maryland
health services
cost review commission

Hospital Clinical Adverse Events (CAEM) Subgroup

May 27, 2026

HSCRC Quality Team

Meeting Agenda

- Measure evaluation and selection process update
- National infrastructure to evaluate, select and endorse measures
  - Measure specifications
- Trends for eCQM measures required for reporting
- Mortality measures results comparison: Maryland 30 day all condition and CMS HWM hybrid measures
- CAEM next steps

CAEM Members

Kelly	Arthur	Qlarant
Sophia	Batallas	Adventist Health Care
Kaitlyn	Beeman	Western MD
Teresa	Brown	MHCC
Zahid	Butt	Digital Measures SME
Samantha	Crandall	GBMC
Jacqueline	Hartford	MD Pt Safety Center
Sofia	Liarakos	Lifebridge
Chris	Mccoy	UMS
Ashka	Mehta	Maryland MCH REP
Jonathan	Patrick	MedStar
Rebecca	Perlmutter	MPH, CIC MDH, HAI Infec Program Coordinator
Edward	Seferian	JHHS
Geeta	Sood	Infectious Disease SME
Michael	Staley	Meritus

Workgroup Learning Agreements

- **Be Present** – Make a conscious effort to know who is in the room, become an active listener. Refrain from multitasking and checking emails during meetings.
- **Call Each Other In As We Call Each Other Out** – When challenging ideas or perspectives give feedback respectfully. When being challenged - listen, acknowledge the issue, and respond respectfully.
- **Recognize the Difference of Intent vs Impact** – Be accountable for our words and actions.
- **Create Space for Multiple Truths** – Seek understanding of differences in opinion and respect diverse perspectives.
- **Notice Power Dynamics** – Be aware of how you may unconsciously be using your power and privilege.
- **Center Learning and Growth** – At times, the work will be uncomfortable and challenging. Mistakes and misunderstanding will occur as we work towards a common solution. We are here to learn and grow from each other both individually and collectively.

REMINDER: These workgroup meetings are recorded.

Sources for Candidate Complication and Mortality Measures

- Maryland Hospital Acquired Conditions Measures (MHAC) Measures
- CMS Hospital Acquired Complications Reduction Program Measures
- Complications/Mortality Measures Under Maryland Quality Based Reimbursement
- Complications/Mortality Measures Under CMS Hospital Value Based Purchasing
- CMS Inpatient Quality Reporting measures
- CMS Measures Under Consideration list for 2025
- CMS Electronic Clinical Quality Measures (eCQMs)
- Others?

National Infrastructure to Evaluate and Select Measures: Partnership for Quality Measurement

CMS has Established the Partnership for Quality Measurement to Evaluate, Endorse and Select Measures for National Use

- **Battelle: Certified Consensus-based Entity**
  - Uses a consensus-based process comprising experts - clinicians, patients, measure experts, and HIT specialists - to ensure informed and thoughtful endorsement reviews of qualified measures.
  - Transparent, streamlined consensus-building approach can be applied widely, including reviews for alternative payment models, clinical decision support, and quality improvement tools.
- **Vision for Quality Measures Endorsement Process:**
  - Reliable, transparent, attainable, equitable, and most of all, meaningful.
  - Straightforward, streamlined, flexible, and designed to distinguish measures whose benefits to patients, clinicians, and payors outweigh potential burdens and risks to implement and report them.
- **Four Key Activities:**
  - **Measure endorsement and maintenance**
  - **Pre-rulemaking measure review**
  - Measure set review
  - Core quality measures collaborative

CMS Framework: Measures Under Consideration Evaluation Pre-Rulemaking Measure Review (not program specific)

Meaningfulness is assessed across several points:

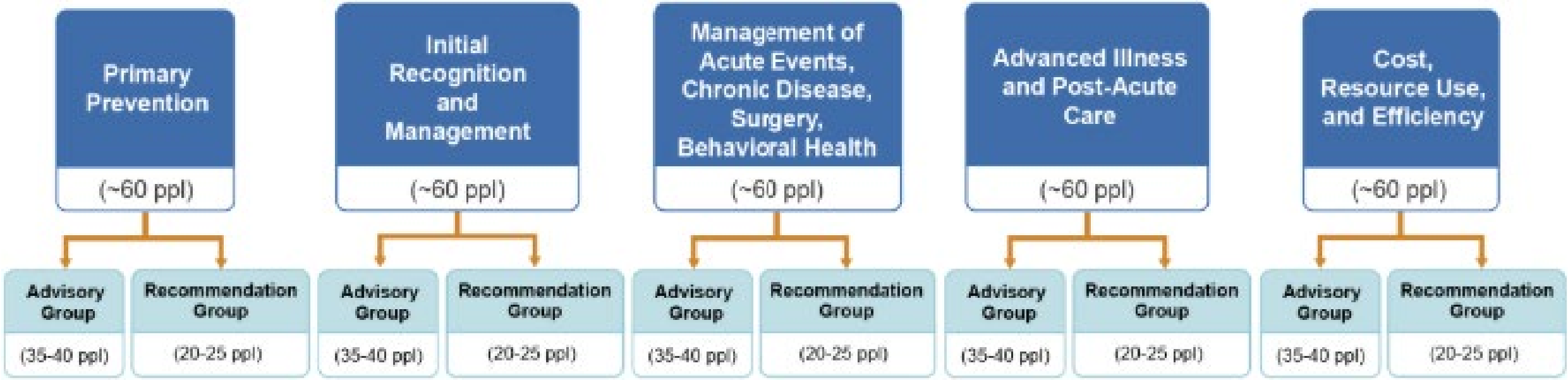
- **Importance:** Why the measure matters and how results benefit patients and care teams.
- **Conformance:** Alignment of measure details with original quality focus.
- **Feasibility:** Availability of necessary tools, steps, and personnel for implementation.
- **Validity:** Data/logic verifies effective ways to improve the measure focus.
- **Reliability:** Variation in performance is mostly due to improvement methods.
- **Usability:** Identification and mitigation of barriers to improvement.

Appropriateness of Scale: Measure is balanced for the target population's goals, ensuring benefits are distributed and risks mitigated.

Time-to-Value Realization: A plan monitors changes in harms and benefits over time (short-term and long-term).

P4QM Measure Endorsement and Maintenance

- Gathers input from all interested parties across the health care enterprise
- Develops consensus among parties regarding which measures warrant endorsement.
- Transparent and publicly available, ensuring that the measures are comprehensive and relevant
- Endorsement signals that measures have been reviewed by a group of diverse individuals representing a range of health care expertise and lived experiences and deemed safe, effective, and meaningful.
- Measures organized in 5 E&M project topical areas, each having an evaluation committee, which oversees the portfolio of measures; regular schedule adopted for endorsement.



CAEM Subgroup Measure Evaluation / Selection Criteria Discussion

Updated Measure Evaluation and Selection Criteria

- Data Analysis/Statistics
  - Variation across hospitals
  - Reliable and Valid*
  - Not topped off
  - Improvement is needed
- Additional Considerations
  - Clinical significance^
  - Coding: Supports coding practice improvements/not subject to known coding changes or concerns
  - Opportunity for improvement/actionability*^
  - Measure overlaps, e.g., PPC-PSI
  - All-payer
  - Feasible
- New Proposed Criteria
  - National CMS alignment; consider CMS and MUC measures*
  - Addresses state priorities for quality and population health improvement
  - Cost of Proprietary systems*^
  - Adequate risk adjustment*
  - Digitally specified*

***Emphasized by subgroup**
^Emphasized by PMWG

Status of Candidate Measures of Interest Endorsed by P4QM

- CMS Pay for Performance Measures
  - Total Hip Knee Arthroplasty
  - Centers for Disease Control National Health Safety Network Healthcare Associated Infection (CDC NHSN HAI) Measures
- Required Digital Measures (eCQMs)
  - Cesarean Section (PC 02)
  - Severe Obstetric Complications (PC 07)
  - Severe Hyperglycemia (eCQM)
  - Severe Hypoglycemia (eCQM)
  - Safe Opioid Use Concurrent Prescribing (eCQM)

SEE MEASURES EXCEL WORKBOOK FOR DETAILED SPECIFICATIONS AND TECHNICAL FINDINGS REGARDING THE MEASURES

CMS Measures

THK Arthroplasty P4QM Maintenance Review Fall 2024*

Following Committee review, P4QM staff assessment concluded:

- The Feasibility criteria was met
- The following criteria were not met but deemed addressable:
  - Importance
  - Closing the care gap
  - Scientific Acceptability
  - Use and Usability

Public comment stated endorsement should be removed because of the following concerns:

- Exclusion of patients receiving outpatient surgery
- Exclusion of Medicare patients during first year of Medicare eligibility
- Failure to Adjust for Low Income Status
- Inappropriate Adjustment for Type of Insurance
- Inadequate Assessment of Model Fit
- Poor Reliability of the Measure
- Lack of Business Case for Using the Measure and Undesirable Effects of Doing So

***Refer to THK Arthroplasty Measure detailed endorsement information on the P4QM Website using the link in the title.**

PUBLIC COMMENT Fall 2024

Center for Healthcare Quality and Payment Reform

The developer did not report how many hospitals would be classified as different from the national average using the proposed measure. However, the Measure Update Report for the current version of the measure (which uses data only for Original Medicare beneficiaries) indicates that the measure was only able to determine that ***27 hospitals out of 3,257 hospitals performed "Better Than the National Rate," and only 8 performed "Worse Than the*** National Rate." *1,724 hospitals were classified as "No Different Than the National Rate," and 1,498 had too few cases (less than 25) to make a determination of whether the hospital was better or worse than average.*

THK Arthroplasty P4QM Maintenance Review

CBE ID	Title	Steward	Endorsement Cycle Status	Previous Endorsement Cycle
1550	Hospital-Level, Risk-Standardized Complication Rate (RSCR) Following Elective Primary Total Hip Arthroplasty (THA) and/or Total Knee Arthroplasty (TKA)	Centers for Medicare & Medicaid Services	Endorsed with Conditions	Fall 2024

E&M Committee Rationale/Justification

After the endorsement meeting, the developer of CBE #1550 submitted an appeal due to the following rationales:

1. Procedural error in the endorsement process; excessive focus on outpatient setting exclusion, outside scope of IP measure.
2. Misapplication of measure evaluation criteria, particularly risk adjustment.

The Appeals Committee voted to uphold the appeal based on both rationales above. Measure' Endorsed with Conditions. When the measure returns for maintenance (5 years), the measure developer should have:

- Explored the proportion of procedures done in the ASC/HOPD* setting and evaluate the need for adjustment (e.g., risk, stratification) based on impact to case mix.
- Explored additional approaches to the reliability assessment to account for low -volume facilities (e.g., borrowing strength).

CDC NHSN HAI Measures: MRSA and CDiff Endorsement Status

CBE #1716 – Methicillin-resistant Staphylococcus Aureus (MRSA) Bacteremia LabID Event Standardized Infection Ration (SIR) [CDC NHSN] – Maintenance

Endorsed with Conditions: Fall 2025.

When the measure comes back for maintenance in 3 years, the developer will have: Explored the possibility of using other all-payer data sources to expand the use of patient- level factors in the risk adjustment model and reduce reliance on facility-level factors.

Vote Count: Endorse (2 votes; 10%), Endorse with Conditions (14 votes; 70%), Remove Endorsement (4 votes; 20%)

Summary of Public Comments: Battelle received one comment from the University of California Davis Health prior to the meeting. University of California Davis Health argued that the measure fails PQM Reliability criterion (>50% of facilities are below the threshold of 0.6), likely violates Poisson assumptions (overdispersion), and requires a longer performance period or higher minimum denominator for reliability.

CBE #1717 – Clostridium difficile (CDI) LabID Event Standardized Infection Ratio (SIR) [CDC NHSN] – Maintenance

Endorsed with Conditions: Fall 2025.

When the measure comes back for maintenance in 3 years, the developer will have: Explored the possibility of using other all-payer data sources to expand the use of patient- level factors in the risk adjustment model and reduce reliance on facility-level factors.

Vote Count: Endorse (1 vote; 6%), Endorse with Conditions (14 votes; 78%), Remove Endorsement (3 votes; 17%)

CDC NHSN HAI CLABSI and CAUTI Measures: Endorsement Status

Central Line-Associated Bloodstream Infection (CLABSI) Standardized Infection Ratio. CBE ID: 0139

1.5 Project: Management of Acute Events, Chronic Disease, Surgery, and Behavioral Health.

Endorsement Status: Endorsed with Conditions (Spring 2025) **E&M Committee Rationale/Justification:** When the measure returns for maintenance (3 years), the measure developer should have explored the possibility of using other all-payer data sources to expand the use of patient-level factors in the risk-adjustment model and reduce reliance on facility-level factors.

Catheter-Associated Urinary Tract Infection (CAUTI) Standardized Infection Ratio. CBE ID: 0138

1.5 Project: Management of Acute Events, Chronic Disease, Surgery, and Behavioral Health .

Endorsement Status: Endorsed with Conditions (Spring 2025) **E&M Committee Rationale/Justification:** When the measure returns for maintenance (3 years), the measure developer should have explored the possibility of using other all-payer data sources to expand the use of patient-level factors in the risk adjustment model and reduce reliance on facility-level factors.

Public comment: …"In the Inpatient Rehabilitation Facilities (IRF) space, 757 hospitals were designated on Care Compare as 'Not Applicable,' 54% are IRFs that had infections. Instead of being designated as the safest care providers related to catheter associated urinary tract infections on IRF Compare for consumer comparison, they are not displayed with a comparative category at all, effectively misrepresenting which IRF providers are, in fact, "better" with not only fewer infections – but zero, as "Not Applicable."

CDC NHSN HAI SSI Measures: Endorsement Status

30-Day Post-Operative Colon Surgery (COLO) and Abdominal Hysterectomy (HYST) Surgical Site Infection (SSI) Standardized Infection Ratio (SIR). CBE ID: 0753

1.5 Project: Management of Acute Events, Chronic Disease, Surgery, and Behavioral Health

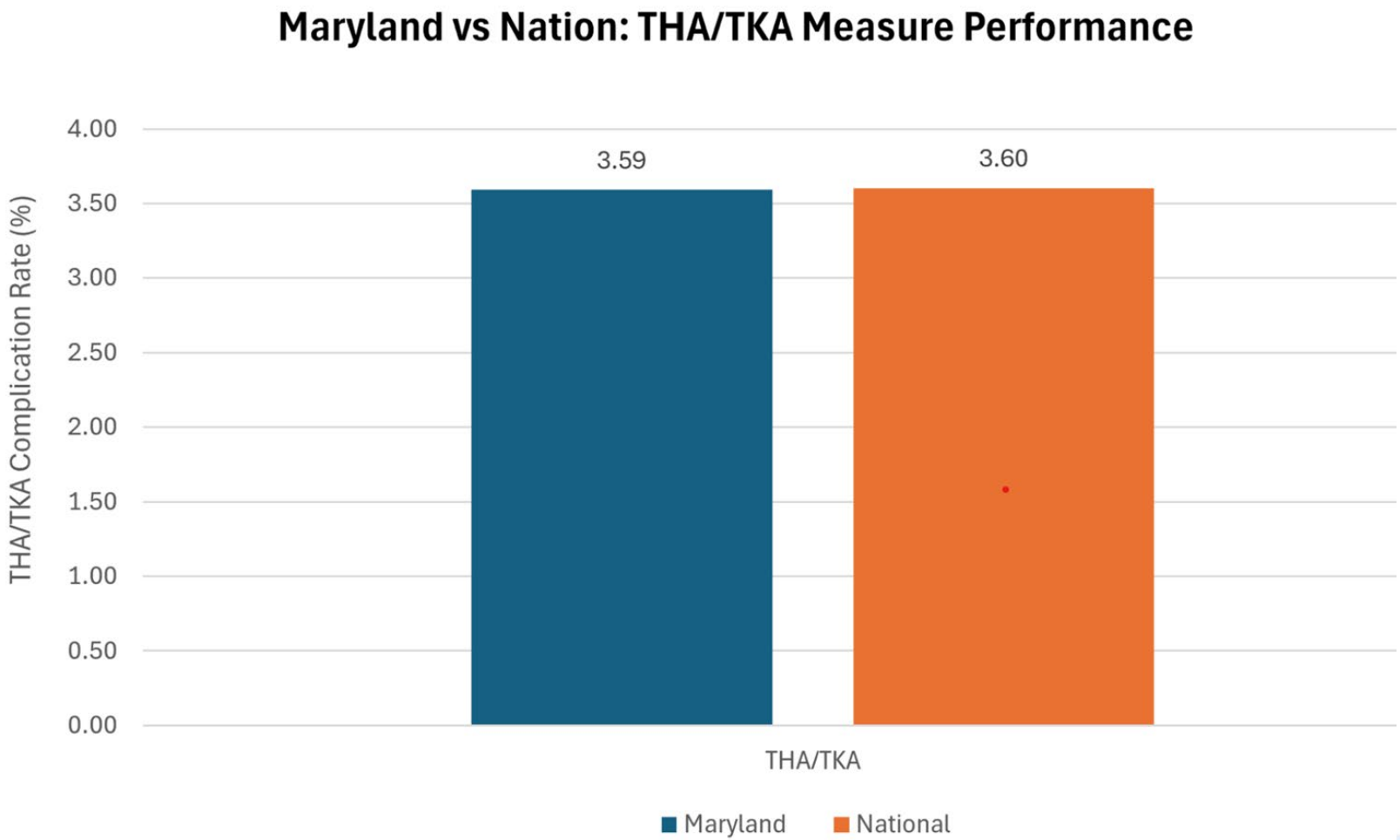
Endorsement Status: Endorsed with Conditions (Spring 2025)

E&M Committee Rationale/Justification

When the measure returns for maintenance (3 years), the measure developer should have:

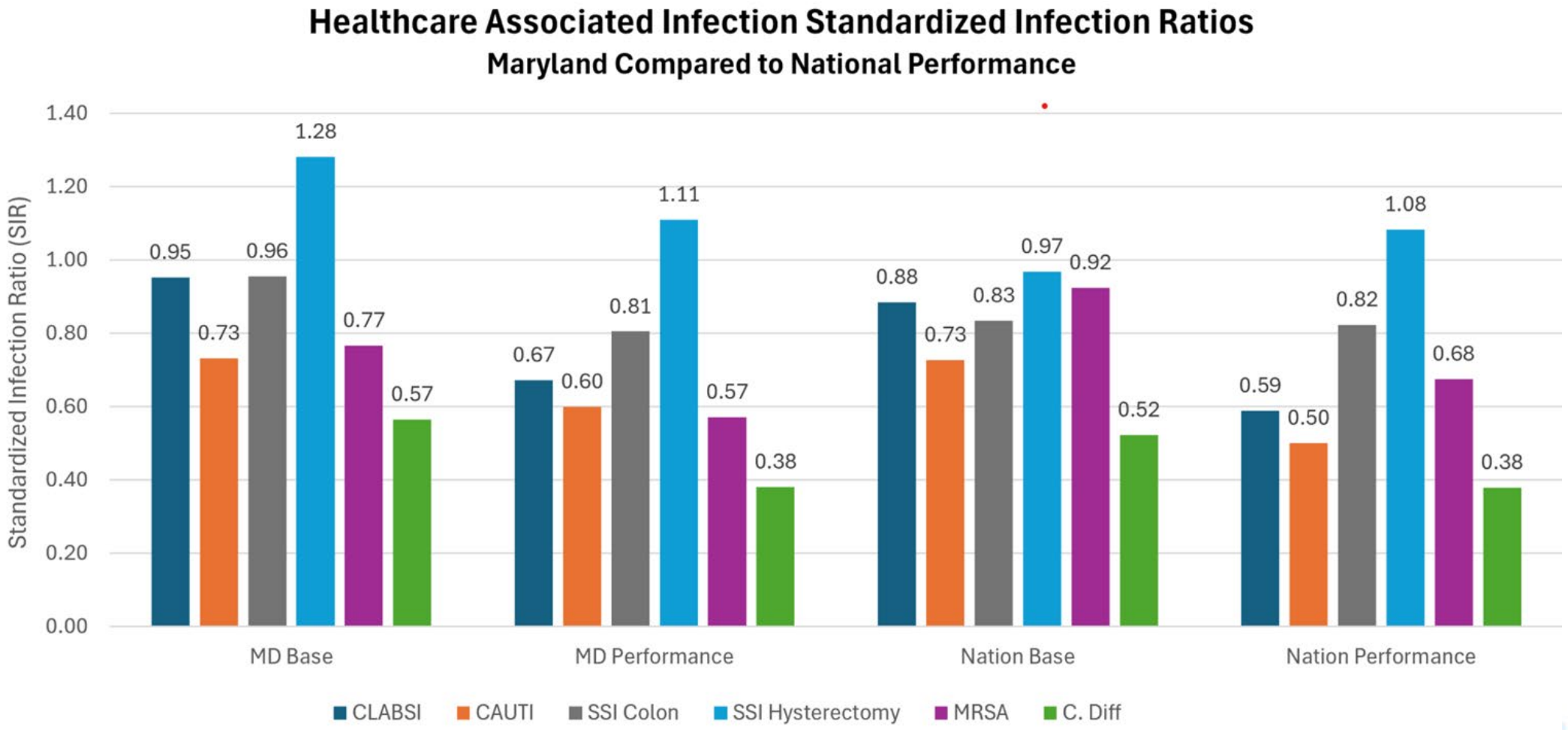
- Explored the possibility of using other all-payer data sources to expand the use of patient-level factors in the risk-adjustment model and reduce reliance on facility-level factors.
- Explored the exclusion of the patient-level factors such as procedure duration and American Society of Anesthesiologists (ASA) score, while also considering the inclusion of procedure complexity and patient comorbidities.
- Explored stratification of trauma cases rather than include as a risk-adjustment variable.

Maryland Performance is Comparable to the Nation THK Arthroplasty Complications



Data Period: July 1, 2021 – June 30, 2024
Source: CMS Care Compare (May 2026 Release)

Maryland Performance is Comparable to the Nation on CDC NHSN HAI Pay for Performance Measures



Data Time Periods: Baseline (CY2022) | Performance (Jul 2024 – Jun 2025)
Source: CMS Care Compare (May 2026 Release)

CMS Measures Discussion Questions

- There is controversy with using the THK measure particularly as the procedures move to outpatient.
  - How should this measure, if it continues, be used in the Maryland HGB quality program?
- To align with CMS, The CDC NHSN HAI measures would be adopted into the MHAC program:
  - Are the measures sufficiently specified?
    - Do they discriminate differences in performance between hospitals?
    - Do they warrant a reward and penalty in both the QBR and MHAC programs?
    - Should the PMWG consider alternate incentive approaches to these measures if they are adopted into MHAC?

Five Currently Required Electronic Clinical Quality Measures (eCQMs) for reporting, MD and US

eCQM Endorsement Status (See Workbook for Measure Specifications)

Rate of severe hypoglycemia among hospitalized patients. CBE ID:3503e

1.5 Project: Management of Acute Events, Chronic Disease, Surgery, and Behavioral Health

Endorsement Status: Endorsed with Conditions Spring 2025

E&M Committee Rationale/Justification: By measure maintenance (5 years), the developer will have considered the potential for risk adjustment through empirical analysis.

Hospital Harm - Severe Hyperglycemia. CBE ID: 3533e

1.5 Project: Management of Acute Events, Chronic Disease, Surgery, and Behavioral Health

Endorsement Status: Endorsed with Conditions Spring 2025

E&M Committee Rationale/Justification: When the measure returns for maintenance review in 5 years, the developer will have: Considered the potential for risk adjustment through empirical analysis.

Safe Use of Opioids – Concurrent Prescribing. CBE ID: 3316e. **1.5 Project:** Primary Prevention. **Endorsement Status:** Endorsed with Conditions Fall 2023. **E&M Committee Rationale/Justification:**

- Expand reliability and validity testing to ensure a more diverse population and explore regional diversity within testing.
- Explore new versus current users of opioids and benzodiazepines on admission, and stratify by these populations.

ePC-07 Severe Obstetric Complications. CBE ID: 3687e. **Endorsement Status:** Approved for Trial Use ..**1.0 New or Maintenance:** New. **Next Maintenance Cycle:** Spring 2027. **Known Issues with POA submission on secondary Dx codes.**

ePC-02 Cesarean Birth. CBE ID: 0471e. **1.5 Project:** Perinatal and Women's Health. **Endorsement Status:** Endorsed Spring 2022. **Next Maintenance Cycle:** Spring 202

ePC-02 Cesarean Birth Endorsed Measure

Planned Use

Measure Currently in Use

Public Reporting

6.1.2 Current or Planned Use(s)

Measure Currently in Use

Public Reporting

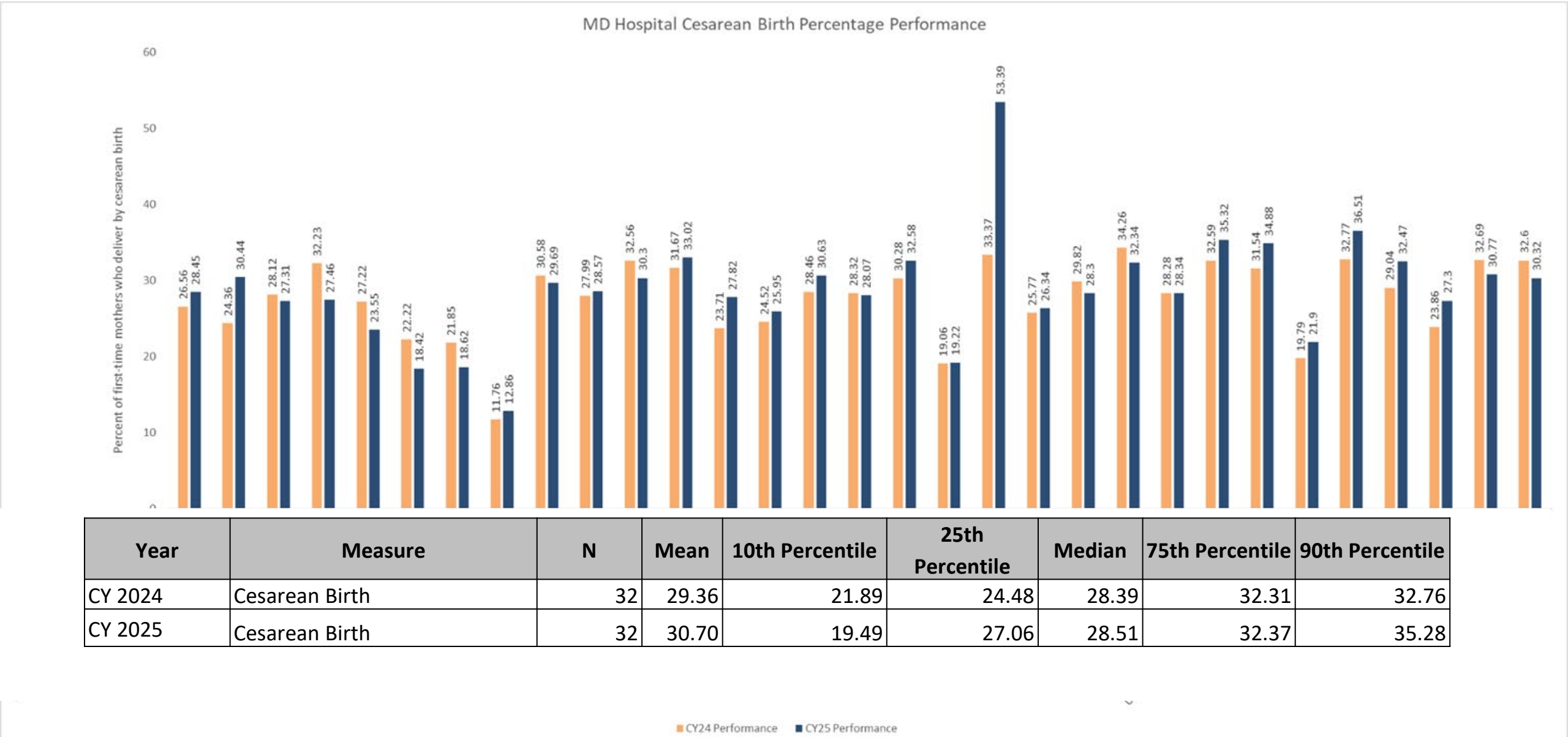
Quality Improvement (Internal to the specific organization)

Quality Improvement with Benchmarking (external benchmarking to multiple organizations)

Regulatory and Accreditation Programs

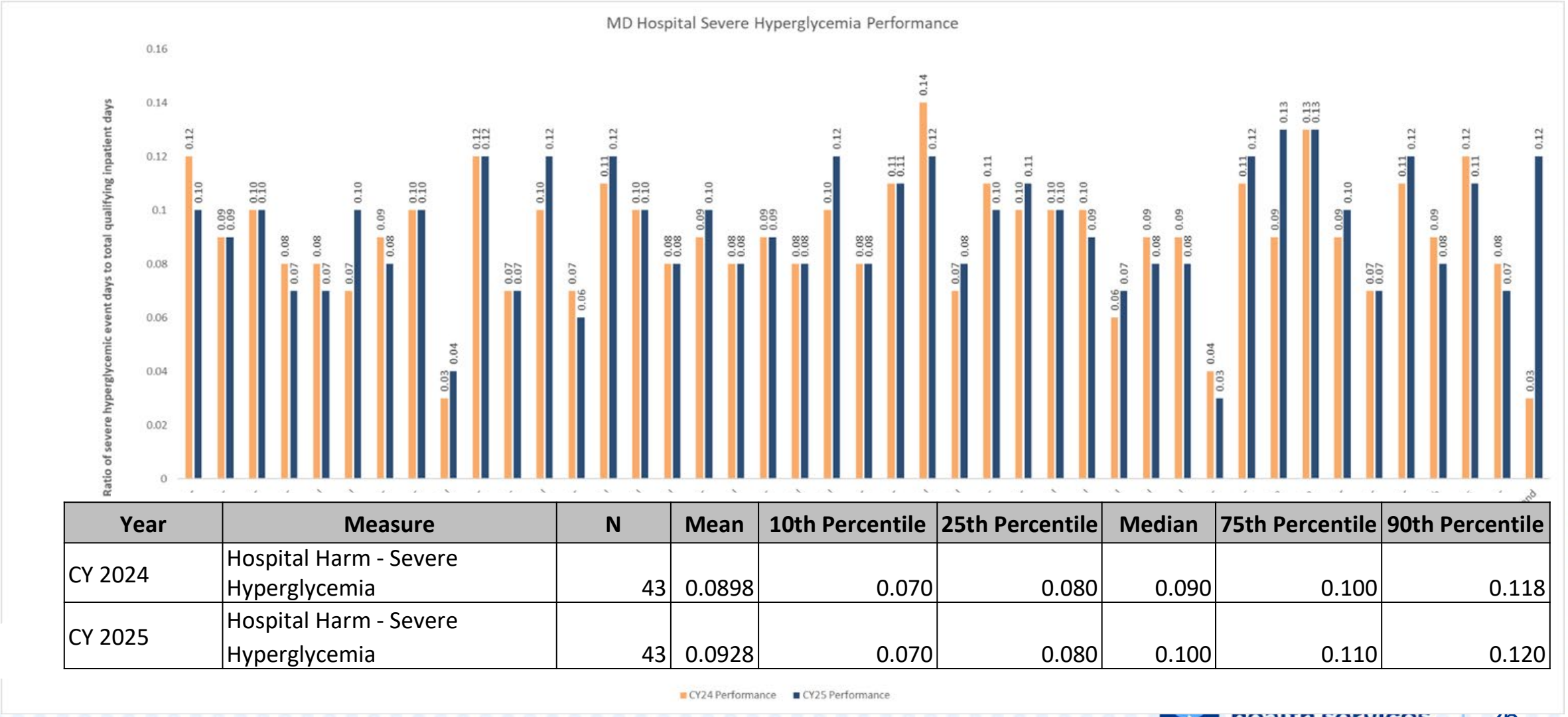
SEE ATTACHED PDF FILE WITH MEASURE TECHNICAL DETAILS SUBMITTED TO NQF IN 2022 FOR ENDORSEMENT CONSIDERATION.

PC 02- Cesarean Section (CMS334)



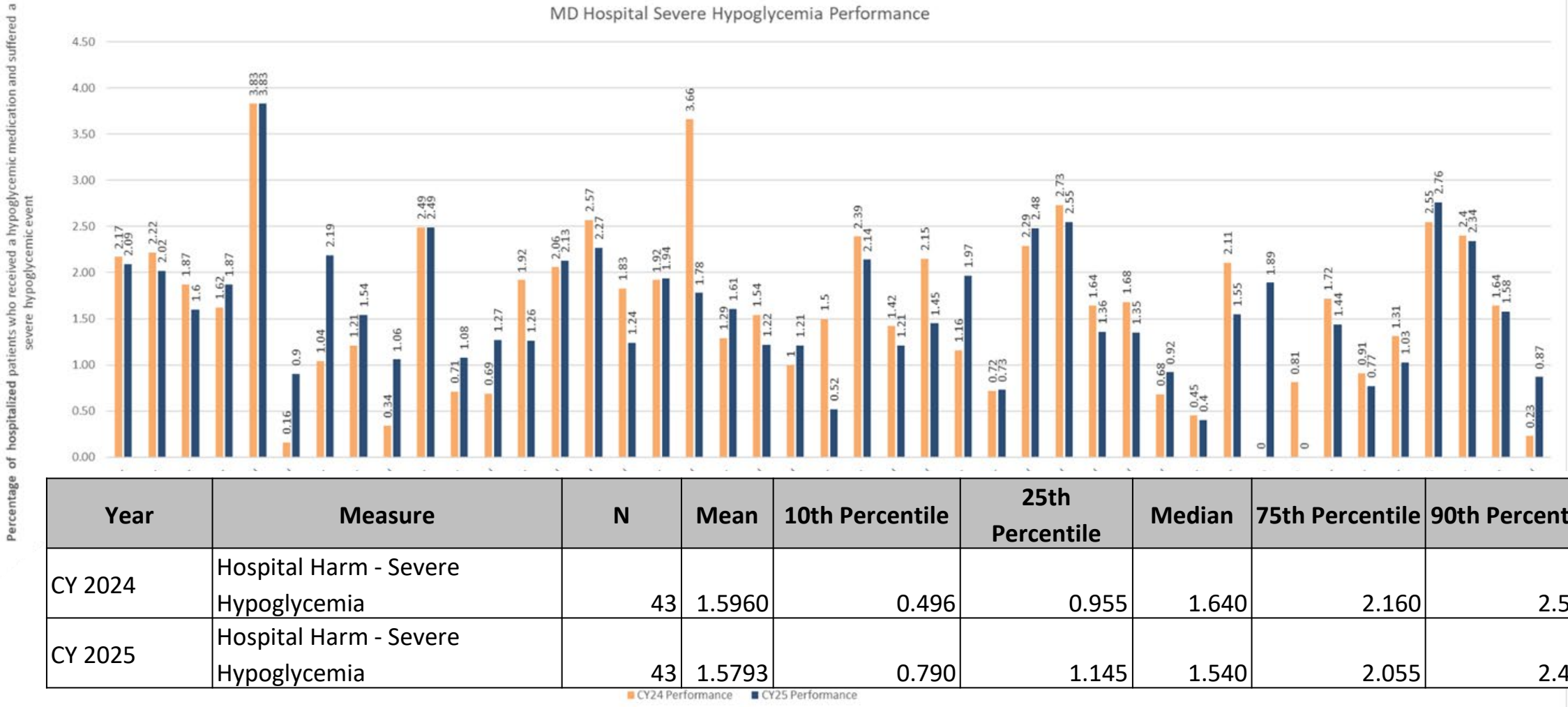
Year	Measure	N	Mean	10th Percentile	25th Percentile	Median	75th Percentile	90th Percentile
CY 2024	Cesarean Birth	32	29.36	21.89	24.48	28.39	32.31	32.76
CY 2025	Cesarean Birth	32	30.70	19.49	27.06	28.51	32.37	35.28

HH Hyper- Hospital Harm Severe Hyperglycemia (CMS871)



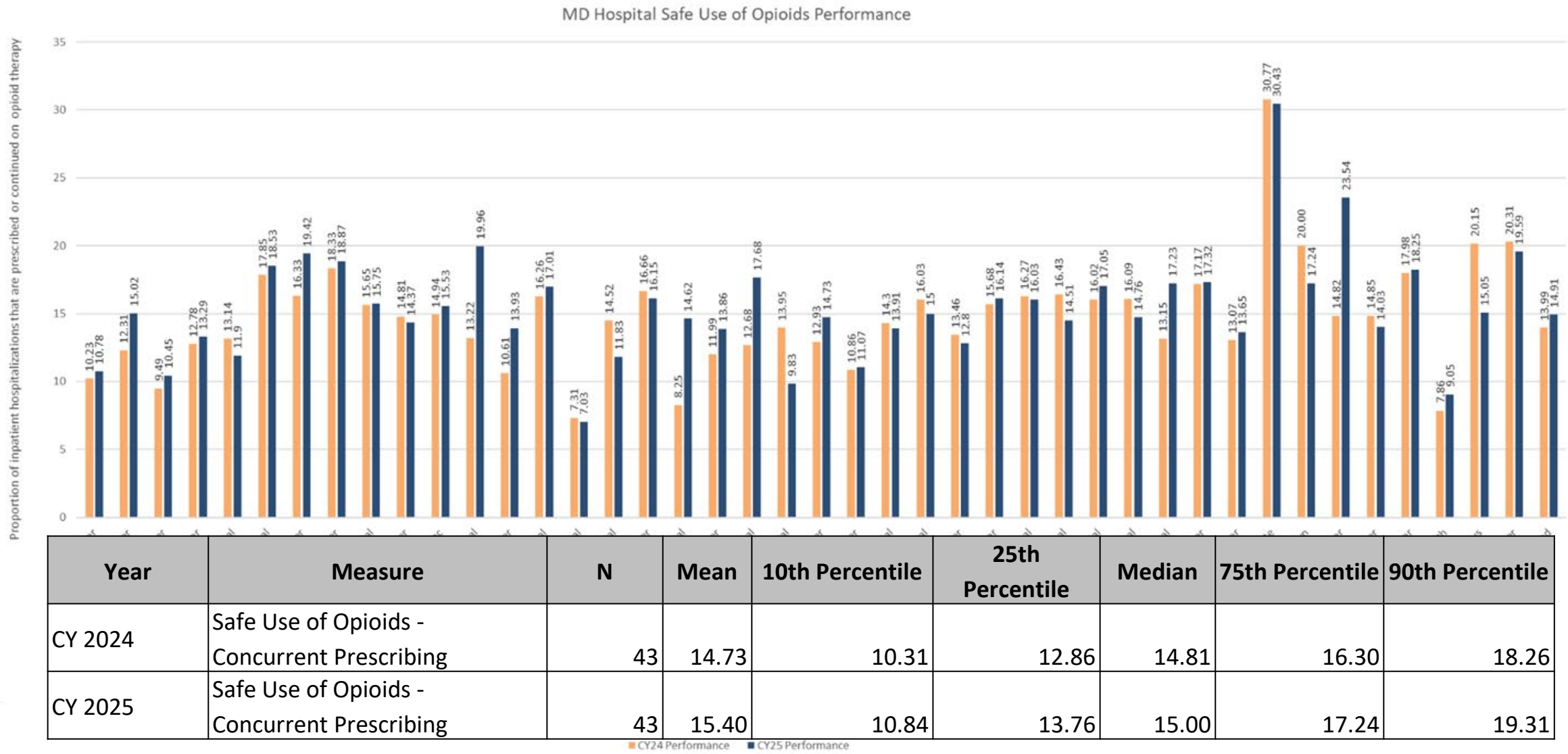
Year	Measure	N	Mean	10th Percentile	25th Percentile	Median	75th Percentile	90th Percentile
CY 2024	Hospital Harm - Severe Hyperglycemia	43	0.0898	0.070	0.080	0.090	0.100	0.118
CY 2025	Hospital Harm - Severe Hyperglycemia	43	0.0928	0.070	0.080	0.100	0.110	0.120

HH Hypo- Hospital Harm Severe Hypoglycemia (CMS816)



Year	Measure	N	Mean	10th Percentile	25th Percentile	Median	75th Percentile	90th Percentile
CY 2024	Hospital Harm - Severe Hypoglycemia	43	1.5960	0.496	0.955	1.640	2.160	2.538
CY 2025	Hospital Harm - Severe Hypoglycemia	43	1.5793	0.790	1.145	1.540	2.055	2.452

Safe Use of Opioids (CMS506)



Year	Measure	N	Mean	10th Percentile	25th Percentile	Median	75th Percentile	90th Percentile
CY 2024	Safe Use of Opioids - Concurrent Prescribing	43	14.73	10.31	12.86	14.81	16.30	18.26
CY 2025	Safe Use of Opioids - Concurrent Prescribing	43	15.40	10.84	13.76	15.00	17.24	19.31

Digital Measures Discussion

- All eCQMs are conditionally endorsed with exception of PC-02 Cesarean Section
- There are hospital data issues with the PC-02 and PC-07 Severe Obstetric Complication measures
- What measures may be best candidates for early adoption into pay for performance after monitoring?
  - Are the measures sufficiently specified?
  - Is risk adjustment needed? for which measures?
  - HSCRC staff would cue up Severe Hypo- Hyper-Glycemia measures

SEE ACCOMPANYING WORKBOOK FOR DETAILED cCQM MEASURE SPECIFICATIONS.

Mortality Measures:

- Analysis of Maryland 30-day vs CMS Hybrid HWR Results
- Sepsis Mortality Definition
  - Definitions comparison for MD Sepsis Dashboard and Community Onset CDC Measure in development
- MD mortality measures sepsis cases capture analysis

Mortality Analysis

- Maryland goal is to shift to Maryland HWM hybrid risk adjusted measure over time by risk adjusting current claims measure with added Core Clinical Data Elements
  - HSCRC/MPR analysis to date compares hybrid HWM measure results posted on Care Compare to Maryland Maryland's 30-day Mortality rates.
- Sepsis Mortality- Approximately 1.7 million adults in the U.S. and 30,000 Marylanders develop sepsis each year accounting for 350,000 deaths in the U.S. and 1,100 in Maryland annually. *, ** ; It is the leading cause of hospitalization and mortality, with one in three people who die in the hospital having sepsis during their stay.
  - Sepsis mortality using the AHRQ definition is included in the HSCRC Sepsis Dashboard on CRISP Reporting Services
  - The CDC is developing and piloting a Community Onset Sepsis digital hybrid mortality measure.
  - HSCRC/MPR has begun analyzing to what extent the HSCRC Inpatient and 30-Day Mortality measures capture sepsis cases as defined by the AHRQ method in order to inform next steps on mortality measures/measurement.

* Found at: https://www.cdc.gov/sepsis/about/index.html. last accessed 8/6/2025.

**Found at: https://health.maryland.gov/newsroom/Pages/Sepsis-Awareness-Month-Highlights-Leading-Cause-Of-Deaths-In-US-Hospitals.aspx. last accessed 8/6/2025.

Comparison of CMS Hybrid Hospital-wide 30-day Mortality Rates to HSCRC's Claims-based 30-day Mortality Rates

Mortality Measures Compared

/ CMS Hybrid 30-day Mortality

- Fee for service Medicare patients 65+ with 12 months or more continuous enrollment, certain clinical exclusions and 1 randomly selected stay per patient
- Risk factors are diagnostic condition categories from patient history and selected lab results and vital signs
- Risk adjusted using hierarchical model by service line
- Results from participating hospitals for 7/23 – 6/24 downloaded from the Hospital Quality Reporting System

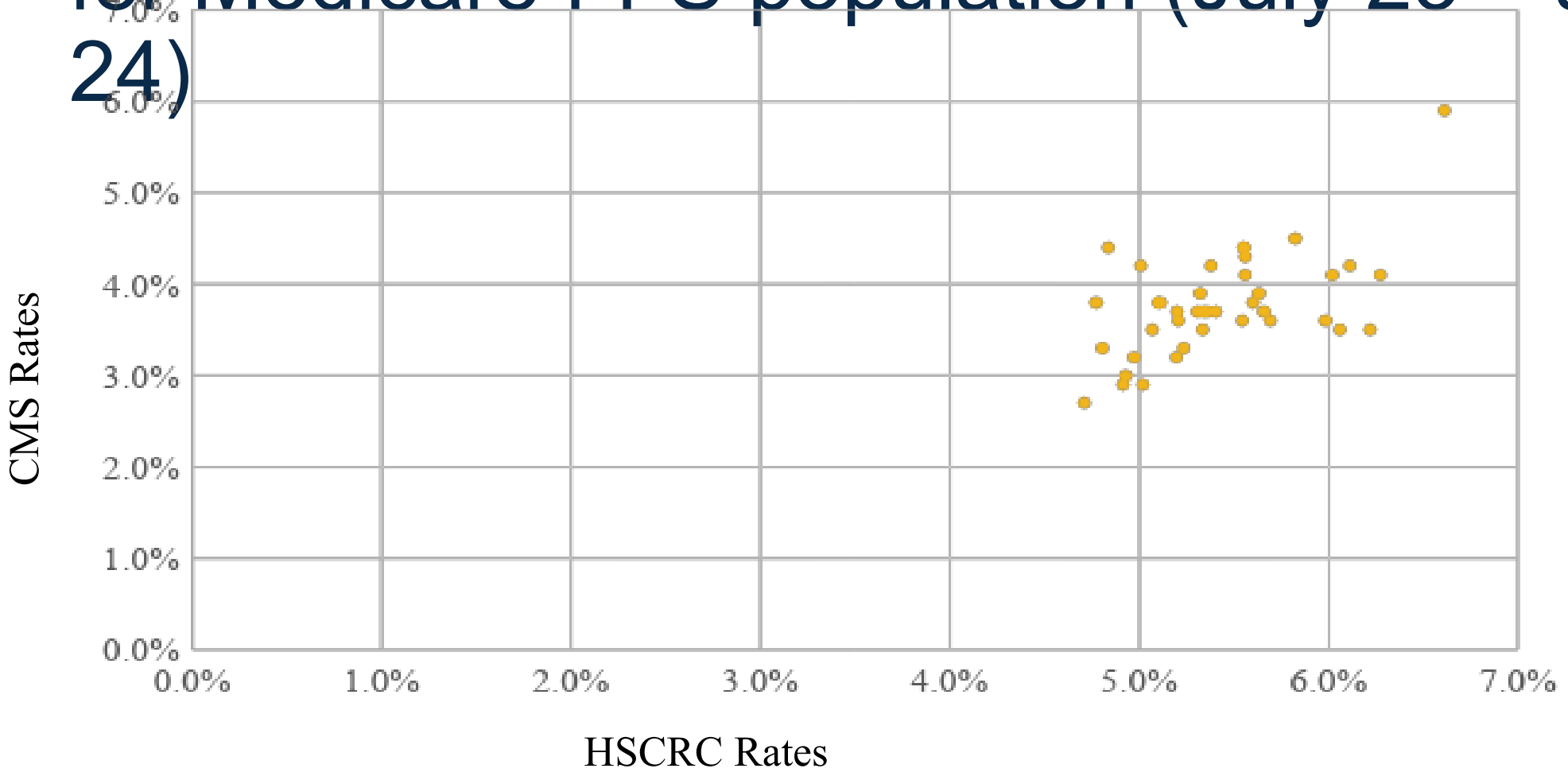
/ HSCRC 30-day Mortality

- All payer
- Risk factors are APR-DRG and risk of mortality
- CMS exclusions applied, no enrollment requirement
- Risk adjusted using hierarchical model for most service lines

Summary of Analysis

- **Re-estimated HSCRC 30-day mortality model for 7/23 – 6/24 and Medicare FFS patients**
- **Compared HSCRC 30-day mortality results by hospital to CMS hybrid HWM results for 40 hospitals**
- **Weighted mean of hospital rates: CMS mortality substantially lower**
  - HSCRC 30-day mortality rate is 5.4%
  - CMS Hybrid HWM rate is 3.6%
- **Mean hospital measure denominator: CMS patient count is higher**
  - HSCRC 30-day mortality denominator count is 1,698
  - CMS Hybrid HWM denominator count is 1,740
- **Correlation of results is moderate: r=0.57**

Comparison of CMS Hybrid HWM and HSCRC Claims-based 30-day Mortality Rates for Medicare FFS population (July 23 – June 24)



Potential Next Steps

- **Investigate reasons for differences in rates between CMS hybrid and HSCRC claims-based measure**
- **Incorporate lab results and vital signs from CMS Hybrid HWM to create HSCRC hybrid mortality measure**
- **Test new HSCRC hybrid mortality measure**
  - Alternative exclusions and risk factors
  - Model fit
  - Reliability and validity
  - Comparison with CMS measure

Sepsis Mortality Measure Comparison

Definition of Sepsis

Measure	Sepsis Definition
CDC Adult Community-Onset Standardized Sepsis Mortality Ratio (SMR)	**Present on admission determination:** Uses present on admission (POA) logic that identifies community onset sepsis as follows: diagnosis that is present on the day of admission to an inpatient location (calendar day 1), the 2 days before admission, or the calendar day after admission (POA time period). **Inpatient mortality:** Patients who die during the hospital stay or are discharged to hospice. **Sepsis events** are identified from electronic health records (EHR) using a combination of clinical indicators of presumed serious infection and evidence of organ dysfunction documented during hospitalization. Indicators of presumed infection include the collection of blood cultures and the initiation of new antimicrobial therapy. Evidence of organ dysfunction may include abnormalities in laboratory results, initiation of supportive therapies, or other indicators consistent with acute physiologic deterioration. Timing relationships between infection indicators and organ dysfunction indicators determine whether a qualifying sepsis event has occurred. Event identification is based on the temporal association of these elements as documented in the EHR.
HSCRC 30-day sepsis mortality	**Present on admission determination:** POA codes identify sepsis that was identified during the course of the stay and not found to be present on admission (healthcare-associated infection or HAI) . Both community acquired and HAI are included; the HAI indicator in HSCRC's Sepsis Dashboard can be used to stratify unadjusted results. **30-day mortality:** Patients who die within 30 days of being admitted to a hospital. **Sepsis events** are identified based on ICD-10 diagnoses codes indicating sepsis and confirmed by ICD-10 codes for organ dysfunction (Dombrowsky method). 30-day sepsis mortality rates are calculated for the following two **service lines**: surgical and non-surgical.

Overview of sepsis mortality measures

Measure	Data Source	Current use	Measure
CDC Adult Community-Onset Standardized Sepsis Mortality Ratio (SMR)	Claims and EHR	Measure being developed and could be used in CMS programs in future	Annual risk-adjusted standardized mortality ratio (SMR) of adult inpatients with community-onset sepsis. SMR is calculated as the observed-to-predicted ratio of adult community-onset sepsis in-hospital deaths or discharges to hospice.
HSCRC 30-day sepsis mortality rate	Casemix	HSCRC Sepsis Dashboard	Risk-adjusted 30-day mortality ratio calculated as the mean predicted probability over the mean expected probability of death within 30-days of being admitted to a hospital among patients with a diagnosis of sepsis. Two separate risk-adjusted mortality rates are calculated for the **surgical service line** and **non-surgical service line**.

Overview of sepsis mortality measures

Measure	Initial Population	Numerator Exclusions	Denominator Exclusions
CDC Adult Community-Onset Standardized Sepsis Mortality Ratio (SMR)	All encounters for patients of any age in an ED, observation, or inpatient location	• Patients <18 years of age • Length of hospitalization >120 days • Patients with prior enrollment in hospice • Patients that transferred to another acute care hospital	None
HSCRC 30-day sepsis mortality rate	Patients ages 95 and younger residing in Maryland and treated in Maryland hospitals	None	• Patients enrolled in hospice before, during, or within 30 days after admission • Maternal, neonatal, and ungroupable admissions • Transfers, Left Against Medical Advice, Inconsistent vital status (death prior to admission or prior to discharge if discharged alive) • Any diagnosis of metastatic cancer or a principal diagnosis indicating low survival probability • After these exclusions are imposed, a random admission is selected for each patient with multiple stays and other admissions are excluded

Overview of sepsis mortality measures

Measure	Numerator	Denominator
CDC Adult Community-Onset Standardized Sepsis Mortality Ratio (SMR)	Number of annually observed adults with community- onset sepsis who died during hospitalization or were discharged to hospice.	Number of annually predicted adults with community- onset sepsis who died during hospitalization or were discharged to hospice.
HSCRC 30-day sepsis mortality rate	Hospital-specific predicted probability of death within 30 days of being admitted to the hospital among patients with sepsis	Hospital-specific expected probability of death within 30 days of being admitted to the hospital among patients with sepsis

Overview of risk adjustment

Measure	Risk Adjustment
CDC Adult Community-Onset Standardized Sepsis Mortality Ratio (SMR)	The regression-based risk adjustment model calculates the predicted number of adults with community-onset sepsis who died during hospitalization or were discharged to hospice. Risk adjustment model includes variables from EHR, claims and NHSN survey. From EHR: Sex; Age; admission from a facility or hospital transfer; patient-level physiology on admission; blood pressure; lactate; creatinine; platelets; white count; anion gap; hematocrit; ALT; bilirubin; sodium; albumin; hypothermia; vasopressors; BMI. From claims: comorbidities; present on admission codes for pulmonary, genitourinary, skin; procedure codes for mechanical ventilation. From NHSN survey: hospital size.
HSCRC 30-day sepsis mortality rate	Predicted probability is calculated as the probability of mortality projected from the model including the hospital's intercept, while expected probability is projected without that intercept. The model includes age, sex, indication of palliative care and APR-DRG-ROM

Sepsis and mortality measures

Breakdown by service line

Sepsis and mortality measures: Methods

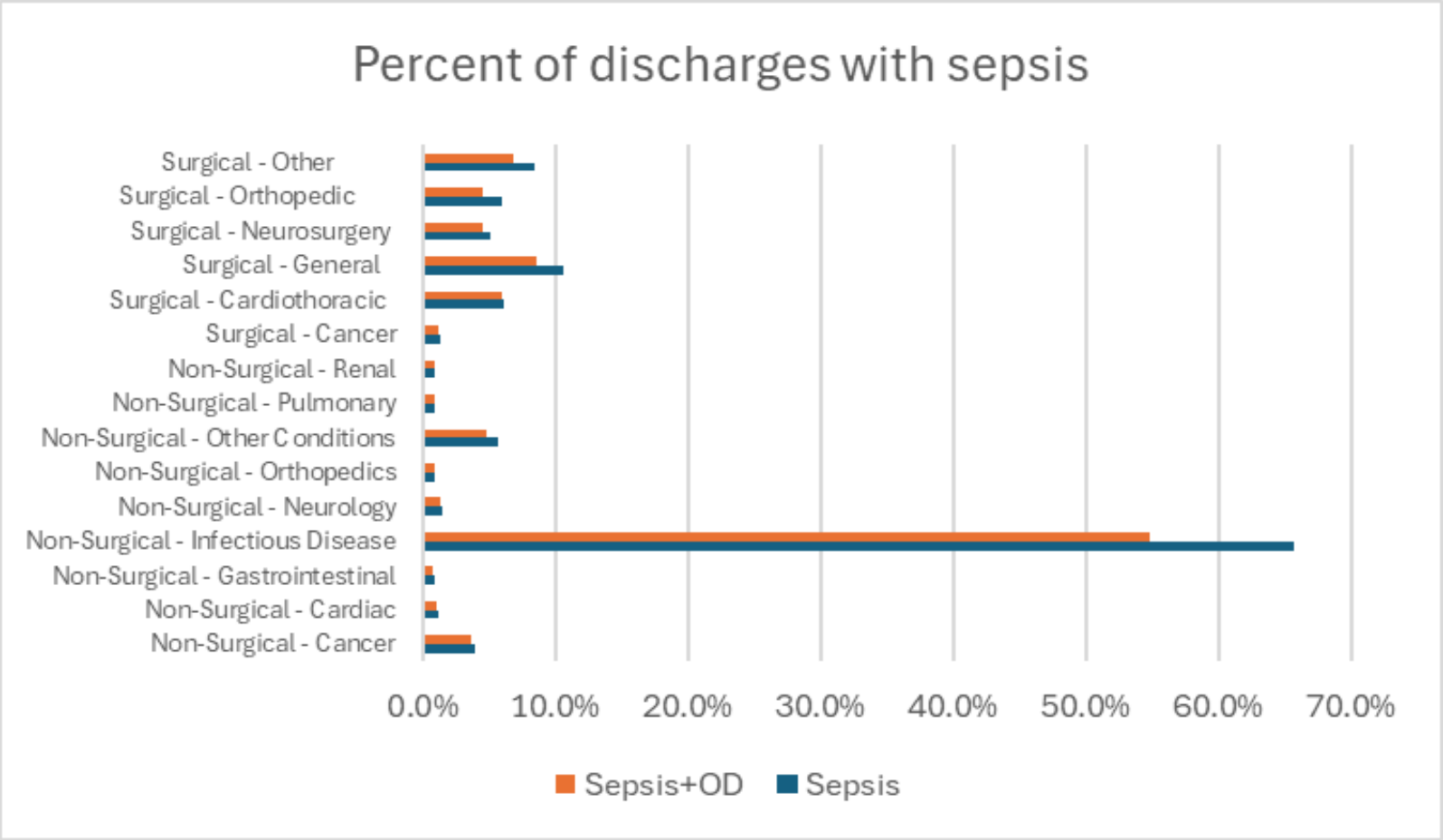
Relation of sepsis to 30-day and inpatient mortality measures measured as proportion by service line of discharges, inpatient and 30-day mortality with sepsis diagnoses

Service lines are those assigned to produce 30-day mortality measure

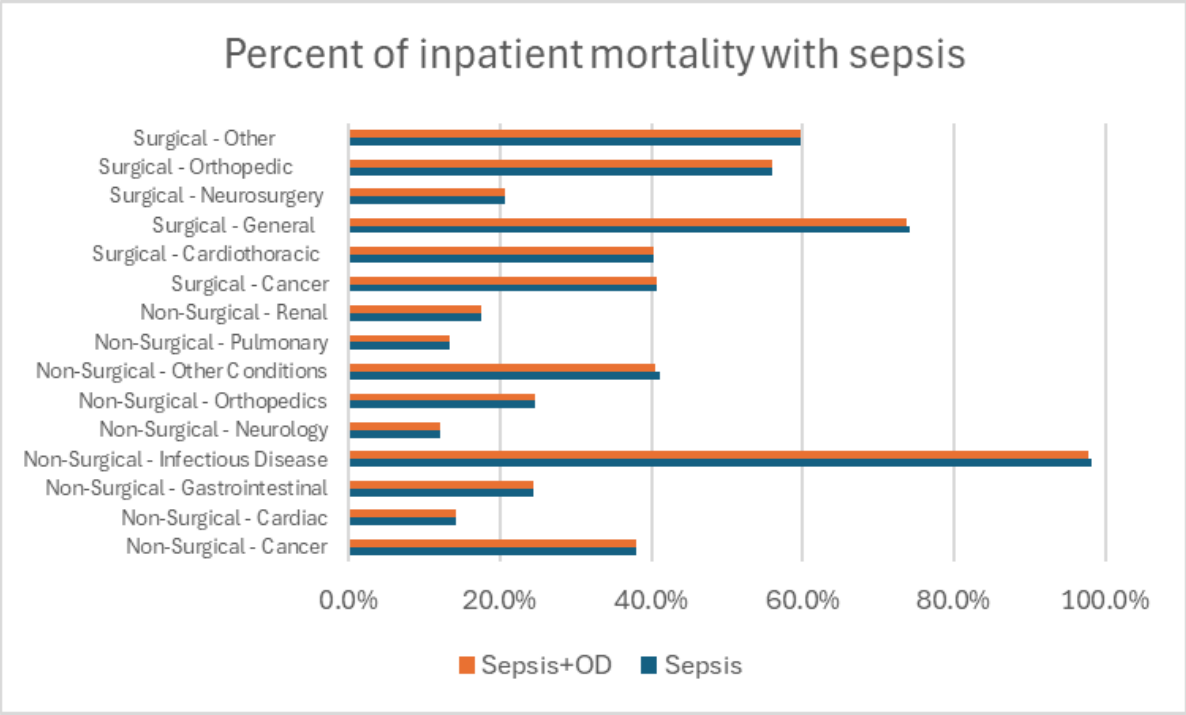
- Analyzed data from 2023 that was used to develop Sepsis Dashboard (which includes present on admission flags)
- Applied exclusions for 30-day measure, including randomly excluded admissions for patients with multiple stays
- Measured proportions of sepsis, sepsis with organ dysfunction, and healthcare associated sepsis infections compared to present on admission

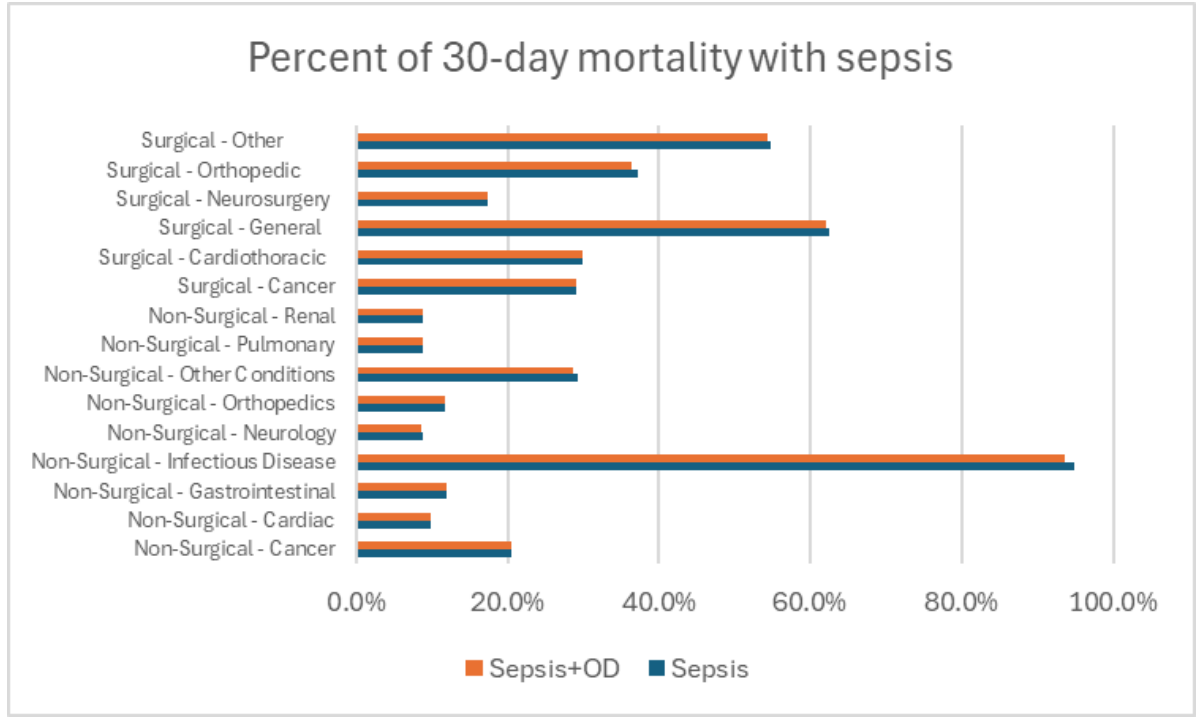
Compared hospitals' 30-day mortality excluding sepsis cases to their overall 30-day mortality for 2025 (first 11 months)

Patients with sepsis by service line: All sepsis and sepsis with organ dysfunction

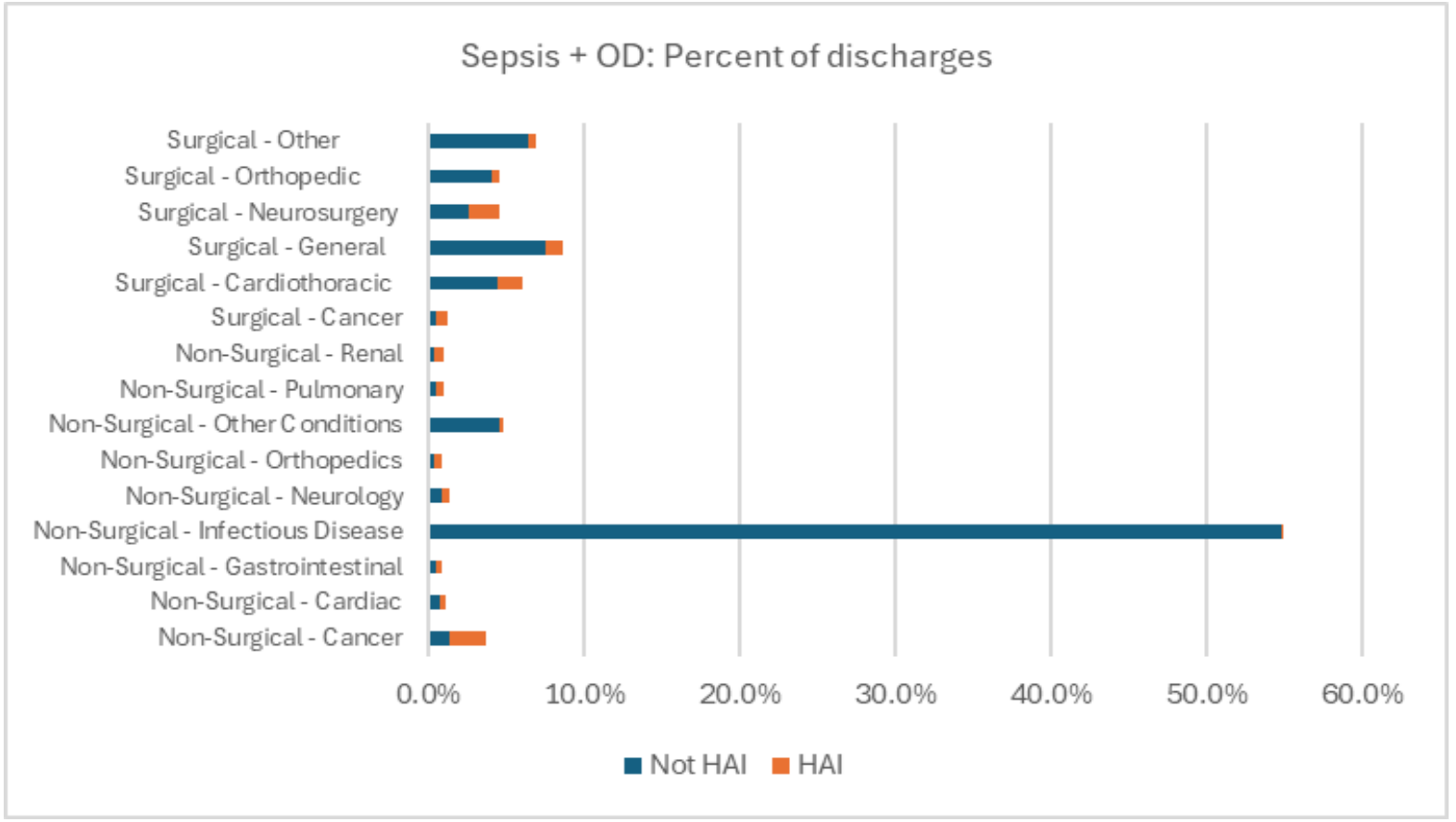


Sepsis share of mortality, by service line

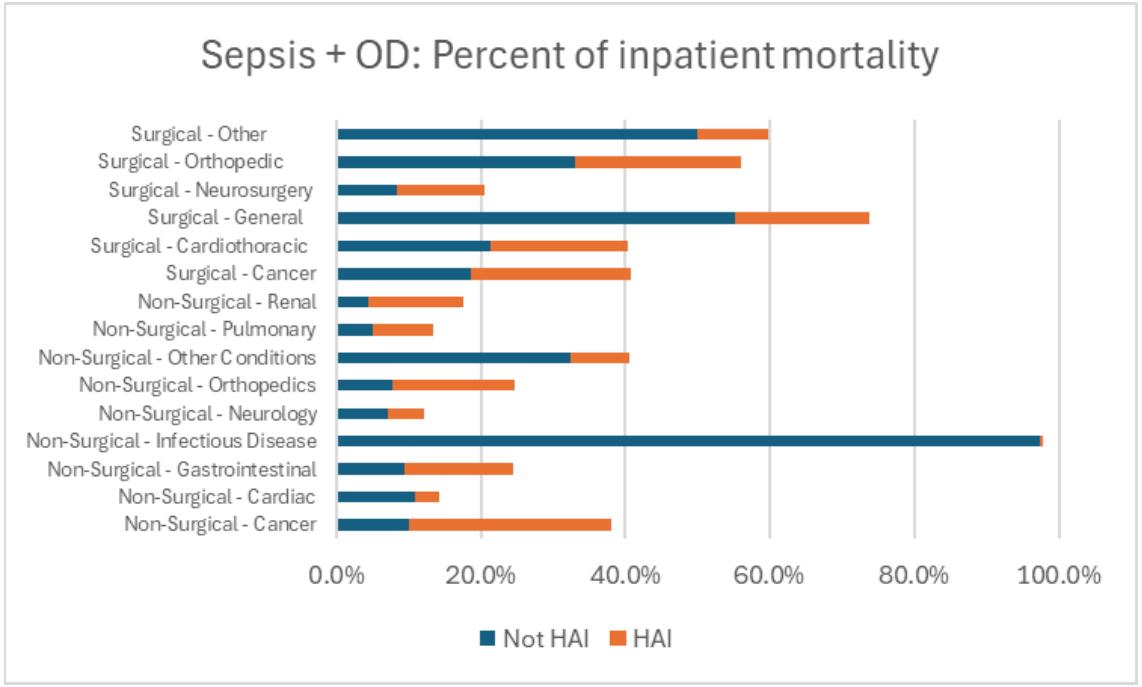


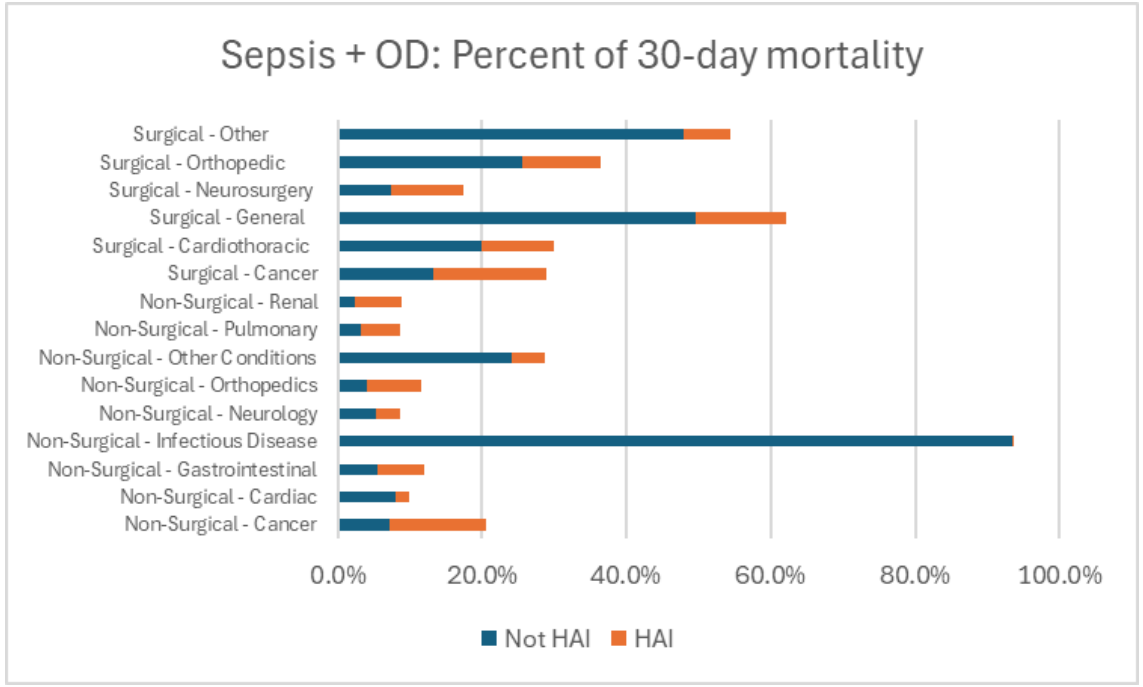


Sepsis (with organ dysfunction) as healthcare associated infection vs sepsis present on admission

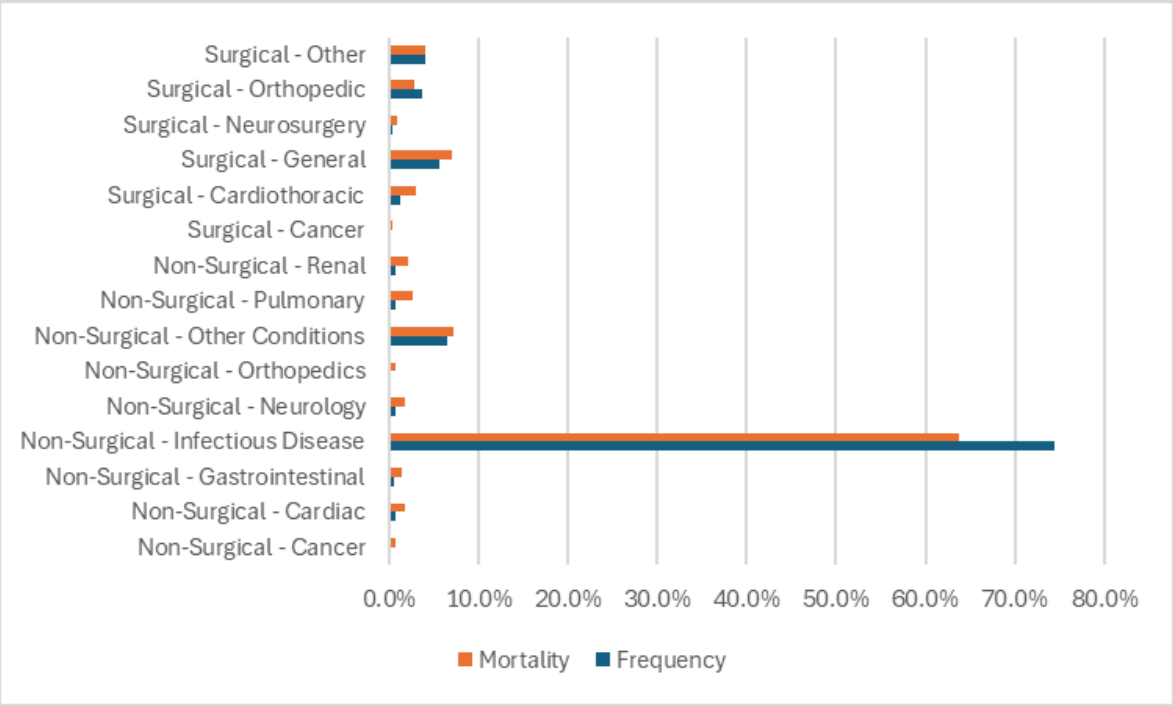


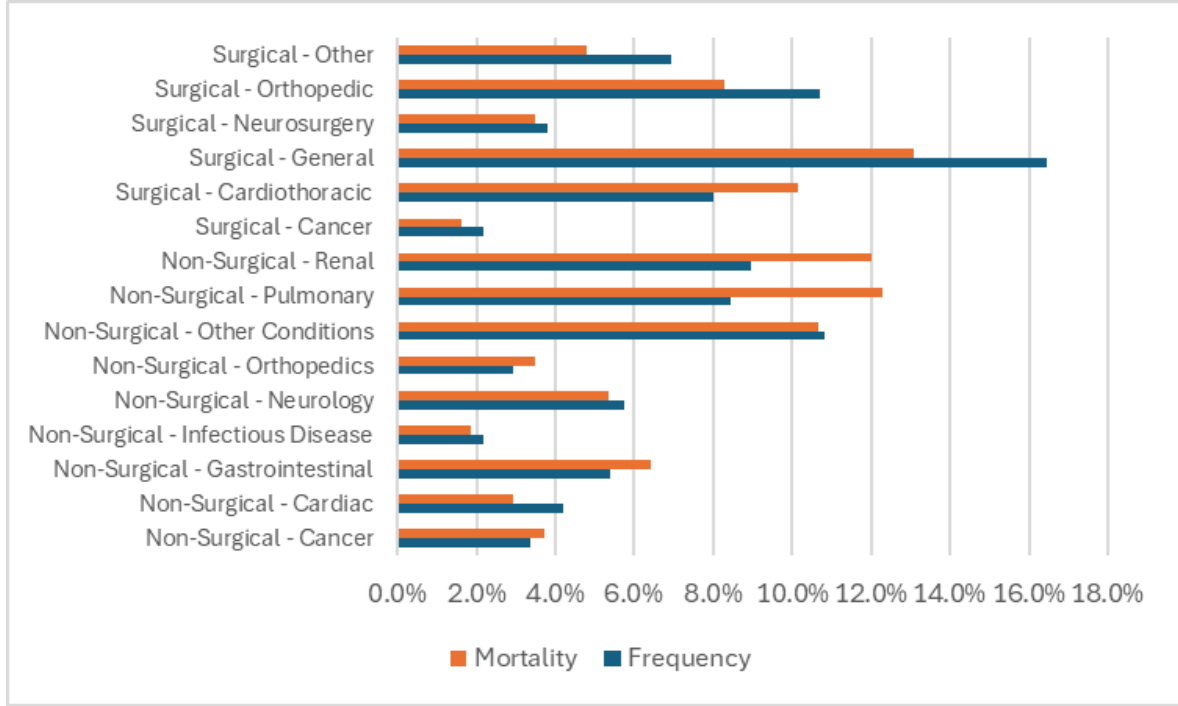
Role of healthcare associated sepsis infections in mortality, by service line



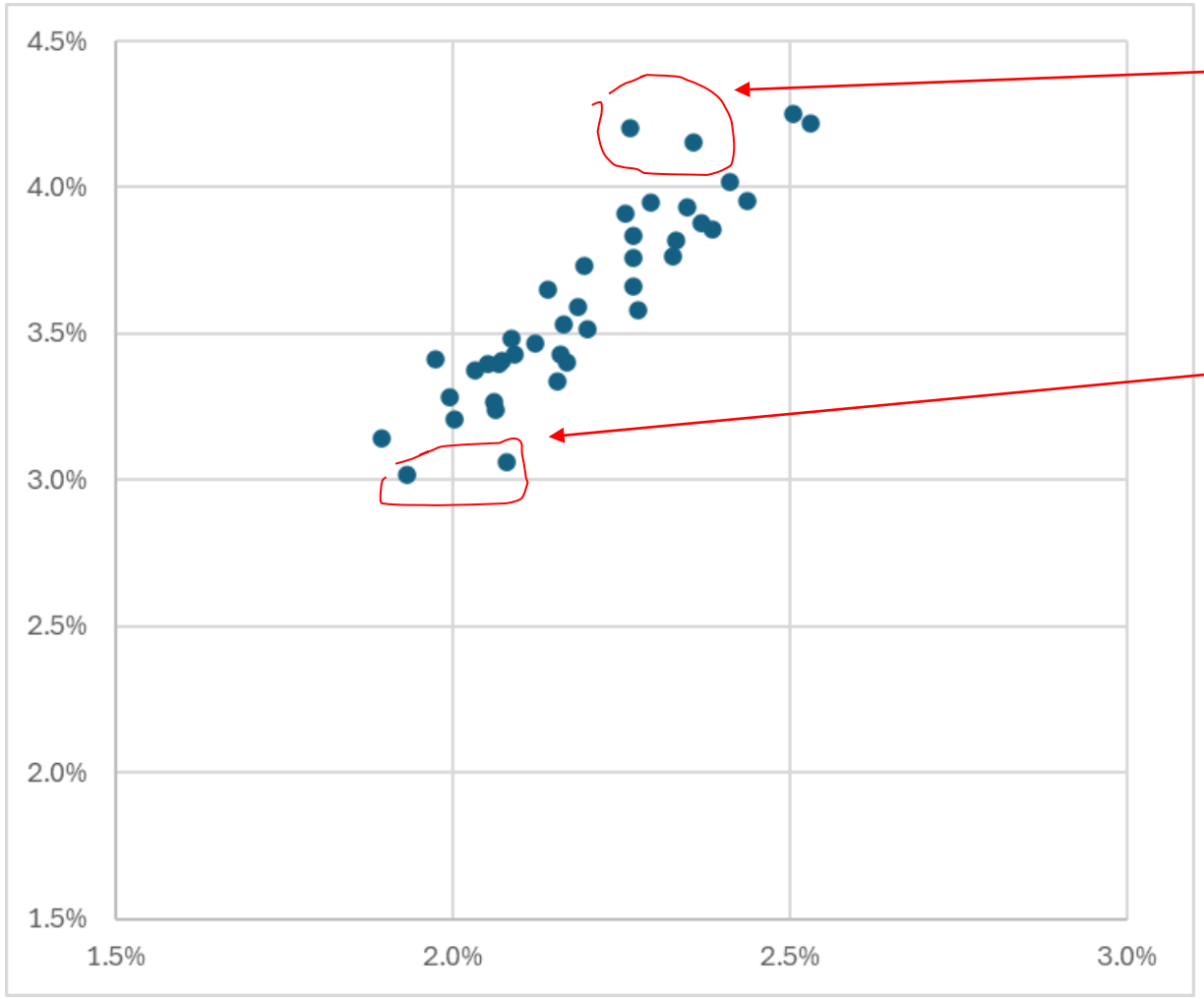


Service line share of sepsis (with organ dysfunction) and share of sepsis inpatient mortality





Risk adjusted 30-day mortality with and without sepsis



Two hospitals with high sepsis mortality contribution.

Two hospitals with low sepsis mortality contribution.

Conclusions

Over 60% of discharges for the infectious disease service line in 2023 were patients with sepsis

Over half were for sepsis + OD

Between 4% and 10% of discharges in surgical service lines involved sepsis + OD

Over 90% of infectious disease mortality was for patients with sepsis

Almost all sepsis mortality includes organ dysfunction

For most surgical service lines, over 40% of inpatient mortality was incurred by sepsis patients

The sepsis share of 30-day mortality is less than its share of inpatient mortality

Almost all infectious disease sepsis was present on admission; for other service lines, a substantial share was HAI

Most sepsis mortality for cancer service lines was HAI

Conclusions (continued)

- **Over 70% of sepsis + OD discharges were in the infectious disease service line, accounting for over 60% of sepsis mortality**
- **Surgical discharges and the non-surgical – other service line accounted for most remaining sepsis discharges and mortality**
- **Cancer accounted for a very small proportion of both sepsis discharges and mortality**
- **General surgery accounted for the greatest share of HAI sepsis discharges and mortality**
- **HAI sepsis and sepsis mortality were spread across many service lines; the shares were least for infectious disease and cancer surgery**
- **In 2025, 30-day mortality including sepsis cases was strongly correlated with 30-day mortality excluding them (r=0.90)**

Mortality Measure Questions for Discussion

- HSCRC is continuing work on risk adjusting our claims-based 30-day mortality measure using the Core Clinical Data Elements.
  - Thoughts about migrating to a state hybrid 30-day Mortality?
  - Are there additional considerations or analyses that should be done related to Hybrid CMS vs Maryland measure inclusions, exclusions?
- How should proceed to maximize our measurement of Sepsis mortality?
  - What additional analysis should we do?
  - Should we consider the option to use the AHRQ definition used in the HSCRC Sepsis Dashboard on CRISP Reporting Services
  - Should we adjust the current HSCRC measures to better account for sepsis cases?
  - Should we consider migrating to the CDC the Community Onset Sepsis digital hybrid mortality measure.

CAEM Next Steps

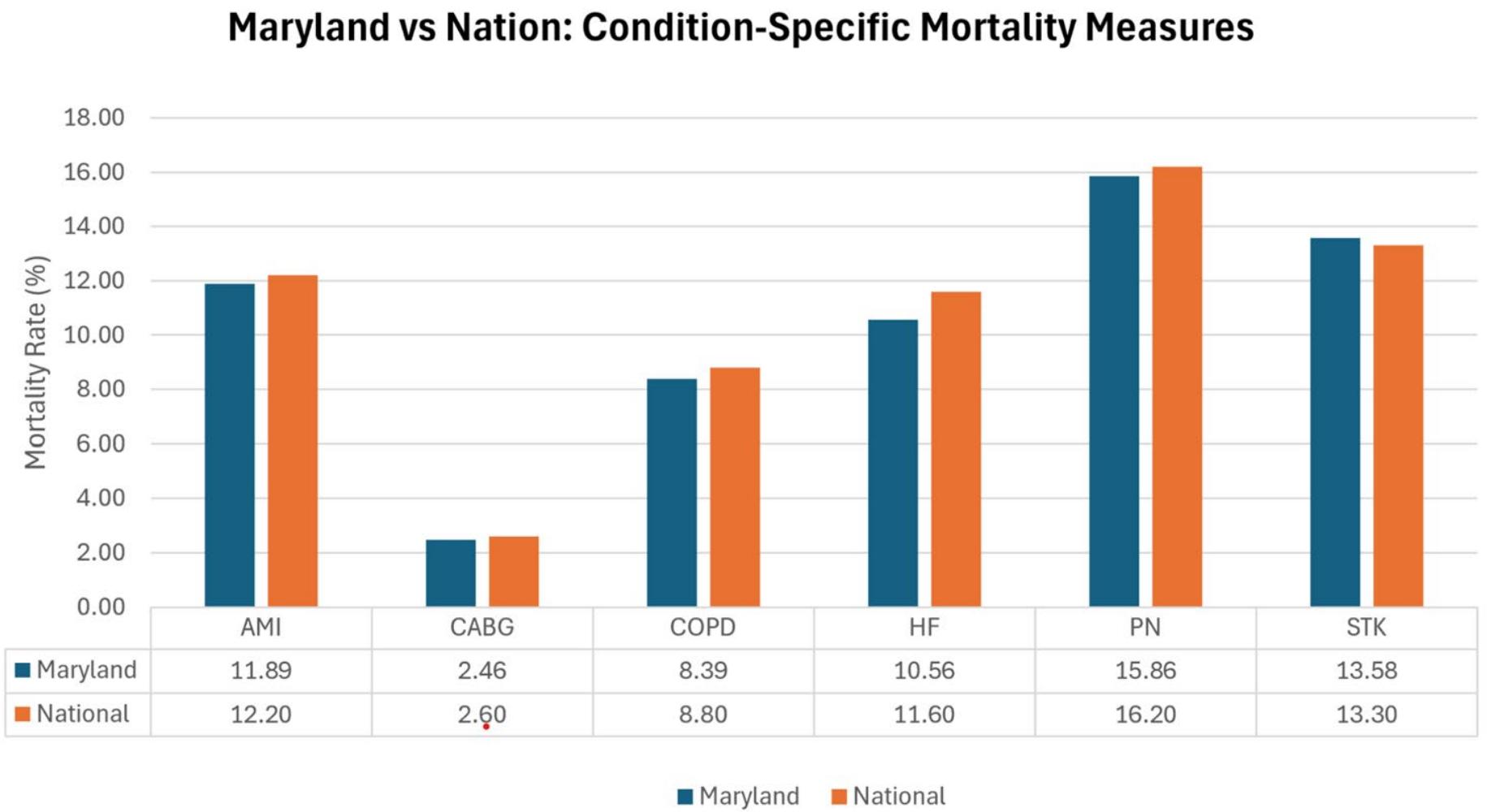
THANK YOU!

Next Meeting: June 24, 2026

Appendix

CMS Performance Results
COND SPEC MORT, SEP 1

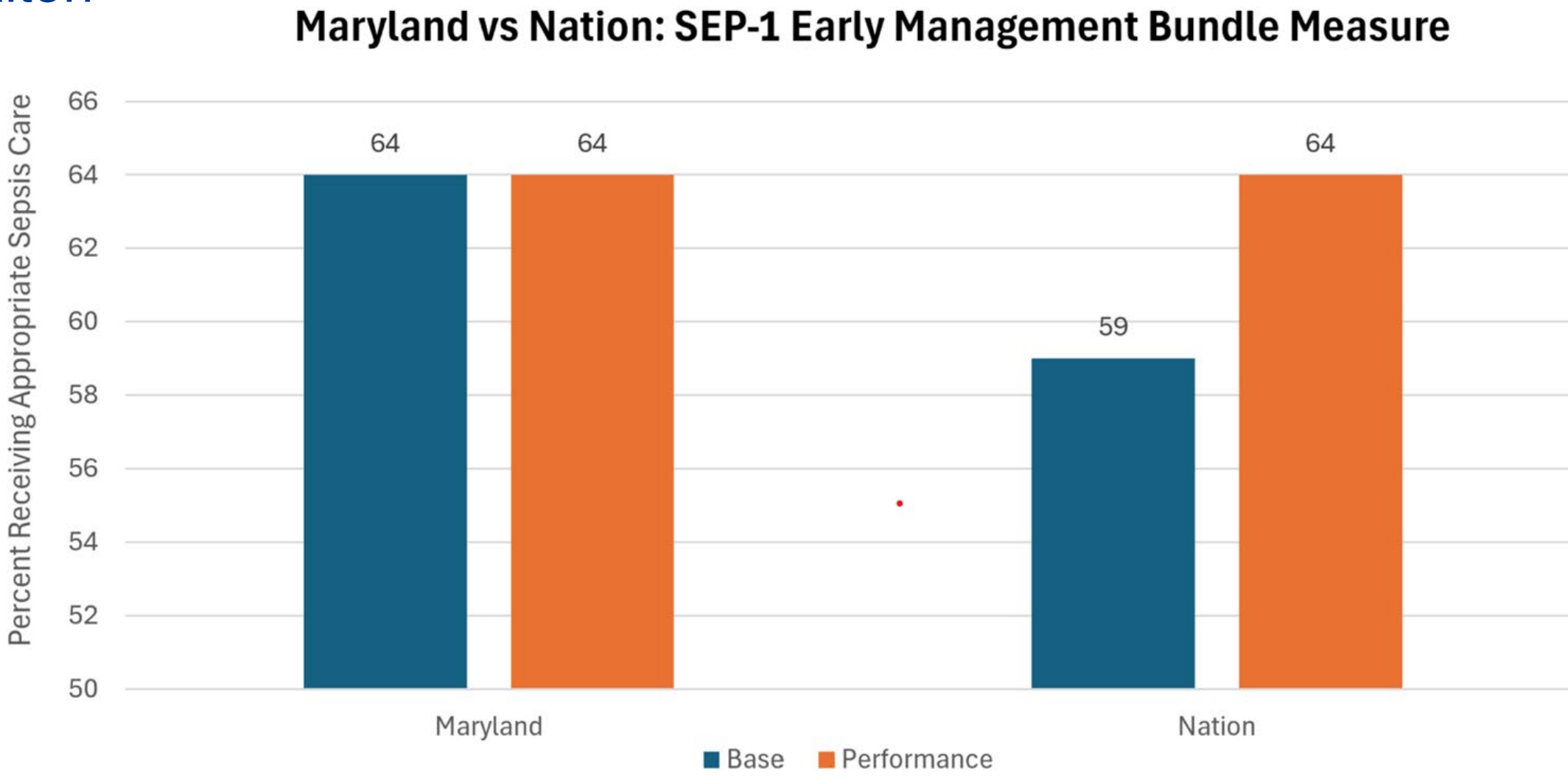
Maryland Performance is Slightly Better than the CMS 3-Day Condition Specific Mortality Measures with Exception of Stroke



	AMI	CABG	COPD	HF	PN	STK
Maryland	11.89	2.46	8.39	10.56	15.86	13.58
National	12.20	2.60	8.80	11.60	16.20	13.30

Data Period: July 1, 2021 – June 30, 2024
Source: CMS Care Compare (May 2026 Release)

Maryland Performance on the Sep-1 Measure is Comparable to the Naiton



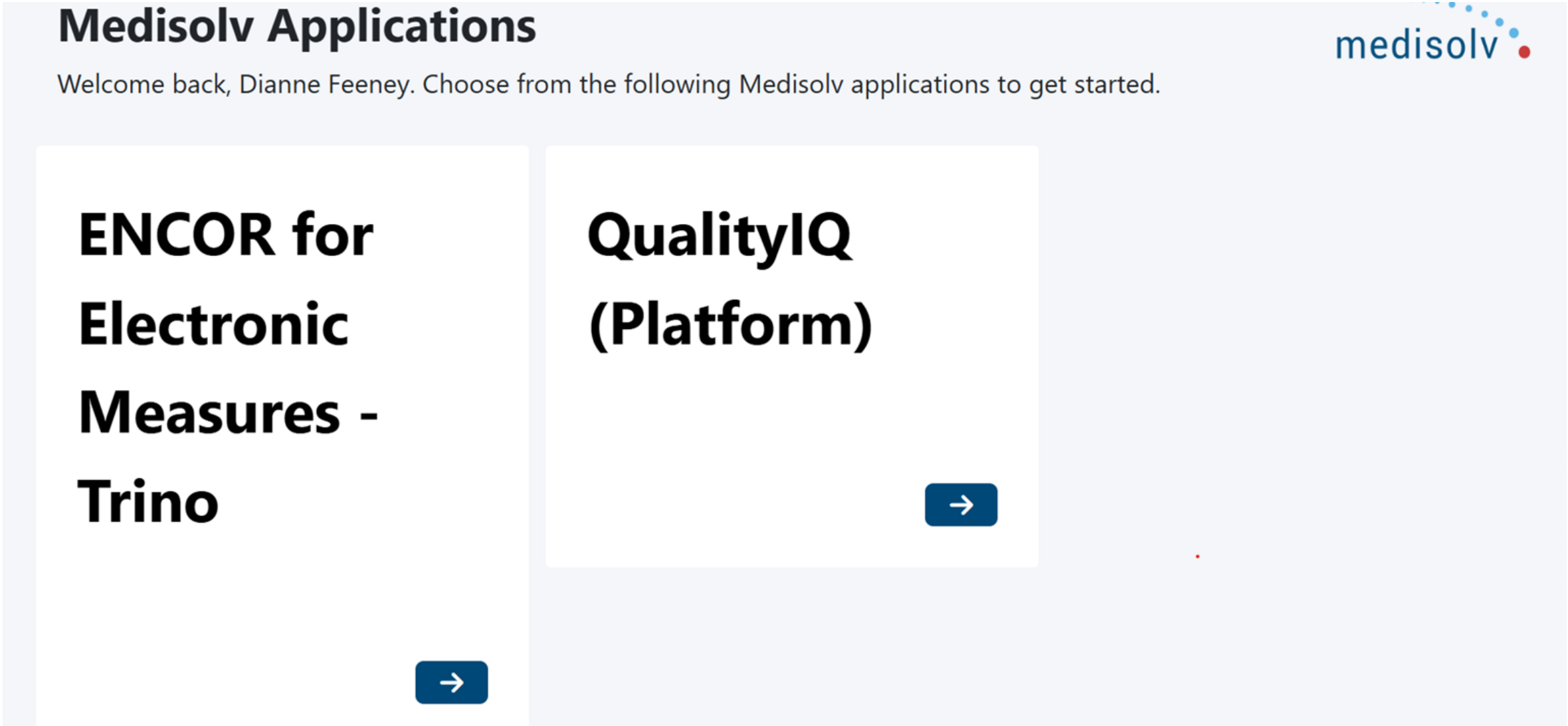
Data Time Periods: Baseline (CY2022) | Performance (Jul 2024 – Jun 2025)
Source: CMS Care Compare (May 2026 Release)

Medisolv Digital Measures to Quality IQ Platform on CRISP (See Appendix for login tips)

Link to Webinar Demo on Using the Medisolv Digital Measures Quality IQ Platform (may be prompted to register):

https://event.on24.com/wcc/r/5257402/95F7D05A99E38B7DD00225E0BB0387FD

Quality IQ Plagform



The Quality IQ URL is https://qualityiq.medisolvcloud.com/measures