US Physician and Surgeon Perspectives on Continuous Board Certification – A National Cross-specialty Survey

Westby G. Fisher, MD, FACC[1], Timothy Sanborn, MD, MS, FACC[1], and Charles Cutler, MD, MACP[2]

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[1] NorthShore University HealthSystem, Evanston, IL and University of Chicago, Pritzker School of Medicine

[2] Einstein Medical Center Montgomery, Norristown, PA

Corresponding Author:
Westby G. Fisher, MD
Director, Cardiac Electrophysiology
NorthShore University HealthSystem
2650 Ridge Avenue, Walgreens Building 3rd Floor
Evanston, IL 60201
Office: 847-570-2640
Fax: 847-570-1865
Email: wfisher@northshore.org

Co-Author Emails:

Timothy Sanborn, MD, MS, FACC: tsanborn@northshore.org

Charles Cutler, MD, MACP: drcharlescutler@gmail.com

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Background: Clinical US physician and surgeon opinions regarding ABMS and AOA Continuous Certification programs are unknown.

Objective: To assess practicing physicians' opinions of ABMS Maintenance of Certification® (MOC) and AOA Osteopathic Continuous Certification (OCC).

Design: An Internet-based voluntary survey of US physicians and surgeons.

Setting: A self-selected cross-specialty sample of US physicians and surgeons from 21 January 2018 through 19 March 2018.

Participants: US physicians and surgeons engaged in clinical practice.

Main Outcome(s) and Measures(s): Self-reported perspectives of the ABMS and AOA Board initial and continuous certification programs including perceived value, costs, conflicts of interest, research methods, contribution to burnout, and negative consequences.

Results: Of an estimated 759421 clinical US physicians, a voluntary sample of 7007 unique US physicians (0.92%) representing 47 subspecialties from every state and nearly every US territory were received. 6048 (93%) were Board Certified by at least one ABMS member board and 4793 of 6004 respondents (80%) participated in MOC or OCC. 5831 of 6477 (90%) felt ABMS or AOA Board Certification should be a life-long credential using Continuous Medical Education credits to document ongoing medical education. Costs for certification or recertification exceeded $6000 for 2027 of 6477 (31%) of the participants. 4059 of 4697 (86%) felt MOC/OCC could interfere with their right to work. 390 of 4697 (8%) physicians participating in continuous

certification perceived negative consequences from the process. 4436 of 4697 (94%) of recertifying physicians were unaware their certification status was sold to third parties when enrolling for MOC/OCC. 4624 of 5812 (80%) expressed concern that MOC research was conducted on physicians or their practice without informed consent. Perceptions were not different based on gender, the time following training, or practice setting.

Conclusions and Relevance: While most physicians valued initial Board certification with lifelong continuing medical education, dissatisfaction and perceived negative consequences to US physicians with current ABMS MOC and AOA "continuous certification" programs exist. As ABMS member boards are currently redesigning the entire MOC process, these findings reflecting the opinions of US physicians and surgeons should be carefully considered.

Background

For the first 33 years of existence, the American Board of Medical Specialties (ABMS) and its member boards issued lifetime certificates following passage of a one-time board certification exam. To demonstrate their commitment to life-long learning, physicians participated in continuing medical education programs to enhance their knowledge.

Some argued that one-time certification did not provide sufficient evidence that physicians could remain competent throughout their careers.[1,2,3,4,5] At its inception in 1969, the American Board of Family Medicine issued time-limited certifications lasting 7 years. In 1976, the American Board of Surgery and American Board of Thoracic surgery instituted arbitrary time-limited certifications for similar reasons. The American Board of Internal Medicine (ABIM) implemented time-limited certification for critical care specialists in 1986 and for all other internal medicine subspecialties after January 1990, after physician support for a compelling accolade from voluntary continuous certification program failed to emerge.[6,7,8]

In 1998, the ABMS established their Task Force on Competence, which led all ABMS member boards to create an expanded and more standardized form of time-limited board certification called Maintenance of Certification® (MOC). The four-part MOC program encompassed: (1) licensure and professional standing, (2) life-long learning and self-assessment, (3) cognitive expertise through formal examination, and (4) practice performance assessment. By 2006, all 24 ABMS member boards had received approval for their individual MOC products.[9] The

American Osteopathic Association instituted a similar continuous certification program called Osteopathic Continuous Certification (OCC) for Doctors of Osteopathy in 2013.

Practicing Physician Concerns with MOC and OCC

Controversy erupted with the implementation of the new four-part MOC/OCC requirements for continuous certification, most prominently from the Internal Medicine community.[10] While most physicians support continuing professional development and lifelong learning,[11] substantive concerns were raised about the program's effectiveness,[12,13] finances,[14] cost,[15] research methods,[1] undisclosed lobbying,[16] and business conflicts of interest exposed through Congressional testimony.[17] In June of 2015, Resolution 309 was passed in the AMA House of Delegates advocating for a moratorium on MOC requirements for all medical and surgical specialties until it has reliably been shown to improve patient care.[18]

In September 2017, after acknowledging physician concerns with MOC, the ABMS convened a "Vision Initiative Commission," comprised of both physicians and non-clinical professionals. The Commission is tasked with making recommendations to improve the current recertification process, however, their findings will not be publicly available for 12-18 months.

There is still controversy related to whether ABMS MOC improves patient outcomes.[12,19,20,21] We undertook an independent national survey to assess recent physician perceptions of continuous certification.

Methods

Practicing Physicians of America, a physician membership organization with its home office in New Braunfels, TX, conducted a self-selected Internet survey (SurveyMonkey, San Mateo, CA) among a broad sample of board-certified US physicians from January 12 through March 19, 2018. The 8-page, 32-question questionnaire included demographic variables and specific questions regarding initial certification, maintenance of certification (MOC) and Osteopathic Continuous Certification (OCC) programs.

Sampling and Human Subjects

Physicians were voluntarily recruited using social media and web-based channels. According to the latest 2016 Association of American Medical Colleges Physician Workforce report, there are 759421 total patient care physicians in the United States[23]. We used this number to estimate the total population of US physicians in clinical practice and to determine the margin of error of our survey. No monetary or in-kind incentive was offered for survey completion.

At the beginning of the survey, physicians were told they would be asked for their name and email at the end of the survey to verify their responses but were not required to provide this information. The survey included demographic variables, Likert scales from 1 to 5 to quantify responses of attitudes on initial board certification and continuous certification, and other nominal yes/no responses. Prior to distribution, twelve ABMS Board-certified physicians from

varying surgical and medical subspecialties (anesthesia, surgery, pediatrics, dermatology, internal medicine, cardiac electrophysiology, interventional cardiology, family medicine, osteopathic family medicine, emergency medicine, and psychiatry) were invited to review survey structure and wording prior to distribution. To avoid multiple survey responses from the same respondent and to geo-locate respondents, Internet computer addresses were tracked, and responses limited to unique IP addresses. Locations of respondents were assessed and quantified (BatchGeo, LLC, Portland, OR). Anonymous survey responses completed from IP addresses outside the US were reviewed to assure participants were US physicians (e.g., military, charity missions, etc.). Skip page logic was used in some survey question responses to direct participants to appropriate questions and to limit responses to physicians in active or recent clinical practice. Non-physicians, non-clinical physician researchers, industry-employed physicians, and physicians not yet board certified were pre-specified to be excluded (Figure 1). The survey was published to the Practicing Physicians of America website (PracticingPhysician.org) and spread through a secure sharable web link (https://www.surveymonkey.com/r/PPA_MOCSurvey) and shared via social media channels (Facebook, Twitter, LinkedIn). Dropouts were tracked for each section of the survey except the initial demographics section, where a 100% completion rate occurred (Figure 1). After release, the Pennsylvania Medical Society directed its members to the survey, as did an online healthcare professional network (Doximity.com, San Francisco, CA). The verbatim survey questions are listed in Appendix A.

Statistical analyses

We applied standard univariate statistics to characterize the sample. Respondent-reported demographic information was obtained from all participants. We compared the primary survey responses of those responding near the end of the survey (the last 10% of the responses) with those responding earlier because prior research suggests those that responded later closely approximates those who never respond.[22] To assess nonresponse bias, we correlated the percentage of self-reported specialties of our respondents to the percentage of specialties of practicing US physician published in the latest-available American Medical Colleges Physician Specialty Data Book 2016.[23] We pre-specified sub-analyses by specialty, time since completion of training, certification status, and gender without specific hypotheses. Surgical subspecialties were pre-specified to include anesthesiology/pain management, cardiothoracic surgery, general surgery, neurosurgery, obstetrics and gynecology, oral and maxillofacial surgery, ophthalmology, orthopedics, otolaryngology, otorhinolaryngology, plastic/reconstructive/aesthetic surgery, and urology.

General linear models were used to test associations between MOC opinions (outcomes) and respondent characteristics. IBM SPSS Version 25 was used for statistical calculations. Hypothesis testing used a pre-specified two-tailed alpha = 0.05.

RESULTS

Survey Response and Sample Characteristics

We received 7125 survey responses. After excluding duplicate or non-US anonymous incomplete responses, 7007 survey responses were available for analysis. At the conclusion of the survey, 3619 of 7007 (52%) physicians included their name and at least one email address for verification. Physicians from every state and US territory (except the Northern Marinas Islands) contributed. Demographic information of respondents is reported in Tables 1 and 2. To verify respondents, a randomly selected 100 respondents who submitted their name and at least one email address were verified against an ABMS database (CertificationMatters.org). All 100 randomly selected non-anonymous physicians reported their practice setting and certification status accurately.

Survey completion rate of issues pertaining to ABMS board certification was 90% (5812/6477) (Figure 1). General perceptions of board certification and continuous certification programs and their estimated costs are outlined in Table 3 and Figure 2. The overwhelming majority (5831 / 6477, 90%) of physicians felt Board certification should be a lifetime credential using continuing medical education to demonstrate a commitment to lifelong learning. Almost all physicians felt MOC/OCC contributed significantly or very significantly to physician burnout (5516/5805, 95%) and post hoc analysis by specialty showed no difference in perceptions between surgical or medical specialties. Similarly, a strong majority across all specialties perceived participation in MOC/OCC as no longer voluntary (5787/6453, 90%). Perception of

MOC/OCC costs exceeded $4000 for the majority of US physicians with each testing cycle (3477/6477, 54%).

While fewer in number, doctors of osteopathy involved in OCC felt the American Osteopathic Association should accept alternate recertification boards' credentials for continuous certification (686/755, 91%) and the vast majority did not think the process should be tied to state licensure (685/754, 91%).

Of the 4793 physicians who described themselves as participating in MOC or OCC, 3262 of 4697 (69%) did so because their hospital required them to participate, 2141 of 4697 (46%) because their insurance company requires participation, and only 903 / 4697 (19%) did so to keep up with their specialty. The majority of physicians disagreed or strongly disagreed that MOC/OCC tested concepts relevant to their practice (2753 / 4697, 58%), had strong scientific evidence base to improve patient outcomes (3973 / 4691, 85%), accurately reflected their ability to practice medicine (4180 / 4691, 89%), or was offered at an acceptable cost (4307 / 4692, 92%).

The majority of physicians (4303 / 4697, 92%) did not fail a MOC examination, lose their Board certification (even briefly), or experience negative consequences because of MOC/OCC requirements. For the 394 physicians who did (Table 3), psychological and economical harms predominated and 17% were contemplating retirement rather than participate in MOC/OCC. Of this same group, 4059 of 4697 (86%) felt the program could affect their right to work as a

physician. Most physicians participating in MOC (4436 / 4697, 94%) were unaware that AMBS Solutions, LLC (Atlanta, GA), a wholly owned subsidiary of ABMS, sells their physician data to third parties.

Of all ABMS board-certified physicians participating in MOC or not, only 2065 of 5812 respondents (36%) felt physicians should be automatically "opted in" to a HIPAA Business Associate Agreement as a condition of enrolling in MOC and 4624 or 5812 (80%) of physicians felt the ABMS and AOA should offer physicians informed consent before conducting research involving MOC or OCC.

Discussion

This survey represents the largest assessment to date of practicing US physicians from a cross-section of subspecialties since the introduction of continuous certification by ABMS and the AOA. Social media and smartphone use by physicians has grown rapidly, particularly amongst younger physicians, leading to the democratization of voices and peer review by crowd.[24] The 7007 response rate approaches nearly 1% of all US clinical physicians in 2016. 93% of respondents were or are Board certified in at least one subspecialty. Only 19% of physicians held one lifetime Board certification issued before 1990 ("grandfathers"). While more men responded than women, the larger proportion of women physicians reporting in this study (48%) is consistent with the trend of a growing female physician workforce.[25] In a 2006 national survey on MOC conducted by members of the American Board of Internal

Medicine, only 23% of respondents were female.[26] Post hoc analyses showed 1530 of 2330 (66%) of physician respondents 0-10 years from training were women, while only 152 of 912 (17%) of physician respondents 30 years post-training or retired were women.

Perceptions of Initial Board Certification

Ninety percent of all physicians surveyed felt initial certification should be a lifelong credential with continuing medical education credits being adequate to document maintenance of competency (Table 3). This perception did not change based on time from training. This finding is consistent with earlier surveys of board-certified physicians[27] and anesthesiologists.[28] Only 666 of 6453 (10%) US physicians felt confident ABMS board certification was a voluntary process. Despite these concerns, perceptions regarding the integrity of the initial board certification process, the educational content, and the ability to maintain practice privacy were neutral (Figure 2). Post hoc analysis suggested most surgical subspecialties held a slightly more favorable opinion of board certification than medical subspecialties.

Perceptions of MOC/OCC

Most physicians who participated in continuous certification did not feel there was a strong evidence base for MOC/OCC to affect patient outcomes, their ability to provide good care or to improve patient safety (Figure 2). Most physicians disagreed or strongly disagreed with the

ability for MOC/OCC to test relevant concepts based on their specific practice setting (Figure 2). 86% of physician respondents felt continuous certification could interfere with their right to work as a physician, perhaps because Board certification is increasingly tied to hospital credentialing[29] and insurance panel inclusion. In terms of cost, the majority of physicians felt the MOC/OCC fees were too high. 2027 of 6477 (31%) of physicians estimated their expenditures were in excess of $6000, an amount that corresponds closely to ten-year costs for MOC reported by others.[15]

While fewer respondents were Doctors of Osteopathy (DO) than Medical Doctors (MD), 91% felt that the American Osteopathic Association should recognize alternate re-certification boards. Only 9% of DO's felt OCC should be tied to state licensure requirements.

Conflicts of Interest, Research Concerns, and Perceived Harms

Most physicians (94%) were unaware that AMBS Solutions, LLC (Atlanta, GA), a wholly owned subsidiary of ABMS, sells physician data to third parties and that this is a condition of enrollment in continuous certification[30]. Likewise, 80% of physicians felt they should understand the research being conducted on them or their practice and sign informed consent for research as required by Department of Health and Human Services Protection of Human Service regulations.[31] Finally, in this survey, 95% of physicians agreed or strongly agreed that continuous certification contributes to physician burnout. (Figure 2) Cook et al

found a similar correlation between burden and burnout in their smaller cross-specialty national survey.[32]

To the best of our knowledge, prior surveys have failed to assess physician attitudes and perceived negative consequences from continuous certifications' business arrangements and research methods since the process was introduced. In this survey, perceived negative consequences caused by continuous certification were experienced by 8% of MOC/OCC participants (Table 3). Psychological harms were the most common, with 56% of affected physicians becoming "depressed, anxious, embarrassed, or suicidal" and 44% ashamed to share their MOC/OCC failure or loss of Board certification with their workplace, family, or friends. Economically, 23% of those who failed MOC lost their hospital privileges (10%), insurance panel payments (8%), or job (5%), and some (4%) had to relocate as a result of failure. A substantial number (67/390, 17%) of physicians planned to retire early in lieu of re-certifying. Post hoc analysis showed those who failed MOC or lost their board certification, even briefly, geographically distributed, more likely to be male, older, and later in their career.

Integration with Previous Research

Our findings of dissatisfaction, lack of evidence base, and concerns with conflicts of interest are consistent with prior cross-specialty surveys performed in Pennsylvania[33], and with national surveys in pediatrics[34]. Like the smaller cross-specialty national survey performed by

Mayo investigators[32], the uniform discontent across survey subgroups and most survey items suggests the problems with MOC are pervasive. The majority of physicians and surgeons agreed that the sale of personal MOC data, research methods, and lack of evidence to support improved patient outcomes or safety significantly contributes to burnout and physician dissatisfaction with MOC/OCC. Given these findings and the perception that MOC has potential to adversely affect a physician's right to work may leave little room for practicing physician acceptance of alternatives to MOC that do not address these issues in the future.

Limitations

Our survey items did not address all current issues with MOC/OCC but attempted to gauge the value physicians perceive from the process, physician awareness of potential conflicts of interest, research methods, and negative consequences experienced by physicians from the process. While we cannot verify how many survey responses were based on personal experience, observations, or other information sources, these insights remain relevant to the discussion on continuous certification processes.

All surveys suffer from non-responder bias, measurement bias, and responder bias. The voluntary nature of this social media-promoted survey subjects data collection to voluntary response bias. As such, this survey may over-represent individuals who have strong opinions on continuous certification. While the large sample size of physician respondents to this

survey helps reduce sampling error, it does not mitigate under coverage and non-response bias, especially since we are aware of only one state medical society that circulated this survey to members. However, post hoc comparisons of the perceptions toward MOC/OCC from Pennsylvania physicians were no different from physicians from other states with a large number of respondents (CA, TX, NY, FL).

It is possible that some non-physicians completed the survey, but the correlation of the percent of subspecialties reported by survey respondents to thirty-two published AAMC specialty percentages, coupled with the random verification of 100 non-anonymous subjects, suggested respondents were likely clinical physicians. Responder bias may have contributed to underreporting of the perceived harms of MOC/OCC because of social and professional concerns. Every effort was made to permit respondent anonymity to limit this bias. Finally, our estimated total population of practicing physicians was reported in 2016[23] and may not represent the total number of practicing physicians in 2018. Still, post hoc analysis using an estimate of 10% more physicians for the total population (835,362) estimated a worst-case survey margin of error for survey responses of ± 1% at the 95% confidence interval for questions with a sample sizes exceeding 4247 (Figure 2).

While the beliefs expressed in this survey could reflect misunderstandings about MOC/OCC program requirements, finances, conflicts, or benefits to self and patients, these concerns must be acknowledged and addressed. Before trust in continuous certification for medical professional self-regulation is restored, solid evidence must be produced.

CONCLUSIONS

While most physicians value initial Board certification with lifelong continuing medical education, this large, cross-specialty national survey suggests widespread dissatisfaction and even perceived negative consequences to US physicians with current ABMS MOC and AOA "continuous certification" programs. As ABMS member boards are currently redesigning the entire MOC process, these findings, reflecting the opinions of US physicians and surgeons, should be carefully considered.

Acknowledgment

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Dr. Sanborn has no conflicts to disclose.

Dr. Cutler is Past President of the Pennsylvania Medical Society and was appointed as a member of the American Board of Medical Specialties' Vision Initiative Commission tasked with improving the current re-certification process. He is also an unpaid advisor to Practicing Physicians of America, Inc.

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Figure 1. Survey Structure, Logic, and Number of Respondents For Each Section of the Survey

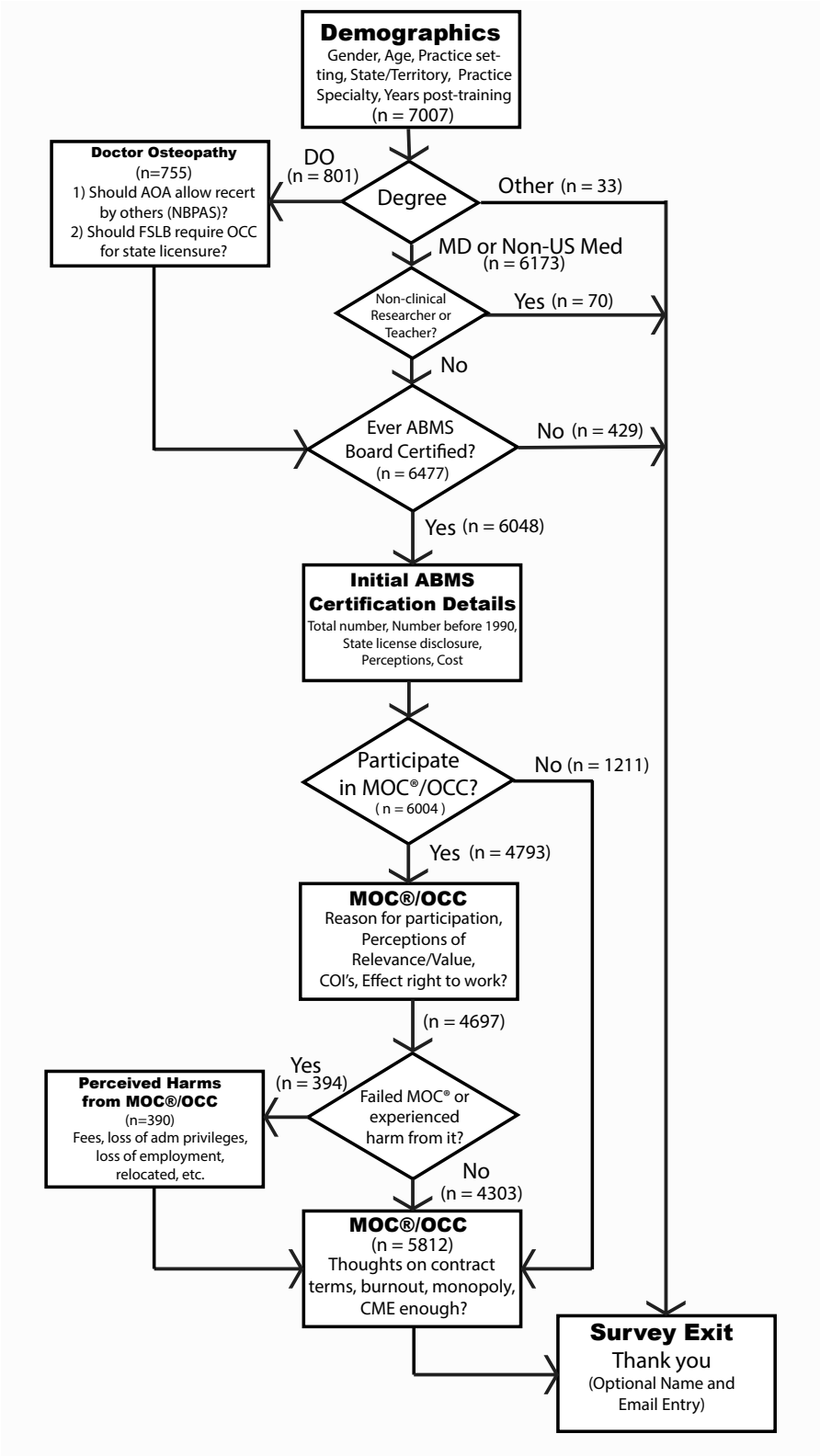


TABLE 1. Demographic Characteristics of the Survey Sample

Gender	No. (%)
Male	3632 (52)
Female	3373 (48)
Other	2 (0)
Age	
21-35	771 (11)
36-50	3378 (48)
51-65	2307 (33)
66 or older	551 (8)
Practice Setting	
Private Practice	1865 (27)
Group Practice / Independent	1199 (17)
Hospital/University/HealthSystem Employee	2939 (42)
Group Practice / Contracted	637 (9)
Other	369 (5)
Stage of Specialty Training	
Have MD/DO but not finished with clinical training	120 (2)
Clinical physician post-training 0-10 years	2330 (33)
Clinical physician post-training 11-20 years	2048 (29)
Clinical physician post-training 21-30 years	1527 (22)
Clinical physician post training > 30 years	760 (11)
Retired clinical physician	152 (2)
Teach physicians, don't see patients	32 (0)
Non-clinical research physician	38 (1)
Physician Degree	
MD	6084 (87)
DO	801 (11)
Non-US	89 (1)
None	33 (0)
Currently or Ever Previously ABMS Board Certified?	n / N (%)
Yes	6048 / 6477 (93)
No	429 / 6477 (7)
Now many valid ABMS Board certificates do you carry?	
0	437 / 6477 (7)
1	3998 / 6477 (62)
2	1515 / 6477 (23)
3	437 / 6477 (7)
4 or more	90 / 6477 (1)
How many of your ABMS Board certifications were acquired before 1990?	
0	5258 / 6465 (81)
1	852 / 6465 (13)
2	299 / 6465 (5)

3	50 / 6465 (1)
4 or more	6 / 6465 (0)

Table 2. Survey Participant Demographics by State/Territory and Subspecialty

US State/Territory	Survey No.	Survey %		Specialty	Survey No.	Survey %	AAMC Clinical[a] No.	AAMC Clinical[a] %
All Locations	7007			**All Specialties**	7007		759421	
Alabama	78	(1)		Adolescent Medicine	5	(0)		
Alaska	32	(0)		Allergy / Immunology	91	(1)	4019	(1)
American Samoa	1	(0)		Anesthesia / Pain Mgmt	325	(5)	38749	(5)
Arizona	131	(2)		Cardiovasc Diseases / EP	519	(7)	20275	(3)
Arkansas	56	(1)		Cardiothoracic Surgery	29	(0)		
California	506	(7)		Critical Care Medicine	76	(1)	8849	(1)
Colorado	123	(2)		Dentistry	0	(0)		
Connecticut	65	(1)		Dermatology	338	(5)	11062	(1)
Delaware	28	(0)		Emergency Medicine	433	(6)	36607	(5)
D.C.[c]	32	(0)		Endocrinology	117	(2)	5682	(1)
Florida	406	(6)		Family Medicine	879	(13)	103235	(14)
Georgia	181	(3)		Gastroenterology	124	(2)	13014	(2)
Guam	2	(0)		General Surgery	192	(3)	22043	(3)
Hawaii	25	(0)		Genetics	9	(0)		
Idaho	67	(1)		Geriatrics	31	(0)	4422	(1)
Illinois	262	(4)		Gynecology and Obsterics	232	(3)	38690	(5)
Indiana	124	(2)		Hematology / Oncology	107	(2)	12234	(2)
Iowa	66	(1)		Hospice / Palliative Care	24	(0)		
Kansas	79	(1)		Hospital Medicine	151	(2)		
Kentucky	82	(1)		Infectious Disease	55	(1)	6548	(1)
Louisiana	86	(1)		Internal Medicine	624	(9)	101281	(13)
Maine	35	(0)		Neonatology	102	(1)	4406	(1)
Maryland	132	(2)		Nephrology	77	(1)	8885	(1)
Massachusetts	144	(2)		Neuromusc Med / OMM	6	(0)		
Michigan	174	(2)		Neurology	203	(3)	4920	(1)
Minnesota	106	(2)		Neurosurgery	43	(1)	11501	(2)
Mississippi	44	(1)		Occupational Medicine	12	(0)		
Missouri	118	(2)		Ophthalmology	145	(2)	17413	(2)
Montana	21	(0)		Oral and Maxillofacial Surg	1	(0)		
Nebraska	44	(1)		Orthopedics	138	(2)	18292	(2)
Nevada	45	(1)		Otolaryngology	56	(1)	8894	(1)
New Hampshire	27	(0)		Otorhinolaryngology	12	(0)		(0)
New Jersey	176	(3)		Palliative Medicine	3	(0)		(0)
New Mexico	35	(0)		Pathology	81	(1)		(0)

New York	409	(6)		Pediatrics	756	(11)	52163	(7)
North Carolina	190	(3)		Physical Med / Rehab	121	(2)	8352	(1)
North Dakota	15	(0)		Plastic/Reconstr/Aesthetic	45	(1)	6727	(1)
N. Marinas Is.	0	(0)		Podiatry	13	(0)		(0)
Ohio	326	(5)		Preventive Medicine	8	(0)	4091	(1)
Oklahoma	72	(1)		Psychiatry	330	(5)	33051	(4)
Oregon	101	(1)		Pulmonary	94	(1)	4830	(1)
Pennsylvania	910	(13)		Radiation Oncology	5	(0)	4499	(1)
Puerto Rico	16	(0)		Radiology	255	(4)	24784	(3)
Rhode Island	46	(1)		Rheumatology	62	(1)	4831	(1)
South Carolina	110	(2)		Sports Medicine	22	(0)		(0)
South Dakota	27	(0)		Toxicology	1	(0)		(0)
Tennessee	144	(2)		Urology	55	(1)	9325	(1)
Texas	504	(7)			**p = 0.74**			
Utah	47	(1)			**Correlation: 0.87**			
Vermont	19	(0)						
Virginia	210	(3)						
Virgin Islands	1	(0)						
Washington	168	(2)						
West Virginia	33	(0)						
Wisconsin	108	(2)						`
Wyoming	18	(0)						

p-value = Paired t-test of the percentage of physicians in thirty-two reported 2016 AAMC subspecialties[23] and the percentages of similar self-reported subspecialties. Correlation coefficient reported is based on this same comparison.

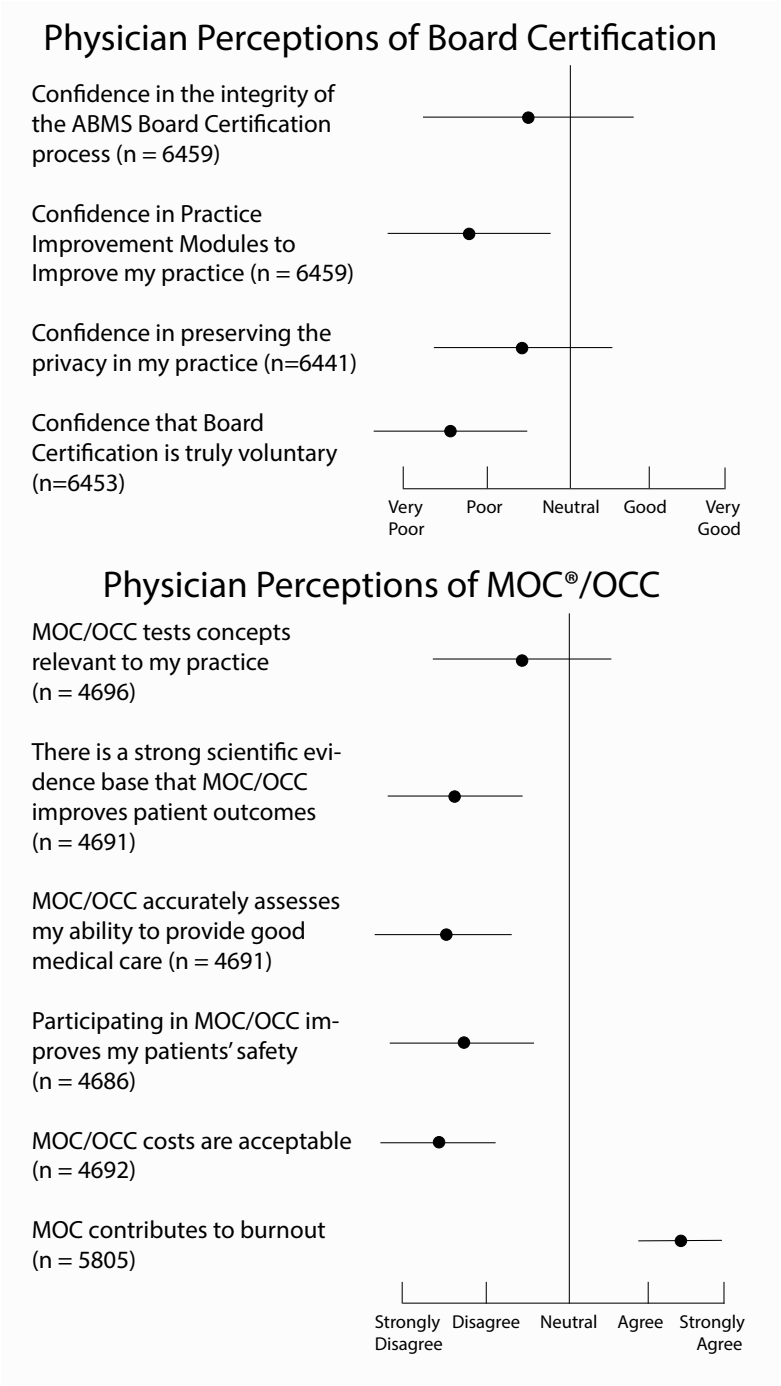
[a] AAMC Clinical US Physicians 2016
[b] Northern Marinas Islands
[c] District of Columbia

Table 3. Surveyed Perceptions of US Board Certification and Continuous Certification

US Board certification	
Should be a life-long credential, using CME credits for continuing education	5831 / 6477 (90)
Should be a time-limited physician credential requiring periodic renewal	646 / 6477 (10)
Most recent estimated cost to become ABMS Board certified or recertified	
Employer subsidized	226 / 6477 (3)
$1-2000	580 / 6477 (9)
$2001 - $4000	1731 / 6477 (27)
$4001 - $6000	1450 / 6477 (22)
$6001 - $10,000	1089 / 6477 (17)
$10,001 - $20,000	615 / 6477 (9)
>$20,000	323 / 6477 (5)
I'm not sure	463 / 6477 (7)
When enrolling for MOC®, I was made aware that ABMS Solutions, LLC, a for-profit subsidiary of the ABMS, sells my certification status to third parties.	
Yes	177 / 4697 (4)
No	4436 / 4697 (94)
Not Applicable	84 / 4697 (2)
Have you ever failed a MOC® examination, lost your Board certification (even briefly) or experienced harm because of MOC® / OCC requirements?	
Yes	394 / 4697 (8)
No	4303 / 4697 (92)
Please check all effects of MOC for failing or losing your Board certification (check all that apply)	
Paid for a re-score of my examination	41 / 390 (11)
Re-took the examination for free	28 / 390 (7)
Re-took the examination for an additional fee	218 / 390 (56)
Never attempted to retake the examination and let my board certificate "expire"	56 / 390 (14)
Lost my hospital/admitting privileges	38 / 390 (10)
Lost my job	21 / 390 (5)
Was dis-enrolled from an insurance company's payment plan	30 / 390 (8)
Eventually passed my repeat examination	204 / 390 (52)
Failed to tell my workplace of my examination results	67 / 390 (17)
Failed to tell my family/friends about my test results	107 / 390 (27)
Became depressed, anxious, embarrassed, or suicidal	220 / 390 (56)
Relocated as a result of this failure	15 / 390 (4)
Plan to retire to avoid MOC / OCC	67 / 390 (17)
I retired because of this failure	1 / 390 (0)
Do you believe Maintenance of Certification® (or Osteopathic Continuous Certification) could threaten your right to work as a physician?	
Yes	4059 / 4659 (86)
No	638 / 4659 (14)
Physicians should be automatically opted into a HIPAA Business Associate Agreement as a condition of enrolling in MOC® or OCC.	
Agree	2065 / 5812 (36)
Disagree	3747 / 5812 (64)
Should the AOA or ABMS member boards conducting research on physicians (or their practice) be required to obtain informed consent from diplomates?	
Yes	4624 / 5812 (80)

No	1188 / 5812 (20)

Figure 2. Perceptions of Initial Board Certification and Maintenance of Certification (MOC)



A plot of mean and standard deviations of physician responses to Likert-type scales on attitudes about Board Certification and MOC/OCC using ranges from 1 ("Very poor" or "strongly disagree") to 5 ("very good" or "strongly agree"). The estimated margin of error was ± 1% at the 95% confidence interval.

Figure Legends

Figure 1.

Survey Structure, Logic, and Number of Respondents For Each Section of the Survey

Figure 2.

Perceptions of Initial Board Certification and Maintenance of Certification (MOC)

A plot of mean and standard deviations of physician responses to Likert-type scales on attitudes about Board Certification and MOC/OCC using ranges from 1 (“Very poor” or “strongly disagree”) to 5 (“very good” or “strongly agree”). The estimated margin of error was ± 1% at the 95% confidence interval.

ENDNOTES

[1] Choudhry NK, Fletcher RH, Soumeral SB. Systemic review: the relationship between clinical experience and quality of health care. *Ann Intern Med*. 2005; 142(4): 260-273.

[2] Poses RM, Diaz JA. Comment on Systemic Review: the relationship between clinical experience and quality of health care. *Ann Intern Med*. 2005 Jul 5; 143(1): 84-5; author reply 86-7; discussion 87.

[3] Samuels MA, Ropper AH. Comment on Systemic Review: the relationship between clinical experience and quality of health care. *Ann Intern Med*. 2005 Jul 5; 143(1): 84; author reply 86-7; discussion 87.

[4] Loder EW. Comment on Systemic Review: the relationship between clinical experience and quality of health care. *Ann Intern Med.* 2005 Jul 5; 143(1): 86; author reply 86-7; discussion 87.

[5] Norman GR, Eva KW. Comment on Systemic Review: the relationship between clinical experience and quality of health care. *Ann Intern Med*. 2005 Jul 5; 143(1): 85-6; author reply 86-7; discussion 87.

[6] Langdon LO, Grosso LJ, Glassock RJ, Kimball HR. Advanced Achievement in Internal Medicine: The End of the Line for Voluntary Recertification. *J Gen Intern Med*. 1989 Nov/Dec; 4: 557-559.

[7] Glassock RJ, Benson JA Jr, Copeland RB, Godwin HA, Johanson WG, Point W, Popp RL, Scherr L, Stein JH, Taunton OD. Time-limited certification and recertification: the program of the American Board of Internal Medicine. *Ann Intern Med*. 1991 1 Jan; 114(1): 59-62.

[8] Inglehart KJ, Baron RB. Ensuring Physicians' Competence – Is Maintenance of Certification the Answer? *N Engl J Med*. 2012 Dec 27, 367: 2543-2549.

[9] Standards for the ABMS Program for Maintenance of Certification (MOC) 2015. American Board of Medical Specialties website http://www.abms.org/media.1109/standards-for-the-abms-program-for-moc-final.pdf . Accessed April 15, 2018.

[10] Teirstein PS. Boarded to death – why maintenance of certification is bad for doctors and patients. *N Engl J Med* 2015; 372(2): 106-108. Circulation: Cardiovascular Quality and Outcomes. 2018 Apr 12.

[11] Hojat M, Veloski JJ, Gonnella JS. Measurement and correlates of physicians' lifelong learning. *Acad Med*. 2009; 84(8): 1066-1074.

[12] Hayes J, Jackson JL, McNutt GM, Hertz BJ Ryan JJ, Pawlikowski SA. Association between physician time-limited vs time-unlimited internal medicine board certification and ambulatory patient care quality. *JAMA* 2014 Dec 10; 312(22): 2358-2363.

[13] Grosch EN. Does specialty board certification influence clinical outcomes? *J Eval Clin Pract* 2006 Oct; 12(5): 473-81.

[14] Fisher WG, Schloss JS. Medical Specialty Certification in the United States – A False Idol? *J Interv Card Electrophysiol*. 2016 Oct; 47(1): 37-43.

[15] 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 Sep 15; 163(6): 401-408.

[16] Eichenwald K. Medical Mystery: Making Sense of ABIM's Financial Report. *Newsweek* 2015, May 21; http://www.newsweek.com/2015/06/05/medical-mystery-making-sense-abims-financial-report-334772.html Accessed 8 Apr 2018.

[17] Allen M. Payments to CEO Raise New Conflicts at Top Quality Group. *ProPublica*. 2014 Feb 12; https://www.propublica.org/article/payments-to-ceo-raise-new-conflicts-at-top-health-quality-group Accessed 8 Apr 2018.

[18] Resolution 309. Resolutions: 2015 Interim Meeting. Ama-assn.org 2015, page 392. https://www.ama-assn.org/sites/default/files/media-browser/public/hod/i15-hod-resolutions.pdf Accessed 20 Apr 2018.

[19] Sharp LK, Bashook PG, Lipsky MS, Horowitz SD, Miller SH. Specialty Board Certification and Clinical Outcomes: The Missing Link. *Acad Med* 2002; 77(6): 534-542.

[20] Gray BM, Vandergrift JL, Johnston MM, et al. Association Between Imposition of Maintenance of Certification Requirement and Ambulatory Care-Sensitive Hospitalizations and Health Care Costs. *J Am Med Assoc* 2014; 312(22): 2348-2357.

[21] Kachalia A, Johnson JK, Miller S, Brennan T. The incorporation of patient safely into board certification examinations. *Acad Med* 2006; 81(4): 317-325.

[22] Miller LE, Smith KL. Handling non-response issues. *JOE*. 1983: 21 (September/October): 45-50.

[23] Association of American Medical Colleges. *Physician Specialty Data Report 2016*. Washington, DC: AAMC Center for Work-force Studies: 2016.

[24] Yeh RW. Academic Cardiology and Social Media – Navigating the Wisdom and Madness of the Crowd. *Circ Cardiovasc Qual Outcomes*. 2018; 11:e004736.

[25] Muhlestein D, Winfield L. Preparing a New Generation of Physicians for a New Kind of Health Care. NEJM Catalyst. Feb 28, 2018; https://catalyst.nejm.org/preparing-new-generation-physicians-new-health-care/. Accessed 8 Apr 2018.

[26] Lipner RS, Bylsma WH, Arnold GK, Fortna GS, Tooker J, Cassel C. Who is Maintaining Certification in Internal Medicine – and Why? A National Survey 10 Years after Initial Certification. *Ann Intern Med* 2006; 144: 29-36.

[27] Kritek PA and Drazen JM. American Board of Internal Medicine Maintenance of Certification Program – Polling Results. New Engl J Med 2010; 362:e54.

[28] Culley DJ, Sun H, Harman AE, Warner DO. Perceived value of Board certification and the Maintenance of Certification in Anesthesiology Program (MOCA®) J Clin Anesth 2013;25:12-19.

[29] Freedman GL, Dunham KM, Gebremariam A. Changes in hospitals' credentialing requirements for board certification from 2005 to 2010. *J Hosp Med* 2013; 8: 298-303.

[30] HIPAA Business Associate Addendum. ABIM.org website. https://www.abim.org/~/media/ABIM%20Public/Files/pdf/hipaa/hipaa-privacy-and-security.pdf Accessed Apr 15, 2018.

[31] National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. The Belmont Report. Department of Health Education and Welfare. April 18, 1979. Accessed 8 Apr 2018 https://www.hhs.gov/ohrp/sites/default/files/the-belmont-report-508c_FINAL.pdf .

[32] Cook DA, Blachman MJ, West CP, Wittich CM. Physician Attitudes About Maintenance of Certification: A Cross-Specialty National Survey. *Mayo Clin Proc* 2016 Oct: 91(10): 1336-1345.

[33] Chadwick JS. Physician survey reveals widespread dissatisfaction with maintenance of certification (MOC). https://webcache.googleusercontent.com/search?q=cache:gc_hPeIfB9AJ:https://dev-www.pamedsoc.org/PAMED_Downloads/Quick%2520Consult/QCMOC.pdf+&cd=1&hl=en&ct=clnk&gl=us&client=safari Accessed April 8, 2018.

[34] Freed GL, Dunham JM, Lamarand KE. Permanent pediatric diplomate awareness of and perspectives on maintenance of certification. *J Pediatr* Dec 2009; 155(6): 919-923.e1.