To: Hospital CFOs

Cc: Case Mix Liaisons; Quality Liaisons

From: Alyson Schuster, Deputy Director of Quality Methodologies

Date: February 24, 2020

Re: Rate Year 2022 Maryland Hospital Acquired Conditions (MHAC) Program

---

On February 12th, 2020, the Commission approved the staff recommendations for the Rate Year (RY) 2022 Maryland Hospital Acquired Conditions (MHAC) program. This memo summarizes the continuing and new recommendations (highlighted in bold) for the RY 2022 program, which will be applied to the CY 2020 performance period.[1]

Below are the specific recommendations approved in the RY 2022 MHAC policy:

A. Continue to use 3M Potentially Preventable Complications (PPCs) to assess hospital – acquired complications.

    a. Maintain focused list of PPCs in payment program that are clinically recommended and that generally have higher statewide rates and variation across hospitals.

    b. Monitor all PPCs and provide reports for hospitals and other stakeholders.

        i. Evaluate PPCs in "Monitoring" status that worsen and consider inclusion back into the MHAC program or RY 2023 o4 beyond.

B. Use two years of performance data for small hospitals (i.e., less than 20,000 at risk discharges and/or 20 expected PPCs).

C. Continue to assess hospital performance on attainment only.

D. Continue to weight the PPCs in payment program by 3M cost weights as a proxy for patient harm.[2]

---

[1] Except for small hospitals that will have CY 2019 and CY 2020 used for performance period; see details in memo.

[2] Version 37 cost weights are not yet available; version 36 will be used now but HSCRC may update to v37 if they become available before June 2020.

E. Maintain a prospective revenue adjustment scale with a minimum penalty at 2 percent and maximum reward at 2 percent and continuous linear scaling with a hold harmless zone between 60 and 70 percent.

New Recommendation for Small Hospitals

In RY 2022, two years of performance data will be used for small hospitals, which is defined as those with less than 20,000 at-risk discharges and/or 20 expected PPCs across all payment program PPCs in the two year time period used to determine performance standards (FY18 and FY19). Below is a chart showing the five hospitals that will be flagged as small hospitals, which means that CY 2019 and CY2020 will be used to assess their performance for RY 2020. The use of two years of data is designed to increase the reliability of MHAC scores for small hospitals.

HOSPITAL ID	HOSPITAL NAME	At-Risk (FY18 and FY19)	Observed (FY18 and FY19)	Expected (FY18 and FY19)
210010	UM-Dorchester	6733	5	6.84
210064	Levindale	8709	31	11.86
210017	Garrett	10889	4	13.97
210060	Ft. Washington	11594	1	14.25
210013	Bon Secours	22139	43	17.75

Scaling Methodology and Revenue At-Risk

The RY 2022 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 remains at 2 percent. The preset scale is included in Appendix I of this memorandum. Additional information on the MHAC methodology can be found in Appendix II and in the RY2022 policy.

Performance Standards and Payment Program Performance Periods

For RY 2022, two years of data (fiscal year 2018 and 2019) is used to establish the normative values that are used to calculate a hospital's expected PPC rate, and to determine the threshold and benchmark for scoring hospital performance. The performance period for assessing attainment will be CY 2020, except as noted above for small hospitals.

An excel workbook with program details (i.e., thresholds and benchmarks, normative values, hospital PPC exclusions, 3M cost weights) is being distributed by email with this memo and will be provided as part of the monthly summary reports posted on the CRISP Reporting Services portal.

Grouper Version and Software Revision

For RY 2022, staff implemented PPC Grouper Version 37 and calculated normative values and

attainment standards using SFYs 2018 and 2019 (moved forward one year from the RY 2021 policy).

MHAC Program Reporting though 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. Most hospital contacts may access the summary report, and a more limited number of hospital contacts may access the case-level detail that contains PHI. For access to the CRS portal, contact support@crisphealth.org.

If you have any questions, please email hscrc.quality@maryland.gov or call Alyson Schuster at 410-764-2673.

Appendix I. RY 2022 MHAC Revenue Adjustment Scale

Below is a concise version of the RY 2022 MHAC scale, which ranges from 0 to 100 percent and includes a revenue neutral zone between 60 and 70 percent. A full scale with all percentage point revenue adjustments is included in the MHAC Summary workbooks.

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%
Penalty Cut-point	60%
Reward Cut-point	70%

Appendix II: RY 2022 MHAC Program Methodology

Figure 1 below provides a summary overview of the RY 2022 MHAC methodology.

Figure 1. Overview of RY 2022 MHAC Methodology
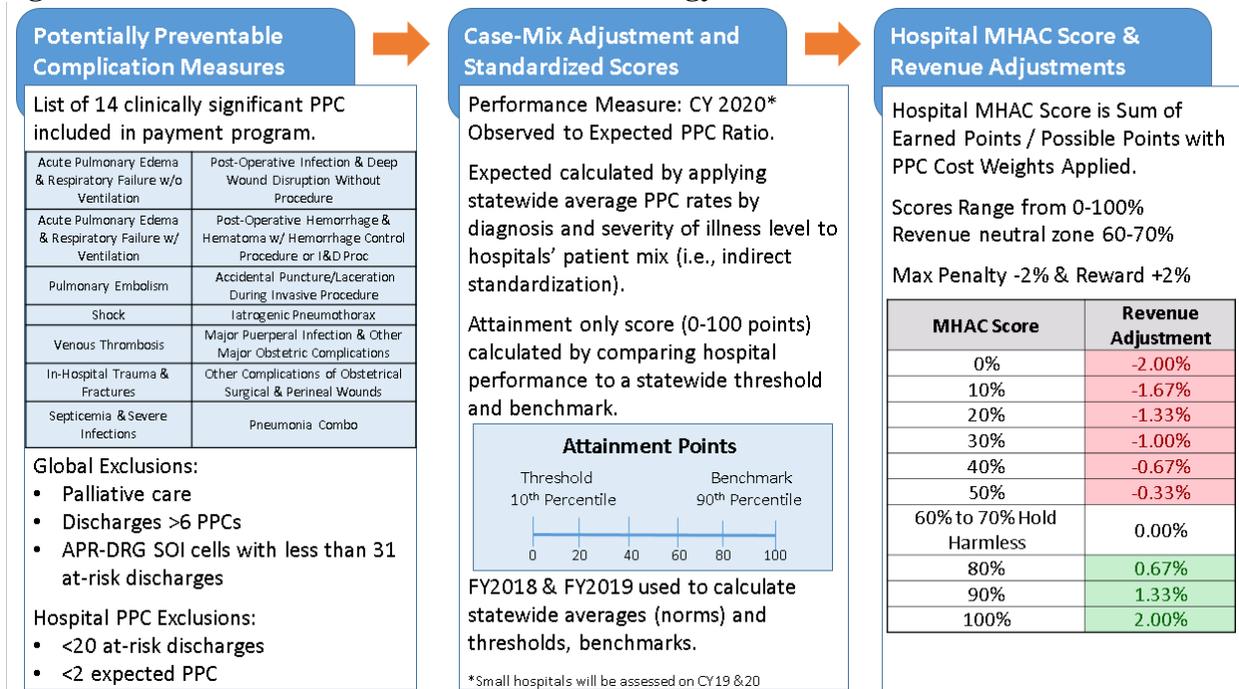
Performance Metric

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 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	B	C	D	E	F	G
Severity of illness Level	At-risk Discharges	Observed Discharges with PPCs	PPCs per discharge (unadjusted PPC Rate)	Normative PPCs per discharge	Expected # of PPCs	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 FY 2018 and FY 2019:
- 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 FY 2018 and FY 2019 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

For RY 2022, McCready and UM-Chestertown are removed because they do not have sufficient volume to have at least 20 at-risk and 2 expected for any payment program PPC.

Benchmarks and Thresholds

For each PPC, a threshold and benchmark value is calculated using the FY 2018 and FY 2019 data. In previous rate years when improvement as 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. Figure 3 provides the thresholds and benchmarks under this revised methodology based on FY 2018 and FY 2019 data.

Figure 3: RY 2022 Thresholds and Benchmarks for all 14 Payment Program PPCs

PPC Number	PPC Description	Threshold	Benchmark
3	Acute Pulmonary Edema and Respiratory Failure without Ventilation	1.8882	0.3348
4	Acute Pulmonary Edema and Respiratory Failure with Ventilation	1.4274	0.4933
7	Pulmonary Embolism	1.5660	0.3091
9	Shock	1.6965	0.3727
16	Venous Thrombosis	1.7715	0.1242
28	In-Hospital Trauma and Fractures	1.5749	0.4468
35	Septicemia & Severe Infections	1.5732	0.3891
37	Post-Operative Infection & Deep Wound Disruption Without Procedure	1.9911	0.4162
41	Post-Operative Hemorrhage & Hematoma with Hemorrhage Control Procedure or I&D Proc	2.4933	0.4362
42	Accidental Puncture/Laceration During Invasive Procedure	2.1677	0.3735
49	Iatrogenic Pneumothrax	1.6971	0.3351
60	Major Puerperal Infection and Other Major Obstetric Complications	1.6266	0
61	Other Complications of Obstetrical Surgical & Perineal Wounds	1.8975	0
67	Combined Pneumonia (PPC 5 and 6)	1.6422	0.3986

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:

- Attainment Points = [99 * ((Hospital's performance period score - Threshold)/ (Benchmark –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.

Figure 5: Hypothetical Example of Scoring Methodology

Hospital A								
PPC	**Threshold**	**Benchmark**	**Hospital O/E Ratio**	**ATTAINMENT POINTS**	**POSSIBLE DENOMINATOR**	**3M Weight**	**Weighted Points**	**Weighted Denominators**
	A	**B**	**C**	**D = C relative to A and B**	**E**	**F**	**G = D * F**	**H = E * F**
PPC 1	1.75	0.5	0.2	100	100	0.5	50	50
PPC 2	2	0.3	1.1	53	100	2	106	200
PPC 3	2.5	0.4	0.65	88	100	1	88	100
Total							**244**	**350**
				TOTAL WEIGHTED SCORE G total /H total				**70%**

Hospital B								
PPC	**Threshold**	**Benchmark**	**Hospital O/E Ratio**	**ATTAINMENT POINTS**	**POSSIBLE DENOMINATOR**	**3M Weight**	**Weighted Points**	**Weighted Denominators**
	A	**B**	**C**	**D = C relative to A and B**	**E**	**F**	**G = D * F**	**H = E * F**
PPC 1	1.75	0.5	2	0	100	0.5	0	50
PPC 2	2	0.3	1.5	30	100	2	60	200
PPC 3	2.5	0.4	1	71	100	1	71	100
Total							**131**	**350**
				TOTAL WEIGHTED SCORE G total /H total				**37%**

Rounding
For the purposes of calculating scores, the benchmarks and O: E ratios are rounded to 4 decimal places. The final score for each hospital is rounded to the whole percentage point (e.g., 10%, 20%).

Financial Impact of MHAC Performance (Scaling)
Starting in RY 2021 the preset scale was modified to account for the higher scores under the new scoring methodology and increased potential rewards from 1 percent to 2 percent of inpatient revenue. The RY 2022 scale, which is the same as RY 2021, uses the full distribution of potential scores (scale of 0-100%), with a hold harmless zone between 60 and 70 percent. The maximum penalty and reward remain at 2 percent.