

## Original Investigation

# Compensation of Chief Executive Officers at Nonprofit US Hospitals

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**IMPORTANCE** Hospital chief executive officers (CEOs) can shape the priorities and performance of their organizations. The degree to which their compensation is based on their hospitals' quality performance is not well known.

**OBJECTIVE** To characterize CEO compensation and examine its relation with quality metrics.

**DESIGN, SETTING, AND PARTICIPANTS** Retrospective observational study. Participants included 1877 CEOs at 2681 private, nonprofit US hospitals.

**MAIN OUTCOMES AND MEASURES** We used linear regression to identify hospital structural characteristics associated with CEO pay. We then determined the degree to which a hospital's performance on financial metrics, technologic metrics, quality metrics, and community benefit in 2008 was associated with CEO pay in 2009.

**RESULTS** The CEOs in our sample had a mean compensation of \$595 781 (median, \$404 938) in 2009. In multivariate analyses, CEO pay was associated with the number of hospital beds overseen (\$550 for each additional bed; 95% CI, 429-671;  $P < .001$ ), teaching status (\$425 078 more at major teaching vs nonteaching hospitals; 95% CI, 315 238-534 918;  $P < .001$ ), and urban location. Hospitals with high levels of advanced technologic capabilities compensated their CEOs \$135 862 more (95% CI, 80 744-190 990;  $P < .001$ ) than did hospitals with low levels of technology. Hospitals with high performance on patient satisfaction compensated their CEOs \$51 706 more than did those with low performance on patient satisfaction (95% CI, 15 166-88 247;  $P = .006$ ). We found no association between CEO pay and hospitals' margins, liquidity, capitalization, occupancy rates, process quality performance, mortality rates, readmission rates, or measures of community benefit.

**CONCLUSIONS AND RELEVANCE** Compensation of CEOs at nonprofit hospitals was highly variable across the country. Compensation was associated with technology and patient satisfaction but not with processes of care, patient outcomes, or community benefit.

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Hospital chief executive officers (CEOs) play a critical role in shaping the performance of their organizations through setting organizational priorities, allocating resources, and hiring clinical leadership. Indeed, in a recent large national survey<sup>1</sup> of hospital board chairpersons, respondents reported that CEOs were the single most influential individuals in shaping quality performance at their institutions.

One way to potentially improve quality at an institution is to tie the CEO's compensation to the institution's performance. This has been broadly used in other industries, and data suggest that metrics chosen for inclusion in CEO compensation packages can affect executives' behavior.<sup>2,3</sup> However, we know little about how CEOs in the hospital industry are paid

and the specific factors that underlie their compensation, with much of the data either decades old or focused on a limited sample of institutions.<sup>4-8</sup> These issues are particularly salient among nonprofit institutions, in which the metric of organizational success in many industries—the profitability of the organization—must be balanced against more mission-driven factors, such as the quality of care delivered and the degree of community benefit provided. Yet, we are unaware of any empirical data on the metrics by which CEOs of nonprofit hospitals are paid or to what degree the hospital's quality of care or level of community benefit affects their compensation.

In mid-2012, national data on compensation of CEOs of nonprofit entities became publicly available for the first time. We used these newly available data to answer 3 questions. First,

what is the range of compensation for CEOs of nonprofit hospitals in the United States? Second, which structural and organizational factors of hospitals are associated with the compensation of CEOs? Finally, to what extent is hospital CEO pay associated with the institution's financial performance, technologic capabilities, patient outcomes, or metrics of community benefit provided?

## Methods

### Data Sources

We linked 7 data sources: (1) publicly available Form 990 tax returns compiled by GuideStar (<http://www.guidestar.org>) for US hospitals filing as nonprofit entities in 2009; (2) the American Hospital Association annual survey; (3) rural-urban commuting area codes<sup>9</sup>; (4) Hospital Compare data, which contain process of care measures and the Hospital Consumer Assessment of Healthcare Providers and Systems survey; (5) the 2009 Medicare Provider Analysis and Review File; (6) Medicare cost reports; and (7) the Medicare impact file. This study was approved by the Office of Human Research Administration at the Harvard School of Public Health.

### Identifying Executives

From the 990 forms, we identified 1877 CEOs overseeing 2681 nonfederal, private, nonprofit acute-care hospitals in the United States. These hospitals comprise more than 98% of private nonprofit US hospitals.

### Structural and Organizational Measures

We hypothesized that CEOs who oversaw more complex organizations (measured by number of beds, number of hospitals overseen, membership in a system, or being a major teaching hospital) would be compensated more highly than others. We also examined other characteristics, including a hospital's proportion of Medicare patients (a marker of payer mix) and its disproportionate share hospital index (a measure of the proportion of low-income patients), hypothesizing that the CEOs of hospitals with a less favorable payer mix might receive lower compensation.

### Financial Performance Measures

We examined 4 measures of financial performance: total margin (calculated from the Medicare Cost Reports as the ratio of net income to net revenue plus other income), liquidity (the ratio of current assets to total liabilities), capitalization (the ratio of fund balances to total assets) all representing performance in fiscal year 2008,<sup>10</sup> and occupancy rate (from the American Hospital Association survey representing calendar year 2008). We examined hospital performance in 2008 because we assumed that the prior year's performance would influence the subsequent year's compensation.

### Technologic Measures

For each hospital, we used a well-validated technologic index<sup>11,12</sup> that combines the presence of several advanced technologies into a single score (eg, positron-emission tomogra-

phy, magnetic resonance imaging, and the capability of performing complex operations) (Supplement [eTable 1]). We assigned higher weights to technologies that are relatively rare.

### Quality-of-Care Measures

We selected a set of quality metrics that are endorsed by the National Quality Forum<sup>13</sup> and used by the Centers for Medicare and Medicaid Services for public reporting and have subsequently formed the basis for new mandatory federal pay-for-performance initiatives, such as value-based purchasing<sup>14</sup> and the Hospital Readmission Reduction Program. Although these metrics are not comprehensive, they represent the best and most widely used measures of hospital quality. For each hospital, we calculated a composite measure of performance on processes of care for acute myocardial infarction, congestive heart failure, and pneumonia for calendar year 2008 (Supplement [eTable 2]).<sup>15,16</sup> To assess patient satisfaction, we used Hospital Consumer Assessment of Healthcare Providers and Systems data and focused on overall satisfaction (the proportion rating the hospital a 9 or 10 on a 10-point scale). We built patient-level hierarchical logistic regression models to calculate 30-day risk-adjusted mortality and readmission rates for patients admitted with acute myocardial infarction, congestive heart failure, or pneumonia in calendar year 2008, excluding December because 30-day outcomes crossed into 2009 (Supplement [eTables 3 and 4]). We built composite mortality and readmissions measures across the 3 conditions for each hospital using indirect standardization.

### Community Benefit Measures

We used hospital-reported 990 forms to determine charity care and other community benefits provided in calendar year 2009, which are self-reported as a proportion of total hospital expenditures. Charity care represents uncompensated care, unreimbursed Medicaid care, and unreimbursed costs from other means-tested government programs. Other community benefits include community health services, health professionals' education, subsidized health services, research, and contributions to charitable organizations.<sup>17</sup>

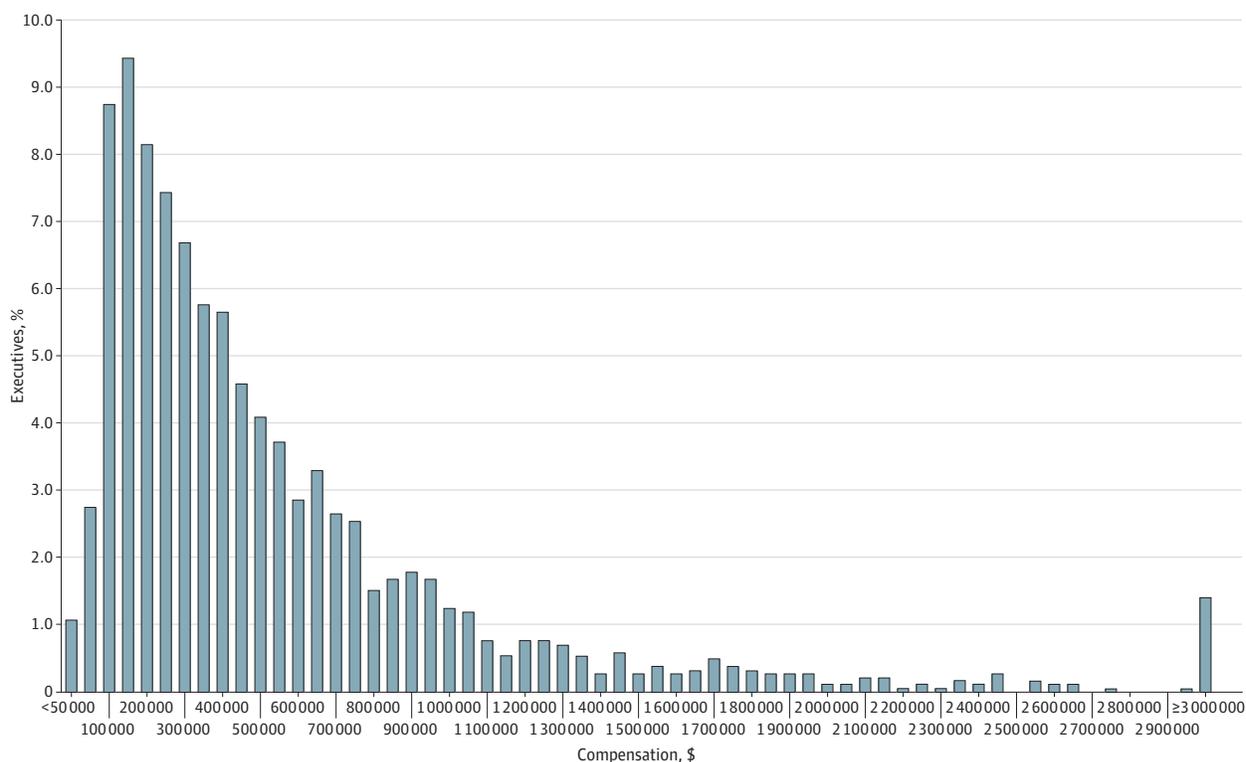
### Primary Outcome

Our primary outcome was CEO compensation in calendar year 2009. For each executive, we used the 990 forms to obtain reportable compensation from the primary organization (including benefits and deferred compensation), reportable compensation from related organizations (ie, a foundation associated with a hospital), and estimated other compensation from the primary and related organizations. We summed these elements to determine each CEO's total compensation package. To account for regional variations in the cost of care, we deflated each CEO's compensation by the Medicare Wage Index, used by Medicare to adjust prospective payments to hospitals for hospital wage level differences between metropolitan statistical areas.

### Statistical Analysis

We began by plotting the distribution of CEO compensation. We then calculated summary statistics for the characteristics

Figure. Distribution of Chief Executive Officer Pay



Histogram of chief executive officer pay at US nonprofit hospitals in calendar year 2009.

of the hospitals that each CEO managed, breaking the sample into the lowest decile, middle 8 deciles, and top decile of compensation. In cases in which executives managed multiple hospitals, we averaged hospital characteristics weighted by the number of beds. Thus, analyses were carried out at the CEO level, with each CEO assigned the aggregate characteristics of the beds they managed. We examined the relationship between wage index-deflated CEO compensation and hospital structural characteristics, using multivariable linear regression models with CEO compensation as the outcome and each of the key hospital characteristics as predictors including number of beds overseen, number of hospitals overseen, teaching status (major, minor, or nonteaching), census region, location (urban vs rural), critical access status, proportion of Medicare patients, and disproportionate share hospital index.

Next, we examined whether a hospital’s performance on measures of financial performance, technology index, quality and patient outcomes, or community benefit was associated with CEO compensation. We individually examined each metric in models adjusted for the structural characteristics outlined above and then proceeded to our full model including all of these variables. Because of interrelationships between the quality measures,<sup>18,19</sup> we tested for but found no evidence of collinearity (Supplement [eTable 5]). We used the linear models to calculate adjusted compensation for low performers (those at the 25th percentile) and high performers (75th percentile) on each metric.

Because we were concerned that focusing on just 3 conditions for our mortality outcomes may not adequately capture the breadth of hospital care provided, we also created, as a sensitivity analysis, a 19-condition composite of medical and surgical mortality rates that comprise a large proportion of hospital care<sup>20</sup> (Supplement [eTable 6]). We compared the relationship between CEO pay and outcomes across these 19 conditions.

We conducted additional sensitivity analyses. Because CEOs’ compensation might be based on improvement over time rather than performance in a single year, we conducted analyses using the change in financial performance and quality performance from 2006 to 2008 as our predictor; for patient satisfaction scores, which became publicly available in 2007, we used change from 2007 to 2008. Finally, because the data on CEO pay were somewhat right-skewed and because the factors that affect CEO pay at wealthy hospitals may be different from those that affect CEO pay among low-paying hospitals, we repeated our analyses using quantile regression at the 25th, 50th, and 75th percentiles.

We considered a 2-tailed value of  $P < .05$  to be significant. Analyses were performed using commercial software (Stata, version 12.1; StataCorp).

## Results

We identified 1877 executives responsible for 2681 hospitals. The CEOs had an unadjusted mean compensation of \$595 781

Table 1. Characteristics of Hospitals Associated With Each Chief Executive Officer

Characteristic	Decile of Compensation		
	Lowest	2-9	Highest
No. of officers	188	1502	187
No. of hospitals	189	1841	651
Total compensation, \$			
Median (IQR)	117 933 (89 221-136 390)	405 167 (264 196-635 226)	1 662 548 (1 358 702-2 327 567)
Mean (SD)	106 324 (38 985)	469 096 (254 133)	2 105 394 (1 201 963)
No. of beds			
Median (IQR)	39 (25-73)	136 (61-256)	234 (80-451)
Mean (SD)	62 (76)	185 (169)	310 (290)
Region, %			
Northeast	9.6	26.2	23.0
Midwest	50.5	34.0	32.1
South	23.4	26.4	31.5
West	16.5	13.4	13.4
Teaching, %			
Major	0.0	6.8	33.8
Minor	12.8	25.2	33.6
Nonteaching	87.2	68.0	32.6
Rural-urban commuting area, %			
Urban	12.8	53.9	88.7
Suburban	3.7	4.4	0.9
Large rural town	8.5	19.2	6.6
Small town/isolated rural	75.0	22.5	3.7
Medicare patients, %	53.2 (49.0-67.2)	48.6 (42.9-54.6)	41.8 (38.0-48.5)
Disproportionate share index	0.0 (0.0-0.0)	17.2 (3.6-26.3)	21.5 (12.2-30.3)
Critical access hospital	69.7	18.3	2.8

Abbreviation: IQR, interquartile range.

and a median compensation of \$404 938 in 2009. Distribution of the compensation is shown in the Figure. The CEOs in the lowest decile of compensation, with a median compensation of \$117 933, were largely responsible for small, nonteaching hospitals in rural areas, most frequently in the Midwest (Table 1). The CEOs in the highest decile of compensation, with a median compensation of \$1 662 548, oversaw larger, urban hospitals, which were more often major or minor teaching hospitals. Overall median hospital margins were 3.5%, and median occupancy rate was 63.0% (Table 2). Hospitals' median performance on process measures was 93.4% and on patient satisfaction, 65.0%. Median charity care and other community benefit comprised 1.6% and 1.4% of total hospital expenditures, respectively.

### Hospital Characteristics and CEO Compensation

In multivariable analyses, compensation was higher for CEOs managing more beds (\$550 per additional bed; 95% CI, 429-671;  $P < .001$ ) (Table 3). Managing more hospitals was also associated with higher pay (\$32 609 per additional hospital; 95% CI, 5154-60 063;  $P = .02$ ). The CEOs of major teaching hospitals were paid \$425 078 more (95% CI, 315 238-534 918;  $P < .001$ ) than were CEOs of nonteaching hospitals. The CEOs of hospitals with a higher proportion of poor patients and Medicare patients were generally compensated less than were other CEOs (Table 3).

### Hospital Financial Performance and CEO Compensation

Hospital financial performance was not significantly associated with CEO compensation in our fully adjusted models (Table 4). High performers on total margins, for example, paid their CEOs similarly to poor performers (difference, \$7045; 95% CI, -16 463 to 30 553;  $P = .56$ ), and the relationships for liquidity, capitalization, and occupancy rate were also nonsignificant.

### Advanced Technologies and CEO Compensation

The presence of higher levels of advanced technology, as measured by a technology index, was associated with substantially higher CEO compensation. High performers on the technology index received \$135 862 additional pay compared with poor performers (95% CI, 80 744-190 980;  $P < .001$ ).

### Hospital Quality Performance and CEO Compensation

We found no significant association between performance on process quality, risk-adjusted mortality, or readmission rates and CEO compensation (Table 4). High performers on mortality rates paid their CEOs \$4667 less than poor performers (95% CI, -27 457 to 18 123;  $P = .69$ ). However, hospitals with higher patient satisfaction scores compensated their CEOs more than did hospitals with lower scores (difference, \$51 706; 95% CI, 15 166 to 88 247;  $P = .006$ ).

**Table 2. Hospital Performance**

Characteristic	% Median (IQR)
Hospital financial outcomes	
Total margins	3.5 (0.1-7.5)
Liquidity	200.1 (135.3-298.4)
Capitalization	51.6 (33.5-66.4)
Occupancy rate	63.0 (50.3-72.8)
Presence of advanced technologies	
Technology index	0.406 (0.246-0.609)
Hospital quality	
Process measures, 2008	93.4 (89.7-95.5)
Patient satisfaction, 2008	65.0 (60.0-70.0)
Risk-adjusted mortality rates, 2008	12.2 (10.3-14.6)
Risk-adjusted readmission rates, 2008	21.2 (18.8-24.3)
Community benefit	
Charity care provided, % of total expenditures	1.6 (0.7-2.8)
Other community benefit, % of total expenditures	1.4 (0.5-3.3)

Abbreviation: IQR, interquartile range.

### Community Benefit and CEO Compensation

We found no association between charity care and CEO compensation (−\$52 for high performers vs poor performers; 95% CI, −441 to 337; *P* = .79) or between community benefit and CEO compensation (\$0 additional compensation for high performers vs poor performers, 95% CI, −3 to 3; *P* = .88).

### Sensitivity Analysis

When we substituted a 19-condition composite mortality rate into the model, we found no association with CEO pay (−\$453 for high vs low performers; 95% CI, −35 992 to 35 086; *P* = .98) (Supplement [eTable 7]). Using changes in financial performance and quality performance from 2006 to 2008 as predictors, technology was the only factor significantly associated with CEO compensation (Supplement [eTable 8]).

When we used quantile regression to examine the distribution of CEO salaries based on varying levels of financial and quality performance, we found relatively similar results in all but 2 instances. Whereas we found little relationship between total margins and CEO pay in our overall analyses, we found that the 25th percentile and median CEO salaries were higher at high-margin hospitals compared with low-margin hospitals (Supplement [eTables 9 and 10]). There was no relationship between hospital total margin and CEO pay at the upper end of the pay scale (Supplement [eTable 11]). Similarly, we found that the 25th percentile of CEO compensation was somewhat higher among hospitals with high performance on process quality measures compared with hospitals with poor performance on the process quality measures. The difference in median salaries was even smaller and not statistically significant, and there was no significant difference based on process quality scores at the upper end of the CEO pay scale.

**Table 3. Hospital Characteristics and Chief Executive Officer Compensation**

Characteristic	Additional Compensation <sup>a</sup> (95% CI)	<i>P</i> Value
Mean wage-adjusted compensation, \$	595 781 (not applicable)	
No. of beds, \$	550 (429 to 671)	<.001
No. of hospitals, \$	32 609 (5154 to 60 063)	.02
Region, \$		
Northeast	Reference	
Midwest	29 206 (−36 476 to 94 888)	.38
South	77 449 (9070 to 145 829)	.03
West	32 533 (−51 917 to 116 983)	.45
Teaching, \$		
Not teaching	Reference	
Major	425 078 (315 238 to 534 918)	<.001
Minor	151 352 (87 899 to 214 805)	<.001
Rural-urban commuting area, \$		
Urban	Reference	
Suburban	−137 690 (−272 195 to −3184)	.045
Large rural town	−124 491 (−198 703 to −50 279)	.001
Small town/isolated rural	−195 553 (−284 305 to −106 801)	<.001
Critical access hospital, \$	−1156 (−136 390 to 134 078)	.99
Disproportionate share index, \$	−38 938 (−59 621 to −18 254)	.000
Percent Medicare patients, \$	−21 112 (−43 137 to 913)	.060

<sup>a</sup> For continuous predictors, additional compensation represents the change in compensation associated with a 10% change in the independent variable. Model is adjusted for all listed covariates.

### Discussion

We examined the compensation of CEOs of nonprofit US hospitals and found that executives who oversaw larger teaching hospitals were the most highly compensated. Furthermore, even after accounting for these and other structural factors, a higher level of advanced technologies was associated with significantly higher compensation. Although we found no relationship with hospital performance on standard process or outcome metrics, patient satisfaction had a modest but significant relationship with CEO compensation. Finally, despite the fact that we examined nonprofit institutions whose tax-exempt status is based on their ability to demonstrate community benefit, we found no relationship between the degree of that benefit and CEO compensation.

Among the quality metrics we examined, only patient satisfaction was consistently associated with CEO compensation. The factors that shape the compensation package of CEOs likely reflect a combination of boards' awareness of hospital performance on key metrics and its assessment of the ability of the CEO to influence those metrics. Boards may have an easier time assessing patient satisfaction than other quality metrics, such as risk-adjusted mortality rates, or may see patient satisfaction as a key measure of organizational performance and marketability. Of course, it is possible that boards reward CEOs on other factors that we could not measure, such as staff satisfaction.

**Table 4. Hospital Financial Outcomes, Technology, Quality, and Community Benefit and Chief Executive Officer Compensation<sup>a</sup>**

Characteristic	Low Performers <sup>b</sup>	High Performers <sup>b</sup>	Difference (95% CI)	P Value
Hospital financial outcomes, \$				
Total margins	592 244	599 289	7045 (-16 463 to 30 553)	.56
Liquidity	595 903	595 889	-14 (-89 to 60)	.71
Capitalization	596 561	594 901	-1660 (-7764 to 4445)	.59
Occupancy rate	583 950	609 384	25 435 (-11 128 to 61 997)	.17
Presence of advanced technologies, \$				
Technology index	527 938	663 800	135 862 (80 744 to 190 980)	<.001
Hospital quality, \$				
HQA process of care, 2008	593 610	601 353	7744 (-17 312 to 32 799)	.54
Patient satisfaction, 2008	574 076	625 782	51 706 (15 166 to 88 247)	.006
Risk-adjusted mortality, 2008	597 485	592 817	-4667 (-27 457 to 18 123)	.69
Risk-adjusted readmission, 2008	593 406	599 734	6328 (-17 480 to 30 135)	.60
Community benefit				
Charity care provided	595 983	595 930	-52 (-441 to 337)	.79
Other community benefit	595 723	595 723	0 (-3 to 3)	.88

Abbreviation: HQA, Health Quality Alliance.

<sup>a</sup> Model is adjusted for all hospital characteristics shown in Table 3, including hospital size, number of hospitals, region, ownership, teaching status, rurality, Critical Access Hospital status, Disproportionate Share Index, and proportion Medicare and additionally adjusted for all listed covariates.

<sup>b</sup> Low performers are those at the 25th percentile on each metric; high performers are those at the 75th percentile of performance on each metric.  $R^2$  for the model is 0.41.

There was no consistent association between CEO pay and more traditional measures of quality, such as adherence to process measures or patient outcomes. In one set of sensitivity analyses, we found that the low end (25th percentile) of CEO pay at hospitals with better adherence to process measures was somewhat higher than at hospitals with worse adherence to process measures, although the difference was small. This could represent a chance finding, or it might suggest that at hospitals with lower-paid CEOs, there appears to be a little more attention given to process quality metrics.

Given that hospital boards have a fiduciary responsibility to represent the welfare of the community, they could make the link between their CEO's pay and hospital quality performance more explicit. It may be that they have not done so because they may believe that these quality metrics are not adequate measures of CEO performance. Whether linking CEO compensation to quality metrics would lead to better care is unknown; an alternative possibility is that linking CEO compensation explicitly to quality metrics could have unintended consequences, such as reducing hospitals' incentive to provide to medically or socially complex populations.

We were surprised to find only weak nonsignificant relationships between CEO pay and financial performance. However, indirect measures of financial performance, including payer mix and advanced technology, were associated with CEO compensation. Furthermore, we found that at the lower half of the pay scale, there appeared to be a modest relationship between hospital total margins and CEO pay. It may be that total margins play a role in CEO salary up to a point, beyond which, as compensation rises, it has little bearing on measures of quality or financial performance. The fact that hospitals with higher levels of technology paid their CEOs more has several potential explanations. First, the advanced technologies may identify hospitals that provide more "complex" care and therefore need to pay more to attract a leader who can manage a complex organization. Alternatively, boards may value their hospitals being seen as technologic leaders in the commu-

nity. Finally, high levels of technology may simply be a reflection of financial health: hospitals with the resources and access to capital to purchase advanced technologies may be rewarding their CEOs for this success.

Although there has been prior work<sup>21</sup> examining the relationship between CEO pay and firm performance broadly, there have been few recent data on the compensation of hospital CEOs. Four large studies using data from the 1990s found that CEO compensation was linked to hospital financial performance,<sup>4</sup> profit status,<sup>5</sup> size, and location<sup>6</sup> and only somewhat to quality.<sup>22</sup> Two recent studies of nonprofit CEO compensation, one in Connecticut<sup>7</sup> and one in New Hampshire,<sup>8</sup> also found no relationship between CEO pay and quality or community benefit, although the samples were small (29 and 23 hospitals, respectively). We are unaware of any recent data on national patterns of hospital CEO compensation.

There are limitations to our study. To assess CEO compensation, we relied on data that, although audited, have not been extensively validated. Although the 990 forms are intended to include all compensation, even that which is indirect or in-kind, this type of compensation may be underreported. Hospitals may not consistently use the same definitions of uncompensated care or may inflate costs attributed to charity by using list prices for this care.<sup>23</sup> The quality measures we assessed were those that are publicly available and that are components of federal pay-for-performance programs but may have their own limitations. For example, patient satisfaction metrics represent a combination of hospital performance and patient expectations. Furthermore, our selected quality metrics, although likely reflective of overall quality at each hospital, are not exhaustive; it is possible that hospitals track internal quality metrics, such as infection rates, and that these may be more closely correlated with financial remuneration. Our metrics of financial performance may not wholly reflect the financial health of the institution, although we aimed to include a set of met-

rics that as a group provide an adequate assessment of financial performance. There may be personal characteristics of the CEO that are associated with compensation, including experience or duration of time in the organization; we did not examine these possibilities. There could be unmeasured confounders that explain the associations we found. Finally, our data examine relationships in 2008 and 2009, and these could change as health care payment models increasingly reward quality rather than simply quantity of care. Future research should track these associations over time.

## Conclusions

Executive compensation metrics are a powerful reflection of the priorities of an institution and likely have the ability to shape the focus of the CEO. We found that CEO compensation at nonprofit US hospitals varies widely and is associated with greater use of technology and higher patient satisfaction but not with the quality of care delivered, patient outcomes, or community benefit.

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