

Does Administrative Staffing Improve Hospital Profitability?

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Abstract

What is the message? In response to continuing declines in payment rates, hospital executives have started making decisions to reduce the number of administrative staff they retain. Levels of administrative staffing in hospitals appear to have a negative impact on hospital profitability.

What is the evidence? This analysis is a first look at the relationship between administrative staffing levels and profitability in hospitals. While administrative staffing has a positive impact on revenues, the adverse impact on hospital operating expenses is greater and results in an overall reduction to a hospital's bottom line.

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Introduction

Hospitals in the United States are facing declining payments and reduced patient volumes that

cause them to pursue cost reduction strategies, including laying off employees. While this has happened periodically since the advent of prospective payments to hospitals in the 1980s, there has been a more recent uptick in hospital layoffs since the end of the COVID-19 pandemic in 2021 [1, 2, 3, 4]. Historically, hospitals have targeted nursing and other direct caregiver positions as patient volumes declined with the growth of managed care programs that restricted hospital use [5, 6]. Growing revenues [7], adding new services, or addressing high-cost contract labor costs [8] have also been mentioned as strategies to address patient volume and revenue declines.

Common among strategies cited in the literature is the focus on revenue, volume of service, payment rates, or variable costs. Recent news of hospital layoffs has shown a change in hospital layoff targets. Recent workforce reductions have moved to the addition of non-patient care staff to the lists of employees subject to reductions in workforce, in particular managers and executive positions [1, 2, 3, 4, 5]. It seems notable that the fixed costs created by managerial and executive positions have come under broader cost-cutting scrutiny at the time of this writing. The extent of administrative costs in healthcare has been examined in the literature [9, 10, 11], but these studies based the expenses classified as “administrative” on the Centers for Medicare and Medicaid Services (“CMS”) Hospital Medicare Cost Report. Those expenses include not only administrative salaries, but other general administrative costs such as legal fees, accreditation fees, facility licensing costs, and even taxes for investor-owned organizations [9, 12]. Prior studies examined the proportion of administrative expense that encompassed both labor and non-labor components. None have addressed the question from the perspective of the number of administrators (and their associated fixed costs) with hospital profitability.

In their study of hospital administrative costs, McKay and colleagues [9] identified specific functions that generate those costs, including “management of human, financial, and facility resources,” as well as administrative compliance and billing/collection for services provided. Further, Holmes and colleagues [8] indicated that administrators devised and executed the strategies needed to improve financial performance in rural, financially challenged hospitals. Thus, it might seem perplexing why organizations might reduce the number of staff charged with the very functions that could improve a hospital’s resilience to environmental challenges such as reduction in patient volumes or payment rates.

In view of this seeming paradox, this paper seeks to examine this question: Is there a

relationship between administrative staffing levels and profitability in hospitals? While other studies have evaluated the question of administrative costs, this preliminary study aims to be the first to explore the question from the perspective of the number of persons doing that administrative work. Since other costs beyond administrative labor were considered in prior studies, this work seeks to learn more about the influence of the administrative Full-Time Equivalent (FTE) on organizational profitability. This staffing approach may better inform hospital leadership on decisions to increase or reduce managerial positions in the organization.

There are multiple ways to define “profitability” in a hospital, including net income, return on assets, or operating margins. In current hospital markets, many hospitals – especially voluntary, non-profit hospitals – rely on non-operating income from investments to generate net income and achieve positive return on assets while losing money from hospital operations [13, 14]. While those non-operating sources are important for the long-term viability of a hospital business, the income from those sources is in many respects a function of the historical asset base for the business and less about the acumen of managers in operating the hospital’s core business: patient care [15]. In evaluating the administrative impact on profitability, this study will focus on income from patient care. This is consistent with the work of Bai and Anderson [16].

Other studies of hospital profitability have given attention to environmental factors such as patient volumes, payer mix, market power, and insurer market penetration [6, 16]. These factors drive revenue and may not necessarily demonstrate management skill in operating a hospital business. Revenue performance certainly improves profitability and may show that administrators have the entrepreneurial skill needed to generate volumes of service and income streams. However, the operation of a hospital is complex and requires not only generating income streams, but also balancing the management of limited resources to keep operating expenses within those income streams while providing quality care to patients. The assessment of the impact of administrators on both revenue and expense measures, would be more informative for learning if this type of staffing can improve hospital profitability.

Bed size is a factor in hospital profitability. More beds could mean greater market presence, as well as an ability to spread fixed costs such as maintenance or depreciation across more activities and gain economies of scale [17]. For the purposes of this work, it may be more useful to consider revenues and expenses per unit of service rather than the overall size of the

organization. Bai and Anderson used revenue and expense per adjusted discharge [16], and Lalani and colleagues [13] used revenues and expenses per patient day. The smaller unit of measure at the patient day level rather than discharges may be a better proxy for administrative effectiveness as managers must manage length of stay as well as operating expenses to maintain profitability [17].

Methods

Timeframe

This exploratory study uses a cross-sectional approach, incorporating publicly available secondary data from 2022, which represents the latest year with data for all United States hospitals. Given the preliminary nature of this work, one year of data is used to determine the general nature of the relationships posited here. Further, 2022 is the first year of more normal hospital operations following the COVID-19 pandemic of 2020 and 2021. Given the post-pandemic “new normal” of hospital operations, this research approach could better inform practice in coming years. There is only one year of complete post-pandemic data available for this work at the time of this writing. Also, the impact of non-operating revenues from federal support payments would distort the results of this analysis. Hence, this exploratory work is intended to evaluate only the general relationship of administrative staffing to measurable financial results in general, acute care hospitals in the United States in 2022. Veterans Administration (V.A.) hospitals, specialty, and children’s hospitals were omitted from consideration because their operating payment mechanisms generally differ from that of the general acute care hospital. Finally, any hospital that experienced a change in ownership or control status in 2022, was omitted under the premise that management decisions in those facilities would differ from normal operations either while the facility prepared for a change of ownership or assimilated a new control of operations [7,13].

Data Sources

Data for variables were extracted from hospital financial statement and operational data filed in annual Medicare cost reports filed with CMS each year [18]. Although the reports are titled “Medicare,” they include operating data for all aspects of the hospital and are appropriate for this type of analysis [9, 13, 16]. All revenue, expense, and staffing variables were adjusted to

account for hospital size and volume, based on adjusted patient days. The adjusted patient day is a measure that considers both inpatient and outpatient service volumes in a hospital [17]. Case mix index data, which measures the overall relative severity of conditions treated in a hospital, were obtained from publicly available files from the CMS website [19].

The dependent variable in this analysis was patient service income per adjusted patient day. Patient service income is separately reported on the Medicare cost report and serves as a measure of operating income for a hospital. Revenue per adjusted patient day and expense per adjusted patient day were treated as dependent variables and examined in separate analyses to explore differences attributable to scale of operation and service mix. Since both revenue and operating expense are components of profitability, those two elements were also considered in this analysis. Net patient revenue and operating expenses were both divided by total adjusted patient days to be on the same unit of measure as profitability. Evaluation of financial performance metrics based on the adjusted patient day in the dependent variable, is consistent with work done by Karim et al and Epane' et al [20, 21].

Labor Hours

To operationalize the level of administrative staffing in a hospital, the Medicare cost report identifies paid labor hours by hospital department. "Administration" and "Nursing Administration" departments were considered as "administrative" for purposes of this study. Administrative services provided by a multi-hospital system office or a management contract were also included in this variable. The administrative department in the cost report includes not only executives, but patient accounting, finance, and other management staff. The cost report does not segregate labor hours by administrative discipline. So, for purposes of this preliminary study, all administrative employee labor hours will be considered. The annual total paid labor hours for the administrative departments were then divided by 2,080 to arrive at an FTE value [17]. The total FTE value was then divided by the adjusted average daily census to arrive at an FTE per adjusted occupied bed.

Case Mix Index

The relative severity of illness in patients treated by hospitals are also a factor in hospital profitability performance, since more severe illness should result in higher overall revenue. In

addition, if prices are set correctly by administrators, profits should increase as well. The common measure for the severity of patient illness in a hospital, known as the case mix index (CMI), were also included in this analysis, as was done in prior studies such as those by Bai and Anderson [16] and Lalani and colleagues [13]. Because rural critical access hospitals do not report case mix data since they are reimbursed on a cost basis, those facilities were omitted from the analysis. CMI data were obtained from the inpatient hospital payment resources page on the CMS website [19].

Hospital Characteristics

The analysis also included the following variables that controlled for hospital characteristics: rural or urban location, ownership (for profit, nonprofit, or public), system affiliation, teaching affiliation for physician residencies, operation of a distinct part inpatient psychiatric or inpatient rehab facility within the hospital. The latter two variables for the distinct part units were included because they are paid at different rates than medical/surgical services and could impact revenues for those hospitals [12]. Since the implementation or operation of such services is an administrative decision impacting profits from patient care, they were included in the study analysis. Rural/urban location was included as a binary variable, with rural location being the base case in operationalizing this variable in the analysis. Ownership was similarly converted to a dummy variable with public ownership being the base case in the analysis. All other variables for hospital characteristics were included as binary variables. Table 1 shows the variables used in this analysis and sources for those variables.

Table 1. Variables and Data Sources

Variable	Source
Income from Patient Services per Adjusted Occupied Bed	HCRIS, Worksheet G-3, Line 5, Column 1 / [(HCRIS, Worksheet S-3, Part I, Line 14, Column 8 / 365) x (HCRIS, Worksheet G-2, Line 28, Column 3/HCRIS, Worksheet G-2, Line 28, Column 1)]
Net Revenue per Adjusted Occupied Bed	Net Revenue / [(HCRIS, Worksheet S-3, Part I, Line 14, Column 8 / 365) x (HCRIS, Worksheet G-2, Line 28, Column 3/HCRIS, Worksheet G-2, Line 28, Column 1)]
Operating Expense per Adjusted Occupied Bed	Total Operating Expense / [(HCRIS, Worksheet S-3, Part I, Line 14, Column 8 / 365) x (HCRIS, Worksheet G-2, Line 28, Column 3/HCRIS, Worksheet G-2, Line 28, Column 1)]
Administrative FTE per Adjusted Occupied Bed	[(HCRIS, Worksheet S-3, Part 2, Line 27, Column 5 + HCRIS, Worksheet S-3, Part 2, Line 28, Column 5 + HCRIS, Worksheet S-3, Part 2, Line 38, Column 5)/2,080] / [(HCRIS, Worksheet S-3, Part I, Line 14, Column 8 / 365) x (HCRIS, Worksheet G-2, Line 28, Column 3/HCRIS, Worksheet G-2, Line 28, Column 1)]
Urban/rural status	HCRIS, Worksheet S-2, Part 1, Line 26, Column 1
Teaching status	HCRIS, Worksheet S-2, Part 1, Line 56, Column 1
Distinct Part Psychiatric Unit	HCRIS, Worksheet S-2, Part 1, Line 70, Column 1
Distinct Part LTACH Unit	HCRIS, Worksheet S-2, Part 1, Line 75, Column 1
Multi-Hospital Affiliation	HCRIS, Worksheet S-2, Part 1, Line 141, Column 1
Ownership/Control	HCRIS, Worksheet S-2, Part 1, Line 21, Column 1
Case Mix Index	CMS Case Mix Index Files from Hospital Inpatient PPS reimbursement files at https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS

Market factors beyond the control of administrators such as payer mix, population, or insurer market penetration were not included in this analysis. Hospitals that underwent a change in ownership, did not report complete data for all study variables, or were critical access hospitals that were omitted from the study sample, leaving a total of 1,483 hospitals included in the study analysis. Descriptive statistics for all variables are listed in Table 2.

Table 2. Descriptive Statistics for Study Variables

<u>Variable</u>	<u>Mean</u>	<u>Median</u>	<u>Std. Dev</u>	<u>Min.</u>	<u>Max.</u>
Patient Service Income per Adjusted Occupied Bed	-164.36	-133.91	1,064.31	-9,005.15	17,909.86
Net Revenue per Adjusted Occupied Bed	3,370.93	2,918.23	2,150.06	429.96	31,654.64
Operating Expense per Adjusted Occupied Bed	3,535.29	3,014.06	2,121.49	603.34	29,191.11
Administrative FTE per Adjusted Occupied Bed	0.77	0.58	0.80	0.01	13.81
Case mix index	1.77	1.73	0.35	0.84	3.91

Counts for the categorical variables in the analysis are listed in Table 3 below.

Table 3. Counts for Study Categorical Variables

<u>Variable</u>	<u>Count</u>	<u>% of Study Facilities*</u>
Voluntary/non-profit control	950	64%
Proprietary control	296	20%
Public control	237	16%
Teaching status	497	34%
System affiliated	820	55%
Urban location	871	59%
Distinct part psychiatric unit	292	20%
Distinct part rehab unit	280	19%

* Will not sum to 100% because some facilities may be represented in multiple categories

Regression Analyses

The research question was evaluated using multivariate linear regression analysis to determine the association between Income from Patient Services per Adjusted Occupied Bed and the independent variables with each study outcome and reported coefficients, betas, and statistical significance. The research question is premised on the idea that more administrators, exercising their entrepreneurial and management skills, will have a positive impact on profitability in a hospital. The analysis used three multivariable linear regression analysis models: one for profitability, another for net revenue per adjusted patient day, and a third for operating expense per adjusted patient day. The latter two used revenue per adjusted patient day and operating expenses per adjusted patient day as dependent variables in two separate additional regression analyses. The regressions with net revenue per adjusted patient day were performed to understand the relative impact of management on these component elements of overall profitability from patient care services. All regression analyses reported coefficients and betas for covariates in the models and figures illustrating marginal effects of fiscal year. A probability value of <0.05 (two-tail) was considered statistically significant for all tests.

Regression analyses in this study used a robust multivariate regression to control for potential serial correlation among variables. Patient service income per adjusted patient day was the dependent variable in one regression, net revenue per adjusted patient day in the other, and the third used for operating expense per adjusted patient day. Stata IC 17 was used to perform all statistical analyses.

Results

The first analysis was a regression using patient service income per adjusted patient day as the dependent variable. This first step was to establish the presence of any relationship between administrative staff levels and profitability. The results of this regression analysis are shown in Table 4.

Table 4. Regression Results for Patient Service Income per Adjusted Patient Day

<u>Patient service income per adjusted patient day</u>	<u>Coefficient</u>	<u>Robust std. err.</u>	<u>P> t </u>
Administrative FTE per Adjusted Occupied Bed	-695.44	385.17	.071
Voluntary/non-profit control	494.71	254.96	.053
Proprietary control	2,722.45	1,156.99	.019*
Teaching status	-349.11	242.58	.150
System affiliation	-975.75	631.32	.122
Urban location	307.39	326.24	.346
Case mix index	1,362.48	703.78	.053
Distinct part psychiatric unit	-406.12	244.95	.098
Distinct part rehab unit	-135.85	260.17	.602
Constant	-1,985.67	1,209.06	.101

* - indicates significant relationship

Interestingly, only proprietary control is significant (p -value of 0.019) in this assessment of profitability per adjusted patient day. The level of administrative staffing approached statistical significance ($p = 0.071$), with the negative coefficient indicating reduction in profitability. Two other variables - voluntary/non-profit control and case mix index - also exhibited p -values just above the significance level of 0.05 (both $p = 0.053$). Teaching status, system affiliation, and the operation of a distinct part psychiatric unit, all showed very weak relationships to profitability in the analysis (p ranging from 0.098 to 0.150).

To better understand the potential drivers of profitability, the dependent variable of profitability per patient day was decomposed into its key component parts: revenue and expense. The analysis was then re-run using net revenue per adjusted patient day as the dependent variable in the regression model and then again with operating expense per adjusted patient day as the dependent variable. The results of analysis of administrative staffing on net revenue per patient

day are shown in Table 5.

Table 5. Regression Results for Net Revenue per Adjusted Patient Day

<u>Net revenue per adjusted patient day</u>	<u>Coefficient</u>	<u>Robust std. err.</u>	<u>P> t </u>
Administrative FTE per Adjusted Occupied Bed	2,846.60	855.32	.001*
Voluntary/non-profit control	1,561.37	1,126.08	.166
Proprietary control	-639.89	533.03	.230
Teaching status	-585.66	369.42	.113
System affiliation	-199.64	801.39	.803
Urban location	378.85	453.07	.403
Case mix index	3,255.63	822.71	.000*
Distinct part psychiatric unit	-852.02	351.12	.015*
Distinct part rehab unit	663.83	500.54	.185
Constant	-4,241.41	1,348.93	.002*

* - indicates significant relationship

In this model, administrative FTE per adjusted occupied patient day was found to be significant ($p = .001$), with each additional FTE per adjusted occupied patient day associated with a \$2,846.60 increase in net revenue per adjusted bed day. Also significant is the relationship between net revenue, and case mix index, and the operation of a distinct part psychiatric unit.

Continuing the decomposition of profitability to revenue and expense components in this analysis, the third regression using operating expense per adjusted patient day as the dependent variable yielded the results shown in Table 6.

Table 6. Regression Results for Operating Expense per Adjusted Patient Day

<u>Operating expense per adjusted patient day</u>	<u>Coefficient</u>	<u>Robust std. err.</u>	<u>P> t </u>
Administrative FTE per Adjusted Occupied Bed	3,542.05	690.61	.0001*
Voluntary/non-profit control	-666.37	248.21	.007*
Proprietary control	-145.18	430.64	.736
Teaching status	-236.55	222.65	.288
System affiliation	776.10	308.95	.012*
Urban location	71.45	233.86	.760
Case mix index	1,893.15	336.90	.000*
Distinct part psychiatric unit	-445.91	261.07	.088
Distinct part rehab unit	799.68	400.49	.046*
Constant	-2,750.46	651.39	.000*

* - indicates significant relationship

Administrative FTE per adjusted patient day was significant in this analysis ($p = 0.0001$), adding expense as staffing increased in this labor category. Also significant were variables for system affiliation, ownership/control, case mix index, and operation of a distinct part rehab unit.

Overall, these three regression analyses suggest that that some relationship between the level of administrative staffing in a hospital and its patient service income. Together, these findings represent fodder for further consideration.

Discussion

This study raises interesting perspectives on decisions made to set administrative staffing levels in contemporary hospital management. While the statistical relationship between administrative staffing and patient service income per adjusted patient day was not significant, that makes sense because the study purposely left out external market factors that may have some impact such as market share, payer mix, or market insurer factors. Despite that intended omission, the relationship between administrative staffing appears to have an overall net negative impact on a hospital's profit performance, as noted in the patient service income per adjusted patient day regression.

Staffing, Net Revenue and Operating Expenses

Regressing administrative FTE on net revenue, there is a positive relationship between administrative labor and net revenue. The idea that administrators could have an impact on revenues is borne out in the observed relationship between administrative staffing and net revenue per patient day. This observation makes sense if we consider that administrators are making strategic decisions that expand business opportunities **for a hospital, set prices, competitively, and in a way that exceed operating expenses**, and structure favorable payment relationships with insurance plans. One possible explanation is that the entrepreneurial ability of administrators may improve revenues. However, while the administrative component of staffing includes executive management functions, it also includes labor hours attributable to patient accounting and finance functions. This may be important since those functions also have a positive impact on net revenues by virtue of improved collection for services rendered. Identifying a credible data source that segregates labor hours for those functions, would be a valuable next step in this line of research. As a result, it is not clear from this analysis the extent to which improved net revenue in hospitals comes from better collections versus better administrative decision-making. However, it stands to reason that the greater the net revenue level in a hospital, the greater the overall ability of that hospital to absorb the administrative overhead component.

More telling in the assessment of administrative impact on profitability is the relationship between administrative staffing and operating expenses, where the level of administrative staffing in a hospital increases operating expense per adjusted patient day. *Ceteris paribus*,

adding administrative staff (including executive managers who oversee expense management) increases operating expense rather than controlling it at a lower level. It is not surprising that higher levels of administrative staffing are associated with increases in operating expenses for a hospital, considering that managers and executives are more highly paid than other front-line workers. The higher the proportion of these highly paid individuals, the greater the likelihood that operating expenses will increase overall.

Impact of Hospital Characteristics

In addition, the analysis found a strong relationship between multi-hospital system affiliation and operating expense as evidenced by the positive coefficient for that variable. This observation is a bit perplexing since one would expect the opposite effect based on a review of research from the American Hospital Association [21], suggesting that consolidation should reduce administrative costs. However, other non-labor administrative costs from a central office may be passed down to affiliate hospitals, increasing the expense burden to hospitals in this study. The potential lagged effects of diminished administrative savings from consolidation could not be considered in the one-year timeframe used in this study and merits further exploration in future work.

Interestingly, voluntary nonprofit hospitals appear to have a better grasp on operating expenses than do their proprietary competitors, noting the negative coefficient for that variable. This difference may also be attributable to the pass-through of corporate office expenses or the payment of taxes by proprietary hospitals. Those taxes would be recognized as administrative expenses in the cost report dataset.

This study is the first to examine the relationship between investments in administrative staff and profitability for hospitals. The findings are consistent with others who have examined administrative costs in total, and aligns with the idea that increased administrative expense has a limiting effect on hospital operating margins. The increase in administrative staffing for urban and for-profit facilities in this study aligns with the findings of McKay, et al [9] and Himmelstein et al [10]. The relationship between higher administrative staffing and diminished profitability is consistent with the observed inverse relationship between administrative expense and profitability in the work of Helton and colleagues [11].

Laying the Groundwork for Future Studies

One of the strengths of this study was its focus on administratively controllable factors like organization and investment in additional major lines of business, along with the reaction to managing the resources expended based on the severity of illnesses treated. It has also attempted to view ongoing operational norms in hospitals without the external influence or inclusion of one-time factors usually associated with the sale of a hospital to another party. The financial data used in the study is audited for submission to CMS and therefore has a higher degree of credibility than that from other sources, all the while encompassing a large number of facilities across the United States.

As with all research studies, this study also has limitations. The sampling criteria notably reduced the number of facilities ultimately included either by use of the case mix index variable that eliminated all critical access hospitals from the study sample or not allowing hospitals that had undergone a change in ownership or cost report filing status. Omission of specialty facilities such as surgical hospitals also reduced the sample size. Importantly, the study uses only the latest year of data because of significant financial impacts in the preceding years arising from the COVID-19 pandemic [13].

This research study can be used as a foundation for future research studies. As more years of cost report data become available, studies examining these variables can employ a longitudinal design that can be even more informative to the field. Also, using credible data that segregates administrative labor disciplines, will allow a much finer analysis of administrative impacts that could be obscured by the fact that those disciplines are currently commingled with employees that perform billing and collection work. The strategic impact of administrators remains clouded by virtue of the available data. Addition measures of market characteristics may be helpful to further delineate any potential benefit from administrative entrepreneurship and strategy development.

Conclusion

This is the first study to consider the relationship between the number of administrative labor hours and profitability in a hospital. Overall, the addition of non-revenue producing administrative overhead appears to burden profitability for hospitals already challenged by decreasing revenues and overall operating expense inflation. Hospital governing boards and

corporate owners must be cognizant of the fixed costs that are generated by administrative staff, in view of currently declining payment rates that appear to reduce contribution margins needed to defray overhead costs.

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