Analytics for advancing quality: Multicenter approaches, challenges, and opportunities

Nirav Shah, MD

Associate Professor, Anesthesiology

University of Michigan

September 2023

Agenda

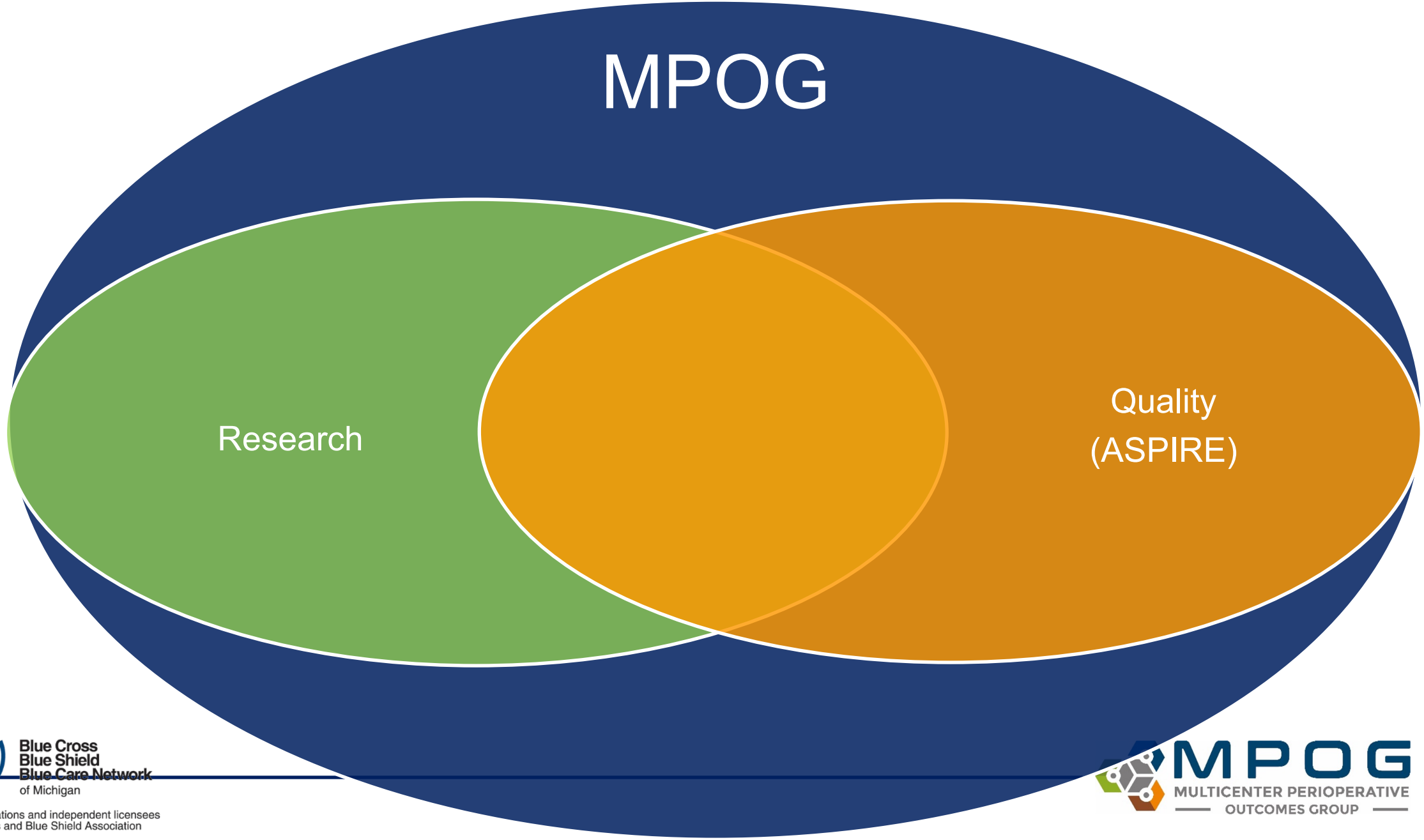
- Describe MPOG infrastructure
- Share our methodology for multicenter QI
- Highlight challenges and opportunities

Disclosures

- No personal consulting, financial, or board membership with any company
- I am a PI/Co-I on projects that receives or has recently received grant funding from:
- Blue Cross Blue Shield of Michigan (BCBSM)
- PCORI (Patient Centered Outcomes Research Institute)
- NIH (NLM, NIA)
- Edwards Lifesciences, Apple

Agenda

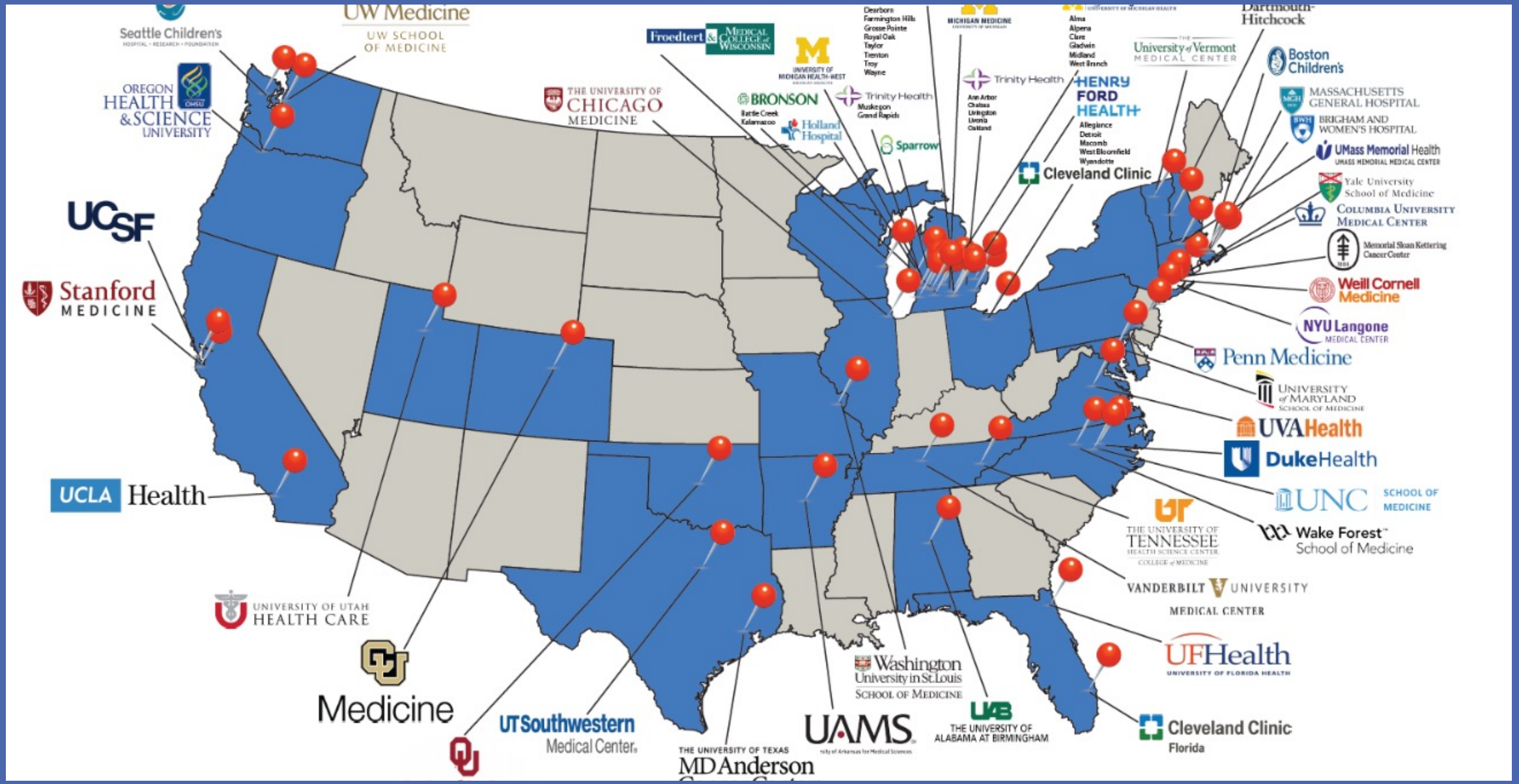
- **Describe MPOG infrastructure**
- Share our methodology for multicenter QI
- Highlight challenges and opportunities

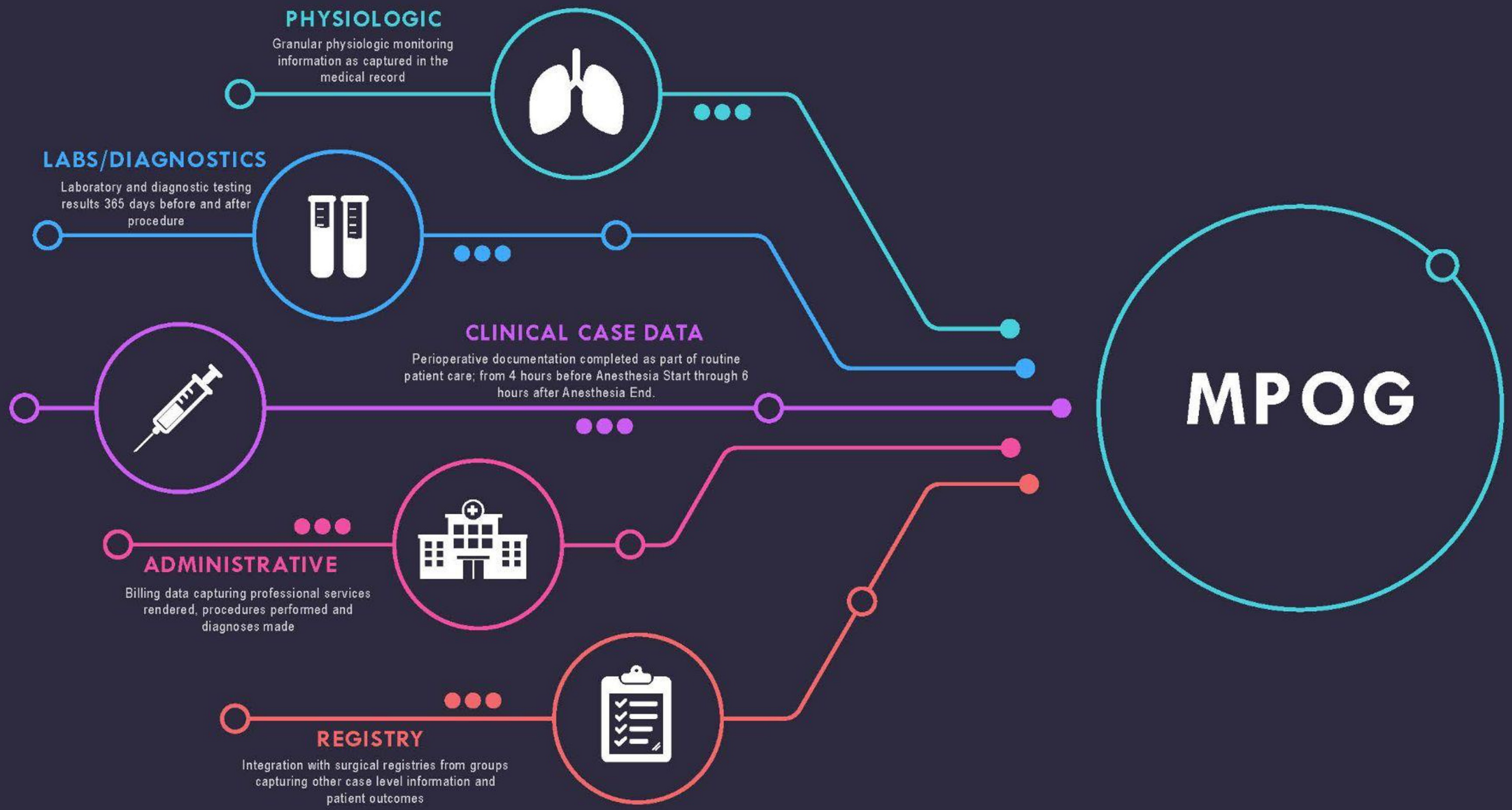


Blue Cross
Blue Shield
Blue Care Network
of Michigan

Nonprofit corporations and independent licensees
of the Blue Cross and Blue Shield Association

MPOG
MULTICENTER PERIOPERATIVE
OUTCOMES GROUP


Seattle Children's
UW Medicine
UW SCHOOL OF MEDICINE
OREGON HEALTH & SCIENCE UNIVERSITY
UCSF
Stanford MEDICINE
UCLA Health
UNIVERSITY OF UTAH HEALTH CARE
Medicine
UT Southwestern Medical Center
THE UNIVERSITY OF TEXAS MD Anderson
UAMS
Washington University in St. Louis SCHOOL OF MEDICINE
UAB THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
Cleveland Clinic Florida
UFHealth UNIVERSITY OF FLORIDA HEALTH
VANDERBILT UNIVERSITY MEDICAL CENTER
THE UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER COLLEGE of MEDICINE
Wake Forest School of Medicine
UNC SCHOOL OF MEDICINE
DukeHealth
UVAHealth
UNIVERSITY of MARYLAND SCHOOL OF MEDICINE
Penn Medicine
NYU Langone MEDICAL CENTER
Weill Cornell Medicine
Memorial Sloan Kettering Cancer Center
Columbia University Medical Center
Yale University School of Medicine
UMass Memorial Health UMASS MEMORIAL MEDICAL CENTER
BRIGHAM AND WOMEN'S HOSPITAL
MASSACHUSETTS GENERAL HOSPITAL
Boston Children's
Dartmouth-Hitchcock
University of Vermont MEDICAL CENTER
HENRY FORD HEALTH
Allegiance
Detroit
Macomb
West Bloomfield
Wyandotte
Cleveland Clinic
Trinity Health
Ann Arbor
Chelsea
Livingston
Livonia
Oakland
MICHIGAN MEDICINE
Alma
Alpena
Clare
Gladwin
Midland
West Branch
Dearborn
Farmington Hills
Grosse Pointe
Royal Oak
Taylor
Trenton
Troy
Wayne
Sparrow
Trinity Health
Muskegon
Grand Rapids
Holland Hospital
BRONSON
Battle Creek
Kalamazoo
UNIVERSITY OF MICHIGAN HEALTH-WEST
THE UNIVERSITY OF CHICAGO MEDICINE
Froedtert & MEDICAL COLLEGE of WISCONSIN


PHYSIOLOGIC
Granular physiologic monitoring information as captured in the medical record
LABS/DIAGNOSTICS
Laboratory and diagnostic testing results 365 days before and after procedure
CLINICAL CASE DATA
Perioperative documentation completed as part of routine patient care; from 4 hours before Anesthesia Start through 6 hours after Anesthesia End.
ADMINISTRATIVE
Billing data capturing professional services rendered, procedures performed and diagnoses made
REGISTRY
Integration with surgical registries from groups capturing other case level information and patient outcomes
MPOG

Source

MPOG Local

EHR

registry

billing

EHR

registry

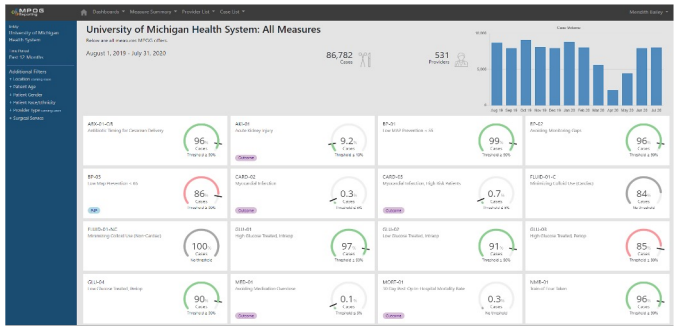
billing

EHR

registry

billing

MPOG Storage and Computation



Original Investigation FREE

February 26, 2019

Association of Overlapping Surgery With Perioperative Outcomes

Eric Sun, MD, PhD[1,2]; Michelle M. Mello, JD, PhD[2,3]; Chris A. Rishel, MD, PhD[1]; et al

Author Affiliations | Article Information

JAMA. 2019;321(8):762-772. doi:10.1001/jama.2019.0711

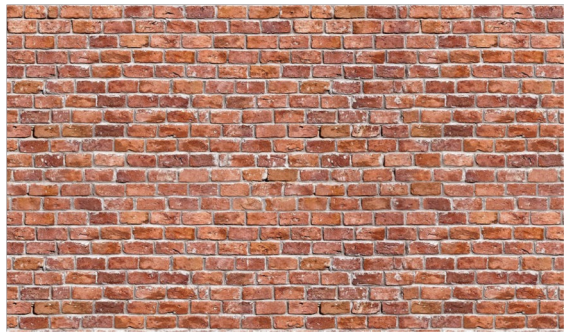
MPOG MULTICENTER PERIOPERATIVE OUTCOMES GROUP

Our Approach

Concepts/ Variables

Data Diagnostics

Case Validation



Collation Mapping

Computed Phenotypes

Performance Measures

Digital Phenotyping

Raw Electronic Health Data

ICD-10	Labs	Physiologic
Meds	Demographics	CPTs
Registry	Radiology/ Pathology	Testing

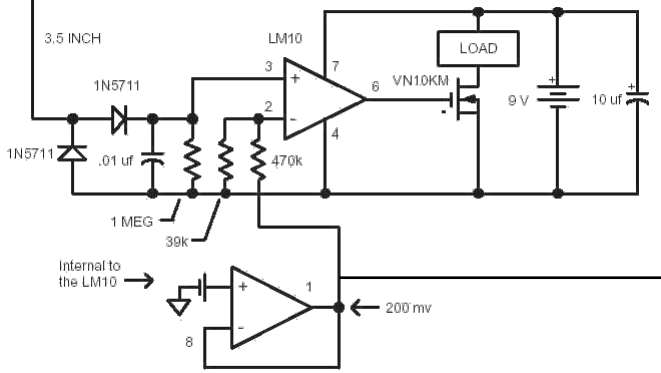
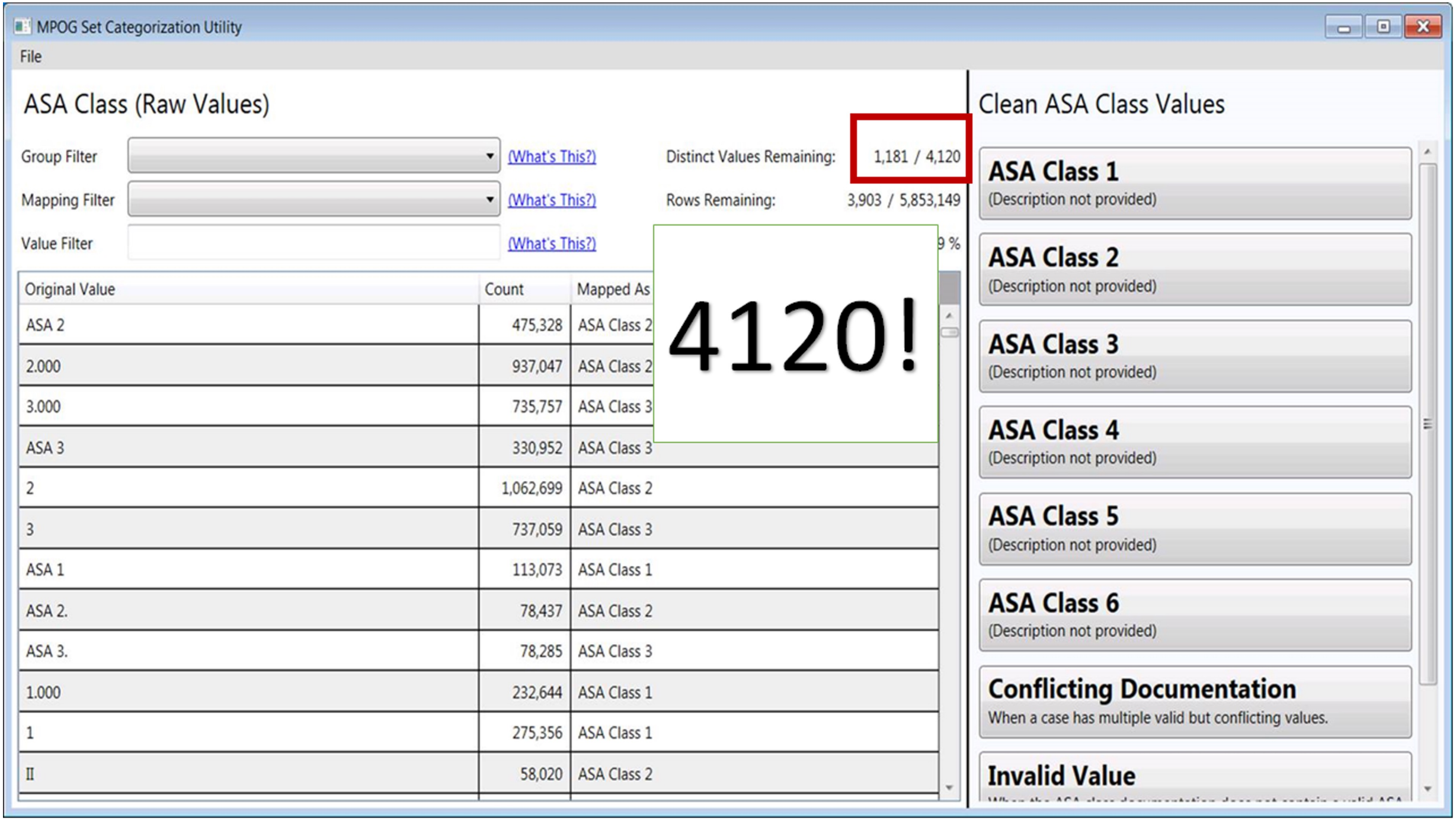


Figure 1: Cellular phone activity detector.

Digital Phenotypes

Patient under general anesthesia
Baseline blood pressure
Cardiopulmonary bypass used
…

MPOG
MULTICENTER PERIOPERATIVE OUTCOMES GROUP


MPOG Set Categorization Utility
File
ASA Class (Raw Values)
Group Filter
(What's This?)
Mapping Filter
(What's This?)
Value Filter
(What's This?)
Distinct Values Remaining:
1,181 / 4,120
Rows Remaining:
3,903 / 5,853,149
9 %
4120!
Original Value
Count
Mapped As
ASA 2
475,328
ASA Class 2
2.000
937,047
ASA Class 2
3.000
735,757
ASA Class 3
ASA 3
330,952
ASA Class 3
2
1,062,699
ASA Class 2
3
737,059
ASA Class 3
ASA 1
113,073
ASA Class 1
ASA 2.
78,437
ASA Class 2
ASA 3.
78,285
ASA Class 3
1.000
232,644
ASA Class 1
1
275,356
ASA Class 1
II
58,020
ASA Class 2
Clean ASA Class Values
ASA Class 1
(Description not provided)
ASA Class 2
(Description not provided)
ASA Class 3
(Description not provided)
ASA Class 4
(Description not provided)
ASA Class 5
(Description not provided)
ASA Class 6
(Description not provided)
Conflicting Documentation
When a case has multiple valid but conflicting values.
Invalid Value

Agenda

- Describe MPOG infrastructure
- **Share our methodology for multicenter QI**
- Highlight challenges and opportunities

Pillars of MPOG QI

QI Measures

50+ measures
10+ domains of care
Process + outcome
Benchmarked nationally and locally

Provider Feedback

Monthly feedback
Benchmarked locally
Link to case
MOCA

Quality Committees

Governance
Ideas
Expertise
Collaboration
Subspecialty
Web + in person

Implementation

Toolkits
Site Visits
VBR / P4P

MPOG
MULTICENTER PERIOPERATIVE OUTCOMES GROUP

How do we build our measures?

- Idea
- Discussion with Quality Committee
- Create Specification
- Approval by Quality Committee
- Build by MPOG team
- Test and Refine
- Publish to Dashboard and feedback email

>60 process & outcome metrics covering myriad aspects of perioperative care

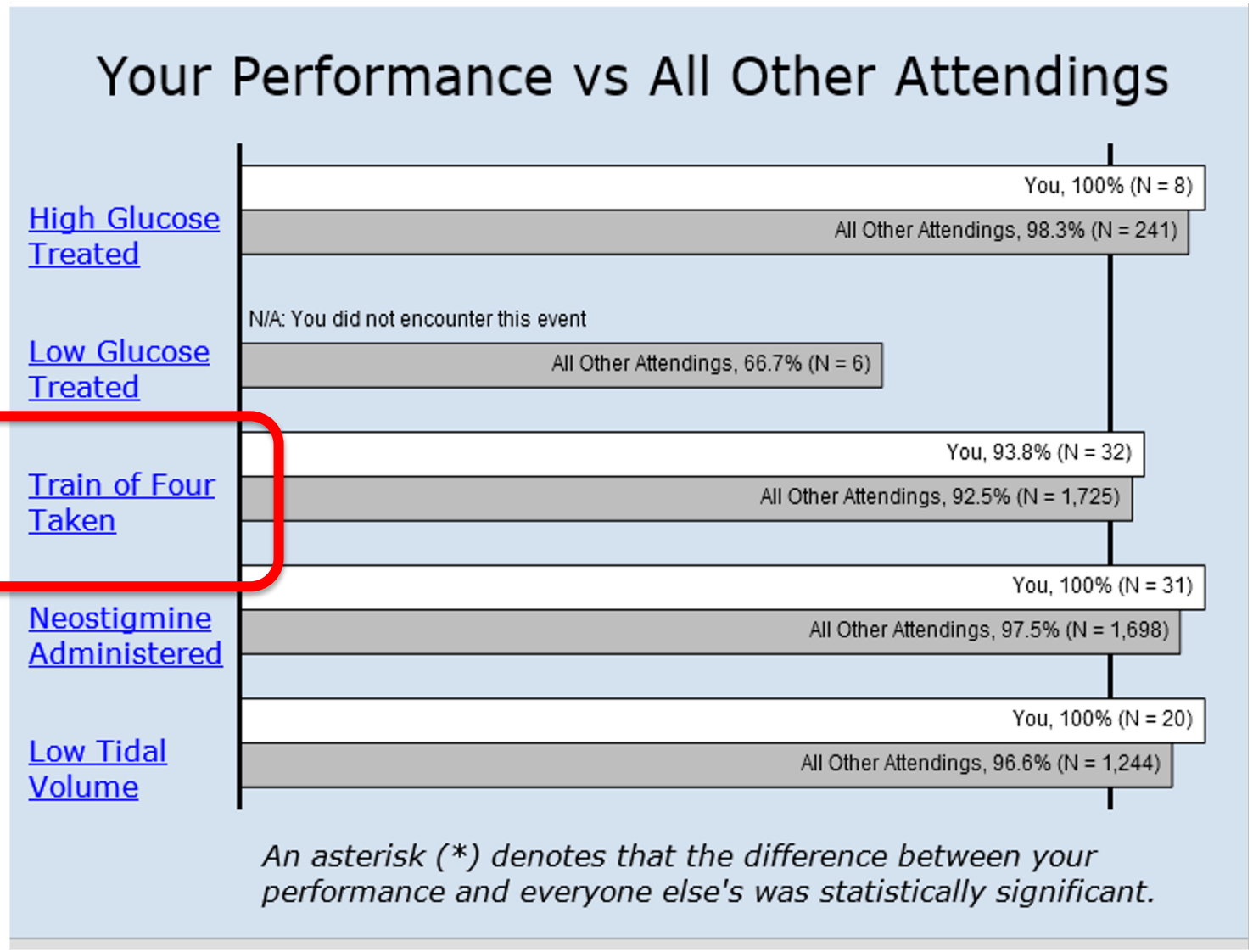
APOG
TICENTER PERIOPERATIVE OUTCOMES GROUP

ASPIRE Performance Emails: Clinician-level Feedback

MPOG
MULTICENTER PERIOPERATIVE OUTCOMES GROUP

Individual Performance Feedback Email

- Automated emails from central MPOG server
- Sent every month to ~8,000 providers nationwide
- “Fresh” – last month’s patients
- Easy access to case review
- MOCA Part IV credit available

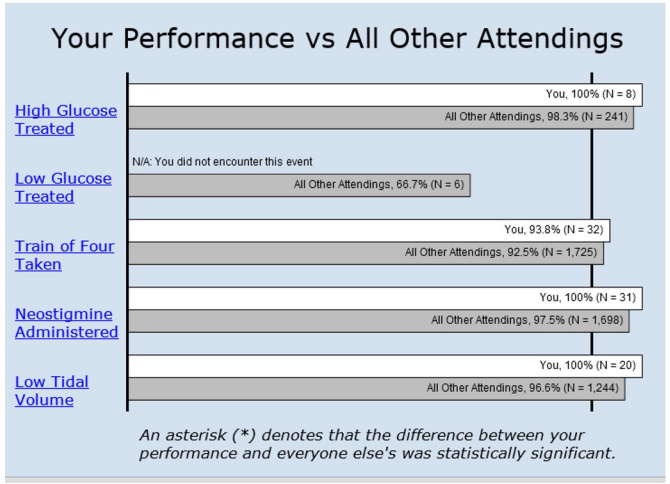


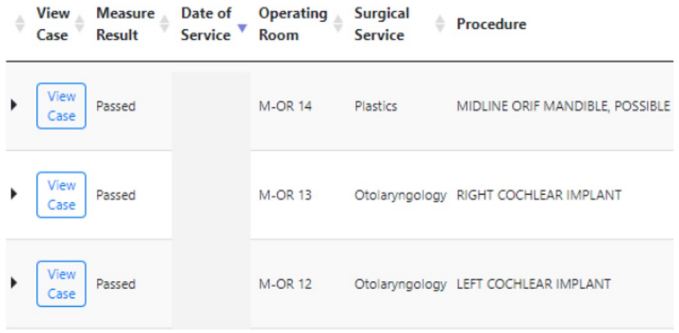
MPOG
MULTICENTER PERIOPERATIVE OUTCOMES GROUP

Review individual cases and measure performance through MPOGs version of the anesthetic record

Enable clinicians to understand why cases did not pass a measure:

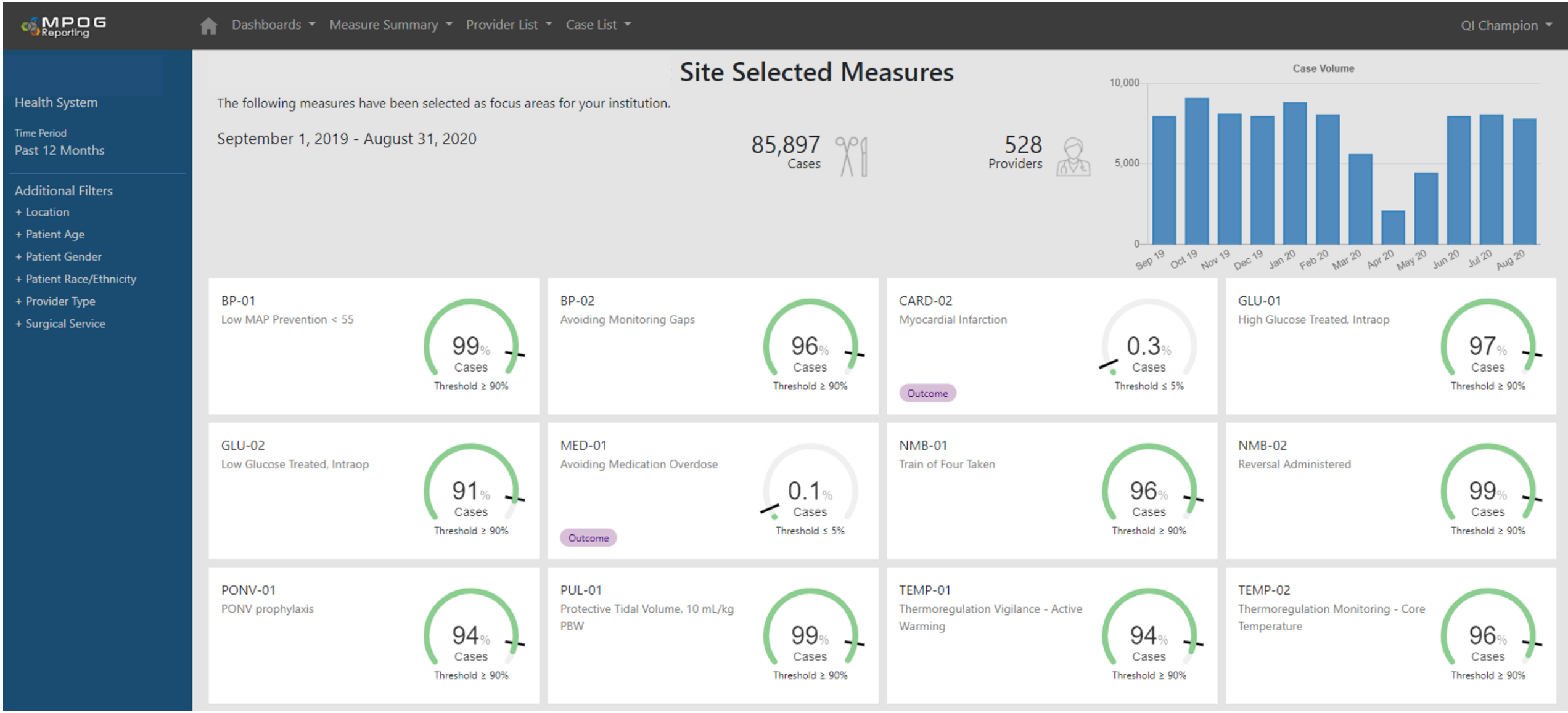
1 2 3



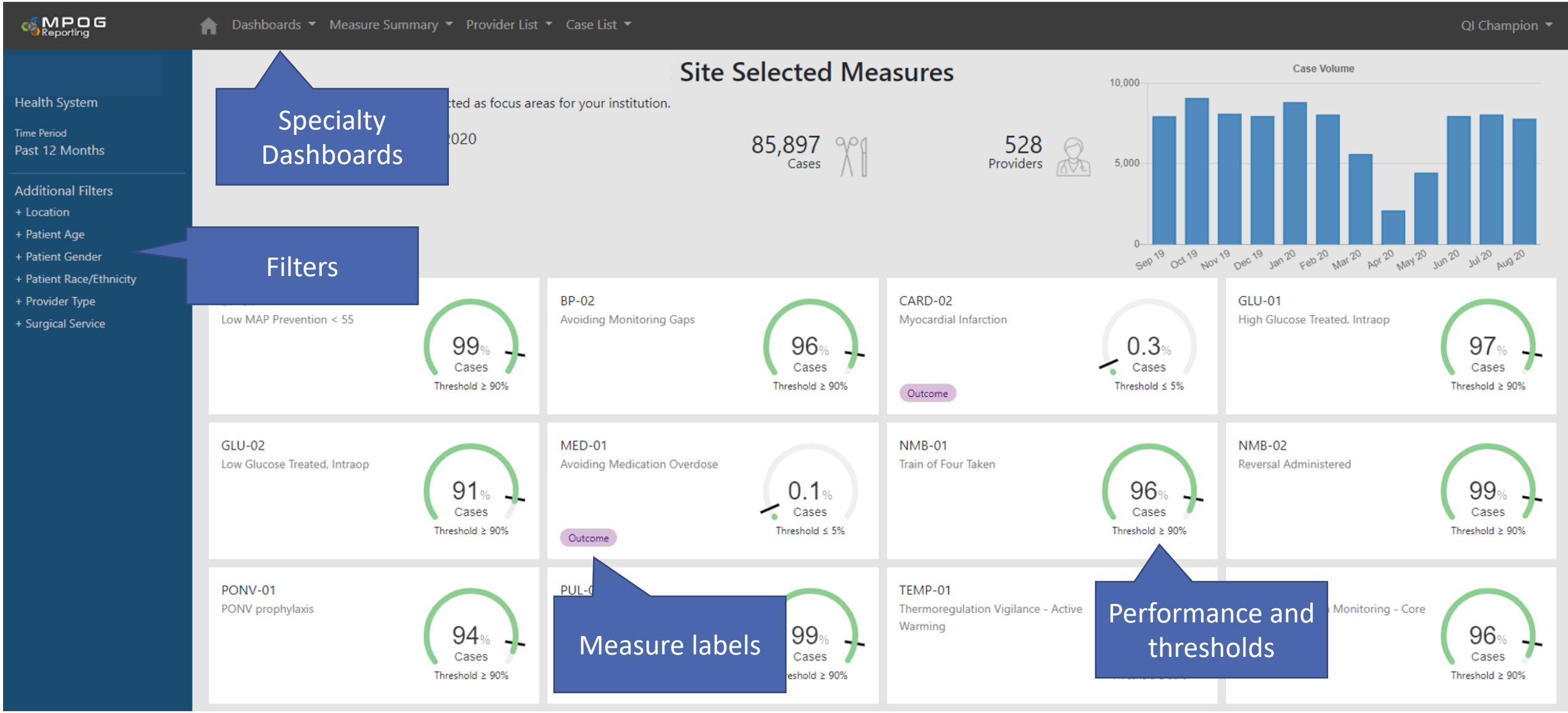


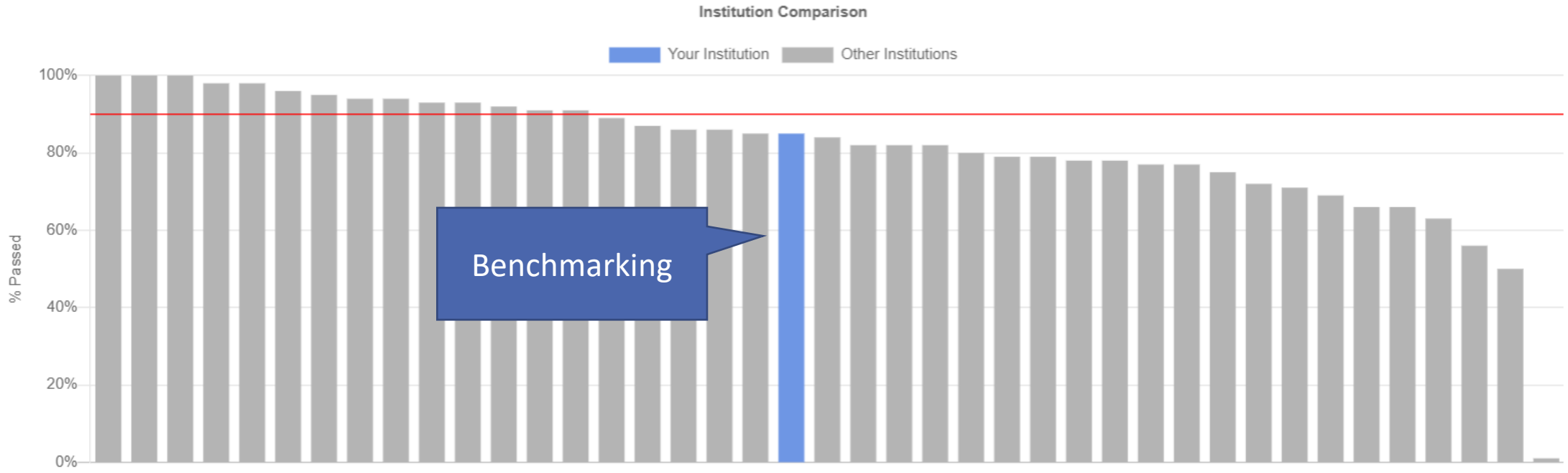
MPOG
MULTICENTER PERIOPERATIVE OUTCOMES GROUP

Practice Level Feedback



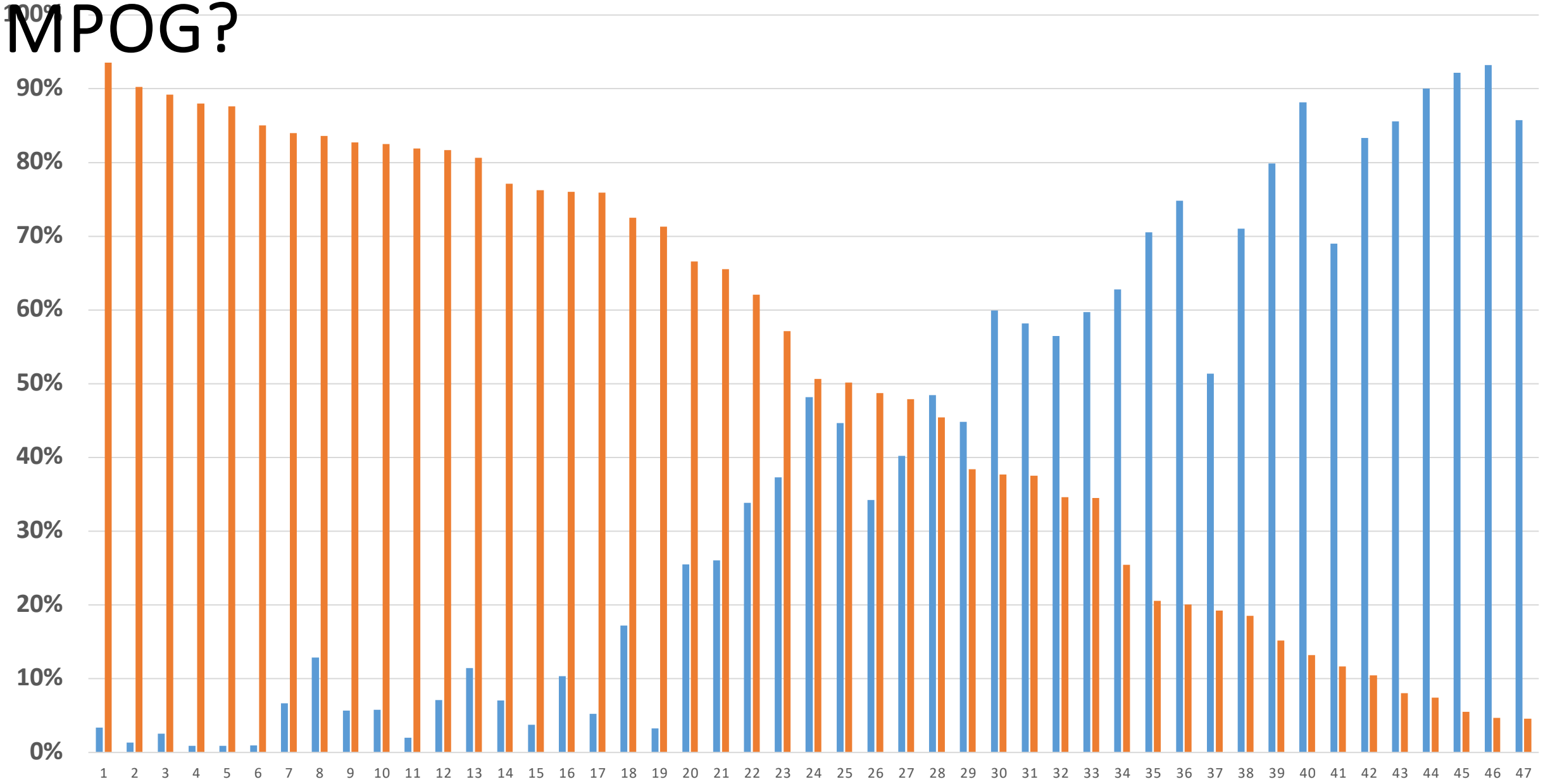
QI Reporting Tool




Institution Comparison
Your Institution
Other Institutions
100%
80%
60%
40%
20%
0%
% Passed
Benchmarking

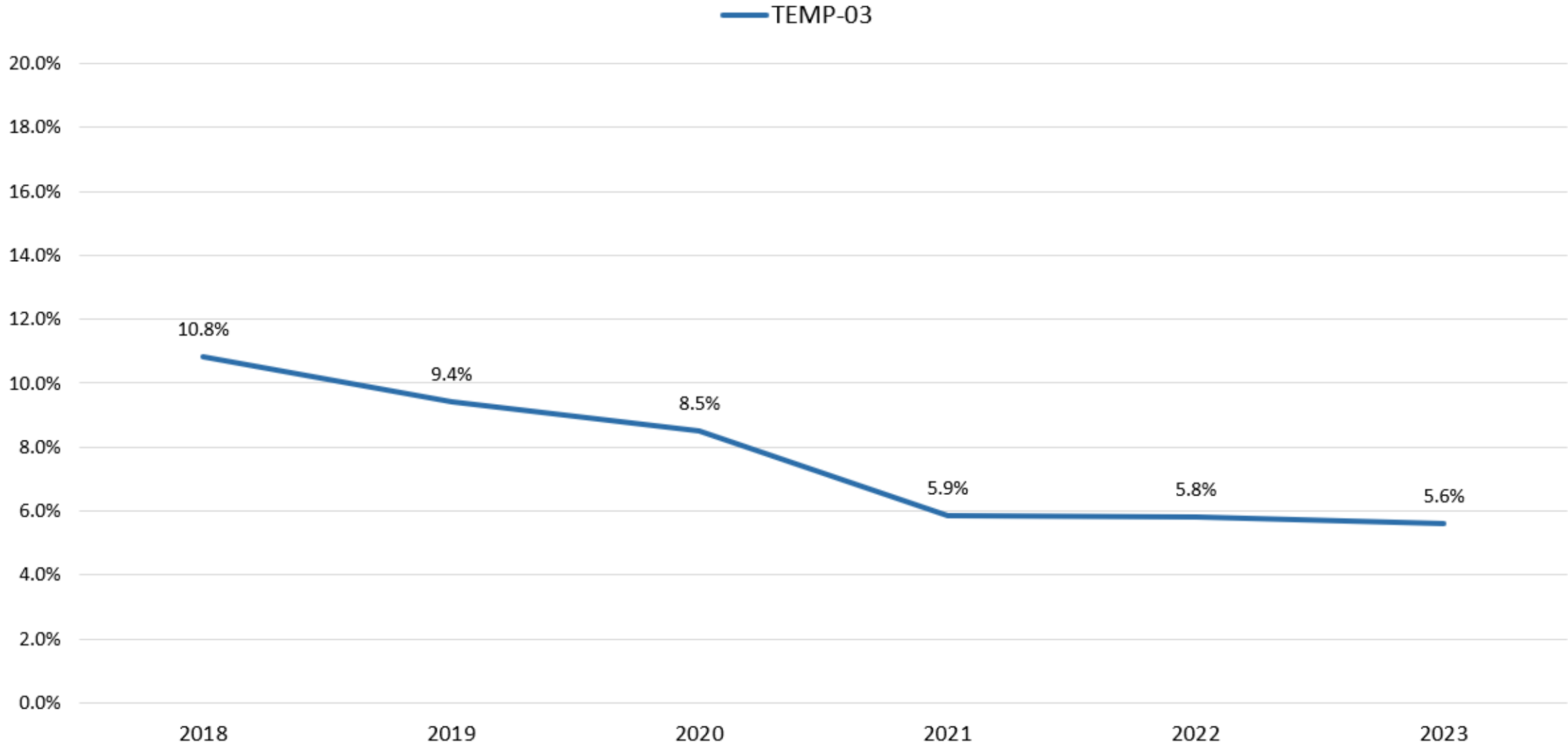
Intra-institutional comparison
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
# of Cases

Sugammadex or Neostigmine across MPOG?



ASPIRE Performance Improvement Across Michigan

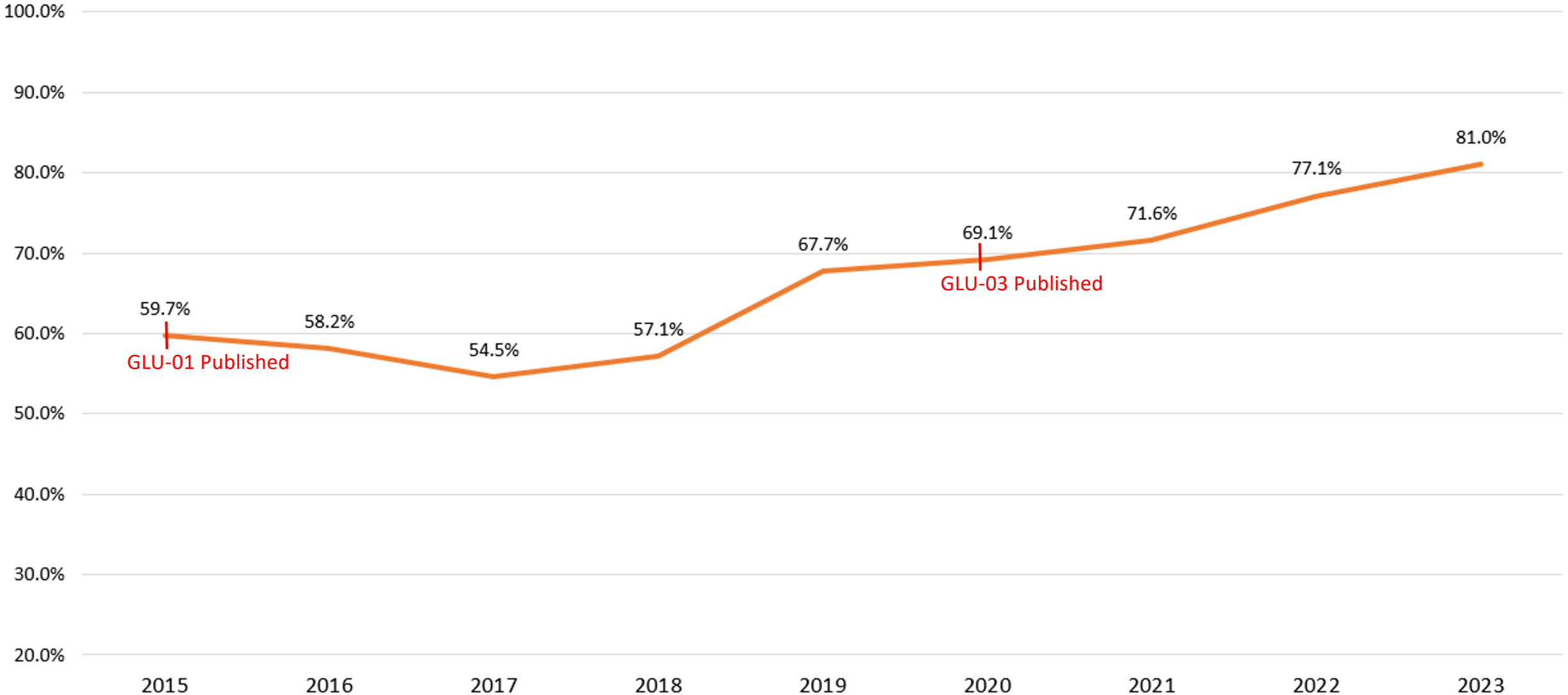
ASPIRE Performance Improvement



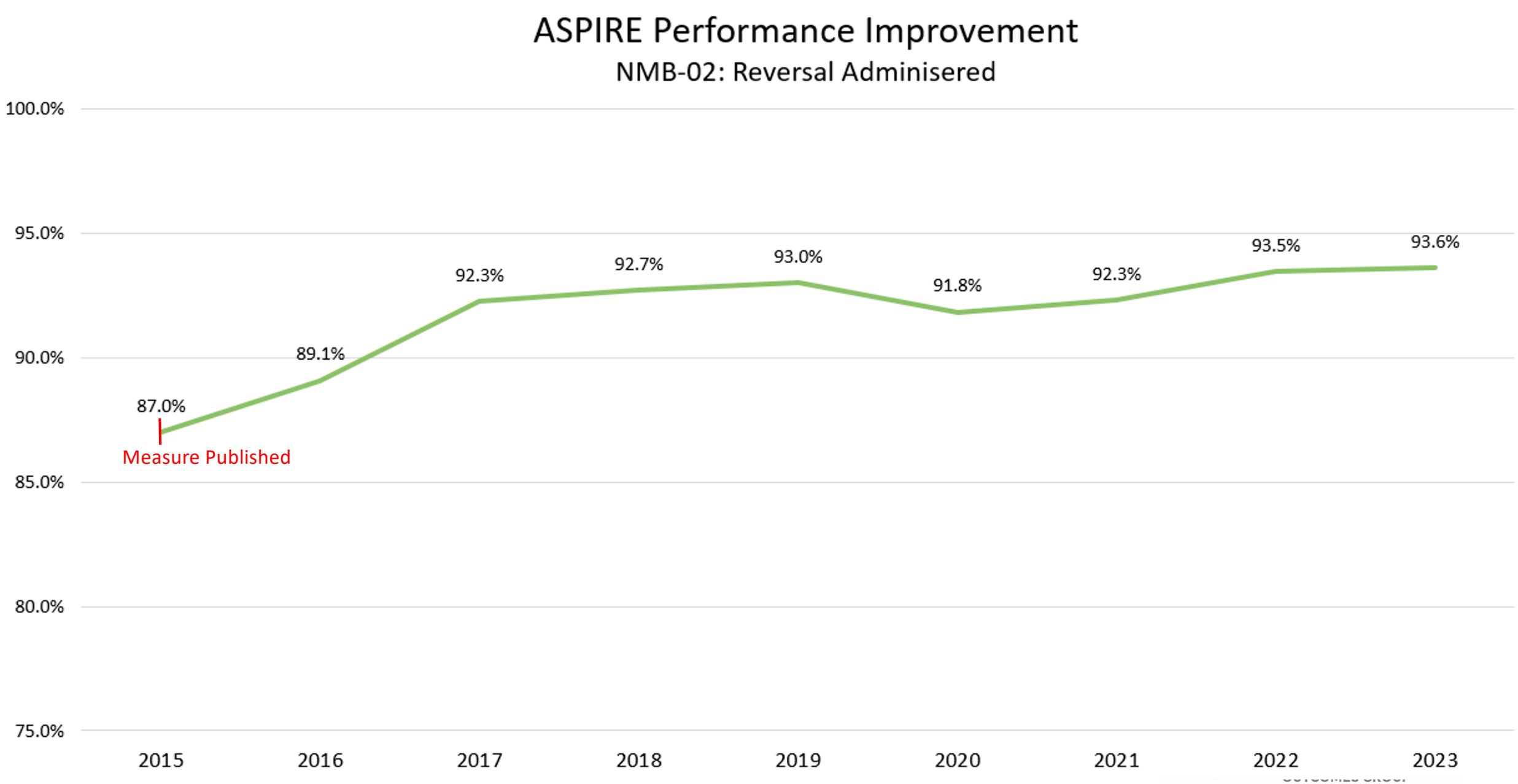
MPOG
MULTICENTER PERIOPERATIVE OUTCOMES GROUP

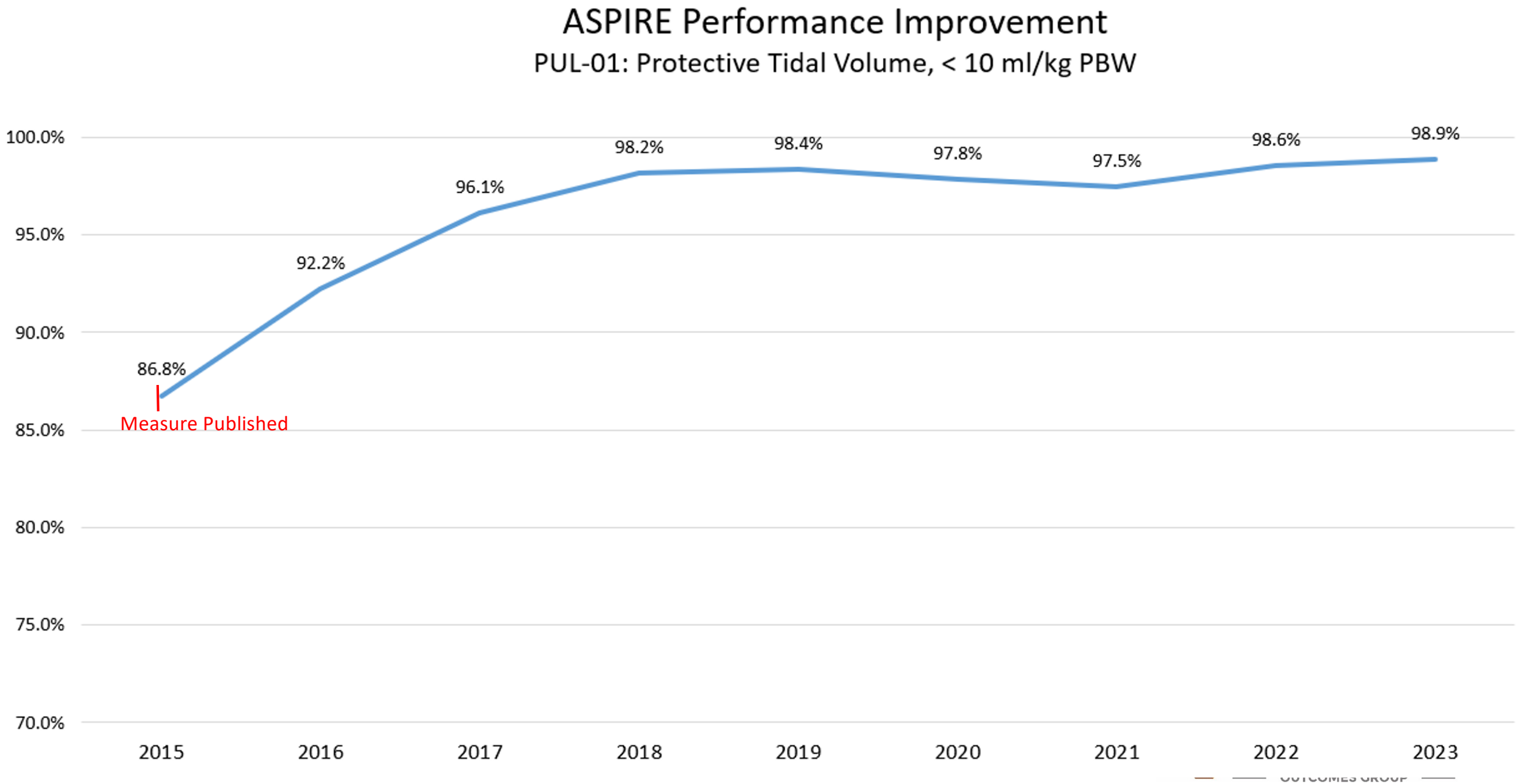
ASPIRE Performance Improvement

GLU-03: High Glucose Treated, Periop

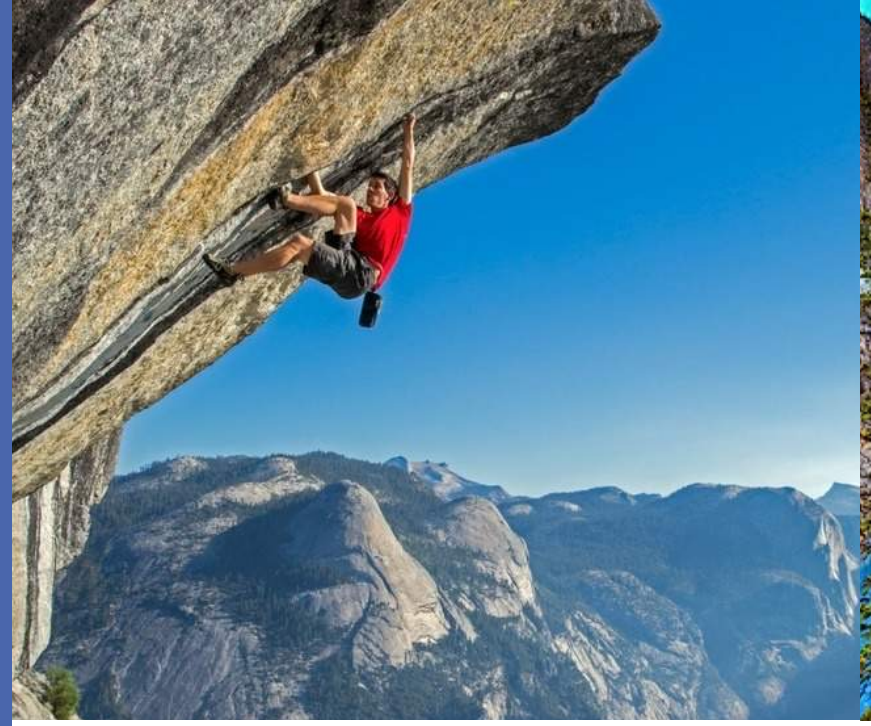


MULTICENTER PERIOPERATIVE OUTCOMES GROUP


ASPIRE Performance Improvement
NMB-02: Reversal Adminisered
100.0%
95.0%
90.0%
85.0%
80.0%
75.0%
87.0%
89.1%
92.3%
92.7%
93.0%
91.8%
92.3%
93.5%
93.6%
Measure Published
2015
2016
2017
2018
2019
2020
2021
2022
2023


ASPIRE Performance Improvement
PUL-01: Protective Tidal Volume, < 10 ml/kg PBW
100.0%
95.0%
90.0%
85.0%
80.0%
75.0%
70.0%
86.8%
92.2%
96.1%
98.2%
98.4%
97.8%
97.5%
98.6%
98.9%
Measure Published
2015
2016
2017
2018
2019
2020
2021
2022
2023

Agenda



- Describe MPOG infrastructure
- Share our methodology for multicenter QI
- **Highlight challenges and opportunities**

Collaborative Quality Initiatives (CQIs)

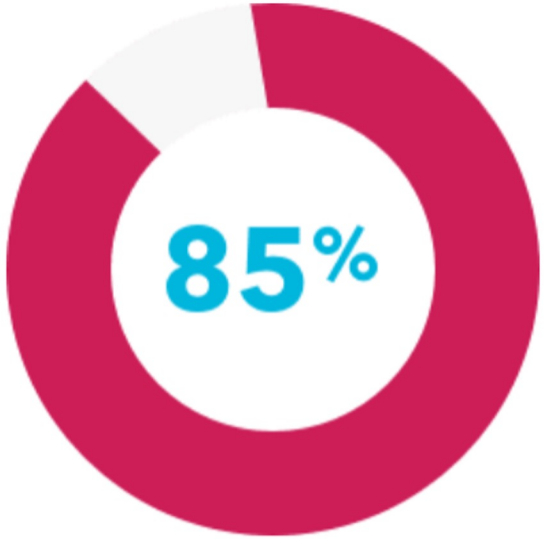
Blue Cross Blue Shield Blue Care Network of Michigan

- Organizations developed by providers and hospital partners, and funded by BCBS of Michigan
- Support quality improvement initiatives across a broad range of specialties
- Able to track performance and provide incentives
- Focus on reduction of errors, prevention of complications, and improvement of patient outcomes

$2.2 billion

Cost Avoided Over Last Decade

20,000 PARTICIPATING PHYSICIANS



85% of Blue Cross Primary Care Providers

Collaborative Quality Initiative Presentations in Over 30 Countries

Pay for Performance in the context of ASPIRE

Pay for Performance - The P4P is an incentive-based program for BCBSM CQI participating sites that recognizes hospitals for achievements and improvements in quality, cost efficiency, and population-health management

Provides incremental reimbursement to hospitals

A hospital's P4P score is determined by its performance on specific measures related to each CQI

Some measures are related to program participation and engagement, such as meeting attendance and timely data submission

Other measures are performance-based and related to quality and clinical process improvement and outcomes, such as reductions in morbidity or surgical complications

2022 Anesthesiology Quality Improvement and Reporting Exchange (ASPIRE)
Collaborative Quality Initiative Performance Index Scorecard
Cohorts 1 - 5

Measure #	Wei
1	5
2	5
3	5
4	5
5	10

6	25%	**Pain (PAIN 02) Percentage of patients ≥ 18 years old who undergo a surgical or therapeutic procedure and receive a non-opioid adjunct preoperatively and/or intraoperatively. (cumulative score January 1, 2022 - December 31, 2022)**	
		Performance is ≥ 75%	25
		Performance is ≥ 70%	15
		Performance is ≥ 65%	10
		Performance is < 65%	0
7	20%	**Sustainability (SUS 01) percentage of cases with mean fresh gas flow (FGF) equal to, or less than 3L/min, during administration of halogenated hydrocarbons and/or nitrous oxide (cumulative score January 1, 2022 - December 31, 2022)**	
		Performance is ≥ 90%	20
		Performance is ≥ 85%	10
		Performance is < 75%	0
8	25%	**Site Directed Measure: Sites choose a measure they are performing above/below ASPIRE threshold or needs improvement by December 10, 2022 (cumulative score January 1, 2022 through December 31, 2022)**	
		Performance is ≥90%; ≤10%; ≤5% or show ≥25% improvement	25
		Performance is ≥85%; ≤15%; ≤10% or show ≥15% improvement	15
		Performance is ≥80%; ≤20%; ≤15% or show ≥10% improvement	10
		Performance is <80%; >20%; >15% or show <10% improvement	0

Value Based Reimbursement

Blue Cross Blue Shield of Michigan has developed a Value-Based Reimbursement model which encourages hospitals to work with physicians to provide cost-efficient care at both hospital and population levels

The coordinating center leadership, jointly with BCBSM, set quality and performance metrics for its VBR program

Each CQI uses unique measures and population-based scoring to receive Blue Cross VBR

Performance is measured at the hospital level and reimbursement applied to all providers within the hospital.

Opportunities and Challenges with VBR and P4P

- Money talks
- Focuses attention on initiatives championed by ASPIRE and BCBSM
- Reimbursement does not always flow to providers
- Easy to get caught into measure “minutiae” or attribution instead of systems issues
- Selected measure may not be relevant to an individual hospital or provider

A scalable service to improve healthcare quality through precision audit and feedback

NIH National Library of Medicine, Project #1R01LM013894-01

Zach Landis-Lewis, Allison Janda, Allen Flynn, Nirav Shah

Proposal publication:
https://www.researchprotocols.org/2022/5/e34990/

MEDICAL SCHOOL
UNIVERSITY OF MICHIGAN

LEARNING HEALTH SCIENCES

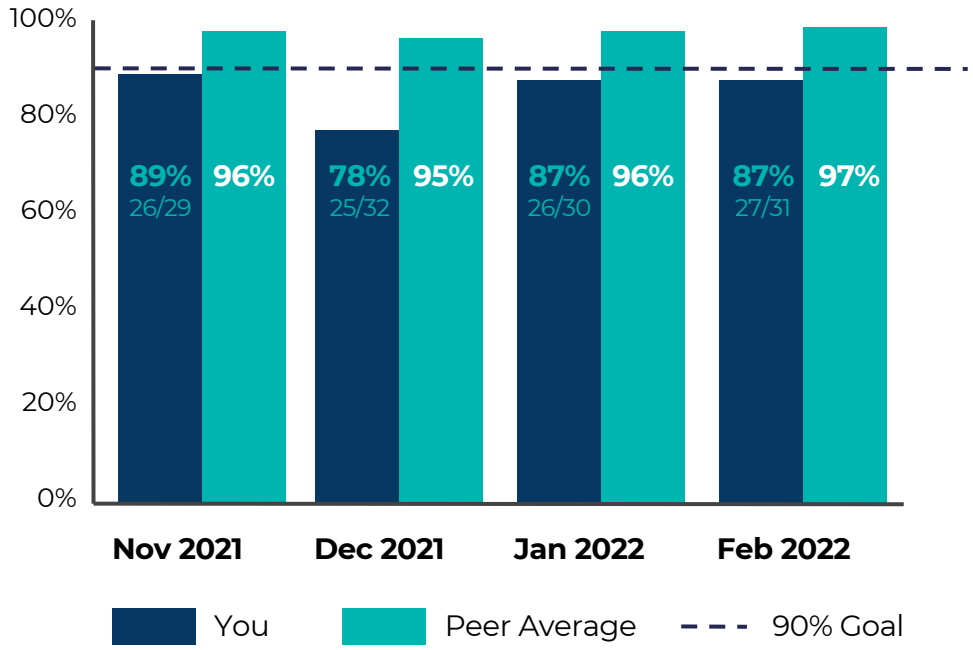
MPOG
MULTICENTER PERIOPERATIVE OUTCOMES GROUP

Claim MOCA® Credit

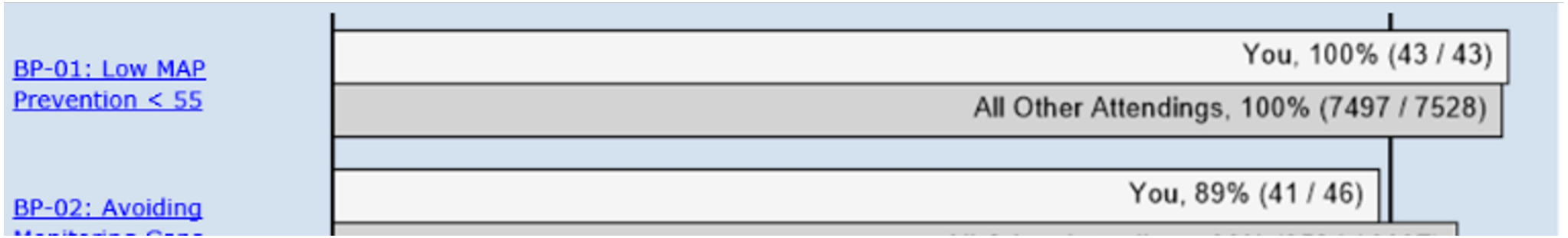
Dear Alex,

You may have an opportunity to improve your performance on measure NMB-01: Train of Four Taken, which measures the percentage of cases with a documented Train of Four (TOF) after last dose of non-depolarizing neuromuscular blocker.

More information about the rationale for the measure and how it is calculated is available here.



Below is your complete MPOG quality performance report...



Progress to date

Aim 1:

- **35 provider interviews, 3 design iterations of prototype messages**
- **Preference survey across MPOG completed**

Aim 2:

- **Software development, performance testing, and integration nearing completion**

Aim 3:

- Assess the effects of a precision feedback service: preparation for pilot study in fall 2023, cluster-randomised trial in 2024

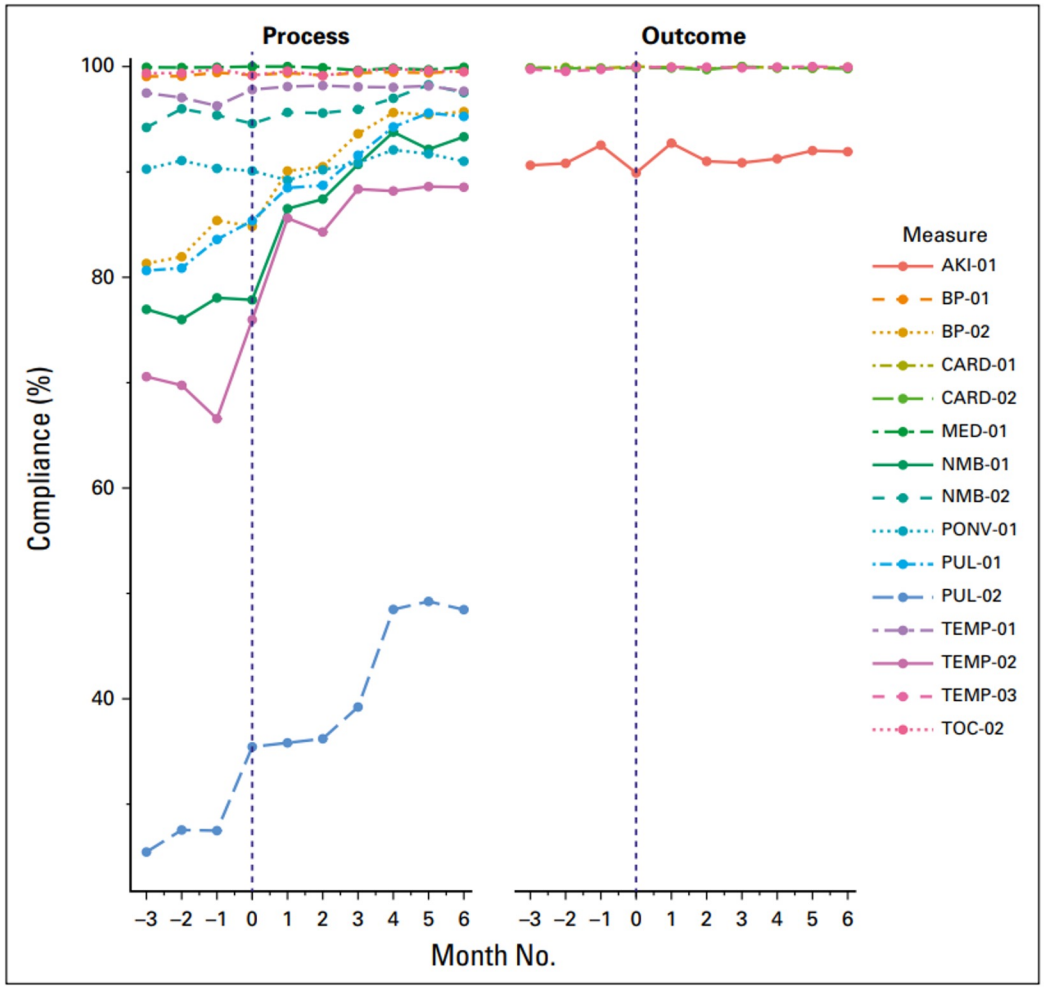
Challenges

- Measure fatigue
- Data types
  - Patient reported outcomes
  - Clinician reported outcome
  - EHR derived long term outcomes

quality in action

Improved Compliance With Anesthesia Quality Measures After Implementation of Automated Monthly Feedback

Patrick J. McCormick, MD[1]; Cindy Yeoh, MD[1]; Raquel M. Vicario-Feliciano[2]; Kaitlin Ervin[3]; Kay See Tan, PhD[1]; Gloria Yang[1]; Meghana Mehta, MS[1]; and Luis Tollinche, MD[1]



McCormick et al., 2019

APOG
TICENTER PERIOPERATIVE
OUTCOMES GROUP

Education

- Residents AND experienced physicians and CRNA / CAAs
- Assessment of learner experience
- Competency based trained
- Precision education

Nirav Shah

nirshah@med.umich.edu

www.mpog.org

Thank you