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To: Hospital CFOs

Cc: Hospital Case-mix Liaisons, MHA

From: Sule Gerovich, Ph.D. *SC*

Date: July 23rd, 2015

Re: Global Budget Demographic Adjustment for Rate Year 2016

The purpose of this memo is to inform hospitals that the Health Services Cost Review Commission (HSCRC) finalized the calculations for rate year 2016 global budget revenue (GBR) demographic adjustments, provided in Table 1.

The HSCRC developed a demographic adjustment to allow for hospital service volume changes due to population change as well as population aging, without allowing for increases in hospital service volume due to potentially avoidable utilization (PAU). The approach also uses a per capita efficiency factor to bring the overall demographic adjustment within the level provided under the new All-Payer Model for population growth as determined by FY2016 update factor recommendation. Please see the attached Appendix for technical details and supporting data tables.

There are no significant changes to the calculation of demographic adjustment from last year. HSCRC staff aligned the calculation of Equivalent Case-Mix Adjusted Discharges (ECMADs) and Potentially Avoidable Utilization (PAU) with market shift adjustments. Another difference this year is that one-year population growth estimates are used instead of 5-year, as one-year estimates are more similar to the current population estimates from the Maryland Department of Planning, which is the source data for All-Payer test. The details of the calculations are provided in Appendix.

The attached excel file includes calculation details as well as a comparison with last year's results. We will be sending zip code level data that includes total charge and ECMAD information for each cohort to hospital's case-mix liaisons today.

If you have any questions, please contact Dr. Gerovich at Sule.Gerovich@maryland.gov.

Sincerely,
Sule Calikoglu Gerovich, Ph.D.
Director, Center for Population-Based Methodologies
Health Services Cost and Review Commission

Table 1: FY 2016 GBR and TPR Demographic Adjustments

HOSPID	Hospital name	Payment Type	CY 2014 MD Resident Total Charges	CY 2014 MD Resident ECMADs	2015 Age Adjusted Population Growth	CY 2014 All-Payer Percent PAU	2015 Age & PAU Adjusted Growth	FY 2016 Demographic Adjustment
210023	ANNE ARUNDEL	GBR	\$543,797,173	52,746	1.83%	11.03%	1.63%	0.66%
210061	ATLANTIC GENERAL	GBR	\$72,714,459	7,167	1.29%	12.29%	1.13%	0.46%
210043	CENTER	GBR	\$390,528,655	33,846	2.23%	18.82%	1.81%	0.74%
210013	BON SECOURS	GBR	\$122,169,932	6,591	0.00%	25.11%	0.00%	0.00%
210333	BOWIE HEALTH	GBR	\$16,836,940	1,142	0.46%	0.00%	0.46%	0.19%
210039	CALVERT	TPR*	\$140,183,085	10,635		11.18%		0.52%
210033	CARROLL COUNTY	TPR*	\$240,506,672	18,196		16.77%		0.51%
210035	CHARLES REGIONAL	GBR	\$135,835,941	11,923	2.53%	18.23%	2.07%	0.84%
210030	CHESTERTOWN	TPR*	\$62,284,210	3,795		16.80%		0.40%
210051	DOCTORS COMMUNITY	GBR	\$206,204,360	15,900	2.73%	20.36%	2.17%	0.88%
210010	DORCHESTER	TPR*	\$59,166,801	3,560		22.02%		0.41%
210037	EASTON	TPR*	\$178,352,220	13,747		14.52%		0.41%
210015	FRANKLIN SQUARE	GBR	\$475,139,236	40,266	0.97%	18.42%	0.79%	0.32%
210005	FREDERICK MEMORIAL	GBR	\$322,491,748	29,019	1.71%	14.07%	1.47%	0.60%
210060	FT. WASHINGTON	GBR	\$42,133,475	3,532	2.19%	19.71%	1.76%	0.71%
210044	G.B.M.C.	GBR	\$410,930,521	34,873	1.08%	10.11%	0.97%	0.39%
210017	GARRETT COUNTY	TPR*	\$34,822,570	3,314		10.48%		0.27%
210087	GERMANTOWN	GBR	\$13,606,021	1,272	0.48%	0.00%	0.48%	0.20%
210056	GOOD SAMARITAN	GBR	\$297,433,385	23,665	1.05%	18.04%	0.86%	0.35%
210034	HARBOR	GBR	\$204,541,923	14,446	0.71%	15.89%	0.60%	0.24%
210006	HARFORD	GBR	\$100,908,315	7,912	0.90%	19.33%	0.73%	0.29%
210004	HOLY CROSS	GBR	\$427,863,836	38,337	1.16%	14.82%	0.99%	0.40%
210065	HOLY CROSS GERMANTOWN	New	\$10,615,785	921	1.37%	0.00%	1.37%	0.00%
210029	HOPKINS BAYVIEW MED CTR	GBR	\$511,994,860	38,485	0.81%	14.37%	0.70%	0.28%
210048	HOWARD COUNTY	GBR	\$275,364,089	25,194	2.00%	15.44%	1.69%	0.69%
210009	JOHNS HOPKINS	GBR	\$1,615,165,148	98,283	0.84%	10.08%	0.76%	0.31%
210055	LAUREL REGIONAL	GBR	\$94,173,893	7,572	1.59%	16.26%	1.33%	0.54%
210064	LEVINDALE	GBR	\$1,714,493	17	4.39%	0.00%	4.39%	1.78%
210045	MCCREADY	TPR*	\$14,571,983	965		11.71%		0.00%
210008	MERCY	GBR	\$456,836,085	37,779	1.05%	8.66%	0.96%	0.39%
210001	MERITUS	TPR*	\$251,887,060	21,769		15.64%		0.51%
210018	MONTGOMERY GENERAL	GBR	\$165,628,912	14,226	1.95%	14.70%	1.66%	0.67%
210040	NORTHWEST	GBR	\$241,946,459	18,309	1.40%	19.77%	1.13%	0.46%
210019	PENINSULA REGIONAL	GBR	\$327,643,408	28,543	0.51%	14.33%	0.44%	0.18%
210003	PRINCE GEORGE	GBR	\$233,755,766	15,469	1.23%	15.25%	1.05%	0.42%
210088	QUEEN ANNES	GBR	\$4,679,081	556	-0.22%	0.00%	-0.22%	0.00%
210058	REHAB & ORTHO	GBR	\$92,380,302	6,852	1.17%	7.58%	1.08%	0.44%
210057	SHADY GROVE	GBR	\$367,696,003	31,046	1.43%	12.59%	1.25%	0.51%
210012	SINAI	GBR	\$668,535,010	46,514	0.98%	11.83%	0.86%	0.35%
210062	SOUTHERN MARYLAND	GBR	\$241,859,799	17,325	2.83%	20.76%	2.24%	0.91%
210011	ST. AGNES	GBR	\$404,364,464	33,081	1.18%	17.36%	0.97%	0.39%
210028	ST. MARY	GBR	\$156,806,479	14,455	1.39%	12.75%	1.21%	0.49%
210022	SUBURBAN	GBR	\$256,689,921	22,941	2.14%	14.15%	1.84%	0.75%
210063	UM ST. JOSEPH	GBR	\$337,770,759	33,513	1.49%	10.83%	1.33%	0.54%
210038	UMMC MIDTOWN	GBR	\$190,215,883	11,555	0.45%	18.71%	0.37%	0.15%
210032	UNION HOSPITAL OF CECIL COUNT	TPR*	\$143,582,954	9,520		13.19%		0.59%
210024	UNION MEMORIAL	GBR	\$402,323,651	30,915	1.26%	14.63%	1.08%	0.44%
210002	UNIVERSITY OF MARYLAND	GBR	\$1,361,499,882	73,051	0.99%	9.97%	0.89%	0.36%
210049	UPPER CHESAPEAKE HEALTH	GBR	\$303,080,313	25,847	1.53%	13.98%	1.31%	0.53%
210016	WASHINGTON ADVENTIST	GBR	\$235,772,380	16,860	1.67%	16.47%	1.39%	0.56%
210027	WESTERN MARYLAND HEALTH SYSTEM	TPR*	\$231,025,448	17,082		12.80%		0.15%
State Total			\$14,098,031,744	\$1,074,532	1.38%	13.65%	1.18%	0.47%

*TPR Hospital Demographic Adjustment is determined by county population growth.

APPENDIX

Overview of the Demographic Adjustment under Global Revenue Models

UPDATED FY 2016

Introduction

Under the new All-Payer Model in Maryland, hospitals have chosen to have their revenues regulated under global models in a system that focuses on meeting the three part aim of promoting better care, better health, and lower cost. In contrast to the previous Medicare waiver that focused on controlling increases in Medicare inpatient payments per case, the new All-Payer Model seeks to control increases in total hospital revenue per capita.

Central to the All-Payer Model are global revenue models that encourage hospitals to focus on population health and care improvement by prospectively establishing an annual revenue budget for each hospital. There are currently two global models being used: The Total Patient Revenue (TPR) model was expanded in 2008 and now includes 10 hospitals in more rural areas of the State. In 2013, the Global Budget Revenue (GBR) model, which was based on the TPR methodology, was introduced to all other hospitals in the State, including those in urban and suburban areas.

Under GBR and TPR, each hospital's total annual revenue is known at the beginning of the fiscal year. Total annual revenue is determined from a historical base period that is adjusted to account for several factors. In order to tie the global models to population and patient centered metrics and to provide for other changes required to the revenue budgets, the HSCRC makes a number of annual adjustments to the hospitals' global revenue budgets. The HSCRC has developed a demographic adjustment to recognize expected changes in hospital service volume due to population change as well as population aging, without allowing for increases in hospital service volume due to potentially avoidable utilization (PAU), which are defined as hospital care that is unplanned and can be prevented through improved care, care coordination, or effective community based care. The approach also uses a marginal cost factor for expected per capita efficiencies under the new Model to bring the overall demographic adjustment within the level provided under the new All-Payer Model for population growth.

This report outlines the demographic adjustment methodology that the HSCRC implemented for the update of GBR hospitals in Maryland fiscal year 2016, which is similar to the approach in previous years. The TPR hospitals are operating under a demographic adjustment that is calculated in a manner similar to as the GBR method, using county level as opposed to zip code level estimates of population changes and aging along with adjustments reflecting expected efficiencies for reductions in avoidable utilization.

Overview of Demographic Adjustment Calculation

The GBR demographic adjustment calculation begins by determining a hospital's virtual patient service area (VPSA). A VPSA is determined by aggregating the hospital's service volume in each zip code for eight age groups in the State. The HSCRC uses this service area distribution to attribute population to each hospital based on the proportional amount of services it provides to patients in each zip code relative to services provided by all hospitals. The eight age cohorts within each zip code provide more specific cost trends than would otherwise result from an overall distribution since population growth trends and health care use within these cohorts differ significantly. In contrast to GBR hospitals, the TPR hospitals have more defined service areas, which allowed the HSCRC to use counties as a service area to calculate population growth for TPR hospitals.

The HSCRC then calculates the estimated population change for the attributed population using population projections (see data sources below). It also applies an age weight to each age/zip code cohort of the hospital's VPSA to adjust for the differences in cost per capita of each age cohort and to allow for changes resulting from aging of the population. However, a portion of the existing service volume is a result of PAU. The HSCRC removes this portion of the base volume when projecting each hospital's expected volume growth by reducing the age-adjusted growth percentage by that hospital's specific proportion of revenue that is associated with PAU. After removing PAU from the each hospital's demographic adjustment, the result is multiplied by a pro-rata factor that accounts for the expected per capita efficiencies to accomplish the overall savings target in the per capita growth rate to be applied. The result is the population driven volume growth that will be recognized in each GBR hospital's global budget (subject to agreement provisions) for the upcoming fiscal year.

Summary:

1. Calculate base population estimates for each hospital based on its share of volume, as measured by equivalent case-mix adjusted discharges, in a given zip code age cohort
2. Calculate age adjusted population growth rates by multiplying statewide age cost weights with zip/age population growth rates.
3. Calculate hospital specific age adjusted population growth by multiplying hospital specific base population by age adjusted population growth rates for each zip/age cohort and calculating total projected age adjusted population growth
4. Calculate final demographic adjustment by applying efficiency adjustments
 - a. Reduce age adjusted population growth by hospital specific PAUs as a percent of total all-payer revenue
 - b. Reduce PAU/age adjusted population growth by pro-rata per capita efficiency adjustment reduction

Demographic Adjustment Calculation Steps

This section provides the data sources used and a more detailed explanation of each step of the calculation.

Data Sources:

Volume estimates and total charges by age cohorts are calculated using HSCRC patient level inpatient and outpatient abstract data submitted on a monthly basis. All calculations involving volume and charges include only Maryland residents, determined by the reported billing zip code of the patient.

Zip code and age specific population estimates and projections were provided by Clarita's for current year and 1-year population projections, since zip code level data are not available from the Department of State Planning.

Below are the detailed calculation steps:

STEP 1. Calculate base population estimates for each hospital based on its share of volume, as measured by equivalent case-mix adjusted discharges, in a given zip code/age cohort.

Step 1a: Calculate the base year total service volume of the hospital (inpatient and outpatient) for each zip code by each of the eight age cohorts based on Equivalent Case Mix Adjusted Discharges (Please see the Market Shift FY 2016 Report).

Step 1b: Allocate the base population for each zip/age cohort.

Use the proportion of each hospital's ECMAD volumes in each zip/age cohort divided by the total ECMADs for all hospitals in that zip/age cohort to allocate a proportion of the population in each zip code to each hospital.

Example:

*For Hospital A and Zip/Age Cohort J the base population would be calculated as:
Base Population_{AJ} = Population_J * (ECMAD_{AJ}/ECMAD_J)*

STEP 2: Calculate age adjusted population growth rates.

Step 2a: Calculate the statewide age cost weight for each age cohort.

Relative age cost weights are applied to a hospital's allocated population and population estimates to arrive at cost weighted populations for the base year and the projection year to account for the age-weighted growth in the population. Age specific hospital cost weights are calculated at the state level as the ratio of average total hospital charges per capita for each statewide age cohort to the statewide average hospital charge per capita in the base year. The total hospital charges include charges for Maryland residents only. This calculation is illustrated below for the statewide [5-14] age cohort.

$$\text{Age Cost Weight for [5 to 14] Age Cohort} = \frac{\text{Total [5 to 14] Hospitals' Charges/Population in Base Year}}{\text{Total [All cohorts] Hospitals' Charges /Population in Base Year}}$$

Step 2b: Calculate age adjusted growth rates.

For each zip/age cohort, the estimated population growth rates are multiplied by the age cost weights to determine the cost weighted population growth rates.

For a Zip/Age Cohort J and Age Weight [5 to 14]:
Age Adjusted Population Growth Rate = Population Growth Rate_J Age-Weight [5 to 14]*

STEP 3: Calculate hospital overall age adjusted growth.

The age adjusted projected population related volume growth is calculated by multiplying base population numbers by age adjusted growth rates from Step 2 for each zip/age cohort. The overall hospital specific age adjusted growth rate is the sum of the allocated age adjusted population for the projection period divided by the age adjusted allocated population for the base period. This is converted to a percentage after subtracting 1.

For Hospital A and Zip/Age Cohort J and Age-Weight [5 to 14]:
*Projected Population Growth = Base Population_{AJ}*Population Growth Rate_J* Age-Weight [5 to 14]*

Then overall Projected Population for Hospital A for all Zip/Age Cohorts = iz:
Overall Projected Population Growth Rate = $\frac{\text{Sum of (Projected Population Growth i ... z)}}{\text{Sum of (Base Population i ... z)}}$

STEP 4: Calculate the appropriate volume growth by applying efficiency adjustments.

Step 4a: Reduce age adjusted overall projected growth by hospital specific overall PAU percentage of revenue.

The overall growth rate calculated in Step 3 is reduced by the PAU percentage of revenue that is calculated on a hospital specific basis by multiplying the growth rate by the PAU percentage of revenue. The policy result is that the hospital will not receive a demographic adjustment on any of its PAU revenues, which includes revenue from avoidable admissions, 30-day readmissions, and additional cost from complications (see below for additional information). PAU percentages of revenue are calculated at the hospital specific level by calculating the ratio of PAU revenue divided by total hospital revenue.

Step 4b: Reduce the PAU adjusted growth percentage for each hospital to achieve an allowance for demographic growth statewide that is lower than the overall growth allowed by the All-Payer Model.

The All-Payer Model provides for per capita growth, without any explicit adjustment for aging

of the population. The preliminary result of Step 4a provides a demographic factor for each hospital that includes an age adjustment, and that has been reduced by a measure of potentially avoidable utilization. Without further adjustment, the age and PAU adjusted demographic factor statewide would produce an allowance for growth that is above the statewide allowance for growth in population. Therefore, an additional efficiency adjustment reduction percentage is applied to each hospital's age and PAU adjusted growth percentage to bring the allowance statewide to a level within the overall population increase percentage provided by the Model. For example, if the age and PAU adjusted allowance were 1.2% but the target population allowance was .6%, then all hospitals would receive an additional efficiency adjustment of 50%. This adjustment recognizes the ability to provide incremental volumes at a lower marginal cost or to further reduce avoidable volume to achieve the needed efficiency level of the per capita model.

Final Demographic Percentage: At the conclusion of Step 4b, the final demographic adjustment percentage has been calculated for each hospital in the State. After adding 1 to the percentage, this demographic growth rate is multiplied by each hospital's approved revenue from the base year to arrive at the population adjusted revenue for the target year.

Example Calculation

Below is an example calculation with just one zip code for a GBR hospital to arrive at the statewide per capita efficiency adjustment.

Zip Code	Age Cohort	Base Year ECMADs for Hospital	Total ECMADs for All Hospitals	Share of ECMADs	Base Population	Allocated Base Population	State Total Hospital Revenue per Capita	Age Cost Weights	Projected Population Growth Rate of Cohort	Age Adjusted Population Growth Rates	Hospital Age Adjusted Population Growth	Hospital Overall Age Adjusted Population Growth	Hospital PAU %	Hospital Specific PAU Adjusted Growth Rate	Statewide Per capita Efficiency Adjustment
A	B	C	D	E = C/D	F	G=F * E	H	I=H/H(total)	J	K=J*I	L=G*K	M=sum(L)/sum(G)	N	O=M*(1-N)	P=O*50%
00000	0-4	30	60	50%	3,713	1,857	\$1,577	0.68	0.77%	0.52%	10				
00000	05-14	45	100	45%	23,471	10,562	\$119	0.05	-0.07%	0.00%	(0)				
00000	15-44	100	210	48%	8,902	4,239	\$3,798	1.63	-1.16%	-1.89%	(80)				
00000	45-55	20	35	57%	7,533	4,305	\$2,822	1.21	1.18%	1.43%	61				
00000	55-64	25	40	63%	7,450	4,657	\$3,413	1.46	0.16%	0.23%	11				
00000	65-74	25	30	83%	4,517	3,764	\$5,162	2.21	2.73%	6.04%	227				
00000	75-84	55	70	79%	2,282	1,793	\$7,337	3.14	2.42%	7.60%	136				
00000	85+	60	80	75%	1,044	783	\$8,009	3.43	1.32%	4.53%	35				
Total	Total	360	625	58%	58,913	31,959	\$2,335				401	1.3%	14%	1.08%	0.54%

Demographic Adjustment Considerations

The approach described above was arrived at after the HSCRC staff conducted additional analysis and received stakeholder input on various demographic variables. The stakeholder workgroup recommended an expanded number of age cohorts, which HSCRC staff has accepted and applied in the updated calculations. The eight age cohorts being used are: 0-4, 5-14, 15-44,

44-55, 55-64, 65-74, 75-84, 85+. The workgroup was also concerned about the initial calculation that used statewide PAU percentages in reducing age-adjusted weights. Staff responded by removing the PAU percentages from the weights and applying the overall PAU adjustment on a hospital specific basis. In the event that the demographic adjustment is not greater than 0%, the demographic adjustment is held at 0%, thereby providing no increase or decrease for the affected hospital. This approach may be adjusted in the future.

Calculation of the PAU Percentage for Each Hospital

PAU is defined as hospital care that is unplanned and can be prevented through improved care, care coordination, or effective community based care. Also, it can reflect cost increases that resulted from a potentially preventable complication occurring in a hospital. The HSCRC intends to continue to create new tools to refine the measurement of PAU.

For purposes of FY2014 and 2015, PAU was measured through three inpatient measures and one outpatient measure: 30 day all cause any hospital inpatient readmissions, inpatient prevention quality indicators (PQIs) as defined by the Agency for Healthcare Research and Quality (AHRQ), and inpatient potentially preventable conditions (PPCs) calculated under the Maryland Hospital Acquired Conditions policy. The measure also includes outpatient re-hospitalizations in the emergency room and observation occurring within 30 days of an inpatient admission.

For FY2016 adjustment, PAU definitions are aligned with the market shift adjustments and include inpatient and outpatient observation cases of 24 or more hours in determining PQIs and readmissions.

The total cost of PAU was calculated for each hospital by summing the total cost associated with the discharges and visits indicated above. The PAU percentage was then calculated as the ratio of total PAU charges to the total charges for each hospital in the fiscal year base period. As described above, this PAU percentage was utilized to remove growth in the expected changes in hospital service volume due to population change as well as population aging, by not providing for increases in hospital service volume for growth in PAU.