maryland
health services
cost review commission

To: Hospital CFOs
Cc: Hospital Quality Liaisons, Case-Mix Liaisons
From: HSCRC Quality Team
Date: June 11, 2025
Re: Final Rate Year 2027 Maryland Hospital Acquired Conditions (MHAC) Policy Recommendation

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On April 9, 2025, the Commission approved staff recommendations for the Rate Year (RY) 2027 MHAC program. This memo summarizes the ongoing and newly revised recommendations for the RY 2027 program.

The MHAC policy was redesigned in RY 2021[1] to modernize the program in alignment with the new Total Cost of Care Model. The RY 2027 final recommendations maintain the current complication measures but updates the methodology for calculating hospital scores and applying revenue adjustments. These changes are intended to address small cell size concerns and comprehensiveness of the program.

These are the final recommendations for the RY 2027 MHAC program:

1. Use Solventum (previously 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 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.

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

3. Assess hospital performance based on statewide attainment standards.
4. 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 harm.[2]
5. Maintain a prospective revenue adjustment scale with a maximum penalty at 2 percent and maximum reward at 2 percent:
    a. Use a continuous linear scale that ranges from 0 to 100 percent without a hold harmless zone.
    b. Establish the cut point for penalties and rewards as the average hospital MHAC score as determined through prospective modeling.
    c. 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-acquired avoidable, harmful complications and appropriate for use in the program, e.g., digitally specified measures.

Potentially Preventable Complications (PPCs) in Payment

During the RY 2021 MHAC redesign, the number of complication measures was reduced from 45+ to a subset of 14 complications that were clinically significant and actionable, as well as meeting measurement criteria such as higher statewide rates, variation across hospitals, and validity and reliability of individual PPCs. The PPCs not selected for payment are considered "monitoring PPCs" and are evaluated annually by staff and stakeholders to determine whether they should be put back into the payment program. For RY 2027, the same payment PPCs are being included as were included in the RY 2026 policy, as shown in Figure 1. However, the two pneumonia related PPCs, which were combined previously into a single PPC referred to as PPC 67, will be assessed individually in RY 2027.[3] Additional discussion on PPC selection for RY27 and discussion of the future of the program can be found in the

[2] Hospitals with zero at-risk discharges for a specific PPC in the performance period would not be assessed on that PPC. For example, if a hospital has no maternity cases during the performance period then they would not be assessed on the OB PPCs. The hospital-specific PPC exclusion is no longer determined by the base period.
[3] PPCs 5 Pneumonia and Other Lung Infections and PPC 6 Aspiration Pneumonia have very different Solventum cost/harm weights of 1.8707 and 0.7765 respectively, and hospitals vary greatly in their proportions of expected PPCs and observed PPCs for PPC 5 vs PPC 6. Thus it was decided that calculating the PPCs separately under the updated composite methodology would more accurately represent hospital-specific performance.

policy and PMWG meeting documentation. Hospitals are now accountable for all 16 PPCs as long as they have at least one at-risk discharge for each PPC during the performance period (i.e., there is no longer a requirement of at least two expected and 20 at-risk and PPC inclusion is no longer determined during the base period).

Figure 1. RY 2027 Payment PPCs

PPC Number	PPC Title
3	Acute Pulmonary Edema and Respiratory Failure without Ventilation
4	Acute Pulmonary Edema and Respiratory Failure with Ventilation
5	Pneumonia and Other Lung Infections
6	Aspiration Pneumonia
7	Pulmonary Embolism
9	Shock
16	Venous Thrombosis
28	In-Hospital Trauma and Fractures
35	Septicemia & Severe Infections
37	Post-Operative Infection & Deep Wound Disruption without Procedure
41	Post-Operative Hemorrhage & Hematoma with 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

Updated Performance Metric and Scoring

For RY 2027, the performance on PPCs will be assessed using a single composite measure that is weighted by the Solventum cost weights (as has been done previously) and the hospital-specific expected PPCs (new). Staff worked with Mathematica to test multiple ways to create a composite measure that better addressed small cell size issues and did not remove PPCs for a hospital with lower expected values. Specifically, Mathematica used data from FY 2018 through FY 2024 to model six iterations of Maryland hospital results under the existing methodology and three composite options. To inform decision making, staff assessed the content validity, predictive validity, and reliability of each composite option vs. the existing methodology across the six iterations of results. Composite Option 1, which provides relatively higher weight within the composite for PPC measure based on hospital-specific expected numbers,[4] was found to improve content validity and reliability the most and was selected for use in the program. By including all PPCs for a hospital with any at-risk discharges in the performance period, the modeling done by Mathematica shows that the number of payment PPCs evaluated increased for hospitals of all sizes. Figure 2 shows the change in the average number of PPCs evaluated under the previous and new composite methodology by hospital size.

Figure 2. Number of PPCs Evaluated Under Previous Method Vs. Composite

Hospital Category	Number of Hospitals	Average Number of PPC Measures Evaluated using Previous Methodology	Average Number of PPC Measures Evaluated using Composite Methodology
Small Hospitals	5	3.6	13.2
Medium Hospitals	13	10.5	14.2
Large Hospitals	24	13.7	15

[4] The Composite is calculated as the sum of the hospital's observed PPCs divided by the sum of the expected payment PPCs with both the numerator and denominator weighted by each of the PPCs' Solventum cost weights. The composite calculation does not explicitly weight PPC measures by volume, but PPC measures with higher expected numbers for the hospital receive more weight .

Instead of scoring (i.e., assigning 0 to 100 points) at the individual PPC level, there is now only one threshold and benchmark value used to assess hospital performance on the PPC Composite measure. The threshold and benchmark for the PPC composite measure are calculated using the base period data. As shown in the equation below, the PPC Composite score is calculated as the sum of the hospital's observed PPCs times the Solventum Cost Weight for each payment PPC measure divided by the sum of the hospital's expected PPCs times the Solventum Cost Weight for each payment PPC measure.

$$PPC\ Composite_j = \frac{\left(\sum_{i=1}^{16} ObservedPPC_{ij} * SolventumCostWeight_i\right)}{\left(\sum_{i=1}^{16} ExpectedPPC_{ij} * SolventumCostWeight_i\right)}$$

The composite 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 generally increases as the volume of at-risk discharges increases.

MHAC Score (0-100 percent)

Each hospital's final MHAC score was previously calculated by adding up the attainment points for each PPC and dividing by the total possible attainment points to get a percent score. Under the new scoring methodology, the PPC composite measure is compared to the threshold and benchmark and the result is the MHAC percent score. The threshold (worse performance) and benchmark (better performance) are calculated by averaging the PPC Composite score for all hospitals in the bottom or top 20th percentile of performance in the base period, respectively.

If the PPC composite measure for the performance period is greater than the threshold, the hospital scores zero percent.

If the PPC composite measure for the performance period is less than or equal to the benchmark, the hospital scores 100 percent.

If the PPC composite measure is between the threshold and benchmark, the hospital scores between 0-100 percent. The formula to calculate the MHAC scores is as follows:

- MHAC Score = [99 * ((Hospital's PPC composite measure - Threshold)/ (Benchmark – Threshold))] + 0.5

Preliminary Composite Threshold and Benchmark Values

The preliminary, unvalidated Threshold value is 1.3524, and the preliminary, unvalidated Benchmark value is 0.4836. The final values will be included in the summary workbook released on the CRS Portal.

On April 14, 2025, HSCRC staff convened a recorded webinar (and posted a link on the MHAC page) for hospitals and other interested parties that provides a review of the technical information on how to calculate hospital composite MHAC scores; links to accompanying powerpoint slides and a preliminary composite workbook are also posted on the MHAC page. An updated workbook with data output that uses PPC Grouper v42 will be posted on the HSCRC MHAC page when finalized.

Small Hospital Criteria Updates

Prior to the RY 2027 policy update, the MHAC program excluded individual PPCs for a hospital that did not meet the minimum criteria of 2 expected and 20 at-risk for any PPC in the two year "base" period. As discussed above, all hospitals with greater than zero at-risk discharges for a given PPC in the performance period, will have that PPC included in the new composite measure. Small hospitals (i.e., a hospital with less than 21,500 at-risk discharges or 22 expected PPCs in the two-year base period) will continue to be assessed using two years data.

Updated Scaling Methodology and Revenue At-Risk

The RY 2027 program uses a continuous scale with a full distribution of potential scores (scale of 0-100%) and the cut point of 84 percent (i.e., score at which penalties end and rewards begin) is based on the average hospital scores from modeling. The previously established "hold harmless zone" where hospitals were not rewarded or penalized, has been removed. Both the minimum and maximum revenue adjustment remain at 2 percent of inpatient revenue. Given the changes to the scoring methodology, the cut point for the revenue adjustment scale will be reassessed based on actual performance scores for RY 2027 and modified if the hospital average score varies by more than 10 percentage points. The preliminary revenue adjustment scale is in Appendix I.

RY2027 Base and Performance Periods

The base period is the historical time period used for determining performance standards, including the normative values used to calculate expected PPCs and the threshold and benchmark for scoring performance. For RY 2027 the base period is July 2022-June 2024. The performance period is CY 2025, but small hospitals will have a two year performance period (CY 2024 and CY 2025). RY 2027

3M/Solventum Grouper Versions and PPC Feedback

The APR-DRG and PPC Grouper Version 42 and its quarterly updates will be used for RY 2027.

Hospitals can access detailed information on the Version 42 APR-DRGs and PPC specifications (including assignment logic, PPC-specific and global exclusions and inclusions, etc.) on the 3M/Solventum Web Portal at the link below. The process for accessing the 3M website has changed in the last few years. For your first use of this website, you will need to go to the registration page and use the old username of "MDHosp" as your authorization code, and then complete the fields with your personal information to establish an account.

3M™ Web Portal - Login

In addition, the HSCRC continues to encourage hospitals to submit concerns about the 3M/Solventum PPC specifications. 3M/Solventum has previously established a PPC feedback submission procedure on their 3M HIS support site that hospitals could use to provide any clinical feedback and request consideration for PPC changes. HSCRC understands from Solventum that the feedback submission procedure for PPCs is not yet migrated to the new Solventum website; staff advises that stakeholders that want to submit PPC feedback check the Solventum HIS support website for this option, and that PPC-specific feedback may be sent to HSCRC in lieu of or in addition to a feedback option being available on the Solventum website.

MHAC Program Reporting through CRS Portal

All monthly and quarterly MHAC summary reports and detail-level data files will continue to be made available to hospitals through the CRISP Reporting Services (CRS) portal. However, due to the policy being approved in the April 2025 Commission meeting and the extent of the MHAC changes, the HSCRC staff is releasing preliminary information as it becomes available and the first validated summary level

report is anticipated to be released on June 20th for the June mid-cycle release. The monthly summary MHAC reports provide RY 2027 program details and resources (i.e., payment PPCs, Solventum cost weights, performance standards, revenue adjustment scale, normative values, and a calculation sheet), as well as year-to-date performance. The monthly detail-level reports provide patient level PPC performance. Most hospital contacts have access to the summary report, and a limited number of hospital contacts have access to the case-level detail that contains PHI. Each hospital has a point-of-contact, the Chief Financial Officer or their designee, who is contacted by CRISP to approve requests for access. If you need access to quality reports, please send an email to CRISP Support (support@crisphealth.org) indicating level of access (summary reports or case-level data).

Additional details on the MHAC methodology can be found in Appendix II and in the RY 2027 policy. If you have any questions, please contact the Quality Team at hscrc.quality@maryland.gov.

Appendix I: RY 2027 MHAC Revenue Adjustment Scale

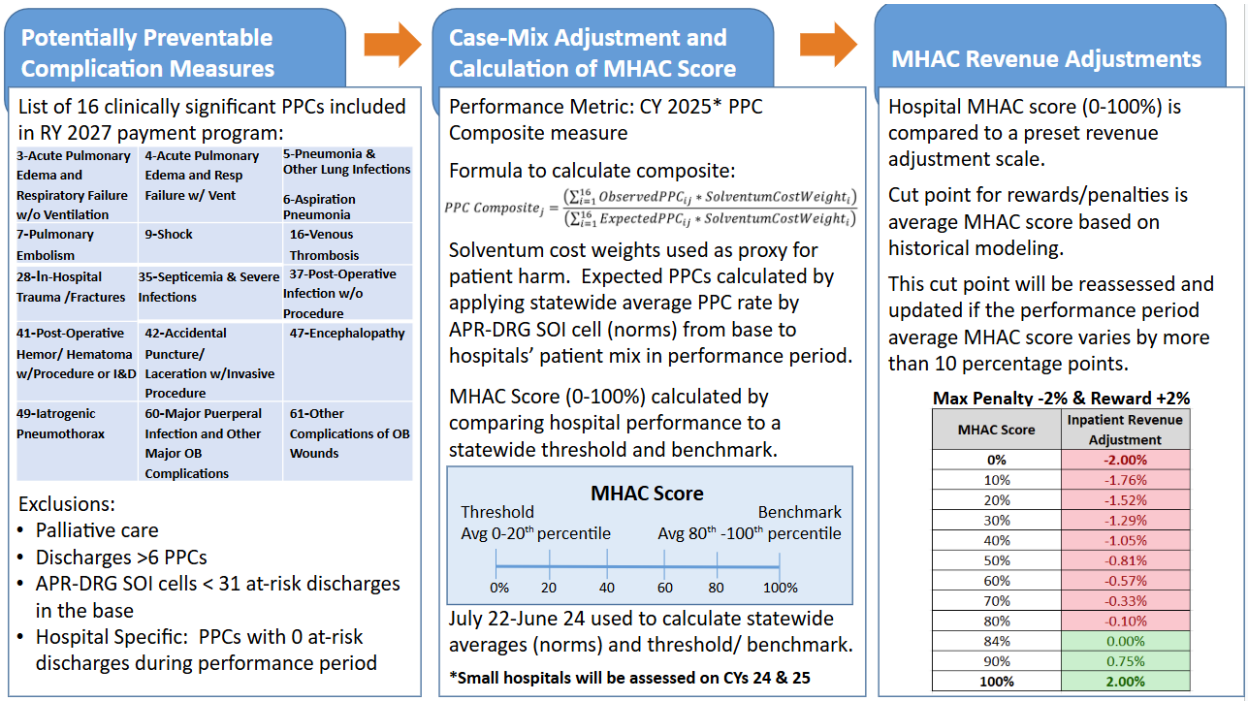
Below is a concise version of the RY 2027 MHAC scale, which is continuous and ranges from 0 to 100 percent with no hold harmless zone. This scale uses a preliminary cut point of **84 percent**; if the average hospital score is more than 10 percentage points different from the modeling used to estimate hospital scores, then the revenue adjustment scale may be updated. Final scaled revenue adjustments will utilize actual MHAC scores out to 2 decimal places; below are percent adjustments at the specified ventiles.

Final MHAC Score	Revenue Adjustment
0%	**-2.00%**
5%	-1.88%
10%	-1.76%
15%	-1.64%
20%	-1.52%
25%	-1.40%
30%	-1.29%
35%	-1.17%
40%	-1.05%
45%	-0.93%
50%	-0.81%
55%	-0.69%
60%	-0.57%
65%	-0.45%
70%	-0.33%
75%	-0.21%
80%	-0.10%
84%	0.00%
85%	0.13%
90%	0.75%
95%	1.38%
100%	**2.00%**

Appendix II: RY 2027 MHAC Program Methodology

Figure 1 below provides a summary overview of the approved RY 2027 MHAC methodology.

Figure 1. Overview of RY 2027 Approved MHAC Methodology



Updated Performance Metric

The methodology for the MHAC program measures hospital performance using the Observed (O) /Expected (E) ratio for the composite of PPCs included for the hospital. 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.

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

$$PPC\ Composite_j = \frac{\left(\sum_{i=1}^{16} ObservedPPC_{ij} * SolventumCostWeight_i\right)}{\left(\sum_{i=1}^{16} ExpectedPPC_{ij} * SolventumCostWeight_i\right)}$$

The composite 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.

If a hospital has >0 at-risk discharges, the measure will be included in the hospital's composite. If the hospital has 0 expected PPCs for a given PPC measure, then the measure would add 0 to the hospital's composite denominator (i.e., not affect the denominator). The hospital could still have an observed PPC for the given PPC measure such that a positive value could be added to the hospital's composite numerator (i.e., the observed harm of the PPC measure would be added to the composite numerator).

Aside from assessing validity and reliability of the composite methodology, staff also examined hospital level results to understand the implications of expected PPC and cost weights put on each payment PPC measure under the Composite Option 1 methodology. As shown in the hypothetical example in Figure 2 below, the given hospital has a very similar number of at-risk discharges for PPC measures 28 and 42, with almost twice as many expected PPCs for PPC 42 compared with PPC 28 (10.2 versus 5.4), so PPC 42 receives roughly twice the weight as PPC 28 under the 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 two composite options staff assessed.

Figure 2. MHAC Composite Weighting Hypothetical Example

PPC Measure	At-risk discharges	Expected PPCs	Pct. of hospital's expected PPCs (Composite Option 1)	Solventum Cost Weight
28	20,270	5.4	2.4%	0.45
42	20,294	10.2	4.5%	0.50

Observed and 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 3 for an individual diagnosis category.

Figure 3. 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 31 at-risk discharges statewide.

PPC Exclusions

The following exclusions are applied:

For each hospital, discharges are removed if:

- Discharge is in an APR-DRG SOI cell that has less than 31 statewide discharges.
- Discharge has a diagnosis of palliative care (within the grouper)
- Discharge has more than 6 PPCs (i.e., a catastrophic case, for which complications are probably not preventable).

For each hospital, a PPC measure will not be included in the hospital's PPC composite if the hospital has zero at-risk discharges for the PPC measure during the performance period.

Benchmarks and Thresholds

One threshold and benchmark value is calculated using hospitals' PPC composite scores during the base period. The threshold is calculated as the average of the bottom 20th percentile of hospital performance on the PPC composite, and the benchmark is calculated as the average of the top 80th percentile of hospital performance on the PPC composite.

MHAC Score (0-100 percent)

Each hospital's final MHAC score used to be calculated by adding up the attainment points for each PPC and dividing by the total possible attainment points to get a percent score. Under the new scoring methodology, the PPC composite measure is compared to the threshold and benchmark and the result is the MHAC percent score.

If the PPC composite measure for the performance period is greater than the threshold, the hospital scores zero percent.

If the PPC composite measure for the performance period is less than or equal to the benchmark, the hospital scores 100 percent.

If the PPC composite measure is between the threshold and benchmark, the hospital scores between 0-100 percent. The formula to calculate the MHAC scores is as follows:

- MHAC Score = [99 * ((Hospital's PPC composite measure - Threshold)/ (Benchmark – Threshold))] + 0.5

Preliminary Composite Threshold and Benchmark Values

The preliminary, unvalidated Threshold value is 1.3524, and the preliminary, unvalidated Benchmark value is 0.4836. The final values will be included in the summary workbook.

RY 2027 MHAC PPC Cost Weights under Grouper v. 42

PPC Number	PPC Description	v42 Cost Weight
3	Acute Pulmonary Edema and Respiratory Failure without Ventilation	0.2945
4	Acute Pulmonary Edema and Respiratory Failure with Ventilation	1.1585
5	Pneumonia and Other Lung Infections	1.8707
6	Aspiration Pneumonia	0.7765
7	Pulmonary Embolism	1.2328
9	Shock	1.1956
16	Venous Thrombosis	1.4963
28	In-Hospital Trauma and Fractures	0.4574
35	Septicemia & Severe Infections	1.2705
37	Post-Operative Infection & Deep Wound Disruption without Procedure	1.5593
41	Post-Operative Hemorrhage & Hematoma with Hemorrhage Control Procedure or I&D	1.0451
42	Accidental Puncture/Laceration During Invasive Procedure	1.5203
47	Encephalopathy	0.8107
49	Iatrogenic Pneumothorax	0.4250

PPC Number	PPC Description	v42 Cost Weight
60	Major Puerperal Infection and Other Major Obstetric Complications	0.7360
61	Other Complications of Obstetrical Surgical & Perineal Wounds	0.1389