

## Hospital Overhead Costs: The Neglected Driver of Health Care Spending?

Noah S. Kalman, MD; Bradley G. Hammill, MS; Kevin A. Schulman, MD;  
Bimal R. Shah, MD, MBA

**Author Affiliations:** Duke Clinical Research Institute (Messrs Kalman and Hammill and Drs Schulman and Shah) and Department of Medicine (Drs Schulman and Shah), Duke University School of Medicine, Durham, North Carolina.

## **Abstract**

**Objective:** To examine temporal trends in hospital overhead costs relative to total hospital costs, hospital inpatient beds, and inpatient days in United States hospitals.

**Methods:** Using Medicare data regarding nonfederal acute care hospitals in the United States, we conducted analyses of hospital overhead costs, total hospital costs, inpatient bed capacity, and inpatient days for nonfederal acute care hospitals from 1996 through 2010. Overhead costs were examined as a function of total beds, total inpatient days, and overall costs during this time period.

**Results:** In 1996, baseline hospital overhead costs were \$220,497 per inpatient bed and \$1,361 per inpatient day in 2010 dollars; mean hospital overhead costs represented 46.1% of total hospital costs. Relative to medical inflation, overhead costs per inpatient bed grew 3.02% per year and overhead costs per inpatient day grew 1.86% per year. Overhead costs as a share of total costs remained unchanged.

**Conclusions:** Overhead costs represent approximately half of total hospital costs. Between 1996 and 2010, mean hospital overhead costs per inpatient bed and per inpatient day increased faster than medical inflation. To adequately constrain rising health care costs, hospitals must address overhead costs as well as direct patient costs.

## Introduction

Hospital costs in 2010 totaled \$375.9 billion in the U.S., 29% of total health expenditures.<sup>1</sup> Over the past 2 decades, government and other payers have attempted numerous interventions to contain growth in hospital costs. Examples include diagnosis related group reimbursement,<sup>2,4</sup> establishment of lower acuity care centers,<sup>5,6</sup> and direct cuts in hospital reimbursement.<sup>7</sup> Recent attempts to limit costs include holding reimbursement for 30-day readmissions<sup>8,9</sup> and bundling of payments for hospital and professional charges beyond the acute care stay.<sup>10</sup>

Hospitals have responded to these pressures by attempting to increase the efficiency of patient care. Hospitals have reduced the average length of stay,<sup>5,11</sup> increased the judicious use of technology,<sup>12,13</sup> and restrained growth in staff compensation.<sup>14,15</sup> These strategies have focused primarily on the variable, or direct, costs of patient care. Although such direct costs typically include short-term inputs and are relatively easier to manage from an administrative perspective, hospitals are a capital-intensive business. Depending on measurement methods, between 30 and 85% of hospital costs can be considered non-patient care related, or overhead, costs.<sup>16,17</sup> Such costs, which consist of employee benefits, administrative staff, and capital costs such as building and equipment operation and maintenance, cannot be directly attributed to patient care, nor are they as responsive to changes in patient volume as variable, direct costs. There is little evidence to suggest that cost-containment efforts have been directed to this important component of health care costs.

Given renewed interest in slowing the growth of health care costs by targeting policy efforts toward hospital expenses, we examined trends in hospital overhead costs and total costs between 1996 and 2010 to understand the contribution of overhead costs to total costs during this period. We also related trends in overhead costs to measures of hospital utilization and capacity to determine whether hospitals have simultaneously managed their overhead costs while continuing to address reductions in variable, or patient-related, costs.

## Methods

### Data Sources

We obtained hospital cost data for 1996 through 2010 from the Hospital Cost Report Information System (HCRIS) in the Centers for Medicare & Medicaid Services (CMS).<sup>18</sup> The HCRIS annual reports contain mandatory hospital-reported demographic information (eg, geographic location, federal/nonfederal status, profit status, inpatient bed capacity, admission volume) and financial information (eg, capital costs, staffing costs, patient care costs) for every hospital registered with CMS.

We defined overhead costs as those identified as “general service cost centers” in the HCRIS reports. We defined total costs as the sum of overhead costs and the costs listed as “inpatient routine service cost centers,” “ancillary service cost centers,” “outpatient service cost centers,” “other reimbursable cost centers,” and “special purpose cost centers.” The Supplemental Table lists the costs included in these categories. We also obtained data on inpatient bed capacity and total inpatient days (for Medicare and other payers) from the HCRIS reports.

We restricted the analysis to nonfederal, acute care hospitals. We excluded hospital records that included outlier values (such as negative, zero, or out-of-range values) for total costs, inpatient bed capacity, cost per inpatient day, cost per inpatient bed, inpatient days per bed, and nonreimbursable costs, because we considered them to be data entry errors. We also excluded hospitals that reported data for fewer than 13 years. We included data from 2010, which was available for roughly half of the included hospitals. We used the Consumer Price Index (CPI) for Medical Care to adjust all costs to 2010 U.S. dollars.<sup>19</sup>

## Statistical Analysis

We used SAS Enterprise Guide version 4.3 (SAS Institute Inc.) for all calculations. We calculated yearly geometric mean values across all hospitals for inpatient bed capacity, total inpatient days, overhead costs per inpatient bed, overhead costs per inpatient day, and overhead costs as a percentage of total costs. We computed occupancy as the ratio of total inpatient days per bed to a 365 day year. To estimate the annual trend in each quantity, we constructed regression models using hierarchical generalized linear model methods. The regression models specified a log link and a negative binomial error structure. The exponentiated estimate associated with year represents the annual change as a multiplicative factor, which can easily be expressed as an annual percentage change.

In the regression models, we controlled for factors described in the HCRIS reports that could influence the trend estimates. These factors included inpatient bed capacity (more than 400 beds vs 400 beds or fewer in 1996), teaching status (yes or no) as determined by documented intern and resident costs in the “other general service cost center,” and profit status (for-profit or nonprofit) as documented in the HCRIS “provider type” for every hospital.

To examine the temporal trend of overhead costs per inpatient bed and overhead costs per inpatient day, we compared the observed trends to 2 cost scenarios that served as hypothetical benchmarks for the observed findings. In each scenario, we specified the observed 1996 values as the baseline. In the “constant ratio” scenario, overhead costs per inpatient bed and per inpatient day were held constant during the study time period after adjustment for medical inflation. This scenario would provide a benchmark if hospital overhead costs changed in proportion to changes in inpatient days and inpatient bed capacity, and vice versa. In the “constant overhead cost” scenario, overhead costs remained constant between 1996 and 2010 after adjustment for medical inflation. In this scenario, overhead costs per inpatient bed and per inpatient day adjusted over time as hospitals experienced changes in inpatient days and inpatient bed capacity.

We conducted sensitivity analyses to measure the effect of using the CPI for All Urban Consumers, which accounts for inflation across more items, such as food and energy, or the CPI for Medical Care. We also examined the effect of including outlier records in the calculations. Furthermore, we constructed regression models using hospital population subsets based on bed capacity, teaching status, and profit status.

## Results

**Exhibit 1** shows the characteristics of the included hospitals in 1996 and 2009. Hospitals had a mean occupancy rate of 44% in 1996. We observed the highest occupancy rates among larger hospitals (62%) and teaching hospitals (57%). During the study period, inpatient bed capacity decreased by 0.39% per year and inpatient days increased by 0.66% per year; therefore, overall hospital utilization grew 1.15% per year (all  $P < 0.001$ ). We observed similar trends in all subgroups. For-profit hospitals had the largest annual increase in utilization at 1.44% ( $P < 0.001$ ), and larger hospitals had the smallest increase at 0.89% ( $P < 0.001$ ).

**Exhibit 1. Hospital Characteristics in 1996 and 2009**

Characteristic	No. of Hospitals	Bed Capacity, mean	Inpatient Days, mean	Inpatient Days per Bed, mean
1996				
All hospitals	3064	150	24 239	162
Hospital size				
< 400 beds	2747	129	20 143	156
> 400 beds	317	534	120 584	226
Teaching status				
Nonteaching	2219	117	17 298	147
Teaching	845	282	58 789	208
Profit status				
Nonprofit	2556	154	25 842	168
For-profit	508	128	17 565	137
Geographic location				
South	1273	135	20 514	152
Midwest	692	167	25 433	153
West	560	133	21 257	160
Northeast	501	193	39 736	206
Other	38	131	27 677	211
2009				
All hospitals	3050	139	25 956	186
Hospital size				
< 400 beds	2692	116	20 611	178
> 400 beds	358	563	146 968	261
Teaching status				
Nonteaching	2145	103	17 278	167
Teaching	905	283	68 098	241
Profit status				
Nonprofit	2439	145	28 016	193
For-profit	611	118	19 136	163
Geographic location				
South	1285	128	21 858	171
Midwest	678	141	25 668	183
West	553	141	27 478	195
Northeast	495	170	37 789	223
Other	39	138	34 406	248

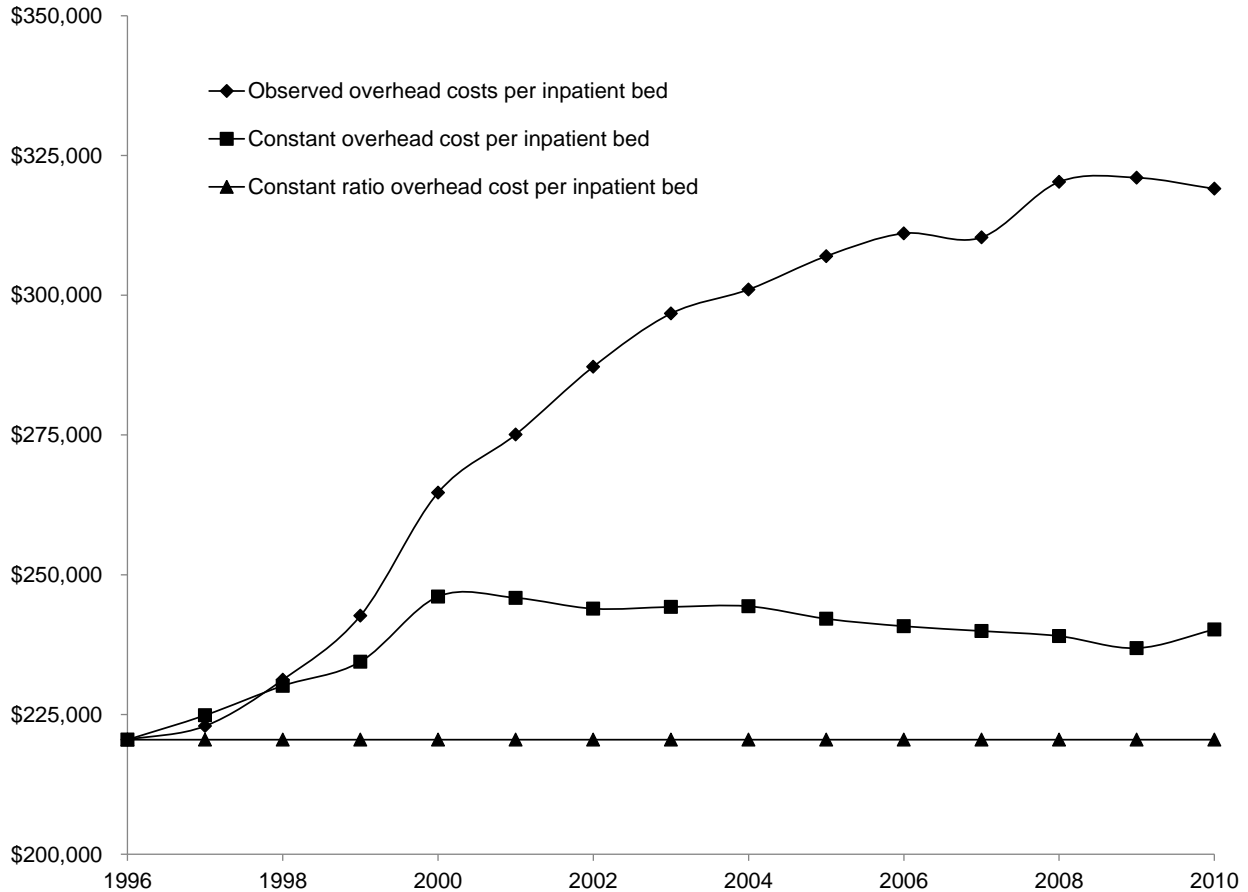
Overhead costs as a percentage of total costs ranged from 45% to 48% in 1996 by subgroup and were highest among teaching hospitals (**Exhibit 2**). We observed no statistically significant trend in overhead costs as a percentage of total costs during the study period, and these results were constant across subgroup analyses of hospital size, teaching status, and profit status (data not shown).

**Exhibit 2. Hospital Overhead Costs in 1996 and 2009**

Hospital Characteristic	Overhead Cost per Bed, mean, \$	Overhead Cost per Inpatient Day, mean	Total Overhead Cost, mean	Overhead Cost as Percentage of Total Cost, %
1996				
All hospitals	220 497	1361	32 979 564	46.1
Hospital size				
< 400 beds	210 652	1351	27 203 415	45.9
> 400 beds	327 569	1451	174 934 911	47.2
Teaching status				
Nonteaching	191 118	1297	22 440 977	45.5
Teaching	320 986	1542	90 641 336	47.6
Profit status				
Nonprofit	229 932	1372	22 872 160	46.2
For-profit	178 587	1302	24 205 513	45.4
Geographic location				
South	179 654	1180	39 936 332	44.3
Midwest	239 644	1570	35 416 853	47.0
West	266 142	1666	55 409 367	45.5
Northeast	286 637	1394	11 949 982	50.3
Other	90 985	432	32 979 564	45.8
2009				
All hospitals	321 022	1722	44 694 515	46.5
Hospital size				
< 400 beds	308 376	1730	35 651 907	46.6
> 400 beds	434 297	1664	244 601 832	45.5
Teaching status				
Nonteaching	282 759	1690	29 193 109	46.4
Teaching	433 684	1801	122 651 535	46.7
Profit status				
Nonprofit	348 635	1807	50 635 503	46.4
For-profit	230 931	1419	27 157 774	46.9
Geographic location				
South	252 810	1478	32 312 134	45.9
Midwest	376 711	2063	52 956 410	47.6
West	386 494	1978	54 351 271	44.0
Northeast	421 447	1893	71 529 788	49.6
Other	118 455	477	16 402 773	45.7

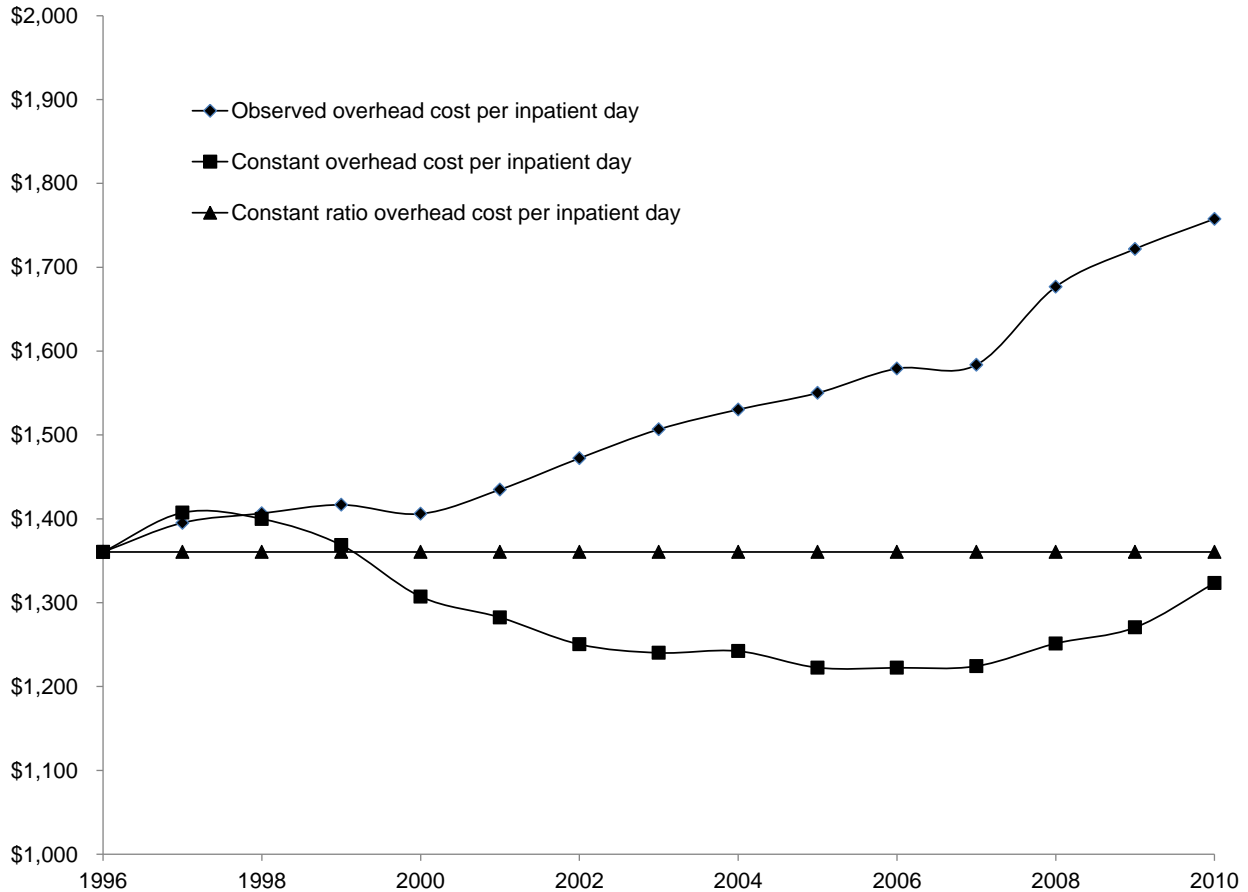
Overhead costs per inpatient bed grew by 3.02% annually over medical inflation (**Exhibit 3**). Among larger hospitals, these costs grew by 1.98%, compared with 3.14% among smaller hospitals. Teaching hospitals had an annual growth rate of 2.39%, compared with 3.29% among nonteaching hospitals. Among for-profit hospitals, overhead costs per inpatient bed increased by 2.14% per year, compared with 3.22% among nonprofit hospitals ( $P < 0.001$  for all trends). Baseline overhead costs per inpatient bed among larger hospitals were higher than among smaller hospitals (\$327,569 vs. \$210,652, respectively). This finding was also true for teaching hospitals (\$320,986 vs. \$191,118 among nonteaching hospitals).

**Exhibit 3.** Overhead Costs per Inpatient Bed, 1996-2010



Overhead costs per inpatient day grew by 2.05% annually over medical inflation across all hospitals (**Exhibit 4**). Similar to trends in overhead costs per inpatient bed, larger hospitals and teaching hospitals had a nearly 1% lower annual growth rate in overhead costs per inpatient day, compared with smaller hospitals and nonteaching hospitals (1.07% vs. 1.86%, and 1.25% vs. 2.11%, respectively). For-profit hospitals had the lowest growth rate in overhead costs per inpatient day of 0.71%, compared with 2.12% among nonprofit hospitals ( $P < .001$  for all trends). Teaching hospitals had the highest baseline overhead costs of \$1361 per inpatient day. This finding was within 15% of the baseline for all other subgroups.

**Exhibit 4. Overhead Costs per Inpatient Day, 1996-2010**



#### Cost Scenario Comparisons

In the “constant overhead cost” scenario, in which overhead costs remained static relative to medical inflation regardless of changes in inpatient bed capacity or inpatient day volume, overhead costs per inpatient bed grew 0.49% per year. The observed growth rate exceeded the constant overhead cost scenario growth rate by 2.53%. Larger hospitals had a decreasing trend of 0.80% in this scenario, compared with an increasing trend of 0.64% among smaller hospitals, which led to a greater difference between the observed and scenario growth rates for larger hospitals (2.78% vs. 2.50%, respectively). The scenario trend of  $-0.01\%$  ( $P > 0.10$ ) for teaching hospitals relative to 0.70% for nonteaching hospitals resulted in a smaller difference between observed and scenario trends for teaching hospitals than nonteaching hospitals (2.40% vs. 2.59%, respectively). For-profit hospitals had a positive growth trend of 0.12% ( $P = 0.02$ ) in the scenario, compared with 0.58% for nonprofit hospitals, which gave for-profit hospitals the smallest difference in observed vs scenario trends of 2.02% compared to 2.64% for nonprofit hospitals. The  $P$  value was less than 0.001 for all trends unless otherwise specified.

Also in the constant overhead cost scenario, overhead costs per inpatient day decreased 0.70% per year. The observed trend in overhead costs per inpatient day outpaced the scenario trend by 2.56%. Larger hospitals had the greatest downward trend in the scenario of 1.87% per year compared to 0.57% for smaller hospitals, a difference between observed and scenario growth rates of 2.94% for larger hospitals and 2.52% for smaller hospitals. Teaching hospitals, with a yearly decrease of 1.23% in the scenario compared to a 0.48% per year decrease for nonteaching hospitals, experienced small differences between observed and scenario growth trends (2.48% vs. 2.59%, respectively). For-profit hospitals had a downward trend in the COHC scenario of 1.48% per year vs 0.52% for nonprofit hospitals, and for-profit hospitals had the smallest difference between observed and



scenario trends in overhead costs per inpatient day of 2.19% compared to 2.64% for nonprofit hospitals ( $P < 0.001$  for all trends).

By definition, overhead costs per inpatient bed and per inpatient day had a 0% yearly growth in the “constant ratio” scenario, indicating that the values in this scenario grew at exactly the rate of medical inflation.

## Discussion

In this contemporary analysis of cost allocation in US hospitals, overhead costs comprised between 45% and 48% of total costs. This ratio remained stable from 1996 to 2010. Total costs and overhead costs increased 33% and 31%, respectively, above medical inflation.

It has been well documented that health care costs in the United States have grown faster than nonmedical expenditures.<sup>20,21</sup> Indeed, the CPI for Medical Care has a much higher growth rate than the general CPI for All Urban Consumers.<sup>19</sup> However, this literature examines only total costs of overall health care spending. With regard to hospital spending, there is substantial research showing that administrative costs in US hospitals are high and increasing.<sup>17,22,23</sup> In our study, we found that up to 50% of hospital costs are related to overhead costs. The most recent study by Woolhandler et al.<sup>17</sup> found that hospital administrative costs constituted 31% of total costs, lower than our findings. However, the previous study considered only administrative costs, which are just one component of overhead costs along with capital and fixed infrastructure costs. A similar study found that hospital overhead costs represented 85% of total short-term hospital costs.<sup>16</sup> This study’s inclusion of staff salaries in the calculation of overhead costs likely led to the higher percentage. Had the HCRIS reports broken down labor costs between hourly and salaried employees, we would have expected our ratio of overhead costs to total costs to approach this high value.

Overhead costs allocated across inpatient beds and inpatient days grew substantially between 1996 and 2010, with yearly growth rates of 3.02% and 1.86%, respectively. These increases in overhead costs per inpatient bed and per inpatient day occurred despite growth in inpatient days. In typical and efficient allocation of overhead, as businesses expand volume and capacity within a set footprint, they attain lower overhead costs per unit produced because these costs can be spread among and supported by more units of production. Our “constant overhead cost” scenario represents this expected efficient allocation of overhead costs. The differences between the observed trends and the constant overhead cost scenario indicate that hospitals did not achieve such efficient allocation.

Not all overhead costs are fixed, and while inpatient bed capacity decreased, some growth in overhead costs should be expected as hospitals add staff and upgrade infrastructure. However, the nearly equal rise of overhead costs and total costs (33% and 31%, respectively, above medical inflation between 1996 and 2010) in the setting of increased inpatient days and decreased inpatient bed capacity suggests that hospitals have failed to control overhead costs.

Our findings support previous research showing that hospital overhead costs do not relate to hospital activity level.<sup>24</sup> Although previous research considered growth in total hospital costs relative to capacity and utilization,<sup>25</sup> there is little examination of trends in overhead costs relative to these capacity and utilization metrics. We previously found that overhead costs per inpatient bed and inpatient day grew faster than medical inflation.<sup>26</sup> Our current results are consistent with these findings, suggesting that the lack of attention to controlling overhead costs is longstanding.

In subgroup analyses, hospitals with more than 400 beds and teaching hospitals had larger baseline overhead costs per inpatient bed and inpatient day, as well as higher baseline occupancy. Given these hospitals’ focus on specialty care and their administrative sophistication, such baseline values are expected. However, larger and academic hospitals greatly underperformed in their overhead cost trends relative to the trends in the constant overhead cost scenario. The hospital subgroup that performed best relative to the constant overhead cost scenario—for-profit hospitals—may have had more motivation to achieve efficiencies in overhead costs. Many for-profit hospitals also lack the teaching and research infrastructure that adds significant costs to larger teaching institutions.

Although we cannot elucidate the exact mechanism for the observed growth in overhead costs, there are multiple categories of overhead costs that can be considered. We examined aggregate overhead costs reported by the hospital, which included property, plant and equipment, and general costs not directly allocated to patient care activities. Investment in new facilities is one potential source of growth in overhead costs. In recent years, aggregation of hospitals into larger provider organizations has led to increased hospital revenue.<sup>27-33</sup> The larger growth in overhead costs per inpatient bed and inpatient day in larger hospitals and teaching hospitals, which often have increased clout in their markets, supports the view that these hospitals have used their increased revenue for capital spending and other non-patient-related activities (i.e., benefits, marketing, compliance functions, etc.).<sup>34</sup> Furthermore, this growth in overhead costs rebuts assertions of synergy as a rationale for provider consolidation among hospitals, as larger hospital size does not correlate with improved overhead cost control.

The growth in costs not related to patient care coincides with increases in the complexity of the delivery system.<sup>35-37</sup> Non-patient care tasks include core functions of the hospital, such as managing and coordinating activities across departments, sites of care, and clinical service lines, and support activities such as information technology, supply chain management, billing operations, compliance, and government relations. Indeed, large investments in health information technology occurred during the study period.<sup>34,38</sup>

### Policy Implications

Our assessment suggests that roughly 50% of hospital costs are less responsive to changes in patient volume and that these non-patient care related, overhead costs have increased significantly. The policy focus on reducing hospital variable costs should be expanded to include discussions of the relationship between overhead costs and total health care costs.

The myriad policy efforts to improve hospital performance may in fact be directly related to the growth in the overhead costs required to manage complex program requirements. Medicare's physician group practice demo, a precursor to accountable care organizations, led to an increase in overhead costs for participating groups without resultant cost savings.<sup>39,40</sup> Similarly, infrastructure expenses under the Blue Cross Blue Shield of Massachusetts alternative quality contract likely exceeded the savings produced in direct patient care costs.<sup>41</sup> Incentives to reduce the costs of operating in a complex market could include new approaches to harmonization of quality, safety, and performance measure development and reporting, and steps to streamline billing processes under administrative simplification in the Patient Protection and Affordable Care Act.

Policy approaches to address capital costs might be more difficult, because both the public and private markets drive these investments. Maryland currently provides a small payment adjustment to reward hospitals with low overhead costs relative to other hospitals,<sup>42</sup> but this reward/penalty is small. Policy approaches to address capital cost increases could include incentives to reduce investment in infrastructure, transparency in reporting on new hospital capital investments (and their potential impact on health care costs), and measures to increase the cost of capital to decrease the return from infrastructure investments.

It must be recognized that decreasing overhead costs, such as personnel, buildings, and equipment, can be complex and by definition, take time. Overall incentives to reduce these costs might include restructuring assistance, "safe harbor" periods for organizational change, and efforts to tie hospital incentives to permanent organizational change. Creative strategies to improve the efficiency and productivity of existing labor and capital infrastructure will be required if there is hope to reduce the rate of growth of overall hospital spending in the United States.

### Limitations

Although the HCRIS data set provides insight across a national hospital population over a long time horizon, our study has some limitations. Our analysis excluded federal acute care hospitals, so the results are not fully indicative of institutional care in the United States. The HCRIS reports contained some omissions and outlier values. When we removed outliers from analysis, the results were consistent. Starting in 1996, the HCRIS data set began separating individual cost items. We examined only certain categories of overhead costs as specified in the HCRIS data set. No international comparators exist to compare different allocations of

overhead versus variable costs. Costs reported in other categories, such as staff salaries, could be construed as overhead costs if more detailed data were available.

## Conclusion

Our analysis suggests that overhead costs account for roughly half of all hospital costs, and that these costs grew by more than 30% above medical cost inflation between 1996 and 2010. Efforts to slow the growth of hospital spending must consider overhead, non-patient care related costs as well as direct patient care costs if they are to be successful.

### **Note: The Corresponding Author for this article is:**

Bimal R. Shah, MD, MBA, Duke Clinical Research Institute, PO Box 17969, Durham, NC 27715; telephone: 919-668-8651; fax: 919-668-7061; e-mail: bimal.shah@duke.edu.

## Endnotes

1. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb146.pdf>
2. Newhouse, J, *Pricing the Priceless: A Health Care Conundrum*, Cambridge, MA: MIT Press (2002).
3. Iglehart, J, "Medicare Begins Prospective Payment of Hospitals," *New England Journal of Medicine*, 308, 23: 1428–1432 (1983).
4. Mayes, R, Berenson, R, *Medicare Prospective Payment and the Shaping of U.S. Health Care*. Baltimore, MD: The Johns Hopkins University Press (2006).
5. Guterman, S, et al., "The First 3 Years of Medicare Prospective Payment: An Overview," *Health Care Financing Review*, 9, 3: 67–77 (1988).
6. Johnson, D, "Home Health, Nursing Homes Take Patients From Hospitals," *Health Care Strategic Management*, 12, 5: 2–3 (1994).
7. Iglehart, J, "Medicare," *New England Journal of Medicine*, 340, 4: 327–332 (1999).
8. Berenson, R, Paulus, R, Kalman, N, "Medicare's Readmissions-Reduction Program—A Positive Alternative," *New England Journal of Medicine*, 366, 15: 1364–1366 (2012).
9. Axon, R, Williams, M, "Hospital Readmission as an Accountability Measure," *JAMA*, 305, 5: 504–505 (2011).
10. Dummit, L, "Medicare's Bundling Pilot: Including Post-Acute Care Services," accessed Jan. 30, 2013, at [www.nhpf.org/library/details.cfm/2850](http://www.nhpf.org/library/details.cfm/2850).
11. Medicare Payment Advisory Commission, *Report to the Congress: Context for a Changing Medicare Program*, Washington, DC: MedPAC (1998).
12. Kennedy, S, Forman, H, "Deficit Reduction Act: Effects on Utilization of Noninvasive Musculoskeletal Imaging," *Radiology*, 264, 1: 146–153 (2012).
13. Levin, D, Rao, V, Parker, L, "Physician Orders Contribute to High-Tech Imaging Slowdown," *Health Affairs*, 29, 1: 189–195 (2010).
14. Bellandi, D, "The Quiet Restructuring. Blaming Feds, Hospitals Shed Workers, Facilities in Doves," *Modern Healthcare*, 28, 50: 2–3, 16 (1998).
15. Buerhaus, P, Staiger, D, "Trouble in the Nurse Labor Market? Recent Trends and Future Outlook," *Health Affairs*, 18, 1: 214–222 (1999).
16. Roberts, R, et al., "Distribution of Variable vs Fixed Costs of Hospital Care," *JAMA*, 281, 7: 644–649 (1999).

17. Woolhandler, S, Campbell, T, Himmelstein, D, "Costs of Health Care Administration in the United States and Canada," *New England Journal of Medicine*, 349, 8: 768–775 (2003).
18. Centers for Medicare & Medicaid Services, "Cost Reports," accessed Jan. 30, 2013, at [www.cms.gov/Research-Statistics-Data-and-Systems/Files-for-Order/CostReports/index.html](http://www.cms.gov/Research-Statistics-Data-and-Systems/Files-for-Order/CostReports/index.html).
19. Bureau of Labor and Statistics, "Consumer Price Index," accessed Jan. 30, 2013, at [www.bls.gov/cpi/](http://www.bls.gov/cpi/).
20. Chernew, M, Hirth, R, Cutler, D, "Increased Spending on Health Care: How Much Can the United States Afford?," *Health Affairs*, 22, 4: 15–25 (2003).
21. Newhouse, J, "Medical Care Costs: How Much Welfare Loss?," *Journal of Economic Perspectives*, 6, 3: 3–21 (1992).
22. Woolhandler, S, Himmelstein, D, "Costs of Care and Administration at For-Profit and Other Hospitals in the United States," *New England Journal of Medicine*, 336, 11: 769–774 (1997).
23. Woolhandler, S, Himmelstein, D, Lewontin, J, "Administrative Costs in U.S. Hospitals," *New England Journal of Medicine*, 329, 6: 400–403 (1993).
24. Noreen, E, Soderstrom, N, "The Accuracy of Proportional Cost Models: Evidence From Hospital Service Departments," *Review of Accounting Studies*, 2, 1: 89–114 (1997).
25. Guerin-Calvert, M, Israilevich, G, "Assessment of Cost Trends and Price Differences for U.S. Hospitals," accessed Jan. 30, 2013, at [www.aha.org/content/11/11costtrendspricediffreport.pdf](http://www.aha.org/content/11/11costtrendspricediffreport.pdf).
26. Shah, B, et al., "The Cost of Inefficiency in US Hospitals, 1985-1997," *Journal of Health Care Finance*, 30, 1: 1–9 (2003).
27. Berenson, R, et al., "The Growing Power of Some Providers to Win Steep Payment Increases From Insurers Suggests Policy Remedies May Be Needed," *Health Affairs*, 31, 5: 973–981 (2012).
28. Berenson, R, Ginsburg, P, Kemper, N, "Unchecked Provider Clout in California Foreshadows Challenges to Health Reform," *Health Affairs*, 29, 4: 699–705 (2010).
29. Medicare Payment Advisory Commission, Hospital Inpatient and Outpatient Services. Report to Congress: Medicare Payment Policy, Washington, DC: MedPAC (2009).
30. Sager, A, Socolar, D, "Massachusetts Hospital Spending Reached 55.4% per Person Above the U.S. Average in 2007," accessed Apr. 30, 2012, at [www.mass.gov/eohhs/docs/dhcfp/costtrend-docs/public-testimony/other-sager-hospitalspending.pdf](http://www.mass.gov/eohhs/docs/dhcfp/costtrend-docs/public-testimony/other-sager-hospitalspending.pdf).
31. Frakt, A, "How Much Do Hospitals Cost Shift? A Review of the Evidence," *Milbank Quarterly*, 89, 1: 90–130 (2011).
32. Melnick, G, Shen, Y-C, Wu, V, "The increased concentration of health plan markets can benefit consumers through lower hospital prices," *Health Affairs*, 30, 9: 1728–1733 (2011).
33. Robinson, J, "Hospitals respond to Medicare payment shortfalls by both shifting costs and cutting them, based on market concentration," *Health Affairs*, 30, 7: 1265–1271 (2011).
34. Healthcare Financial Management Association, Financing the Future Report 2: How Are Hospitals Financing the Future? Capital Spending in Health Care Today, Washington, DC: HFMA (2004).
35. Christensen, C, Bohmer, R, Kenagy, J, "Will disruptive innovations cure health care?," *Harvard Business Review*, 78, 5: 102–112, 199 (2000).
36. Smith, M, "Disruptive innovation: Can health care learn from other industries? A conversation with Clayton M. Christensen," *Health Affairs*, 26, 3: w288–w295 (2007).
37. Best Care at Lower Cost: The Path to Continuously Learning Health Care in America, Washington, DC: The National Academies Press (2012).
38. Blanchfield, B, Fahlman, C, Pittman, M, Hospital Capital Financing in the Era of Quality and Safety: Strategies and Priorities for the Future—A Survey of CEOs, Chicago, IL: Health Research and Educational Trust (2005).
39. Wilensky, G, "Lessons From the Physician Group Practice Demonstration--A Sobering Reflection," *New England Journal of Medicine*, 365, 18: 1659–1661 (2011).
40. Colla, C, et al., "Spending Differences Associated With the Medicare Physician Group Practice Demonstration," *JAMA*, 308, 10: 1015–1023 (2012).

41. Song, Z, et al., “The ‘Alternative Quality Contract,’ Based on a Global Budget, Lowered Medical Spending and Improved Quality,” *Health Affairs*, 31, 8: 1885–1894 (2012).
42. Health Services Cost Review Commission, Final Staff Recommendation and Discussion Document Regarding the FY 2012 HSCRC Hospital Payment Update, Baltimore, MD: Health Services Cost Review Commission (2011).

**Supplemental Table.** Classification of Cost Centers According to the Medicare Cost Report Form

Cost Center	Description
Overhead costs	
General service cost centers	Old capital-related costs: buildings and fixtures
	Old capital-related costs: movable equipment
	New capital-related costs: buildings and fixtures
	New capital-related costs: movable equipment
	Employee benefits
	Administrative and general
	Maintenance and repairs
	Operation of plant
	Laundry and linen service
	Housekeeping
	Dietary
	Cafeteria
	Maintenance of personnel
	Nursing administration
	Central services and supply
	Pharmacy (excludes medication costs)
	Medical records and medical records library
	Social service
	Other general service
	Nonphysician anesthetists
	Nursing school
	Intern and resident service: salary and fringes
	Intern and resident other program costs
	Paramedical education program
Direct Patient Costs	
Inpatient routine service cost centers	Adults and pediatrics (general routine care)
	Intensive care unit
	Coronary care unit
	Burn intensive care unit
	Surgical intensive care unit
	Other special care
	Subprovider
	Nursery
	Skilled nursing facility
	Nursing facility
	Other long-term care
Ancillary service cost centers	Operating room
	Recovery room
	Delivery room and labor room
	Anesthesiology
	Radiology: diagnostic
	Radiology: therapeutic
	Radioisotope
	Laboratory
	PBP clinical laboratory services: program only
	Whole blood and packed red blood cells
	Blood storing, processing, and transport
	Intravenous therapy
	Respiratory therapy
	Physical therapy
	Occupational therapy
	Speech pathology
	Electrocardiology
	Electroencephalography

	Medical supplies charged to patients
	Implantable devices charged to patients
	Drugs charged to patients
	Renal dialysis
	Ambulatory surgery center
	Other ancillary
Outpatient service cost centers	Clinic
	Emergency
	Observation beds
	Other outpatient service
Other reimbursable cost centers	Home program dialysis
	Ambulance services
	Durable medical equipment: rented
	Durable medical equipment: sold
	Other reimbursable
	Outpatient rehabilitation provider
	Intern-resident service (not approved teaching program)
	Home health agency
Special service cost centers	Lung acquisition
	Kidney acquisition
	Liver acquisition
	Heart acquisition
	Other organ acquisition
	Interest expense
	Utilization review: SNF
	Other capital-related costs
	Ambulatory surgical center
	Hospice
	Other special purpose