



Physician Attitudes About Maintenance of Certification: A Cross-Specialty National Survey

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Abstract

Objectives: To determine physicians' perceptions of current maintenance of certification (MOC) activities and to explore how perceptions vary across specialties, practice characteristics, and physician characteristics, including burnout.

Patients and Methods: We conducted an Internet and paper survey among a national cross-specialty random sample of licensed US physicians from September 23, 2015, through April 18, 2016. The questionnaire included 13 MOC items, 2 burnout items, and demographic variables.

Results: Of 4583 potential respondents, we received 988 responses (response rate 21.6%) closely reflecting the distribution of US physician specialties. Twenty-four percent of physicians (200 of 842) agreed that MOC activities are relevant to their patients, and 15% (122 of 824) felt they are worth the time and effort. Although 27% (223 of 834) perceived adequate support for MOC activities, only 12% (101 of 832) perceived that they are well-integrated in their daily routine and 81% (673 of 835) believed they are a burden. Nine percent (76 of 834) believed that patients care about their MOC status. Forty percent or fewer agreed that various MOC activities contribute to their professional development. Attitudes varied statistically significantly ($P < .001$) across specialties, but reflected low perceived relevance and value in nearly all specialties. Thirty-eight percent of respondents met criteria for being burned out. We found no association of attitudes toward MOC with burnout, certification status, practice size, rural or urban practice location, compensation model, or time since completion of training.

Conclusion: Dissatisfaction with current MOC programs is pervasive and not localized to specific sectors or specialties. Unresolved negative perceptions will impede optimal physician engagement in MOC.

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Certification boards emerged in the United States in the early 20th century to ensure the competence of physicians completing formal training.^{1,2} To accommodate concerns that physician knowledge and skills decline over time and that medical science changes, certification has evolved from a one-time event to a program of ongoing education and assessment—maintenance of certification (MOC).^{1,3} Each member board of the American Board of Medical Specialties has developed an MOC program within a 4-part framework: professional standing, lifelong learning and self-assessment, assessment of knowledge and skills, and improvement in medical practice. Maintenance of certification has a sound theoretical rationale,⁴ is favorably associated with some clinical quality measures,^{4,5} and many physicians support its

intent,⁵⁻⁸ yet substantive concerns have been raised about the effectiveness, relevance, and value of current MOC programs.^{2,6,9,10} This controversy is evidenced by letters,¹¹ editorials,¹²⁻¹⁴ opinion polls,¹⁵ petitions,¹⁶ changes in program structure,¹⁷ and efforts to create an alternative certification board.¹⁸

Despite its importance in the eyes of physicians and the public, and the vocal comments of individual authors,¹¹⁻¹⁴ empirical research on physician attitudes about MOC is surprisingly limited.⁵ Research in the early days of MOC, although seminal in its time, is now out-of-date.⁷ The Pennsylvania Medical Society's statewide cross-specialty survey in 2014 found widespread physician dissatisfaction with MOC in practice and concept.¹⁹ In national surveys of board-certified US physicians, pediatricians voiced disinterest in and many concerns about

MOC²⁰; anesthesiologists affirmed that they value continuing certification but have concerns about MOC implementation⁸; and internal medicine physicians expressed dissatisfaction with MOC.²¹ A recent focus group study among internal medicine and family medicine physicians identified concerns about the value, relevance, integration, and coherence of and support for MOC as currently operationalized,⁹ but the generalizability of these findings remains uncertain. We are not aware of any national cross-specialty investigations of physician attitudes and perceptions about MOC.

A broader understanding of the current opinions of physicians about MOC and how opinions vary among different physician specialties and subgroups is lacking. For example, physicians in small practices, rural communities, and productivity-based (vs salaried) positions and those later in their careers may perceive less relevance in MOC activities or greater difficulty meeting MOC requirements. Given recent concerns about physician wellness,^{22,23} it is also important to determine the relationship between burnout and MOC perceptions. Such information could help certification boards and other stakeholders refine and improve MOC to better meet the needs of physicians and patients.

To address these gaps, we conducted a cross-specialty national survey of US physicians to determine physicians' perceptions of current MOC activities and to explore how their perceptions vary across specialties, practice models, certification status, and level of burnout.

METHODS

From September 23, 2015, through April 18, 2016, we surveyed licensed US physicians via a self-administered Internet and paper questionnaire. Survey items addressed attitudes about continuing professional development and MOC; this report focuses on those related to MOC.

Sampling and Human Subjects

We obtained contact and basic demographic information (specialty, sex, and practice location) for a random sample of 4648 licensed US physicians from the LexisNexis Provider Data Management and Services database

(LexisNexis Risk Solutions). Web survey completion was tracked, but all survey responses were anonymized. We informed invitees that responses would be anonymous and offered a nominal incentive (book valued <\$12) for participation. This study was approved by the Mayo Clinic Institutional Review Board.

Instrument

The authors and 2 other experienced physician-educators (R.B. and D.P.), all with backgrounds working in academic medical centers, integrated care delivery systems, and medical specialty boards, created a survey questionnaire addressing various topics related to continuing professional development, including 13 Likert-scale items about MOC (quoted verbatim in Table 1; response options: 1=strongly disagree and 7=strongly agree). To keep the questionnaire length manageable, we divided it into 2 sections of approximately equal length and allowed participants to submit the survey after completing the first section ("primary items"); those willing to continue could respond to the additional "secondary" items. Eight primary items addressed concerns identified in a recent focus group study⁹ (value, relevance, integration, and support), comprehensiveness in addressing professional development needs, overall burden, and 2 issues raised in recent discussions (certification board financial interests^{13,14} and public [patient] attention to certification status²⁴). Five secondary items concerned the value of MOC-related activities (self-assessment activities, practice improvement activities, and preparing for the examination) in supporting one's professional development, MOC's effect on patient safety, and interest in various MOC activities. We also inquired about burnout²⁵ and demographic characteristics. To provide a shared context and framework for participants with different backgrounds, the questionnaire instructions defined MOC as "a program of assessment, continuous learning, and practice improvement designed to encourage and certify ongoing development and proficiency in key professional competencies."

We asked 4 continuing medical education experts at nonaffiliated institutions to review the full questionnaire to identify important

TABLE 1. Main Survey Results^a

Item	Mean ± SD, median ^b	Agree ^{b,c}
		n/N (%)
Primary survey items		
MOC activities are relevant to the patients I see ^d	2.9±1.8, 2	200/842 (23.8)
MOC is worth the time and effort required of me ^d	2.4±1.7, 2	122/824 (14.8)
I have adequate support in completing MOC activities	3.1±1.8, 3	223/834 (26.7)
MOC activities are well-integrated with my daily clinical practice	2.4±1.5, 2	101/832 (12.1)
MOC provides all I need to remain a competent physician	2.0±1.3, 2	56/827 (6.8)
MOC is a burden to me	5.6±1.7, 6	673/835 (80.6)
MOC is all about generating money for the boards	5.2±1.7, 6	574/851 (67.5)
Patients care about my MOC status	2.1±1.5, 2	76/834 (9.1)
Secondary survey items		
MOC self-assessment activities contribute to my professional development	3.2±1.8, 3	114/367 (31.1)
MOC practice improvement activities contribute to my professional development	2.8±1.7, 2	82/367 (22.3)
Studying for the board recertification exam contributes to my professional development	3.4±1.9, 3	138/359 (38.4)
MOC as a whole improves patient safety	3.0±1.7, 3	80/378 (21.2)
I would like to see a broader array of activities that qualify for MOC	5.1±1.5, 6	232/335 (69.3)

^aMOC = maintenance of certification.
^bResponse options ranged from 1 (strongly disagree) to 7 (strongly agree). The questionnaire was divided into 2 sections, and ~55% of the respondents completed only the first section (primary items).
^c“Agree” indicates slightly agree, agree, or strongly agree.
^dIndicates prespecified key item.

omitted or irrelevant topics. Mayo Clinic Survey Research Center personnel with expertise in questionnaire development also reviewed items to verify structure and wording. We pilot tested the questionnaire among 17 physicians representing anesthesiology, dermatology, emergency medicine, family medicine, internal medicine, neurology, pathology, psychiatry, and surgery, soliciting feedback on item relevance and wording and revising items accordingly.

Survey Administration

We administered the Internet questionnaire using Qualtrics, a research survey administration

tool (www.qualtrics.com). Each physician was contacted via e-mail with an individually tracked link, followed by e-mail reminders to nonrespondents. Those not responding to the Internet survey within 3 months were mailed a paper questionnaire. The paper questionnaire had no identifying information, so that responses could not be tracked.

Statistical Analyses

We applied standard univariate statistics to characterize the sample; we used respondent-reported demographic information when available and used information from LexisNexis to fill in missing data. We explored the possibility that nonrespondents were systematically different from respondents in 2 ways. First, we compared specialty, practice location, and sex (ie, demographic information from the LexisNexis database) between respondents and nonrespondents using chi-squared tests. Second, we compared the primary survey responses of those responding near the end of the survey (the last 15% of responses) with those responding earlier, because research suggests that the perceptions of late responders closely approximate the perceptions of those who never respond.²⁶ We also compared the distribution of respondents' specialties against the national distribution published in the Association of American Medical Colleges' *Physician Specialty Data Book 2014*.²⁷

We were able to link Internet survey responses with the respondent's zip code. We used the US Department of Agriculture Rural-Urban Continuum Codes²⁸ to classify practice location as predominantly urban or rural.

We identified a priori 2 perceptions (“key items”) as most salient to current MOC practice: those related to relevance and value. We hypothesized that higher burnout, generalist practice, smaller practice size, rural practice, and productivity-based compensation would be associated with less favorable opinions about MOC. We planned subanalyses by specialty, time since completion of training, certification status, and sex without specific hypotheses. We also evaluated hypothesized relationships involving MOC burden (less burden with higher relevance, integration, support, nongeneralist

TABLE 2. Demographic Characteristics of the Survey Sample^a

Domain	Response	n (%)	
		Invited (N=4583)	Respondents (n=988) ^b
Specialty	Anesthesiology	231 (5.1)	53 (5.4)
	Diagnostic subspecialties	311 (6.8)	54 (5.5)
	Family medicine	496 (10.9)	98 (10.0)
	Internal medicine, general	586 (12.8)	108 (11.0)
	Internal medicine subspecialties	701 (15.4)	145 (14.8)
	Obstetrics-gynecology	278 (6.1)	55 (5.6)
	Pediatrics	352 (7.7)	76 (7.8)
	Pediatric subspecialties	95 (2.1)	44 (4.5) ^c
	Surgery and surgical subspecialties	694 (15.2)	148 (15.1)
	Other clinical specialties	821 (18.0)	197 (20.1)
Sex	Male	3054 (66.6)	590 (66.2)
	Female	1529 (33.4)	301 (33.8)
Region	Northeast	987 (21.6)	199 (20.6)
	Midwest	955 (20.9)	221 (22.8)
	South	1563 (34.1)	326 (33.7)
	West	1072 (23.4)	222 (22.9)
Community size ^d	Rural	359 (7.8)	43 (7.0)
	Urban	4218 (92.2)	571 (93.0)
Certification status	Lifetime	NA	260 (29.2)
	Time-limited, current		620 (69.7)
	Time-limited, not current		10 (1.1)
Burnout	Feel burned out	NA	309 (33.7)
	Feel more callous		165 (18.0)
	Either burned out or callous		349 (38.1)
Years since training	1-10	NA	181 (18.8)
	11-20		280 (29.0)
	21-30		285 (29.6)
	>30		218 (22.6)
Practice size	1 physician	NA	133 (13.6)
	2-5		226 (23.1)
	6-25		290 (29.7)
	>25		328 (33.6)
Compensation model	Salary (fixed)	NA	345 (35.3)
	Salary with incentives		305 (31.3)
	Productivity		326 (33.4)
Practice type	Self-employed	NA	243 (24.8)
	Medical group or hospital		465 (47.5)
	Academic		179 (18.3)
	Other		91 (9.3)
Race	American Indian	NA	6 (0.7)
	Asian		131 (15.2)
	Black		22 (2.6)
	Pacific Islander		2 (0.2)
	White		701 (81.3)
Ethnicity	Hispanic	NA	49 (5.9)

^aNA = not available.

^bNumbers may not sum to 988 because of missing data. Percentages are calculated using all available data. n=916 for burnout items.

^cP<.001 compared with nonrespondents. We also compared respondents against national demographic characteristics²⁸ and found only small differences (see text).

^dCommunity size available only for those completing the Internet survey.

specialty, and lower burnout), integration (more integration in larger practices), and support (less support with productivity-based compensation). We defined generalists as non-subspecialist family medicine, internal medicine, and pediatric physicians.

We used general linear models to test associations between MOC opinions (outcomes, see [Table 1](#)) and respondent characteristics (predictors, as outlined above) and to compare opinions on primary survey items between those who did and who did not complete the secondary items. We calculated Spearman's ρ to evaluate correlations among MOC opinions and with burnout. We conducted analyses using the full 1- to 7-point Likert scale, but to simplify reporting we grouped responses of slightly agree, agree, or strongly agree as indicative of agreement (hereafter labeled "agree"). Because of the large sample size and multiple comparisons, we used a 2-tailed α value of .01 to define statistical significance in all analyses. We used SAS version 9.4 (SAS Institute Inc.).

RESULTS

Survey Response and Sample Characteristics

Of 4648 survey invitations sent, 646 e-mails and 223 paper questionnaires were returned as undeliverable, along with 65 returned as undeliverable via both e-mail and paper. We received 988 responses (631 via Internet and 357 via paper). Using the conservative denominator of 4583 potential respondents (excluding the 65 undeliverable via either method), our response rate was 21.6%.

Demographic characteristics of the respondents and the demographic information available for those invited to participate are reported in [Table 2](#). About 45% of those completing the primary questionnaire items also completed the secondary items. Their responses to all primary items were similar to responses from those who did not complete the secondary items (data not shown).

The distribution of specialties among respondents was not statistically significantly different from published data for all US physicians²⁷ ($P > .06$), except that our sample had fewer family medicine and general internal medicine physicians (absolute difference

~4% for both; $P < .001$). Respondents and nonrespondents were comparable across all available characteristics except that we had more responses from pediatric subspecialists (see [Table 2](#)).

Nearly all respondents (99%) had current board certification (29% with lifetime certification and 70% with current time-limited certification). Three respondents (all in practice for ≥ 46 years) indicated they had never been board certified; they were excluded from further analysis.

Thirty-eight percent of the respondents met criteria for being burned out, defined as feeling either burned out (34%) or more callous toward others (18%) on at least a weekly basis.

Main Results

For each item, 74 to 103 respondents indicated that the statement did not apply to them, and 57 to 61 did not respond, leaving 824 to 851 quantifiable responses per item (see [Table 1](#) for detailed response information). Twenty-four percent of physicians agreed (ie, slightly agreed, agreed, or strongly agreed) that MOC activities are relevant to their patients, and 15% felt they have value (are worth the time and effort). Although 27% perceived adequate support for MOC activities, only 12% indicated that activities are well-integrated into their daily routine and 81% believed they are a burden. Nine percent believed that patients care about their MOC status. Of those responding to the second half of the survey, about two-thirds would like to see a broader array of MOC activities, whereas 31%, 22%, and 38% agreed that self-assessment, practice improvement, and examination preparation activities (respectively) contribute to their professional development. [Supplemental Table 1](#) (available online at <http://www.mayoclinicproceedings.org>) contains responses for all items using the full 1- to 7-point Likert scale.

In a planned analysis to estimate the effect of potential nonresponse bias, we compared the responses of those responding early vs late in the survey period and found no statistically significant differences for any primary survey items.

Preplanned Subgroup Analyses

[Table 3](#) shows the association between the key items (MOC relevance and value) and

TABLE 3. Subgroup Analyses of Responses to Key Items by Respondent Characteristics

Domain	Characteristic	Relevance, agree ^a		Value, agree ^a	
		n/N (%)	P value ^b	n/N (%)	P value ^b
Specialty	Anesthesiology	14/39 (35.9)	<.001	13/38 (34.2)	<.001
	Diagnostic subspecialties	6/37 (16.2)		1/37 (2.7)	
	Family medicine	35/95 (36.8)		15/94 (16.0)	
	Internal medicine, general	15/92 (16.3)		15/91 (16.5)	
	Internal medicine subspecialties	23/124 (18.5)		11/123 (8.9)	
	Obstetrics-gynecology	27/48 (56.3)		19/47 (40.4)	
	Pediatrics	13/71 (18.3)		7/71 (9.9)	
	Pediatric subspecialties	10/39 (25.6)		2/37 (5.4)	
	Surgery and surgical subspecialties	31/129 (24.0)		21/126 (16.7)	
	Other clinical specialties	24/159 (15.1)		17/151 (11.3)	
Generalist	Nongeneralist	135/575 (23.5)	.99	84/559 (15.0)	.91
	Generalist ^c	63/258 (24.4)		37/256 (14.5)	
Sex	Male	121/519 (23.3)	.36	75/508 (14.8)	.62
	Female	70/274 (25.5)		39/267 (14.6)	
Region	Northeast	40/160 (25.0)	.40	19/153 (12.4)	.58
	Midwest	47/191 (24.6)		30/190 (15.8)	
	South	62/276 (22.5)		40/270 (14.8)	
	West	44/197 (22.3)		28/193 (14.5)	
Community size ^d	Rural	6/40 (15.0)	.48	7/38 (18.4)	.82
	Urban	105/482 (21.8)		70/476 (14.7)	
Certification status	Lifetime	50/185 (27.0)	.56	24/176 (13.6)	.62
	Time-limited, current	138/601 (23.0)		87/591 (14.7)	
	Time-limited, not current	3/9 (33.3)		3/10 (30.0)	
Burnout	No (neither burned out nor callous)	116/498 (23.3)	.50	73/487 (15.0)	.48
	Yes (either burned out or callous)	78/316 (24.7)		44/310 (14.2)	
Years since training	1-10	39/164 (23.8)	.32	20/166 (12.0)	.41
	11-20	58/257 (22.6)		43/255 (16.9)	
	21-30	54/245 (22.0)		32/237 (13.5)	
	>30	43/156 (27.6)		23/148 (15.5)	
Practice size	1 physician	30/108 (27.8)	.40	19/104 (18.3)	.91
	2-5	42/194 (21.6)		27/186 (14.5)	
	6-25	65/251 (25.9)		37/248 (14.9)	
	>25	61/284 (21.5)		37/281 (13.2)	
Compensation model	Salary (fixed)	70/294 (23.8)	.09	35/280 (12.5)	.15
	Salary with incentives	69/269 (25.7)		48/270 (17.8)	
	Productivity	58/271 (21.4)		38/265 (14.3)	

^aResponse options ranged from 1 (strongly disagree) to 7 (strongly agree). "Agree" in this table indicates slightly agree, agree, or strongly agree. Relevance = "MOC [maintenance of certification] activities are relevant to the patients I see." Value = "MOC is worth the time and effort required of me." Denominators vary slightly because of nonresponse to either the MOC item or the subgroup characteristic.

^bP values reflect analyses of MOC attitudes using the full 1- to 7-point Likert scale.

^cNon-subspecialist family medicine, internal medicine, and pediatric physicians were collectively regarded as generalists.

^dCommunity size available only for those completing the Internet survey.

prespecified demographic characteristics. The correlation between MOC relevance and value was moderately strong ($\rho=0.65$; $P<.001$). Attitudes varied statistically significantly ($P<.001$) across specialties, but reflected low perceived relevance and value in nearly all specialties. Contrary to all our hypotheses, we found no

significant differences for any other subgroup analyses with relevance and value. The correlations between burnout scores and relevance and value were small and statistically nonsignificant (all $\rho=-0.06$ to -0.04 ; $P>.10$). [Supplemental Table 2](http://www.mayoclinicproceedings.org) (available online at <http://www.mayoclinicproceedings.org>) contains responses

for relevance and value, by subgroup, using the full 1- to 7-point Likert scale.

We confirmed significant correlations between MOC burden and MOC perceptions of relevance, support, and integration ($\rho=-0.55$, $\rho=-0.42$, and $\rho=-0.49$, respectively; $P<.001$), but the magnitude of correlation was lower than that between relevance and value. The association between burden and generalist specialty did not reach statistical significance (85% [220 of 260] for generalists and 79% [446 of 566] for nongeneralists; $P=.02$). The correlation between burden and burnout was statistically significant ($P<.001$) but accounted for only 2% of the variance in scores ($\rho=0.15$ for both burnout measures).

We did not confirm expected associations between MOC support and compensation model or between MOC integration and practice size ($P\geq.19$).

Exploratory Analyses

In exploratory analyses, we found no association between the desire for various MOC activities and MOC relevance and value ($\rho=-0.01$ and $\rho=-0.05$, respectively; $P\geq.39$). We did find moderate correlations between the item about MOC generating money for the boards and MOC relevance and value ($\rho=-0.49$ and $\rho=-0.46$, respectively; $P<.001$).

DISCUSSION

In this national survey of US physicians, we found that physicians perceived that current MOC activities have little relevance or value and are neither well-supported nor well-integrated into their clinical practice. More than 80% agreed that MOC is a burden. Physicians also did not believe that patients care about their MOC status. In a smaller subsample, physicians viewed MOC activities related to self-assessment, examination preparation, or practice improvement as contributing only modestly to their professional development. Between-specialty differences were typically small. We found no association between MOC perceptions and other respondent characteristics including burnout, time-limited or lifetime certification, practice size, rural or urban practice location, productivity vs salaried compensation, or time since completion of training.

Limitations and Strengths

The response rate leaves uncertainty about how well our findings reflect the attitudes of nonresponding physicians. If those with strong MOC beliefs (favorable or unfavorable) preferentially responded, it could have biased results; however, the decision to respond could also have been prompted by beliefs about other survey topics (eg, continuing professional development). Moreover, demographic characteristics of respondents were similar to those of nonrespondents and the distribution of specialties among respondents generally mirrors that of US physicians. We also found that those responding late (ie, after several reminders) had attitudes similar to those responding early. To the extent that late responders' attitudes approximate those who never responded,²⁶ this provides some reassurance that our findings do not underrepresent nonrespondents.

Our survey items did not address all current issues affecting MOC, but we tried to address key issues noted in recent research and editorials.^{8,9,13,14,19,20} We framed questionnaire items to focus on physicians' attitudes and perceptions rather than asking respondents to estimate or recall specific facts. We acknowledge that responses may reflect misconceptions about MOC, but maintain that physician perceptions are nonetheless vitally important. We did not ask respondents to speculate about solutions.

We note that nearly all respondents had current certification, which differs from the known distribution of currently certified US physicians ($\sim 80\%$ ²⁹). Our findings may not apply directly to those not currently certified, but do apply to those with lifetime or maintained certification. We did not ask whether respondents had personally completed an MOC cycle and cannot tell how much a respondent's beliefs are based on personal experiences with MOC vs observations and other information sources. However, data on time in practice suggest that at least half of respondents had likely completed an MOC cycle. We further suggest that beliefs based on anticipated challenges are still relevant to conversations surrounding MOC.

Strengths include the nationwide cross-specialty sample that closely mirrors US

physician demographic characteristics²⁷; exploration of responses by specialty, location, and other subgroups with specific hypotheses for most analyses; and ample power for these analyses. We followed a robust process of questionnaire development, including item generation by experienced educators with diverse backgrounds, review by 4 external experts, and pilot testing among physicians representing several diverse specialties. We also adhered to best practices in survey implementation and delivery, including use of a dedicated survey research center.

Integration With Previous Research

This is, to our knowledge, the first cross-specialty national survey exploring physician attitudes about MOC. Beyond the issues addressed in previous studies, our survey items focused on the integration and burden of MOC, the boards' perceived financial conflict of interest, and the desire for a broader array of MOC activities. Our findings of dissatisfaction with MOC are consonant with a recent cross-specialty survey in Pennsylvania¹⁹ and with national surveys of pediatrics²⁰ and internal medicine.²¹ Our results also corroborate the findings of a regional focus group study,⁹ in that perceived relevance, value, support, and integration all seem to be lacking in current MOC programs.

However, some studies^{8,30,31} have found more favorable attitudes both for MOC generally and for specific MOC activities. Some differences may be attributed to wording of items. For example, previous surveys indicate that physicians believe that patients value board-certified physicians,^{8,20} but that patients may not care about *maintenance* of certification.²⁰ Of course, physician beliefs may not reflect patients' true preferences.²⁴ Other differences may be due to differences in specialty. For example, a survey of anesthesiologists⁸ found that 35% disagreed with the statement "MOCA [MOC Anesthesiology] is not relevant to my practice" and that 59% to 82% agreed that various components of MOC were relevant to a physician's practice. In our sample, anesthesiologists (along with obstetricians/gynecologists) perceived somewhat greater MOC relevance and value than did physicians in other specialties, suggesting that specialty-specific factors may be influential. Other studies

involving emergency medicine physicians also revealed favorable attitudes toward MOC examination-related tasks³¹ and lifelong learning activities.³⁰

Physicians' perceptions must be counterbalanced by societal demands for competent physicians and high-quality care and for public accountability in this regard.^{2,32} Although limited research suggests that MOC helps to achieve these goals,³³⁻³⁵ the extent and value of these benefits remain controversial.^{36,37}

Implications

The uniform dissatisfaction across subgroups and survey items suggests that the problems with MOC are ubiquitous and pervasive, not localized to specific sectors, and that all elements of MOC may warrant similar efforts to improve. It is clear that to meaningfully engage physicians, MOC will need to change. What remains unclear is how to structure MOC programs that provide tangible value and adequate support to physicians, and prepare them to meet the needs of patients and society. The American Board of Medical Specialties and its member boards are simultaneously implementing and investigating innovative approaches to address these issues.^{3,17,38-40} Individual physicians also need to be engaged in this process of change, providing meaningful feedback and constructive suggestions that will enable the evolution and improvement of MOC programs.

Most physicians agree with the concept of lifelong learning,^{6,9,41} and research has found associations between board certification and favorable patient outcomes.^{4,5,33,34} However, evidence is presently lacking about how current formal programs of *maintenance* of certification contribute to lifelong learning beyond what physicians would spontaneously do (eg, learning while caring for patients) and how MOC can be made less burdensome while achieving the same aspirational goals.^{9,30,32,42} For example, evidence confirms that physicians cannot self-assess their learning needs^{43,44} and that they receive inadequate feedback on their clinical performance.^{45,46} To the degree that MOC supports identification and remediation of learning gaps, it serves a useful purpose.^{31,47} Additional empirical evidence to support these and other benefits and to guide the

implementation of interventions that promote meaningful learning is needed.

Finally, physician perceptions must be taken seriously and at face value. Beliefs could reflect misperceptions about MOC program requirements, available supports, board finances, or benefits to self and patients, but beliefs must be acknowledged, concerns addressed, misperceptions corrected, and evidence provided. Rhetoric alone will not suffice. Before we can expect physicians to truly embrace MOC, they will need to spontaneously recognize its relevance, coherence, integration, support, and, most importantly, value to themselves and the patients they serve.

CONCLUSION

Dissatisfaction with current MOC programs is widespread. Certification boards, individual physicians, and other stakeholders will need to collaborate to continue creating and improving programs that ensure physician competence, support lifelong learning, minimize burden, and add value for physicians and patients.

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SUPPLEMENTAL ONLINE MATERIAL

Supplemental material can be found online at: <http://www.mayoclinicproceedings.org>. Supplemental material attached to journal articles has not been edited, and the authors take responsibility for the accuracy of all data.

Abbreviation and Acronym: MOC = maintenance of certification

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REFERENCES

1. Baron RJ, Johnson D. The American Board of Internal Medicine: evolving professional self-regulation. *Ann Intern Med.* 2014; 161(3):221-223.
2. Iglehart JK, Baron RB. Ensuring physicians' competence—is maintenance of certification the answer? [published correction appears in *N Engl J Med.* 2013;368(8):781]. *N Engl J Med.* 2012; 367(26):2543-2549.
3. American Board of Medical Specialties. Standards for the ABMS program for maintenance of certification (MOC): For implementation in January 2015. <http://www.abms.org/media/1109/standards-for-the-abms-program-for-moc-final.pdf>. Accessed March 18, 2016.
4. Hawkins RE, Lipner RS, Ham HP, Wagner R, Holmboe ES. American Board of Medical Specialties Maintenance Of Certification: theory and evidence regarding the current framework. *J Contin Educ Health Prof.* 2013;33(suppl 1):S7-S19.
5. Lipner RS, Hess BJ, Phillips RL Jr. Specialty board certification in the United States: issues and evidence. *J Contin Educ Health Prof.* 2013;33(suppl 1):S20-S35.
6. Drazen JM, Weinstein DF. Considering recertification. *N Engl J Med.* 2010;362(10):946-947.
7. Lipner RS, Bylsma WH, Arnold GK, Fortna GS, Tooker J, Cassel CK. Who is maintaining certification in internal medicine—and why? A national survey 10 years after initial certification. *Ann Intern Med.* 2006;144(1):29-36.
8. Culley DJ, Sun H, Hamman AE, Warner DO. Perceived value of Board certification and the Maintenance of Certification in Anesthesiology Program (MOCA®). *J Clin Anesth.* 2013;25(1):12-19.
9. Cook DA, Holmboe ES, Sorensen KJ, Berger RA, Wilkinson JM. Getting maintenance of certification to work: a grounded theory study of physicians' perceptions. *JAMA Intern Med.* 2015; 175(1):35-42.
10. Levinson W, King TE Jr, Goldman L, Goroll AH, Kessler B. Clinical decisions: American Board of Internal Medicine maintenance of certification program. *N Engl J Med.* 2010;362(10):948-952.
11. Weiss KB, Bryant LE Jr, Morgan LB, O'Kane ME. The ABIM and recertification. *N Engl J Med.* 2010;362(25):2428-2429; author reply 2429-2430.
12. Steele R. Maintenance of certification. *Clin Pediatr (Phila).* 2011; 50(7):584-586.
13. Strasburger VC. Ain't misbehavin': is it possible to criticize maintenance of certification (MOC)? *Clin Pediatr (Phila).* 2011;50(7): 587-590.
14. Teirstein PS. Boarded to death—why maintenance of certification is bad for doctors and patients. *N Engl J Med.* 2015;372(2): 106-108.
15. Krittek PA, Drazen JM. Clinical decisions: American Board of Internal Medicine maintenance of certification program—polling results. *N Engl J Med.* 2010;362(15):e54.
16. Physicians for Certification Change. Petitions and pledge of non-compliance. <http://nomoc.org/>. Accessed March 18, 2016.
17. Baron R. ABIM announces immediate changes to MOC program. <http://www.abim.org/news/abim-announces-immediate-changes-to-moc-program.aspx>. Accessed February 25, 2015.

18. National Board of Physicians and Surgeons website: <https://nbpas.org/>. Accessed March 18, 2016.
19. Chadwick JS. Physician survey reveals widespread dissatisfaction with maintenance of certification (MOC). https://www.pamedsoc.org/PAMED_Downloads/Quick%20Consult/QCMOC.pdf. Accessed April 22, 2016.
20. Freed GL, Dunham KM, Lamarand KE; Research Advisory Committee of the American Board of Pediatrics. Permanent pediatric diplomate awareness of and perspectives on maintenance of certification. *J Pediatr*. 2009;155(6):919-923.e921.
21. American Board of Internal Medicine. All-diplomate survey: Improving the MOC assessment experience. <http://transforming.abim.org/wp-content/uploads/2016/04/abim-survey-results-april-2016.pdf>. Accessed August 19, 2016.
22. Dyrbye LN, West CP, Satele D, et al. Burnout among U.S. medical students, residents, and early career physicians relative to the general U.S. population. *Acad Med*. 2014;89(3):443-451.
23. Shanafelt TD, Hasan O, Dyrbye LN, et al. Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014 [published correction appears in *Mayo Clin Proc*. 2016;91(2):276]. *Mayo Clin Proc*. 2015;90(12):1600-1613.
24. Freed GL, Dunham KM, Clark SJ, Davis MM; Research Advisory Committee of the American Board of Pediatrics. Perspectives and preferences among the general public regarding physician selection and board certification. *J Pediatr*. 2010;156(5):841-845.e841.
25. West CP, Dyrbye LN, Sloan JA, Shanafelt TD. Single item measures of emotional exhaustion and depersonalization are useful for assessing burnout in medical professionals. *J Gen Intern Med*. 2009;24(12):1318-1321.
26. Miller LE, Smith KL. Handling nonresponse issues. *JOE*. 1983; 21(September/October):45-50.
27. Association of American Medical Colleges. *Physician Specialty Data Book 2014*. Washington, DC: AAMC Center for Workforce Studies; 2014.
28. United States Department of Agriculture Economic Research Service. 2013 Rural-Urban Continuum Codes. <http://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx>. Accessed April 18, 2016.
29. American Board of Medical Specialties. Fact sheet: American Board of Medical Specialties. http://www.abms.org/media/100051/abms_factsheet_2016.pdf. Accessed April 14, 2016.
30. Jones JH, Smith-Coggins R, Meredith JM, Korte RC, Reisdorf EJ, Russ CM. Lifelong learning and self-assessment is relevant to emergency physicians. *J Emerg Med*. 2013; 45(6):935-941.
31. Marco CA, Wahl RP, Counselman FL, et al. The American Board of Emergency Medicine ConCert™ Examination: emergency physicians' perceptions of learning and career benefits [published online ahead of print March 28, 2016]. *Acad Emerg Med*. <http://dx.doi.org/10.1111/acem.12971>.
32. Levinson W, Holmboe E. Maintenance of certification: 20 years later. *Am J Med*. 2011;124(2):180-185.
33. Holmboe ES, Wang Y, Meehan TP, et al. Association between maintenance of certification examination scores and quality of care for medicare beneficiaries. *Arch Intern Med*. 2008;168(13): 1396-1403.
34. Gray BM, Vandergrift JL, Johnston MM, et al. Association between imposition of a Maintenance of Certification requirement and ambulatory care-sensitive hospitalizations and health care costs. *JAMA*. 2014;312(22):2348-2357.
35. O'Neill TR, Puffer JC. Maintenance of certification and its association with the clinical knowledge of family physicians. *Acad Med*. 2013;88(6):780-787.
36. Sandhu AT, Dudley RA, Kazi DS. A cost analysis of the American Board of Internal Medicine's maintenance-of-certification program. *Ann Intern Med*. 2015;163(6):401-408.
37. Hayes J, Jackson JL, McNutt GM, Hertz BJ, Ryan JJ, Pawlikowski SA. Association between physician time-unlimited vs time-limited internal medicine board certification and ambulatory patient care quality. *JAMA*. 2014;312(22): 2358-2363.
38. The American Board of Anesthesiology. Why is the ABA changing MOCA? <http://www.theaba.org/MOCA/About-MOCA-2-0>. Accessed March 18, 2016.
39. American Board of Obstetrics + Gynecology. ABOG begins innovative pilot program to enhance maintenance of certification process. https://www.abog.org/new/ABOG_mocimp.aspx. Accessed April 20, 2016.
40. Phillips R. ABFM to simplify maintenance of certification (MOC) for family physicians and make it more meaningful: a family medicine registry. *J Am Board Fam Med*. 2015;28(3):431-433.
41. Hojat M, Veloski JJ, Gonnella JS. Measurement and correlates of physicians' lifelong learning. *Acad Med*. 2009;84(8):1066-1074.
42. Lee TH. Certifying the good physician: a work in progress. *JAMA*. 2014;312(22):2340-2342.
43. Eva KW, Regehr G. Self-assessment in the health professions: a reformulation and research agenda. *Acad Med*. 2005; 80(10 suppl):S46-S54.
44. Davis DA, Mazmanian PE, Fordis M, Van Harrison R, Thorpe KE, Perrier L. Accuracy of physician self-assessment compared with observed measures of competence: a systematic review. *JAMA*. 2006;296(9):1094-1102.
45. Gallagher TH, Prouty CD, Brock DM, Liao JM, Weissman A, Holmboe ES. Internists' attitudes about assessing and maintaining clinical competence. *J Gen Intern Med*. 2014;29(4):608-614.
46. Sargeant J, Bruce D, Campbell CM. Practicing physicians' needs for assessment and feedback as part of professional development. *J Contin Educ Health Prof*. 2013;33(suppl 1):S54-S62.
47. Duffy FD, Lynn LA, Didura H, et al. Self-assessment of practice performance: development of the ABIM Practice Improvement Module (PIM). *J Contin Educ Health Prof*. 2008;28(1):38-46.