

Hospital price transparency data: Case studies for how to use it

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Hospital price transparency data opens a new window of opportunity

Effective January 1, 2021, hospitals nationwide were required to publicly post a machine-readable file containing negotiated prices for all services provided at the hospital. The data made available from this legislation unlocks significant potential opportunity for industry stakeholders thinking about healthcare strategy and analytics.

Background

LEGISLATION

According to the final rule,¹ hospitals² are required to post the following five types of “standard charges”:

1. Gross charges
2. Payer-specific negotiated charges
3. Discounted cash price
4. De-identified minimum negotiated charge
5. De-identified maximum negotiated charge

This information is required to be posted in a “single comprehensive, machine-readable file” for all hospital items and services. Milliman has compiled and analyzed machine-readable files for hospitals nationwide. Hospitals are also required to post a “shoppable” services file intended for patient review, but we did not analyze this file because it represents only a subset of common services performed at each facility.

WHAT'S AVAILABLE

Despite the regulation and noncompliance penalty,³ many facilities have been slow to post data that complies with federal requirements. In prior Milliman research as of late 2021, we found that about half of hospitals were posting compliant data,

although our ongoing research indicates these figures are increasing.⁴ Even for the hospitals that have posted compliant data, there are significant data quality considerations to address before the data is suitable for analysis.⁵

DATA QUALITY CONSIDERATIONS

Milliman has been studying the hospital price transparency data quality, and we are applying solutions that enable analytics from the data to unlock its value. Some important data barriers we have identified include:

Inconsistency. File formats and the underlying data can be so varied among hospitals that simply accessing a file to compare prices for a single service can be challenging even for those with payment data analysis expertise. If the user can find the payer payment rates in a file, there is no guarantee the different data elements are comparable. Rather often the rates are based on different units of service, precluding “apples-to-apples” comparisons at that level without adjustments.

It is important to assess whether a payment is based on a time unit, per admission, per day, per service, per scan, etc., to create consistent comparisons.

Service mix and intensity. To make broader, meaningful hospital and/or payer payment comparisons, the hospital service mix must be considered. For example, a children’s hospital will perform different services from a rehabilitation facility and comparing payments per admission without any adjustments for these differences would not yield actionable insights. Aligning the service mix and intensity of services is an important step for a summarized payment comparison.

For example, Milliman uses nationwide health service utilization data sets to create service mix profiles for the types of hospitals whose payments are being compared.

¹ The full text of the final rule is available at <https://www.federalregister.gov/documents/2019/11/27/2019-24931/medicare-and-medicaid-programs-cy-2020-hospital-outpatient-pps-policy-changes-and-payment-rates-and>.

² The U.S. Department of Health and Human Services defines hospitals under this rule as institutions licensed by a state or local government agency that is responsible for licensing hospitals. We believe this includes most short-term acute care, long-term care, psychiatric, rehabilitation, children’s, and critical access hospitals, which amount to roughly 6,000 hospitals nationwide.

³ The noncompliance penalty goes up to \$5,500 per day for large hospitals. See Table 63 here: <https://www.federalregister.gov/documents/2021/08/04/2021-15496/medicare-program-hospital-outpatient-prospective-payment-and-ambulatory-surgical-center-payment>.

⁴ Smith, C., Boschert, J., Gaal, M., & Lewis, D.C. (December 10, 2021). Hospital Price Transparency: December 2021 Update. Milliman Insight. Retrieved May 3, 2022, from <https://www.milliman.com/en/insight/hospital-price-transparency-december-2021-update>.

⁵ For more information on these and other data considerations, see here: <https://www.milliman.com/en/insight/Hospital-price-transparency-Data-or-information>.

Payer identification. Each hospital has its own approach to naming the payers when it reports its payments. Knowing which type of coverage (i.e., line of business) or which payer network is associated with a given payment is generally not clear, and sometimes it is even difficult for experienced reimbursement analysts to figure this out. For example, a user viewing the data for a particular payer and facility may not have enough descriptive information in the file to know whether they are looking at individual or group commercial rates, which can be dramatically different.

We have applied our expertise and experience in hospital contracting and network analysis to develop approaches for identifying the payers' lines of business and/or the network types in the transparency data.

These examples are just a few of the challenges that must be accounted for in the raw price transparency data before using it in meaningful analytics. Users of the data, whether it is acquired directly from hospital websites, or indirectly through other means, need to understand how to resolve the variability issues present in the data.

Having turned the machine-readable files into interpretable information, we can use the data to answer important questions about payers' and hospitals' payment arrangements, which are of great strategic or other importance to health industry stakeholders. Some of the key questions we have recently considered are described below.

Opportunity

Once data quality considerations are addressed, the hospital price transparency data lends itself to many innovative analyses.

We used live price transparency data from facilities located in Wisconsin and Illinois to illustrate a few analyses that align with common use cases:

- Contract discount analysis
- Payer payment relativity analysis
- Facility payment relativity analysis
- Geographic network strength and weakness
- Member outreach and education

⁶ Group commercial plans that resembled health maintenance organization (HMO) plans were selected at each facility. These plans are laid out in Appendix A of this paper.

FIGURE 1: COMMERCIAL OUTPATIENT RADIOLOGY SERVICES

| CPT CODE | CODE DESCRIPTION | MILLIMAN CATEGORY |
|----------|------------------------------|-------------------------|
| 74177 | Ct abd & pelv w/contrast | FOP Radiology - CT Scan |
| 74176 | Ct abd & pelvis w/o contrast | FOP Radiology - CT Scan |
| 70450 | Ct head/brain w/o dye | FOP Radiology - CT Scan |
| 78815 | Pet image w/ct skull-thigh | FOP Radiology – PET |
| 78816 | Pet image w/ct full body | FOP Radiology – PET |

We have focused the transparency data to group commercial reimbursement⁶ for a subset of outpatient radiology services, as they are very common services. The specific services by Current Procedural Terminology (CPT) codes, descriptions, and Milliman service categories⁷ are outlined in Figure 1. The facilities selected include those from Milwaukee-based health systems labeled as “System 1” and “System 2” in the other figures and discussions.

CONTRACT DISCOUNT ANALYSIS

Many hospital contracts define reimbursement for services in terms like per diem or per admission rates, or other types of “unitized” structures. Whatever the structure of these payer-specific negotiated charges (payer rates), measuring the average discount from a hospital's gross charges (billed charges) is a common approach to measuring the financial value of a payer's contracts with the hospital.

The percentage discount (discount) is calculated as:

$$\text{Discount} = 1 - \frac{\text{Payer rates}}{\text{Billed charges}}$$

Medicare cost reporting rules require hospitals to apply the same set of billed charges for its services (i.e., the charge-master) for every payer, although the charges will vary by type of service. Therefore, for a service or a given set of services, the payer with the highest average discount has the lowest average payer rates with the hospital.

Note that hospital charge-masters can be quite different by hospital, which makes the discount by itself a poor measure for comparing how much one hospital is paid relative to another one.

This leads to the next key point: payers and hospitals who structure their contracts based on discounts should understand the relative billed charge levels for relevant services and how potential differences may exist when considering what other hospitals bill for those same services.

⁷ Milliman's Health Cost Guidelines™ Grouper is used to categorize claims data into these categories. More information here: <https://www.milliman.com/en/products/health-cost-guidelines-suite>.

Hospital transparency data includes each hospital's reported billed charges for the services they report, which makes comparing differences in hospitals' charge-masters possible.

Also, one can calculate the discount a payer's rates yield for each service or calculate the average for a combined set of services, with the weighted average discount by service using a representative service mix for the hospital.

We demonstrate these concepts in the figures below with data from de-identified hospitals and payers. Using the services

described in Figure 1 at two System 1 hospitals and two System 2 hospitals in Wisconsin and Illinois, Figure 2 and Figure 3 demonstrate the:

- Dollar amounts the hospitals charge for these services
- Negotiated charge amounts that Payer 1 and Payer 2 have in their contracts to pay the hospital for group commercial coverages
- Resulting discounts

FIGURE 2: PAYER 1 GROUP COMMERCIAL DISCOUNTS

| CPT CODE | MILLIMAN SERVICE CATEGORY | SYSTEM 1 HOSPITAL A | SYSTEM 1 HOSPITAL B | SYSTEM 2 HOSPITAL C | SYSTEM 2 HOSPITAL D |
|-----------------------|--------------------------------------|---------------------|---------------------|---------------------|---------------------|
| BILLED CHARGES | | | | | |
| 74177 | FOP Radiology - CT/MRI/PET - CT Scan | \$4,920 | \$4,680 | \$6,310 | \$5,720 |
| 74176 | FOP Radiology - CT/MRI/PET - CT Scan | \$4,520 | \$4,280 | \$5,876 | \$3,355 |
| 70450 | FOP Radiology - CT/MRI/PET - CT Scan | \$2,260 | \$2,140 | \$2,744 | \$2,233 |
| 78815 | FOP Radiology - CT/MRI/PET - PET | \$6,680 | \$6,680 | \$8,765 | \$6,466 |
| 78816 | FOP Radiology - CT/MRI/PET - PET | \$6,680 | \$6,680 | \$7,968 | \$6,624 |
| PAYER RATES | | | | | |
| 74177 | FOP Radiology - CT/MRI/PET - CT Scan | \$1,368 | \$1,158 | \$750 | \$3,747 |
| 74176 | FOP Radiology - CT/MRI/PET - CT Scan | \$1,455 | \$1,233 | \$750 | \$2,198 |
| 70450 | FOP Radiology - CT/MRI/PET - CT Scan | \$899 | \$698 | \$750 | \$1,463 |
| 78815 | FOP Radiology - CT/MRI/PET - PET | \$3,186 | \$2,655 | \$3,000 | \$4,235 |
| 78816 | FOP Radiology - CT/MRI/PET - PET | \$3,137 | \$2,655 | \$3,000 | \$4,339 |
| DISCOUNTS | | | | | |
| 74177 | FOP Radiology - CT/MRI/PET - CT Scan | 72% | 75% | 88% | 35% |
| 74176 | FOP Radiology - CT/MRI/PET - CT Scan | 68% | 71% | 87% | 34% |
| 70450 | FOP Radiology - CT/MRI/PET - CT Scan | 60% | 67% | 73% | 34% |
| 78815 | FOP Radiology - CT/MRI/PET - PET | 52% | 60% | 66% | 35% |
| 78816 | FOP Radiology - CT/MRI/PET - PET | 53% | 60% | 62% | 35% |

FIGURE 3: PAYER 2 GROUP COMMERCIAL DISCOUNTS

| CPT CODE | MILLIMAN SERVICE CATEGORY | SYSTEM 1 HOSPITAL A | SYSTEM 1 HOSPITAL B | SYSTEM 2 HOSPITAL C | SYSTEM 2 HOSPITAL D |
|-----------------------|--------------------------------------|------------------------|------------------------|------------------------|------------------------|
| BILLED CHARGES | | | | | |
| 74177 | FOP Radiology - CT/MRI/PET - CT Scan | \$4,920 | \$4,680 | \$6,310 | \$5,720 |
| 74176 | FOP Radiology - CT/MRI/PET - CT Scan | \$4,520 | \$4,280 | \$5,876 | \$3,355 |
| 70450 | FOP Radiology - CT/MRI/PET - CT Scan | \$2,260 | \$2,140 | \$2,744 | \$2,233 |
| 78815 | FOP Radiology - CT/MRI/PET - PET | \$6,680 | \$6,680 | \$8,765 | \$6,466 |
| 78816 | FOP Radiology - CT/MRI/PET - PET | \$6,680 | \$6,680 | \$7,968 | \$6,624 |
| PAYER RATES | | | | | |
| 74177 | FOP Radiology - CT/MRI/PET - CT Scan | \$1,422 | \$1,219 | \$2,410 | \$3,609 |
| 74176 | FOP Radiology - CT/MRI/PET - CT Scan | \$1,519 | \$1,292 | \$2,245 | \$2,117 |
| 70450 | FOP Radiology - CT/MRI/PET - CT Scan | \$921 | \$738 | \$1,048 | \$1,409 |
| 78815 | FOP Radiology - CT/MRI/PET - PET | \$3,369 | \$2,720 | \$3,348 | \$4,080 |
| 78816 | FOP Radiology - CT/MRI/PET - PET | \$3,293 | \$2,720 | \$3,044 | \$4,180 |
| DISCOUNTS | | | | | |
| 74177 | FOP Radiology - CT/MRI/PET - CT Scan | 71% | 74% | 62% | 37% |
| 74176 | FOP Radiology - CT/MRI/PET - CT Scan | 66% | 70% | 62% | 37% |
| 70450 | FOP Radiology - CT/MRI/PET - CT Scan | 59% | 66% | 62% | 37% |
| 78815 | FOP Radiology - CT/MRI/PET - PET | 50% | 59% | 62% | 37% |
| 78816 | FOP Radiology - CT/MRI/PET - PET | 51% | 59% | 62% | 37% |

Figure 2 shows results for Payer 1 and Figure 3 shows results for Payer 2. A few observations in Figures 2 and 3 are:

- Even within the same system, there can be considerable variation in discounts. For example, both Payer 1 and Payer 2 have negotiated considerably higher discounts with System 2 Hospital C than with System 2 Hospital D. Conversely, for both payers, the discounts at the System 1 facilities are more in line with each other.
- The Payer 2 discounts at Hospital C and Hospital D are equal across these outpatient radiology services, while the Payer 1 discounts vary by individual service. Sometimes hospital contracts are defined by groups of services or by individual service.
- At System 1 Hospital A, the Payer 1 discounts are narrowly better than the Payer 2 discounts for these outpatient radiology services, so Payer 1's payer rates are slightly lower than Payer 2's.

- Payer 1's negotiated rates at Hospital B and Hospital C illustrate an important point: even though the discount from billed charges for PET scans is higher at Hospital C, the payer rate for these services is lower at Hospital B. This is because Hospital C's billed charges for PET scans are much higher than Hospital B's; although the discount is higher, it is not high enough to offset the difference in the higher billed charge starting point.

In summary, analyzing discounts across payers and facilities can be telling for hospital or insurance executives looking at contract terms or planning for negotiations. However, as seen in the analysis, higher discounts do not always equate to lower reimbursement.

As a reminder, these results are based solely on publicly available transparency data and not informed by any other source.

PAYER RATE PAYMENT RELATIVITY ANALYSIS

Another comparison method looks at the average of the relative rates of payers within a hospital. The analysis steps are:

1. Look at the payer rates for a common set of services for multiple payers.
2. Calculate a weighted average payer rate for each payer using a “market basket” utilization mix for the type of hospital being analyzed (or some other mix, such as a given payer’s historical utilization mix). Milliman uses our own mix assumption that is based on large, credible utilization data sources available to us by major line of business.
3. Calculate the average payer rate for all payers combined to serve as the comparison average payer rate.
4. Divide each payer’s payer rate by the comparison average payer rate to calculate each payer’s average payment relativity, which is an index for payment levels.

We demonstrate the results of this type of calculation in Figure 4, using actual payer rates reported by a subset of System 1 hospitals for the five services listed in Figure 1 above. Figure 4 shows the service mix weighted average payer payment index for Payers 1 to 5, separately at each hospital.

FIGURE 4: PAYER GROUP COMMERCIAL RELATIVE COSTS AT SYSTEM 1

| HOSPITAL | PAYER AVERAGE | PAYER 1 | PAYER 2 | PAYER 3 | PAYER 4 | PAYER 5 |
|------------|---------------|---------|---------|---------|---------|---------|
| Hospital A | 1.00 | 0.867 | 0.901 | 0.976 | 1.257 | 0.999 |
| Hospital B | 1.00 | 0.795 | 0.836 | 0.916 | 1.380 | 1.073 |
| Hospital E | 1.00 | 0.766 | 0.803 | 0.870 | 1.535 | 1.025 |
| Hospital F | 1.00 | 0.833 | 0.850 | 0.895 | 1.478 | 0.944 |

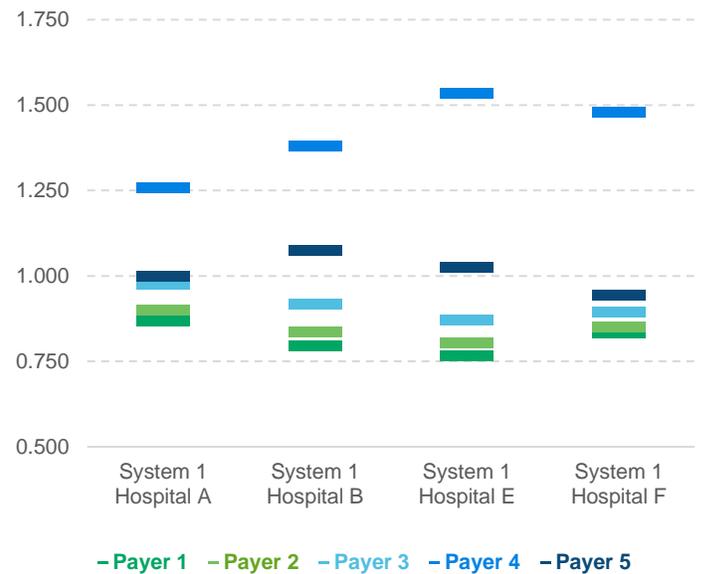
A few observations from these results include:

- Looking from lowest to highest payer payment index, for Figure 1 services, every facility has the same order: Payer 1, Payer 2, Payer 3, Payer 5, and Payer 4.
- The facility with the widest reimbursement spread is System 1’s Hospital E from 0.766 to 1.535.
- The facility with the smallest spread is System 1’s Hospital A from 0.867 to 1.257.

The results can be seen graphically in Figure 5.

This type of analysis is useful for both payers and providers who want to understand competitive performance of the payers within a facility. The next analysis calculates the relative average payment difference from payers at different facilities.

FIGURE 5: PAYER GROUP COMMERCIAL RELATIVE COSTS



FACILITY PAYMENT RELATIVITY ANALYSIS

Somewhat like the Payer Rate Payment Relativity Analysis section above, we continue to look at each payer’s rates at each facility, but this time we calculate each payer’s average reported payer rate at different facilities.

The analysis steps are the same, except we perform step 2 for every payer and hospital in the analysis, using the same market basket service utilization mix for every payer and hospital.

Next, step 3 and step 4 are calculated similarly except the combined average payer rate includes all payers at all the hospitals. For our example results in Figure 6, we used the bed days at each hospital as weights in the combined average calculation. Note: the Figure 6 average for all payers and hospitals combined is 1.00.

FIGURE 6: FACILITY GROUP COMMERCIAL PAYER RATE RELATIVES

| HOSPITAL | PAYER 1 | PAYER 2 | PAYER 3 | PAYER 4 | PAYER 5 |
|------------|---------|---------|---------|---------|---------|
| Hospital A | 1.033 | 1.032 | 1.032 | 0.980 | 1.007 |
| Hospital B | 0.870 | 0.879 | 0.890 | 0.988 | 0.993 |
| Hospital E | 0.899 | 0.905 | 0.905 | 1.178 | 1.017 |
| Hospital F | 0.898 | 0.880 | 0.856 | 1.042 | 0.860 |

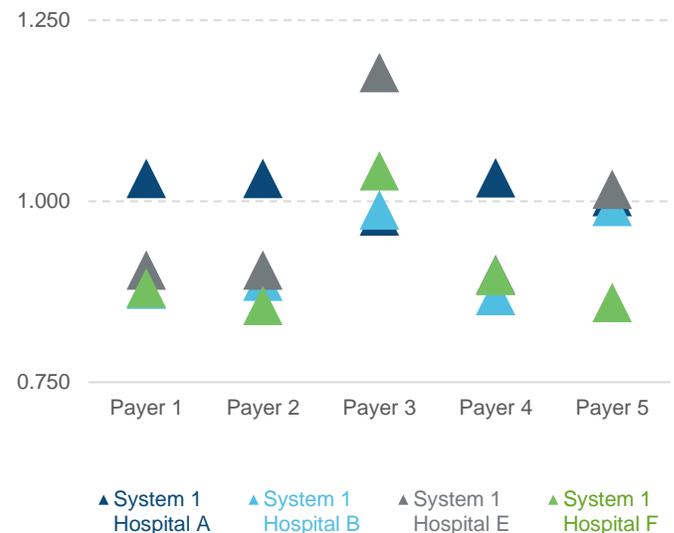
A few observations from this comparison of the payer payment index for the radiology services from Figure 1 above include:

- For all payers (except Payer 4), Hospital A is reimbursed higher than average.
- The Payer 2 payer payment index at Hospital B and at Hospital F is nearly the same, and Payer 2's Hospital E result is 2.8% higher (0.905 / 0.880).
- Payer 5's payer payment indices are close to average for Hospital A and Hospital B, while its Hospital F payer payment index is one of the lowest for all the payers and facilities.

The results can be seen graphically in Figure 7.

This analysis can be very useful for payer executives who are looking to understand which facilities and systems are reimbursed above or below average within their network. As we discuss next, when paired with geographic location, these payment indices can be a good indicator of network strength and weakness in various regions.

FIGURE 7: FACILITY GROUP COMMERCIAL PAYER RATE RELATIVITIES



RELATIVE VALUE UNIT ENHANCEMENT

A fundamental limitation with these two payment relativity analyses is that comparisons need rates for all services and payers being compared.

Otherwise, average rates for relativities would have inconsistent services and weights. Natural differences in service intensity and procedure price levels can skew relativities, making them invalid.

The trade-offs are that fewer services are included and values for similar but different services are not compared. A relative value unit (RVU) system, like Milliman's GlobalRVUs, helps normalize for service intensity, enabling rate comparisons for more services.

RVU systems reflect expected cost differences in services based on the complexity and severity of that service. When a service's payer rate is divided by the RVU, it adjusts for the complexity and severity for the service, making different services and their rates more directly comparable.

RVU adjustments across services in aggregate rate comparisons can normalize for service mix differences. Therefore, relativities do not have to be limited to only services with rates at every payer and facility. More of the transparency data can be used in the relativity calculations.

You can learn about RVUs from the MedInsight® white paper "GlobalRVUs," available at <https://www.medinsight.milliman.com/-/media/medinsight/pdfs/medinsight-globalrvus.ashx>.

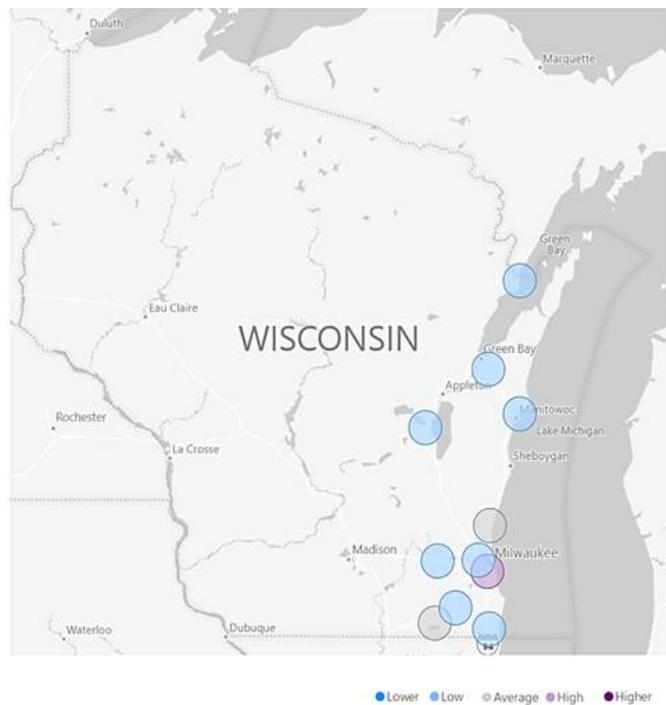
GEOGRAPHIC NETWORK STRENGTH AND WEAKNESS

As shown in the Facility Payment Relativity Analysis section above, the transparency data can be used to show the relative payment levels of facilities within a single payer’s network. When done across many facilities in larger geographical areas, this same comparison can give insight into regional network strength and weakness.

Figures 8 and 9 below display bubble maps of the hospital payment indices for Payer 3 and Payer 5 in eastern Wisconsin. These metrics are based on a larger list of facilities than in Figure 6 above and are calculated using the same facility payment rate relativity methodology as in Figure 6.

As can be seen in Figure 8, Payer 3’s results do not vary a lot by area because most circles are the same shade. Its highest reimbursement is coming from the Milwaukee area (the purple circle).

FIGURE 8: PAYER 3 RELATIVE NETWORK PERFORMANCE IN WISCONSIN



Conversely, in Figure 9, Payer 5’s highest reimbursement came from a facility in the northeastern corner of the state. Several Milwaukee and Green Bay facilities were reimbursed in line with Payer 5’s average, while they were slightly lower than the average for Payer 3.

FIGURE 9: PAYER 5 RELATIVE NETWORK PERFORMANCE IN WISCONSIN



This type of analysis can be useful for payer and provider executives seeking to understand contracting opportunities in various geographical regions.

MEMBER OUTREACH AND EDUCATION

All the above analyses are directed toward payers and providers, but one obvious stakeholder not mentioned yet is the individual consumer. The price transparency legislation targets making healthcare more understandable and accessible to individual consumers of services provided at hospitals nationwide. Several firms and startups are seeking to use transparency data to help consumers inform their healthcare decisions. Once items like those mentioned in the Data Quality Considerations section above are addressed, and if posted charges are accurate and timely, then the transparency data can be valuable for members in nonemergency situations.

Although hospitals are required to make information available to consumers for common, shoppable services, this information is typically imbedded within hospital websites and not readily available for mass comparisons across providers or payers.

To show an example, we selected the CPT code 70450 (CT scanning of the head or brain without contrast). If an individual living between Milwaukee and Green Bay (e.g., in Sheboygan) knew that they needed this service, they could search the cost for this service at surrounding facilities. We selected four facilities from health System 1 in this area and show this service’s cost at each of them in Figure 10. Figure 10 shows three distinct dollar values by facility:

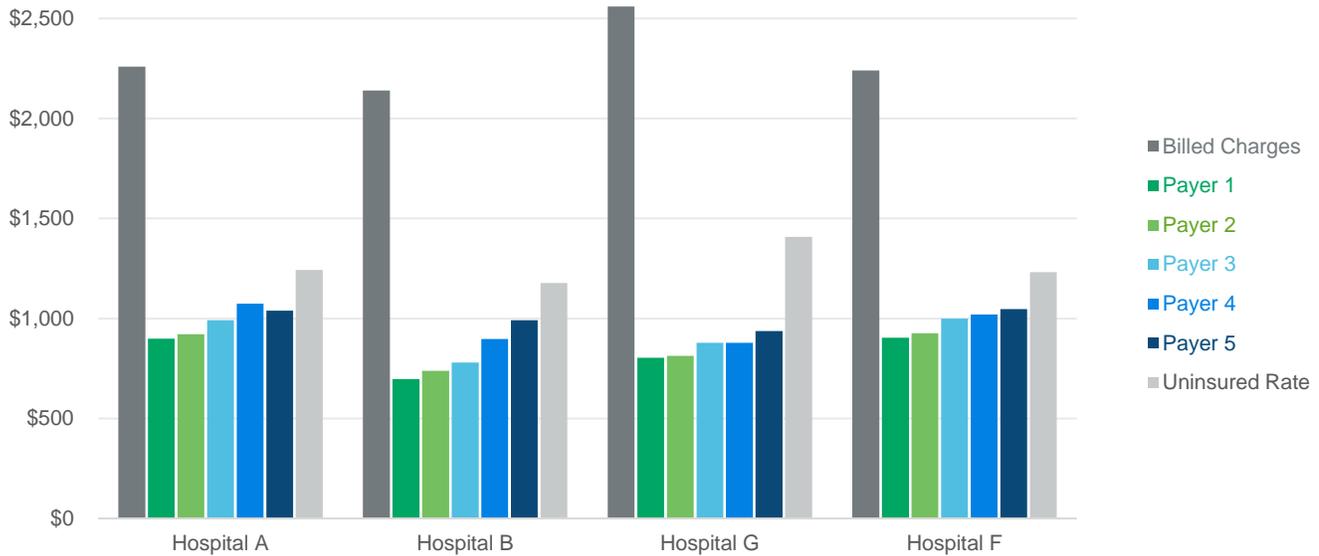
- **Billed charges.** This represents the amount that the hospital bills the payer for rendering the service provided.
- **Insurer rate.** This represents the amount that the insurer has contractually negotiated to reimburse the hospital for the service provided (this is the same as the “payer rate” in the figures above).
- **Uninsured rate.** This represents the amount that someone without insurance would pay for the service provided. This is the “discounted cash price” amount that the price transparency regulation requires facilities to report.

It’s important to understand that the “insurer rate” shows the cost to the insurer for this service—the amount that the member will pay ultimately depends on the details of the plan (e.g., deductibles and copays) that they have selected with their insurer.

As can be seen in Figure 10, unless a member is enrolled with a Payer 4 or Payer 5 plan, it will likely be a better choice financially to receive this service at Hospital B. If a member is enrolled in a Payer 4 or Payer 5 plan, then Hospital G may be the better financial choice. In any case, the member’s ultimate payment will be defined by the terms of their plan (e.g., deductible and copayments).

As price transparency data continues to be collected and quality considerations considered as discussed previously, innovators will soon put this information at consumers’ fingertips to help them change the way they utilize healthcare.

FIGURE 10: GROUP COMMERCIAL RATES FOR CT SCAN (70450) NEAR MILWAUKEE



Conclusion

The hospital price transparency regulation that went into effect in January 2021 has the potential to significantly alter the competitive dynamic among healthcare providers. Using transparency data to its full potential requires significant data quality considerations but, once they have been addressed, payers and providers will be able to understand competition and contracting strategy like never before. This regulation also opens doors for innovators to create products that allow individual consumers to have more insight into the cost of their care.

Caveats & Limitations

The observations and ideas presented in this paper reflect a point-in-time conclusion based on the current information collected and reviewed. Files and file content may have been updated since retrieval.

The data presented in this paper is to illustrate how transparency data can potentially be used and is not to be relied upon.

The data presented in this paper is only a subset of the data available at each facility or payer displayed. As such, the results of these limited comparisons should not be interpreted as indicators of any broad contracting relationships or trends.

The estimates included in this paper are not predictions of the future; they are estimates based on the assumptions and data analyzed at a point in time. If the underlying data or other listings are inaccurate or incomplete, then the results may also be inaccurate or incomplete.

The hospital systems, hospitals, and plans selected for the de-identified comparisons in this paper are outlined in Appendix A. They do not represent perfectly comparable plans, but rather a simplified approach was used to select plans that appeared to be comparable plans, as the intent of the comparisons was to present use cases for the data.

Throughout this analysis, Milliman relied on data and other information provided by publicly available data sources. Milliman has not audited or verified this data and other information but has reviewed it for reasonableness. Models used in the preparation of our analysis were applied consistent with their intended use. We have reviewed the models, including their inputs, calculations, and outputs, for consistency, reasonableness, and appropriateness to the intended purpose and in compliance with generally accepted actuarial practice and relevant actuarial standards of practice (ASOP).

Guidelines issued by the American Academy of Actuaries require actuaries to include their professional qualifications in all actuarial communications. Chris Smith, FSA, MAAA, Adam R. Singleton, FSA, MAAA, and Brian Allen, ASA, MAAA are members of the American Academy of Actuaries and meet the qualification standards for performing the analyses in this paper.



Milliman is among the world's largest providers of actuarial and related products and services. The firm has consulting practices in life insurance and financial services, property & casualty insurance, healthcare, and employee benefits. Founded in 1947, Milliman is an independent firm with offices in major cities around the globe.

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Appendix A: Plan Selection by Facility

Below is the list of hospital systems, hospitals, and payer plans from which we collected data for the analysis. Results presented are actual de-identified data points for systems, hospitals, and payers selected from this list in no particular order.

| FACILITY NAME | MEDICARE ID | BCBS | UNITED | CIGNA | AETNA | HUMANA |
|--|-------------|-------------------------------|-------------------------|------------|--------------|------------------------|
| HSHS St. Anthony's Memorial Hospital | 140032 | Blue Cross Blue Shield II Hmo | United Health All Payor | Cigna | Aetna Hshs | Humana |
| HSHS St. John's Hospital | 140053 | Blue Cross Blue Shield II Hmo | United Health All Payor | Cigna | Aetna | Humana Choice Care Hmo |
| ProHealth Waukesha Memorial Hospital | 520008 | Anthem Blue Priority | Uhc | Cigna | Aetna W Plan | Humana Hmo |
| HSHS Sacred Heart Hospital | 520013 | Anthem Blue Priority | United Health All Payor | Cigna | Aetna Hshs | Humana |
| HSHS St. Joseph's Hospital | 520017 | Anthem Blue Priority | United Health All Payor | Cigna | Aetna Hshs | Humana |
| Aurora Medical Ctr Manitowoc County | 520034 | Anthem_Blue_Priority | Uhc_Hmo | Cigna_Gppo | Aetna_W | Humana_Hmo |
| Aurora Medical Center Burlington | 520059 | Anthem_Blue_Priority | Uhc_Hmo | Cigna_Gppo | Aetna_W | Humana_Hpn_Hmo |
| ProHealth Oconomowoc Memorial Hospital | 520062 | Anthem Blue Priority | Uhc | Cigna | Aetna W Plan | Humana Hmo |
| HSHS St. Vincent's Hospital | 520075 | Anthem Hmo | United Health All Payor | Cigna | Aetna Hshs | Humana Choice Care Hmo |
| Aurora Lakeland Medical Center | 520102 | Anthem_Blue_Priority | Uhc_Hmo | Cigna_Gppo | Aetna_W | Humana_Hpn_Hmo |
| Aurora Medical Center Bay Area | 520113 | Anthem_Blue_Priority | Uhc_Hmo | Cigna | Aetna | Humana_Hmo |
| Aurora St. Luke's Medical Center | 520138 | Anthem_Blue_Priority | Uhc_Hmo | Cigna_Gppo | Aetna_W | Humana_Hpn_Hmo |
| Aurora West Allis Medical Center | 520139 | Anthem_Blue_Priority | Uhc_Hmo | Cigna_Gppo | Aetna_W | Humana_Hpn_Hmo |
| Aurora Medical Ctr Kenosha | 520189 | Anthem_Blue_Priority | Uhc_Hmo | Cigna_Gppo | Aetna_W | Humana_Hpn_Hmo |
| Aurora BayCare Medical Center | 520193 | Anthem_Blue_Priority | Uhc_Hmo | Cigna_Gppo | Aetna_W | Humana_Hmo |
| Aurora Medical Ctr Oshkosh | 520198 | Anthem_Blue_Priority | Uhc_Hmo | Cigna_Gppo | Aetna_W | Humana_Hmo |
| Aurora Medical Center Summit | 520206 | Anthem_Blue_Priority | Uhc_Hmo | Cigna_Gppo | Aetna_W | Humana_Hpn_Hmo |
| Aurora Medical Center | 520207 | Anthem_Blue_Priority | Uhc_Hmo | Cigna_Gppo | Aetna_W | Humana_Hpn_Hmo |