



Hospital compliance with price transparency policy in the U.S.

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Background: Starting in 2021, U.S. federal regulations required hospitals to disclose their prices and negotiated third-party payor rates as well as publish chargemasters and pricing information for 300 shoppable healthcare services in a consumer-friendly manner. There is variation in hospital compliance with this policy. The purpose of this study was to report the level of hospital compliance and examine factors associated with compliance so as to promote consumer-friendly hospital pricing information disclosure.

Methods: Our study used data collected by ZeaMed Health from January to October 2021 and linked it to the 2020 American Hospital Association (AHA) Annual Survey data. We focused on non-federal hospitals in 50 states and Washington, D.C. The total analytical sample size was 4,910 facilities. We conducted bivariate and multivariable logistic regression to analyze associations of market competition and hospital characteristics with hospital price transparency compliance.

Results: Our study found that only 33.40% of hospitals were in compliance with price transparency regulations. Hospitals that were part of a centralized physician/insurance, moderately centralized health system, critical access hospitals (CAHs), and sole providers had higher odds of compliance. On the other hand, hospitals affiliated with a decentralized health system as well as non-profit/public hospitals had lower odds of compliance. The level of market competition was not associated with hospital compliance with the regulation in our multivariable logistic regression analysis. Furthermore, the results showed that compliance was higher in certain geographic regions.

Conclusions: Further policy implementation efforts should be directed towards assisting non-system affiliated hospitals, non-critical access/non-sole provider hospitals, non-profit/public hospitals, and geographic regions with low compliance rates.

Keywords: Hospital price transparency; policy implementation and compliance; hospital characteristics; market competition

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Introduction

Background

Price transparency in healthcare is defined as having access to pricing information on all procedures, services, and service packages of healthcare services. Equipped with hospital standard charges, stakeholders (including patients, employers, clinicians, and other third parties) will have the pricing information necessary to make more informed decisions (1). Price transparency has become increasingly important in recent years due to rising patient deductibles and other pressures to engage consumers. In 2022, a significant portion of commercially insured workers had high deductibles, with 61% having a deductible higher than \$1,000 and 32% having deductibles greater than \$2,000 for individual coverage (2).

The impetus to increase healthcare price transparency is aimed at promoting market competition among providers and bringing down care costs so that healthcare becomes more affordable for consumers. Many empirical studies on the impact of price transparency on healthcare markets are consistent with standard economic theory predictions, showing that price transparency may drive lower and more uniform prices by influencing providers' and consumers' decisions (3-5). Furthermore, research in this area also suggests that if consumers increase price-shopping

behaviors, payors and/or providers would be incentivized to improve quality, compete on price, and communicate the value of their goods and services more effectively for consumers (6,7). The concomitant decrease in prices may empower patients to take control of their health and improve access (8).

To further these goals, the U.S. Department of Health & Human Services (HHS) and the Centers for Medicare & Medicaid Services (CMS) promulgated policies to promote market competition, increase health care services competition, and make healthcare more affordable for all patients by improving price and quality transparency in American healthcare (8,9). These federal policies require that, starting on January 1, 2021, hospitals operating in the United States comply with the hospital price transparency requirements outlined in the Calendar Year 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 (CMS-1717-F2) (10), herein referred to as the "Hospital Price Transparency Final Rule". This rule implements Section 2718(e) of the Public Health Service Act and requires most hospitals to publicly post their standard charges [as defined at 45 Code of Federal Regulations (CFR) § 180.20] online in two ways.

First, to comply with the Hospital Price Transparency Final Rule, five types of standard charges, including gross charge, discounted cash price, payer-specific negotiated charge, de-identified minimum negotiated charge, and the de-identified maximum negotiated charge, are required to be publicly available. Second, a consumer-friendly format be adopted to present the following standard charges for at least 300 'shoppable' services: discounted cash prices (if cash prices are not provided, providers may use gross charges), payer-specific negotiated charges, de-identified minimum negotiated charges, and de-identified maximum negotiated charges. These 300 shoppable services consist of 70 services defined by CMS, and 230 services selected by the hospital for publication. If a hospital does not provide 300 shoppable services, the hospital must make public as many shoppable services as it provides. Alternatively, hospitals can also use a patient estimator tool to display the 300 shoppable services (11).

In addition to establishing the regulations of hospitals' public reporting of pricing information in a consumer-friendly manner starting in 2021, the CMS is tasked with

Highlight box

Key findings

- Compliance rates with U.S. hospital pricing transparency rules in 2021 were 33.40%.
- Compliance was significantly associated with hospital characteristics, including for-profit status, system affiliation, critical access hospital/sole provider hospital status, and geographic regions.

What is known and what is new?

- Since 2019, many hospitals have not been fully compliant with price transparency regulations.
- New price transparency rules have become more complex and harder for hospitals to follow.

What is the implication, and what should change now?

- Future policy implementation efforts should be directed towards hospitals that are having difficulties presenting pricing information publicly.
- Additionally, future policy changes should consider best-practices from state legislation, which requires disclosure of pricing information.

taking actions against non-complying hospitals and levying penalties under 45 CFR § 180.90. As of June 2022, CMS had issued about 352 warning notices to hospitals that were found noncompliant with price transparency rules (12). CMS also had sent 157 requests for corrective action plans to hospitals that had not made any corrections after receipt of a warning (12). The enforcement of these regulations can have a variety of repercussions affecting hospital administration, including receiving monetary penalties and negative publicity. According to the CMS and as reported in the media by Becker's Hospital Review, Atlanta-based Northside Hospital was the first health system in the nation to be fined more than \$1 million by CMS for violating federal price transparency laws (12). Northside Hospital Atlanta, the health system's flagship facility, was fined \$883,180; another hospital in the system, Northside Hospital Cherokee in Canton, GA, was fined \$214,320 (12).

Rationale and knowledge gap

Several studies have reported on the rates of hospital compliance with price transparency regulations. For instance, a study found that 65 out of the 100 largest U.S. hospitals by bed size were non-compliant with the regulations (13). Similarly, only 20% of top orthopaedic hospitals were found to be fully-compliant with price transparency requirements (14). Another study conducted using a random sample of 100 hospitals found that 83% were non-compliant with at least one of the requirements prescribed by the latest price transparency regulations (15). This was also the case in a purposeful sample of the top 100 highest-revenue hospitals, where 75% were found to be non-compliant with at least one requirement (15). In 2021, two studies using the Turquoise Health dataset found low compliance with hospital pricing transparency rules in the U.S. (16,17). However, these studies did not take into account various important hospital characteristics [such as hospital's system affiliation type, critical access hospital (CAH) status, or sole provider status] and/or had limited sample sizes. Overall, previous study findings are limited to specific settings, states, or hospital characteristics and, as a result, had limited generalizability at the national level.

Objectives

This study uses a national sample to examine two objectives: (I) to describe the extent to which U.S. hospitals are complying with federal price transparency regulations,

and (II) to examine how market competition and hospital characteristics are associated with price transparency compliance within the U.S. healthcare industry.

Methods

Data source

This study used compliance data collected by ZeaMed Health and hospital characteristics from the 2020 American Hospital Association (AHA) Annual Survey data. ZeaMed Health collected compliance data by downloading the hospital list from the CMS database and then manually collecting the machine-readable files and pricing estimator links, required by the CMS price transparency rule, from the hospital websites. Compliance data were collected from January to October 2021. Compliance information compiled includes: CMS Medicare ID number, provider demographics, charge master variables (gross price, discounted cash price, insurance negotiated rates, de-identified minimum charges, and de-identified maximum charges), shoppable services (discounted cash price or gross price, insurance negotiated rates, de-identified minimum charges, and de-identified maximum charges), and availability of online price estimator tools for patients to use. The ZeaMed Health dataset consisted of a total of 5,139 hospitals. In this study, we focused on non-federal hospitals located in all 50 states, including Washington, D.C., and linkable to the 2020 AHA survey. The final analytical sample contained 4,910 hospitals.

Outcome measures

The hospital was defined as compliant if it met all CMS requirements, including: (I) providing machine-readable file of chargemaster with all standard charges, gross price, cash price, insurance negotiated prices, de-identified minimum and maximum negotiated prices; and (II) providing a machine-readable file of 300 shoppable services with all standard charges, cash price or gross price, insurance negotiated price, de-identified minimum, and maximum price. Alternatively, hospitals could provide estimator tools instead of shoppable services.

Independent variables

We included market competition and several important hospital characteristics (i.e., hospital bed size, ownership,

teaching status, system affiliation, CAH status, sole provider status, and geographic region) to identify characteristics associated with hospital compliance. We used Herfindahl-Hirschman Index (HHI) to measure market competition (18). We calculated HHI for each hospital referral region (HRR) based on adjusted admissions, defined as the sum of admissions and equivalent admissions attributed to outpatient services. The number of equivalent admissions attributed to outpatient services was derived by multiplying admissions by the ratio of outpatient revenue to inpatient revenue. The HHI is the sum of squares of market share and can range from near zero to one. Teaching status, CAH status, and sole provider status were also represented by binary variables indicating whether a hospital was a teaching hospital, a CAH, and the sole provider in the county. The categories of system affiliation included centralized, centralized physicians/health insurance, moderately centralized, decentralized, independent, and no system affiliation. Hospital geographic region was operationalized using five regions: western, midwestern, northeastern (including Washington, D.C.), southeastern, and southwestern.

Statistical analysis

We conducted chi-square tests for categorical variables, *t*-test for HHI, and multivariable logistic regression modeling using Stata 16.1.

Results

Table 1 presents basic characteristics of the non-federal hospitals in our study and their association with compliance or non-compliance. Out of 4,910 hospitals, only 1,640 (33.40%) were fully compliant. The breakdown of hospitals by hospital characteristics are as follows: the majority were located in the midwestern and southeastern regions (29.49% and 25.91%, respectively); 53.20% were classified as small hospitals; 95.01% as non-teaching hospitals; 79.82% as non-profit or public; 34.24% as non-system affiliated and the remainder affiliating with different types of systems; 27.19% as CAHs; and only 6.17% as sole providers. In terms of market competition, the mean of HHI was 0.14 with a standard deviation of 0.12.

The results of the Chi-square tests indicated that region, bed size, system affiliation, CAH status, sole provider status in the community were significantly associated with compliance, while the HHI was not associated with

compliance in the early phase of the 2021 price transparency rule.

Table 2 presents the results from the logistic regression analysis. Our findings indicate that geographic region, profit/non-profit status, system affiliation, CAH status, and sole provider status had a statistically significant association with compliance with the price transparency policy. Hospitals located in the midwestern [odds ratio (OR) =1.297; $P<0.01$] and southeastern (OR =1.249; $P<0.05$) regions had higher odds of complying with the CMS policy compared to those in the western region. Hospitals with a centralized physician/insurance structure (OR =1.722; $P<0.001$) and a moderately centralized system (OR =1.712; $P<0.001$) had higher odds of compliance with the policy compared to non-system affiliated hospitals. On the contrary, hospitals under a decentralized system had lower odds of compliance (OR =0.558; $P<0.001$). CAH (OR =1.470; $P<0.001$) and sole provider (OR =1.356; $P<0.05$) hospitals had higher odds of compliance with the policy compared to their counterparts. Our study did not reveal a significant association between hospital bed size, hospital teaching status, or market competition with hospitals' compliance with the price transparency regulation during the first 10 months after its implementation.

Discussion

Key findings

In our multivariable analysis, we found that there was no association between hospital compliance and market competitiveness as measured by HHI. However, we found other hospital characteristics to be significantly associated with hospital pricing transparency compliance. Specifically, hospitals under centralized physician/insurance and moderately centralized hospital systems, CAH, and sole-provider hospitals were associated with higher levels of compliance compared to their respective reference groups, holding all else constant. On the other hand, we found that non-profit or public ownership and hospitals under a decentralized system were less likely to be compliant with price transparency regulations compared to their respective reference groups, holding all else constant.

Overall compliance rates with price transparency regulations from 2019 to 2022

Since the passing of the Patient Protection and Affordable Care Act (ACA) in 2010 and the enactment of hospital

Table 1 U.S. hospital characteristics by compliance with 2021 Centers for Medicare & Medicaid services price transparency rule (n=4,910)

Characteristics	Descriptive statistics	Compliance		P value
		Yes	No	
All	4,910 (100.00)	1,640 (33.40)	3,270 (66.60)	
Region				**
Western	859 (17.49)	246 (28.64)	613 (71.36)	
Midwest	1,448 (29.49)	515 (35.57)	933 (64.43)	
Northeast (including District of Columbia)	669 (13.63)	206 (30.79)	463 (69.21)	
Southeast	1,272 (25.91)	440 (34.59)	832 (65.41)	
Southwest	662 (13.48)	233 (35.20)	429 (64.80)	
Bed size				**
Small	2,612 (53.20)	922 (35.30)	1,690 (64.70)	
Medium and large	2,298 (46.80)	718 (31.24)	1,580 (68.76)	
Teaching status				–
Yes	245 (4.99)	80 (32.65)	165 (67.35)	
No	4,665 (95.01)	1,560 (33.44)	3,105 (66.56)	
Profit/non-profit				–
For-profit	991 (20.18)	340 (34.31)	651 (65.69)	
Non-profit or public	3,919 (79.82)	1,300 (33.17)	2,619 (66.83)	
System affiliation				***
Centralized	463 (9.43)	150 (32.40)	313 (67.60)	
Centralized physician/insurance	263 (5.36)	116 (44.11)	147 (55.89)	
Moderately centralized	955 (19.45)	427 (44.71)	528 (55.29)	
Decentralized	903 (18.39)	191 (21.15)	712 (78.85)	
Independent	645 (13.14)	196 (30.39)	449 (69.61)	
Non-system	1,681 (34.24)	560 (33.31)	1,121 (66.69)	
Critical access				***
Yes	1,335 (27.19)	504 (37.75)	831 (62.25)	
No	3,575 (72.81)	1,136 (31.78)	2,439 (68.22)	
Sole provider				*
Yes	303 (6.17)	117 (38.61)	186 (61.39)	
No	4,607 (93.83)	1,523 (33.06)	3,084 (66.94)	
Herfindahl-Hirschman Index	0.138 (0.115)	0.142 (0.116)	0.136 (0.114)	–

Unless otherwise noted, all data are presented as n (%) except for the Herfindahl-Hirschman Index scores that are presented as mean (standard deviation). Chi-square tests were conducted for categorical variables, and a *t*-test was conducted for the continuous Herfindahl-Hirschman Index variable. *, P<0.05; **, P<0.01; ***, P<0.001.

Table 2 Compliance with 2021 U.S. Centers for Medicare & Medicaid Services price transparency rule regressed on hospital characteristics (n=4,910)

Characteristics	Odds ratio	95% CI	P value
Region (reference: western)			
Midwest	1.297	(1.075, 1.565)	**
Northeast (including District of Columbia)	1.070	(0.850, 1.348)	–
Southeast	1.249	(1.029, 1.517)	*
Southwest	1.233	(0.984, 1.546)	–
Bed size (reference: small)			
Medium and large	1.008	(0.864, 1.177)	–
Teaching status (reference: no)			
Yes	1.026	(0.767, 1.372)	–
Profit/non-profit (reference: for-profit)			
Non-profit or public	0.807	(0.680, 0.958)	*
System affiliation (reference: non-system affiliated)			
Centralized	1.148	(0.910, 1.447)	–
Centralized physician/insurance health system	1.722	(1.313, 2.258)	***
Moderately centralized	1.712	(1.442, 2.032)	***
Decentralized	0.558	(0.458, 0.679)	***
Independent	0.920	(0.752, 1.125)	–
Critical access (reference: no)			
Yes	1.470	(1.231, 1.755)	***
Sole provider (reference: no)			
Yes	1.356	(1.050, 1.753)	*
Herfindahl-Hirschman Index	1.209	(0.713, 2.048)	–

*, P<0.05; **, P<0.01; ***, P<0.001. CI, confidence interval.

price transparency policies in 2019, researchers and other professionals have been monitoring compliance rates using various approaches. Under the simpler, initial 2019 price transparency regulation that required only diagnosis-related charges be made publicly available in machine-readable format, hospital compliance rates were quite high. According to previous research, a nationwide compliance measure showed 51.5% of hospitals failing to comply (18). Some studies also found that compliance with transparency regulations varied among different geographic regions and types of procedures, with some areas and procedures demonstrating higher levels of compliance. For example, 80% compliance was observed in a sample of all Pennsylvanian hospitals (19), 74% in a random sample

of 100 general U.S. hospitals (20), 72% among acute care hospitals in North Carolina (21), and even 84% in relation to prostate cancer treatment prices at National Cancer Institute-designated cancer centers (22). However, these studies had limited sample sizes and were restricted to specific regions or services, therefore, their findings could not be generalized to the national level.

Coincidentally, evidence originating from an empirical study as well as data released by the CMS showed that compliance rates improved from 2021 to 2022 (23,24). However, the level of compliance assessed by researchers was much lower when compared to that of the CMS' determination, e.g., compliance rate of 35.9% (with sample size of 4,834 hospitals) versus 70% (sampling 600 acute

care hospitals), respectively (23,24). This discrepancy raises questions about the accuracy and reliability of the methods used to assess compliance and highlights the need for further research to ensure that the data used for monitoring the compliance is accurate and trustworthy.

System-affiliation and compliance with price transparency regulation

Our study found that hospitals that were part of a centralized physician/insurance or moderately centralized health system were more likely to comply with CMS price transparency regulations compared to non-system affiliated hospitals. In contrast, hospitals under a decentralized health system were less likely to comply with these regulations. To better understand these findings, we conducted an additional analysis by changing the reference group (not shown in our results but available upon request) and found that hospitals under either a centralized physicians/insurance or a moderately centralized health system were more likely to comply with the regulations compared to hospitals under a centralized health system.

There could be several explanations for these findings. One is that centralized health systems often have a larger organizational structure, which may result in a slower and more cumbersome process of updating their pricing information as required by the CMS regulation. Contrarily, hospitals under centralized physicians/insurance or moderately centralized health systems may have more decision-making autonomy to comply with the regulation, which could result in higher levels of compliance. It is also possible that cultural and organizational factors may influence the level of compliance, such as a stronger emphasis on transparency and accountability in hospitals under centralized physicians/insurance or moderately centralized health systems. Future work should seek to determine the extent to which system membership, and the financial resources it affords, affect hospitals' decisions to comply with price transparency requirements.

Hospital ownership type and compliance with price transparency regulation

Our study found that non-profit and public hospitals had lower odds of compliance with CMS price transparency regulations compared to for-profit hospitals. Previous research indicated minimal differences between ownership types in terms of pricing behavior, the quality of care provided, or the amount of uncompensated care. Although these comparisons were based on averages, generally

speaking, they suggest that non-profit hospitals' behaviors are similar to for-profit hospitals. Unfortunately, it is not possible to analyze the prices among those hospitals that did not comply with the regulation in the early stages of policy implementation but became compliant later, as there is a lack of data for those hospitals that did not post their prices prior to the policy's implementation.

Geographical implications and capturing theoretical savings

Our study found the midwestern, southeastern, and southwestern regions have the highest compliance rates with price transparency regulations (35.57%, 34.59%, and 35.20%, respectively), making these geographical areas the most price-shoppable for consumers in 2021. Our results appeared to align with another study showing similar regional differences in savings for consumers and insurers due to price transparency. As shown in a national estimation of healthcare market savings to consumers and insurers due to price transparency, the midwestern and southern regions in the U.S. have the highest potential for savings by the year 2025, \$20.6 billion and \$24.9 billion, respectively, using an upper-bound estimate (25).

Conversely, we found the western and northeastern regions with the lowest compliance rates at 28.64% and 30.79%, respectively. One study also found that these regions were estimated to have the lowest savings for consumers and insurers by the year 2025, \$17.7 billion and \$17.5 billion using an upper-bound estimate (25). The implication of our findings is that consumers in western and northeastern regions will face significant challenges in finding transparent pricing information for shoppable healthcare services. If they are successful in price shopping, they will save less on out-of-pocket expenses, including deductibles and copays/co-insurance, compared to other parts of the country.

Further research is needed to examine not only the association between higher compliance rates and regions with greater potential healthcare expenditure savings but also, importantly, how consumers are using pricing information (if at all). It is likely that health care administrators and executives in these regions are aware of the potential savings and have made efforts to increase price transparency—resulting in a 5% advantage compared to regions with lower price transparency compliance rates and estimated savings. However, other factors, such as health literacy or access to price transparency websites, among healthcare consumers in these regions may also play a role

and need further investigation. These consumers may have the ability to navigate health systems and demand more consumer-friendly practices from providers. However, equipping consumers with pricing information from chargemasters as well as information on shoppable services through federal hospital price transparency regulations is no guarantee for consumers having perfect information in healthcare markets and acting out informed decision-making behaviors. Specifically, patients will need to learn how to utilize newly available pricing information to their advantage, since it has a different use case when compared to other documents, such as medical bills and explanations of benefits (EOBs), that patients may have better familiarity with.

Study limitations

First, we were not able to determine whether hospitals were voluntarily publishing their pricing information prior to the implementation of federal price transparency regulations. This was outside the scope of our study. However, it is possible that prior expertise with publishing pricing information could impact a hospital's likelihood of complying with federal regulations. Further study can be conducted to identify if prior experience in publishing pricing information was beneficial in implementing 2021 federal price transparency rules. Second, manually pooling information from thousands of hospitals is time-consuming and requires intensive effort. Since a fair amount of time may have elapsed between the start and end of the data collection, it is likely that observations made early on in the data collection period may have changed as time passed. The 2021 increase in penalties imposed by CMS may well have motivated more hospitals to achieve compliance in more recent years.

Conclusions

Additional efforts by stakeholders are needed to close the noncompliance gap and achieve the intended aims of the price transparency regulations. Overall, our findings suggest that hospitals operating under a physician/insurance or moderately centralized management structure may have greater technical and financial capacities to implement public reporting of shoppable healthcare services as well as presentation of hospital chargemasters. Given that hospital competition, hospital bed size, and hospital teaching status was not found to be associated with compliance rates, we

believe that a hospital's noncompliance may stem from other reasons: a lack of incentive mechanisms provided by the CMS, a lack of pervasive policy monitoring by the CMS, and/or decentralized management structured hospitals having difficulty making decisions related to implementing the recently mandated public reporting of complex hospital pricing information.

To further improve implementation of the policy, we can examine best practices from related efforts. Many efforts already were in place to ensure pricing information is available in healthcare, particularly with state-level policies. For example, in 2020, around two-fifths of U.S. states utilize (or were in the process of utilizing) all-payer claims databases (APCDs) to require disclosure of pricing information (26). These pre-existing efforts had a variety of uses and benefits, such as supplying the public cost information and lending the ability to influence data-driven policy changes (27). These efforts could further inform federal price transparency policy implementation (28). However, we caution against imposing further federal regulation changes that will likely result in more confusion, in duplication of efforts, and in added financial and technical burdens for health systems and other stakeholders across the country without thorough consideration of pre-existing policies and best practices.

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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