Analysis of the Association Between Performance on Multicenter Perioperative Outcomes Group (MPOG) Quality Improvement Clinical Measures and Participation in the Maintenance of Certification in Anesthesiology (MOCA®) Program in the State of Michigan in 2019

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BACKGROUND

Since 2000 all new board certification has been time-limited, with continuing certification contingent on participation in a maintenance of certification (MOC) program. Across specialties, continuing certification has not consistently been linked to differential improvement in clinical practice.

The association between the American Board of Anesthesiology's implementation of continuing certification [Maintenance of Certification in Anesthesiology (MOCA)] and clinical care has not been evaluated. We evaluated whether participation in MOCA is independently associated with anesthesiologist performance on Multicenter Perioperative Outcomes Group Quality Improvement (MPOG QI) measures for board-certified anesthesiologists practicing in the state of Michigan during 2019.

OUTCOMES EVALUATED

(Smarter Objective)

Seven out of 30 standard adult anesthesiology clinical process measures were included:

Blood pressure (BP-03): Percentage of patients where intraoperative hypotension (MAP < 55 mmHg) was avoided (defined as >20 minutes cumulatively).

Neuromuscular blockade use and reversal: Percentage of patients with a documented Train of Four (TOF) after last dose of non-depolarizing neuromuscular blocker (**NMB-01**) and percentage of patients administered neostigmine, sugammadex, and/or edrophonium before extubation and after the last dose of non-depolarizing neuromuscular blockade (**NMB-02**)

Control of postoperative nausea and vomiting (PONV-01): Percentage of adult patients who undergo general anesthesia (in which an inhalational anesthetic is administered AND who have three or more risk factors for post-operative nausea and vomiting) and receive combination therapy consisting of at least two prophylactic pharmacologic antiemetic agents of different classes preoperatively or intraoperatively.

Tidal volume (PUL-02): Percentage of patients with median tidal volume less than or equal to 8 mL/kg.

Temperature control: Percentage of patients with active warming applied (**TEMP-01**) and percentage of patients receiving general anesthesia that had at least one core temperature documented intraoperatively (**TEMP-02**)

Acute kidney injury (AKI-01): Percentage of patients with a baseline creatinine increase of more than 1.5 times within 7 postoperative days or the baseline creatinine level increases by ≥ 0.3 mg/dL within 48 hours postoperatively.

METHODOLOGY

(Improvement Action Plan and Actions Taken)

ABA-certified anesthesiologists consenting to ABA-related research from 19 institutions (and satellite hospitals and surgery centers) in Michigan were included. Participation in MOCA was defined as participating, not participating, or participation not required. We compared de-identified MOCA participant anesthesiologists with non-MOCA participant anesthesiologists (including both non-participating and participation not required) within the MPOG database. To ensure the privacy of each anesthesiologist's personal data, an honest broker from the University of Michigan Data Office for Clinical and Translational Research, unaffiliated with the ABA or MPOG, was used to merge data between the two organizations and produce an analytic dataset without direct identifiers.

All operative cases from 2019 were included. We included MPOG QI process and outcome measures which demonstrated sufficient distribution and variability amongst state of Michigan anesthesiologists, and had at least 1,000 instances at the primary institution over 2019. We excluded measures that were either not evaluated for the entire 12-month study period or focused solely on pediatric/subspecialty specific cases.

Seven adult anesthesiology clinical process measures were included: blood pressure (BP-03), neuromuscular blockade use and reversal (NMB-01 & NMB-02), control of postoperative nausea and vomiting (PONV-01), tidal volumes (PUL-02), and temperature control (TEMP-01 & TEMP-02) along with the outcome measure acute kidney injury (AKI-01). **The primary study outcome was anesthesiologist performance on a composite measure of all eight selected MPOG QI measures.**

Our primary model assessed the outcome of composite MPOG QI performance as the raw proportion passed (# passed cases/# eligible cases). The mixed model contained the exposure of interest of MOCA participation (Yes/No), institution as a random effect, and fixed-effect covariates: age, medical-school affiliated hospital, and first attempt result of Part 1 written exam. Additional provider-level covariates included anesthesiologist sex and whether they graduated from a United States (US) medical school. Individual models for each MPOG QI measure were constructed and evaluated as secondary outcomes.

RESULTS

We matched 573 deidentified board-certified attending anesthesiologists at 19 institutions in the state of Michigan meeting the inclusion criteria for all selected MPOG QI measures. 370 (65%) participated in MOCA.

MOCA participation was not associated with a statistically significant increase in composite MPOG QI measure performance (95%CI:-1.9,5.9; P=0.321). Two MPOG QI measures were associated with significantly improved performance when participating in MOCA: AKI-01 (estimate 11.9%; 95%CI:7.2,16.5; P<0.001) and PUL-02 (12.3%; 95%CI:2.8,21.9; P=0.012). Conversely, MOCA participation was associated with worse performance on TEMP-01 (-5.2%, 95%CI:-9.9,-0.5;p=0.030)

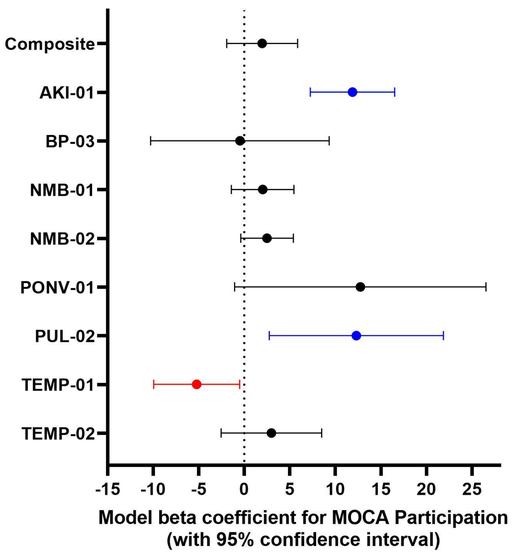

Figure 1. Model fixed-effects beta coefficients for Maintenance of Certification in Anesthesiology (MOCA) participation in the adjusted mixed-effects model for the association between MOCA and the outcome of MPOG QI measures (separate models), including institution as a random effect, and covariates of sex, age, graduation from a US medical school, first-attempt written exam result, and medical-school affiliated hospital. An interaction term between age and MOCA status was included.

CONCLUSIONS

(and Scale Up Plan)

We found no statistically significant association between MOCA participation and a composite of MPOG QI clinical quality measures, our primary outcome. MOCA participation was associated with statistically significantly improved performance on individual MPOG QI measures (AKI-01, PUL-02) and worse performance on TEMP-01, our secondary outcomes.

Despite attempts to control for identifiable confounders, the possibility of residual cofounding remains due to the study's observational design. Further evaluation of individual elements of the MOCA program may provide pathways to improve clinical performance and patient outcomes.

Investments to improve the impact of continuing physician certification and educational policies should be developed synergistically with efforts to identify areas for improved clinical performance along with quality measures to optimize patient outcomes and value.

SUSTAINABILITY PLAN

We obtained a second grant to study "The Association of MOCA Minute® Performance on ASPIRE Clinical Quality Metrics"

In this study, we endeavor to evaluate performance on MOCA Minute Questions and directly tie performance on these educational activities to clinical performance and quality metrics.

LESSONS LEARNED

This study demonstrates that it is feasible to privately and accurately match de-identified clinical and educational data at scale and use that to continuously evaluate the impact of clinical education programs on quality of care.

We thus have the ability to detect improvements in the quality of care after interventions on a large scale.

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