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The Relationships Among Cash Prices, Negotiated Rates, And Chargemaster Prices For Shoppable Hospital Services

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ABSTRACT **Hospitals must disclose their cash prices, commercial negotiated rates, and chargemaster prices for seventy common, shoppable services under the hospital price transparency rule. Examining prices reported by 2,379 hospitals as of September 9, 2022, we found that a given hospital's cash prices and commercial negotiated rates both tended to reflect a predetermined and consistent percentage discount from its chargemaster prices. On average, cash prices and commercial negotiated rates were 64 percent and 58 percent of the corresponding chargemaster prices for the same procedures at the same hospital and in the same service setting, respectively. Cash prices were lower than the median commercial negotiated rates in 47 percent of instances, and most likely so at hospitals with government or nonprofit ownership, located outside of metropolitan areas, or located in counties with relatively high uninsurance rates or low median household incomes. Hospitals with stronger market power were most likely to offer cash prices below their median negotiated rates, whereas hospitals in areas where insurers had stronger market power were less likely to do so.**

High prices for health care services, especially those paid by private insurers, are the main reason why the US spends more on health care than other industrialized countries.[1–4] To encourage price competition and improve access to and affordability of hospital care, the Centers for Medicare and Medicaid Services (CMS) implemented the hospital price transparency rule on January 1, 2021, requiring all hospitals to publicly disclose their cash prices (paid by patients without insurance or choosing not to use insurance), commercial negotiated rates, and chargemaster prices for all services.[5]

The data disclosed by hospitals in compliance with this regulation provide an opportunity to understand the relationships among cash prices, commercial negotiated rates, and chargemaster prices. Hospitals have full discretion to set their chargemaster prices, which, on average, are more than four times the actual cost of care delivery.[6,7] Although commercial insurers negotiate discounted payment rates, it remains unclear whether negotiated rates are directly connected to hospitals' chargemaster prices.[8]

Cash prices are relevant to out-of-pocket spending by uninsured people, who accounted for 12.5 percent of the US adult population in 2020.[9] Cash prices can also be relevant for privately insured patients enrolled in high-deductible health plans. Before their deductibles are met, these patients pay the insurer-negotiated rate out of pocket. This full exposure to price may motivate the patients to seek and consider alternative prices that may generate savings opportunities, such as paying cash prices without using their insurance. To our knowledge, no academic research has examined the prevalence of these patients paying attention to or using cash

prices. However, anecdotal evidence suggests that such behavior has occurred for hospital services.[10–12] For prescription drugs, pricing platforms—such as GoodRx—that offer insured patients alternative cash prices without using insurance (prices that are often lower than their insurer-negotiated rate) have been established, suggesting that cash prices can be relevant to some insured patients.[13]

Recent studies have found large variations in cash prices across hospitals and have identified factors associated with variations in cash prices for emergency department services.[14,15] A case study of three hospital systems found that cash prices were simply set at a flat discount from the chargemaster price across different services.[11] Yet it remains unknown whether this observation is a common, nationwide practice. Cash prices have also been found to be often lower than commercial negotiated rates, a finding that seemingly contradicts the belief that commercial insurers, especially those with stronger market power, are able to negotiate lower payment rates.[14,16–20] However, little is known about the factors that could explain the differential between cash prices and commercial negotiated rates.

Using data from Turquoise Health, this study examined the relationships among cash prices, commercial negotiated rates, and chargemaster prices for seventy CMS-designated shoppable services disclosed by 2,379 US hospitals nationwide.[15,17,21] Our results can shed light on the affordability of hospital care and can inform policy makers interested in lowering hospital prices through price transparency and competition.

Study Data And Methods

DATA AND SAMPLE Our main data source was Turquoise Health, which collects current hospital facility price data disclosed by US hospitals under the hospital price transparency rule; this source has been used in prior studies on hospital pricing.[14,17,21–23] On September 9, 2022, we extracted hospitals' cash prices, commercial insurer–specific negotiated rates, and chargemaster prices for the seventy services specified by CMS as shoppable, identified using seventy Current Procedural Terminology codes and four diagnosis-related group codes (see online appendix exhibit A1).[24] We matched cash prices with commercial negotiated rates and chargemaster prices for each unique combination of hospitals, procedures, and service settings (inpatient, outpatient, emergency department, and unspecified or missing). Consistent with prior literature, we measured the commercial negotiated rate as the median value among all commercial plans for a given hospital, procedure, and service setting.[25] We excluded negative price values as well as cash prices and commercial negotiated rates that exceeded the corresponding chargemaster prices.

To identify hospital and local socioeconomic characteristics, we then linked these price data to data from the American Hospital Association (AHA) 2020 Annual Survey and to county-level uninsurance rate and median household income data from the Census Bureau.[26–28] The final analytic data set included a total of 107,737 observations disclosed by 2,379 general acute care hospitals. Details of the sample exclusion process are in appendix exhibit A2.[24] On average, each hospital disclosed forty-four of the seventy shoppable procedures (median: 45 procedures; interquartile range: 37–52) in two of the four service settings (appendix exhibit A3).[24]

To assess the representativeness of our data sample, we compared key hospital characteristics in our study sample and the universe of general acute care hospitals from the AHA 2020 Annual Survey. We used t-tests and chi-square tests to evaluate whether the differentials across two groups were statistically significant. Our hospital samples included 55 percent of general acute care hospitals from the AHA survey database. On many indicators, such as census region, teaching status, market concentration, county-level uninsurance rate, and median household income, there were no differences in these two groups. Our sample had slightly more hospitals that were for profit, were system affiliated, had larger bed sizes, and were located in metropolitan areas (appendix exhibit A3).[24]

VARIABLE MEASUREMENT For each of the 107,737 unique combinations of hospitals, procedures, and service settings, we calculated a cash-to-chargemaster price ratio (cash price divided by chargemaster price) to assess levels of cash prices relative to chargemaster prices. For each of the 1,766,632 unique combinations of hospitals, procedures, service settings, and commercial health plans, we calculated a commercial negotiated-to-chargemaster price ratio (negotiated rate divided by chargemaster price) to assess levels of negotiated rates relative to chargemaster prices. To identify when cash prices were lower than a majority of the commercial negotiated rates for the same hospital, procedure, and service setting combination, we created a binary outcome variable that equaled 1 when cash prices were smaller than (or equal to) the median negotiated rates and 0 if otherwise.

STATISTICAL ANALYSIS We first plotted a histogram to demonstrate the distribution of the cash-to-chargemaster price ratio. To evaluate whether hospitals set their cash prices at a fixed discount

from their chargemaster prices for all services, we calculated the difference between the maximum and minimum cash-to-chargemaster price ratios across all procedures and service settings within each hospital and summarized the distribution in a pie chart. We conducted the same descriptive analysis for negotiated-to-chargemaster price ratio for the 1,766,632 unique combinations of hospitals, procedures, service settings, and commercial health plans.

Next we examined the prevalence of cash prices lower than median negotiated rates for seventy shoppable services and stratified four subtypes of services: medicine and surgery, radiology, laboratory and pathology, and evaluation and management.[5] We also compared cash prices with the median negotiated rates of six major national insurers—Blue Cross Blue Shield, UnitedHealth Group, Anthem, Aetna, Cigna, and Kaiser Permanente—which together represented 85 percent of the US market in 2020.[29,30] Bar charts were plotted for both the full sample and the major-insurer sample. We also calculated the ratio of cash prices to median negotiated rates to understand their relative magnitude. We produced box plots to show the median and interquartile range (twenty-fifth to seventy-fifth percentile) of this ratio for seventy shoppable services and stratified this analysis into the four subtypes of services.

We performed a logistic regression to assess factors associated with the probability of cash prices being lower than the median negotiated rates at the hospital-procedure–service setting level, and we calculated marginal effects for each factor. Following prior literature, we incorporated hospital characteristics that influence prices, including critical access hospital status, ownership (nonprofit, for profit, and government), geography (metropolitan versus nonmetropolitan area), bed size, teaching status, and proportions of Medicare and Medicaid patients, as well as county-level uninsurance rate and median household income (log-transformed).[15,31–33]

Cash-pay patients may be more sensitive to price changes, as they pay the full cost out of pocket.[34] Lower-income cash-pay patients could be even more price sensitive, given their lower willingness (and ability) to pay.[15] Therefore, we hypothesized that hospitals may be more likely to set lower cash prices if they are located in areas with a higher uninsurance rate or a lower median household income, are located in rural communities, or are treating more uninsured or lower-income patients (for example, government, nonprofit, or critical access hospitals).

Prior research on health care markets has found that commercial negotiated rates were positively associated with hospital market power but negatively associated with insurer market power.[18–20,35–38] Therefore, we incorporated hospitals' system status and county-level market concentration measured by the Herfindahl-Hirschman Index. The Herfindahl-Hirschman Index was computed at the hospital system level, using the number of inpatient bed days to approximate market share.[32,39] We used the number of insurers contracting at the hospital-procedure–service setting level as a proxy for insurer market power. We also included a binary variable to indicate whether any of the six major national insurers had a negotiated rate for a given hospital, procedure, and service setting.

Policy makers and payers should recognize the important role played by the chargemaster in influencing hospital commercial prices.

Although the relationships between hospital and insurer market power and commercial negotiated rates are well established,[18–20,35–39] we hypothesized that there may be little association between market power and cash prices. This is because cash prices are not part of the rate negotiation process between hospitals and insurers and may instead be set as a fixed proportion of chargemaster prices. Thus, we hypothesized that stronger hospital market power would be associated with a greater probability of cash prices being lower than the median negotiated rates, because of relatively high negotiated rates, but stronger insurer market power would be associated with a lesser probability of cash prices being lower than the median negotiated rates, because of relatively low negotiated rates. To test these hypotheses, we assessed the association between these factors and variation in cash prices and median negotiated rates in two separate regression models.

We included state fixed effects to address unobserved factors (for example, state-level policy) that could influence cash prices or commercial negotiated rates. We also included procedure fixed effects and service setting fixed effects to ensure that our results were not subject to het-

Our study underscores an ongoing concern for policy makers interested in promoting hospital price transparency: low compliance.

erogeneity across procedures or service settings.

Multiple sensitivity analyses were performed. We constructed an alternative binary outcome measure by comparing cash prices with the mean commercial negotiated rates and reran our logistic model. We also compared cash prices with the median and mean of the negotiated rates among the six major insurers only, and we reestimated our model using these subset data. To understand the relative magnitude between cash prices and median negotiated rates beyond a binary comparison, we used a linear model to estimate the association between the cash-to-median negotiated rate ratio (log-transformed because of the right-skewed distribution) and the same hospital and market factors identified earlier.

LIMITATIONS This study had several important limitations. Our sample was contingent on hospitals' disclosure. Almost half of the general acute care hospitals in the US still have not disclosed their prices for the seventy CMS-designated shoppable services. Among hospitals that disclosed prices, they did so for only forty-four procedures, on average. Moreover, because of the lack of data, this study was unable to examine patient volume, care use, or quality outcomes by cash-pay status, and the results of our cross-sectional regressions should be interpreted as associations rather than causal relationships. Importantly, as the hospital price transparency rule only required the disclosure of cash prices, negotiated rates, and charges among hospitals, our results were confined to hospitals' facility fees, and thus the results might not be generalizable to out-of-network prices or prices in non-hospital settings. As suggested in a recent study, out-of-network prices may be important in this context, as patients may have to pay the full price out of pocket when they elect out-of-network care.[40] Disclosure of out-of-network hospital prices falls under another recent rule, the Transparency in Coverage final rule of 2020.[41] Under that rule, insurers are required to disclose both in-network negotiated rates and out-of-network prices, effective July 1, 2022. The information disclosed will provide an opportunity to examine out-of-network pricing issues in future work.

Study Results

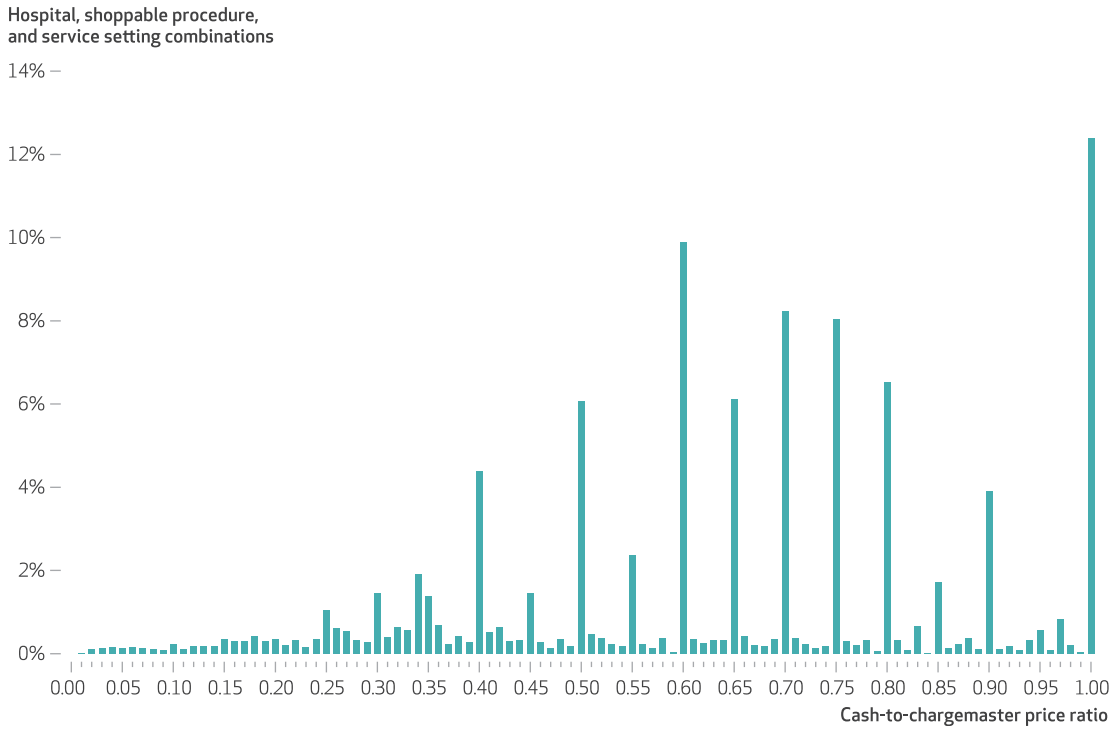
SUMMARY STATISTICS Across all seventy shoppable services, the average and median cash prices were 64 percent and 65 percent, respectively, of their corresponding chargemaster rates (IQR: 50–80) (data not shown). About 12 percent of the cash prices were set the same as the chargemaster rates, and other cash prices were predominantly priced in increments of 5 percent off the chargemaster rates (64 percent of the time) (exhibit 1). Most hospitals set their cash prices based on a consistent discount from the chargemaster prices for all services. As shown in appendix exhibit A4, cash-to-chargemaster price ratios had almost no variations (less than 1 percent between the maximum and minimum) across all procedures and settings in 79 percent of hospitals.[24]

The average and median commercial negotiated rates were 58 percent and 65 percent, respectively, of the chargemaster prices, with larger variations than for cash prices (IQR: 32–85) (data not shown). Similar to cash prices, commercial rates were often negotiated in increments of 5 percent off the chargemaster prices (32 percent of the time) (exhibit 2). Many insurers did not negotiate a uniform percentage discount from hospitals' chargemaster prices across different services and settings. As shown in appendix exhibit A5, negotiated-to-chargemaster price ratios had less than 1 percent difference between the maximum and minimum across all services and settings in only 25 percent of the hospital-plan pairs, and 66 percent of the hospital-plan pairs had a greater than 10 percent minimum-maximum difference.[24]

Overall, cash prices were lower than or equal to the median negotiated rates for the same procedure in the same hospital and service setting 47 percent of the time (exhibit 3). Among the four subtypes of shoppable services, evaluation and management services were most likely to have lower cash prices (55 percent), followed by medicine and surgery (48 percent), radiology (47 percent), and laboratory and pathology (44 percent). We also found that the six major insurers in our subsample (that is, those with greater market power) were able to negotiate slightly lower rates than the overall median negotiated rates across all insurers for the seventy shoppable services. This resulted in a slightly

EXHIBIT 1

Distribution of cash-to-chargemaster price ratios for 107,737 combinations of hospitals, shoppable procedures, and service settings, September 2022



SOURCE Authors' analysis of Turquoise Health data as of September 9, 2022.

lower probability of cash prices being lower than the median negotiated rates (–3 percentage points for all services; range, –1 to –5 percentage points by service subtype) (exhibit 3). Similarly, the overall cash-to–median negotiated rate ratio had a median of 1.03, including median ratios of 0.96, 1.03, 1.04, and 1.06 for evaluation and management, medicine and surgery, radiology, and laboratory and pathology, respectively (appendix exhibit A6).[24] Consistent with exhibit 3, we found this ratio to be slightly higher when using the median negotiated rates among the six major insurers as the denominator (appendix exhibit A6).[24]

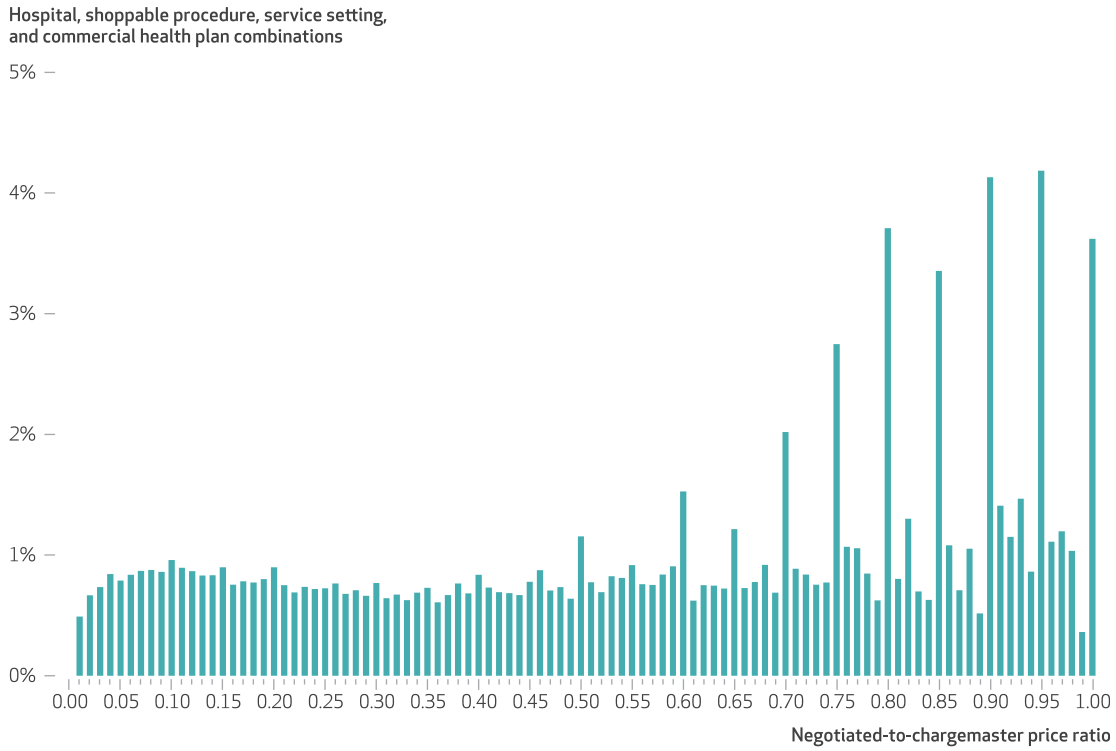
REGRESSION RESULTS In exhibit 4 we show the logit regression results estimating factors associated with having a lower cash price than the median negotiated rate. Compared with for-profit hospitals, nonprofit and government hospitals were associated with 4 percent and 2 percent higher likelihood of providing lower cash prices, respectively ($p < 0.001$). Hospitals located in metropolitan areas were associated with 3 percent ($p < 0.001$) lower probability of having lower cash prices. In addition, hospitals located in counties with 1 percent higher uninsurance rates were 0.3 percent more likely to offer lower cash prices than their median negotiated rates, whereas hospitals in counties with 1 percent higher median household income were 16 percent less likely to offer lower cash prices ($p < 0.001$).

Among market factors, system-affiliated hospitals and hospitals located in more concentrated hospital markets (indicating stronger hospital market power) or in markets with more commercial insurer participation (indicating weaker insurer market power) were associated with higher likelihood (6 percent, 0.5 percent, and 2 percent, respectively) of offering cash prices lower than their median negotiated rates ($p < 0.001$) (exhibit 4). In contrast, having major national insurers contracting at a given hospital, procedure, and service setting (an indicator of stronger insurer market power) was associated with 4 percent ($p < 0.001$) lower probability of offering cash prices lower than the median negotiated rates.

Sensitivity analyses comparing cash prices with mean negotiated rates and using the major-insurer subset showed very similar results (appendix exhibits A7 and A8).[24] An alternative model using the log-transformed cash-to–median negotiated rate ratio as the outcome

EXHIBIT 2

Distribution of commercial negotiated-to-chargemaster price ratios for 1,766,632 combinations of hospitals, shoppable procedures, service settings, and commercial health plans, September 2022



SOURCE Authors' analysis of Turquoise Health data as of September 9, 2022.

had results consistent with those of the logistic model (appendix exhibit A9).[24] For example, factors associated with a lower ratio corresponded to a higher probability of cash prices being lower than the median negotiated rates (for example, nonprofit and government hospitals were associated with 0.46 and 0.40 lower ratios, respectively, compared with for-profit hospitals), whereas factors associated with a higher ratio matched with lower likelihoods of cash prices being lower than the median negotiated rates (for example, counties with 1 percent higher median household income were associated with a 0.20 higher ratio).

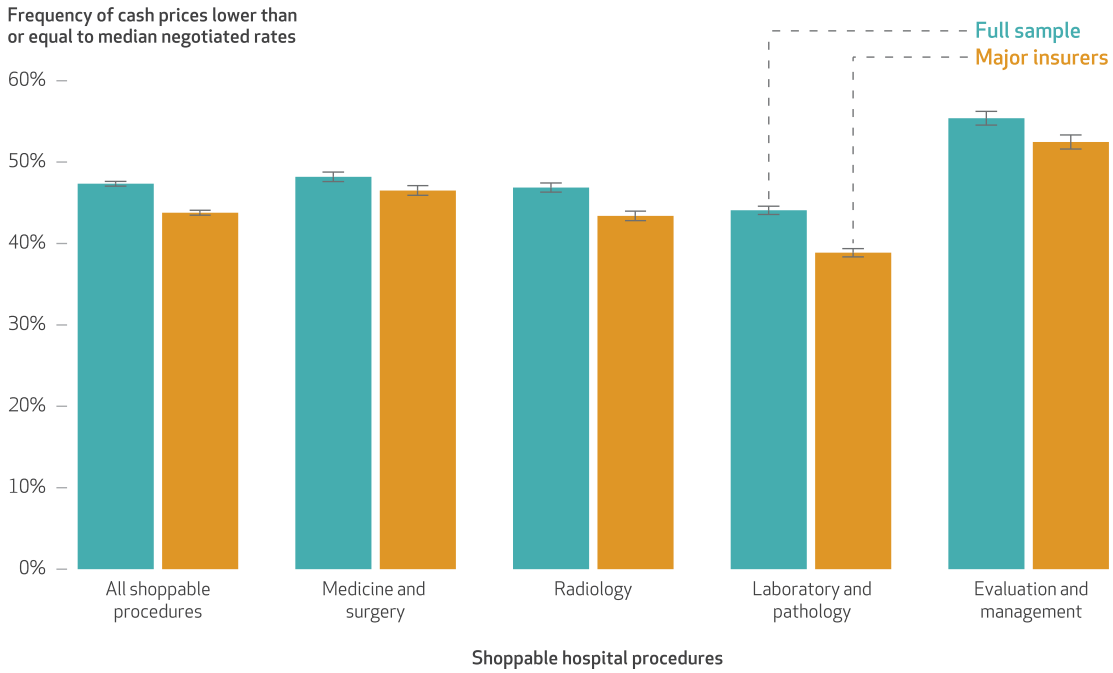
We estimated separate regressions for the log-transformed cash prices and the log-transformed median negotiated rates to understand whether cash prices or negotiated rates were the predominant driver of the binary outcome from the logistic model (appendix exhibit A10).[24] We found that, compared with for-profit hospitals, government and nonprofit hospitals were associated with setting lower cash prices (both −0.67; $p < 0.001$) at a magnitude that was larger than the reduction in insurer-negotiated rates (−0.21 and −0.27, respectively; $p < 0.001$). This led to a higher probability that cash prices were lower than the median negotiated rates. We also found that counties with a 1 percent higher median household income had a larger rate of increase in cash prices (0.35 percent; $p < 0.001$) than in median insurer-negotiated rates (0.15 percent; $p < 0.001$), leading to a lower probability that cash prices were lower than the median negotiated rates. In contrast, we did not see economically meaningful associations between cash prices and various measures for hospital or insurer market power, suggesting that these market factors had little association with cash prices. Therefore, the greater probability of cash prices being lower than the median negotiated rates was mostly driven by changes in the median negotiated rates associated with variations in hospital and insurer market power.

Discussion

For shoppable hospital services, we found nationwide evidence that both cash prices and commercial negotiated rates were typically calculated consistently in increments of a 5 percent discount from chargemaster prices. Moreover, most hospitals set cash prices as a fixed discount from their chargemaster prices across all ser-

EXHIBIT 3

Proportion of cash prices lower than or equal to median negotiated rates for shoppable hospital procedures, overall and by subtype, among the full and major-insurer samples, September 2022



SOURCE Authors' analysis of Turquoise Health data as of September 9, 2022. **NOTES** Major insurers are Blue Cross Blue Shield, UnitedHealth Group, Anthem, Aetna, Cigna, and Kaiser Permanente. Whiskers indicate 95% confidence intervals. The number of hospital-procedure-service setting combinations is 107,737 in the full sample (medicine and surgery, $n = 28,266$; radiology, $n = 29,583$; laboratory and pathology, $n = 36,386$; and evaluation and management, $n = 13,502$) and 102,717 in the major-insurer sample.

vices. This finding contributes to the literature on cash prices and extends a case study that found that hospitals set cash prices at a fixed proportion of their chargemaster prices for all services.[11] Policy makers and payers interested in improving hospital affordability should recognize the important role played by the chargemaster in influencing hospital commercial prices.

Across seventy CMS-designated shoppable hospital services, we found that cash prices were lower than the median negotiated rates for approximately half of the 107,737 unique combinations of hospitals, procedures, and service settings.[14,17] Cash-pay patients are more likely to have lower willingness (and ability) to pay for hospital care,[15] and they may be more sensitive to higher hospital prices than patients with insurance coverage.[34,42] Therefore, offering lower cash prices might be a way that hospitals respond to the greater price sensitivity from uninsured and underinsured patients.[15]

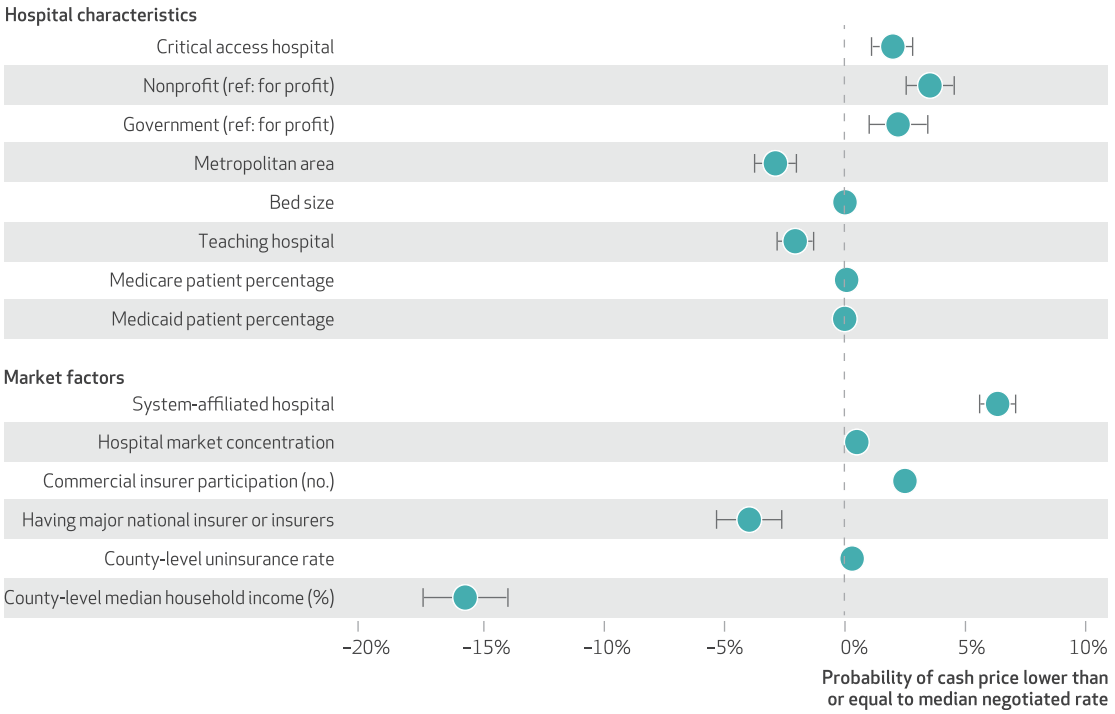
We also found that cash prices were more likely to be lower than negotiated rates at hospitals with government or nonprofit ownership and at hospitals located in nonmetropolitan areas or counties with higher uninsurance rates or lower median household income. A potential explanation is that these hospitals might treat more uninsured and underinsured patients. Also, cash prices were more likely to be lower than negotiated rates in areas with stronger hospital market power or weaker insurer market power. By extension, this would result in higher negotiated rates and potentially higher patient cost sharing for commercially insured patients.[38,39] Therefore, offering lower-cash-price services might be a strategy to attract patients who choose to forgo coverage because of the high cost of health plans.

In addition, hospitals may incur lower costs when providing cash-price services, as immediate cash payment would avoid billing- and insurance-related expenses. One study estimated that such expenses could account for up to 10.8 percent of hospitals' total revenue.[43] The cost savings from a simplified billing process may incentivize hospitals to set relatively lower cash prices.

Recently, a growing number of self-insured employers have been exploring options to lower their health plans' payment rates, including benchmarking their rates against Medicare's prices, engaging in direct contracts with hospi-

EXHIBIT 4

Hospital characteristics and market factors associated with the probability of cash prices being lower than or equal to the median negotiated rates for shoppable hospital procedures, September 2022



SOURCE Authors' analysis of Turquoise Health data as of September 9, 2022; data from the American Hospital Association 2020 Annual Survey; and Census Bureau data. **NOTES** Whiskers indicate 95% confidence intervals. State, procedure, and service-setting fixed effects are included. Hospital market concentration is measured by the Herfindahl-Hirschman Index at the county level (unit: 1,000s). All variables were significantly different from 0 ($p < 0.001$) except "Medicaid patient percentage" ($p > 0.10$).

tals, and forming employer coalitions to strengthen their negotiating leverage.[44–46] So far, however, no consistent evidence indicates that employers have been able to lower their health plans' payment rates successfully.[47] Our findings suggest that some self-insured employers often pay prices higher than cash prices. Employers may wish to consider using the cash-price information as an input in their negotiations with insurers or directly contracting with providers with low cash prices and steering employees to them. Health savings accounts, for example, might facilitate the implementation of this option.

At the same time that our findings provide insight into the dynamics of hospital price setting for various stakeholders, our study underscores an ongoing concern for policy makers interested in promoting hospital price transparency: low compliance. Twenty-one months after the implementation of the hospital price transparency rule, nearly half of the general acute care hospitals required to do so still had not disclosed most of their prices for mandated shoppable procedures. More rigorous enforcement may be necessary to achieve broad compliance and realize the regulation's price-containing potential. ■

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