MILLIMAN PRICE TRANSPARENCY SOLUTIONS
FOR PAYERS AND PROVIDERS

Price transparency in 2023

Price transparency data unlocks a new era of healthcare analytics

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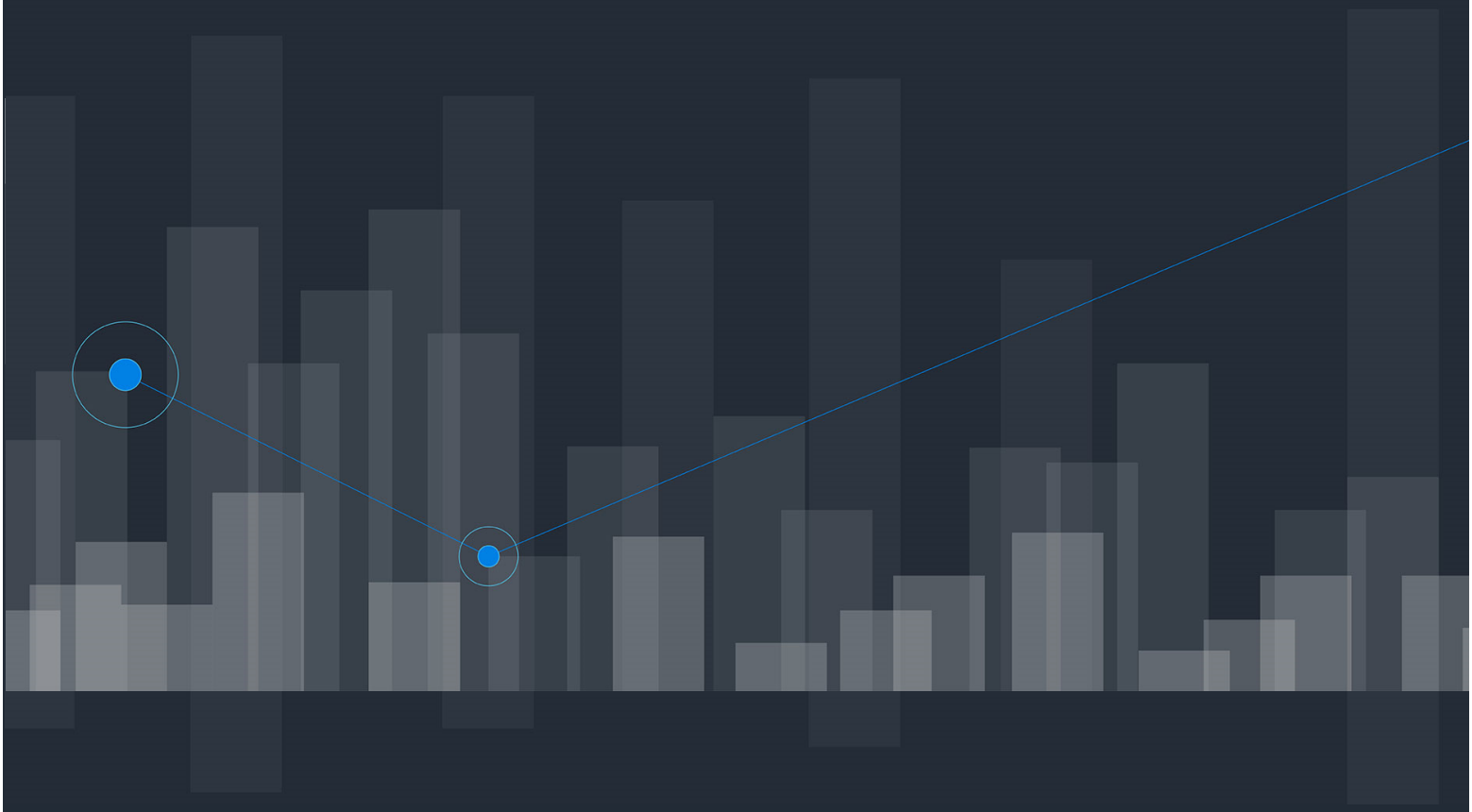


Milliman

Recent healthcare price transparency legislation has made a vast amount of proprietary data publicly available for the first time. This data has the potential to transform how entities contract, negotiate, and set prices for healthcare services, how employers offer healthcare benefits to their employees, how individuals understand healthcare costs prior to being serviced, and much more.

This legislation impacts all healthcare stakeholders, including payers, providers, employers, consumers, researchers, and innovators. Among various transparency requirements, both hospitals and payers were required to publish negotiated payment rates for healthcare services. This paper provides an overview of the available transparency data and common questions we have received throughout the development of Insights from Milliman Transparent ("Insights"), our price transparency analytics product,[1] which is powered by Turquoise Health data. This paper also serves as the introduction to our upcoming Milliman white paper series on how price transparency data is relevant to *all healthcare stakeholders*.

Regulatory background

In November 2019, the Centers for Medicare and Medicaid Services (CMS) published a Final Rule for hospital price transparency (HPT regulation),[2] detailing requirements for hospitals to publish (1) a machine-readable file (MRF) of their negotiated payment rates, and (2) a consumer-friendly website for 300 "shoppable" services by January 1, 2021.

In October 2020, the U.S. Department of Health and Human Services, Department of the Treasury, and the Department of Labor (collectively "the Departments") released the Transparency in Coverage Final Rules (TiC Final Rules).[3] The TiC Final Rules required non-grandfathered group health plans and health insurance issuers (collectively referred to in this paper as "payers") to publish certain information about the prices of healthcare services and estimates of members' cost-sharing liabilities. Together, these two regulations represent the most significant step to date toward increasing price and cost transparency in the U.S. healthcare system. Other legislation, such as the No Surprises Act, is also furthering the movement toward additional transparency for patients.

What's in the data?

HOSPITAL VERSUS PAYER DATASETS

Although the hospital transparency (HPT) and payer transparency (TiC) data are often discussed interchangeably, the two datasets have a number of distinct elements. The key requirements and differences in the available data to date are summarized in Figure 1.

FIGURE 1: HPT AND TIC DATA ATTRIBUTES

COMPONENT	HOSPITAL (HPT LEGISLATION)	PAYER (TIC FINAL RULES)
Estimated Data Volume/Frequency	3 TB/Annually	500 TB/Monthly
Line of Business	Commercial (Individual and Group), Medicare Advantage, Managed Medicaid	Commercial (Individual and Group)
Billed Charges	✓	✗
Negotiated Rates	✓	✓
In-Network Services	✓	✓
Out-of-Network Services	✗	✓
Professional Services	✗	✓
Negotiated Rate Type	✗	✓
Capitation/Bundled Payments	✗	✓
Standard Schema/ File Layout	✗	✓

[1] See https://www.milliman.com/en/products/Milliman-Price-Transparency-Solutions-for-Payers-and-Providers/.

[2] Federal Register, Vol. 84, No. 229 (November 27, 2019). Medicare and Medicaid Programs: CY 2020 Hospital Outpatient PPS Policy Changes and Payment Rates and Ambulatory Surgical Center Payment System Policy Changes and Payment Rates. Price Transparency Requirements for Hospitals To Make Standard Charges Public. Final Rule. Retrieved August 27, 2023, from https://www.govinfo.gov/content/pkg/FR-2019-11-27/pdf/2019-24931.pdf.

[3] CMS. Transparency in Coverage: Final Rule. Retrieved August 27, 2023, from https://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/CMS-Transparency-in-Coverage-9915F.pdf.

Estimated data volume/frequency

The HPT data is required to be updated annually, but the Final Rule did not specify a timeframe for updating the MRFs. As such, hospitals can update rates or post a new MRF at any time. Furthermore, entities are not required to include the date of publication or the effective date of the MRF data, so the contract period may not always be clear.

In contrast, the TiC data must be updated monthly by each payer and must reflect current contractual payment information as of the month of publication.

Line of business

The HPT legislation required hospitals to publish all negotiated rates, including rates with commercial plans (group and individual), Medicare Advantage plans, and managed Medicaid plans. We have also observed negotiated rate information in the MRFs for other types of payers that are not specifically required (e.g., TRICARE). The hospitals were permitted to publish the negotiated rates for each payer and network combination using their own naming convention and were not required to state which line of business each network reflects. Therefore, much work is required to cross-walk the information provided to determine the appropriate line of business when evaluating the data.[4] Recognizing some of these challenges, CMS recently announced a number of proposed updates to the HPT regulations as part of the 2024 Hospital Outpatient Prospective Payment System (OPPS) proposed rule (CMS-1786-P), which aim to better standardize the HPT MRFs. The proposed rule includes a requirement for hospitals to post the payer and plan name (as specified in the contract) in their MRF, which may reduce the amount of interpretation required.[5]

The TiC data only includes commercial rates. Within the TiC files, the data is clearly labeled as either group or individual although the network name may not always be clear.

Billed charges/negotiated rates

Both the HPT and TiC datasets include the negotiated rate (or the allowed amount) for each service by billing code. In the HPT data, the negotiated rate should be reported as a specific dollar amount for each code. In the TiC data, payers were permitted to report the specific percentage rate (rather than a negotiated dollar amount) for services that are reimbursed as a percentage of billed charges (or the gross amount). However, the TiC data does not include the billed charge amounts, so additional analysis is required in order to estimate a negotiated dollar amount for the rates that are reimbursed as a percentage of billed charges. The HPT data includes billed charges and cash prices in addition to the negotiated rates—two data points the TiC data does not include for in-network services.

In-network/out-of-network services

The HPT data only contains in-network negotiated rates. Under the TiC legislation, payers were required to publish two MRFs, an in-network negotiated rate file and an allowed amount file with out-of-network rate information. However, the allowed amount MRFs do not include information that is as comprehensive as the in-network MRFs.

Professional services

The HPT data only covers services that are performed in a hospital setting. This may include professional services provided by physicians employed by the hospital, but the regulations do not apply to professional practices operating under a distinct employer ID, even when the professional practice is clearly affiliated with the hospital. The TiC data contains all provider types, including professional practices, specialty groups, standalone radiology and labs, etc.

Negotiated rate type

The HPT data does not include any information about the specific rate methodology that applies to each negotiated rate. Therefore, the user must derive whether a value represents a per diem, percentage discount, case rate, etc. Conversely, the TiC data does indicate the “negotiated type” (e.g., fee schedule) for each negotiated rate, but even the TiC negotiation type is not always precise enough to understand how each rate is reimbursed. As part of the 2024 Hospital OPPS proposed rule, CMS is proposing that hospitals specify the contracting method used for each negotiated rate in the MRF. This would require hospitals to note whether each price should be interpreted by the user as a dollar amount, percentage rate, or by some other algorithm.[6]

Capitation/bundled payments

Payers are required to report and identify bundled payment and capitated rates in the TiC data with the applicable billing codes. These rates may be present in the HPT data, but the hospitals are not required to specifically identify which services were bundled or capitated.

File schema/layout

One additional difference between the HPT and TiC datasets is the required schema or data layout for the MRFs. The HPT regulation described the required data elements for the files but did not provide a specific schema for the MRFs. As a result, the

[4] Smith, C., Singleton, A., Lewis, D.C., & Allen, B. (May 2022). Hospital Price Transparency Data: Case Studies for How to Use It. Milliman White Paper. Retrieved August 27, 2023, from https://www.milliman.com/en/insight/hospital-price-transparency-data-case-studies-for-how-to-use-it.

[5] The full text of the Hospital OPPS proposed rule is available at https://www.federalregister.gov/public-inspection/2023-14768/medicare-program-hospital-outpatient-prospective-payment-and-ambulatory-surgical-center-payment.

[6] Ibid.

information has been posted in hundreds of different schemas. In contrast, for the TiC data, CMS created a GitHub website[7] with a prescribed schema, examples, and functionality to ask questions about the required format prior to the July 1 publication deadline. Although more standardized compared to the HPT data, the TiC schema includes an open text field for describing alternate reimbursement arrangements.

In early 2023, CMS published a recommended schema for the HPT data. If widely adopted, it could substantially impact the ease of using the data. In the 2024 Hospital OPPS proposed rule, CMS proposed making the recommended schema a mandatory template for all hospitals.[8]

HOW MUCH DATA IS AVAILABLE?

Our price transparency tool, Milliman Transparent, leverages both the HPT and TiC datasets to provide in-depth analytics to our clients. We have formed a strategic alliance with Turquoise Health (https://turquoise.health/) to obtain standardized HPT and TiC data through the Turquoise Clear Rates Data Platform. For HPT data, Turquoise has ingested data from all hospitals that have posted data across the country. This represents approximately 5,050 hospitals out of an estimated 6,200 that are subject to the transparency requirements.[9] For TiC data, Turquoise has ingested data from over 300 payers.

Figures 2, 3, and 4 provide a view of the contracts by facility available for commercial, Medicare Advantage, and managed Medicaid sources of coverage across the country in the HPT dataset.

FIGURE 2: COMMERCIAL CONTRACTS PER FACILITY – HPT DATA

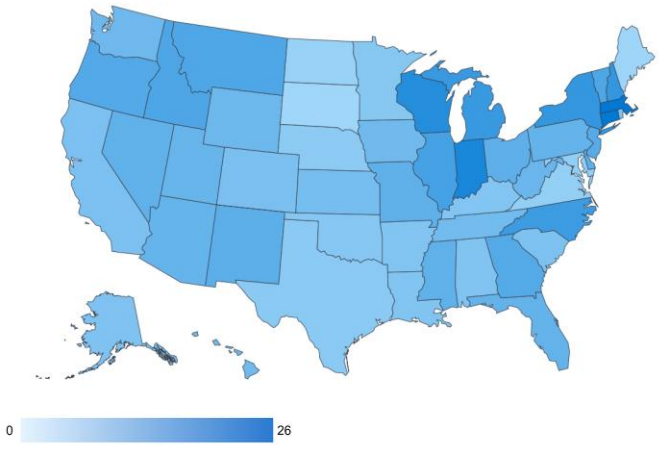


FIGURE 3: MEDICARE ADVANTAGE CONTRACTS PER FACILITY – HPT DATA

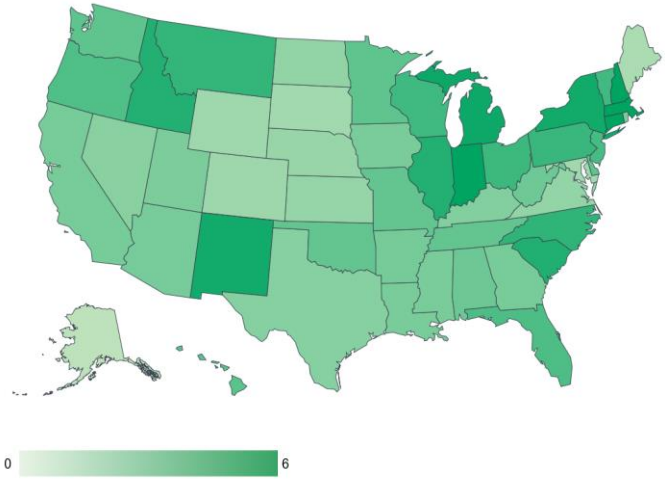
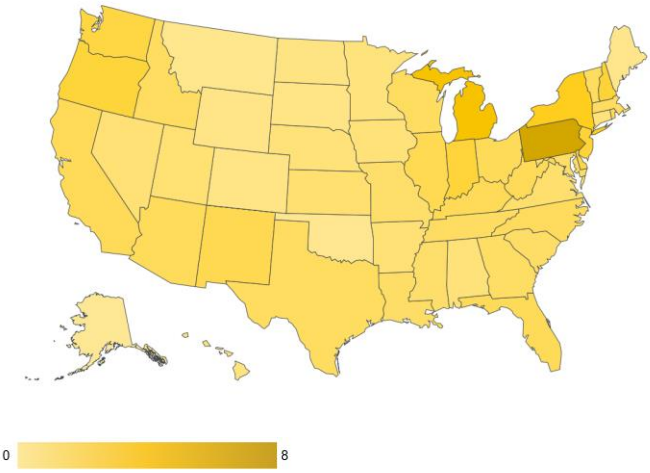


FIGURE 4: MANAGED MEDICAID CONTRACTS PER FACILITY – HPT DATA



Additionally, we have analyzed the number of facilities that have posted the required HPT data by type of hospital (using Milliman's proprietary classifications). As shown in Figure 5, as of August 1, 2023, about 82% of all hospital types have posted at least one MRF as required by the HPT regulations. It is important to note that the values shown in Figure 5 are not necessarily a reflection of the level of submission compliance with the regulations.

[7] See https://github.com/CMSgov/price-transparency-guide.

[8] Hospital OPPS proposed rule, op cit.

[9] As of August 1, 2023, Turquoise reporting includes data for over 5,300 entities. However, the figures in this report only include facilities that map to a valid Medicare ID number and contain non-zero data for valid code sets.

FIGURE 5: HPT DATA BY MILLIMAN HOSPITAL TYPE

	Number of facilities that posted files			
Hospital type	**Yes**	**No**	**Total**	**% of Total**
Academic Medical Center	179	8	187	96%
Cancer Hospital	11	-	11	100%
Childrens Hospitals	57	11	68	84%
Critical Access Hospitals	1,181	183	1,364	87%
Long Term Hospitals	290	101	391	74%
Other Teaching Hospital	321	10	331	97%
Psychiatric Hospitals	273	347	620	44%
Rehabilitation Hospitals	244	94	338	72%
Religious Non-Medical Health Care Institutions	-	14	14	0%
Short Term Hospitals	2,494	374	2,868	87%
Total	**5,050**	**1,142**	**6,192**	**82%**

For the TiC data, we have analyzed data for hundreds of networks. Milliman Transparent is ingesting new data from Turquoise Health every day. Given the scale of the dataset and the frequency of submissions, it is difficult to quantify the overall quality of the posted data. However, we have reviewed MRF postings from the majority of payers (over 300 different entities) and found very few instances where a payer posted no data.

HOW RELIABLE IS THE DATA?

In order to allow for fair, accurate, and defensible comparisons across payers and providers, we aggregate code-level prices into a normalized, comparable benchmark (i.e., percentage of "GRVU Medicare", which is defined below) by broad service category using utilization weights from Milliman's own data assets. Neither the HPT nor TiC dataset includes any utilization or service mix information to allow for aggregations of the code-level data. In order to create actionable insights from the data, we developed utilization profiles specific to line of business (e.g., group commercial) and provider type (e.g., short-term acute care hospital) using data from Milliman's research databases[10] to allow for aggregations of the code-level transparency data into meaningful service categories.

Milliman Transparent expresses aggregated prices in two ways: as a percentage of "GRVU Medicare" and as a percentage of "CMS Medicare." The definitions for each metric are described below.

1. **Percentage of GRVU Medicare:** We use Milliman's GlobalRVUs™ (GRVUs)[11] to approximate nationwide Medicare relativities. The GRVUs are a set of Relative Value Units (RVUs) that cover the entire range of healthcare services. The GRVUs can be thought of as an all-payer version of Medicare because the GRVUs help overcome common limitations of contract comparisons that use Medicare fee schedules. This includes non-credible diagnosis-related group (DRG) weights for mothers and babies in the Medicare data, Medicare fee schedules that vary by setting (e.g., ambulatory surgical center versus outpatient), Ambulatory Payment Classification (APC) weights that may aggregate many codes under a single payment, and different DRG types (All Patients Refined DRGs vs. TRICARE).[12]
2. **Percentage of CMS Medicare:** Even with the limitations of using Medicare fee schedules for commercial populations noted above, many payers and providers negotiate commercial contracts by leveraging Medicare fee schedules. As such, we also derive the percentage of CMS Medicare for each negotiated rate submitted in the transparency data. This includes area adjustments for all lines of business as well as full add-ons for Medicare Advantage contracts (excluding pass-through payments and indirect medical education [IME] payments).

One of the key questions surrounding the transparency data is the dependability of the posted information. To help address this question, Milliman has developed two key metrics to quantify the quality and reliability of the data and our percentage of Medicare reference values:

1. **Percent of Expected**: Estimates the total RVUs associated with the transparency data that pass all quality checks relative to the total RVUs we would expect for the given provider type and line of business (LOB). This metric helps quantify the comprehensiveness and reliability of the posted transparency data (i.e., how much is available compared to what we would expect). Contracts that have more data than

[10] See https://us.milliman.com/en/health/life-sciences/data-assets.

[11] See https://www.milliman.com/en/products/globalrvus.

[12] Fox, W., Jhu, E., Mills, C. et al. (March 2022). Milliman RBRVS for Hospitals. Milliman White Paper. Retrieved August 27, 2023, from https://www.milliman.com/-/media/products/hecs-and-rbrvs-for-hospitals/4-13-22_rbrvshospitals.ashx.

expected—e.g., Medicare Severity (MS)-DRGs and revenue codes for overlapping inpatient services—may have a Percent of Expected greater than 100%.

2. **Percent Usable:** Calculates the proportion of total initial dollars (prices * utilization) that passes our quality and reasonableness checks. This metric helps quantify the usability and quality of the transparency data (i.e., how much is usable from what was provided).

CAN WE COMPARE THE DATASETS?

Despite the differences in the HPT and TiC datasets, there are many ways the two datasets complement each other. Using the percentage of Medicare values from Milliman Transparent, values can be compared across payers, providers, and datasets. For example, Figure 6 provides comparisons of aggregated results for specific facilities in the Chicago metropolitan statistical area (MSA) between the HPT and TiC datasets. These results include commercial data for Aetna, Blue Cross Blue Shield of Illinois, Cigna, and United Healthcare. Please note Figure 6 makes a simplifying assumption that all payers are weighted equally when aggregating results to the facility level. In reality, the various payers will have very different service volumes across facilities. Also note that the payers, products, and codes included in Figure 6 may differ among the various facilities and the HPT and TiC datasets.

FIGURE 6: HPT AND TIC RESULTS BY FACILITY – CHICAGO MSA

Facility	HPT Data			TiC Data		
	Percent GRVU Medicare			Percent GRVU Medicare		
	Inpatient	Outpatient	Total	Inpatient	Outpatient	Total
140281 - Northwestern Memorial Hospital	252%	252%	252%	234%	323%	240%
140010 - Northshore University HealthSystem Evanston Hospital	241%	280%	254%	253%	241%	252%
140088 - The University Of Chicago Medical Center	351%	239%	256%	284%	384%	285%
140119 - Rush University Medical Center	176%	262%	204%	192%	429%	197%
140223 - Advocate Lutheran General Hospital	306%	358%	328%	253%	409%	261%
140276 - Loyola University Medical Center	194%	201%	200%	247%	257%	248%
140150 - University Of Illinois Hospital And Clinics	157%	238%	224%	132%	302%	147%
140007 - Presence Saint Joseph Medical Center	172%	168%	171%	184%	221%	188%
140048 - Advocate Trinity Hospital	285%	398%	346%	257%	399%	267%
140062 - Palos Community Hospital	210%	243%	222%	180%	248%	187%
140029 - Rush Copley Medical Center	183%	285%	217%	143%	160%	145%
140018 - Mt Sinai Hospital Medical Center	169%	125%	130%	158%	229%	167%
140122 - AdventHealth Hinsdale	182%	328%	189%	185%	211%	190%
140054 - MacNeal Hospital	173%	244%	227%	190%	159%	185%
Facility	**HPT Data**			**TiC Data**		
	Percent of Expected			**Percent of Expected**		
	Inpatient	**Outpatient**	**Total**	**Inpatient**	**Outpatient**	**Total**
140281 - Northwestern Memorial Hospital	77%	37%	56%	97%	10%	61%
140010 - Northshore University HealthSystem Evanston Hospital	78%	34%	55%	91%	14%	69%
140088 - The University Of Chicago Medical Center	75%	57%	59%	100%	2%	69%
140119 - Rush University Medical Center	76%	31%	52%	85%	5%	66%
140223 - Advocate Lutheran General Hospital	76%	60%	68%	99%	15%	76%
140276 - Loyola University Medical Center	4%	3%	4%	88%	24%	65%
140150 - University Of Illinois Hospital And Clinics	9%	36%	23%	57%	15%	46%
140007 - Presence Saint Joseph Medical Center	81%	37%	66%	90%	20%	69%
140048 - Advocate Trinity Hospital	49%	48%	48%	98%	20%	77%
140062 - Palos Community Hospital	91%	43%	65%	96%	26%	77%
140029 - Rush Copley Medical Center	88%	36%	60%	88%	36%	73%
140018 - Mt Sinai Hospital Medical Center	15%	33%	29%	55%	40%	53%
140122 - AdventHealth Hinsdale	72%	10%	57%	35%	17%	29%
140054 - MacNeal Hospital	5%	8%	7%	88%	49%	78%

Although the results vary between the two datasets, facilities with higher Percent of Expected values in Figure 6 tend to have more consistent results across the two datasets. In general, the Percent of Expected is higher for inpatient services in both the HPT and TiC datasets and thus we see greater alignment of the results. For example, several facilities have an inpatient Percent of GRVU Medicare within 15% (e.g., Mt. Sinai Hospital Medical Center, Presence Saint Joseph Medicare Center, AdventHealth Hinsdale). The outpatient results are more variable but we can still observe directional alignment in the relativity among facilities where Percent of Expected is higher. For example, the outpatient Percent of GRVU Medicare for University of Illinois Hospital and Clinics is about 94% of Northwestern Memorial Hospital in both datasets. Please note that although we often see more consistency in the results across facilities with higher Percent of Expected in both datasets, we still may observe very different rates between the two datasets. This may include, but is not limited to, errors by the hospital or payer, rates posted based on averages rather than contract terms (which could include items such as outlier or stop-loss provisions), or differences in the timing of the effective dates of the rates.

Taking a deeper dive, Figure 7 contains a more detailed comparison of TiC data and HPT data for the same single hospital (University of Texas Medical Branch) and plan (Blue Cross Blue Shield of Texas Preferred Provider Organization [PPO]). Although the data was limited in certain categories, many of the inpatient and outpatient results are consistent across the two datasets (e.g., inpatient surgical and outpatient lab), which helps increase confidence when making comparisons of the relative costs of the data posted by both entities. This type of comparison can be done all the way down to the code level using the transparency data in Milliman Transparent.

What's not in the data?

The data contains actual negotiated rates between payers and providers, which can provide very powerful insights into the relationships among different healthcare stakeholders. However, it is important to take into consideration the data elements that are *not* included in the transparency files. Understanding the differences between the payment information in the data and the final contracted rate determined by a contract is critical because the transparency data does not account for certain contractual provisions that can have significant impacts on payment terms. For example, neither the HPT nor TiC datasets is required to contain outlier or stop-loss provisions, value-based or quality payments, or contract hierarchy logic and payment rules when different reimbursement methodologies may apply sequentially. Additionally, the data does not include other key information such as utilization weights and provider quality of care metrics.

Despite these caveats, the data provides meaningful insight into payment relativities, contract structure, network breadth, and market competitiveness across payers and providers. Compliance with the regulations is continually improving, which increases confidence in the quality of the data and the value to users.

The data in its current form is ready to consume and interpret. However, there are significant limitations with attempting to consume and interpret the data directly from the MRFs. Turquoise Health has invested considerable time and effort to ingest the data and Milliman has invested considerable time and effort to layer intelligence onto the data to make it business-interpretable.

FIGURE 7: HPT AND TIC RESULTS AT UNIVERSITY OF TEXAS MEDICAL BRANCH

University Of Texas Medical Branch		TiC Data			HPT Data		
		Blue Choice PPOSM			Blue Cross PPO		
Setting	Service Line	Percent GRVU Medicare	Percent Usable	Percent of Expected	Percent GRVU Medicare	Percent Usable	Percent of Expected
Facility Inpatient (FIP)	FIP Medical	188%	99%	93%	193%	100%	81%
	FIP Surgical	204%	98%	86%	210%	97%	75%
	FIP Maternity	290%	100%	106%	253%	51%	99%
	FIP MHSA	111%	100%	76%	168%	100%	92%
	FIP	**208%**	**99%**	**90%**	**210%**	**85%**	**80%**
Facility Outpatient (FOP)	FOP ED	259%	4%	86%	631%	94%	106%
	FOP Surgery	278%	48%	92%	219%	82%	56%
	FOP Pharmacy	271%	48%	71%	234%	0%	10%
	FOP Lab	240%	89%	92%	241%	81%	95%
	FOP Other	245%	13%	38%	237%	57%	43%
	FOP Radiology	306%	97%	102%	274%	86%	100%
	FOP	**273%**	**32%**	**77%**	**265%**	**2%**	**48%**
Total		**240%**	**46%**	**83%**	**232%**	**4%**	**63%**

Milliman's role

Milliman Transparent was first developed in 2021 when the HPT data was initially posted by hospitals. Insights from Milliman Transparent leverages the Turquoise Clear Rates Data Platform to access clean HPT and TiC data, supplements the data with proprietary data assets, and applies analytic intelligence and tools (e.g., Milliman GRVUs) to create business-interpretable results from the data. Key output includes aggregated percentage of Medicare payment relativities for each payer/provider combination by Milliman's Health Cost Guidelines™ (HCG) service categories and for inpatient, outpatient, and in total.

Insights from Milliman Transparent is a dynamic reporting solution that enables a user to browse the transparency data and analytics based on the user's filters and selections in the reporting platform. The raw detailed transparency data (with the Milliman Transparent supplemental information attached to it) can be downloaded by the user to their own data environment for user-defined analytics.

More information is available at: https://www.milliman.com/en/products/Milliman-Price-Transparency-Solutions-for-Payers-and-Providers/.

Conclusion

Price transparency data has the potential to revolutionize the way stakeholders understand the pricing for healthcare services and the cost structure supporting the entire U.S. healthcare ecosystem. This will undoubtedly impact how stakeholders interact and work together on a daily basis. Although the quality of the data still has room to improve, there is incredible opportunity for those who are willing to dive into the transparency data and use analytical intelligence to solve their organization's needs and questions. Through a series of white papers, we will show specific examples of how the data is being utilized to support benchmarking and business decisions, and how Milliman is unraveling the tangled web of transparency data for our clients. Our next white paper, "Price Transparency for Payers," will dive deeper into the key strategic questions that payers face in today's healthcare landscape. The paper will highlight several case studies to demonstrate how payers are using the transparency data to answer these key strategic questions.

Caveats and 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 as of August 1, 2023. It is intended to illustrate how transparency data can potentially be used and is not intended to be relied upon outside of this illustrative context.

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.

Throughout this analysis, Milliman relied on data provided by Turquoise Health 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. Erica Reijula, FSA, MAAA and Chris Smith, FSA, MAAA are members of the American Academy of Actuaries and meet the qualification standards for performing the analyses in this paper.

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