CENTER FOR HEALTH INFORMATION AND ANALYSIS

Relative Price and Provider Price Variation in the Massachusetts Commercial Market

June 2021

Methodology Report

Publication Number 21-176-CHIA-03

Relative Price and Provider Price Variation in the Massachusetts Commercial Market (June 2021)

METHODOLOGY REPORT

Table of Contents

Introduction

Relative price (RP) is a calculated, aggregate measure used to evaluate variation in health care provider prices. The Center for Health Information and Analysis (CHIA) is statutorily mandated to collect and report data on relative prices from private and public health care payers operating in the Massachusetts health care market.[1] RP reporting supports the Commonwealth's goals of promoting transparency, cost containment, and efficiency.

RP compares prices paid to different providers within a payer's network, while accounting for differences in intensity of services, the quantity, the types of services delivered by providers, and for differences in the types of insurance products offered by payers.[2]

In addition, RP data forms the basis for the calculation of statewide relative price (S-RP), a measure of the prices paid to a provider across multiple payers. Pursuant to Section 2TTTT of Chapter 29 of the Massachusetts General Laws, CHIA is required to calculate commercial S-RP values for acute care hospitals, and compare these results with the statewide median. Hospitals with S-RP values below 120 percent of the statewide median relative price will be eligible for payments from the Community Hospital Reinvestment Trust Fund (CHRTF).

S-RP blends relative price across payers using payer payment distributions. Since relative price is calculated within each payer, a blending of relative prices will not account for absolute price differences across payers. For this reason, it is not advisable to use S-RP to understand absolute price differences between one provider and another. S-RP should only be used for directional purposes. We have illustrated an example of the limitations of the S-RP below.

Consider Hospital A with an outpatient RP of 1.05 for Insurer X and an outpatient RP of 1.10 for Insurer Y. The S-RP calculation would blend the outpatient RP using Insurer X and Y payments. However, the calculation does not consider whether Insurer X prices are higher or lower than Insurer Y prices. CHIA does not collect this information and therefore cannot incorporate the RP differences among insurers into the S-RP calculation. Due to this limitation, the resulting S-RPs are not accurate and should not be used to understand absolute price differences among providers.

[1] CHIA is required by Massachusetts General Law (M.G.L.) chapter 12C to promulgate regulations for the uniform calculation and reporting by payers of provider relative prices, and to publicly report that data. The Code of Massachusetts Regulations (CMR) 957 2.00 governs the methodology and filing requirements for health care payers to calculate and report these data to CHIA.

[2] Adjustments to control for differences in patient acuity or intensity of services occur only in the Inpatient Relative Price calculation, due to a lack of comparable base unit in outpatient services. Service mix adjustments, which adjust for differences in types of services delivered by providers occur in hospital outpatient, physician group, and other provider type Relative Price calculations only.

Data Collection

Timeline

RP data files are collected annually. Payers submit three files corresponding to different provider types—Hospitals, Physician Groups, and Other Providers.[3] Hospital and Other Provider data correspond to the previous calendar year. Physician Group data correspond to the calendar year ending 17 months prior to the deadline, which allows sufficient run-out for claims to be processed and for contractual non-claims based payment settlements to be finalized.

Data Submitters

CHIA collects RP data from payers operating in the Massachusetts commercial health insurance market, commercial payers offering Medicare Advantage plans, and MassHealth Managed Care Organizations (MCOs)/Accountable Care Organizations (ACO-As).[4,5] Payers report data for all Massachusetts-based providers with whom they contract, including payments on behalf of non-Massachusetts residents who receive care from Massachusetts providers.

Data and Methodology

Payers submit three data files for different provider types: Hospitals including Inpatient and Outpatient datasets separately, Physician Groups, and Other Providers. Relative price is calculated for each of the payer's networks. A network is defined as a provider type-insurance type combination, e.g., Acute Inpatient Hospital-Commercial or Physician Group-Medicare Advantage. Within each network, RPs are calculated separately for each product type, as well as for all products combined.

Payers report data for the following insurance categories:

- Commercial (self and fully insured)
- Medicare Advantage
- Medicaid Managed Care Organization (MCO)/Accountable Care Organization (ACO-A)
- Medicare and Medicaid Dual-eligibles, aged 65 and over
- Medicare and Medicaid Dual-eligibles, aged 21-64[6]
- Other

[3] Other provider types include ambulatory surgery centers, community health centers, community mental health centers, freestanding clinical laboratories, freestanding diagnostic imaging centers, home health agencies, and skilled nursing facilities.

[4] Historically, CHIA also has collected data from payers offering Commonwealth Care products, a state insurance program providing coverage to low- and moderate-income residents ineligible for MassHealth coverage. The Commonwealth Care program ended in January 2015, and is not reported for data years 2016 onward.

[5] A full list of payers required to submit RP data to CHIA can be found here: **http://www.chiamass.gov/list-of-payers-required-to-report-data**.

[6] Dually eligible members aged 21-64 are covered under Massachusetts One Care Program

Payers report the following product types:

- Health Maintenance Organization and Point of Service (HMO and POS)
- Preferred Provider Organization (PPO)
- Indemnity
- Other

RP calculations are performed at the network level. A network is defined by the following attributes:

- Insurance Payer
- Provider Type { Hospital-Inpatient, Hospital-Outpatient, Total Hospital, Physician Group, Other Provider}
- Insurance Category { Commercial (self and fully insured), Medicare Advantage, Medicaid Managed Care Organization (MCO), Medicare and Medicaid Dual-eligibles aged 65 and over, Medicare and Medicaid Dual-eligibles, aged 21-64, Other}
- Product Type {HMO and POS, PPO, Indemnity, Other, All products combined}

The basic steps for computing RP are the same across all file types:

1. Compute provider-specific aggregate price levels. (This calculation varies by provider type)
2. Take unweighted average of provider-specific price levels to obtain the network average price level.
3. For each provider, divide provider-specific price level by network average price level to obtain each provider's relative price (RP).

By construction, the network average RP equals 1.0 for each payer network. Providers with RP above 1.0 receive higher-than-average payments within a payer's network, and vice versa.

Limitations

RP is an aggregate measure for assessing providers' overall price levels across all services. It is not designed to compare provider prices for particular services. And, because the measure is specific to each payer's network, RP values are not directly comparable across payers.[7]

Each of the RP file types and corresponding RP calculations are described in more detail below.

[7] For example, the network average price level for payer A corresponds to $200, while the network average price level for payer B is $100. Provider X has RP=0.8 for payer A, which represents an absolute dollar amount of 0.8*$200=$160. The same provider has RP=1.5 for Payer B, which corresponds to an absolute dollar amount of 1.5*$100=$150. The example illustrates that a higher relative price value may not translate to higher absolute price; therefore RP cannot be used draw conclusions about absolute price levels across payers.

Hospital RP

Within the Hospital file, payers report data for four hospital types—Acute, Chronic (or long-term care), Rehabilitation, and Psychiatric.[8] Within these provider types, payers report inpatient and outpatient services separately.

Hospital Inpatient

For each hospital, payers submit number of discharges, total claims payments, total non-claims payments (such as bonuses for financial performance or for meeting certain quality targets), and case mix index (CMI), which captures the relative health of the population treated.[9]

Table A contains a simple illustration of the inpatient data elements submitted by payers that is used in the RP calculation. The payer in this example reported four hospitals and two product types (HMO, PPO) in its Acute Hospital-Commercial network.

Table A. Sample Hospital Inpatient Data

Hospital	Hospital Type	Insurance Category	Product Type	Discharges	Total Claims Payments	Total Non-Claims Payments	Case Mix Index
Hospital 1	Acute	Commercial	HMO and POS	251	$460,661	$105,491	1.5
	Acute	Commercial	PPO	237	$582,240	$81,406	1.6
Hospital 2	Acute	Commercial	HMO and POS	73	$453,685	$90,602	0.7
	Acute	Commercial	PPO	295	$56,882	$111,764	1.8
Hospital 3	Acute	Commercial	HMO and POS	49	$955,453	$76,962	0.7
	Acute	Commercial	PPO	228	$61,774	$125,589	0.7
Hospital 4	Acute	Commercial	HMO and POS	242	$838,973	$128,995	1.8
	Acute	Commercial	PPO	78	$965,899	$89,544	0.6

[8] RP Hospital designations follow those used by the Centers for Medicare and Medicaid Services (CMS) to delineate hospitals subject to or exempt from Medicare's inpatient prospective payment system, as defined in the Code of Federal Records **(42 CFR 412.23)**.

[9] Hospital inpatient discharges are assigned to diagnosis-related groups (DRGs), based upon diagnosis and other factors. Each DRG is assigned a weight that reflects the relative amount of resources required to treat patients in the group, which determines provider reimbursement. A hospital's CMI equals the average DRG weight for their patients. A higher CMI represents a more clinically complex population. CMI values are generally not comparable across payers, as payers may use different DRG groupers.

Computing Hospital Inpatient Relative Price (by Product Type):

Step 1. Compute the Adjusted Base Rate (ABR). For inpatient data, this equals the cost per case mix-adjusted discharge. Discharges are weighted by case mix index to control for variation in patient acuity across providers. A higher CMI represents a more complex patient population (i.e., a patient population that requires more intensive resource use) and a lower CMI indicates a less complex set of patients. The formula for ABR is shown below and is also shown in Table C, Column C5.

$$Adjusted\ Base\ Rate\ (ABR) = \frac{(Total\ claims + Total\ NonClaims\ )}{(Discharges) * (CMI)}$$

In calculating Hospital Inpatient RP, several adjustments are applied to the data. First, within a given insurance category, product-specific RP is only computed when payments to a hospital associated with that product equal at least $10,000. In addition, when the calculated ABR exceeds $100,000, the ABR is truncated at $100,000 to prevent outlier payments from skewing the results.

Step 2. Calculate the network average price level by product type. Starting with product type HMO, calculate the arithmetic mean of all hospitals' ABR. This calculation is shown below and the results are included in Table C, Column C7. Perform the same calculation for all other product types (e.g., PPO, Indemnity).

$$Network\ Average\ ABR_{HMO} = \frac{\$1{,}503.72 + \$10{,}651.41 + \$30{,}099.56 + \$2{,}222.15}{4}$$

Step 3. Calculate RP ratios by product type for each provider. To do this, divide each hospital's ABR by the corresponding network average ABR for that product. (See Table C, Column C6.)

$$RP_{HMO}(Hosp\ 1) = \frac{ABR_{HMO}(Hosp\ 1)}{Network\ average\ ABR_{HMO}} = \frac{\$1{,}503.72}{\$11{,}119.21} = 0.14$$

Table C. Computing Product-specific Hospital Inpatient RP

Hospital	Hospital Type	Insurance Category	Product Type	C1 Discharges	C2 Total Claims Payments	C3 Total Non-Claims Payments	C4 Case Mix Index	C5 Product Type Adjusted Base Rate = (C2+ C3) / (C1*C4)	C6 Network Average ABR	C7 Product-specific RP = C5/ C6 (HMO or PPO)
Hospital 1	Acute	Commercial	HMO	251	$460,661	$105,491	1.5	$1,503.72	**$11,119.21**	0.14
	Acute	Commercial	PPO	237	$582,240	$81,406	1.6	$1,750.12	**$6,448.47**	0.27
Hospital 2	Acute	Commercial	HMO	73	$453,685	$90,602	0.7	$10,651.41	**$11,119.21**	0.96
	Acute	Commercial	PPO	295	$56,882	$111,764	1.8	$317.60	**$6,448.47**	0.05
Hospital 3	Acute	Commercial	HMO	49	$955,453	$76,962	0.7	$30,099.56	**$11,119.21**	2.71
	Acute	Commercial	PPO	228	$61,774	$125,589	0.7	$1,173.95	**$6,448.47**	0.18
Hospital 4	Acute	Commercial	HMO	242	$838,973	$128,995	1.8	$2,222.15	**$11,119.21**	0.2
	Acute	Commercial	PPO	78	$965,899	$89,544	0.6	$22,552.20	**$6,448.47**	3.5

Computing Hospital Inpatient Relative Price (All Products Combined):

To compute RPs for all product types combined, ABRs by product type are weighted by the network average product mix or product distribution Network average product mix is calculated as the sum of payments corresponding to each product type divided by total network payments across all product types. The calculation for HMO is shown below. A similar calculation is performed for PPO. The results are shown in Table D, column E2.

$$Network\ Average\ Product\ Mix_{HMO} = \frac{Total\ Payments_{HMO}}{Total\ Network\ Payments} = \frac{\$3{,}110{,}822}{\$5{,}185{,}920} = 0.60$$

Step 1. The all products combined ABRs are computed for each hospital by summing the multiplicative products of the ABRs by product type and the network average product mix values (see Table DD, column D3D3). For example, for Hospital 1:

$$ABR(Hospital\ 1) = ABR_{HMO}(Hospital\ 1) * 0.60 + ABR_{PPO}(Hospital\ 1) * 0.40 = \$1{,}602.32$$

Step 2. Calculate the All Products Combined network average price level, or all products combined network average adjusted base rate. This equals the arithmetic mean of the all products combined ABRs (see Table D, Column D4).

Step 3. Calculate the all products combined RP for each provider. The all products combined ABRs for each hospital are divided by the network average (column D4) to obtain RP values for all product types combined (see Table D, Column D5).

$$RP(Hospital\ 1) = \frac{All\ Products\ Combined\ ABR(Hospital\ 1)}{Network\ average\ All\ Products\ Combined\ ABR} = \frac{\$1{,}602.32}{\$9{,}250.26} = 0.17$$

Table D. Computing Hospital Inpatient RP for all product types combined

Hospital	Hospital Type	Insurance Category	Product Type	D1 Adjusted Base Rate by Product Type From Table C, Column C5	D2 Network Average Product Mix (From Table D)	D3 All Products Combined Adjusted Base Rate (Step 1)	D4 Network Average Product-Adjusted Base Rate (Step 2)	D5 All Products Combined Inpatient Relative Price (Step 3)
						For each hospital, = Sum of (E1 series * E2 series)	= Mean of E3 series	= E3/E4
Hospital 1	Acute	Commercial	HMO	$1,503.72	0.60	$1,602.32	$9,250.26	**0.17**
	Acute	Commercial	PPO	$1,750.12	0.40			
Hospital 2	Acute	Commercial	HMO	$10,651.41	0.60	$6,516.43	$9250.26	**0.70**
	Acute	Commercial	PPO	$317.60	0.40			
Hospital 3	Acute	Commercial	HMO	$30,099.56	0.60	$18,525.25	$9,250.26	**2.00**
	Acute	Commercial	PPO	$1,173.95	0.40			
Hospital 4	Acute	Commercial	HMO	$2,222.15	0.60	$10,357.03	$9,250.26	**1.12**
	Acute	Commercial	PPO	$22,552.20	0.40			

Hospital Outpatient

Unlike payments for hospital inpatient services, payers employ a variety of payment methodologies to reimburse for outpatient services. As a result, the hospital outpatient RP calculation differs from the hospital inpatient calculation because hospital outpatient RP data does not contain volume information analogous to discharges. At a summary level, the hospital outpatient RP calculation aims to measure price variation across hospitals within a payer's network, after controlling for differences in service mix and product mix. To build hospital outpatient RP, CHIA collects the following data elements for each hospital: claims and non-claims payments, multipliers, and service mix values – for each service type category.

A service category represents a grouping of outpatient hospital services that are similar in nature and within which the insurer negotiates prices in a consistent manner. Common service categories for outpatient hospital services include ambulatory surgery, lab, radiology, and pharmacy. Each payer defines their own service categories, so service category groupings are not consistent from one payer to another.

A service multiplier represents the negotiated mark-up (or mark-down) relative to the payer's standard fee schedule that a payer agrees to pay a given provider for a particular service category. For example, for laboratory services, a payer reports a multiplier of 1.15 for Hospital A and .90 for Hospital B. This indicates that the payer reimburses

Hospital A 15% above the payer's standard fee schedule rate for that service line, whereas Hospital B receives 10% below the standard rate. This also implies that Hospital A's price for this service type category is 28% higher than Hospital B's price (1.15/0.90-1).

Service mix represents the percent of total hospital outpatient dollars that are attributed to a particular service category. In other words, service mix is the distribution of hospital outpatient payments by service category.

If the provider is not paid on a fee-for-service basis, there are two other approaches identified in this methodology document to impute a service category multiplier. If neither of these approaches is applicable to a payer's method of reimbursement, the payer may develop their own approach.

Imputing Service Category Multipliers: Method 1

A service multiplier may be calculated as the ratio of actual paid claims for a given service category to the network average payment for that service category (see Table E).

Table E. Service Multiplier Calculation: Ratio of Actual to Average Payments

					E1	E2	E1/E2
Hospital	**Hospital Type**	**Insurance Category**	**Product Type**	**Service Category**	**Payments For Ambulatory Surgery**	**Network Average Payments for Ambulatory Surgery**	**Imputed Multiplier (Provider Payments / Network Average Payments)**
Provider A	Acute	Commercial	HMO and POS	Ambulatory Surgery	$60,000	$50,000	1.20
Provider A	Acute	Commercial	HMO and POS	Ambulatory Surgery	$45,000	$50,000	0.90
Provider A	Acute	Commercial	HMO and POS	Ambulatory Surgery	$40,000	$50,000	0.80

Imputing Service Category Multipliers: Method 2

A service multiplier may also be calculated as the ratio of actual spending for a given service unit to the network average payment for that service unit (see Table F). These service multipliers may be constructed based on unit costs for the underlying Current Procedural Terminology (CPT) codes within a service category. In Table F's example, two CPT codes comprise a single service category. To calculate for this, the spending per unit across the two codes is divided by cross-CPT code network average payment per unit.

Table F. Category Multiplier Calculation: Payment Example

	A	B	C	D	E	F	G	H	I
				B/C			E/F	D+G	H1/H3
		CPT Code X			CPT Code Y			Combined	
	Hospital	Payments	Unit	Payments per Unit	Payments	Unit	Payments per Unit	Total Payments per Unit for Service Category	Provider Payment per Unit / Network Average Payment Per Unit
1	Provider A	250	3	83	300	3	100	183	**1.172**
2	Provider B	700	10	70	700	9	78	148	**0.945**
3	Network Average	950	13	73.08	1000	12	83.33	156	

Hospital Outpatient RP Calculation Steps

Payers submit hospital outpatient payment data at the hospital-insurance category-product level, for all services combined (Table G). In order to calculate RP, it is necessary to impute service-specific claims payments by multiplying total hospital claims payments by the respective service mix values. Claims by service category by product are then summed across the payer's network (Table H).

Table G: Sample Data for Acute Commercial Hospitals

Sample Data for Acute Commercial Hospitals

		Service Category Multiplier			Service Category Mix			Expenditures	
Hospital	Product Type	Emergency Room	Lab	Physician Services	Emergency Room	Lab	Physician Services	Total Hospital Claims	Total Hospital Non Claims
Hospital 1	HMO and POS	1.000	1.140	1.130	25%	15%	60%	$2,318,733.27	$26,972.26
Hospital 1	PPO	1.090	1.180	1.120	19%	11%	70%	$1,018,406.00	$11,826.00
Hospital 2	HMO and POS	1.015	1.040	1.030	33%	23%	44%	$2,025,891.00	$32,659.00
Hospital 2	PPO	1.000	0.000	1.110	32%	0%	68%	$1,925,618.00	$10,649.00

Table H. Computing Service Specific Claims Payments

		A	B	C	D	E			
		Service Catergory Mix			Expenditures		A*D	B*D	C*D
Hospital	Product Type	Emergency Room	Lab	Physician Services	Total Hospital Claims	Total Hospital Non Claims	Emergency Room	Lab	Physician Services
Hospital 1	HMO and POS	25%	15%	60%	$2,318,733.27	$26,972.26	$579,683	$347,810	$1,391,240
Hospital 1	PPO	19%	11%	70%	$1,018,406.00	$11,826.00	$193,497	$112,025	$712,884
Hospital 2	HMO and POS	33%	23%	44%	$2,025,891.00	$32,659.00	$668,544	$465,955	$891,392
Hospital 2	PPO	32%	0%	68%	$1,925,618.00	$10,649.00	$616,198	$0	$1,309,420
Total	**HMO and POS**						**$1,248,227**	**$813,765**	**$2,282,632**
Total	**PPO**						**$809,695**	**$112,025**	**$2,022,304**

Next, the network average service category mix is calculated for each product type, as shown in Table I. In Table I's example, the results show that across all hospitals in this payer's network, 28.7% of HMO and POS claims were in Emergency Room.

Table I: Computing Network Wide Service Category Mix by Product Type

	A	B	C	D	A/D	B/D	C/D
Product Type	Emergency Room	Lab	Physician Services	Total	Emergency Room Network Mix	Lab Network Mix	Physician Services Network Mix
HMO and POS	$1,248,227	$813,765	$2,282,632	$4,344,624	28.7%	18.7%	52.5%
PPO	$809,695	$112,025	$2,022,304	$2,944,024	27.5%	3.8%	68.7%

The next step in the calculation is to calculate a weighted average multiplier (also known as base service- weighted multiplier) using the network service category mix as weights (Table J). In the hospital outpatient calculation, the base service-weighted multiplier represents the provider-specific price level for a given service category. A base service weighted multiplier is only calculated for hospitals with reported claims of more than $5,000 within a given network. Table J shows the results of this calculation. In this table, the base service weighted multiplier for each hospital and product type is equal to the following:

$$\{(A * D) + (B * E) + (C * F)\}/G \{(A*D) + (B*E)+(C*F)\}/G$$

Table J: Calculating Base Service Weighted Multiplier

		A	B	C	D	E	F	G = D+E+F	H
		Service Category Multiplier			Network Service Category Mix				
Hospital	Product Type	Emergency Room	Lab	Physician Services	Emergency Room	Lab	Physician Services	Total Network Mix	Base Service Weighted Multiplier
Hospital 1	HMO and POS	1.000	1.140	1.130	28.7%	18.7%	52.5%	100.0%	1.095
Hospital 1	PPO	1.090	1.180	1.120	27.5%	3.8%	68.7%	100.0%	1.114
Hospital 2	HMO and POS	1.015	1.040	1.030	28.7%	18.7%	52.5%	100.0%	1.028
Hospital 2	PPO	1.000	0.000	1.110	27.5%	0.0%	68.7%	96.2%	1.079

Note that Hospital 2 did not report a multiplier (highlighted in red) for lab services for their commercial PPO product. As a result, the network average service mix for this provider is set to 0 (highlighted in red).). The sum of the network average service mixes for Hospital 2-PPO is 96.2% instead of the usual 1.0 (see Column G). The calculation in the

above formula divides by column G to avoid artificially deflating the base service weighted multiplier for a multiplier that is reported as zero. This is known as the zero correction.

The next step is to calculate the non-claims multiplier which will be added to the base service weighted multiplier to account for non-claims based payments (Table K). The non-claims multiplier (column D) is the ratio of non-claims to claims, the result of which is then multiplied by the base service weighted multiplier (calculated in Table J, Column H). The non-claims multiplier is added to the base service weighted multiplier to calculate the adjusted rate (Table K, Column E). Next, a network average adjusted rate is calculated by product type. Using the data in Table K as an example, the network average adjusted rate for HMO and POS would be calculated as:

$$(1.107 + 1.044)/2 = 1.076 \textit{(1.107 + 1.044)/2 = 1.076}$$

Finally, a relative price by product type is calculated by taking the ratio of the adjusted rate to the network average adjusted rate.

Table K: Calculating Product-Specific Relative Price

	A	B	C	D = B/A*C	E=D+C	F=Avg of E	E/F
Hospital	Product Type	Total Hospital Claims	Total Hospital Non Claims	Base Service Weighted Multiplier	Non Claims Multiplier	Adjusted Rate	Network Average Adjusted Rate	Relative Price
Hospital 1	HMO and POS	$2,318,733	$26,972	1.095	0.013	1.107	1.076	1.029
Hospital 1	PPO	$1,018,406	$11,826	1.114	0.013	1.127	1.106	1.019
Hospital 2	HMO and POS	$2,025,891	$32,659	1.028	0.017	1.044	1.076	0.971
Hospital 2	PPO	$1,925,618	$10,649	1.079	0.006	1.085	1.106	0.981

The final step in calculating hospital outpatient relative price is to calculate an all products combined outpatient hospital RP. First, a network average product mix (or product distribution) is calculated. Table L below sums total claims and total non-claims across product types for each hospital's payments by product type. In this illustration, total HMO and POS payments equal $4,404,256 or 59.8% ($4,404,256/7,370,755) of total claims and PPO represents 40.2%.

Table L: Summing Total Payments by Product to Calculate Network- wide Product Mix

Hospital	Product Type	Total Hospital Claims	Total Hospital Non Claims	Total Medical Expenditures
Hospital 1	HMO and POS	$2,318,733	$26,972	$2,345,706
Hospital 1	PPO	$1,018,406	$11,826	$1,030,232
Hospital 2	HMO and POS	$2,025,891	$32,659	$2,058,550
Hospital 2	PPO	$1,925,618	$10,649	$1,936,267

Total HMO and POS	$4,404,256
Total PPO	$2,966,499
Grand Total	$7,370,755

The final step in the RP calculation is to calculate the All Products Combined Outpatient Hospital Relative Price, shown products combined outpatient hospital relative price is shown in the table below in Table M. For each hospital, a weighted average adjusted rate Adjusted Rate is calculated using the network average product type mix or network average product distributions (. As shown in Table M, Columns C and columns A through D). The product mix is used to weight the product-specific relative prices to compute an all products combined adjusted rate (have already been calculated from previous steps. Column E). is the All Products Combined Adjusted Rate. The all products relative price is equivalent to the ratio of the All Products Combined Adjusted Rate for each hospital to the average of the All Products Combined Adjusted Rate.

Table M: All Products Combined Relative Price

	A	B	C	D	E=A*C+B*D	F=E/1.088
	HMO and POS Adjusted Rate	PPO Adjusted Rate	HMO and POS Network Average Product Mix	PPO Network Average Product Mix	All Products Combined Adjusted Rate	All Products Combined Relative Price
Hospital 1	1.107	1.127	59.8%	40.2%	1.12	1.025
Hospital 2	1.044	1.085	59.8%	40.2%	1.06	0.975
Average					1.088	

Blended Hospital RP

In addition to separate Inpatient and Outpatient RP values, CHIA calculates and reports blended Hospital RP, which combines these results. Blended Hospital RP is only reported for hospitals with payments exceeding both the inpatient and outpatient reporting thresholds, as previously specified.

One approach to blending the inpatient RP and outpatient RP could include calculating a simple weighted average of the two RP's using network wide inpatient and outpatient payments as weights. However this approach may double count prices as the payments already reflect the price of the hospitals. A second approach would be to blend the inpatient and outpatient RP using network wide volume of services. However, measures of volume are very diverse across inpatient and outpatient hospital services which makes this a very challenging calculation. In addition, CHIA does not collect outpatient hospital volume data. A third approach would be to calculate a volume proxy which would be equal to payments divided by relative price. ("normalize payment for price"). Once the network wide volume proxies are calculated, a weighted average RP is calculated using the network wide volume proxy as weights. A fourth approach utilizes the third approach but makes further adjustments to account for providers that have high inpatient price and high inpatient payments in relation to outpatient. The fourth approach attempts to avoid overweighting of the inpatient RP. This is the approach that is currently used in CHIA's RP methodology.

Blended RP is calculated as follows:

1. Calculate Inpatient Payments for Blending. A hypothetical example is shown Table N below. Column A includes the calculated Inpatient RP which averages to 1.00. Column B includes the insurer reported payments for each of the four hospitals. Column C and D calculate a weighted average inpatient relative price using reported payments. Note the weighted average inpatient relative price is 1.108. Column E adjusts the inpatient RP to be used in the blending calculation. This adjustment normalizes the inpatient RP for the weighted average inpatient RP. Finally, column F adjusts the revenue (or "normalizes" the revenue) for the inpatient RP for blending. This is the revenue that will be used in the hospital blending RP calculation.
2. Calculate Outpatient Payments for Blending. A hypothetical example is shown in Table O below. As shown, outpatient payments are normalized or adjusted for outpatient RP.
3. Calculate network wide Inpatient and Outpatient mix or distribution to use in the blending calculation. In this example the calculation is as follows:

   Inpatient Hospital Mix: $6,182,955/($6,182,955+$34,522,607) = .152 or 15.2%

   Outpatient Hospital Mix: $34,522,607/($6,182,955 +$34,522,607) = .848 or 84.8%

4. The final step as shown in Table P below blends the Inpatient RP and Outpatient RP using the network wide mix.

Table N: Calculation of Inpatient Payments for Blending

	A	B	C=A*B	D	E= A/D	F= B/E
	Inpatient RP	Inpatient Payments	Inpatient RP * Inpatient Payments	Weighted Average RP	Inpatient RP for Blending	Inpatient Payments for Blending
Hospital 1	0.6440	$982,170	$632,517		0.58	1,689,583
Hospital 2	1.6600	$1,978,945	$3,285,049		1.50	1,320,701
Hospital 3	1.0450	$969,452	$1,013,077		0.94	1,027,753
Hospital 4	0.6500	$1,258,477	$818,010		0.59	2,144,918
Average	1.00					
Total		$5,189,044	$5,748,654	1.108		6,182,955

Table O: Calculation of Outpatient Payments for Blending

	A	B	C = A/B
	Outpatient RP	Outpatient Payments	Outpatient Payments for Blending
Hospital 1	0.5500	$3,375,938	$6,138,069
Hospital 2	1.3500	$6,280,404	$4,652,151
Hospital 3	1.2800	$19,186,130	$14,989,164
Hospital 4	0.8000	$6,994,578	$8,743,223
Average	1.00		
Total		$35,837,050	$34,522,607

Table P: Calculation of Blended Hospital RP

	A	B	C	D	E =A*C+B*D
	Inpatient RP	Outpatient RP	Inpatient Mix	Outpatient Mix	Blended RP
Hospital 1	0.6440	0.5500	15.2%	84.8%	0.564
Hospital 2	1.6600	1.3500	15.2%	84.8%	1.397
Hospital 3	1.0450	1.2800	15.2%	84.8%	1.244
Hospital 4	0.6500	0.8000	15.2%	84.8%	0.777

Statewide Relative Price (S-RP)

As previously discussed, RP values are payer-specific, and cannot be used for comparing provider prices across payers. In order to compare provider price levels across payers and comply with Section 2TTTT of Chapter 29 of the Massachusetts General Laws, CHIA converts RP values into S-RP values for acute hospitals. For details on comparing provider prices across payers for in general, see the RP Composite Percentile Rank section below.

CHIA calculates S-RP values and the median S-RP value used to determine whether an acute hospital is eligible for the Community Hospital Reinvestment Trust Fund (CHRTF) using the methods described below:

Step 1: Calculate Inpatient Statewide Relative Price (SRP)

- **a.** This step builds upon results from the calculated hospital inpatient relative price. In the hospital inpatient RP calculation, an All Products Combined ABR (payments per case mix adjusted discharge) is calculated for each hospital by payer.
- **b.** Combine the All Products Combined ABR across payers into a single All Product Combined ABR for each hospital using the share of total inpatient payments made by each payer to a given hospital to weight each payer-specific All Products Combined ABR. This will be known as the cross-payer inpatient All Products Combined ABR.
- **c.** Compute statewide average All Products Combined ABR as the mean across all hospitals of the cross-payer ABRs calculated in step 1(b)
- **d.** Calculate the cross-payer inpatient S-RP values for each hospital by dividing the hospital-specific cross-payer All Products Combined ABRs (step 1(b)) by the statewide average cross-payer All Products Combined ABR (step 1(c))

Step 2: Calculate Outpatient Statewide Relative Price (S-RP)

- **a.** This step builds upon results from the calculated hospital outpatient relative price. In the hospital outpatient RP calculation, an All Products Combined relative price is calculated for each hospital by payer.
- **b.** Combine the All Products Combined Hospital Outpatient RPs across payers into a single All Products Combined Hospital Outpatient RP for each hospital using the share of total outpatient payments made by each payer to a given hospital to weight each RP. This will be known as the cross-payer outpatient All Products Combined RP. Compute the statewide average outpatient cross-payer
- **c.** All Products Combined RP as the mean of the hospital-specific cross-payer outpatient All Products Combined RP calculated in step 2(b)
- **d.** Calculate the cross-payer outpatient S-RP for each hospital by dividing the hospital-specific cross-payer outpatient RP (step 2(b)) by the statewide average (step 2(c))

Step 3: Calculate Blended Cross-Payer RPs

a. Calculate the share of cross-payer total payments accounting for inpatient and outpatient services for each hospital
b. Using the hospital-specific inpatient and outpatient payment shares calculated in step 3(a) as weights, combine each hospital's all-payer inpatient and outpatient S-RP values (steps 1(d) and 2(d)) – these amounts will be known as the interim blended cross-payer S-RPs
c. Compute the statewide average of the interim blended cross-payer S-RPs as the mean of the hospital-specific interim blended cross-payer S-RP calculated in step 3(b)
d. Calculate the final blended cross-payer S-RP for each hospital by dividing the hospital-specific interim blended cross-payer S-RP (step 3(b)) by the statewide average (step 3(c))

Step 4: Calculate Median S-RP

a. Compute the median of the blended cross-payer S-RP values computed in step 3(d) above - this is the median S-RP
b. Multiply the median S-RP by 1.2 to calculate 120 percent of the median S-RP
    i. This is the threshold used to determine hospitals' eligibility for payments from the CHRTF under Chapter 115

All hospitals below 120 percent of the median S-RP are eligible to receive payments from the CHRTF.

RP Composite Percentile Rank

When making comparisons of provider price levels across payers for all non-acute-hospital providers, CHIA converts RP values into percentile terms. Within a payer's network, each provider's relative price is converted into a percentile, ranging from 0 to 100. Higher RP values translate to higher percentile ranks. For example, an RP percentile of 90 indicates that a provider has a higher RP value than 90% of all other, same-type providers in that payer's network. An RP percentile of 10 means that a provider's RP was lower than 90% of all other providers in that payer's network. The 50th percentile represents a payer's median RP. Because the percentile method uses the same ordered rank scale for all payers, the relative position of the provider may be compared across payers.

Physician Group

CHIA requires payers to submit data for each physician group, according to share of total physician group payments within each insurance category. Payers report in the aggregate for physician groups not reported individually. Data elements reported by payers and the RP calculation methodology are analogous those used for hospital outpatient services. Though each payer must report each physician group, RP is calculated only for physician groups with product-specific payments exceeding $1,000.

Other Provider

Payers submit data separately for the following other provider types:

- Ambulatory surgery centers
- Community health centers
- Community mental health centers
- Freestanding clinical laboratories
- Freestanding diagnostic imaging centers
- Home health agencies
- Skilled nursing facilities

Payers must report data for providers that received at least three percent of a payer's total network payments for a given provider type. Providers not meeting this threshold are combined and reported in aggregate. The data elements and RP calculation method for Other Provider types are analogous to the Hospital Outpatient and Physician Group data and methods. RP is calculated only for providers receiving at least $1,000 in product-specific payments.

Conclusion

CHIA's Relative Price data provides crucial information for monitoring the performance of health care providers in the Massachusetts health insurance market, and bolsters the Commonwealth's goals of promoting price transparency.

CHIA will update this document to reflect any changes to RP data collection and methodology.

For more information, please contact: Matthew MacNabb, Associate Manager of Health Informatics and Reporting, at ***Matthew.MacNabb@chiamass.gov****.*