

629th Meeting of the Health Services Cost Review Commission

March 12, 2025

(The Commission will begin in public session at 12:00 pm for the purpose of, upon motion and approval, adjourning into closed session. The open session will resume at 1:00 pm)

CLOSED SESSION

12:00 pm

1. Update on Administration of Model - Authority General Provisions Article, §3-103 and §3-104

PUBLIC MEETING

1:00 pm

1. Review of Minutes from the Public and Closed Meetings on February 12, 2025

Specific Matters

For the purpose of public notice, here is the docket status.

Docket Status – Cases Closed

2. Docket Status – Cases Open

2668R Johns Hopkins Howard County Medical Center

2669A Johns Hopkins Health System

2670A University of Maryland Medical Center

Informational Subjects

1. Presentation: Advancing Innovation in Maryland (AIM) Winners

CAPABLE and Neighborhood Nursing

Sarah L. Szanton, PhD, RN, FAAN, Johns Hopkins School of Nursing

Tele-dizzy

David E. Newman-Toker, MD, PhD, Johns Hopkins School of Medicine

Subjects of General Applicability

3. Report from the Executive Director
 - a. Model Monitoring
 - b. Deregulation Oversight Overview
 - c. Legislative Update
4. Final Recommendation: ED Best Practices Incentive Policy & ED Wait Times Activities
5. Draft Recommendation: Maryland Hospital Acquired Conditions (MHAC) Policy for RY 2027
6. AHEAD Public Testimony
7. Hearing and Meeting Schedule



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STAFF RECOMMENDATION RE: Alternative Method of Rate Determination

Johns Hopkins Health System, MARCH 12, 2025

IN RE: THE APPLICATION FOR AN	*	BEFORE THE MARYLAND HEALTH	
ALTERNATIVE METHOD OF RATE	*	SERVICES COST REVIEW	
DETERMINATION	*	COMMISSION	
JOHNS HOPKINS HEALTH	*	DOCKET:	2025
SYSTEM	*	FOLIO:	2479
BALTIMORE, MARYLAND	*	PROCEEDING:	2669A

I. INTRODUCTION

On January 29, 2025, Johns Hopkins Health System (“System”) filed a renewal application on behalf of its member hospitals Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center (the “Hospitals”) for an alternative method of rate determination, pursuant to COMAR 10.37.10.06. The System is requesting approval to continue to participate in a global price arrangement with Aetna Health, Inc. for solid organ and bone marrow transplant services. The Hospitals request that the Commission approve the arrangement for one year beginning March 1, 2025.

II. OVERVIEW OF APPLICATION

The contract will continue to be held and administered by Johns Hopkins HealthCare, LLC (“JHHC”), which is a subsidiary of the System. JHHC will continue to manage all financial transactions related to the global price contract including payments to the Hospitals and bear all risk relating to regulated services associated with the contract.

III. FEE DEVELOPMENT

The hospital portion of the updated global rates was developed by calculating mean historical charges for patients receiving the procedures for which global rates are to be paid. The remainder of the global rate is comprised of physician service costs. Additional per diem payments were calculated for cases that exceed a specific length of stay outlier threshold.

IV. IDENTIFICATION AND ASSESSMENT OF RISK

The Hospitals will continue to submit bills to JHHC for all contracted and covered services. JHHC is responsible for billing the payer, collecting payments, disbursing payments to the Hospitals at their full HSCRC approved rates, and reimbursing the physicians. The System contends that the arrangement among JHHC, the Hospitals, and the physicians holds the Hospitals harmless from any shortfalls in

payment from the global price contract. JHHC maintains it has been active in similar types of fixed fee contracts for several years, and that JHHC is adequately capitalized to bear risk of potential losses.

V. STAFF EVALUATION

Staff found that the experience under the arrangement for the last year has been favorable. Staff believes that the Hospitals can continue to achieve a favorable performance under the arrangement.

VI. STAFF RECOMMENDATION

The staff recommends that the Commission approve the Hospitals' application for an alternative method of rate determination with Aetna Health, Inc. for solid organ and bone marrow transplant services for one-year beginning March 1, 2025. The Hospitals must file a renewal application annually for continued participation.

Consistent with its policy paper regarding applications for alternative methods of rate determination, the staff recommends that this approval be contingent upon the execution of the standard Memorandum of Understanding ("MOU") with the Hospitals for the approved contract. This document would formalize the understanding between the Commission and the Hospitals and would include provisions for such things as payments of HSCRC-approved rates, treatment of losses that may be attributed to the contract, quarterly and annual reporting, confidentiality of data submitted, penalties for noncompliance, project termination and/or alteration, on-going monitoring, and other issues specific to the proposed contract. The MOU will also stipulate that operating losses under the contract cannot be used to justify future requests for rate increases.



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Final Recommendations on Hospital Best Practice Policy for Rate Year 2027

March 12, 2025

This document contains the staff final recommendations for RY 2027.

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LIST OF ABBREVIATIONS

AHEAD	State's Advancing All-Payer Health Equity Approaches and Development Model
APR DRG	All Patient Refined Diagnosis Related Group
CDC	Centers for Disease Control & Prevention
CMS	Centers for Medicare & Medicaid Services
DRG	Diagnosis-Related Group
eCQM	Electronic Clinical Quality Measure
ED	Emergency Department
ED-1 Measure	Emergency Department Arrival to Departure for Admitted Patients
ED-2 Measure	Time of Order to Admit until Time of Admission for ED Patients
EDDIE	Emergency Department Dramatic Improvement Effort
FFY	Federal Fiscal Year
HCAHPS	Hospital Consumer Assessment of Healthcare Providers and Systems
HSCRC	Health Services Cost Review Commission
LOS	Length of Stay
MIEMSS	Maryland Institute for Emergency Medical Services Systems
NHSN	National Health Safety Network
PQI	Prevention Quality Indicators
QBR	Quality-Based Reimbursement
RY	Maryland HSCRC Rate Year (Coincides with State Fiscal Year (SFY) July-Jun; signifies the timeframe in which the rewards and/or penalties would be assessed)
VBP	Value-Based Purchasing

POLICY OVERVIEW

Policy Objective	Policy Solution	Effect on Hospitals	Effect on Payers/ Consumers	Effect on Health Equity
<p>The quality programs operated by the Health Services Cost Review Commission, including the Best Practices policy, are intended to promote quality improvement and ensure that any incentives to constrain hospital expenditures under the Total Cost of Care Model and subsequent AHEAD model (Maryland 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 Maryland Model while guarding against unintended consequences and penalizing poor performance. The objective of implementing a Hospital Best Practice Policy is to track and incentivize hospitals to implement and strengthen operational structures and processes, which are designed to provide high quality, evidence-based care to all patients, at all times.</p>	<p>The Best Practice policy is a newly proposed pay-for-performance quality initiative that provides incentives for hospitals to improve and maintain high-quality patient care and value within a global budget framework. For Year 1, RY 2027, we propose to focus on best practices related to hospital throughput, that should ultimately reduce ED LOS. Specifically, during Year 1, HSCRC staff will collaborate with hospitals to finalize the best practices and tiers, develop infrastructure for data collection, and disseminate statewide monitoring reports to track performance. Hospitals will be expected to participate in the implementation of best practices and submission of data for tracking by an agreed upon deadline to avoid an “accountability” penalty of 0.1 percent of all-payer, Inpatient revenue. This penalty will be applicable to any hospital that does not implement and report on the selected best practices.</p> <p>This approach will allow sufficient time to establish workflows, report development, and validate data collection mechanisms.</p> <p>This Best Practice policy will initially focus on ED-Hospital Throughput Best Practices but is written with the intention of developing and standardizing best practices for various clinical processes and operations as appropriate.</p>	<p>For program Year 1, RY 27, hospitals will be required to implement or strengthen best practices designed to improve patient care and throughput and report data to the HSCRC to track intensity and fidelity to the best practices. For Year 1, there is no revenue at risk associated with performance. There will be an accountability penalty that will be assessed for not reporting on best practice measures. This penalty will be 0.1% of all-payer, inpatient revenue, to be assessed in the January 2026 rate update. We will follow our extraordinary circumstances exception policy to address any unforeseen events (i.e. cyberattack, natural disaster, etc.).</p> <p>For program Year 2, RY 28, we recommend +/-0.25% inpatient revenue at risk associated with performance on designated best practice measures. This will be reassessed at the end of Year 1 after evaluating the impact of the best practices.</p>	<p>This policy ensures that the quality of care provided to consumers is evidence-based and patient-centered. by incentivizing specific types of best practices to address areas of concern. Hospitals that do not participate in implementation and data tracking of best practices will be penalized 0.1% of all-payer inpatient revenue through their Global budget. This penalty will only be assessed if a hospital does not report on their selected best practices. The HSCRC quality programs are all-payer in nature and so improve quality for all patients that receive care at the hospital.</p>	<p>There is currently not a health equity measure in the Best Practice policy, but in future years, we can potentially stratify data collected to evaluate health disparities. Health equity incentives could be integrated in a subsequent rate year. Standardization of Best Practices across all patients should better ensure that all patients receive the same evidence-based interventions. By focusing on structures and processes, this program will allow all hospitals the potential to earn rewards regardless of the types of patients served or other barriers that impact outcomes such as ED LOS. Going forward, HSCRC staff will continue to analyze disparities and propose incentives for reducing them in the program.</p>

FINAL RECOMMENDATIONS

This document puts forth for consideration the RY 2027 (CY 2025 performance period) final policy recommendations on hospital best practices:

1. Building upon the ongoing work of staff and key stakeholders, refine the specifications developed by the Best Practice subgroup on a set of up to six Hospital Best Practices that are designed to improve emergency department (ED) and hospital throughput and reduce ED length of stay (LOS).
 - a. For each best practice identified, develop three weighted tiers with corresponding measures that reflect the fidelity and intensity of each best practice. Weighting of tiers will be determined in Year 2 (RY 2028) after Year 1 (RY 2027) data is collected and analyzed.
2. Require hospitals to select two Best Practices to implement and report data on for RY 2027.
 - a. Failure to implement and report data to the Commission by October 2025 will result in a 0.1 percent penalty on all-payer, inpatient revenue to be assessed in January 2026.
3. We propose that subsequent rate years will have +/-0.25 percent inpatient hospital revenue at risk tied to performance on these best practice metrics but intend to evaluate the impact of the best practices and make a final recommendation for subsequent rate years after the Year 1 Best Practice program impact is assessed.

INTRODUCTION

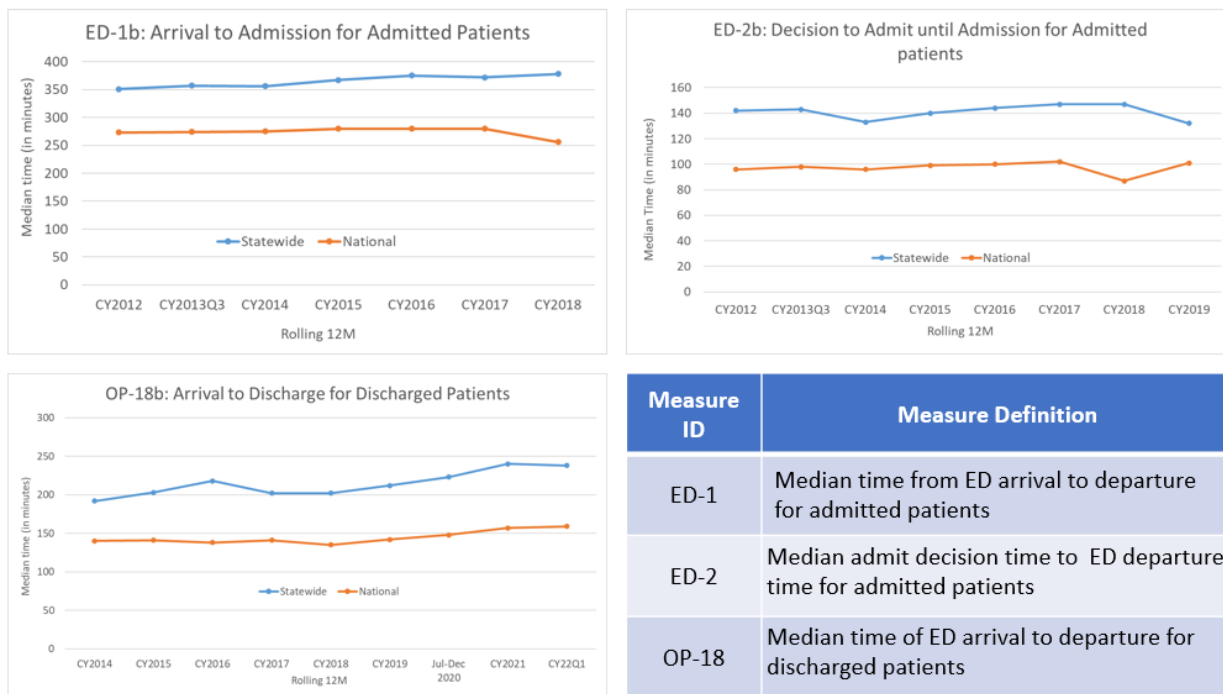
Maryland hospitals are funded under a population-based revenue system with a fixed annual revenue cap set by the Maryland Health Services Cost Review Commission (HSCRC or Commission) under the All-Payer Model agreement with the Centers for Medicare & Medicaid Services (CMS) beginning in 2014, and continuing under the current Total Cost of Care (TCOC) Model agreement, which took effect in 2019 and will transition to the AHEAD Model in 2026. Under the global budget system, hospitals are incentivized to shift services to the most appropriate care setting and simultaneously have revenue at risk under 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, improved emergency department length of stay, 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 Hospital Best Practice Policy is a new program that is being proposed for Commissioner consideration. The Best Practice Policy would be one of several quality pay-for-performance initiatives that provide +/- revenue at risk for hospitals to improve and maintain high-quality patient care and value over time. However, unlike other quality policies that primarily focus on outcomes of care, the Best Practice policy would specifically provide +/- revenue at risk tied to the structure and process of care delivery in Maryland hospitals. During this initial year, the policy will focus on processes that drive ED and hospital throughput to address the long ED LOS experienced by patients in Maryland. Specifically, the commission will refine a set of up to six best practices for RY 2027 and require hospitals to select and report data on two best practices by the latter part of CY 2025. If data is not submitted by hospitals in Year 1, an accountability penalty will be implemented. After the initial year focused on development, implementation and reporting, the program will have a designated percentage of inpatient hospital revenue at-risk based on performance on best practice measures. In addition to this Best Practice policy, the RY 2027 Quality-Based Reimbursement Policy, which was approved at the December 2024 Commission meeting, has a financial incentive tied ED LOS. The ED-Hospital Throughput best practice measures are process and structural measures aligned to support the outcome measure, ED LOS, in the QBR program.

BACKGROUND

ED length of stay (LOS)--i.e., wait times--has been a significant concern in Maryland, predating Maryland's adoption of hospital global budgets instituted in 2014,¹ with multiple underlying causes and potential negative impacts (e.g., poorer patient experience, quality, care outcomes). Thus, the Commission approved the addition of an ED wait time or length of stay (LOS) measure in the RY 2026 QBR program and voted to continue its inclusion in RY 2027. Previously published and available data on CMS Care Compare reveals Maryland's poor performance compared to the Nation on both inpatient and outpatient ED measures (i.e., higher wait times for both those admitted to the inpatient hospital and those discharged home), as shown in Figure 1.

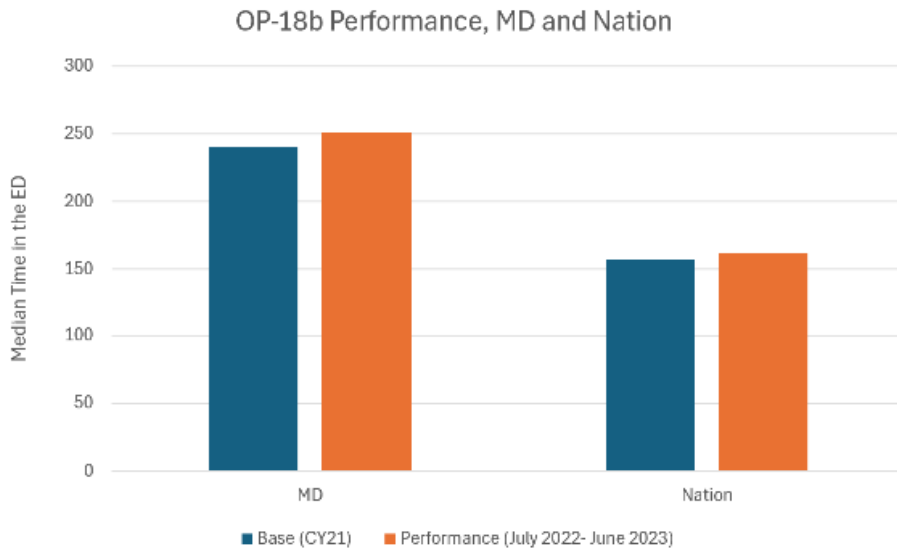
Figure 1. Emergency Department Performance on CMS ED Wait Time Measures



As illustrated in Figure 2 below, based on the most current data available, the OP-18b wait time for discharged patients has increased slightly for both Maryland and the Nation from the base to the performance year, and Maryland wait times continue to be significantly above those of the Nation for both the base and performance years.

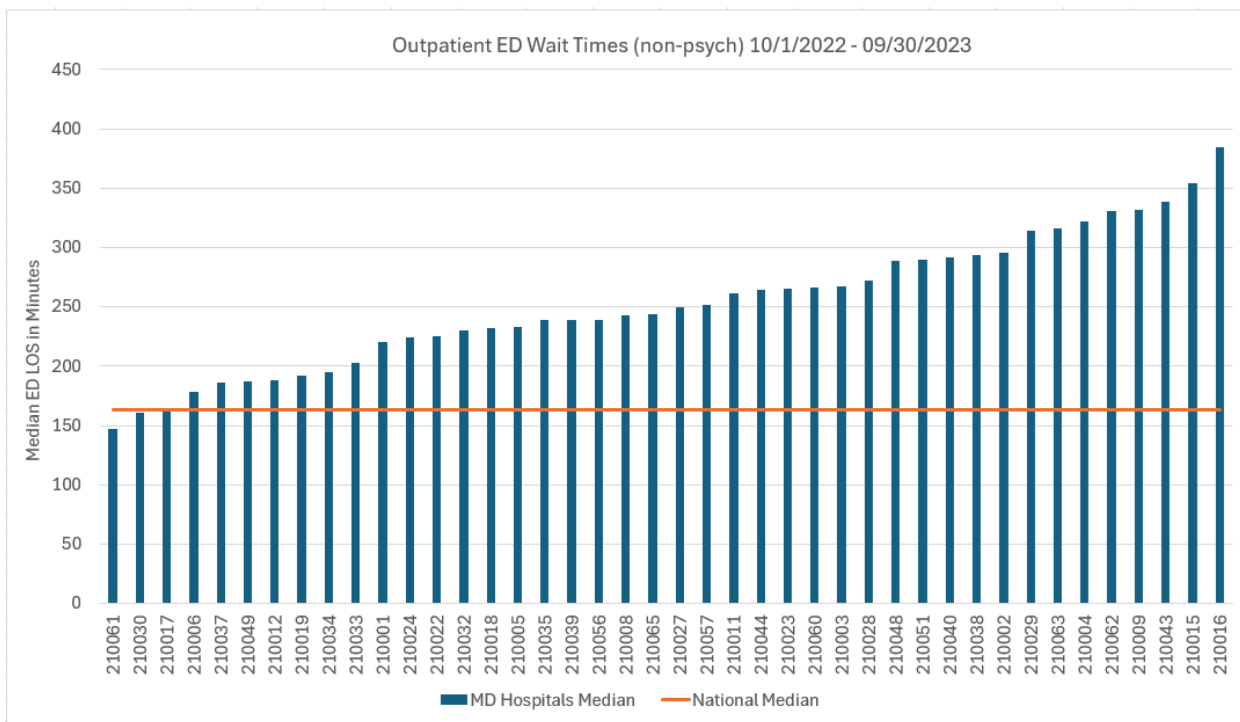
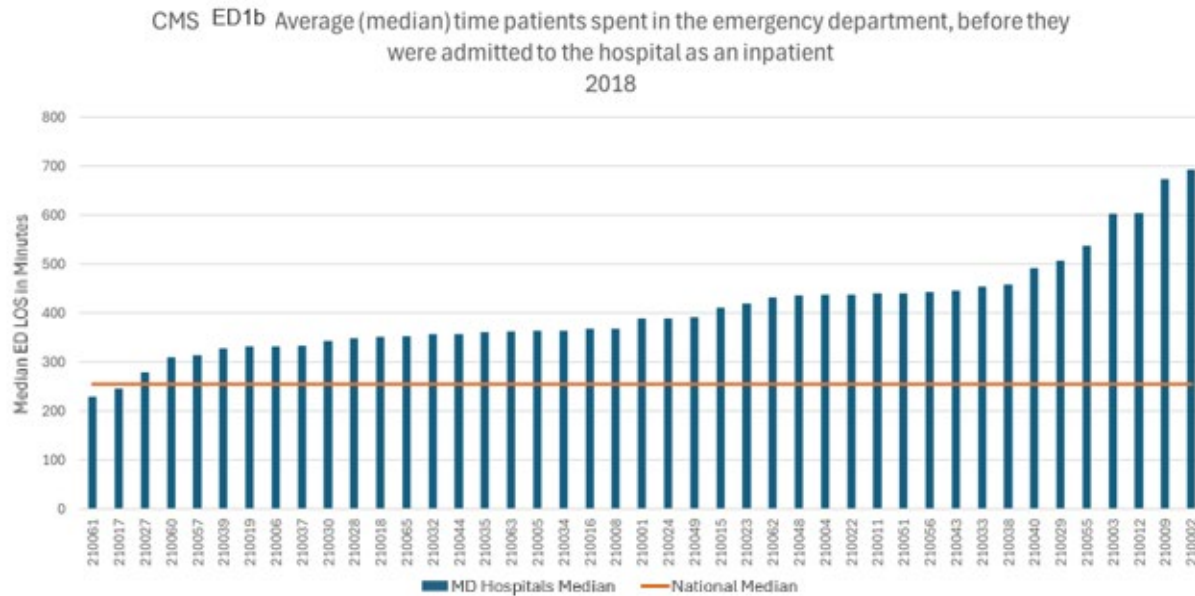
¹ Under alternative payment models, such as hospital global budgets or other hospital capitated models, some stakeholders have voiced concerns that there may be an incentive to reduce resources that lead to ED-hospital throughput issues.

Figure 2. Maryland and National Performance on ED Wait Times for Discharged Patients



Furthermore, all but a couple of hospitals in Maryland perform worse than the national average. Figure 3 shows the ED length of stay for non-psychiatric patients who are admitted (ED1b) for 2018 (last year this was reported) and for those who are discharged home (OP-18b) using the most recently available data.

Figure 3. Maryland by Hospital and National Performance on ED Wait Times



Based on these results, staff believe all hospitals in Maryland have an opportunity to improve ED LOS. Furthermore, there has been increased public scrutiny on Maryland’s ED Wait times, which has been consistently higher than all other states for the past decade. Several initiatives have been underway over the last two years to analyze Maryland’s ED length of stay and promote improvement (e.g., MHA Legislative Taskforce, EDDIE). In the 2024 Maryland General Assembly Session, a new ED Wait Time Reduction Commission was established. The

ED Commission is co-chaired by the HSCRC Executive Director and staffed by the HSCRC. The ED Commission will work on hospital and wider access issues to improve hospital throughput and will develop a state goal for improvement in ED wait times. The development of Best Practices focused on ED-Hospital Throughput is one of the specific goals outlined by the ED Wait Time Reduction Commission. Appendix A provides additional background on initiatives that the HSCRC and hospitals have undertaken to address this issue.

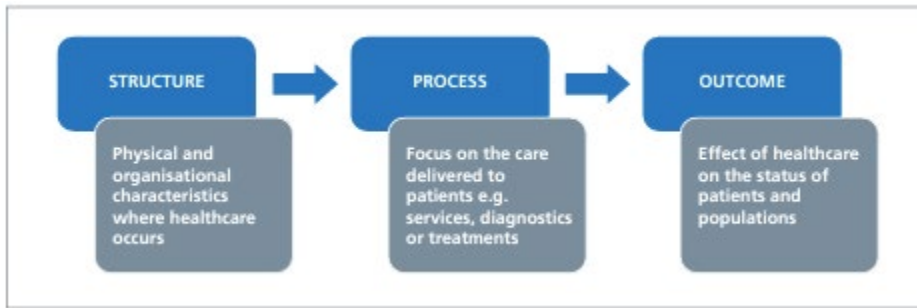
POLICY DEVELOPMENT AND IMPLEMENTATION

In this section, staff provide an overview of work done during CY 2024 to develop this Best Practice Policy. This includes discussion on why the Commission should develop incentives related to structure and process measures, description of stakeholder engagement, as well as an outline of the six best practices that have been selected and examples of tiers for assessing the intensity and fidelity to the best practices. The section concludes with next steps and recommendations for input.

Policy Origins

The Donabedian model of quality of care assesses three components as shown in Figure 4. While most current pay for performance incentives are focused on outcomes (i.e., mortality, complications, readmissions), structure and process measures are important to understand how changes in quality actually occur and are still required for some areas by CMS (e.g., attestation measures for health equity). There are several additional reasons why incentivizing structure and process measures should be considered in the case of ED LOS improvement. First, given that the ED LOS data collection and measure development is still underway, staff are hesitant to put additional revenue at risk on the outcome measure at this time. Second, the changes that can occur within a hospital to impact ED LOS may not be sufficient to improve the State's rankings nationally by themselves. This is because ED and hospital throughput is impacted by access to outpatient primary care, specialty care, behavioral health, and post-acute care. Third, there may be ways to reduce ED LOS to earn an incentive that would not result in better care for patients and these unintended consequences could be avoided by providing incentives to focus hospitals on better care delivery through optimization of known best practices. Hospitals in the State have demonstrated significant collaboration and engagement in this work. There will be an accountability measure in RY 2027 requiring data submission. Thus, staff feel that the current revenue at-risk on the outcome through QBR is sufficient at this time, but ensuring best practices such as the ones identified below will drive improvements in throughput as well as patient outcomes. By developing tiers and measures to assess the intensity and fidelity to these best practices, the State has a unique opportunity to improve more than just ED LOS. Thus, staff believe a mix of incentives on structure, process, and outcomes is appropriate and could be more impactful than simply adding more revenue to outcomes alone.

Figure 4. The Donabedian model for quality of care



Stakeholder Process and Selected Best Practices

Staff formed an ED Subgroup in February 2024 to develop the ED LOS measure and incentive methodology for the RY 2026 QBR policy. By the fall of 2024, staff transitioned this subgroup to work on the development of ED and Hospital Best Practices to improve throughput and reduce ED LOS. This was also aligned, as mentioned above, with the ED Wait Time Reduction Commission's legislative mandate to focus on the sharing of best practices. Since September 2024, there have been eleven large subgroup meetings and multiple smaller workgroups focused on individual best practices. Specifically, the subgroup vetted over thirty best practice suggestions and narrowed down the list to six and proposed that hospitals be expected to implement or improve upon two best practices during CY 2025. While there were several discussions on whether to select two best practices that all hospitals must uniformly implement, hospitals felt strongly that options were needed since certain types of best practices may be more or less effective in different settings; additionally, since hospitals were engaged in the selection of the best practice options, measures and tiers for each of the options, the staff felt that providing choices would best maintain collaboration and address the variation in hospital settings. However, the selection of the number of best practice options, requirements for implementation, and focus of the best practices can change over time as this policy evolves. Figure 1 provides an overview of the six best practices for ED-Hospital Throughput. In addition, examples of how the best practices could be measured and tiered (i.e., assessed on intensity and fidelity) are provided. The idea would be that in future years hospitals would earn points based on the measures and could earn more points for higher intensity or fidelity to the best practice, as opposed to an all or nothing incentive.

Figure 1. ED-Hospital Throughput Best Practices

Best Practice	Measures	Points (0-10 scale)												
Interdisciplinary Rounds & Early Discharge Planning	<table border="1"> <thead> <tr> <th data-bbox="396 281 516 310">Criteria</th> <th data-bbox="516 281 651 310">Tier One</th> <th data-bbox="651 281 846 310">Tier Two</th> <th data-bbox="846 281 1112 310">Tier Three</th> </tr> </thead> <tbody> <tr> <td data-bbox="396 310 516 386"></td> <td data-bbox="516 310 651 386"> <ul style="list-style-type: none"> Discharge Planning Adult General Medical and Surgical Inpatient Admissions </td> <td data-bbox="651 310 846 386"> <ul style="list-style-type: none"> Adult inpatients offered screening for the 5 HRSN prior to discharge </td> <td data-bbox="846 310 1112 386"> <ul style="list-style-type: none"> Adult inpatients that have screened positive for HRSN are given referrals to community resources prior to discharge </td> </tr> <tr> <td data-bbox="396 386 516 661"> Accountable measure or outcome </td> <td data-bbox="516 386 651 661"> <ul style="list-style-type: none"> Documentation within 48 hours of admission discharge plan, example estimated discharge date (EDD) and/or disposition KPI: 70% of inpatient admissions have documented discharge planning or 10% improvement from baseline. </td> <td data-bbox="651 386 846 661"> <ul style="list-style-type: none"> Documentation of food insecurity, housing instability, transportation needs, utility difficulties and interpersonal safety screenings for inpatients who are screened KPI: 50% or 10% improvement from baseline of all inpatients identified in tier one offered screening for HRSN </td> <td data-bbox="846 386 1112 661"> <ul style="list-style-type: none"> Documentation of community resource access or referral for patients screening positive for 1 or more of HRSN KPI: 75% or 10% improvement from baseline of all positive screens for HRSN are given referral prior to discharge identified from tier two. </td> </tr> </tbody> </table>	Criteria	Tier One	Tier Two	Tier Three		<ul style="list-style-type: none"> Discharge Planning Adult General Medical and Surgical Inpatient Admissions 	<ul style="list-style-type: none"> Adult inpatients offered screening for the 5 HRSN prior to discharge 	<ul style="list-style-type: none"> Adult inpatients that have screened positive for HRSN are given referrals to community resources prior to discharge 	Accountable measure or outcome	<ul style="list-style-type: none"> Documentation within 48 hours of admission discharge plan, example estimated discharge date (EDD) and/or disposition KPI: 70% of inpatient admissions have documented discharge planning or 10% improvement from baseline. 	<ul style="list-style-type: none"> Documentation of food insecurity, housing instability, transportation needs, utility difficulties and interpersonal safety screenings for inpatients who are screened KPI: 50% or 10% improvement from baseline of all inpatients identified in tier one offered screening for HRSN 	<ul style="list-style-type: none"> Documentation of community resource access or referral for patients screening positive for 1 or more of HRSN KPI: 75% or 10% improvement from baseline of all positive screens for HRSN are given referral prior to discharge identified from tier two. 	<p>Tier 1 earns 0-2 points</p> <p>Tier 2 earns up to 4 additional points (cumulative tier 1 and 2 has 6 possible points)</p> <p>Tier 3 earns up to 4 additional points</p>
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Bed Capacity Alert System	<p>Tier 1: Organization establishes one or more capacity metrics, examples could include: total number of patients in hospital, % hospital beds occupied, % of ED border c/w overall ED beds, NEDOC score, other hospital defined metrics.</p> <p>Tier 2: Organization establishes a bed capacity alert process (aka surge plan) driven by capacity metrics that triggers defined actions to achieve expedited throughput. Actions could include: Enhanced inpatient huddles to expedite discharges, rapid admission order turnarounds, hospitalist care in the ED, executive escalation, opening surge units, etc.</p> <p>Tier 3: Organization quantitatively demonstrates consistent activation of surge plans in response to bed capacity triggers. Internal metrics to be hospital defined and specific to hospital surge protocol. Examples could include: #/% of protocol activations, % discharges by specific time- maybe 1 p.m. and/or 3 p.m., etc.</p>	<p>Tier 1 earns 0-2 points</p> <p>Tier 2 earns up to 4 additional points (cumulative tier 1 and 2 has 6 possible points)</p> <p>Tier 3 earns up to 4 additional points</p>												
Standardized Daily/Shift Huddles	<p>The AHRQ defines a huddle as a short, standing meeting that is typically used in clinical settings to quickly share important information and touch base with a team, typically held at the beginning of each workday or shift.</p> <p>Tier 1: Implementation of, at minimum, daily huddles utilizing a multidisciplinary team approach with a focus on throughput and discharges.</p> <p>KPI: Multidisciplinary daily huddles are being completed at X frequency as defined by each organization.</p> <p>Tier 2: Tier 1 requirements with the addition of a standardized infrastructure (standard scripting, documentation, and/or use of huddle boards). Tier 2 would also include an escalation process for addressing clinical and/or non-clinical barriers to discharge or throughput.</p> <p>Tier 3: Tier 1 and Tier 2 requirements, with the addition of monitoring and reporting of key performance indicators (KPIs) as drivers of process improvement r/t throughput. Example KPIs could include but are not limited to, percent of discharge orders written by noon, or percent patients leaving the facility by a designated time as determined by each facility.</p>	<p>Tier 1 earns 0-2 points</p> <p>Tier 2 earns up to 4 additional points (cumulative tier 1 and 2 has 6 possible points)</p> <p>Tier 3 earns up to 4 additional points</p>												

Best Practice	Measures	Points (0-10 scale)												
<p>Expedited Care Intervention (Expediting team, expedited care unit)</p>	<p>Many best practices are proven to reduce Hospital Length of Stay and Boarding. Select one or more of the expediting practices listed below:</p> <ul style="list-style-type: none"> • Nurse Expediter • Discharge Lounge • Observation Unit (ED or Hospital based) • Provider Screening in Triage / Early Provider Screening Process • Dedicated CM and/or SW Resources in the ED <p>Tier 1: Implement/Expand one (1) expedited care practice from the list above and report KPI as determined by the hospital. For example, LWBS, Inpatient LOS, Door to Provider Time, etc.</p> <p>Tier 2: Implement/Expand two (2) expedited care practices from the list above and report KPI for each practice as determined by the hospital.</p> <p>Tier 3: Implement/Expand three (3) expedited care practices from the list above and report KPI as determined by the hospital.</p>	<p>Tier 1 earns 0-2 points</p> <p>Tier 2 earns up to 4 additional points (cumulative tier 1 and 2 has 6 possible points)</p> <p>Tier 3 earns up to 4 additional points</p>												
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<p>Clinical Pathways & Observation Management</p>	<p>Tier 1: Design and Implement Intervention</p> <p>Hospitals will select and implement a clinical pathway tailored to a specific patient population. This clinical pathway should be based on the facility's unique patient needs and can incorporate existing pathways if already in place.</p> <p>Tier 2: Develop Data Infrastructure</p> <p>Hospitals will establish robust data collection and analysis systems to monitor and evaluate outcomes. These systems should emphasize comparing the effectiveness of inpatient and ambulatory management strategies for the selected patient population, enabling data-driven decision-making and continuous improvement.</p> <p>Tier 3: Demonstrate Improvement</p> <p>Hospitals will demonstrate a measurable decrease in unwarranted clinical variation and/or measurable improvement in outcomes specific to their chosen intervention.</p>	<p>Tier 1 earns 0-2 points</p> <p>Tier 2 earns up to 4 additional points (cumulative tier 1 and 2 has 6 possible points)</p> <p>Tier 3 earns up to 4 additional points</p>												

The initial proposal under consideration for the Best Practice policy was additional revenue at risk for performance on best practices for CY 2025. However, the work needed to refine the tiers and develop data collection is substantial. Furthermore, given concerns about the time it took to develop the ED LOS measure and incentive

concurrent to its use, staff believe additional time is needed to do this well. Finally, stakeholder engagement has been exceptional during this process and should be commended by providing this additional time for hospitals to develop the data collection needed to measure the tiers. Staff recommend that RY 2027 be focused on refinement and implementation of best practice measures, workflow redesign, and report development and validation. Therefore, RY 2027 efforts will be focused on development of the Best Practice tiers and data collection, and no revenue be tied to performance on the best practice measures for RY2027. There will be a 0.1 percent all-payer, IP revenue, accountability penalty tied to best practice implementation and data submission, meaning a penalty would be assessed if a hospital did not report data by October 2025 for its two selected best practices. Staff intend to continue the refinement of the best practices measures and tiers throughout RY 2027.

STAKEHOLDER FEEDBACK

THE BEST PRACTICE SUBGROUP HAS REPRESENTATION FROM ALL HOSPITALS/HEALTH SYSTEMS, AS WELL AS MHA AND SEVERAL OTHER AGENCIES AND ORGANIZATIONS. THE SUBGROUP MEMBERS HAVE BEEN VERY ENGAGED AND ACTIVELY INVOLVED IN THE DEVELOPMENT OF THE BEST PRACTICE RECOMMENDATIONS. OVERALL, STAKEHOLDERS HAVE EXPRESSED SUPPORT FOR THE BEST PRACTICE POLICY. THE FOLLOWING HAS BEEN CALLED OUT IN COMMENT LETTERS:

- Consideration of the effort required for data collection and reporting, allowing flexibility across health systems for alignment of measures with specific organizational opportunities
- Encourage flexible reporting timelines
- Request to shift data reporting deadline from October 2025 to December 2025
- Request for consideration of justifiable reporting delays in hospitals that are making a good faith effort in implementing best practices that may fall outside of the extraordinary circumstances exception policy. Noted above: [We will follow our extraordinary circumstances exception policy to address any unforeseen events \(i.e. cyberattack, natural disaster, etc.\)](#).
- Hospitals have been investing significant resources to implement initiatives directed at optimizing throughput and decreasing both IP and ED LOS. They ask that we also support and lead efforts to address external factors driving throughput and boarding issues related to an increased need for behavioral health and substance use disorder care, primary care, chronic condition management and complex post-acute care, as well as prior authorization delays and payer denials.
- Suggestions to also consider concurrent evaluation of other measures in the context of ED Wait Times, throughput and patient outcomes including: post-acute facility capacity, ambulatory and telemedicine care access related to ED wait times and hospital throughput, Left without being seen (LWBS), length of stay (stratified by discharge location and other factors), readmissions, 30-day mortality and patient experience
- Stakeholders also note external drivers of throughput issues including workforce challenges, supply delays, and capacity constraints across the continuum of care. Stakeholders support and in many instances volunteer to assist with efforts to address these external challenges, including engagement with legislators to facilitate meaningful actions.
- Request consideration of the +/- 0.25% revenue at risk in future years. Note: Policy indicates we will evaluate year 1 results before determining revenue at risk for subsequent years

HSCRC RESPONSE TO STAKEHOLDER FEEDBACK

- The HSCRC staff support flexibility of measure reporting across health systems to allow for targeted efforts at each hospital. This flexibility is reflected in the measures in the final draft recommendation.

- HSCRC supports flexible reporting timelines and would support a data reporting timeline that would request preliminary data reporting as data is available in CY2025 with a requirement to have a data submission by December 2025.
- As reflected in the policy, regarding justifiable reporting delays, HSCRC will follow our extraordinary exception policy to address any unforeseen events. HSCRC will consider each request for delayed reporting outside of this policy on a case-by-case basis.
- HSCRC staff supports the requested focus on external drivers of ED LOS and ED Wait Times, and are working with the ED Wait Time Reduction Commission and designated subgroups to address external factors driving: throughput and boarding issues related to an increased need for behavioral health and substance use disorder care, primary care, chronic condition management and complex post-acute care, as well as prior authorization delays and payer denials.
- External drivers related to capacity across the continuum of care, supplies, external throughput challenges, and workforce issues will be evaluated by the HSCRC staff in partnership with the ED Wait Time Reduction Commission and designated representatives from hospital and other health care organizations on the Capacity, Operations and Staffing Subgroup of the ED WTR Commission.
- HSCRC staff agree with the suggestion to concurrently evaluate other measures in the context of ED Wait Times, throughput and patient outcomes, including: post-acute facility capacity, ambulatory and telemedicine care access related to ED wait times and hospital throughput, Left without being seen (LWBS), length of stay (stratified by discharge location and other factors), readmissions, 30-day mortality and patient experience.
 - HSCRC staff and the ED WTR Data Subgroup have begun analyses focused on capacity and LOS and are in agreement with analysis of the other measures noted above in the comments.
 - Regarding the post-acute facility capacity and care transitions, legislative partners have volunteered to help facilitate collaboration between HSCRC, ED WTR Commission and hospitals and post-acute partners and support data analysis. We anticipate moving forward with this collaboration during this legislative session.
- HSCRC staff believes the request for consideration of the +/- 0.25 % revenue at risk for subsequent years has been addressed, as the policy notes that we will evaluate the impact of the best practices and make a final recommendation for subsequent rate years after the Year 1 Best Practice program impact is assessed.

FINAL RECOMMENDATIONS

This document puts forth for consideration the RY 2027 (CY 2025 performance period) draft policy recommendations on hospital best practices:

1. Building upon the ongoing work of staff and key stakeholders, refine the specifications developed by the Best Practice subgroup on a set of six Hospital Best Practices that are designed to improve the emergency department (ED) and hospital throughput and reduce ED length of stay (LOS).
 - a. For each best practice identified, three weighted tiers were developed with corresponding measures that reflect the fidelity and intensity of each best practice.
2. Require hospitals to select two Best Practices to implement and report data on for RY 2027.
 - a. Failure to implement and report data to the Commission by October 2025 will result in a 0.1 percent penalty on all-payer, inpatient revenue to be assessed in January 2026. We will follow our extraordinary circumstances exception policy to address any unforeseen events (i.e. cyberattack, natural disaster, etc.).

3. We propose that subsequent rate years will have a +/- 0.25 percent inpatient hospital revenue at risk tied to performance on these best practice metrics but intend to evaluate the impact of the best practices and make a final recommendation for subsequent rate years after the Year 1 Best Practice program impact is assessed.

APPENDIX A: HSCRC EFFORTS TO ADDRESS ED LENGTH OF STAY

Concerns about unfavorable ED throughput data have been shared by many Maryland stakeholders, including the HSCRC, the MHCC, payers, consumers, emergency department and other physicians, hospitals, the Maryland Institute of Emergency Medical Services Systems, and the Maryland General Assembly, with around a dozen legislatively mandated reports on the topic since 1994, including the Maryland General Assembly Hospital Throughput Work Group Final Report in March 2024.

Historically, HSCRC has taken several steps to address emergency department length of stay concerns. However, in the past few years, the COVID public health emergency and its effects on inflation and labor have had particularly significant negative impacts on hospitals and other care settings that patients may use after receiving hospital care (e.g., nursing homes), further exacerbating pressures on emergency departments.

Previously, the HSCRC included ED LOS measures in the QBR program for two years. In RY 2020 (CY 2018 measurement period), the QBR Program introduced the use of the two CMS inpatient ED wait time measures (chart abstracted measures: ED-1 and ED-2) as part of the QBR Person and Community Engagement (PCE) domain because of the high correlation between ED wait times and HCAHPS performance (also in the PCE domain and on which the state also performs poorly). CMS retired ED-1 after CY 2018 and ED-2 after CY 2019 necessitating both measures' removal from the QBR program after only two years. Overall, ED LOS improved (i.e., ED LOS time went down) for more than half the hospitals when the measures were in QBR, although some of the improvements were minimal. With the retirement of the chart-abstracted ED LOS measures, HSCRC continued to work to find a way to collect the data and include the results in QBR.

More recently, staff collaborated with CRISP and their contractor to collect the electronic Clinical Quality Measure (eCQM) ED-2 (Order of admission to admit time) for CYs 2022-2023. However, analyses of the ED-2 eCQM found that there are a significant number of hospitalizations (>50,000 statewide) that are dropped from the ED measure due to an exclusion for stays where the patient spends more than one hour in observation care. Furthermore, CMS discontinued this eCQM measure in CY 2024, rendering it not feasible for hospitals to continue to report the eCQM at this time for use in the QBR program.

To determine the direction for inclusion of an ED throughput measure in the RY 2026 QBR policy that would begin with CY2024 performance, the Commission considered several measurement options proposed by staff as well as other initiatives underway to address this issue going forward.

Ultimately, the Commission approved inclusion of ED 1-like measure in the RY 2026 QBR program to be finalized during CY 2024 and that would not require additional Commission approval. In working with ED Subgroup stakeholders in early 2024, staff selected a measure that mirrors the CMS ED1 measure, with specifications aligned with those of The Joint Commission as much as possible; the initial measure collection and submission is through an ad hoc electronic data pull for all patients that will be submitted on an ongoing basis eventually

through the existing HSCRC case mix data submission process; the initial ad hoc electronic data pull and submission includes data from CY 2023 to serve as the performance baseline period, and from January through March 2024. Hospitals also provided an ad hoc submission in December 2024 that will correct any previously submitted data and provide data from April through September 2024; beginning with data from October 2024 going forward, the ED measure data elements will be included as part of the standard case mix submission process. The ED1 LOS measure captures the time of emergency department arrival to the time of physical departure from the emergency department for patients admitted to the facility. The population is all ED patients (pediatrics and adults) admitted to an inpatient (IP) bed and discharged from the hospital during the reporting period.

Additional Initiatives: Emergency Department Dramatic Improvement Effort (EDDIE)

In June of 2023, Commissioner Joshi convened HSCRC, MIEMSS, MHA, and MDH to propose the EDDIE project with the goal of reducing the time patients spent in the emergency department and pushed the HSCRC staff and MHA to begin this project immediately (i.e., not wait until the next policy year) given the importance of this issue. The EDDIE project focuses on short-term, rapid-cycle improvement in ED patient experience by collecting and publicly reporting on ED performance data and fostering a quality improvement process to address those metrics.

Specifically, starting in July 2023, hospitals are submitting data on measures that mirror the CMS ED 1 and OP 18 CMS measures on a monthly basis in accordance with an excel reporting template along with a memo provided by HSCRC staff that contains reporting instructions and high-level specifications. The HSCRC has requested that the measures submitted be stratified by behavioral health based on initial ICD codes. Additionally, the HSCRC has developed a reporting process by which MIEMSS provides monthly reporting on EMS turnaround times by hospital. This will provide hospital accountability for improving efficiency in handoffs by EMS personnel, which will in turn improve EMS unit availability and decrease response times.

The HSCRC and MIEMSS are supporting this work by collecting and publicly reporting hospital ED wait times at monthly Commission meetings. The intent is to provide a mechanism for Commission monitoring of timely ED performance data that brings on-going attention to this issue through public reporting, provides an opportunity for the Commission to recognize and learn from high performers, and to track the hospitals improvement efforts relative to their aim statements. Once hospitals have submitted CY 2023 and CY 2024 patient level data, the staff will ask the Commissioners whether EDDIE data submissions are still needed.

Additional Initiatives: ED Potentially Avoidable Utilization

In CY 2021, Commissioners asked staff to evaluate expansion of potentially avoidable utilization (PAU) to emergency department utilization. Staff recommendations initially focused on high volume and low acuity chief complaint encounters (e.g., ear pain, dental problems) based on analysis of 2.4M ED observations with triage ratings. With workgroup/stakeholder vetting, this project was re-focused on multi-visit patients in the ED with >3

ED visits (statewide) in a 12-month period. A hospital monitoring program with reporting through CRISP has been established in CY 2023, with plans to consider a payment policy for CY 2025. A draft ED PAU policy will be presented at the November 2024 commission meeting.

Additional Initiatives: Legislative Workgroup

In early 2023, the Maryland General Assembly passed legislation establishing the Task Force on Reducing Emergency Department Wait Times to study best practices for reducing emergency department wait times; and requiring the Task Force to report its findings and recommendations to the Governor and the General Assembly by January 1, 2024. In response, MHA, with co-chair Dr. Ted Delbridge, executive director of Maryland Institute for Emergency Medical Services Systems (MIEMSS), led a multi-stakeholder work group, the Hospital Throughput Work Group, aimed at making recommendations to improve the patient journey in Maryland.

Members included hospital representatives, legislators, the HSCRC, the MHCC, the state Department of Health, patient advocates and emergency department and behavioral health providers. The Task Force was charged with making legislative, regulatory and/or policy recommendations in a report. The Maryland General Assembly Hospital Throughput Work Group Final Report was submitted in March 2024. The HSCRC staff were active participants in the Task Force and believe that inclusion of an ED length of stay measure in QBR will be consistent with any policy recommendations designed to improve ED length of stay and hospital throughput (i.e., a payment incentive should bolster performance improvement and not hinder other policy recommendations).

New Commission: Maryland Emergency Department Wait Time Reduction Commission

In the 2024 General Assembly session, legislation was passed establishing the ED Wait Times Reduction Commission, which went into effect on July 1, 2024. Figure E1 provides details on the ED Commission purpose, specific tasks, and member representation on the ED Commission.

Figure E1. ED Wait Time Commission Description

Establishment of Maryland ED Wait Time Reduction Commission

Bill went into effect July 1, 2024, and terminates June 30, 2027

Purpose: To address factors throughout the health care system that contribute to increased Emergency Department wait times

Specific focus: Develop strategies and initiatives to recommend to state and local agencies, hospitals, and health care providers to reduce ED wait times, including initiatives that:

- Ensure patients are seen in most appropriate setting
- Improve hospital efficiency by increasing ED and IP throughput
- Improve postdischarge resources to facilitate timely ED and IP discharge
- Identify and recommend improvements for the collection and submission of data
- Facilitate sharing of best practices

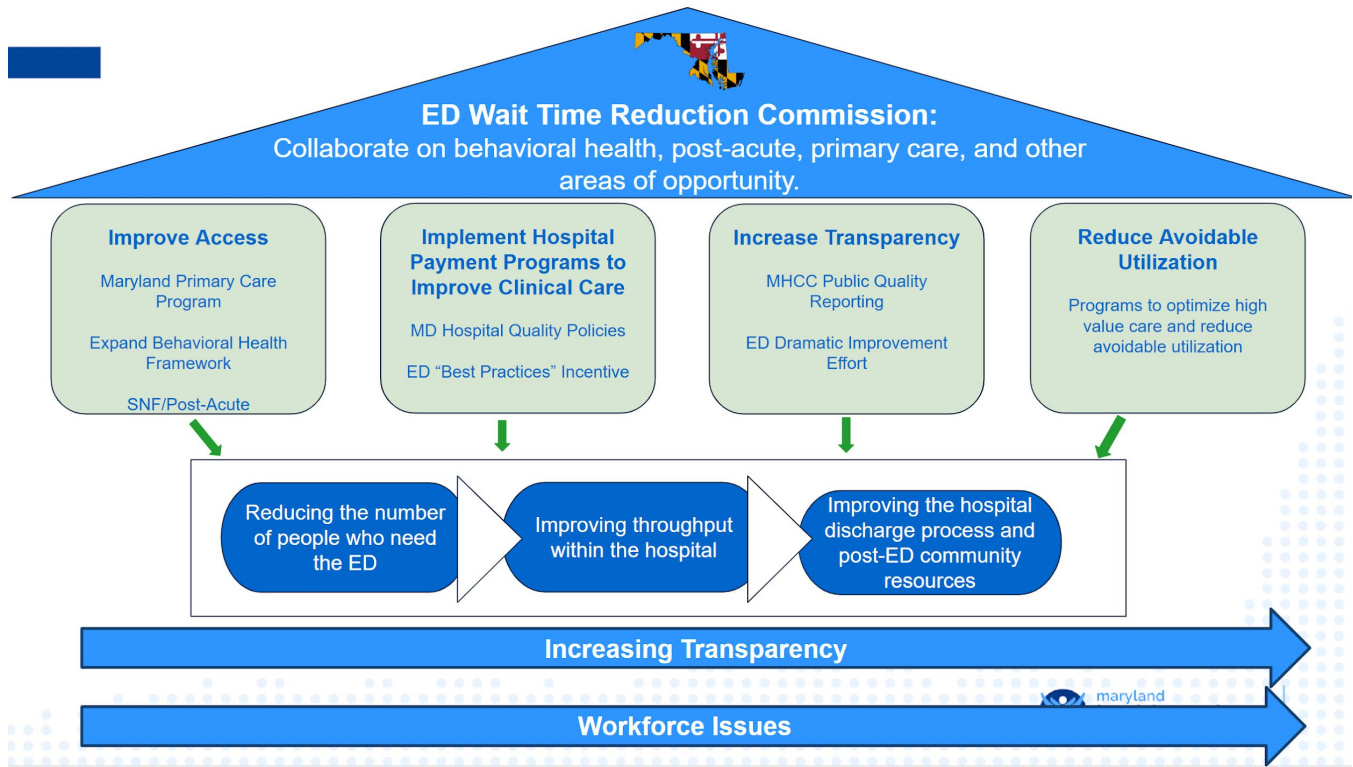
Chairs: Secretary of Health and Executive Director of HSCRC

Appointed Members:

- Executive Director of MIEMSS
- Executive Director of MHCC
- 2 Indiv. with operation experience in an ED, including 1 physician
- 1 Indiv with professional experience in an ED, who is not a physician or APP
- 1 representative from local EMS
- 1 representative from a Managed Care Plan with experience in Case Management
- 1 representative of Advanced Primary Care Practice
- 1 representative from MHA
- 1 representative from a patient advocacy organization
- 1 representative of a behavioral health provider

The ED Commission's work aligns with many of the current HSCRC policies and those under development. These policies, shown in Figure E2, are designed to address ED and hospital throughput by reducing the number of people who need ED services, improving ED and hospital throughput, and improving the hospital discharge process and community resources. The ED Commission will address state-level opportunities related to access to hospital and community-based services that impact ED wait times, such as access to behavioral health care, post-acute/SNF beds, and primary care. The ED Commission will also support hospital best practices to address ED wait times and throughput across Maryland hospitals. The ED Commission members have been appointed, and the first meeting occurred in October 2024. Four subgroups have been established and are reporting up through the ED Wait Time Reduction Commission, including the ED Hospital Throughput Best Practices subgroup, which also reports up through the HSCRC Commission as it relates to hospital policy.

Figure E2. ED Wait Time Commission and Other Initiatives to Reduce ED Wait Times



ED Wait Time Reduction Commission Subcommittees

Access to Non-Hospital Care

- Integrate and optimize best practices and data analytics for advanced primary care, specialty care, home health, post-acute care, and ancillary services in an effort to reduce avoidable ED and hospital utilization and improve care transition workflows throughout the continuum of care.
- Meetings every six to eight weeks.

Data Subcommittee

- Identify different data sources across healthcare platforms to include ambulatory, acute care, post-acute care, and third-party data. Will support the strategic data-driven priorities of the ED Wait Time Reduction Commission
- Meetings every six to eight weeks

ED Hospital Throughput Best Practices

- Develop a set of hospital best practices and scoring criteria to improve overall hospital throughput and reduce ED length of stay, advise on revenue at-risk and scaled financial incentives, and provide input on data collection and auditing.
- Meetings every four weeks.

Hospital Capacity, Operations & Staffing

- Subgroup will convene in April 2025.
- Planned focus of the subgroup is to assess access and capacity across the State, collaborate with commercial payers, Medicare, and Medicaid, and optimize workforce development opportunities.
- Meetings every four to six weeks.

January 17, 2025

Jon Kromm, PhD
Executive Director
Health Services Cost Review Commission
4160 Patterson Avenue
Baltimore, MD 21215 re

Dear Dr. Kromm,

We are writing to provide comments on the Emergency Department (ED) and Hospital Throughput Best Practices Draft Policy. We strongly support pilots to study ways to improve healthcare delivery and patient experience and outcomes for all patients.

As the Chief Nursing Executive and former ED nurse and director for twenty years, I have had the honor of contributing to the hard work and dedication of the ED team at TidalHealth. The efforts that have been made to enhance patient throughput and overall ED operations have been extensive, and I am incredibly proud of the strides that have been made.

The TidalHealth ED has implemented initiatives to enhance throughput including but not limited to interdisciplinary rounds on boarding patients, an internal department capacity management plan that has been presented on the national stage at the 2023 Emergency Nurses Association Conference in San Diego, CA, twice daily capacity huddles with leadership from both hospitals in our system, treatment of lower acuity patients in non-traditional care spaces while having efforts to maintain privacy and remain HIPAA compliant, a hospital wide throughput team that examines throughput challenges in both inside and outside the walls of the hospital, establishing the role of throughput nurse and many others. Our efforts have been successful because of the collaborative nature of the relationship between staff, physicians and advanced practice professionals and our dedication to our community.

Our performance because of these initiatives speaks for itself. TidalHealth is ranked eighth in overall throughput in the state and ranked first in similar high volume EDs. Our EMS median offload time is 7.3 minutes for the past six months for an average of almost 1600 arrivals per month. TidalHealth Peninsula Regional ED's average rate of patients who leave without being seen is under 3%.

We will continue our work as we believe in a culture of teamwork, innovation and continuous improvement and always challenge ourselves to better serve our community. As we continue to learn ways to improve and work to develop payment policies, we need to ensure we don't penalize Hospitals unfairly and differences are considered and adjusted for in the policies.

With this policy, the bed capacity in certain areas of the State and the close proximity to other hospitals has an impact and should be considered. We also should make sure that Hospitals that already perform well compared to their peers are not financially penalized for their good work.

We believe there are other factors and we want to work with the team as they develop the payment policy.

We appreciate the opportunity to submit our comments and we look forward to working with you to study the impact of the process measure adoptions on delivery of care.

Sincerely,

Angela Brittingham DNP, MS, RN, CEN, CPEN, NEA-BC, CPHQ
Vice President and Chief Nursing Officer

Cc:

Joshua Sharfstein, Chair HSCRC

Dr. James Elliott, Commissioner

Richardo Johnson, Commissioner

Dr. Maulik Joshi, Commissioner

Adam Kane, Commissioner

Nicki McCann, Commissioner

Dr. Farzaneh Sabi, Commissioner

Alyson Schuster Deputy Director, Quality Methodologies, HSCRC

Alan Pack, Principal Deputy Director, Quality and Population Based Methodologies,

HSCRC Kathy Talbot, Vice President of Finance and Chief Revenue Integrity Officer



February 19, 2025

Joshua Sharfstein, MD
Chairperson, Health Services Cost Review Commission
4160 Patterson Avenue
Baltimore, Maryland 21215

Dear Dr. Sharfstein,

On behalf of the Johns Hopkins Health System (JHHS), we appreciate the opportunity to provide input on the Emergency Department Best Practices Incentive Policy. We agree that Emergency Department wait times are important drivers for patient safety and patient satisfaction and that the wait times in Maryland and the nation must be significantly reduced.

Numerous community, payer, post-acute capacity, and hospital drivers contribute to prolonged Emergency Department wait times, particularly in a “post”-pandemic world with higher rates of mental health illness, substance use, and increased incidence of chronic diseases. We appreciate the HSCRC’s commitment to understand all of these drivers and to incentivize implementation of actionable processes that may reduce Emergency Department wait times. In pursuit of understanding these numerous drivers, JHHS also encourages staff to concurrently evaluate post acute facility capacity, ambulatory and telemedicine care access in relation to ED wait times and hospital throughput. Tracking the number of and length of stay of patients who are in our hospitals waiting for a post-acute care facility is an important indicator of a bottleneck in our shared delivery system.

JHHS encourages staff to also measure outcomes such as left before being seen, patient satisfaction, and complementary measures—such as 30-day mortality and subsequent length of stay or readmission—in order to develop a comprehensive, data-informed approach to Emergency Department wait times.

We appreciate that there is adequate time to collect data and performance, as the data will help identify not only opportunities for improvement on ED wait times, but also the other pressures impacting ED wait times. We are supportive of the approach as it exists today, though do recognize that the staff recommendation may need to be revisited once the data is collected and analyzed.

JHHS applauds HSCRC staff's collaborative, front-line clinician supported approach in developing appropriate best practices and tiered incentives. Emergency Department Wait times remain a challenging problem in Maryland and the nation, and we look forward to continued partnership with the HSCRC to further understand and mitigate this important issue.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter Hill". The signature is fluid and cursive, with the first name "Peter" written in a larger, more prominent script than the last name "Hill".

Peter Hill, MD
Senior Vice President Medical Affairs
Johns Hopkins Health System

cc: Josh Sharfstein, MD, Chairman Maulik Joshi, DrPH
James Elliott, MD, Vice Chairman Farzaneh Sabi, MD
Nicki McCann, JD Ricardo Johnson
Adam Kane Jonathan Kromm, Executive Director



Maryland
Hospital Association

February 19, 2025

Alyson Schuster, Ph.D.
Deputy Director, Quality Methodologies

Health Services Cost Review Commission
4160 Patterson Avenue
Baltimore, MD 21215

Dear Dr. Schuster:

On behalf of the Maryland Hospital Association (MHA) and our member hospitals and health systems, we appreciate the opportunity to comment on the Health Services Cost Review Commission's (HSCRC) hospital best practices draft policy proposal aimed at incentivizing the implementation and optimization of best practices to improve hospital throughput and reduce emergency department (ED) wait times.

MHA and its members share the HSCRC's commitment to improving patient flow and reducing ED length of stay (LOS), recognizing that timely patient movement is essential for quality care, patient safety, and operational efficiency. Maryland hospitals have been actively engaged in efforts to enhance throughput and alleviate bottlenecks in the care continuum. Many of these efforts are already demonstrating promising results, and we appreciate HSCRC's recognition of the ongoing work by hospital leaders, frontline staff, and key stakeholders to address these challenges.

While we support the intent of this policy to drive system-wide improvements, we encourage HSCRC to carefully consider the broader systemic factors contributing to ED crowding and throughput inefficiencies, many of which fall outside of hospital control. Workforce shortages, supply and prior authorization delays limiting access to post-acute care, and community-based alternatives to hospitalization are significant constraints that must be addressed in parallel with hospital-driven initiatives. Sustainable improvements require a holistic approach involving hospitals, payers, emergency medical services, post-acute facilities, primary care, and community-based organizations.

We offer the following considerations regarding the draft policy proposal:

Refining the Best Practice Specifications

We appreciate the hard work of the Emergency Department Hospital Best Practice Subgroup over the past year. We encourage HSCRC to engage further with hospitals to refine the

specifications, ensuring that the selected practices are evidence-based, adaptable across diverse hospital settings, and aligned with ongoing hospital initiatives.

The proposed three-tiered weighting system should be developed with clear, achievable metrics that reflect realistic implementation timelines and acknowledge the varying levels of hospital resources.

Hospital Selection and Implementation Requirements

Allowing hospitals to select two best practices for implementation is a reasonable approach. We urge HSCRC to consider flexible implementation timelines, recognizing that some best practices may require significant operational changes or infrastructure investments.

While we acknowledge the need for accountability, we are concerned that the proposed 0.1% penalty for non-implementation and reporting by October 2025 does not account for external barriers to meeting the reporting deadline. We recommend that HSCRC establish an alternative pathway for hospitals demonstrating good-faith efforts toward implementation but facing justifiable delays.

Future Performance-Based Incentives

We appreciate HSCRC's willingness to evaluate the impact of the policy in the first year before finalizing the financial implications for subsequent years. However, we urge HSCRC to assess hospital performance within the broader context of external constraints. Factors such as patient acuity trends, regional variations in post-acute care availability, and emergency medical services transport issues should be accounted for when determining hospital performance expectations.

Rather than imposing a strict 0.25% at-risk revenue model in subsequent years, we recommend a phased approach that prioritizes technical assistance, peer learning, and collaborative problem solving before implementing financial penalties.

Maryland hospitals remain committed to working alongside HSCRC and other stakeholders to improve hospital throughput and reduce ED wait times. We urge HSCRC to ensure that policy incentives are designed to support hospitals in overcoming systemic barriers rather than imposing undue penalties that will not address the full scope of challenges. We appreciate the opportunity to provide feedback and look forward to continued collaboration on this important issue.

Sincerely,



Brian Sims

Vice President, Quality & Equity

cc:

Dr. Jon Kromm, Executive Director

Dr. Joshua Sharfstein, Chairman

Dr. James Elliott

Ricardo Johnson

Dr. Maulik Joshi Adam Kane

Nicki McCann Dr. Farzaneh Sabi



maryland
health services
cost review commission

Draft Recommendation for the Maryland Hospital Acquired Conditions Program for Rate Year 2027

March 12, 2025

This document contains staff draft recommendations for the RY 2027 Maryland Hospital Acquired Conditions Program. Comments are due on Wednesday, March 21, 2025 and may be submitted to hsrc.quality@maryland.gov.

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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 drive improvements in patient outcomes and to ensure that any incentives to constrain hospital expenditures under the Total Cost of Care Model do not result in declining quality of care on an all-payer basis. 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.¹ The RY 2021 policy approach to performance assessment, scoring, and conversion of scores to revenue adjustments has been maintained through RY 2026. This RY 2027 draft recommendation maintains the Potentially Preventable Complication (PPC) measures used for RY 2026 and also presents potential options for updating the methodology to address small cell size concerns, as well as the scaling to determine revenue adjustments. Specifically, the policy provides validity and reliability analysis results, hospital-level and statewide scores and revenue adjustments for the current methodology that scores hospitals on each PPC individually compared to an option that scores hospitals based on a PPC composite measure. While small hospitals initially raised concerns about small cell sizes, staff proposes the Commission consider adopting this new scoring methodology for all hospitals based on the findings outlined in this policy. Last, staff also propose potential changes for how scores are converted to revenue adjustments.

The draft recommendations for the RY 2027 Maryland Hospital Acquired Conditions (MHAC) program are as follows:

1. 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. Assess performance using more than one year of 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 2024 and 2025.
3. Assess hospital performance based on statewide attainment standards.
4. Consider options for determining hospital scores:
 - a. Option1 (current methodology): Score hospital performance on each PPC individually

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

- weighted by Solventum (3M) cost weights as a proxy for patient harm. Hospitals are only assessed on the PPCs that meet minimum volume criteria.²
- b. Option 2 (staff proposal): Score hospital performance on a PPC composite that includes all payment PPCs weighted by hospital specific expected volume and Solventum (3M) cost weights as a proxy for patient harm³
5. Maintain a prospective revenue adjustment scale with a maximum penalty at 2 percent and maximum reward at 2 percent. Consider the following options for the revenue adjustment scale:
- a. Option 1 (current methodology): Linear scale that ranges from 0 to 100 percent and includes a 10 percentage point hold harmless zone. The cut point for penalties and rewards is determined by centering the no harmless zone around the average hospital MHAC score as determined through prospective modeling.
 - b. Option 2 (staff proposal): Continuous linear scale that ranges from 0 to 100 percent without a hold harmless zone. The cut point for penalties and rewards is average hospital MHAC score as determined through prospective modeling.
 - c. (New proposal for either option): Retrospectively assess the average hospital MHAC scores and propose to the Commissioners that the cutpoint be modified if the actual average score is more than +/- 10 percent different from the prospectively modeled average MHAC score.
6. Going forward, consider other candidate measures/measure sets that may be important for assessing hospital avoidable, harmful complications and appropriate for use in the program, e.g., digitally specified measures.

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

² Hospitals must have at least 20 at-risk and 2 expected PPCs in the two year base period used to calculate Statewide normative values (i.e., statewide PPC rate for each diagnosis and severity of illness level). This criteria means that not all hospitals are assessed on all Payment PPCs; in RY 2026 some hospitals were assessed on as few as 3 PPCs (on average hospitals were assessed on X number of PPC categories)

³ Hospitals without any at-risk or expected for a specific PPC would not be assessed on that PPC. The two maternity related PPCs are dropped for hospitals without this service line, but almost all other Payment PPCs are included for all hospitals at this time weighted by the hospital volume.

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 statewide 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). With the onset of the Total Cost of Care Model Agreement, each Quality 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.

For this RY 2027 MHAC draft policy, staff proposes maintaining the current focused list of payment PPCs and suggests consideration of potential changes to calculate hospital scores and applying revenue

adjustments to address small cell size concerns that particularly impact small hospitals; the potential changes entail the use of a composite measure to calculate all hospital scores, and updating the revenue adjustment scaling approach. The Assessment section of this draft includes an evaluation of PPCs in the payment program as well as those in “monitoring” status using the RY 2026 current MHAC methodology. This draft recommendation does not propose moving any complication categories from monitoring to payment. However, the Assessment section does provide analyses to evaluate the current methodology versus using a composite score, and includes a discussion of options for updating revenue adjustment scaling.

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 Federal Fiscal Year 2025.

Overview of the MHAC Policy

The MHAC program, first implemented for Rate Year 2011, is based on a classification system developed by 3M Health Information Systems (3M), now Solventum. To identify potentially preventable complications

(PPCs), the system uses the present-on-admission (POA) variable for eligible secondary diagnosis codes available in claims data to identify conditions not POA. The PPC system originally comprised specifications for 65 PPCs,⁴ 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.

Current MHAC Methodology

Figure 1 provides an overview of the three steps in the Rate Year 2026 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.

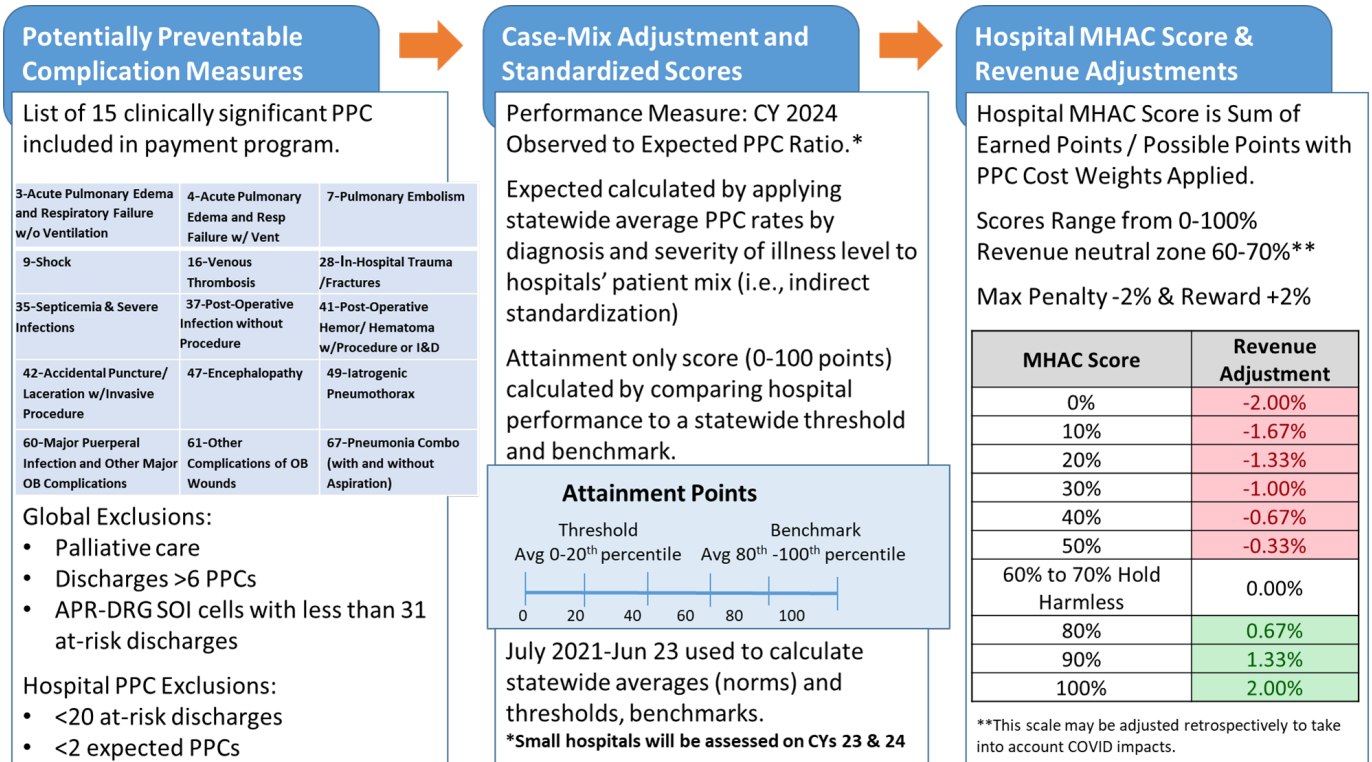
Step 2. Case-mix adjustment is used to calculate observed to expected ratios that are then converted to a standardized point score (from 0-100 points) based on each hospital's attainment levels using a similar scoring methodology that is used for CMS Value-Based Purchasing and Maryland QBR program.

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.

⁴ In RY 2020, 45 out of 65 PPCs or PPC combinations were included in the program as 3M had discontinued some PPCs and others were deemed not suitable for a pay-for-performance program. The re-designed RY 2021 policy reduced the PPCs assessed to a focused list of 14 PPCs that were clinically actionable and had higher rates and greater variation across hospitals, and/or were clinically significant. In RY 2025, the policy was updated to include PPC 47 Encephalopathy, so there are now 15 payment PPCs.

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 2026 MHAC Methodology



Assessment

This section provides an overview of the statewide PPC trends—for those used for payment, under monitoring, and overall (comprising a total of 58 PPCs)—using the current RY 2026 methodology. Following the results to date, this section provides analyses that evaluate the validity and reliability of hospital scores using the current methodology that scores hospitals on each PPC individually compared to options that score hospitals based on a PPC composite measure. Lastly, this section provides modeled revenue adjustments for hospitals based on both scoring methods as well as additional options for scaling rewards and penalties.

Statewide PPC Performance Trends

Performance trends to date provided below use the RY 2026 methodology, illustrating Maryland's continued improvement under the program.

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 September CY 2024.⁵ 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.⁶ Specifically, there has been a 40.9 percent decrease in the ratio based on the most recent data available (CY 2018 YTD O/E ratio = 1.15 and CY 2024 YTD O/E ratio = 0.68).

PPCs in the MHAC payment program include:

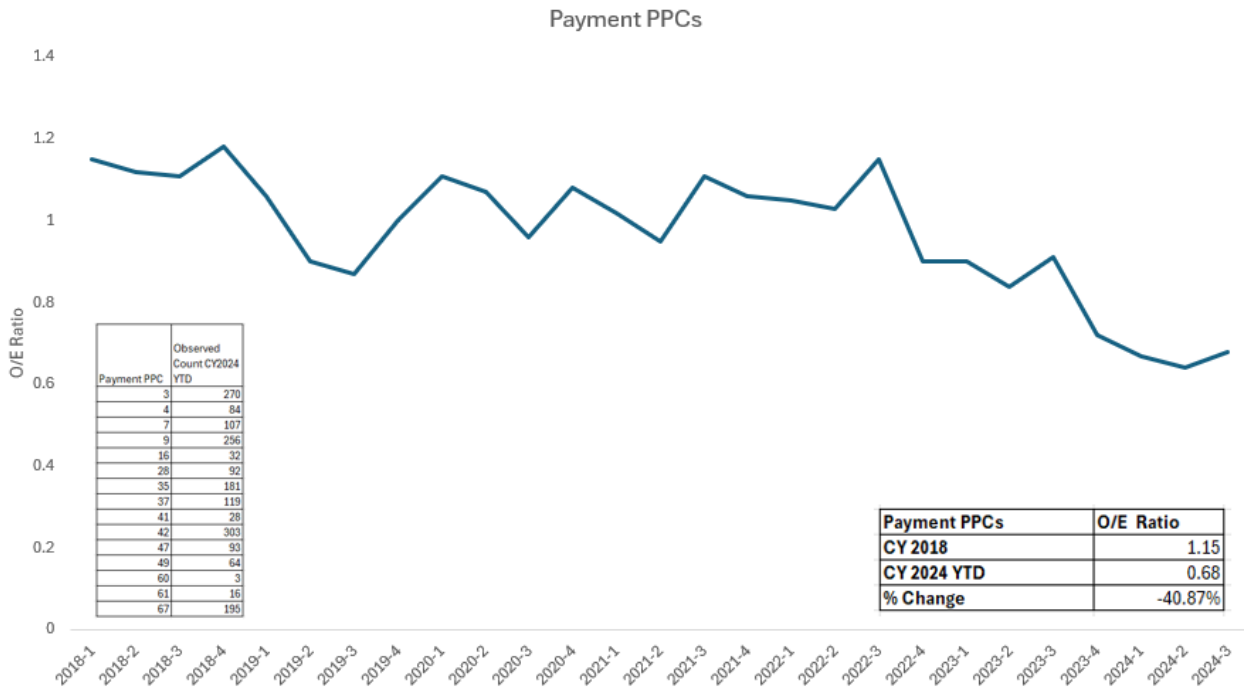
- 3 Acute Pulmonary Edema and Resp Failure w/o Ventilation
- 4 Acute Pulmonary Edema, Resp Failure w/ventilation
- 7 Pulmonary Embolism
- 9 Shock
- 16 Venous Thrombosis
- 28 In-Hospital Trauma and Fractures
- 35 Septicemia & Severe Infections
- 37 Post-Operative Infection & Deep Wound Disruption Without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

⁵ 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.

⁶Beginning in v38 of the 3M PPC grouper, COVID exclusions vary by PPC.

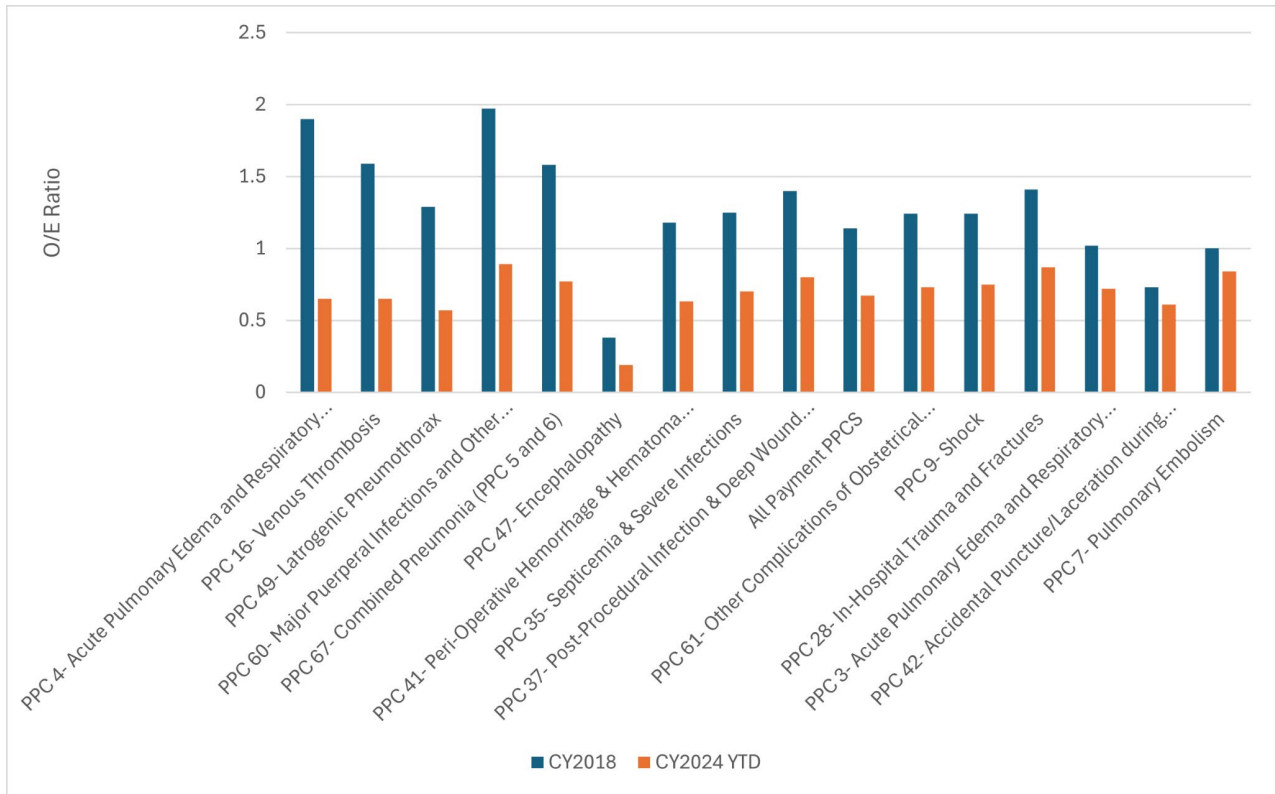
- 41 Peri-Operative Hemorrhage & Hematoma w/ Hemorrhage Control Procedure or I&D
- 42 Accidental Puncture/ Laceration During Invasive Procedure
- 47 Encephalopathy
- 49 Iatrogenic Pneumothorax
- 60 Major Puerperal Infection and Other Major Obstetric Complications
- 61 Other Complications of Obstetrical 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 2024 YTD Through September



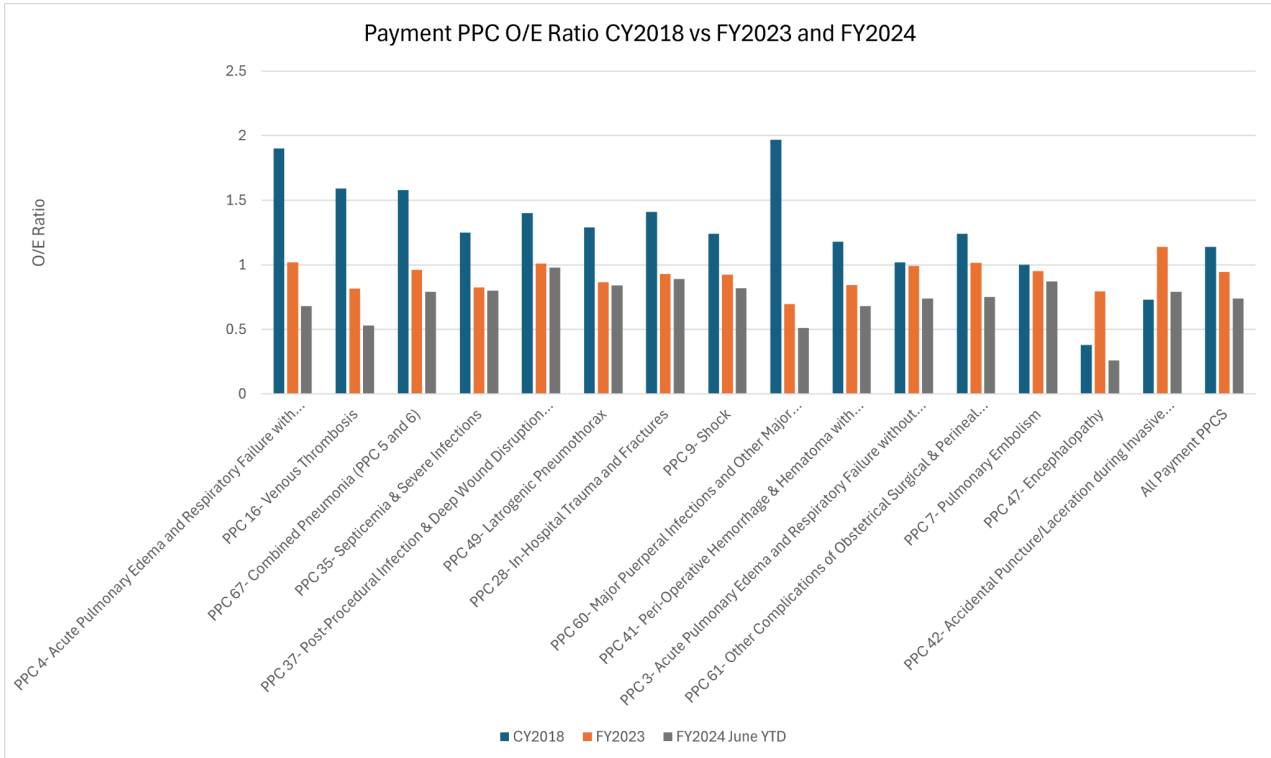
In terms of specific improvements among the 15 payment PPCs, Figure 3 shows the O/E ratios for CY 2018 and CY 2024 YTD, sorted from greatest percent decrease (on the left). The three PPCs with the greatest decreases (improvements) include PPC 4- Acute Pulmonary Edema and Respiratory Failure with Ventilation, PPC16- Venous Thrombosis, and PPC 67- Combined Pneumonia.

Figure 3. Payment Program PPC Observed to Expected Ratios CY 2018 and CY 2024 September YTD



Staff also analyzed payment PPC changes for FYs 2023 and 2024 compared to the base period of CY 2018 as illustrated in Figure 4 below. The overall PPC O/E ratios show a steadily declining trend across the three time periods; from FY2023 to FY2024 all payment PPCs showed a decrease in the O/E ratios (improvement).

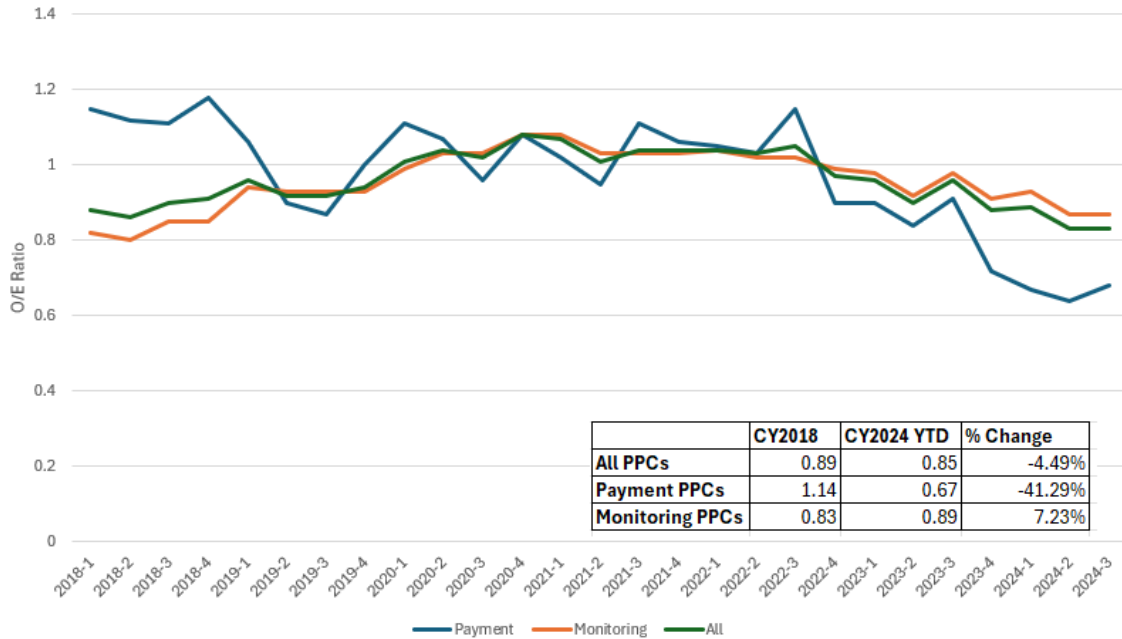
Figure 4. Payment Program PPC Observed to Expected Ratio Trends; CY 2018, FY 2023, and FY 2024



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 a decrease in the overall statewide O/E ratio from 0.89 in CY 2018 to 0.85 in CY 2024 YTD through September; the minimal improvement in overall performance is the result both of increases in some of the PPCs under monitoring status and reductions in the payment program PPCs, as illustrated in Figure 5 below. As also illustrated, the monitored PPC trends have increased from 0.83 as of 2018 to 0.89 in YTD 2024 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 2024 Qtr 3



To support determinations on whether to move monitored PPCs into the payment program, staff considers several factors identified by the Clinical Adverse Events Measures (CAEM) subgroup which was convened when the MHAC program was re-designed for RY 2021. These include:

- PPC Data Analysis/Statistics: greater than 50% increase in O/E ratio compared 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, and 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, impact on all-payers.

Based on staff evaluation of the monitored PPCs vetted with the PMWG, staff does not recommend moving any monitored PPCs into the payment program for RY 2027. Appendix III provides the statewide percentage changes in the O/E ratios for the monitored PPCs from 2018 to 2024 YTD through September sorted by the observed PPCs with the largest increases.

Stability of Case-Mix Adjusted PPC Rates and Scoring

Small Cell Size Considerations

Statistical issues of measurement validity and reliability related to small cell sizes impact all hospitals but are amplified for small hospitals. The current MHAC program addresses small cell size concerns in two ways: 1) All 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) Small hospitals (those with less than 21,500 at-risk or 22 expected PPCs across all payment PPCs) are assessed using two years of data. Currently in RY 2026, only 4 hospitals are assessed on all of the 15 PPCs in the MHAC program and 5 hospitals are considered small hospitals by the criteria outlined above.

Despite the Commission's best efforts to address small cell size concerns, one relatively small hospital has requested changes to the MHAC policy that would better balance the tradeoff between incenting greater year over year performance across all in-hospital complications and concerns of statistical instability for PPC evaluations amongst small hospitals. In advance of the RY 2026 Policy, the hospital expressed their concerns that they had in previous years been eligible for PPC 35-Sepsis but had the previous 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 on PPC 35 is not counted or recognized in their score. Staff did not remove the inclusion requirement of 2 expected PPCs, as there was concern over the potential instability of the measurement with very low numbers of events. Further, the hospital was concerned that they were measured on two years of performance, vs. one year, as a small hospital.

As Maryland hospitals continue to improve on payment PPCs, small cell size issues are also impacting larger hospitals (i.e., non-small hospitals). The current approach of having minimum criteria for at-risk and expected is designed to increase validity and reliability. However, over time, hospitals may be assessed on fewer PPC measures, effectively reducing the comprehensiveness of the program and failing the crucial test of content validity, the degree to which a measure captures the concept it is intended to measure. Thus, staff assessed methods to evaluate the PPCs through updates to the MHAC methodology aimed at better addressing small cell size issues and related statistical reliability and validity. Among the methods considered were Bayesian smoothing⁷, an approach used by CMS for the same concerns, and composite

⁷ Under this Bayesian smoothing approach, a hospital's smoothed O/E ratio for each PPC measure equals the sum of a) the hospital's O/E ratio for the PPC measure times the reliability of the PPC measure at the hospital and b) one

measurement, i.e., evaluating all PPCs as one measurement as opposed to evaluating each PPC unto itself.. Results of the modeling to address small cell sizes were presented to the PMWG during the RY 2026 policy development process. Initial concerns regarding Bayesian smoothing were that, despite improved statistical reliability, small hospitals' evaluations and financial penalties/rewards would be driven by the statewide average as opposed to the hospital's' performance, which additionally could reduce the incentive for small hospitals to improve since their score would be based on other hospitals. For these reasons, staff focused its attention on the composite measurement approach in RY 2027.

Potential PPC Composite Score Options to Improve Statistical Measurement

During the RY 2027 MHAC updating process, concerns were again raised regarding the current MHAC methodology by PMWG members and other hospital stakeholders and included the following:

- Hospital performance may be based on a small subset of PPCs, as few as two or three of the 15 PPC measures for small hospitals.
- PPC measure reliability is low for some of the PPCs.
- Scores for hospitals defined as small tend to be at the high or low ends of performance.
- Two years of data in the measurement period for small hospitals (vs. one year for other hospitals) means that one year of performance will be counted in two consecutive Rate Year scores under the program.

Working with Mathematica Policy Research (MPR), staff assessed and presented options for developing a PPC composite to address these issues. Specifically, three potential composite methodologies were modeled and compared to the current MHAC methodology. Similarities and differences from the current methodology in the steps for calculating hospital composite scores are outlined in Figure 6 below.

Figure 6. Summary of MHAC Score Calculation Steps for Current Methodology vs Models

minus the reliability of the PPC measure at the hospital times the statewide O/E ratio for the PPC measure. If the reliability of a PPC measure is 1.00 at the hospital, then the hospital's smoothed O/E ratio equals the hospital's O/E ratio and is not affected by the statewide average. If the reliability of a PPC measure is 0.00 at a hospital, then the hospital's smoothed O/E ratio equals the statewide average.

1-3

Calculation Steps	Current Methodology	PPC Composite Option 1	PPC Composite Option 2	PPC Composite Option 3
PPC Exclusion Criteria	Exclude PPC measures with <2 expected PPCs or <20 at risk discharges	Exclude PPCs with 0 at-risk discharges		
PPC Measure "Volume" Weights	PPC measures not weighted by volume	PPC measures with greater expected PPCs at hospital receive a larger weight	PPC measures with more at-risk discharges at hospital receive larger weight	PPC measures with more observed PPCs across Maryland hospitals receive a larger weight
PPC Measure 3M Cost Weights	PPC measures are weighted by 3M Cost Weights			
Benchmarks and Thresholds	For each of the 15 payment PPCs, calculate a benchmark and threshold	Calculate a benchmark and threshold for the PPC Composite		

As shown in Figure 6 above, the current methodology and the three composite options staff assessed all have different approaches to PPC measure volume weights. While all of the methods tested maintain the use of the Solventum (3M) cost weights as a proxy for patient harm, the composite methodologies differ in that the hospitals are scored on the PPC measure composite as opposed to being scored on each individual PPC and the PPC exclusion logic for the current methodology excludes far more PPC's.

In order to evaluate the current methodology and potential composite score options, staff assessed the content validity, predictive validity, and reliability of each method. Content validity refers to the degree to which a measure captures the concept it is intended to measure. The intention of the MHAC Program is to evaluate Maryland hospitals based on their performance on the 15 payment PPCs, so methodologies that evaluate Maryland hospitals on all 15 payment PPCs would have the highest content validity. The composite methodologies tested evaluate Maryland hospitals on payment PPC measures with greater than 0 at-risk discharges, resulting in very high content validity, even for the smallest hospitals (Figure 7).

Figure 7. Content Validity Current Methodology Versus Composite Options

Hospital Category*	Number of Hospitals	Average Number of PPC Measures Evaluated	
		Current Methodology	Composite Methodology
Small Hospitals	5	3.6	13.2
Medium Hospitals	15	11.0	14.5
Large Hospitals	21	13.8	15

*Hospital category definitions are based on FY 2024 data. Small hospitals had less than 21,500 at-risk discharges or 22 expected PPCs; medium hospitals had between 60,000 and 150,000 at-risk discharges; large hospitals had greater than 150,000 at-risk discharges.

As previously stated, the current methodology evaluates Maryland hospitals on PPC measures for which the hospital has at least two expected PPCs, resulting in fewer PPC measures being evaluated, especially for small and medium hospitals. As illustrated in Figure 7 above, the five small Maryland hospitals are evaluated on an average of 3.6 payment PPC measures under the current methodology compared with 13.2 payment PPC measures under the composite methodologies. The 15 medium Maryland hospitals are evaluated on an average 11.0 payment PPC measures under the current methodology compared with 14.5 payment PPC measures under the composite methodologies. In addition to improving content validity, evaluating small hospitals on almost all of the 15 payment PPCs under the composite methodologies lessens the degree to which one observed PPCs on one payment PPC measure can have a drastic negative impact on a small hospital's MHAC revenue adjustment in consecutive rate years.

Reliability refers to the consistency of a measure and thus its dependability in assessing the performance of an intervention versus random variation.. Staff assessed the reliability of PPC measures and PPC composite values using the Morris signal-to-noise method under which a score of 1.00 indicates a perfect signal of hospital performance without noise (i.e., perfect reliability) and a score of 0 indicates no signal of hospital performance and all noise (i.e., worst reliability). Staff consider reliability above 0.50 to be acceptable but would hope the MHAC methodology could achieve an average reliability across Maryland hospitals of 0.75 or higher. The current methodology achieves reliability generally somewhat below the desired minimum of 0.50, with the average reliability across FY 2021 to FY 2024 being 0.39. Composite

Options 1, 2, and 3 all yield substantially higher reliability than the current methodology, especially Composite Option 1 with an average reliability of 0.76 across FY 2021 to FY 2024 (Figure 8).

Figure 8. Average Reliability Across Maryland Hospitals using a 1-year Performance Period by Methodology

Performance Period	Current Methodology*	Composite Option 1	Composite Option 2	Composite Option 3
FY 24	0.24	0.61	0.48	0.54
FY 23	0.38	0.81	0.63	0.68
FY 22	0.50	0.81	0.70	0.76
FY 21	0.42	0.80	0.62	0.72
Average	0.39	0.76	0.61	0.68

Based on the results of reliability and validity analyses of the current methodology versus the composite options presented above and also detailed in Appendix IV, **staff supports consideration of Option 1 to replace the current methodology.**

Hospital Scores and Revenue Adjustments

The hospital MHAC scores are calculated based on 1) hospital performance on each payment PPC measure relative to the PPC measure's benchmark and threshold (current methodology) or 2) hospital performance on the PPC composite relative to the PPC composite benchmark and threshold (staff proposal). Hospital MHAC scores are 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. Should Commissioners approve staff's proposal to move to a PPC composite measurement, staff is proposing to adopt a continuous linear revenue adjustment scale that ranges from 0 to 100 percent without a hold harmless zone, using average hospital MHAC score as determined through prospective modeling as the cutpoint for rewards and

penalties. Staff believes there is no longer a need for a hold harmless zone because the composite methodology achieves a highly reliable measurement of hospital performance on payment PPC measures. Figure 9 provides the estimated revenue adjustments statewide under the current methodology and Composite Option 1, with and without a hold harmless zone. This prospective modeling is not actual values for any rate year, and may be updated in the final policy with more recent data that has the same gap between the base and performance period. For this modeling, the average MHAC score was 75 percent so this was used to determine the cut point between penalties and rewards.

The estimated statewide aggregate penalties and aggregate rewards were one and a half to two times larger, respectively, under Composite Option 1 than the Current Methodology (Figure 1). Net revenue adjustments increased from \$11.8 million under the Current Methodology to \$25.5 million under the Composite Option 1 with no hold harmless zone (staff proposal). Hospitals' estimated revenue adjustments under the Current Methodology and Composite Option 1 were highly correlated (0.83 with no hold harmless zone and 0.85 with a hold harmless zone).

Figure 9. Statewide Aggregate Revenue Adjustments Under Current Methodology and Composite Option 1

Statewide Revenue Adjustments	Current Methodology		Composite Option 1	
	No Hold Harmless Zone	Hold Harmless Zone	No Hold Harmless Zone	Hold harmless Zone
Aggregate Net Revenue Adjustment	\$11,816,553	\$9,289,553	\$25,518,286	\$22,286,597
Aggregate Penalties	-\$23,903,863	-\$16,502,774	-\$35,931,679	-\$29,594,430
Penalties: % of inpatient spending	-0.20%	-0.14%	-0.30%	-0.25%
Aggregate Rewards	\$35,720,416	\$25,792,327	\$61,449,965	\$51,881,027
Rewards: % of inpatient spending	0.30%	0.22%	0.52%	0.44%

Appendix V contains the by-hospital MHAC scores and estimated hospital revenue adjustments under the current methodology and Composite Option 1. Staff is also considering an option to retrospectively assess the average hospital MHAC scores and propose to the Commission that the cut point be modified if the actual average MHAC score is more than +/- 10 percent different from the prospectively modeled average MHAC score.

Recommendations

This RY 2027 draft recommendation maintains the measures used for RY 2026 but presents potential options for updating the methodology using composite scores, to address concerns of small cell sizes and those raised by small hospitals; results of the composite models will be presented in the final policy.

The draft staff recommendations for the RY 2027 Maryland Hospital Acquired Conditions (MHAC) program are as follows:

1. 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. Assess performance using more than one year of 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 2024 and 2025.
3. Assess hospital performance based on statewide attainment standards.
4. Consider options for determining hospital scores:
 - a. Option1 (current methodology): Score hospital performance on each PPC individually weighted by Solventum (3M) cost weights as a proxy for patient harm. Hospitals are only assessed on the PPCs that meet minimum volume criteria.⁸

⁸ Hospitals must have at least 20 at-risk and 2 expected PPCs in the two year base period used to calculate Statewide normative values (i.e., statewide PPC rate for each diagnosis and severity of illness level). This criteria means that not all hospitals are assessed on all Payment PPCs; in RY 2026 some hospitals were assessed on as few as 3 PPCs (on average hospitals were assessed on X number of PPC categories)

- b. Option 2 (staff proposal): Score hospital performance on a PPC composite that includes all payment PPCs weighted by hospital specific expected volume and Solventum (3M) cost weights as a proxy for patient harm⁹
5. Maintain a prospective revenue adjustment scale with a maximum penalty at 2 percent and maximum reward at 2 percent. Consider the following options for the revenue adjustment scale:
 - a. Option 1 (current methodology): Linear scale that ranges from 0 to 100 percent and includes a 10 percentage point hold harmless zone. The cut point for penalties and rewards is determined by centering the no harmless zone around the average hospital MHAC score as determined through prospective modeling.
 - b. Option 2 (staff proposal): Continuous linear scale that ranges from 0 to 100 percent without a hold harmless zone. The cut point for penalties and rewards is average hospital MHAC score as determined through prospective modeling.
 - c. (New proposal for either option): Retrospectively assess the average hospital MHAC scores and propose to the Commissioners that the cutpoint be modified if the actual average score is more than +/- 10 percent different from the prospectively modeled average MHAC score.
6. Going forward, consider other candidate measures/measure sets that may be important for assessing hospital avoidable, harmful complications and appropriate for use in the program, e.g., digitally specified measures.

⁹ Hospitals without any at-risk or expected for a specific PPC would not be assessed on that PPC. The two maternity related PPCs are dropped for hospitals without this service line, but almost all other Payment PPCs are included for all hospitals at this time weighted by the hospital volume.

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>

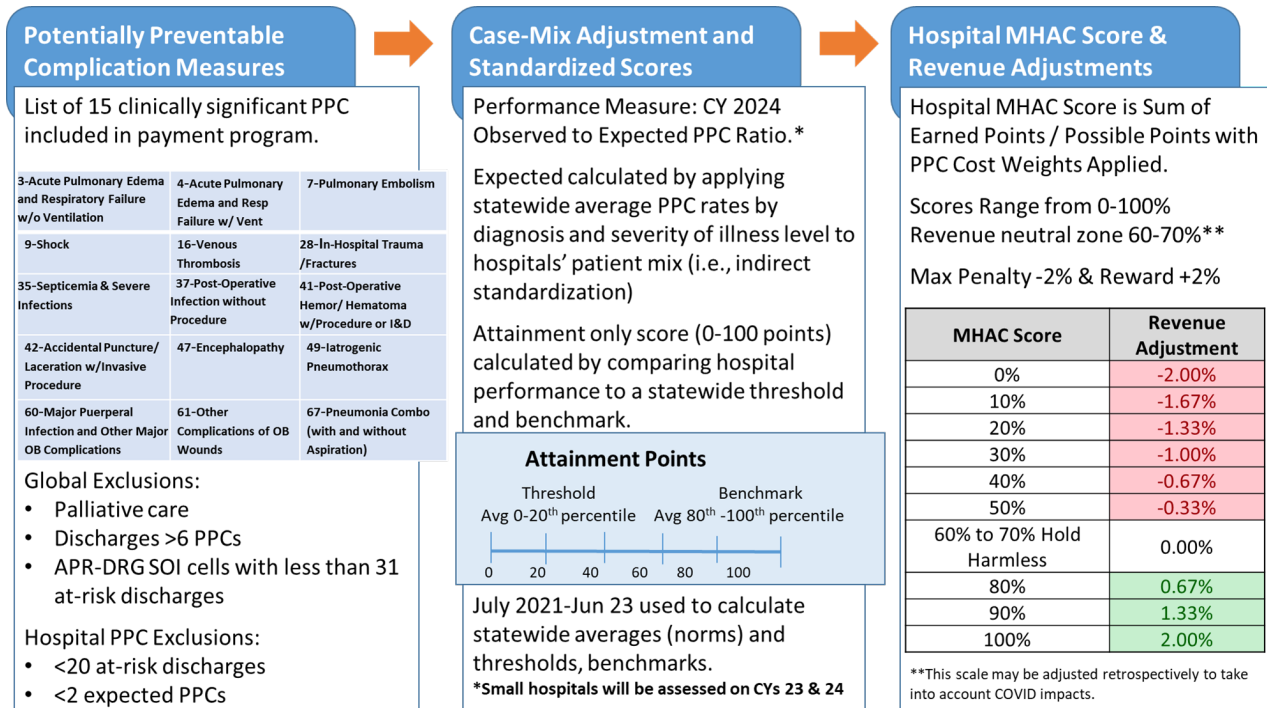
For more information on the HAC Reduction program, please refer to:

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

Appendix II: RY 2026 MHAC Program Methodology

Figure 1 below provides a summary overview of the approved RY 2026 MHAC methodology.

Figure 1. Overview of RY 2026 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 the base period:

- The number of cases at-risk is less than 20; and
- The expected number of PPCs is less than 2.

The PPCs for which a hospital will be assessed are determined using the base period 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 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. 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). “

RY 2026 Update: Calculating Performance Standards

Staff modified 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 the 90th and 10th percentile). This updated methodology is more in line with the CMS VBP program approach to setting the benchmark. Staff explored a couple of options and determined that averaging the 20 percent of O/E ratios of the worst and best performing hospitals results yields similar benchmark and threshold values compared to the previous method but avoids the cliff effects of using a single percentile.

Appendix III: Monitoring PPCs

The table below shows the monitored PPCs' O/E ratios for CY 24 YTD (through September) and the percent changes in the observed-to-expected ratio from CY 2018.

Monitoring PPC	2018 O/E	2024 YTD O/E	2018-2024 % Change
2:Extreme CNS Complications	1.82	0.82	-55.19%
21: Clostridium Difficile Colitis	1.31	0.73	-44.50%
25: Renal Failure with Dialysis	1.19	0.68	-43.37%
45: Post-Procedure Foreign Bodies	0.79	0.52	-34.51%
29:Poisonings due to Anesthesia	0.88	0.61	-30.88%
10: Congestive Heart Failure	0.82	0.58	-28.67%
65:Urinary Tract Infection without Catheter	1.11	0.80	-27.62%
66: Catheter-Related Urinary Tract Infection	1.02	0.74	-26.95%
39:Reopening Surgical Site	1.08	0.85	-20.91%
14: Ventricular Fibrillation/Cardiac Arrest	0.84	0.74	-11.31%
33: Cellutis	0.92	0.90	-2.49%
11: Acute Myocardial Infarction	0.96	0.95	-0.95%
54: Infections due to Central Venous Catheters	0.85	0.88	3.58%
18: Major Gastrointestinal Complication with Transfusion or Significant Bleeding	0.52	0.60	14.66%
24: Renal Failure without Dialysis	0.81	0.96	17.77%
40: Peri-Operative Hemorrhage & Hematoma without Hemorrhage Control Procedure or I&D Proc	0.82	0.97	18.76%
20: Other Gastrointestinal Complications without Transfusion or Significant Bleeding	0.69	0.88	28.36%
44: Other Surgical Complication- Mod	0.63	0.81	29.38%
8: Other Pulmonary Complications	0.72	0.95	31.05%
23: GU Complications Except UTI	0.61	0.84	38.07%
1:Stroke & Intracranial Hemorrhage	0.68	0.95	40.57%
48: Other Complications of Medical Care	0.57	0.80	40.77%
19:Major Liver Complications	0.69	0.98	41.55%
26: Diabetic Ketoacidosis & Coma	0.59	0.88	47.97%
50: Mechanical Complication of Device, Implant & Graft	0.56	0.84	50.35%
15: Peripheral Vascular Complications Except Venous Thrombosis	0.53	0.80	50.68%
34: Moderate Infections	0.60	0.92	52.77%
13: Other Cardiac Complications	0.57	0.87	52.96%

Monitoring PPC	2018 O/E	2024 YTD O/E	2018-2024 % Change
64: Other In-Hospital Adverse Events	0.49	0.77	58.40%
27: Post-Hemorrhagic & Other Acute Anemia with Transfusion	0.72	1.16	61.66%
52: Inflammation & Other Complications of Devices, Implants or Grafts Except Vascular Infection	0.67	1.09	63.24%
17: Major Gastrointestinal Complications without Transfusion or Significant Bleeding 0	0.67	1.09	63.24%
38: Post-Operative Wound Infection & Deep Wound Disruption with Procedure	1.24	2.07	67.39%
53: Infection, Inflammation & Clotting Complications of Peripheral Vascular Catheters & Infusions	0.54	0.92	69.77%
51: Gastrointestinal Ostomy Complications	0.47	0.88	87.51%
59: Medical & Anesthesia Obstetric Complications	0.48	0.99	106.96%
31: Decubitus Ulcer	0.35	0.87	147.91%
30: Poisonings due to Anesthesia	0 observed	0 Observed	
32: Transfusion Incompatibility Reaction	0 observed	0 Observed	

Appendix IV. Composite Options Testing Results

As shown in the equation below, PPC Composite Option 1 is calculated as the sum of the hospital's observed PPCs times the 3M Cost Weight for each payment PPC measure divided by the sum of the hospital's expected PPCs times the 3M Cost Weight for each payment PPC measure.

$$PPC\ Composite_j = \frac{(\sum_{i=1}^{15} ObservedPPC_{ij} * 3MCostWeight_i)}{(\sum_{i=1}^{15} ExpectedPPC_{ij} * 3MCostWeight_i)}$$

PPC Composite Option 1 does not explicitly weight PPC measures by volume, but PPC measures with higher expected PPCs receive more weight. The expected PPCs for a PPC measure increases as the volume of at-risk discharges increases.

As show in the equation below, PPC Composite Option 2 is calculated as the sum of the hospital's observed-to-expected (O/E) ratio for each payment PPC measure, weighted by the PPC measure's 3M Cost Weight and hospital's volume of at-risk discharges for the given PPC measure.

$$PPC\ Composite_j = \sum_{i=1}^{15} \left(\frac{Observed\ PPCs_{ij}}{Expected\ PPCs_{ij}} \right) * \left(\frac{Volume_{ij} * 3MCostWeight_i}{\sum_{i=1}^{15} Volume_{ij} * 3MCostWeight_i} \right)$$

As shown in the equation below, PPC Composite Option 3 is calculated as the sum of hospital's O/E ratio for each payment PPC measure, weighted by the PPC measure's 3M Cost Weight and the proportion of observed payment PPCs statewide for the given PPC measure.

$$PPC\ Composite_j = \sum_{i=1}^{15} \left(\frac{Observed\ PPCs_{ij}}{Expected\ PPCs_{ij}} \right) * \left(\frac{StateProportion_i * 3MCostWeight_i}{\sum_{i=1}^{15} StateProportion_i * 3MCostWeight_i} \right)$$

For example, if there were 10,000 observed PPCs across the 15 payment PPC measures across Maryland hospitals and there were 1,000 observed PPCs for a given payment PPC measure, then the statewide proportion would be 0.10 for the PPC measure.

Staff used data from FY 2018 through FY 2024 to model six iterations of Maryland hospital results under each composite option and the current methodology (Figure I). To inform decision making, staff assessed the content validity, predictive validity, and reliability of each composite option and the current methodology across the six iterations of results.

Figure I. Performance Periods for Each Iteration of MHAC Results

Iteration	Small Hospital Performance Period	Non-Small Hospital Performance Period
1	FY 2023- FY 2024	FY 2024
2	FY 2022- FY 2023	FY 2023
3	FY 2021- FY 2022	FY 2022
4	FY 2020- FY 2021	FY 2021
5	FY 2019- FY 2020	FY 2020
6	FY 2018- FY 2019	FY 2019

Notes: 1) A base period of FYs 2021 and FY 2022 was used for each iteration to keep PPC measure O/E ratios and PPC composite values on the same scale to facilitate comparisons across iterations. 2) Small hospitals were identified as having <21,500 at-risk discharges or <22 expected PPCs during the base period.

Content validity refers to the degree to which a measure captures the concept it is intended to measure. The intention of the MHAC Program is to evaluate Maryland hospitals based on their performance on the 15 payment PPCs, so methodologies that evaluate Maryland hospitals on all 15 payment PPCs would have the highest content validity. The composite methodologies evaluate Maryland hospitals on payment PPC measures with greater than 0 at-risk discharges, resulting in very high content validity even for the smallest hospitals (Figure 2). The current methodology only evaluates Maryland hospitals on PPC measures for which the hospital has at least two expected PPCs, resulting in fewer PPC measures being evaluated especially for small and medium hospitals. The five small Maryland hospitals are evaluated on an average of 13.2 payment PPC measures under the composite methodologies compared with 3.6 payment PPC measures under the current methodology. The 15 medium Maryland hospitals are evaluated on an average of 14.5 payment PPC measures under the composite methodologies compared with 11 payment PPC measures under the current methodology. In addition to improving content validity, evaluating small hospitals on almost all of the 15 payment PPCs under the composite methodologies lessens the degree to which one observed PPCs on one payment PPC measure can drastically negatively impact a small hospital's MHAC revenue adjustment in consecutive rate years.

Figure 2. Content Validity Current Methodology Versus Composite Options

Hospital Category*	Number of Hospitals	Average Number of PPC Measures Evaluated	
		Current Methodology	Composite Methodology
Small Hospitals	5	3.6	13.2
Medium Hospitals	15	11.0	14.5
Large Hospitals	21	13.8	15

Predictive validity refers to the extent that past performance is predictive of future performance. Staff calculated correlations in hospitals' PPC composite values across iterations to assess predictive validity. A measure can be considered to have sufficient predictive validity if adjacent performance periods have moderately to highly correlated and correlations get smaller as the distance between performance periods increases. All composite options demonstrated sufficient predictive validity, but Composite Option 1 demonstrated slightly higher correlations across iterations of results (Figure 3).

Figure 3. Average Correlations of Composite Values Composite Options

Distance Between Performance Periods	Composite Option 1	Composite Option 2	Composite Option 3
1 Year Apart	0.61	0.57	0.53
2 Years Apart	0.40	0.34	0.28
3 Years Apart	0.31	0.23	0.27
4 Years Apart	0.13	0.10	0.10

Reliability refers to the degree to which a measure captures the underlying quantity the measure is intended to capture. Staff assessed the reliability of PPC measures and PPC composite values using the Morris signal-to-noise method under which a score of 1.00 indicates a perfect signal of hospital performance without noise (i.e., perfect reliability) and a score of 0 indicates no signal of hospital performance and all noise (i.e., worst reliability). Staff consider reliability above .50 to

be acceptable but would hope the MHAC methodology could achieve an average reliability across Maryland hospitals of 0.75 or higher. The current methodology achieves reliabilities generally somewhat below the desired minimum reliability of 0.50, with the average reliability across FY 2021 to FY 2024 being 0.39 (Figure 4). Options 1, 2, and 3 all yield substantially higher reliabilities than the current methodology, especially Composite Option 1 with an average reliability of 0.76 across FY 2021 to FY 2024.

Figure 4. Average Reliability Across Maryland Hospitals using a 1-year Performance Period by Methodology

Performance Period	Current Methodology*	Composite Option 1	Composite Option 2	Composite Option 3
FY 24	0.24	0.61	0.48	0.54
FY 23	0.38	0.81	0.63	0.68
FY 22	0.50	0.81	0.70	0.76
FY 21	0.42	0.80	0.62	0.72
Average	0.39	0.76	0.61	0.68

Note: Reliability was calculated using a one-year performance period for all hospitals. Two years of performance data are used to assess reliability for small hospitals, so the actual average reliability across Maryland hospitals is slightly higher than represented in Figure 10.

*For the Current Methodology, staff calculated average reliability across payment PPC measures with two or more expected PPCs during the performance period.

Average reliability dipped lower across methodologies when using FY 2024 as the performance period. As rates of observed PPCs continue to decrease across Maryland hospitals over time, PPC measure and PPC composite reliability could decrease. Staff will continue to monitor PPC measure and PPC composite reliability and consider using two years of performance period data for all hospitals if reliability when using one year of performance period data continues to decrease. Figure 5 below shows that PPC measure and PPC composite reliability is notably higher when using a two-year performance period for all hospitals and above 0.75 for Composite Option 1 for the FY 2024-2023 performance period.

Figure 5. Average Reliability Across Maryland Hospitals using a 2-year Performance Period by Methodology

Performance Period	Current Methodology*	Composite Option 1	Composite Option 2	Composite Option 3
23-24	0.33	0.78	0.68	0.71
22-23	0.50	0.86	0.76	0.80
21-22	0.54	0.87	0.76	0.81

Performance Period	Current Methodology*	Composite Option 1	Composite Option 2	Composite Option 3
20-21	0.47	0.85	0.71	0.77
Average	0.46	0.84	0.73	0.77

*For Current Methodology, calculated average reliability across payment PPCs with two or more expected PPCs during performance period.

When examining small hospitals only, the composite options have drastically higher reliability than the current methodology (Figure 6). When using two years of data, the average reliability across small hospitals using Composite Option 1 is greater than the minimum reliability of 0.50 but somewhat lower for Composite Option 2 and Composite Option 3 and much lower under the current methodology.

Figure 6. Average Reliability Across Small Maryland Hospitals using a 1-year, 2-year, and 3-year Performance Period by Methodology

Performance Period	Current Methodology*	Composite Option 1	Composite Option 2	Composite Option 3
One Year (FY24)	0.13	0.28	0.14	0.18
Two Years (FY23-24)	0.19	0.51	0.32	0.34
Three Years (FY22-24)	0.32	0.66	0.43	0.41
One Year (FY23)	0.20	0.46	0.26	0.29
Two Years (FY22-23)	0.45	0.67	0.41	0.42
Three Years (FY21-23)	0.41	0.73	0.46	0.45

*For Current Methodology, calculated average reliability across payment PPCs with two or more expected PPCs during performance period.

Aside from assessing validity and reliability of the composite methodologies, staff also examined hospital level results to understand the implications of the different weights each composite methodology puts on each payment PPC measure. As shown in Figure 7 below, the weight put on each PPC measure can vary notably across composite methodologies. In this hypothetical example, the given hospital has a very similar number of at-risk discharges for PPC measures 28 and 42 and therefore both have volume weights of 12.7% under Composite Option 2. However, PPC 42 has almost twice as many expected PPCs as PPC 28 (10.2 versus 5.4) so PPC 42 receives roughly twice the weight as PPC 28 under Composite Option 1. Reliability tends to increase as the number of expected PPCs at a hospital increases and the weight Composite Option 1 puts on each PPC measure is based on the number of expected PPCs at the hospital, offering a

plausible explanation for why Composite Option 1 demonstrated consistently higher reliabilities than the other composite options. Composite Option 3 also yields high reliability levels across iterations, but staff anticipate hospitals may perceive this methodology to be less fair than Composite Option 1 because the weight put on payment PPC measures is based on statewide proportion of expected PPCs instead of hospital-specific percentage of expected PPCs. Across Maryland hospitals and payment PPC measures, the average difference between the proportion of observed PPCs statewide and hospital-specific percentage of expected PPCs was about 3 percentage points (e.g., 3% compared with 6%), thus confirming that the Composite Option 3 methodology could be considered less representative of hospital-specific performance or less fair. This average difference also could explain why reliabilities across iterations were somewhat lower for Composite Option 3 than Composite Option 1.

Figure 7. MHAC Composite Weighting Hypothetical Example

PPC Measure	At-risk discharges	Expected PPCs	Pct. of hospital's expected PPCs (Composite Option 1)	Pct. of hospital's at-risk discharges (Composite Option 2)	Proportion of statewide observed PPCs (Composite Option 3)	3M Cost Weight
28	20,270	5.4	2.4%	12.7%	4.8%	0.45
42	20,294	10.2	4.5%	12.7%	7.3%	0.50

Appendix V: Hospital MHAC Scores and Revenue Adjustments

Figures 1 and 2 below show hospitals' MHAC scores and revenue adjustments without a hold harmless zone and with a hold harmless zone, respectively. These MHAC scores and estimated revenue adjustments are not actual values for any rate year because staff used FY data periods for testing purposes, not calendar year data periods.

Figure 1. Revenue Adjustments using Current Methodology Versus Composite Option 1 (FY 2024, No Hold Harmless Zone)

Hospital ID	Current Methodology MHAC Score	Current Methodology Revenue Adjustment (%)	Current Methodology Revenue Adjustment (\$)	Composite Option 1 MHAC Score	Composite Option 1 Revenue Adjustment (%)	Composite Option 1 Revenue Adjustment (\$)
210001	63%	-0.33%	-\$829,111	74%	-0.14%	-\$355,688
210002	61%	-0.38%	-\$5,628,094	55%	-0.62%	-\$9,109,788
210003	56%	-0.51%	-\$1,592,906	59%	-0.52%	-\$1,602,995
210004	66%	-0.25%	-\$1,032,564	58%	-0.54%	-\$2,247,955
210005	54%	-0.57%	-\$1,445,227	55%	-0.62%	-\$1,574,268
210008	55%	-0.54%	-\$1,194,250	59%	-0.52%	-\$1,142,916
210009	59%	-0.44%	-\$7,914,269	50%	-0.74%	-\$13,532,989
210011	78%	0.21%	\$537,644	85%	0.53%	\$1,345,252
210012	79%	0.29%	\$1,517,346	94%	1.41%	\$7,324,387
210015	91%	1.27%	\$4,715,776	100%	2.00%	\$7,437,246
210016	87%	0.94%	\$2,290,181	95%	1.51%	\$3,666,063
210017	71%	-0.12%	-\$33,867	100%	2.00%	\$579,764
210018	65%	-0.28%	-\$265,076	69%	-0.27%	-\$256,215

Hospital ID	Current Methodology MHAC Score	Current Methodology Revenue Adjustment (%)	Current Methodology Revenue Adjustment (\$)	Composite Option 1 MHAC Score	Composite Option 1 Revenue Adjustment (%)	Composite Option 1 Revenue Adjustment (\$)
210019	79%	0.29%	\$1,024,331	86%	0.63%	\$2,193,940
210022	57%	-0.49%	-\$1,217,879	50%	-0.74%	-\$1,856,209
210023	76%	0.05%	\$178,088	80%	0.04%	\$137,544
210024	72%	-0.09%	-\$241,946	81%	0.14%	\$363,065
210027	91%	1.27%	\$2,325,533	100%	2.00%	\$3,667,597
210028	85%	0.78%	\$783,993	86%	0.63%	\$629,171
210029	76%	0.05%	\$228,357	67%	-0.32%	-\$1,495,495
210032	83%	0.62%	\$523,759	88%	0.82%	\$697,445
210033	63%	-0.33%	-\$535,789	70%	-0.24%	-\$393,477
210034	87%	0.94%	\$1,209,103	100%	2.00%	\$2,564,689
210035	78%	0.21%	\$205,942	67%	-0.32%	-\$309,334
210037	64%	-0.30%	-\$373,936	80%	0.04%	\$46,212
210038	65%	-0.28%	-\$387,515	70%	-0.24%	-\$339,289
210039	77%	0.13%	\$104,975	88%	0.82%	\$665,552
210040	94%	1.51%	\$2,432,386	100%	2.00%	\$3,217,228
210043	89%	1.11%	\$3,599,390	94%	1.41%	\$4,594,690
210044	78%	0.21%	\$556,659	76%	-0.09%	-\$239,795
210048	67%	-0.22%	-\$491,074	62%	-0.44%	-\$974,957
210049	72%	-0.09%	-\$213,902	93%	1.31%	\$3,110,205
210051	74%	-0.04%	-\$69,761	84%	0.43%	\$804,923
210056	88%	1.02%	\$1,911,451	90%	1.02%	\$1,901,168
210057	95%	1.59%	\$5,321,585	100%	2.00%	\$6,679,462
210058	100%	2.00%	\$1,619,362	100%	2.00%	\$1,619,362
210060	62%	-0.36%	-\$134,334	59%	-0.52%	-\$195,694
210061	76%	0.05%	\$22,959	65%	-0.37%	-\$174,189
210062	70%	-0.14%	-\$302,363	86%	0.63%	\$1,320,723
210063	87%	0.94%	\$2,758,580	97%	1.71%	\$4,990,062

Hospital ID	Current Methodology MHAC Score	Current Methodology Revenue Adjustment (%)	Current Methodology Revenue Adjustment (\$)	Composite Option 1 MHAC Score	Composite Option 1 Revenue Adjustment (%)	Composite Option 1 Revenue Adjustment (\$)
210064	83%	0.62%	\$420,894	72%	-0.19%	-\$130,426
210065	94%	1.51%	\$1,432,122	100%	2.00%	\$1,894,215

Figure 2. Revenue Adjustments using Current Methodology Versus Composite Option 1 (FY 2024, Hold Harmless Zone)

Hospital ID	Current Methodology MHAC Score	Current Methodology Revenue Adjustment (%)	Current Methodology Revenue Adjustment (\$)	Composite Option 1 MHAC Score	Composite Option 1 Revenue Adjustment (%)	Composite Option 1 Revenue Adjustment (\$)
210001	63%	-0.21%	-\$530,069	74%	-0.02%	-\$41,812
210002	61%	-0.27%	-\$3,935,499	55%	-0.53%	-\$7,746,084
210003	56%	-0.41%	-\$1,266,440	59%	-0.42%	-\$1,295,643
210004	66%	-0.13%	-\$517,951	58%	-0.45%	-\$1,843,845
210005	54%	-0.47%	-\$1,186,294	55%	-0.53%	-\$1,338,606
210008	55%	-0.44%	-\$965,640	59%	-0.42%	-\$923,777
210009	59%	-0.32%	-\$5,892,829	50%	-0.66%	-\$12,002,209
210011	78%	0.00%	\$0	85%	0.05%	\$126,199
210012	79%	0.00%	\$0	94%	1.22%	\$6,330,993
210015	91%	1.08%	\$4,021,354	100%	2.00%	\$7,437,246
210016	87%	0.67%	\$1,635,013	95%	1.35%	\$3,278,651
210017	71%	0.00%	\$0	100%	2.00%	\$579,764
210018	65%	-0.15%	-\$147,473	69%	-0.15%	-\$144,660
210019	79%	0.00%	\$0	86%	0.18%	\$629,157
210022	57%	-0.38%	-\$950,014	50%	-0.66%	-\$1,646,244
210023	76%	0.00%	\$0	80%	0.00%	\$0
210024	72%	0.00%	\$0	81%	0.00%	\$0
210027	91%	1.08%	\$1,983,087	100%	2.00%	\$3,667,597

Hospital ID	Current Methodology MHAC Score	Current Methodology Revenue Adjustment (%)	Current Methodology Revenue Adjustment (\$)	Composite Option 1 MHAC Score	Composite Option 1 Revenue Adjustment (%)	Composite Option 1 Revenue Adjustment (\$)
210028	85%	0.47%	\$471,265	86%	0.18%	\$180,428
210029	76%	0.00%	\$0	67%	-0.20%	-\$963,443
210032	83%	0.26%	\$224,630	88%	0.44%	\$372,818
210033	63%	-0.21%	-\$342,542	70%	-0.12%	-\$201,608
210034	87%	0.67%	\$863,206	100%	2.00%	\$2,564,689
210035	78%	0.00%	\$0	67%	-0.20%	-\$199,283
210037	64%	-0.18%	-\$224,911	80%	0.00%	\$0
210038	65%	-0.15%	-\$215,590	70%	-0.12%	-\$173,843
210039	77%	0.00%	\$0	88%	0.44%	\$355,770
210040	94%	1.39%	\$2,232,123	100%	2.00%	\$3,217,228
210043	89%	0.88%	\$2,856,278	94%	1.22%	\$3,971,520
210044	78%	0.00%	\$0	76%	0.00%	\$0
210048	67%	-0.10%	-\$213,061	62%	-0.34%	-\$745,070
210049	72%	0.00%	\$0	93%	1.09%	\$2,581,289
210051	74%	0.00%	\$0	84%	0.00%	\$0
210056	88%	0.78%	\$1,446,767	90%	0.70%	\$1,305,821
210057	95%	1.49%	\$4,975,104	100%	2.00%	\$6,679,462
210058	100%	2.00%	\$1,619,362	100%	2.00%	\$1,619,362
210060	62%	-0.24%	-\$90,209	59%	-0.42%	-\$158,172
210061	76%	0.00%	\$0	65%	-0.26%	-\$122,293
210062	70%	-0.01%	-\$24,252	86%	0.18%	\$378,744
210063	87%	0.67%	\$1,969,413	97%	1.61%	\$4,710,074
210064	83%	0.26%	\$180,513	72%	-0.07%	-\$47,838
210065	94%	1.39%	\$1,314,212	100%	2.00%	\$1,894,215



TO: HSCRC Commissioners
FROM: HSCRC Staff
DATE: March 12, 2025
RE: Hearing and Meeting Schedule

Joshua Sharfstein, MD
Chairman

James N. Elliott, MD
Vice-Chairman

James N. Elliott, MD

Ricardo R. Johnson

Maulik Joshi, DrPH

Adam Kane, Esq

Nicki McCann, JD

Farzaneh Sabi, MD

April 9, 2025 In person at HSCRC office and Zoom webinar

May 14, 2025 In person at HSCRC office and Zoom webinar

The Agenda for the Executive and Public Sessions will be available for your review on the Wednesday before the Commission meeting on the Commission’s website at <http://hscrc.maryland.gov/Pages/commission-meetings.aspx>.

Post-meeting documents will be available on the Commission’s website following the Commission meeting.

Jonathan Kromm, PhD
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Medical Economics & Data Analytics

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Population-Based Methodologies

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Healthcare Data Management & Integrity