

To: Hospital CFOs  
Cc: Hospital Quality Liaisons, Case-Mix Liaisons  
From: HSCRC Quality Team  
Date: January 4, 2023 (updated, Palliative Care, January 19, 2023)  
Re: Rate Year 2025 Maryland Hospital Acquired Conditions (MHAC) Policy Recommendations

**Adam Kane, Esq**  
Chairman

**Joseph Antos, PhD**  
Vice-Chairman

**Victoria W. Bayless**

**Stacia Cohen, RN, MBA**

**James N. Elliott, MD**

**Maulik Joshi, DrPH**

**Sam Malhotra**

On December 14, 2022, the Commission approved the staff recommendations for the Rate Year (RY) 2025 Maryland Hospital Acquired Conditions (MHAC) program. This memo summarizes the continuing and new/revised recommendations for the RY 2025 program.

**Katie Wunderlich**  
Executive Director

**William Henderson**  
Director  
Medical Economics & Data Analytics

**Allan Pack**  
Director  
Population-Based Methodologies

**Gerard J. Schmith**  
Director  
Revenue & Regulation Compliance

The MHAC policy was redesigned in RY 2021 to modernize the program for the new Total Cost of Care Model. The RY 2025 final recommendations, in general, maintain the measures and methodology that were developed and approved for RYs 2021-2024.<sup>1</sup>

These are the final recommendations for the RY 2025 MHAC program:

1. Continue to use 3M Potentially Preventable Complications (PPCs) to assess hospital acquired complications.
  - a. Maintain a focused list of PPCs in the payment program that are clinically recommended and that generally have higher statewide rates and variation across hospitals.
  - b. Assess monitoring PPCs based on clinical recommendations, statistical characteristics, and recent trends to prioritize those for future consideration for updating the measures in the payment program.

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

- c. Engage hospitals on specific PPC increases to understand trends and discuss potential quality concerns.
2. Use more than one year of performance data for small hospitals (i.e. less than 21,500 at-risk discharges and/or 22 expected PPCs). The performance period for small hospitals will be CYs 2022 and 2023.
3. Continue to assess hospital performance on attainment only.
4. Continue to weigh the PPCs in the payment program by 3M cost weights as a proxy for patient harm.<sup>2</sup>
5. Maintain a prospective revenue adjustment scale with a maximum penalty at two percent and maximum reward at two percent and continuous linear scaling with a hold harmless zone between 60 and 70 percent.

## Update to Potentially Preventable Complications in Payment

During the RY 2021 MHAC redesign, the number of complication measures was reduced from 45+ to 14 PPCs that were determined to be clinically significant, actionable, for which there were higher statewide rates and hospital variation. The PPCs not selected for payment are considered “monitoring PPCs” and are monitored to determine whether they should be put back into the payment program. Based on the analysis of data from CYs 2018-2022 YTD, staff vetted and stakeholders agreed to include PPC 47 encephalopathy as a payment PPC. Specifically, analyses show that the PPC 47 O/E ratio has consistently increased since CY 2016 and meets the criteria for re-inclusion into the payment program; the results of these analyses are included in the Appendix I. While other PPCs have also shown increases, staff and stakeholders did not recommend including them based on feedback regarding coding concerns, clinical actionability, and inclusion of similar complication in other measures (e.g., NHSN or AHRQ PSI). Including an additional PPC also required that the small hospital criteria be updated as discussed below. For RY 2025 these are the 15 payment PPCs:

- Acute Pulmonary Edema & Respiratory Failure w/o Ventilation
- Acute Pulmonary Edema & Respiratory Failure w/ Ventilation
- Pulmonary Embolism
- Shock
- Venous Thrombosis
- Post-Operative Infection & Deep Wound Disruption w/o Procedure
- Post- Operative Hemorrhage & Hematoma w/ Hemorrhage Control Procedure or I&D Proc

---

<sup>2</sup> Please see Appendix IV for the RY 2025 Version 40 PPC Cost Weights.

- Accidental Puncture/Laceration During Invasive Procedure
- Iatrogenic Pneumothorax
- Major Puerperal Infection & Other Major Obstetric Complications
- In-Hospital Trauma & Fractures
- Septicemia & Severe Infections
- Pneumonia Combo
- Other Complications of Obstetrical Surgical & Perineal Wounds
- **Encephalopathy**

## Small Hospital Criteria

The MHAC program handles small hospitals in two ways: 1. Hospitals are excluded because they do not meet the minimum criteria of 2 expected and 20 at-risk for any PPC; and 2. Hospital performance is assessed using an additional year of data for the performance period (i.e., two years data), if across all payment PPCs the hospital has less than a certain number of cases at-risk or expected. With the addition of PPC 47 encephalopathy, the Commission approved increasing the criteria for using two years of data proportionally to the number of PPCs. Thus for RY 2025, with the 15 payment PPCs, two years of data will be used if a hospital has less than 21,500 at-risk or 22 expected PPCs.

## COVID-19 Program Adjustments

The RY 2025 policy will use data during the COVID PHE to determine performance standards (i.e., the two year base period will be July 2020 through June 2022) under PPC Grouper Version 40. Thus, the performance standards will be determined post-COVID, thereby reducing the concerns of using a pre-COVID time period. As with PPC Grouper Version 39, the Version 40 grouper has clinical logic that determines if a discharge with a COVID diagnosis can be assigned a PPC, which in effect means that the PPC Grouper is acknowledging that these PPCs for COVID patients are not potentially preventable. Below is the list of PPCs that can be assigned for discharges with a COVID diagnosis, with the five payment PPCs bolded.

- 20 Other Gastrointestinal Complications
- 23 Genitourinary Complications except Urinary Tract Infection
- 26 Diabetic Ketoacidosis & Coma
- 27 Post-Hemorrhagic & Other Acute Anemia with Transfusion
- **28 In-Hospital Trauma and Fractures**
- 29 Poisonings except from Anesthesia
- 30 Poisonings due to Anesthesia
- 31 Pressure Ulcer

- 32 Transfusion Incompatibility Reaction
- 36 Altered Mental Status
- **37 Post-Procedural Infection & Deep Wound Disruption without Procedure**
- 38 Post-Procedural Infection & Deep Wound Disruption with Procedure
- 39 Reopening Surgical Site
- **42 Accidental Puncture/Laceration during Invasive Procedure**
- 44 Other Surgical Complication - Moderate
- 45 Post-Procedural Foreign Bodies and Substance Reaction
- 48 Other Complications of Medical Care
- **49 Iatrogenic Pneumothorax**
- 50 Mechanical Complication of Device, Implant & Graft
- 51 Gastrointestinal Ostomy Complications
- 52 Infection, Inflammation & Other Complications of Devices, Implants or Grafts except Vascular Infection
- 54 Central Venous Catheter-Related Infection
- 59 Medical & Anesthesia Obstetric Complications
- **60 Major Puerperal Infection and Other Major Obstetric Complications**
- 64 Other In-Hospital Adverse Events
- 65 Urinary Tract Infection
- 66 Catheter-Related Urinary Tract Infection

While staff believes the post-COVID base for performance standards and the grouper logic largely handle COVID concerns, hospitals should alert HSCRC staff of any COVID concerns.

## Palliative Care Update

Last year for RY 2024, the MHAC program adjusted its methodology to exclude palliative care cases because the palliative care diagnosis became exempt from present-on-admission coding. Under the 3M PPC Grouper Version 40, palliative care has moved from a global exclusion to a PPC specific exclusion. Moving forward, the MHAC program will rely on the 3M clinical logic to determine what PPCs can be assigned to discharges with a palliative care diagnosis (whether or not present-on-admission). Below is the list of PPCs that can be assigned for discharges with a palliative care diagnosis, with the three payment PPCs (PPC 28, 41 and 42) **bolded**. **The bolded PPCs in red are included on the updated list of the payment PPCs that can be assigned with a palliative care diagnosis.**

Palliative care exclusion is applicable to all PPCs except:

- **PPC 28 In-Hospital Trauma and Fractures**
- PPC 29 Poisonings except from Anesthesia
- **37 Post-Procedural Infection & Deep Wound Disruption without Procedure**

- PPC 39 Reopening Surgical Site
- **PPC 41 Post-Operative Hemorrhage & Hematoma w/ Hemorrhage Control Procedure or I&D**
- **PPC 42 Accidental Puncture/Laceration during Invasive Procedure**
- PPC 48 Other Complications of Medical Care
- **49 Iatrogenic Pneumothorax**
- PPC 64 Other In-Hospital Adverse Events
- PPC 66 Catheter-Related Urinary Tract Infection

## Scaling Methodology and Revenue At-Risk

The RY 2025 scale uses a full distribution of potential scores (scale of 0-100%), with a hold harmless zone between 60 and 70 percent. Both the minimum and maximum penalty remain at 2 percent. The preset scale is included in Appendix II of this memorandum. Additional information on the MHAC methodology can be found in Appendix III and in the RY 2025 policy.

## Performance Standards and Payment Program Performance Periods

As stated above, the base period for RY 2025 for determining performance standards will be July 2020-June 2022. The performance period will be CY 2023, but small hospitals will have a two year performance period (CY 2022 and CY 2023). Performance standards, including the normative values for expected PPCs and the thresholds and benchmarks, will be released in the January MHAC Summary report. See below for additional information on reporting.

## Grouper Version and Software Revision

The APR-DRG and PPC Grouper Version 40 and its quarterly updates will be used for RY 2025.

## MHAC Program Reporting through CRISP Reporting Services (CRS) Portal

All monthly and quarterly MHAC summary reports and case-level data will continue to be made available to hospitals through the CRS portal. The monthly CRISP summary MHAC reports will be updated in the March 2023 release to provide RY 2025 program details and resources (i.e. 3M cost weights, performance standards, revenue adjustment scale, hospital PPC exclusions, normative values, and a

calculation sheet). Most hospital contacts have access to the summary report, and a more limited number of hospital contacts have access to the case-level detail that contains PHI. For access to the CRS portal, contact [support@crisphealth.org](mailto:support@crisphealth.org).

If you have any questions, please contact the Quality Team at [hscrc.quality@maryland.gov](mailto:hscrc.quality@maryland.gov)



## Appendix I: Monitoring PPCs

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

PPC	2022 YTD O/E Ratio	2018-2022 % Change
45: Post-Procedure Foreign Bodies	25.47%	-78.77%
2: Extreme CNS Complications	46.04%	-60.54%
5: Pneumonia & Other Lung Infections	77.78%	-50.42%
66: Catheter-Related Urinary Tract Infection	39.74%	-42.35%
6: Aspiration Pneumonia	73.74%	-35.06%
21: Clostridium Difficile Colitis	100.53%	-18.26%
39: Reopening Surgical Site	80.32%	-17.98%
65: Urinary Tract Infection without Catheter	99.37%	-10.84%
33: Cellulitis	99.45%	7.59%
11: Acute Myocardial Infarction	97.61%	10.91%
25: Renal Failure with Dialysis	138.51%	11.65%
19: Major Liver Complications	69.02%	13.86%
14: Ventricular Fibrillation/Cardiac Arrest	80.11%	14.32%
40: Post-Operative Hemorrhage & Hematoma without Hemorrhage Control Procedure or I&D Proc	95.96%	20.43%

10: Congestive Heart Failure	84.03%	25.69%
27: Post-Hemorrhagic & Other Acute Anemia with Transfusion	99.22%	29.40%
54: Infections due to Central Venous Catheters	89.46%	36.95%
8: Other Pulmonary Complications	124.86%	38.89%
44: Other Surgical Complication-Mod	61.23%	40.33%
1: Stroke & Intracranial Hemorrhage	97.45%	46.48%
52: Inflammation & Other Complications of Devices, Implants or Grafts Except Vascular Infection	98.06%	47.07%
17: Major Gastrointestinal Complications without Transfusion or Significant Bleeding	90.32%	51.06%
29: Poisonings due to Anesthesia	142.19%	52.18%
20: Other Gastrointestinal Complications without Transfusion or Significant Bleeding	101.41%	53.47%
23: GU Complications Except UTI	102.47%	69.48%
48: Other Complications of Medical Care	90.20%	69.56%
34: Moderate Infections	92.15%	69.64%
50: Mechanical Complication of	99.59%	90.65%



Device, Implant & Graft		
13: Other Cardiac Complications	103.61%	103.73%
59: Medical & Anesthesia Obstetric Complications	105.55%	125.40%
18: Major Gastrointestinal Complication with Transfusion or Significant Bleeding	117.47%	130.00%
51: Gastrointestinal Ostomy Complications	119.35%	131.61%
38: Post-Operative Wound Infection & Deep Wound Disruption with Procedure	81.23%	133.71%
53: Infection, Inflammation & Clotting Complications of Peripheral Vascular Catheters & Infusions	181.68%	145.34%
15: Peripheral Vascular Complications Except Venous Thrombosis	124.30%	152.27%
26: Diabetic Ketoacidosis & Coma	121.83%	152.62%
64: Other In-Hospital Adverse Events	131.92%	155.78%
31: Decubitus Ulcer	98.59%	214.82%
47: Encephalopathy	130.43%	243.51%
30: Poisonings due to Anesthesia	0 Observed	
32: Transfusion Incompatibility Reaction	0 Observed	

Below are results for PPC 47: Encephalopathy on the criteria used to re-include a monitoring PPC into the payment program.

## Monitoring PPC: Analysis of PPC 47

- Greater than 50% increase in O/E ratio comparing to 2018
  - 177.27% in 2021, 243.51% for 2022
- Clinical considerations
- Observed counts: 233 in 2021, 138 in 2022
- 3M v39 cost weight: 0.8728
- Percent of hospitals with O/E ratios less than .85 or greater than 1.15 (variation): 86.62 in 2021, 82.5% in 2022
- Rate per 1000 at risk: 1.12 in 2021, 1.43 in 2022
- Predictive validity: Adequate
- Reliability: Substantial
- 3M Group: Other Medical and Surgical Complications
- 3M Level: Major

## Appendix II: RY 2025 MHAC Revenue Adjustment Scale

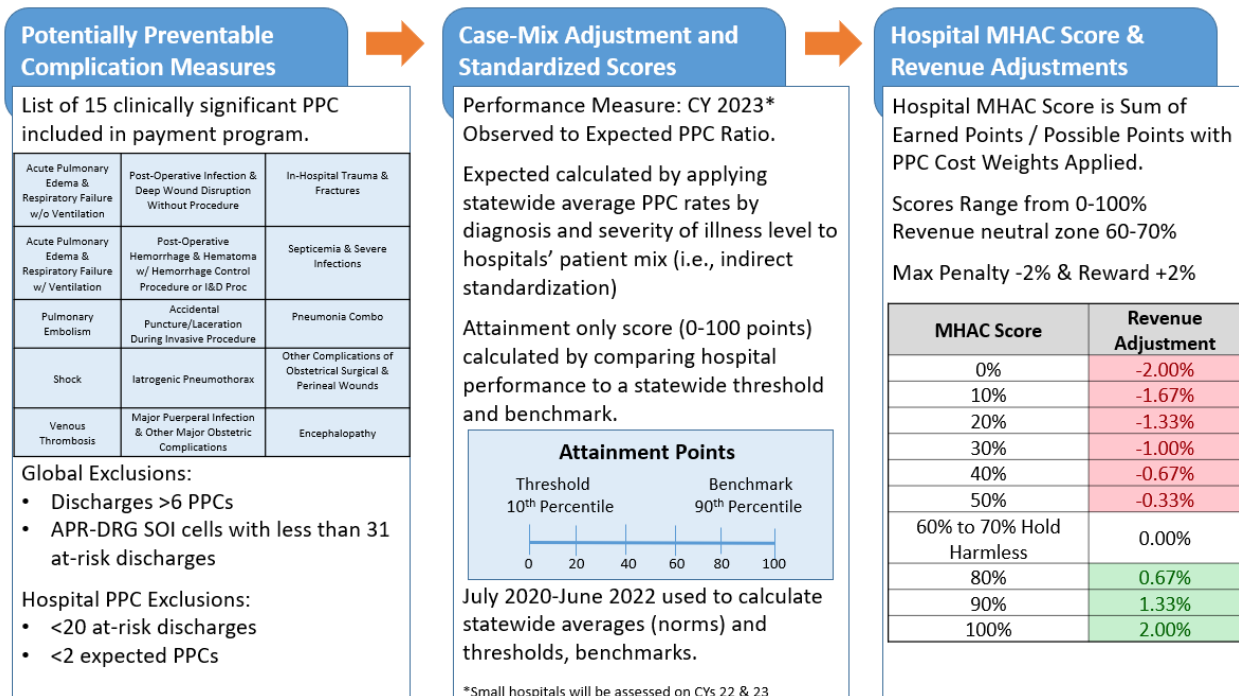
Below is a concise version of the RY 2025 MHAC scale, which ranges from 0 to 100 percent and includes a hold harmless zone between 60 and 70 percent.

Abbreviated Version	
Final MHAC Score	% Revenue Adjustment
0%	-2.00%
5%	-1.83%
10%	-1.67%
15%	-1.50%
20%	-1.33%
25%	-1.17%
30%	-1.00%
35%	-0.83%
40%	-0.67%
45%	-0.50%
50%	-0.33%
55%	-0.17%
60%	0.00%
65%	0.00%
70%	0.00%
75%	0.33%
80%	0.67%
85%	1.00%
90%	1.33%
95%	1.67%
100%	2.00%
<b>Penalty Cut-point</b>	<b>60%</b>
<b>Reward Cut-point</b>	<b>70%</b>

# Appendix III: RY 2025 MHAC Program Methodology

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

Figure 1. Overview of RY 2025 Approved MHAC Methodology



## Performance Metric

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

## Observed and Expected PPC Values

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

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

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

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

Let:

$N$  = norm

$P$  = Number of discharges with one or more PPCs

$D$  = Number of “at-risk” discharges

$i$  = A diagnosis category and severity level

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

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

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

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

Figure 2. Expected Value Computation Example for one Diagnosis Category

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

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 <20 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 that has less than 31 statewide discharges.
- Discharge has a diagnosis of palliative care
- Discharge has more than 6 PPCs (i.e., a catastrophic case, for which complications are probably not preventable).

For each hospital, PPCs will be removed if during July 2020 to June 2022:

- 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 July 2020 to June 2022 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 20 at-risk and 2 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). Figure 5 provides a hypothetical example of the points based scoring approach with the 3M cost weights.



## **RY 2025 Update: Small Hospital Methodology**

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

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

## Appendix IV: RY 2025 MHAC PPC Cost Weights and Performance Standards

PPC Number	PPC Description	v40 Cost Weight
3	Acute Pulmonary Edema and Respiratory Failure without Ventilation	0.5005
4	Acute Pulmonary Edema and Respiratory Failure with Ventilation	1.5519
7	Pulmonary Embolism	1.1248
9	Shock	1.0478
16	Venous Thrombosis	1.5503
28	In-Hospital Trauma and Fractures	0.3379
35	Septicemia & Severe Infections	1.4394
37	Post-Operative Infection & Deep Wound Disruption without Procedure	1.5936
41	Post-Operative Hemorrhage & Hematoma with Hemorrhage Control Procedure or I&D	0.9745
42	Accidental Puncture/Laceration During Invasive Procedure	0.4264
47	Encephalopathy	0.7724
49	Iatrogenic Pneumothorax	0.4717
60	Major Puerperal Infection and Other Major Obstetric Complications	0.8978
61	Other Complications of Obstetrical Surgical & Perineal Wounds	0.2099
67	Pneumonia Combo (with and without Aspiration)	1.1332