Quantifying For-Profit Outcomes in GME: A Multispecialty Analysis of Board Certifying Examination Pass Rates in For-Profit Affiliated Residency Programs

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ABSTRACT

Background The number of for-profit hospitals has increased in the United States, but their role in and outcomes for graduate medical education (GME) are unclear.

Objectives To describe for-profit involvement in internal medicine (IM), general surgery (GS), and pediatrics GME by quantifying change in for-profit affiliated residency programs and comparing for-profit and nonprofit affiliated program board certifying examination pass rates.

Methods We used Accreditation Council for Graduate Medical Education and Medicare data to quantify for-profit prevalence in IM, GS, and pediatrics GME from 2001 to 2021. We used public pass rate data from the American Board of Surgeons (2017-2019; n=242 programs; 6562 examinees), American Board of Internal Medicine (2018-2020; n=465 programs; 23 922 examinees), and American Board of Pediatrics (2018-2020; n=202 programs; 9819 examinees) to model the relationship between profit status and pass rate within each specialty and across specialties combined using linear regression.

Results The proportion of for-profit affiliated residency programs increased 400.0% in IM, 334.4% in GS, and 23.2% in pediatrics from 2001 to 2021. Bivariate linear regression revealed significantly lower pass rate in for-profit affiliated programs in IM (β =-7.73, $P<.001$), pediatrics (β =-14.6, $P<.001$), and the 3 specialties combined (β =-5.45, $P<.001$). Upon multiple regression with addition of program characteristic covariates, this relationship remained significant in pediatrics (β =-10.04, $P=.006$).

Conclusions The proportion of for-profit affiliated residency programs has increased in IM, GS, and pediatrics from 2001 to 2021. After controlling for covariates, for-profit affiliated programs were associated with lower board examination pass rates in pediatrics with no association in IM, GS, or the combined measure.

Introduction

Throughout the past 20 years, for-profit hospitals in the United States have experienced substantial growth, increasing in number by 63.5% from 2001 to 2019.[1] For-profit hospitals now comprise 23.9% of all community hospitals.[2] During this period, the differences between for-profit and nonprofit institutions have been studied extensively. The assumed basis of any difference in clinical outcomes is rooted in the idea that these institutions fundamentally differ in their goals: for-profits are postulated by some to take a business-oriented approach with focus on maximizing profits, while nonprofits prioritize other goals that may more often align with public interests.[3] Therefore, monetary incentives would act as a more powerful motivator at for-profit institutions than at their nonprofit counterparts, which is supported by several studies that have identified key differences in patient outcomes, spending, and services offered by for-profit hospitals.[4-8] Recently, for-profit hospitals are increasingly engaging with graduate medical education (GME) by sponsoring residency programs.[9] Given the potential differences between these institutions and nonprofits, there is a growing need to understand how these differences may impact GME.

When the first for-profit university hospital was created by a merger in 1983, the influx of resources was acknowledged but balanced against the new financial pressures present that could negatively impact resident learning experiences.[10] Since this initial warning, few studies have attempted to assess

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Editor's Note: The online version of this article contains the complete regression results and data for further breakdown of the classification process for the pass rate analysis.

educational quality differences at for-profit affiliated residency programs. The presence of for-profit corporations in GME has expanded considerably since this first article was published. For example, according to a recent press release, HCA Healthcare—the largest for-profit hospital network in the United States—was also the largest GME sponsor in the 2021 Match.[11]

It is important to evaluate the outcomes of the growing number of for-profit affiliated residency programs to ensure these programs are meeting the educational needs of their residents, in addition to their organization's need for profitability. Previous studies have used member board certifying examination pass rates from the American Board of Medical Specialties (ABMS) as a measure to quantify educational outcomes of residency programs and identify predictive program characterstics.[12,13] These studies have indicated factors such as community/academic distinctions and program location are associated with residency board certifying examination pass rates in different fields. However, no study has ever examined if differences in pass rates exist between residency programs affiliated with nonprofit and for-profit hospitals. In fact, almost no literature exists on the recent increasing presence of for-profit hospitals in GME and the possible differences in educational quality at these institutions.

In this article, we quantify the change in proportion of residency programs affiliated with for-profit hospitals over the past 20 years and compare board certifying examination pass rates between for-profit and nonprofit affiliated residency programs in internal medicine (IM), general surgery (GS), and pediatrics. The results of this research will ultimately help us assess the extent and potential educational ramifications of this trend while providing vital information to program directors looking to understand if hospital ownership could be impacting educational outcomes, as well as those in the medical education community who may be concerned about a growing for-profit influence in GME.

Methods

In this study, we chose to describe for-profit affiliated residency programs in IM, GS, and pediatrics. These specialties were selected because they are among the 5 specialties with the largest number of active residents.[14] Family medicine was not included due to high average pass rates which would have likely led to ceiling effects.[15] Emergency medicine, also among the top 5, was not included because the American Board of Emergency Medicine declined to share program level pass rate data.

Objectives
The purpose of this study is to quantify the involvement of for-profit hospitals in internal medicine (IM), general surgery (GS), and pediatrics graduate medical education (GME) and compare board examination pass rates between for-profit and nonprofit affiliated programs.

Findings
For-profit involvement in GME has increased substantially in IM and GS GME during the 2001-2021 period, and for-profit affiliated programs were associated with lower board examination pass rates in pediatrics, with no difference in IM or GS.

Limitations
This study is limited by the inability to control for resident test-taking ability, which means to attribute differences in pass rates to differences in educational quality; there was also a small sample size of for-profit affiliated programs with available pass rate data in GS and pediatrics.

Bottom Line
For-profit involvement in GME may warrant greater attention from the GME community given the rapid expansion of for-profit affiliated programs in some specialties and the potential for differences in educational outcomes between these program types.

Data Collection

We used publicly available data from the Accreditation Council for Graduate Medical Education (ACGME) website to create a list of the names and locations of all IM, GS, and pediatrics ACGME-accredited residency programs as of July 2021.[16] ACGME's newly accredited program records were used to determine the date of accreditation for programs accredited from 2001 to 2021—this period was chosen because 2001 was the earliest year these records can be found on the public database. Programs not accredited during this period were assumed to be accredited prior to 2001. Programs were then classified as university-based, community-based/university-affiliated, military-based, or community-based using the American Medical Association's Fellowship and Residency Electronic Interactive Database Access (AMA FREIDA). Programs were classified as belonging to 1 of the 4 following regions based on the US census divisions: Northeast, Midwest, West, or South.

We operationalized our for-profit affiliated program designation as the main rotation site affiliated with the residency program being classified as a for-profit investor-owned hospital. To determine the designation of the hospital we used the public Centers for Medicare & Medicaid Services (CMS) Healthcare Cost Report Information System records.[17] If the name of the residency program contained a hospital or medical center, we used this hospital in the CMS search. If a specific name specified no or many hospitals, we used Doximity residency navigator to identify the hospital where the largest number of

months are spent over the course of the program and used this hospital in the data search.[18] If the CMS query indicated a proprietary type of control for a hospital, we searched Google to determine the entity that owned the hospital. If our Google search indicated a for-profit corporation owned the hospital, we determined date of acquisition and searched the hospital listings on the website of the indicated corporation to confirm this ownership. Hospitals indicated as nonprofit by CMS were also searched on Google to determine if they had been for-profit at any point during the 2001-2021 period. For the purposes of board examination pass rate analyses, programs that changed affiliations were classified as whichever affiliation they held during the majority of the testing period we analyzed. See the FIGURES in the supplementary data for further breakdown of this classification process for the pass rate analysis.

Using public data, we acquired 2018-2020 American Board of Internal Medicine (ABIM) pass rate data (n=465 programs, 23 922 examines), 2017-2019 American Board of Surgeons (ABS) pass rate data for both the qualifying examination (n=242 programs, 3453 examinees) and certifying examination (n=242 programs, 3109 examinees), and 2018-2020 American Board of Pediatrics (ABP) pass rate data (n=202 programs, 9819 examinees). The ABIM and ABP excluded programs with data from fewer than 10 residents and 5 residents from their respective datasets. The data were acquired from the public websites of ABIM,[19] ABS,[20] and ABP.[21] The ABS gave written permission to use the public pass rate data. The ABIM and ABP do not have disclaimers requiring written permission when using their publicly available data for research purposes.

Data Analysis

Accreditation data and profit status determinations were used to calculate the growth of for-profit affiliated residency programs within each specialty from 2001 to 2021, as well as to identify the number of residency programs each individual corporation is affiliated within each specialty. We used the pass rate data to calculate descriptive pass rate statistics within each specialty. In GS, a certifying examination and qualifying examination are taken; we analyzed each separately. We performed bivariate linear regressions modeling the relationships of the following program factors with pass rate within each specialty, and all 3 specialties combined: profit status of affiliated hospital, number of examinees, accreditation within the last 10 years ($\geq$2011), program type (university-based, community-based/university-affiliated, military-based, or community-based) and program location (Northeast, Midwest, West, or South). These program characteristics were chosen because the data were readily available from public sources and we hypothesized they could reasonably impact board certifying examination pass rates or previous studies had found associations with pass rates.[12,13] Year of accreditation $\geq$2011 was specifically chosen because we hypothesized the growth of for-profit affiliated programs in the past decade could influence pass rates due to these programs being comparatively newer. SPSS Statistics 28 (IBM Corp, Armonk, NY) was used for all statistical testing. Statistical methods were decided upon consultation with the University of Chicago Biostatistics Laboratory. A $P<.05$ was used to determine statistical significance.

This study was determined to be exempt after review from the University of Chicago Institutional Review Board.

Results

The percentage of residency programs affiliated with for-profit institutions as of 2021 was found to be 15.9%, 11.7%, and 3.4% in IM, GS, and pediatrics, respectively. This represents an increase in the proportion of residency programs affiliated with for-profit hospitals of 400.0%, 334.4%, and 23.2%, respectively, since 2001 (TABLE 1). In all specialties, HCA Healthcare was the most prevalent corporate entity affiliated with residency programs, followed by Tenet Healthcare (TABLE 1). The trend in growth of for-profit affiliated residency programs over this period is shown in the FIGURE.

Bivariate regression showed for-profit affiliation is associated with lower board examination pass rates among a combination of IM, GS, and pediatrics residency programs (β =-5.45, $P<.001$). Subgroup analysis showed for-profit affiliation is associated with lower board examination pass rates in IM (β =-7.73, $P<.001$) and pediatrics (β =-14.6, $P<.001$). We were unable to detect an association between for-profit affiliation and board examination pass rate in GS certifying examination (β =4.25, $P=.29$) or GS qualifying examination ($\beta = -3.48$, $P=.06$). Board examination pass rates are shown in TABLE 2.

After controlling for the number of examinees in the 3-year testing period, year of accreditation $\geq$2011, program type, and program location using multiple regression, for-profit affiliation remains associated with lower board pass rate in pediatrics (β =-10.04, $P=.006$). We were unable to detect an association between for-profit affiliation and board pass rates in IM (β =-0.340, $P=.84$), GS certifying examination (β =6.06, $P=.13$), GS qualifying

TABLE 1
Results of For-Profit ACGME 2001-2021 Accreditation Data

Specialty	2001 For-Profit Affiliated	2021 For-Profit Affiliated	Change in For-Profit Affiliated 2001-2021	Corporate Affiliates as of 2021[a]
General surgery	2.7% (6/222)	11.7% (40/341)	334.4%	HCA Healthcare: 50.0% (20/40)
				Tenet Healthcare: 12.5% (5/40)
				Steward Health Care Network: 7.5% (3/40)
				Prime Healthcare Services: 5.0% (2/40)
				Prospect Medical Holdings: 5.0% (2/40)
				Universal Health Services: 5.0% (2/40)
				Other/Physician Owned: 15.0% (6/40)
Internal medicine	3.2% (11/345)	15.9% (93/583)	400.0%	HCA Healthcare: 40.9% (38/93)
				Tenet Healthcare: 10.8% (10/93)
				LifePoint Health: 6.5% (6/93)
				Prime Healthcare Services: 6.5% (6/93)
				Steward Health Care Network: 6.5% (6/93)
				Universal Health Services: 6.5% (6/93)
				Community Health Systems: 5.4% (5/93)
				Prospect Medical Holdings: 3.2% (3/93)
				Ardent Health Services: 2.2% (2/93)
				Pipeline Health: 2.2% (2/93)
				Other/Physician Owned/Owner Not Identified: 9.7% (9/93)
Pediatrics	2.7% (5/184)	3.3% (7/209)	23.2%	HCA Healthcare: 57.1% (4/7)
				Tenet Healthcare: 28.6% (2/7)
				Universal Health Services: 14.3% (1/7)

[a] All corporations affiliated with ≥2 programs were included.
Abbreviation: ACGME, Accreditation Council for Graduate Medical Education.

examination (β =-2.27, P=.25), or the 3 specialties combined (β =-0.625, P=.61). See the TABLE in the supplementary data for complete regression results.

Discussion

Our results indicate that for-profit presence has increased in IM, GS, and pediatrics GME from 2001 to 2021. We found for-profit affiliated residency programs were associated with lower board examination pass rates among the combination of IM, GS, and pediatrics, as well as in IM and pediatrics individually. This relationship remained significant in pediatrics when controlling for other program characteristics that could affect board examination pass rates.

Our study is the first to quantify the growth of for-profit involvement in GME and demonstrate that the proportion of programs affiliated with for-profit hospitals has increased over the past 20 years, with notable growth occurring in the last decade. The specific motives for this recent expansion of for-profit hospitals into GME are unclear; based on the operations of for-profits, these entities must find long-term profitability in this venture. Potential explanations for the profitability of operating GME programs include access to substantial federal and state funding as well as the likely reduced need for positions that demand higher compensation than residents, such as nurse practitioners, physician assistants, or even additional physicians.[22] Although the true extent of the immediate profitability stemming directly from training residents can be controversial,[22] the argument that residents provide intangible benefits that would not appear on a balance sheet also exists.[23] Another potential motive is desire to "train and retain" qualified trainees.[24] Additionally, some have suggested that for-profit institutions increasing residency positions increases physician supply, which leads to downward pressure on salaries that could benefit these for-profit institutions.[25] Interestingly, the high rate of growth found in IM and GS was not seen in pediatrics. The comparatively lower rate of for-profit affiliated

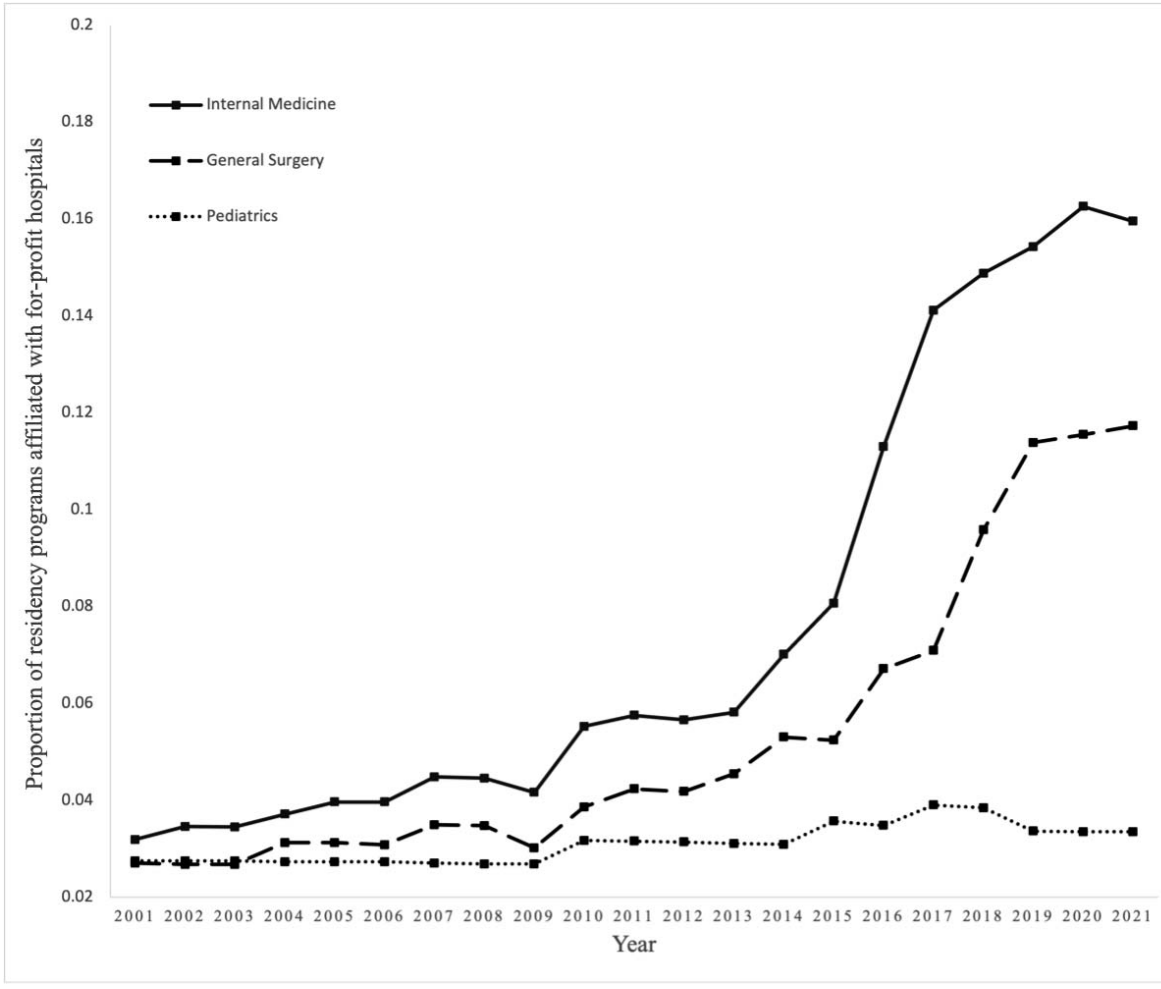

FIGURE
Change in Proportion of For-Profit Affiliated Programs From 2001 to 2021

program growth in pediatrics could be due to the relative difficulty of opening new programs, which requires access to rotation sites with sufficient pediatric volume.

We did not detect an association between profit status and board examination pass rate in either GS examination. While we found a difference in pass rates between for-profit and nonprofit affiliated

TABLE 2
Board Examination Pass Rate

Specialty	Average Pass Rate (Mean±SD), %	Average For-Profit Affiliated Pass Rate (Mean±SD), %	Average Nonprofit Affiliated Pass Rate (Mean±SD), %
General surgery certifying examination	80.90±13.92 (n=242)	84.92±13.56 (n=13)	80.67±13.94 (n=229)
General surgery qualifying examination	96.07±6.50 (n=242)	92.77±10.87 (n=13)	96.25±6.15 (n=229)
Internal medicine	89.58±12.61 (n=464)	82.85±17.27 (n=60)	90.58±11.46 (n=404)
Pediatrics	85.73±12.03 (n=202)	71.78±23.13 (n=9)	86.38±10.93 (n=193)

Note: n = number of residency programs.

programs in IM and the combined measure, the association disappears after controlling for program type, number of examinees, program location, and year of accreditation ≥2011. This suggests no meaningful difference in pass rates exists between for-profit and nonprofit affiliated programs in these specialties and the differences found in the IM and combined bivariate analysis were likely due to confounding factors.

The difference in pass rates between for-profit and nonprofit affiliated pediatrics residency programs persisted after controlling for the aforementioned factors, which could support the idea that educational quality differences exist between them. However, this difference could also be reflective of for-profit affiliated residency programs not attracting the same caliber of standardized examination performers as their nonprofit affiliated counterparts. Thus, we have identified pediatrics as a potential area of focus for more comprehensive studies examining differences in educational outcomes between for-profit and nonprofit affiliated programs.

These results are relevant to program directors who may have questioned if hospital ownership could impact their program outcomes as well as others involved in medical education who may have recognized and questioned the growing trend of for-profit involvement in GME. These results are also applicable to medical students choosing residency programs to apply to and ultimately rank, because passing the board certifying examination is an important educational milestone and students generally want to maximize their chances of passing this examination. Program directors, medical students, and other members of the GME community should be reassured that for-profit affiliated residency programs do not differ in board examination pass rate in IM, GS, or our highest-powered combined model when other program characteristics are controlled for. However, because a difference does exist within pediatrics, profit status of residency programs in this field may warrant closer attention from prospective applicants and program directors looking to implement changes in their programs.

There are several limitations to this study. The profit status of the hospitals was not always clear, and while we created a systematic process for making for-profit designations, it is possible we may not have designated specific programs' profit status appropriately. Specifically, it is possible Doximity residency navigator pages were inaccurate or our internet searches yielded erroneous ownership information. Additionally, while we attempted to account for hospitals changing affiliation during the study period, it is possible some acquisitions could have been overlooked, and this could affect our results. Because many of the for-profit affiliated programs identified in this study are newer and do not yet have pass rate data available, we had a small sample size of for-profit affiliated programs with available pass rate data, specifically in GS and pediatrics. This small sample size along with using data over a 3-year period limits the generalizability of our findings. We also used board certifying examination pass rates as a quantifiable proxy for educational quality, but there are a wide variety of other variables that could explain differences in pass rates at a program level. Because no risk adjustment was included in our analyses, definitive statements about educational differences cannot be made as any differences in pass rates found could be due to differences in resident test-taking abilities between program types.

Despite the limitations of this study, we present here the first in-depth analysis into the growth of for-profit presence in GME, and the first quantitative comparison between nonprofit and for-profit affiliated residency program outcomes. Future studies are necessary to explore why these pass rate differences exist between for-profit and nonprofit affiliated pediatrics residency programs. Studies should also re-examine pass rate differences in the future once these for-profit programs have been accredited for a longer period. Additionally, future studies could utilize other measures to compare these program types, including assessing resident subjective experiences through surveying methods.

Conclusions

We found for-profit affiliated residency prevalence has increased over a 20-year period in IM, GS, and pediatrics. There was no relationship between for-profit status and ABMS member board examination pass rate in IM, GS, or the 3 specialties combined after controlling for other program factors. However, for-profit affiliated pediatrics programs were associated with lower board certifying examination pass rates, suggesting the relationship between profit status and board examination pass rates may vary between specialties.

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