



Final Recommendation for the Maryland Hospital Acquired Conditions Program for Rate Year 2026

February 14, 2024

This document contains staff final recommendations for the RY 2026 Maryland Hospital Acquired Conditions Program.

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List of Abbreviations

AHRQ	Agency for Health Care Research and Quality
APR-DRG	All Patients Refined Diagnosis Related Groups
CMS	Centers for Medicare & Medicaid Services
CY	Calendar Year
DRG	Diagnosis-Related Group
FFY	Federal Fiscal Year
FY	State Fiscal Year
HAC	Hospital-Acquired Condition
HAI	Hospital Associated Infection
HSCRC	Health Services Cost Review Commission
ICD	International Statistical Classification of Diseases and Related Health Problems
MHAC	Maryland Hospital-Acquired Condition
NHSN	National Healthcare Safety Network
NQF	National Quality Forum
PMWG	Performance Measurement Work Group
POA	Present on Admission
PPC	Potentially Preventable Complication
PSI	Patient Safety Indicator
QBR	Quality-Based Reimbursement
RY	Rate Year
SIR	Standardized Infection Ratio
SOI	Severity of Illness
TCOC	Total Cost of Care
VBP	Value-Based Purchasing
YTD	Year to Date

Key Methodology Concepts and Definitions

Potentially preventable complications (PPCs): 3M originally developed 65 PPC measures, which are defined as harmful events that develop after the patient is admitted to the hospital and may result from processes of care and treatment rather than from the natural progression of the underlying illness. PPCs, like national claims-based hospital-acquired condition measures, rely on **present-on-admission codes** to identify these post-admission complications.

At-risk discharge: Discharge that is eligible for a PPC based on the measure specifications

Diagnosis-Related Group (DRG): A system to classify hospital cases into categories that are similar clinically and in expected resource use. DRGs are based on a patient's primary diagnosis and the presence of other conditions.

All Patients Refined Diagnosis Related Groups (APR-DRG): Specific type of DRG assigned using 3M software that groups all diagnosis and procedure codes into one of 328 All-Patient Refined-Diagnosis Related Groups.

Severity of Illness (SOI): 4-level classification of minor, moderate, major, and extreme that can be used with APR-DRGs to assess the acuity of a discharge.

APR-DRG SOI: Combination of Diagnosis Related Groups with Severity of Illness levels, such that each admission can be classified into an APR-DRG SOI "cell" along with other admissions that have the same Diagnosis Related Group and Severity of Illness level.

Case-Mix Adjustment: Statewide rate for each PPC (i.e., normative value or "norm") is calculated for each diagnosis and severity level. These **statewide norms** are applied to each hospital's case-mix to determine the expected number of PPCs, a process known as **indirect standardization**.

Observed/Expected Ratio: PPC rates are calculated by dividing the observed number of PPCs by the expected number of PPCs. Expected PPCs are determined through case-mix adjustment.

Diagnostic Group-PPC Pairings: Complications are measured at the diagnosis and Severity of Illness level, of which there are approximately 1,200 combinations before one accounts for clinical logic and PPC variation.

Zero norms: Instances where no PPCs are expected because none were observed in the base period at the Diagnosis Related Group and Severity of Illness level.

Policy Overview

Policy Objective	Policy Solution	Effect on Hospitals	Effect on Payers/Consumers	Effects on Health Equity
<p>The quality programs operated by the Health Services Cost Review Commission, including the Maryland Hospital Acquired Conditions (MHAC) program, are intended to ensure that any incentives to constrain hospital expenditures under the Total Cost of Care Model do not result in declining quality of care. Thus, HSCRC's quality programs reward quality improvements and achievements that reinforce the incentives of the Total Cost of Care Model, while guarding against unintended consequences and penalizing poor performance.</p>	<p>The MHAC program is one of several pay-for-performance quality initiatives that provide incentives for hospitals to improve and maintain high-quality patient care and value over time.</p>	<p>The MHAC policy currently holds 2 percent of inpatient hospital revenue at-risk for complications that may occur during a hospital stay as a result of treatment rather than the underlying progression of disease. Examples of the types of hospital acquired conditions included in the current payment program are respiratory failure, pulmonary embolisms, and surgical-site infections.</p>	<p>This policy affects a hospital's overall GBR and so affects the rates paid by payers at that particular hospital. The HSCRC quality programs are all-payer in nature and so improve quality for all patients that receive care at the hospital.</p>	<p>Historically the MHAC policy included the better of improvement and attainment, which incentivized hospitals to improve poor clinical outcomes that are often emblematic of disparities. The protection of improvement has since been phased out to ensure that poor clinical outcomes and the associated health disparities are not made permanent, which is especially important for a measure that is limited to in-hospital complications. In the future, the MHAC policy may provide direct hospital incentives for reducing disparities, similar to the approved readmission disparity gap improvement policy. Also for future consideration is inclusion of electronic Clinical Quality Measures to address areas such as maternal complications, which disproportionately impact lower income, minority patients.</p>

Recommendations

The MHAC policy was redesigned in Rate Year (RY) 2021 to modernize the program for the new Total Cost of Care Model. This RY 2026 final recommendation, in general, maintains the measures and methodology that were developed and approved for RYs 2022 through 2025.¹

These are the final recommendations for the RY 2026 Maryland Hospital Acquired Conditions (MHAC) program:

1. Continue to use 3M Potentially Preventable Complications (PPCs) to assess hospital acquired complications.
 - a. Maintain a focused list of PPCs in the payment program that are clinically recommended and that generally have higher statewide rates and variation across hospitals.
 - b. Assess monitoring PPCs based on clinical recommendations, statistical characteristics, and recent trends to prioritize those for future consideration for updating the measures in the payment program.
 - c. Engage hospitals on specific PPC increases as indicated/appropriate to understand trends and discuss potential quality concerns.
2. Use more than one year of performance data for small hospitals (i.e., less than 21,500 at-risk discharges and/or 22 expected PPCs). The performance period for small hospitals will be CYs 2023 and 2024.
3. Continue to assess hospital performance on attainment only, with adjustment to performance standards for increased stability.
4. Continue to weight the PPCs in the payment program by 3M cost weights as a proxy for patient harm.
5. Maintain a prospective revenue adjustment scale with a maximum penalty at 2 percent and maximum reward at 2 percent and continuous linear scaling with a hold harmless zone between 60 and 70 percent.
6. Future Considerations:
 1. Assess options for streamlining (or simplifying) the quality programs overall, or for the hospital acquired complication measures that are currently included in both the QBR Safety Domain and the MHAC program.
 2. Assess digitally specified quality measures such as electronic Clinical Quality Measures (eCQMs) for future inclusion in quality programs.

¹ See the [RY 2021 policy](#) for detailed discussion of the MHAC redesign, rationale for decisions, and approved recommendations.

Introduction

Maryland hospitals are funded under a population-based revenue system with a fixed annual revenue cap set by the Maryland Health Services Cost Review Commission (HSCRC or Commission) under the All-Payer Model agreement with the Centers for Medicare & Medicaid Services (CMS) beginning in 2014, and continuing under the current Total Cost of Care (TCOC) Model agreement, which took effect in 2019. Under the global budget system, hospitals are incentivized to shift services to the most appropriate care setting and simultaneously have revenue at risk in Maryland's unique, all-payer, pay-for-performance quality programs; this allows hospitals to keep any savings they earn via better patient experiences, reduced hospital-acquired infections, or other improvements in care. Maryland systematically revises its quality and value-based payment programs to better achieve the state's overarching goals: more efficient, higher quality care, and improved population health. It is important that the Commission ensure that any incentives to constrain hospital expenditures do not result in declining quality of care. Thus, the Commission's quality programs reward quality improvements and achievements that reinforce the incentives of the global budget system, while guarding against unintended consequences and penalizing poor performance.

The Maryland Hospital Acquired Conditions (MHAC) program is one of several quality pay-for-performance initiatives that provide incentives for hospitals to improve and maintain high-quality patient care and value over time. The program currently holds 2 percent of hospital revenue at-risk for hospital acquired complications that may occur during a hospital stay as a result of treatment rather than the underlying progression of disease. Examples of the types of hospital acquired conditions included in the current payment program are respiratory failure, pulmonary embolisms, and surgical-site infections.

For MHAC, as well as the other State hospital quality programs, annual updates are vetted with stakeholders and approved by the Commission to ensure the programs remain aggressive and progressive with results that meet or surpass those of the national CMS analogous programs (from which Maryland must receive annual exemptions). For purposes of the RY 2026 MHAC final Policy, staff vetted the updated proposed recommendations in December with the Performance Measurement Workgroup (PMWG), the standing advisory group that meets monthly to discuss Quality policies.

Additionally, with the onset of the Total Cost of Care Model Agreement, each program was overhauled to ensure they support the goals of the Model. For the MHAC policy, the overhaul was completed during

2018, which entailed an extensive stakeholder engagement effort. The major accomplishments of the MHAC program redesign were focusing the payment incentives on a narrower list of clinically significant complications, moving to an attainment only system given Maryland's sustained improvement on complications, adjusting the scoring methodology to better differentiate hospital performance, and weighting complications by their associated cost weights as a proxy for patient harm. The redesign also assessed how hospital performance is converted to revenue adjustments, and ultimately recommended maintaining the use of a linear revenue adjustment scale with a hold harmless zone.

Following the MHAC program redesign, this RY 2026 MHAC policy final proposes minimal changes to the program. The assessment section also includes an evaluation of PPCs in "Monitoring" status consistent with the approved recommendations for RY 2021 going forward, which includes identifying PPCs that should be considered for inclusion back into the MHAC payment program due to worsening performance. Based on this analysis and consideration of stakeholder input, the RY 2026 final recommendation does not propose to move any complications from monitoring to payment.

Background

Exemption from Federal Hospital-Acquired Condition Programs

The Federal Government operates two hospital complications payment programs, the Deficit Reduction Act Hospital Acquired Condition program (DRA-HAC), which reduces reimbursement for hospitalizations with inpatient complications, and the HAC Reduction Program (HACRP), which penalizes hospitals with the highest rates of complications. Detailed information, including HACRP complication measures, may be found in Appendix I. Also, it should be noted that the CMS Value-Based Purchasing program and the analogous Quality Based Reimbursement program contain a safety domain that assess hospital acquired complication measures.

Because of the State's unique all-payer hospital model and its global budget system, Maryland does not directly participate in the federal pay-for-performance programs. Instead, the State administers the Maryland Hospital Acquired Conditions (MHAC) program, which relies on quality indicators validated for use with an all-payer inpatient population. However, the State must submit an annual report to CMS demonstrating that Maryland's MHAC program targets and results continue to be aggressive and progressive, i.e., that Maryland's performance meets or surpasses that of the nation. Specifically, the State must ensure that the improvements in complication rates observed under the All-Payer Model through 2018

are maintained throughout the TCOC model. Based on performance to date, CMS has granted Maryland exemptions from the federal pay-for-performance programs (including the HAC Reduction Program) each year through FFY 2024.

Overview of the MHAC Policy

The MHAC program, which was first implemented for RY 2011, is based on a system developed by 3M Health Information Systems (3M) to identify potentially preventable complications (PPCs) using the present-on-admission variable for eligible secondary diagnosis codes available in claims data. 3M originally developed specifications for 65 PPCs,² which are defined as harmful events that develop after the patient is admitted to the hospital and may result from processes of care and treatment rather than from the natural progression of the underlying illness. For example, the program holds hospitals accountable for venous thrombosis and sepsis that occur during inpatient stays. These complications can lead to 1) poor patient outcomes, including longer hospital stays, permanent harm, and death; and 2) increased costs. Thus, the MHAC program is designed to provide incentives to improve patient care by adjusting hospital budgets based on PPC performance.

MHAC Methodology

Figure 1 provides an overview of the three steps in the RY 2025 MHAC methodology (also see Appendix II) that converts hospital performance to standardized scores, and then payment adjustments, as outlined below:

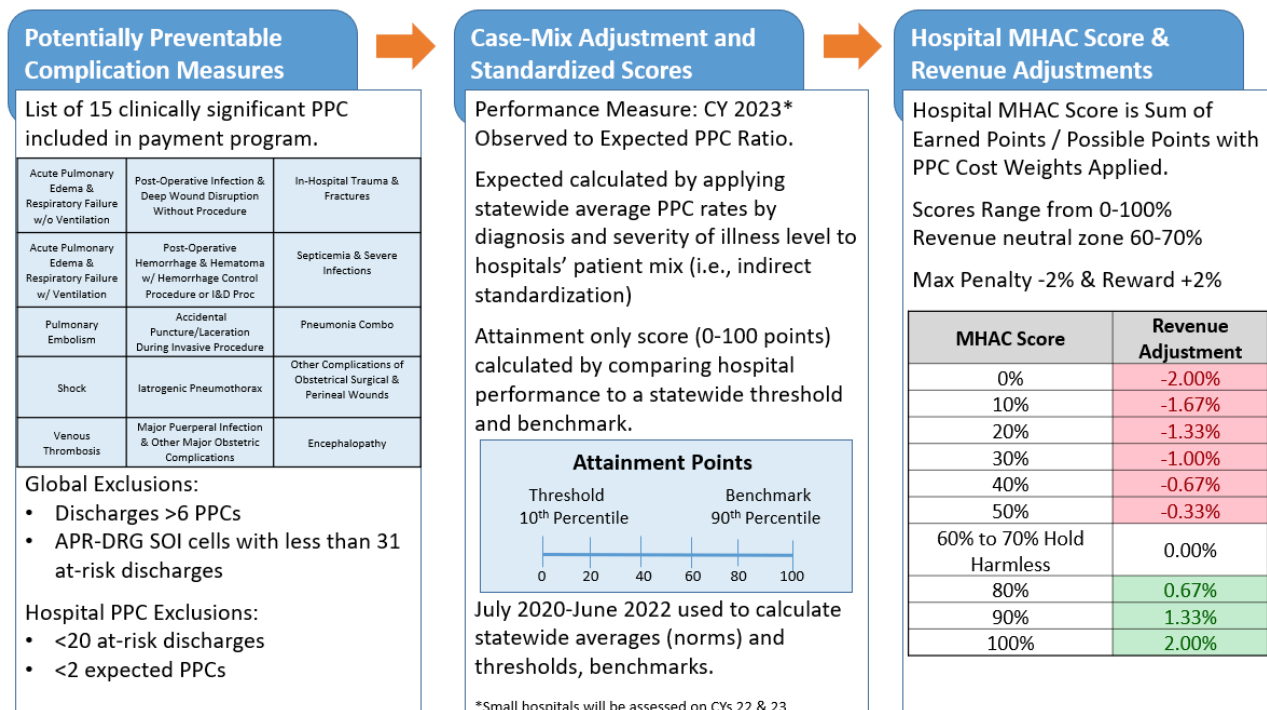
Step 1. For the PPCs identified for payment, clinically-determined global and PPC-specific exclusions, as well as volume based hospital-level exclusions are identified to ensure fairness in assignment of complications.

Step 2. Case-mix adjustment is used to calculate observed to expected ratios that are then converted to a standardized point based score (0-100 points) based on each hospital's attainment levels using a similar scoring methodology that is used for CMS Value-Based Purchasing and Maryland QBR program.

² In RY 2020, there were 45 PPCs or PPC combinations included in the program, from an initial 65 PPCs in the software, as 3M had discontinued some PPCs and others were deemed not suitable for a pay-for-performance program.

Step 3. Overall hospital scores are then calculated by taking the points for each PPC and multiplying by the 3M PPC cost weights, then summing numerator (points scored) and denominator (possible points) across the PPCs to calculate a percent score. A linear point scale set prospectively is then used to calculate the revenue adjustment percent. This prospective scaling approach differs from national programs that relatively rank hospitals after the performance period. Additionally, the HACRP differs in that it provides no opportunity for rewards and reduces payments by 1 percent for hospitals in the worst-performing quartile.

Figure 1. Overview Rate Year 2025 MHAC Methodology



Assessment

In order to develop the RY 2026 MHAC policy, staff solicited input from the PMWG and other stakeholders. In general, stakeholders support the staff's recommendation to not make major changes to the RY 2026 MHAC program. This section of the report provides an overview of the statewide PPC trends—for those used for payment, under monitoring, and overall—and updates related to 3M clinical logic and MHAC methodology.

Statewide PPC Performance Trends

Complications Included in Payment Program

Under the All-Payer Model, Maryland hospitals saw a dramatic decline in complications and, as a State, well exceeded the requirement of a 30 percent reduction by the end of CY 2018. These reductions were achieved through clinical quality improvement, as well as improvements in documentation and coding.

As mentioned previously, the MHAC redesign assessed which PPCs should be included in the pay-for-performance program based on criteria developed by the Clinical Adverse Events Measures (CAEM) subgroup that are outlined in the “Monitored Complications” section below.

Under the TCOC Model, Maryland must maintain these improvements by not exceeding the CY 2018 PPC rates for complications included in the payment program. Figure 2 below shows the statewide observed to expected (O/E) ratio from 2018 through June CY 2023.³ The O/E ratio presents the count of observed PPCs divided by the calculated number of expected PPCs (which is generated using statewide normative values applied to the case-mix of discharges a hospital experiences). An O/E Ratio of greater than 1 indicates that a hospital experienced more PPCs than expected, and conversely, an O/E Ratio less than one indicates that a hospital experienced fewer PPCs than expected. Figure 2 below also indicates how Maryland is performing relative to CY 2018, which is the time period that will be used to assess any backsliding on performance.⁴ Specifically, there has been a 27.5 percent decrease in the ratio based on the most recent data available (CY 2018 YTD O/E ratio = 1.09 and CY 2023 YTD O/E ratio = 0.79).

PPCs in the MHAC payment program include:

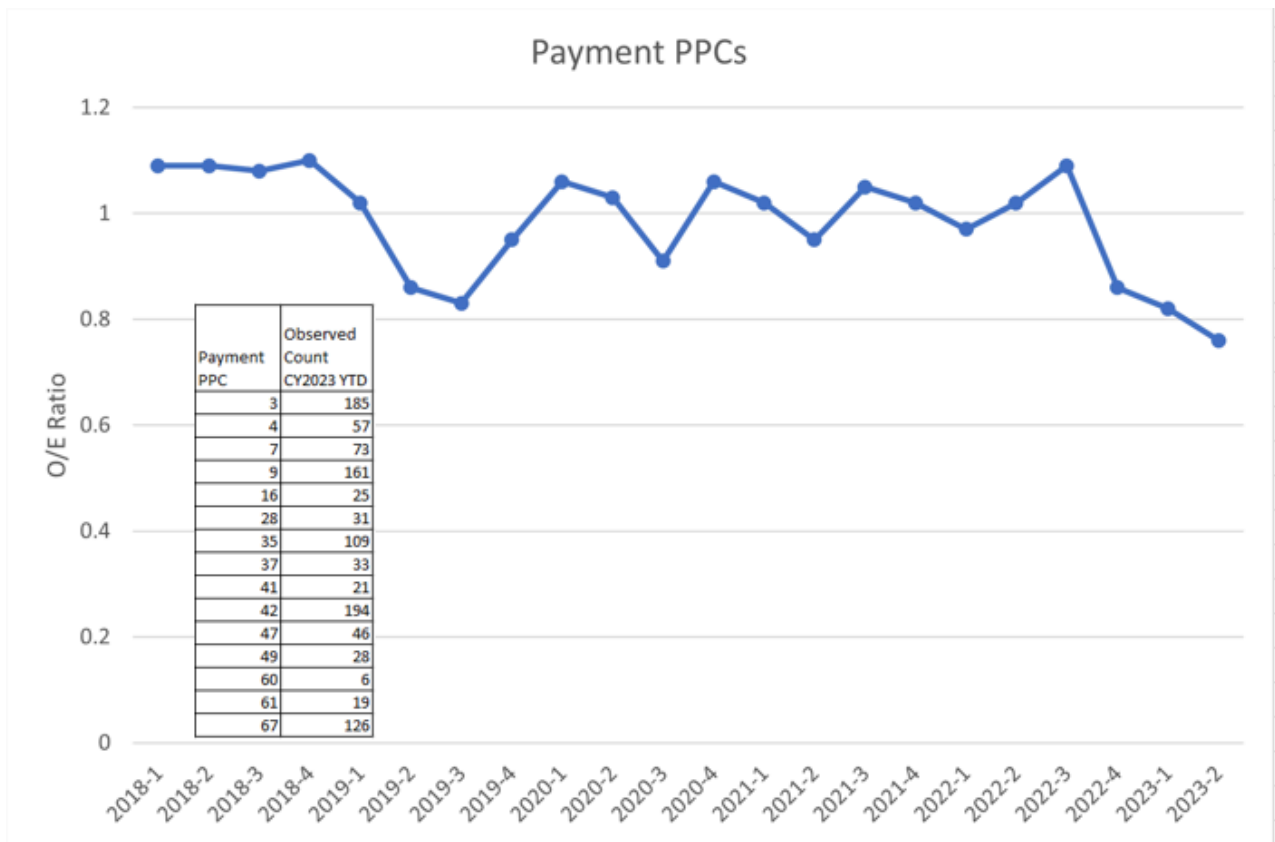
- 3 Acute Pulmonary Edema and Resp Failure w/o Ventilation
- 4 Acute Pulmonary Edema, Resp Failure w/ventilation
- 7 Pulmonary Embolism
- 9 Shock
- 16 Venous Thrombosis
- 28 In-Hospital Trauma and Fractures
- 35 Septicemia & Severe Infections
- 37 Post-Operative Infection & Deep Wound Disruption Without Procedure
- 41 Peri-Operative Hemorrhage & Hematoma w/ Hemorrhage Control Procedure or I&D

³ Staff notes that, consistent with federal policies during the COVID Public Health Emergency, PPC data from January-June 2020 will not be used for assessing quality of care.

⁴Beginning in v38 of the 3M PPC grouper, COVID exclusions vary by PPC.

- 42 Accidental Puncture/ Laceration During Invasive Procedure
- 47 Encephalopathy
- 49 Iatrogenic Pneumothorax
- 60 Major Puerperal Infection and Other Major Obstetric Complications
- 61 Other Complications of Obstetrical Surgical & Perineal Wounds
- 67 Pneumonia Combo (with and without aspiration)

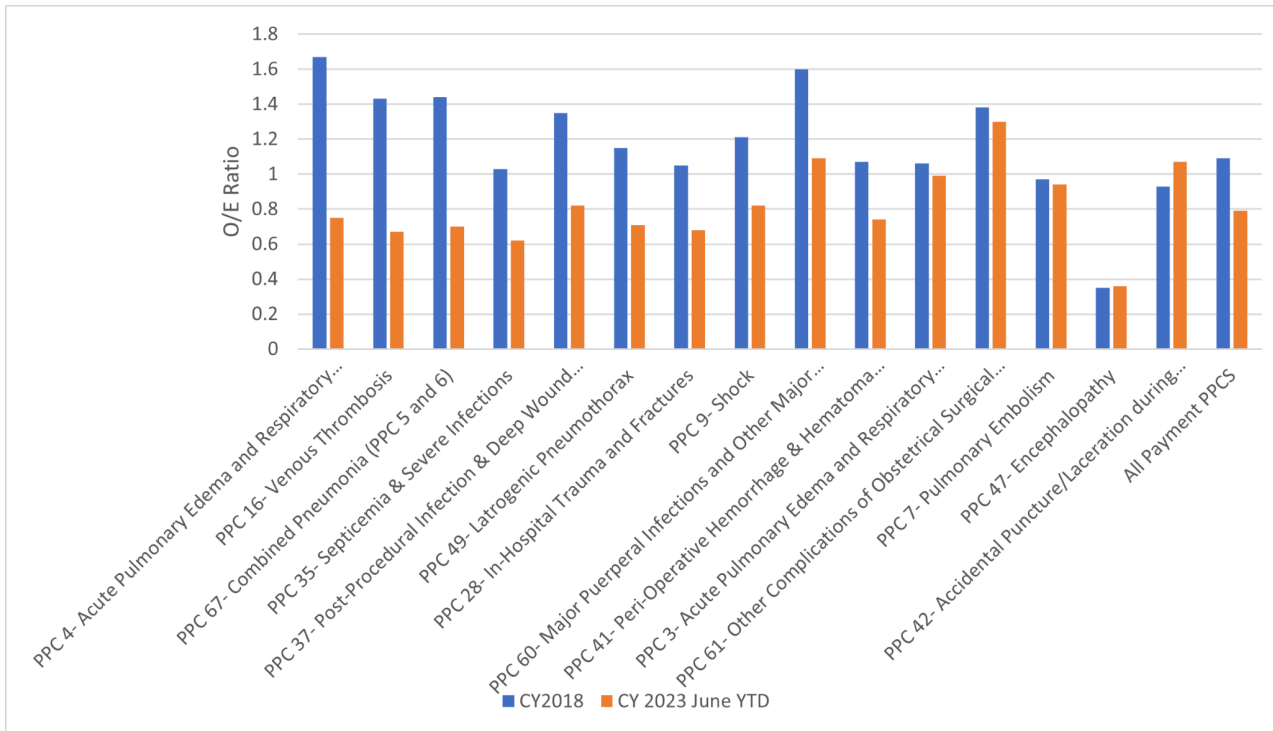
Figure 2. Payment Program PPCs Observed to Expected Ratios by Quarter CY 2018 to CY 2023 YTD Through June



In terms of specific improvements among the 15 payment PPCs, Figure 3 shows the O/E ratios for CY 2018 and CY 2023 YTD, sorted from greatest percent decrease (on the left) to greatest percent increase (on the right). The two PPCs that worsened during this time period include PPC 47- Encephalopathy and PPC

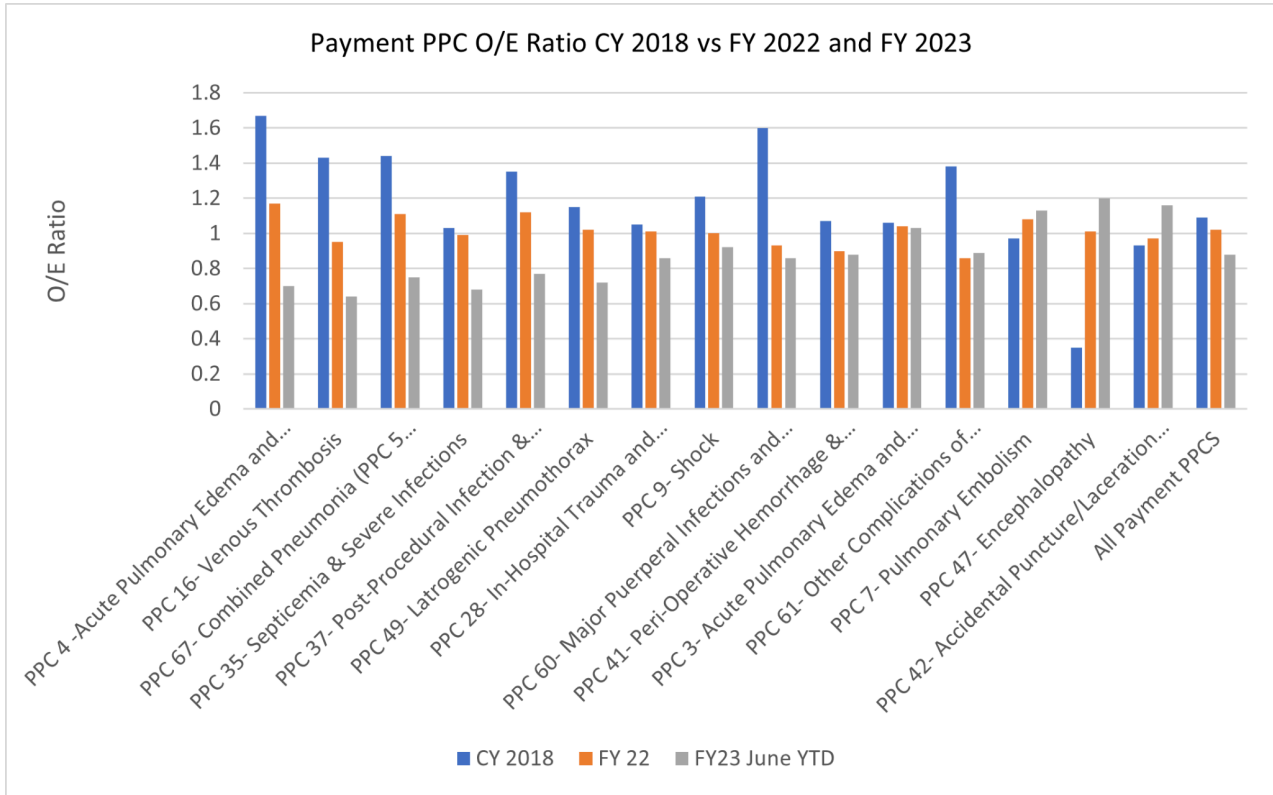
42-Accidental Puncture/ Laceration During Invasive Procedure. The three PPCs with the greatest decreases (improvements) include PPC 4- Acute Pulmonary Edema and Respiratory Failure with Ventilation, PPC16- Venous Thrombosis, and PPC 67- Combined Pneumonia.

Figure 3. Payment Program PPC Observed to Expected Ratios CY 2018 and CY 2023 June YTD



Staff also analyzed payment PPC changes for FYs 2022 and 2023 compared to the base period of 2018 as illustrated in Figure 4 below. The overall PPC O/E ratios show a steadily declining trend across the three time period; from FY2022 to FY2023 there were 11 PPCs that showed a decrease in the O/E ratios (improvement), and 4 PPCs that showed a slight increase (worsening).

Figure 4. Payment Program PPC Observed to Expected Ratio Trends; CY 2018, FY 2022, and FY 2023

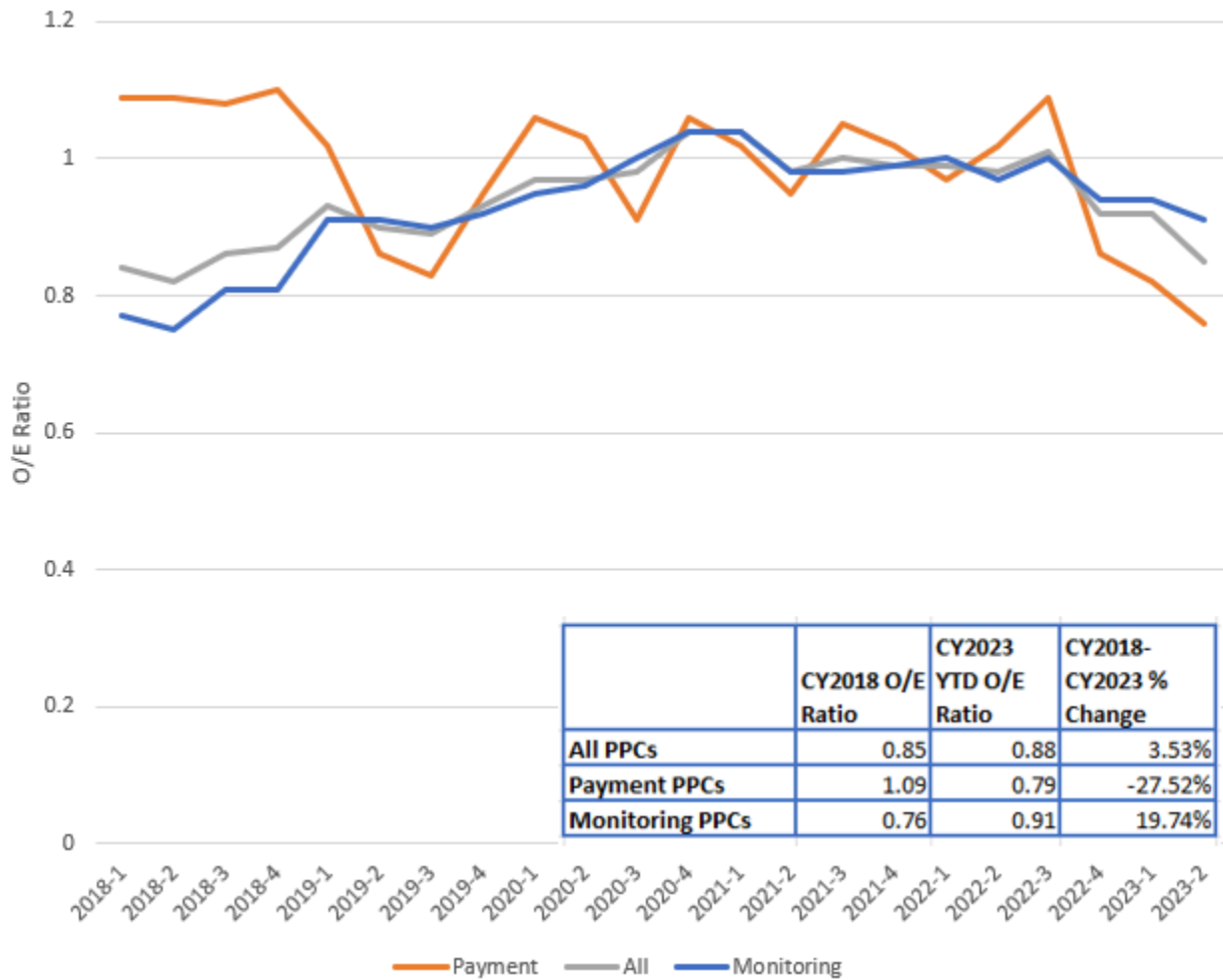


Monitored Complications

In addition to focusing on a narrowed list of PPCs for payment, as stated previously, the RY 2021 MHAC policy following the program redesign included a recommendation to monitor the remaining PPCs. Staff fulfills this recommendation by monitoring all PPCs that are still considered clinically valid by 3M, and distinguishing between “Monitoring” and “Payment” PPCs. The overall PPC trend across all 56 (payment and monitored) PPCs shows that there has been an increase in the overall statewide O/E ratio from 0.85 in CY 2018 to 0.88 in CY 2023 YTD through June; the worsening performance is driven primarily by increases in PPCs under monitoring status, and not increases in the payment program PPCs, as illustrated in Figure 5 below. As also illustrated, the monitored PPC trends have increased from 0.76 as of June YTD

2018 to 0.91 in YTD 2023 with the highest O/E ratios experienced from Q3 2020 to Q1 2021 during the COVID peak period.

Figure 5. PPC O/E Ratio Trends CY 2018 Qtr 1 Through CY 2023 Qtr 2



To provide additional context, the MHAC redesign process assessed which PPCs should be included in the pay-for-performance program based on criteria developed by the Clinical Adverse Events Measures (CAEM) subgroup. To support determining the monitored PPCs that are the best candidates for re-adopting into the payment program, staff and stakeholders are using the previously established criteria that include:

- PPC Data Analysis/Statistics
 - Greater than 50% increase in O/E ratio comparing 2022 to 2018
 - Rate per 1,000 generally 0.5 or above
 - Volume of observed events 100 or above (over two years)
 - Significant variation across hospitals O/E ratios less than .85 and greater than 1.15
 - At least half of the hospitals are eligible for the PPC
- Additional Considerations
 - PSI overlap
 - Clinical significance
 - Potential influence of coding practices/changes
 - Opportunity for improvement/actionability
 - All-payer

The monitored PPCs with the most significant increases in O/E ratios over time included the PPCs listed below. Staff notes, however, that these PPCs were identified as having limited actionability based on input from stakeholders during the program redesign process; therefore, staff is not recommending that these PPCs be moved into the payment program.

- PPC 8: Other Pulmonary Complications
- PPC 15: Peripheral Vascular Complications except Venous Thrombosis
- PPC 53: Infection, Inflammation and Clotting Complication of Peripheral Vascular and Infusions

Appendix III provides the statewide percentage changes in the O/E ratios for the monitored PPCs from 2018 to 2023 YTD through June sorted by the observed PPCs with the largest increases.

Calculating PPC Performance Standards

Since the RY2021 MHAC Redesign, the performance standards have been the O/E ratio at the 90th (threshold = start to earn points) and 10th (benchmark = full points) percentiles. However, staff are proposing for RY 2026 to modify the methodology slightly to make the performance standards less sensitive to potential outliers by averaging the worst and best performing hospitals (as opposed to taking a single value at a given percentile). This methodology is more in line with the CMS VBP program approach to setting the benchmark. Staff explored a couple of options and suggests averaging the 20 percent of O/E

ratios of the worst and best performing hospitals results, which results in similar benchmark and threshold values as compared to the current method but avoids the cliff effects of using a single percentile. See Appendix IV for additional explanation using the older version of the PPC Grouper and one year of data. Figure 6 shows the results under the current method and potential method using V41 of the PPC Grouper.⁵

Figure 6. Performance Standards Comparisons by Calculation Method

Base FY22 and FY23		Current Method		Proposed Method	
		P90	P10	Avg P80	Avg P20
PPC Number	PPC Description	Threshold	Benchmark	Threshold	Benchmark
3	Acute Pulmonary Edema and Respiratory Failure without Ventilation	1.4858	0.4248	1.9458	0.3844
4	Acute Pulmonary Edema and Respiratory Failure with Ventilation	1.4756	0.1441	2.0135	0.1378
7	Pulmonary Embolism	1.3432	0.1342	1.4736	0.2431
9	Shock	1.874	0.2989	1.8793	0.2747
16	Venous Thrombosis	1.8446	0.2157	1.9665	0.1621
28	In-Hospital Trauma and Fractures	1.6451	0.3822	1.6225	0.3183
35	Septicemia & Severe Infections	1.4583	0.3376	1.6904	0.3397
37	Post-Operative Infection & Deep Wound Disruption Without Procedure	1.4446	0.3896	1.4635	0.3125
41	Peri-Operative Hemorrhage & Hematoma with Hemorrhage Control Procedure or I&D Proc	2.0363	0	2.2026	0.084
42	Accidental Puncture/Laceration During Invasive Procedure	1.6377	0.2539	1.6748	0.2746
47	Encephalopathy	1.9126	0.2282	1.9165	0.2327
49	Iatrogenic Pneumothrax	1.8791	0.4935	1.8856	0.397
60	Major Puerperal Infection and Other Major Obstetric Complications	1.4697	0.3485	1.4697	0.3485
61	Other Complications of Obstetrical Surgical & Perineal Wounds	1.8459	0	1.911	0.0784
67	Combined Pneumonia (PPC 5 and 6)	1.4979	0.1878	1.6807	0.191

Small Hospital Criteria

The current MHAC program handles small hospitals in two ways: 1) Hospitals are excluded from being assessed on a PPC if they do not meet the minimum criteria of 2 expected PPCs and 20 admissions at-risk for a PPC; and 2) Hospital performance is assessed using two years of data if across all 15 payment PPCs the hospital has less than 21,500 at-risk or 22 expected PPCs. For the sepsis PPC, one hospital raised a concern about Criteria 1 that requires a minimum of 2

⁵ These results were updated since the December Performance Measurement Workgroup to V41 of the PPC grouper and two years of “base” data.

expected PPCs for the hospital to be assessed on the PPC; this is described more fully in the section just below. Staff is not proposing any global changes to the small hospital criteria.

PPC Clinical Concerns

Over this past calendar year, hospitals have raised concerns about the small hospital PPC inclusion criteria with regard to the sepsis PPC as well as specific clinical concerns regarding some other PPCs on which they have provided input to 3M for consideration in the annual PPC Grouper updating process.

PPC 35 Septicemia & Severe Infections

One hospital expressed their concerns that they had in previous years been eligible for PPC 35 but had this past year seen their expected rate drop below 2, rendering them ineligible for inclusion of this PPC in their MHAC score. They noted further that the PPC was serious and highly amenable to interventions which they had identified and implemented; however, with the minimum expected criteria of 2, their performance is not counted or recognized in their score. Staff has vetted with the PMWG a proposal that the minimum criteria be waived for PPC 35 Sepsis in light of its seriousness and preventability. While staff are open to stakeholder input on this issue, our initial opinion is that PPCs with small numbers should be removed from the payment program for stability of measurement and that the hospitals still benefit from preventing these complications under the global budget.

PPC 42: Accidental Puncture or Laceration

Two clinical scenarios of concern were raised for this PPC during RY 2025. For patients with cerebral and spinal dural tissue tears during a surgical procedure when adhesions are present, hospitals provided input that cases with a code indicating adhesions are present should be excluded for this PPC. 3M has agreed with this input and added the code to the exclusion list for this PPC in the Grouper version 41 just released this October. Similarly, hospitals provided input that this PPC should be excluded for patients with abdominal adhesions that have abdominal surgical procedures. 3M is now considering this input and will make a determination to be addressed in Grouper version 42 scheduled for release in October 2024. Staff proposes to address the changes and remove the PPC42 cases of concern retrospectively for RYs 2025 and 2026 by rerunning the PPC data using Grouper version 41 for RY 2025 for PPC 42, and version 42 for RY 2026 if needed. Hospitals will then be given the better of the score for PPC 42 to reflect a clinical issue recognized by 3M during the performance period while not penalizing hospitals retrospectively.

PPC 07- Pulmonary Embolism

For this PPC, hospitals raised concerns that patients with codes indicating a deep vein thrombosis is present should be excluded from being assigned this PPC. 3M has agreed and has updated the exclusion code list for PPC 7 in Grouper version 41. Staff again proposes to address the changes retrospectively and remove the cases of concern from PPC 7 assignment for RY 2025 by rerunning the PPC data using Grouper version 41 and using the better of the scores for each hospital that qualifies for the PPC.

Stability of Case-Mix Adjusted PPC Rates

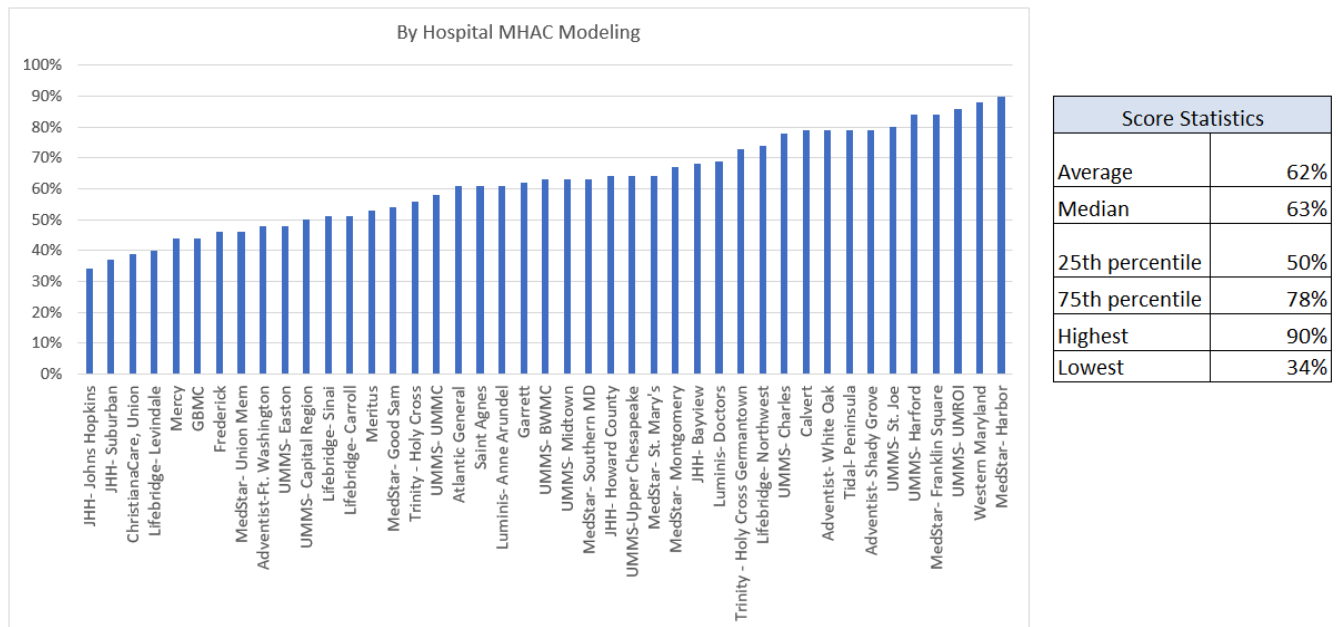
As Maryland hospitals continue to improve on payment PPCs, staff plan to pursue statistical methods that will better address small cell size issues and statistical reliability and validity. Thus, during CY 2023, staff has begun working with our contractor MPR to explore whether changes are needed to the program. The methods that will be considered are similar to methods used by CMS for the same concerns (i.e., Bayesian smoothing) and modeling has been initially presented to the PMWG during the RY 2026 policy development process. Initial concerns raised by stakeholders have included potential smoothing impact on small hospitals where rates would be driven more by statewide average than the hospitals performance. The HSCRC is exploring different options to address these concerns with our contractor MPR. Staff will continue to develop and model hospital scores with select options for smoothing and vet results with the PMWG during CY 2024 with potential for adoption for the RY 2027 MHAC policy.

Hospital Scores and Revenue Adjustments

The hospital scores are calculated across all payment PPCs and then converted to revenue adjustments using a prospectively determined revenue adjustment scale, which allows hospitals to track their progress throughout the performance period. Since the program redesign, the scale has remained the same—that is it ranges from 0 to 100 percent with a hold-harmless zone between 60 and 70 percent. Despite historical concerns regarding the lack of a continuous scale from some stakeholders, staff still believes that the hold harmless zone is reasonable given the lack of national benchmarks for establishing a cut-point. Using data under v41 of the PPC grouper, staff modeled scores for hospitals using the two methods of setting performance standards. Overall the change in the approach for determining the performance standards

results in equal or higher scores for all but one hospital (i.e., Garrett hospitals score went down by 1 percentage point), with the median increase in scores of 3 percentage points (range -1 to +7 percent). Figure 7 shows the distribution of hospital scores and statistics indicating, for example, that the median score was 63 percent. However, using the current RY 2025 scale, 17 hospitals would receive a penalty, 13 hospitals would be held harmless (i.e., no penalty or reward), and 13 hospitals would receive a reward. Given the average scores are within the hold harmless zone, staff does not recommend changing the current revenue adjustments scale for RY 2026.

Figure 7. Modeled MHAC Scores, SFYs 22-23 Base Period, CY 2023 YTD Through November Performance



Health Equity

Over the past two years, staff began to analyze the quality programs and measures for racial and sociodemographic disparities. Specifically for the MHAC program, the results for the payment PPCs were stratified by race, payer and area deprivation index (ADI) and risk-adjusted for age, sex, Admit-DRG, and Severity of Illness level. Results of this analysis, displayed in Appendix V suggested that there are statistically insignificant differences between racial categories; however, there were statistically significant

differences between payers and ADI categories. While statistically significant differences were found between payers and ADI categories, the odds ratios are relatively low and are, therefore, not an area of large concern for staff compared to the disparities uncovered in other quality measures, for example, Timely Follow-Up. Staff remains committed to addressing health equity, but at this time does not recommend including additional incentives for reducing disparities in PPC performance because of the overall low rates in PPCs and the relatively low odds ratios between payer and ADI categories. Over the next year, Staff will continue to monitor disparities in the quality programs' measures and develop disparity measure(s) and incentives that will drive improvement in disparities.

Stakeholder Feedback and Responses

One comment letter was received from the Maryland Hospital Association stating its support for the draft recommendation. Staff thanks stakeholders, in particular the PMWG members and interested parties, for their engagement and support to update the MHAC policy.

Recommendations

These are the final recommendations for the RY 2026 Maryland Hospital Acquired Conditions (MHAC) program:

1. Continue to use 3M Potentially Preventable Complications (PPCs) to assess hospital acquired complications.
 - a. Maintain a focused list of PPCs in the payment program that are clinically recommended and that generally have higher statewide rates and variation across hospitals.
 - b. Assess monitoring PPCs based on clinical recommendations, statistical characteristics, and recent trends to prioritize those for future consideration for updating the measures in the payment program.
 - c. Engage hospitals on specific PPC increases as indicated/appropriate to understand trends and discuss potential quality concerns.
2. Use more than one year of performance data for small hospitals (i.e., less than 21,500 at-risk discharges and/or 22 expected PPCs). The performance period for small hospitals will be CYs 2023 and 2024.
3. Continue to assess hospital performance on attainment only, with adjustment to performance

standards for increased stability.

4. Continue to weight the PPCs in the payment program by 3M cost weights as a proxy for patient harm.
5. Maintain a prospective revenue adjustment scale with a maximum penalty at 2 percent and maximum reward at 2 percent and continuous linear scaling with a hold harmless zone between 60 and 70 percent.
6. Future Considerations: 1. Assess options for streamlining (or simplifying) the quality programs overall, or for the hospital acquired complication measures that are currently included in both the QBR Safety Domain and the MHAC program. 2. Assess digitally specified quality measures such as electronic Clinical Quality Measures (eCQMs) for future inclusion in quality programs.

Appendix I. Background on Federal Complication Programs

The Federal Government operates two hospital complications payment programs, the Deficit Reduction Act Hospital Acquired Condition program (DRA-HAC) and the HAC Reduction Program (HACRP), both of which are designed to penalize hospitals for post-admission complications.

Federal Deficit Reduction Act, the Hospital-Acquired Condition Present on Admission Program

Beginning in Federal Fiscal Year 2009 (FFY 2009), per the provisions of the Federal Deficit Reduction Act, the Hospital-Acquired Condition Present on Admission Program was implemented. Under the program, patients were no longer assigned to higher-paying Diagnosis Related Groups if certain conditions were acquired in the hospital and could have reasonably been prevented through the application of evidence-based guidelines.

Hospital-Acquired Condition Reduction Program

CMS expanded the use of hospital-acquired conditions in payment adjustments in FFY 2015 with a new program, entitled the Hospital-Acquired Condition Reduction Program, under the authority of the Affordable Care Act. That program focuses on a narrower list of complications and penalizes hospitals in the bottom quartile of performance. Of note, as detailed in Figure 1 below, all the measures in the Hospital-Acquired Condition Reduction Program are used in the CMS Value Based Purchasing program, and the National Healthcare Safety Network (NHSN) Healthcare-Associated Infection (HAI) measures are also used in the Maryland Quality Based Reimbursement (QBR) program.

Figure 1. CMS Hospital-Acquired Condition Reduction Program (HACRP) FFY 2024 Measures

<p>Recalibrated Patient Safety Indicator (PSI) measure:[^]</p> <ul style="list-style-type: none"> ● PSI 03 – Pressure Ulcer Rate ● PSI 06 – Iatrogenic Pneumothorax Rate ● PSI 08 – In-Hospital Fall with Hip Fracture Rate ● PSI 09 – Perioperative Hemorrhage or Hematoma Rate ● PSI 10 – Postoperative Acute Kidney Injury Requiring Dialysis Rate ● PSI 11 – Postoperative Respiratory Failure Rate ● PSI 12 – Perioperative Pulmonary Embolism or Deep Vein Thrombosis Rate ● PSI 13 – Postoperative Sepsis Rate ● PSI 14 – Postoperative Wound Dehiscence Rate ● PSI 15 – Unrecognized Abdominopelvic Accidental Puncture/Laceration Rate
Central Line-Associated Bloodstream Infection (CLABSI) ^{^*}
Catheter-Associated Urinary Tract Infection (CAUTI) ^{^*}
Surgical Site Infection (SSI) – colon and hysterectomy ^{^*}
Methicillin-resistant Staphylococcus aureus (MRSA) Bacteremia ^{^*}
Clostridium Difficile Infection (CDI) ^{^*}

[^]Recalibrated PSI Composite Measures included in the CMS VBP Program beginning FFY 2023. * National Healthcare Safety Network (NHSN) Healthcare-Associated Infection (HAI) measures included in both the CMS VBP and Maryland QBR Programs

For more information on the DRA HAC program POA Indicator, please refer to:

<https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/index>

For more information on the DRA HAC program, please refer to:

<https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/Downloads/FAQ-DRA-HAC-PSI.pdf>

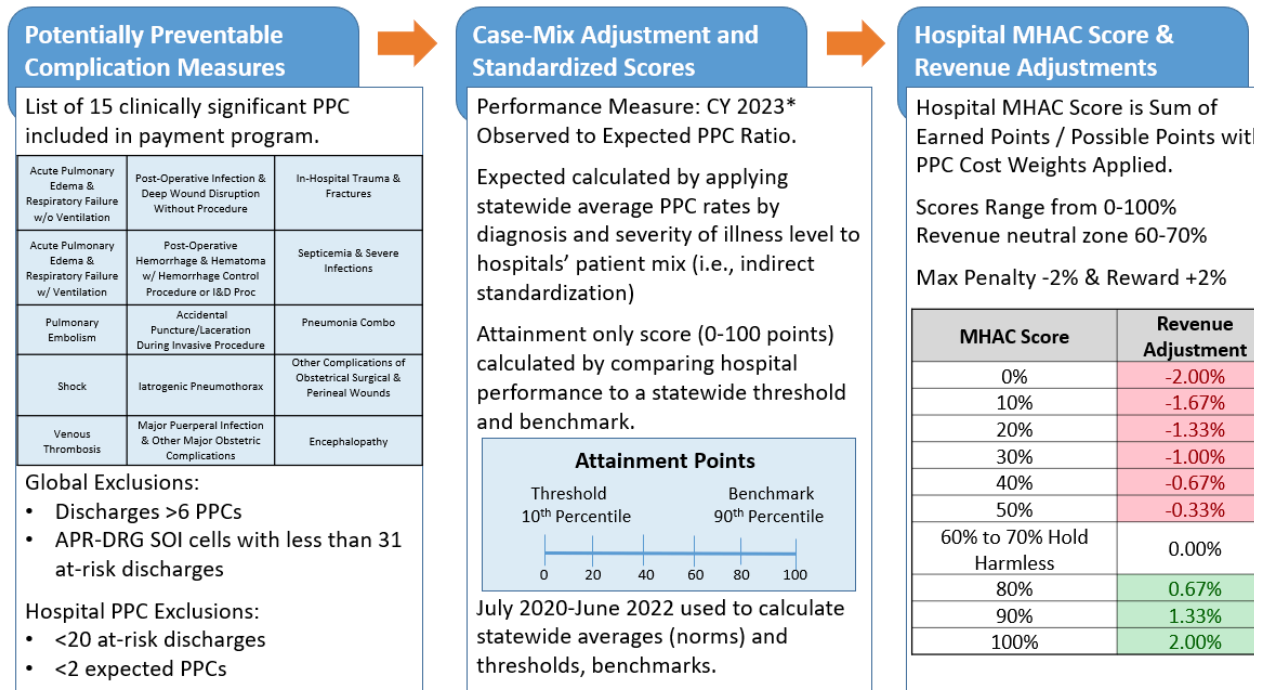
For more information on the HAC Reduction program, please refer to:

<https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/HAC-Reduction-Program>

Appendix II: RY 2025 MHAC Program Methodology

Figure 1 below provides a summary overview of the approved RY 2025 MHAC methodology.

Figure 1. Overview of RY 2025 Approved MHAC Methodology



Performance Metric

The methodology for the MHAC program measures hospital performance using the Observed (O) /Expected (E) ratio for each PPC. Expected number of PPCs are calculated using historical data on statewide PPC rates by All Patient Refined Diagnosis Related Group and Severity of Illness Level (APR-DRG SOI). See below for details on how the expected number of PPCs are calculated for each hospital.

Observed and Expected PPC Values

The MHAC scores are calculated using the ratio of *Observed* : *Expected* PPC values.

Given a hospital's unique mix of patients, as defined by APR-DRG category and Severity of Illness (SOI) level, the HSCRC calculates the hospital's expected PPC value, which is the number of PPCs the hospital would have experienced if its PPC rate were identical to that experienced by a normative set of hospitals.

The expected number of PPCs is calculated using a technique called indirect standardization. For illustrative purposes, assume that every hospital discharge is considered "at-risk" for a PPC, meaning that all discharges would meet the criteria for inclusion in the MHAC program. All discharges will either have no PPCs, or will have one or more PPCs. In this example, each discharge either has at least one PPC, or does not have a PPC. The unadjusted PPC rate is the percent of discharges that have at least one PPC.

The rates of PPCs in the normative database are calculated for each diagnosis (APR-DRG) category and severity level by dividing the observed number of PPCs by the total number of admissions. The PPC norm for a single diagnosis and severity level is calculated as follows:

Let:

N = norm

P = Number of discharges with one or more PPCs

D = Number of "at-risk" discharges

i = A diagnosis category and severity level

$$N_i = \frac{P_i}{D_i}$$

In the example, each normative value is presented as PPCs per discharge to facilitate the calculations in the example. Most reports will display this number as a rate per one thousand discharges.

Once the normative expected values have been calculated, they can be applied to each hospital. In this example, the normative expected values are computed for one diagnosis category and its four severity levels.

Consider the following example in Figure 2 for an individual diagnosis category.

Figure 2. Expected Value Computation Example for one Diagnosis Category

A Severity of illness Level	B At-risk Discharges	C Observed Discharges with PPCs	D PPCs per discharge (unadjusted PPC Rate)	E Normative PPCs per discharge	F Expected # of PPCs	G Observed: Expected Ratio
			= (C / B)	(Calculated from Normative Population)	= (B x E)	= (C / E) rounded to 4 decimal places
1	200	10	.05	.07	14.0	0.7143
2	150	15	.10	.10	15.0	1.0000
3	100	10	.10	.15	15.0	0.6667
4	50	10	.20	.25	12.5	0.8000
Total	500	45	.09		56.5	0.7965

For the diagnosis category, the number of discharges with PPCs is 45, which is the sum of discharges with PPCs (column C). The overall rate of PPCs per discharge in column D, 0.09, is calculated by dividing the total number of discharges with PPCs (sum of column C) by the total number of discharges at risk for PPCs (sum of column B), i.e., $0.09 = 45/500$. From the normative population, the proportion of discharges with PPCs for each SOI level for that diagnosis category is displayed in column E. The expected number of PPCs for each severity level shown in column F is calculated by multiplying the number of at-risk discharges (column B) by the normative PPCs per discharge rate (column E). The total number of PPCs expected for this diagnosis category is the expected number of PPCs for the severity levels.

In this example, the expected number of PPCs for the APR DRG category is 56.5, which is then compared to the observed number of discharges with PPCs (45). Thus, the hospital had 11.5 fewer observed discharges with PPCs than were expected for 500 at-risk discharges in this APR DRG category. This difference can be expressed as a percentage difference as well.

All APR-DRG categories and their SOI levels are included in the computation of the observed and expected rates, except when the APR-DRG SOI level has less than 30 at-risk discharges statewide.

PPC Exclusions

Consistent with prior MHAC policies, the number of at-risk discharges is determined prior to the calculation of the normative values (hospitals with <10 at-risk discharges are excluded for a particular PPC) and the normative values are then re-calculated after removing PPCs with <2 complication expected. The following exclusions will also be applied:

For each hospital, discharges will be removed if:

- Discharge is in an APR-DRG SOI cell has less than 31 statewide discharges.
- Discharge has a diagnosis of palliative care (this exclusion may be removed in the future once POA status is available for palliative care for the data used to determine performance standards); and
- Discharge has more than 6 PPCs (i.e., a catastrophic case, for which complications are probably not preventable).

For each hospital, PPCs will be removed if during July 2020 to December 2021:

- The number of cases at-risk is less than 15; and
- The expected number of PPCs is less than 1.5.

The PPCs for which a hospital will be assessed are determined using the July 2020 to December 2021 data and not reassessed during the performance period. This is done so that scores can be reliably calculated during the performance period from a pre-determined set of PPCs. The MHAC summary workbooks provide the excluded PPCs for each hospital.

Combination PPCs

Based on clinical input and 3M recommendation, starting in RY 2021 two pneumonia (PPC 5 Pneumonia & Other Lung Infections & PPC 6 Aspiration Pneumonia) PPCs were combined into single pneumonia PPC and the 3M cost weight is a simple average of the two PPC cost weights.

Hospital Exclusions

Acute care hospitals that do not have sufficient volume to have at least 15 at-risk and 1.5 expected for any payment program PPC are excluded from the MHAC policy.

Benchmarks and Thresholds

For each PPC, a threshold and benchmark value are calculated using the determined base period data. In previous rate years when improvement was also assessed, the threshold was set at the statewide median of 1 and the benchmark was the O/E ratio for the top performing hospitals that accounted for 25% of discharges. For RY 2021 under an attainment only methodology, staff adapted the MHAC points system to allow for greater performance differentiation by moving the threshold to the value of the observed to expected ratio at the 10th percentile of hospital performance, moving the benchmark to the value of the observed to expected ratio at the 90th percentile of hospital performance, and assigning 0 to 100 points for each PPC between these two percentile values.

Attainment Points (possible points 0-100)

If the PPC ratio for the performance period is greater than the threshold, the hospital scores zero points for that PPC for attainment.

If the PPC ratio for the performance period is less than or equal to the benchmark, the hospital scores a full 100 points for that PPC for attainment.

If the PPC ratio is between the threshold and benchmark, the hospital scores partial points for attainment.

The formula to calculate the Attainment points is as follows:

- $\text{Attainment Points} = [99 * ((\text{Hospital's performance period score} - \text{Threshold}) / (\text{Benchmark} - \text{Threshold}))] + 0.5$

Calculation of Hospital Overall MHAC Score

To calculate the final score for each hospital, the attainment points earned by the hospital and the potential points (i.e., 100) for each PPC are multiplied by the 3M cost weights. Hospital scores across PPCs are calculated by summing the total weighted points earned by a hospital, divided by the total possible weighted points (100 per PPC * 3M cost weight).

RY 2025 Update: Small Hospital Methodology

Hospital-specific PPC inclusion requirements were updated for the RY 2025 policy, i.e., all hospitals are required to have at least 20 at-risk discharges and 2 expected PPCs in order for a particular PPC to be included in the payment program. Because of the volatility in performance scores for smaller hospitals, the Commission also approved the following policy updates in RY 2025:

“Establish small hospital criteria for assessing performance under the MHAC policy based on the number of at-risk discharges and expected PPCs (i.e., small hospitals are those with less than 21,500 at-risk discharges and/or 22 expected PPCs across all payment program PPCs) as opposed to the number of PPC measure types, and for hospitals that meet small hospital criteria, increase reliability of score by using two years of performance data to assess hospital performance (i.e., for RY 2025 use CY 2022 and 2023). “

Appendix III: Monitoring PPCs

The table below shows the monitored PPCs' O/E ratios for CY 22 YTD (through June) and the percent changes in the observed-to-expected ratio from CY 2018.

Monitoring PPC	2018 O/E	2023 YTD O/E	2018-2023 % Change
25: Renal Failure with Dialysis	1.02	0.31	-69.43%
2: Extreme CNS Complications	1.29	0.47	-63.92
21: Clostridium Difficile Colitis	1.2	0.64	-47.03%
10: Congestive Heart Failure	0.68	0.55	-18.65%
39: Reopening Surgical Site	1	0.88	-11.93%
65: Urinary Tract Infection without Catheter	1.12	0.98	-12.53%
38: Post-Operative Wound Infection & Deep Wound Disruption with Procedure	0.32	0.29	-7.81%
14: Ventricular Fibrillation/Cardiac Arrest	0.74	0.71	-3.51%
11: Acute Myocardial Infarction	0.88	0.85	-2.58%
33: Cellulitis	0.89	0.95	6.08%
40: Peri-Operative Hemorrhage & Hematoma without Hemorrhage Control Procedure or I&D Proc	0.8	0.89	11.65%
24: Renal Failure without Dialysis	0.78	0.94	21.09%
34: Moderate Infections	0.58	0.72	24.28%
19: Major Liver Complications	0.64	0.84	30.47%
66: Catheter-Related Urinary Tract Infection	0.99	1.3	31.50%
20: Other Gastrointestinal Complications without Transfusion or Significant Bleeding	0.65	0.86	32.06%
1: Stroke & Intracranial Hemorrhage	0.67	0.92	38.54%
27: Post-Hemorrhagic & Other Acute Anemia with Transfusion	0.74	1.08	45.23%
8: Other Pulmonary Complications	0.85	1.25	46.36%
48: Other Complications of Medical Care	0.6	0.88	46.79%
45: Post-Procedure Foreign Bodies	1.12	1.74	55.70%
52: Inflammation & Other Complications of Devices, Implants or Grafts Except Vascular Infection	0.7	1.13	60.65%
17: Major Gastrointestinal Complications without Transfusion or Significant Bleeding	0.62	1.01	63.86%
50: Mechanical Complication of Device, Implant & Graft	0.55	0.9	64.49%
26: Diabetic Ketoacidosis & Coma	0.48	0.8	67.05%
29: Poisonings due to Anesthesia	0.82	1.37	67.91%

Monitoring PPC	2018 O/E	2023 YTD O/E	2018-2023 % Change
18: Major Gastrointestinal Complication with Transfusion or Significant Bleeding	0.5	0.84	68.51%
13: Other Cardiac Complications	0.13	0.87	71.54%
59: Medical & Anesthesia Obstetric Complications	0.46	0.82	78.40%
23: GU Complications Except UTI	0.55	0.99	82.26%
54: Infections due to Central Venous Catheters	0.6	1.1	82.59%
53: Infection, Inflammation & Clotting Complications of Peripheral Vascular Catheters & Infusions	0.6	1.1	83.08%
44: Other Surgical Complication- Mod	0.49	0.92	88.42%
15: Peripheral Vascular Complications Except Venous Thrombosis	0.46	0.92	99.92%
51: Gastrointestinal Ostomy Complications	0.47	0.95	102.52%
64: Other In-Hospital Adverse Events	0.49	1.02	106.91%
31: Decubitus Ulcer	0.3	0.81	172.70%
30: Poisonings due to Anesthesia	0 observed	0 Observed	
32: Transfusion Incompatibility Reaction	0 observed	0 Observed	

Appendix IV: Calculating Performance Standards

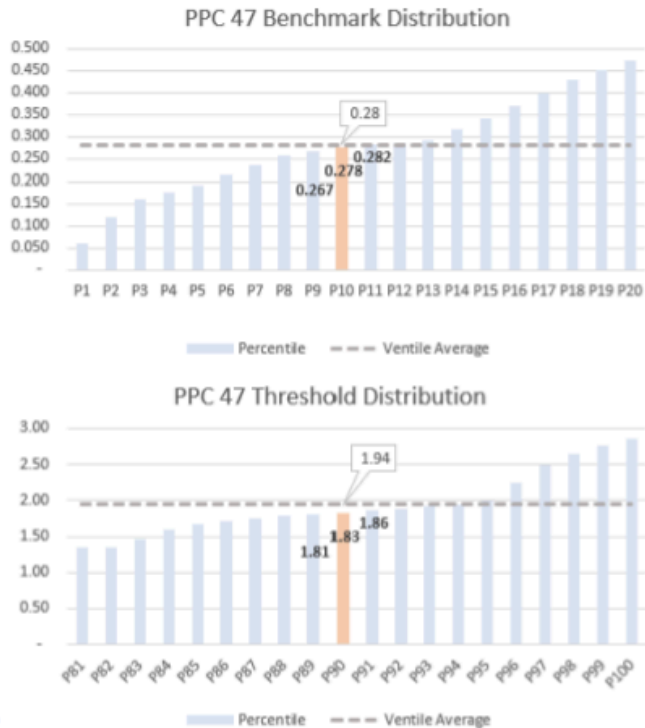
PPC Variation in Performance

- To understand if there's a need to move to an average approach, staff wanted to understand the variation around the cut points for rewards and penalties
 - Large variation would warrant moving to an average approach



Note: Staff calculations vary from SAS calculations due to rounding differences between SAS and Excel

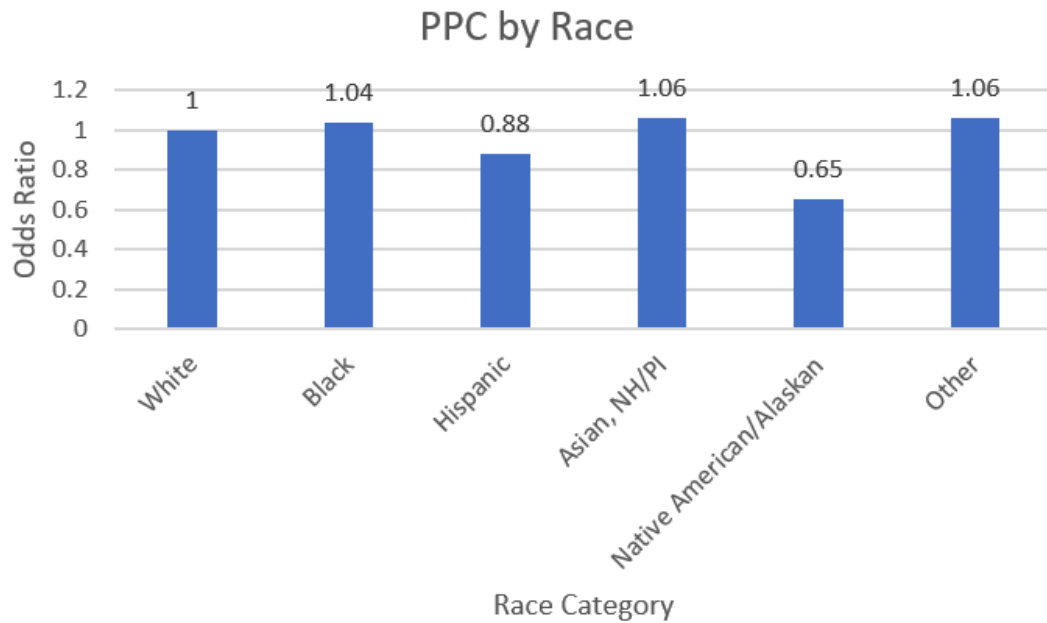
EX: PPC 47 Variation in Performance



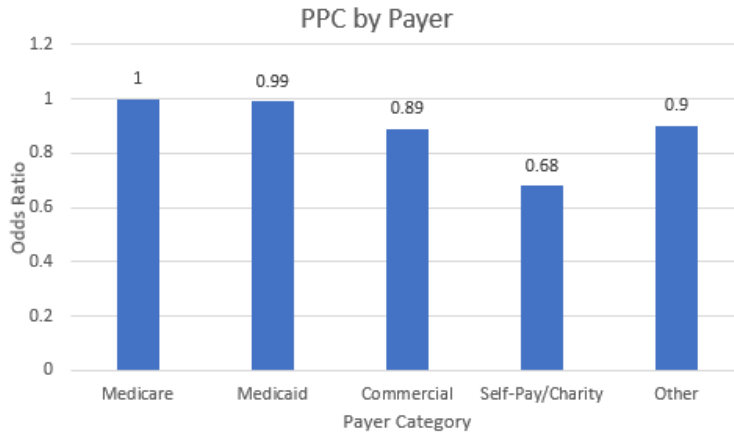
- 10th percentile for benchmark determination appears reasonable
 - Delta between 9th, 10th, and 11th percentile is limited
 - Range between 1st percentile and 20th percentile is limited (~0.4)
 - Average of best ventile is similar to 10th percentile
- 90th percentile for threshold determination appears less reasonable
 - Delta between 89th, 90th, and 91st percentile is more significant
 - Range between 81st percentile and 100th percentile is substantial (~1.5)
 - Average of worst ventile is less similar to 90th percentile

Appendix V: Disparities in PPCs

Below slides are presented by race, payer, and ADI categories that show the odds ratio of experiencing a PPC as well as tables that present the odds ratio, the p-value, and the confidence intervals by category.

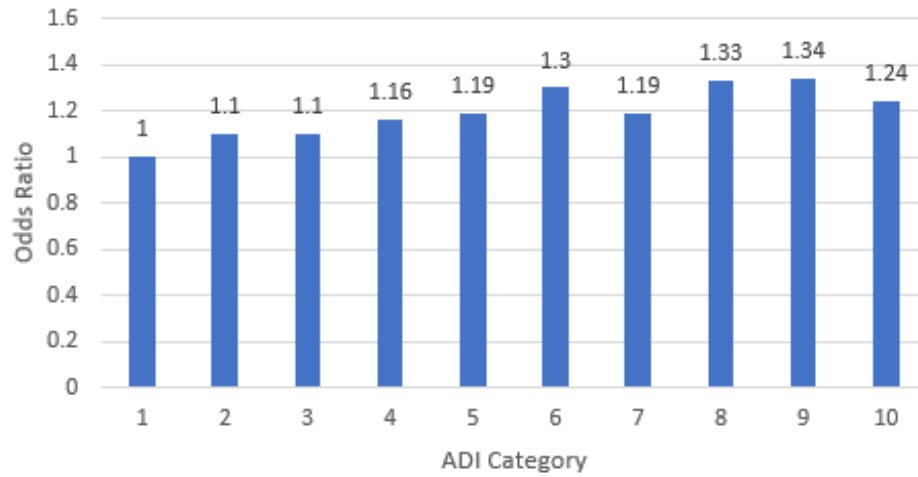


PPCs	Odds Ratio Coefficient	P-Value	Confidence Intervals
White (reference)			
Black	1.04	0.113	.9913536 - 1.085907
Hispanic	.88	0.027	.7901786 .9856565
Asian	1.06	0.425	.924325 1.205196
Native Am.	.65	0.151	.3552198 1.173473
Other	1.06	0.341	.9408 1.193
Non-White	1.02	0.312	.9797004 1.066333
Black	1.04	0.123	.9903417 1.084905
Non-Black vs Black (Non-Black reference)	1.04	0.066	.9973128 1.089417



PPCs	Coefficient	P-Value	CI
Medicare (reference)			
Medicaid	.99	0.836	.916711 1.07284
Commercial	.89	0.000	.8295058 .9482376
Self-Pay/Charity	.68	0.000	.5441243 .8426922
Other	.90	0.117	.7809703 1.027758

PPC by ADI Decile



PPCs	Coefficient	P-Value	CI
1 (reference)			
2	1.10	0.041	1.004006 1.209946
3	1.10	0.053	.9987985 1.2043
4	1.16	0.002	1.054725 1.270863
5	1.19	0.001	1.078814 1.313731
6	1.30	0.000	1.170513 1.449902
7	1.19	0.003	1.063426 1.335627
8	1.33	0.000	1.176754 1.498999
9	1.34	0.000	1.182045 1.520293
10	1.24	0.001	1.088737 1.419777