	Yes	Yes	No	No	\$100 for each of 8 self-assessment activities, \$1,850 exam fee	Exam offered annually. Eligible to attempt and retake in years 6–10 of cycle. Passing score is 75%.
American Board of Family Medicine ²³¹	M.D.	10 year	No	Secure computer-based exam (full-day, 320 multiple-choice questions)	Piloting longitudinal assessment for Part II credit; intent to consider feasibility to replace Part III exam requirement in future	Yes	Yes	Yes	No	No	\$250 application fee, \$1,300 exam fee	Exam offered twice per year. Allowed to retake as needed to pass within cycle.
American Board of Internal Medicine ²³²	M.D.	10 year	No	Option of secure computer-based exam (full-day every ten years) in lieu of longitudinal assessment or if longitudinal assessment passing standard not met	Option of longitudinal assessment as of 2018 (3 hours every two years)	Yes: 100 CME credits every 5 years	Optional	Optional	No	No	\$155 annual MOC fee, \$650 exam fee, \$130 knowledge check-in fee	Take secure exam upon failing longitudinal assessment. Secure exam offered twice per year. Allowed to retake secure exam to pass within cycle.

Table A.1. U.S. Health Professionals—Continued

Certifying Board	Profession	Cycle ^a	Required for Licensure	Exam Requirement	Longitudinal Assessment Requirement	CME/CPD/CE Required	Self-Assessment Activities Required	Practice Improvement Required	Peer or Patient Review Required	Practice or Case Report Required	Cost	Failure and Consequence
American Board of Medical Genetics and Genomics ²³³	M.D.	10 year	No	Option of secure computer-based exam in lieu of longitudinal assessment or if longitudinal assessment passing standard not met	Option of longitudinal assessment pilot in 2018 (24 questions every six months, 5 minutes per question) in lieu of exam	Yes: 25 CME credits per year	Literature review modules	Yes	No	No	\$400 annual fee, \$550 exam fee	Eligible to attempt and retake exam in years 6–10 of cycle. Exam offered once per year.
American Board of Neurological Surgery ²³⁴	M.D.	10 year	No	No	Longitudinal assessment as of 2017 (multiple-choice questions)	Yes: 150 CME credits every 3 years	No	Yes	No	No	\$350 annual fee, \$800 exam fee	Incorrect question response yields educational material. Must get each question correct to move on to the next assessment question.
American Board of Nuclear Medicine ²³⁵	M.D.	10 year	No	Option of secure computer-based exam (3.5 hours) in lieu of longitudinal assessment or if longitudinal assessment passing standard not met	Option of longitudinal assessment pilot in 2018 (13 questions per quarter) in lieu of exam	Yes: 25 CME credits per year	Yes	Yes	No	No	\$400 annual fee, \$615 exam fee	Exam offered annually. Allowed to retake as needed to pass in the cycle. Take secure exam if failing longitudinal assessment.
American Board of Obstetrics and Gynecology ²³⁶	M.D.	6 year	No	Option of secure computer-based exam (100 questions, 105 minutes) or required if literature assessment standard not met	Pilot of exam exemption with high-performance on Part II Literature Assessment Modules as of 2016	Yes: 25 CME credits per year	Literature Modules, 30 articles per cycle with 4 questions each	Yes	No	No	\$265 annual fee, \$390 annual fee for non-ACOG fellows, \$175 exam fee	Upon exam failure, eligible to retake four times per year.
American Board of Ophthalmology ²³⁷	M.D.	10 year	No	Current: Secure computer-based exam (4 hours, 150 questions) required	Future: Longitudinal assessment in 2019 (piloted 2017; 50 questions per year)	Yes: 25 CME credits per year	Yes	Yes	No	No	\$200 annual fee	Exam administered annually. 2018 is the final year of exam administration.
American Board of Orthopedic Surgery ²³⁸	M.D.	10 year	No	Current: Secure computer-based exam (3 hours, 150 multiple-choice questions) and oral exam Future: Option of secure computer-based exam and oral exam in lieu of longitudinal assessment or if longitudinal assessment passing standard not met	Future: Option of longitudinal assessment pilot as of 2019 (30 questions per year) in lieu of exam	Yes: 240 CME credits per cycle	Yes	Yes	Yes	Yes: case lists submitted	\$1,075 application fee, \$1,040 exam fee	Eligible to attempt to retake exam in years 8–10 of cycle, offered annually. Attempt secure exam up to two times upon failing longitudinal assessment.

Table A.1. U.S. Health Professionals—Continued

Certifying Board	Profession	Cycle ^a	Required for Licensure	Exam Requirement	Longitudinal Assessment Requirement	CME/CPD/CE Required	Self-Assessment Activities Required	Practice Improvement Required	Peer or Patient Review Required	Practice or Case Report Required	Cost	Failure and Consequence
American Board of Otolaryngology ²³⁹	M.D.	10 year	No	Current: Secure computer-based exam (80 questions) Future: Option in lieu of longitudinal assessment or if longitudinal assessment passing standard not met	Future: Option of longitudinal assessment in 2019 (10–15 questions per quarter) in lieu of exam	Yes: 25 CME credits per year	No	In future; remains under development	In future; remains under development	No	\$310 annual fee	Three opportunities to pass the secure exam per cycle. Longitudinal assessment passing standards under development.
American Board of Pathology ^{240,241}	M.D.	10 year	No	Option of secure computer-based exam (150 questions) in lieu of longitudinal assessment	Option of longitudinal assessment pilot in 2018 in lieu of exam	Yes: 70 CME credits every 2 years	Yes	Yes	Yes	No	\$700 exam fee, \$100 biennial fee	Exam offered twice per year. Eligible to attempt and retake in years 8–10 of cycle.
American Board of Pediatrics ²⁴²	M.D.	5 year	No	Option of secure computer-based exam (4 hours, 200 questions) in lieu of longitudinal assessment or if longitudinal assessment passing standard not met	Option of longitudinal assessment as of 2019 (20 questions per quarter) (piloted 2017) in lieu of exam	Yes: 100 CME credits every 5 years	Yes	Yes	No	No	\$1,304 per 5-year cycle	Retake secure exam upon failure of secure exam or longitudinal assessment.
American Board of Physical Medicine and Rehabilitation ²⁴³	M.D.	10 year	No	Secure computer-based exam (5 hours, 150 questions)	Pilot of longitudinal assessment for a subset of diplomates as of 2018	Yes: 30 CME credits per year	Yes	Yes	No	No	\$795 exam fee, \$200 annual MOC fee	Eligible to attempt to retake exam in years 7–10. Offered twice per year.
American Board of Plastic Surgery ²⁴⁴	M.D.	10 year	No	Current: Secure computer-based exam (200 questions) Future: Internet-based instead of testing center based exam in 2019 in lieu of longitudinal assessment pilot	Future: Longitudinal assessment pilot in 2019 (30 questions per year) in lieu of exam	Yes: 150 CME credits every 3 years	No	Yes	No	No	Current: \$265 annual fee, \$220 practice assessment fee 3 times per cycle, \$445 exam application fee, \$1,120 exam fee; \$395 annual fee beginning 2019	Eligible to attempt to retake exam in years 8–10 of cycle.
American Board of Preventive Medicine ²⁴⁵	M.D.	10 year	No	Secure paper-based exam (2 hours, 200 multiple-choice questions)	No	Yes: 250 CME credits per cycle	Yes	Yes	No	No	\$1,750 exam fee	Eligible to attempt to retake exam as needed in years 8–10 of cycle.

Table A.1. U.S. Health Professionals—Continued

Certifying Board	Profession	Cycle ^a	Required for Licensure	Exam Requirement	Longitudinal Assessment Requirement	CME/CPD/CE Required	Self-Assessment Activities Required	Practice Improvement Required	Peer or Patient Review Required	Practice or Case Report Required	Cost	Failure and Consequence
American Board of Psychiatry and Neurology ²⁴⁶	M.D.	10 year	No	Current: Secure paper-based exam (5 hours, 220 multiple-choice questions) required Future: Option of secure exam in lieu of longitudinal assessment pilot or if longitudinal assessment passing standard not met	Future: Option of longitudinal assessment pilot in 2019 in lieu of exam	Yes: 30 CME credits per year	Yes	Yes	No	No	\$175 annual fee	Primary specialty exam offered twice per year. Allowed two consecutive attempts to pass.
American Board of Radiology ²⁴⁷	M.D.	10 year	No	Secure computer-based certifying exam to be offered in limited circumstances in lieu of longitudinal assessment	Longitudinal assessment beginning in 2018 (2 questions per week, 52 questions required for the year)	Yes: 75 CME credits every 3 years	Yes	Yes	No	No	\$340 annual fee	Passing threshold will not be applied until diplomate answers 200 questions. Under development.
American Board of Surgery ²⁴⁸	M.D.	5 year	No	Current: Secure computer-based exam (5 hours, 200 questions) Future: Exam required if longitudinal assessment passing standard not met as of 2018	Future: Longitudinal assessment beginning in 2018 (40 questions per year)	Yes: 150 CME credits per cycle	Yes	Yes	No	Yes: operative experience requirement	\$1,600 exam fee, \$285 annual longitudinal assessment fee	Eligible to attempt to retake exam to pass in years 3–5 of cycle.
American Board of Thoracic Surgery ²⁴⁹	M.D.	10 year	No	Secure computer-based exam (100 multiple-choice questions), option to take remotely in future	No	Yes	Yes	Yes	No	Yes	\$500 fee every 5 years, \$500 exam fee	Eligible to attempt to retake exam to pass in years 8–10 of cycle.
American Board of Urology ^{250,251}	M.D.	10 year	No	Beginning in 2018 modular exam (4 hours, 75 questions) can be either passed outright or conditionally passed pending completion of CME in areas of low performance	No	Yes	No	Yes	Yes	Yes: submit practice log	\$200 annual fee	Eligible to take exam in years 7–10 of cycle. Those who conditionally pass must complete CME in areas of low performance.
American Osteopathic Board of Anesthesiology ²⁵²	D.O.	10 year	No	Written exam (2 hours, 100–120 multiple-choice questions)	No	Yes: 120 CME hours every 3 years	No	Yes	No	No	\$2,000 fee	Must answer 70% of exam questions correct. Eligible to take in years 8–10 of cycle. Exam offered twice per year.

Table A.1. U.S. Health Professionals—Continued

Certifying Board	Profession	Cycle ^a	Required for Licensure	Exam Requirement	Longitudinal Assessment Requirement	CME/CPD/CE Required	Self-Assessment Activities Required	Practice Improvement Required	Peer or Patient Review Required	Practice or Case Report Required	Cost	Failure and Consequence
American Osteopathic Board of Dermatology ²⁵³	D.O.	10 year	No	Written exam (2 hours, 100 multiple-choice questions)	No	Yes: 50 CME credits in 3 years	No	Yes	Peer	No	\$1,800 exam fee	Eligible to attempt to retake exam in years 7–10 of cycle. Exam offered annually.
American Osteopathic Board of Emergency Medicine ²⁵⁴	D.O.	10 year	No	Computer-based exam (3 hours, 150 multiple-choice questions) and performance exam	No	Yes: 150 CME credits per cycle	Yes	Yes	No	No	\$500–\$800 exam fee	Absolute standard: Eligible to attempt to retake exam in years 7–10 of cycle. Exam offered annually.
American Osteopathic Board of Family Physicians ²⁵⁵	D.O.	8 year	No	Computer-based exam	No	Yes: 120 CME credits per 3 years	Communication skills & professionalism assessments	Yes	No	No	\$2,050 fee for 4 modules, \$800 exam fee	Eligible to attempt after practical exam in years 8–10 of cycle with two retakes. Exam offered twice per year.
American Osteopathic Board of Internal Medicine ²⁵⁶	D.O.	10 year	No	Computer-based exam (3.5 hours, 150 questions)	No	Yes: 50 CME credits every 3 years	No	In future, for those with certificates expiring 2019 and later	No	No	\$600–\$700 exam fee	Eligible to attempt to retake exam in years 8–10 of cycle. Exam offered annually.
American Osteopathic Board of Neurology and Psychiatry ²⁵⁷	D.O.	10 year	No	Written exam (100 multiple-choice questions in 3 hours)	No	Yes: 120 CME every 3 years	No	Yes	No	No	\$300 application fee, \$1,500 exam fee	Eligible to attempt to retake exam in years 8–10 of cycle. Exam offered twice per year.
American Osteopathic Board of Neuromusculoskeletal Medicine ²⁵⁸	D.O.	10 year	No	Written exam (one-day, multiple-choice questions)	No	Yes: 150 CME every 3 years	No	Yes	No	No	\$600 exam fee	Eligible to attempt to retake exam in years 8–10 of cycle. Exam offered twice per year.
American Osteopathic Board of Nuclear Medicine ²⁵⁹	D.O.	10 year	No	Computer-based exam	No	Yes	No	In future	No	No	\$2,200 exam fee	Exam offered once per year. Retakes allowed upon failure.
American Osteopathic Board of Obstetrics and Gynecology ²⁶⁰	D.O.	6 year	No	Computer-based exam (2 hours, 100 multiple-choice questions)	No	Yes	No	Yes	No	No	\$150 annual OCC fee, \$1,525 exam fee	Eligible to attempt to retake exam in years 4–6 of cycle. Offered twice per year.

Table A.1. U.S. Health Professionals—Continued

Certifying Board	Profession	Cycle ^a	Required for Licensure	Exam Requirement	Longitudinal Assessment Requirement	CME/CPD/CE Required	Self-Assessment Activities Required	Practice Improvement Required	Peer or Patient Review Required	Practice or Case Report Required	Cost	Failure and Consequence
American Osteopathic Board of Ophthalmology & Otolaryngology ²⁶¹	D.O.	10 year	No	Written exam (multiple-choice questions)	No	Yes	No	Yes	No	No	\$150 annual OCC fee, \$2,000 exam fee	Eligible to attempt to retake exam in years 8–10 of cycle. Exam offered twice per year.
American Osteopathic Board of Orthopedic Surgery ²⁶²	D.O.	10 year	No	Computer-based exam or clinical exam	No	Yes: 120 CME credits every 3 years	No	Yes	No	No	\$2,700 exam fee, \$6,500 clinical exam fee, \$295 fee for component 4 modules	Eligible to attempt to retake exam in years 8–10 of cycle.
American Osteopathic Board of Pathology ²⁶³	D.O.	10 year	No	Written and practical exam	No	Yes: 75 CME credits every 3 years	No	Yes	No	No	\$50 application fee, \$900 exam fee	Eligible to attempt to retake exam in years 8–10 of cycle. Exam offered annually. If fail only 1 part by 10% of cut score, can retake only that part; otherwise must retake whole exam.
American Osteopathic Board of Pediatrics ²⁶⁴	D.O.	10 year	No	Computer-based exam	No	Yes: 120 CME credits every 3 years	Osteopathic manipulative modules	Yes	No	No	\$1,300 exam fee	Eligible to attempt to retake exam in years 8–10 of cycle. Exam offered annually.
American Osteopathic Board of Physical Medicine & Rehabilitation ²⁶⁵	D.O.	10 year	No	Oral exam (9 cases)	No	Yes: 120 CME credits every 3 years	No	Yes	No	No	\$395 annual fee, \$500 exam fee	Exam offered annually.
American Osteopathic Board of Preventive Medicine ²⁶⁶	D.O.	10 year	No	Written exam (2 hours, 100 multiple-choice and 2-hour essay)	No	Yes: 120 CME credits every 3 years	No	Yes	No	No	\$295 application fee, \$850 exam fee	Eligible to attempt to retake exam in years 9–10 of cycle. Exam offered annually.

Table A.1. U.S. Health Professionals—Continued

Certifying Board	Profession	Cycle ^a	Required for Licensure	Exam Requirement	Longitudinal Assessment Requirement	CME/CPD/CE Required	Self-Assessment Activities Required	Practice Improvement Required	Peer or Patient Review Required	Practice or Case Report Required	Cost	Failure and Consequence
American Osteopathic Board of Proctology ^{267.c}	D.O.	10 year	No	Written exam	No	Yes: 120 CME credits every 3 years	Yes	Yes	Yes	No	\$1,400 fee	
American Osteopathic Board of Radiology ²⁶⁸	D.O.	10 year	No	Current: secure computer-based exam	Future: Self-assessment modules (15 every 3 years) in 2019	Yes: 120 CME credits every 3 years	See Exam/assessment	Yes	No	No	\$300 annual fee	
American Osteopathic Board of Surgery ²⁶⁹	D.O.	10 year	No	Written exam	No	Yes: 120 CME credits every 3 years	No	Yes	No	No	\$2,225 fee per cycle	Eligible to attempt to retake exam in years 8–10 of cycle. Exam offered twice per year; up to six opportunities to pass. Must take CME after failure.

^a Cycle length refers to time between high-stakes exam requirements, where applicable, or, where not applicable, to time between other requirements.

^b There are several professional certifications for midwifery. Accordingly, state licensing requirements for midwives, including CNMs, are complex and varied. According to the AMCB, AMCB certification is required for CNM licensure in most states.

^c American Osteopathic Board of Proctology periodic recertification process is currently under review.

Table A.2. International Health Professionals

Country	Profession	Cycle	Required for Practice/Licensure?	Exam or Assessment Required	CME/CPD/CE Required	Peer or Patient Review Required	Failure and Consequence
Canada ²⁷⁰	PA	5 year	Varies. Not regulated in all provinces.	No	Yes	A CPD option	Retake certification exam if noncompliant with CPD.
United Kingdom ^{271,272}	PA	6 year	Voluntary	Yes	Yes	No	N/A
Australia ²⁷³	NP	Annual	Yes	No	Yes	Yes: peer	Lose license to practice.
Canada ²⁷⁴⁻²⁸⁶	NP	Annual in most provinces, some activities every 3–5 years	Yes	If failed to meet other requirement(s)	Yes	Peer review in some provinces; patient review in Manitoba	Lose license to practice.
Netherlands ²⁸⁷	NP	5 year	Yes	No	Yes	No	Lose license to practice.
New Zealand ²⁸⁸	NP	3 year	Yes	No	Yes	Yes: physician prescribing review	Lose license to practice.
United Kingdom ²⁸⁹	NP	3 year	Yes	No	Yes	An option for feedback or reflective discussion requirements	Lose license to practice.
Australia ^{290,291}	Physician	3–5 years	No	No	Yes	Varies by college	Financial disincentive for noncompliance.
Austria ^{290,292-294}	Physician	3 year	Yes	No	Yes	Yes: peer	Lose license to practice.
Belgium ²⁹⁰⁻²⁹⁴	Physician	3 year	No	No	Voluntary	Yes: peer	Financial disincentive for noncompliance.
Canada ^{290,291,295}	Physician	1 year for some activities, 5-year cycles for CPD	Yes	No	In most provinces, per Royal College of College of Family Physicians standards	Peer review in several provinces; patient review in Manitoba	Lose license to practice.
Czech Republic ²⁹²	Physician	5 year	Yes	No	Yes	No	Lose license to practice.
Denmark ^{292,296}	Physician	1 year	No	No	Recommended	Yes	N/A
Finland ^{292,294}	Physician	1 year	No	No	Recommended	Yes	N/A
France ^{290,292,293}	Physician	5 year	Yes	No	Yes: CPD.	Yes	Lose license to practice.
Germany ²⁹⁰⁻²⁹⁴	Physician	5 year	Yes, except for purely private physicians	No	Yes	No	Required for practice unless purely private physician.
Greece ²⁹²	Physician	5 year	Yes, for National Health Service doctors	No	Yes	No	Cannot be a government-employed physician.
Hungary ^{292,294}	Physician	5 year	Yes	No	Yes	If noncompliant examination before a commission	Lose license to practice.
Ireland ²⁹²	Physician	5 year	Yes	No	Yes	Yes	Lose license to practice.
Italy ^{290,292}	Physician	5 year	Yes	No	Yes	No	Lose license to practice.

Table A.2. International Health Professionals—Continued

Country	Profession	Cycle	Required for Practice/Licensure?	Exam or Assessment Required	CME/CPD/CE Required	Peer or Patient Review Required	Failure and Consequence
Luxembourg ²⁹²	Physician	N/A	No	No	Yes	No	N/A
Netherlands ^{291-294,297}	Physician	5 year	Yes	No	Yes	Yes: peer and patient for specialists	Removal from medical registry if physician doesn't comply.
New Zealand ^{290,298}	Physician	Variable by region and college.	Yes	No	Yes	Yes	Noncompliance results in forced work supervision and loss of registration.
Norway ²⁹²	Physician	5 year	Yes, for general practitioners	No	Yes	No	Lose license to practice.
Portugal ²⁹²	Physician	Voluntary—1 year	No	No	Recommended	No	N/A
Slovakia ²⁹²	Physician	5 year	Yes	No	Yes	No	Lose license to practice.
Slovenia ^{292,294}	Physician	7 year	Yes	In event of noncompliance with other requirements	Yes	No	Lose license to practice.
Spain ^{290,292-294}	Physician	Varies by region	No	No	In some regions	No	N/A
Sweden ²⁹²	Physician	Voluntary—1 year	No	No	Recommended	No	N/A
Switzerland ²⁹²	Physician	N/A	Yes, for specialists	No	Yes	No	Loss of membership in the Swiss Medical Association.
Turkey ²⁹²	Physician	Yes—1 year	No	No	Yes	No	N/A
United Kingdom ^{290,292-294,299}	Physician	Yes—5 year	Yes	Only if cannot complete other revalidation requirements	Yes	Yes: peer and patient	Lose license to practice.

Appendix B: Questions from Semi-Structured Interview Guide

1. We've reviewed [ORGANIZATION]'s [recertification] requirements [and briefly summarize understanding here]—would you be able to walk us through how those components fit together for a [PROVIDER] going through the process? (*Meaning: From the provider's perspective, what are the steps?*)
2. How did [ORGANIZATION] decide on these particular components or requirements? What was the rationale? (*Probe: How did [ORGANIZATION] decide on these components? What did you weigh when designing this program? Were there other options considered? Is there anything about the organization, the profession locally, or other context that informed this decision?*)
3.
 - a. IF NO EXAM RIGHT NOW: We know that a closed-book, proctored examination to assess professional competence is not a part of the current [recertification] requirements. Was such an examination a component of the requirements in the past?
 - i. If so, why did [ORGANIZATION] move away from that requirement?
 - ii. If not, has [ORGANIZATION] ever considered the use of a closed-book, proctored examination as a part of the maintenance of certification requirements?
 - b. IF PILOTING EXAM ALTERNATIVE: We know that [ORGANIZATION] is piloting an alternative to the closed-book, proctored examination to assess professional competence that has been a part of the [recertification] requirements. Why is [ORGANIZATION] considering this option to move away from that exam requirement?
(Probe: What else did you consider? Was the approach taken by other bodies/providers/entities a consideration? Was provider feedback a consideration? If so, was this in response to relevance, burden, cost, stress, or other considerations?)
4. Can you tell us a bit more about your experience with selecting, developing, or implementing your current assessment (*or recertification requirement*)?
5. How did [ORGANIZATION] make the decision about what constitutes “passing” this assessment [or recertification requirement]? (*Probe: Is there a threshold score, a rating, a ranking, a percentile? How was that level decided?*)
6. What do you see as the benefits of the current approach to assessments of knowledge and competence (*or recertification requirement*)—as compared to prior approaches, to other options considered, or to having no assessments or recertification requirements or procedures? (*Probe: Applicability and relevance to daily practice, ease of use and burden, etc.*)

7. What do you see as the limitations? *(Probe: Cost, burden, uptake, effectiveness? Is [ORGANIZATION] planning to address some of these limitations in the near future? How?)*
8. How have [PROVIDERS] responded to the current approach to the assessment *(or recertification)* and to the [recertification/requirements in general]? *(Probe: Have there been complaints or resistance? Have there been positive reactions?)*
9. Have there been any unanticipated challenges to implementing or running the current approach and requirements? *(Probe: Were there logistical issues, communication issues, buy-in issues, others?)*
10. Based on [ORGANIZATION]'s experience to date with your current assessment and [recertification] requirements in general, what, if anything, would [ORGANIZATION] do differently if implementing a new approach? *(Probe: Or, if you were just starting over again? Or, what advice would you give advice to another organization designing and implementing new requirements?)*

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