

RESEARCH BRIEF

Hospital-cardiologist integration often occurs without a practice acquisition

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Abstract

Objective: To describe how much of the recent increase in hospital-cardiologist integration has come from acquisitions of physician practices compared to individual employment decisions. While the role of physician practice acquisitions has received considerable attention in the news, integration may also be driven by individual physicians accepting employment at hospital-based practices.

Data Sources: American Medical Association Physician Masterfile and Medicare data.

Study Design: Analysis of changes in hospital-cardiologist integration from 2011 to 2018. We measured increases in integration and changes in the number of independent and hospital-owned practices.

Data Collection/Extraction Methods: Not applicable.

Principal Findings: In 2011, 18% of cardiologists were integrated, rising to 25% in 2016. Of this rise, 48% occurred with no acquisitions. Physicians who had completed residencies in the past 5 years (early career physicians) had higher rates of integration that also increased over time: the percentage of early career physicians joining hospital systems rose from 25% to 32%, indicating rapid growth in the number of physicians who began their careers working in hospital-based sites.

Conclusions: A large and growing portion of hospital-cardiologist integration came from hospital employment at the individual physician level. Future policies focused on preserving competition and affordability may benefit from better understanding this form of consolidation.

KEYWORDS

delivery system organization, hospital workforce, hospital-physician integration, outpatient care delivery, physician employment, physician practice organization, vertical integration

What is known on this topic

- Hospital-physician integration has been increasing rapidly for the past decade.
- Cardiology has experienced some of the largest surges in the integration of any specialty.
- The importance of nonacquisition consolidation—that is, individual cardiologists accepting employment at hospital-owned practices without a merger or acquisition—remains poorly understood.

What this study adds

- Nearly 50% of hospital-cardiologist integration activity in our study occurred without any acquisition.

- Early career cardiologists were especially likely to work for hospital-owned practices, with marked increases in rates of integration among early career physicians from 2011 to 2016.
- Much of the ongoing consolidation between hospitals and physicians involves no mergers or acquisitions. Research in this topic would benefit from both group-level and physician-level analyses.

1 | INTRODUCTION

Hospitals and physicians have become increasingly integrated in recent years.¹⁻³ This trend, in which hospitals employ physicians either directly or indirectly through ownership of physician practices, has gone by several terms, often hospital-physician integration (sometimes hospital-physician vertical integration or hospital employment of physicians). Integration has been especially pronounced in cardiology, in which hospital employment of physicians has steadily risen since 2011.⁴ Understanding this trend is critical to health care affordability since integration has been associated with patients using lower-quality hospitals, anticompetitive changes in outpatient markets, and higher spending⁵⁻⁸; meanwhile, evidence for its effects on quality improvement has been underwhelming.⁹⁻¹⁴

The Biden administration has shown increased interest in promoting competition, including in health care specifically.^{15,16} Industry observers have advised that relevant authorities are poised to consider broader definitions of competitive harm in health care.¹⁷ While the specifics of new approaches are yet to be defined, this underscores the timeliness of a deeper understanding of hospital-physician integration. In this paper, we do not aim to provide a legal analysis of antitrust policy options; instead, we provide data on a consolidation issue that may be useful to experts at the Federal Trade Commission, the Department of Justice, and state antitrust authorities.

This paper decomposes the swell in integration into two types: integration through acquisitions and integration through individual employment decisions. Both result in more consolidated provider markets, but the relative prevalence of these different types is a gap in the literature with important implications. The first type—hospital acquisitions of physician practices—garners considerable attention from the popular press and scholars. On rare occasions, vertical acquisitions of large physician groups by hospitals have been challenged by antitrust agencies.¹⁸ Most practice acquisitions, however, go unchallenged because they are too small.¹⁹ Moreover, not all integration occurs through acquisitions: the second type of integration occurs among physicians who individually leave independent (i.e., nonhospital-owned) practices in favor of hospital-owned practices or among physicians who complete their training and immediately proceed to hospital employment. To our knowledge, no antitrust cases have ever been brought against a hospital employing one doctor. Yet when these numerous individual employment arrangements are taken in aggregate, their effect on the total level of consolidation in a market may be considerable.

For example, a market for cardiology services might become consolidated by a hospital making several high-profile acquisitions of large

cardiology practices, resulting in the hospital supplying most of the cardiology services. Alternatively, a market might become equally consolidated by a hospital serially employing individual cardiologists from those practices. The result—a single dominant firm offering cardiology services—is the same. Market entry (which, if easy, would constrain anticompetitive behavior) may be difficult for cardiologists if new entrants find it difficult to obtain admitting privileges; in the past, market incumbents have sometimes used barriers like this to restrain competition.^{20,21}

No studies to our knowledge have quantified the role of individual-level employment decisions in provider consolidation, which we call nonacquisition consolidation. Our research questions were: how much of the recent increase in hospital-cardiologist integration comes from practice acquisitions compared to nonacquisitions—and how important are early career physicians in this phenomenon? We join two important data sources to describe the important role of non-acquisition consolidation, especially among early career physicians, in reshaping hospital-physician relations.

2 | METHODS

In our main analysis, we used the 2016 American Medical Association's Physician Masterfile (the most recent year available to us under our data use agreement), Medicare Data on Provider Practice and Specialty (MD-PPAS) for 2011 and 2016, and Medicare 20% Part B claims files for 2011 and 2016. Since 2016 was the most recent year for which we had both Masterfile data and Medicare data, our analysis focused on hospital-cardiologist integration up until and including this year. The 2011–2016 timeframe was characterized by the rapid acceleration in hospital-cardiologist integration, so this was an ideal window to study. For completeness and to offer insights as recent as possible, we also used the Medicare 20% Part B claims for 2018 (the most recent claims year available to us) to calculate and report the prevalence of hospital-cardiologist integration, although we do not have Masterfile information for 2018.

The Masterfile contains a record for nearly every physician in the United States (irrespective of membership in the American Medical Association) and indicates the year in which a physician completed training, making it an effective source for measuring the physician labor force.²² With the Masterfile, we observed physicians who completed training in any previous year up to and including 2016, allowing us to evaluate how trends in physician employment have changed across generations of physicians. The MD-PPAS dataset identifies the primary practice of each Medicare-billing physician. We used both

specialty codes (e.g., specialty listed as “Cardiology,” “Cardiac Electrophysiology,” or “Interventional Cardiology”) and procedures (e.g., insertion of coronary stents) to identify clinically active cardiologists (Appendix 1A of Supporting information). Medicare claims indicate the setting (office or hospital outpatient department) in which physicians render services. Appendix 1A of Supporting information provides details, sample sizes, and inclusion criteria.

We defined integration using a claims-based algorithm developed by Neprash and colleagues²³ and used in other peer-reviewed work^{24–26} that makes use of the place of service information submitted on every Medicare claim (Appendix 2 of Supporting information); we supplemented this with a keyword search of the employer name (Appendix 5 of Supporting information). We defined early career physicians as those who completed their training within the last 5 years; established physicians were those who completed training six or more years ago. Five years is an arbitrary cutoff, but it corresponds to the span of our data and helps to provide at least some sense of how integration rates changed across cohorts of physicians (our conclusions were not affected by varying the threshold by a year or two in either direction). We defined the practice as a unique tax identifier number (TIN) from the MD-PPAS datasets (Appendices 1–4 of Supporting information). We calculated how much of the increase in integration between 2011 and 2016 came from individual physicians accepting employment at hospital-owned practices compared to becoming employees through acquisitions (Appendix 1B of Supporting information). We defined acquisitions and nonacquisitions by applying a series of rules to TINs over time. Briefly, an individual physician who left an independent practice for a hospital-owned practice (in the absence of the independent practice becoming hospital-owned) we classified as a nonacquisition. By contrast, physicians who stayed with a practice that became hospital-owned were classified as acquisitions. We constructed our approach to be conservative; if anything, there was more nonacquisition activity than we estimated here (Appendix 1B of Supporting information). We also measured whether there were fewer independent (nonhospital-owned) practices over time (Appendix 4 of Supporting information).

Last, we supplemented the above analysis by ruling out a potential alternative explanation. Our results could be confounded if physicians begin their careers at a hospital (i.e., integrated), then leave to form their own practices; early career physicians would then naturally be disproportionately hospital-employed. We rule this trajectory out in two ways. First, we show that the tendency to work for hospital systems grew sizably over our study window, even among early career cardiologists. Second, for further evidence that the change we observed in integration rates was likely to persist, we examined the career behavior of a previous generation of physicians. We identified cardiologists who completed their training in 2007 and immediately took a job with a hospital (i.e., were integrated in 2008). We then calculated whether, nearly a decade after completing their training, those same physicians were still working for hospitals. This allowed us to assess whether the decision to work for a hospital was persistent over time.

A limitation is that our findings apply only to cardiologists who treated Medicare patients (thereby excluding those, for example, who treated only pediatric patients or commercial patients). However, we

include most practicing US cardiologists, and since cardiovascular conditions are especially common among Medicare patients, our sample is relevant to a core part of the patient population. In addition, while our combination of the Masterfile with Medicare data enables novel insights, we do not have access to other data sources, such as practice surveys, that could help illuminate this topic; we aim here to provide a foundation and invite future researchers to use alternative data sources and methodologies that further expand the knowledge base. Last, vertical integration is not the only form of consolidation that merits scrutiny; although outside our research scope, hospital, insurer, and physician markets have been consolidating for years.²⁷

3 | RESULTS

We identified 21,394 cardiologists who met our inclusion criteria in 2011 (3824 integrated) and 23,089 cardiologists in 2016 (5869 integrated) (Appendix 1 of Supporting information). While we know of no data source that includes a complete universe of cardiologists with the practice ownership information required for our study, previous estimates imply that our sample includes close to 90% of all active adult cardiologists.²⁸ We confirmed an increase in integration: there were 2045 more integrated cardiologists in 2016 relative to 2011 (a 53% increase). The proportion of integrated physicians rose from 2011 to 2016 for both established (from 17% to 24%) and early career (from 25% to 32%) cardiologists (Table 1). In 2011, 18% of all cardiologists were integrated; by 2016, 25%; and by 2018, an estimated 29%, confirming a rapid and sustained increase in integration (Appendix 5 of Supporting information).

Over half (56%) of all integrated cardiologists in 2016 had become integrated between 2011 and 2016, consistent with a surge in integration during this time (Figure 1). These recently integrated physicians totaled 3173. Among these, a small majority had become integrated through an acquisition. However, 48% became integrated without an acquisition. These cardiologists were either established physicians who left independent practices to individually enter hospital employment or physicians who took integrated jobs immediately after their training.

Figure 2 further breaks down these 3173 recently integrated physicians by career stage. The majority of those who had become integrated without an acquisition were early career physicians (about 59%). The majority of those who had become integrated via an acquisition were established physicians (about 91%).

Increases in integration from 2011 to 2016 among early career cardiologists persisted across men, women, country of birth, and country of medical training (Table 1). The exceptions to this trend were women, who were more likely to be integrated in both 2011 and 2016 compared to any other population group.

We examined changes in the numbers of hospital-owned and independent practices (Table 1). We identified 5505 independent practices in 2011. By 2016, this number had declined 15% to 4691. By contrast, hospital-owned practices proliferated from 605 to 734 (a 21% increase).

TABLE 1 Distribution of cardiologist employment and number of practices from 2011 to 2016

	2011	2016
Total counts by integration type		
All	21,394 (100%)	23,089 (100%)
Integrated	3824 (18%)	5869 (25%)
Independent	17,570 (82%)	17,220 (75%)
Total counts by early career and established		
All	21,394 (100%)	23,089 (100%)
Established	18,283 (85%)	19,853 (86%)
Early career	3111 (15%)	3236 (14%)
Among established physicians		
All	18,283 (100%)	19,853 (100%)
Integrated	3031 (17%)	4828 (24%)
Independent	15,252 (83%)	15,025 (76%)
Among early career physicians		
All	3111 (100%)	3236 (100%)
Integrated	793 (25%)	1041 (32%)
Independent	2318 (75%)	2195 (68%)
Percent of US cardiologists integrated, by demographic characteristics		
Women	38%	37%
Men	23%	31%
Foreign-born	24%	31%
US-born	27%	33%
Foreign-trained	26%	33%
US-trained	24%	31%
Number of distinct practices		
Independent	5505	4691
Hospital-owned	605	734

Note: Independent physicians are those working for practices that are not hospital-owned, that is, independent practices. Integrated physicians are those working for hospital-owned practices. In 2011, early career cardiologists were those who had completed their training between 2007 and 2011. In 2016, early career cardiologists were those who had completed their training between 2012 and 2016. Demographic categories are from the Physician Masterfile. The number of practices was calculated as the number of unique TINs for each year and employment setting. An integrated practice was defined as a TIN in which at least 50% of its cardiologists were hospital-integrated (results not sensitive to this threshold; Appendix 4 of Supporting information).

We found that a small majority of the physicians who began their careers as hospital-integrated physicians in 2008 were still integrated in 2016, while just under half had left for private practice. Conversely, 13% of cardiologists who began independent had become integrated by 2016. The net effect was a cohort that became more integrated, not less, over time. While these figures display reasonably high persistence of employment setting (i.e., integrated cardiologists did not leave en masse for independent practice), there was also some fluidity in the market (Appendix 6 of Supporting information).

4 | DISCUSSION

In this study of hospital-cardiologist integration, we found a rapid and sustained increase from 2011 to 2018 in the proportion of cardiologists who worked for hospital-owned practices, consistent with related work.⁴ We add that nearly half of this increase in integration—48%—occurred without an acquisition. We further add that early career physicians played an outsized role, with the proportion working for hospital-owned practices jumping from 25% to 32%. The landscape changed markedly: 15% of independent practices disappeared while the number of hospital-owned practices grew by 21%. Together, these findings suggest that while group practice acquisitions are one important mechanism of market consolidation, provider markets are also at risk of becoming consolidated simply through a series of individual employment arrangements.

Three results strike us as particularly important. First, over a study window of only 6 years, we observed a large shift in the proportion of early career cardiologists that were hospital employees (from 25% of post-fellowship cardiologists in 2011 to 32% in 2016). Extrapolating this trend, by 2030, over 50% of cardiologists completing their fellowships will join hospital-owned practices. Second, physicians joining the workforce in 2016 faced a different landscape: we observed 15% fewer independent groups and 21% more hospital-owned groups. Newly minted physicians exit medical school with over \$200,000 in educational debt,²⁹ which may make it risky or undesirable to secure the financing needed to start their own practices. These factors may help explain their higher rates of hospital employment. Third, our supplemental analyses of a previous cohort of physicians suggested that at least half of physicians who initially join hospital-owned practices are there to stay. A little under half of the integrated physicians did move into independent practices, suggesting some fluidity—but the previous cohort became, overall, more integrated over time.

Our data may be useful to policy makers seeking to understand the ways in which provider markets can become consolidated. Previous researchers found that the vast majority of physician groups grew through piecemeal acquisitions that were too small to raise antitrust flags.¹⁹ We build on this by showing that in nearly half the integration we observed, there was not even an acquisition. Thus, even if antitrust authorities had the resources and desire to litigate every acquisition, great and small, nearly half of all hospital-physician integration would still go unchallenged. As it stands today, antitrust agencies already face strong limits on their ability to scrutinize small acquisitions. States with cost containment models may be concerned with market consolidation; Massachusetts, for example, reviews major mergers and acquisitions.³⁰ Consolidation that accumulates through piecemeal employment may, in certain cases, result in hospital dominance of a market that could approach monopolization of physician services, at least in specialties and geographies where payers have few alternatives. Hospitals as dominant employers may also raise monopsony concerns about wages that fall below competitive levels.³¹ Such markets merit attention.

FIGURE 1 Hospital-integrated cardiologists in 2016. As of 2016, there were 5869 integrated cardiologists; 212 were excluded from this figure because their 2011 integration status could not be determined, for example, foreign-born physicians who moved to the United States between 2011 and 2016. Of all remaining 5657 cardiologists (2484 + 3173), many had integrated recently (56%), corroborating reports of rapid acceleration of hospital-cardiologist integration. Of this recent integration, a large minority—48%—occurred in the absence of any merger or acquisition [Color figure can be viewed at wileyonlinelibrary.com]

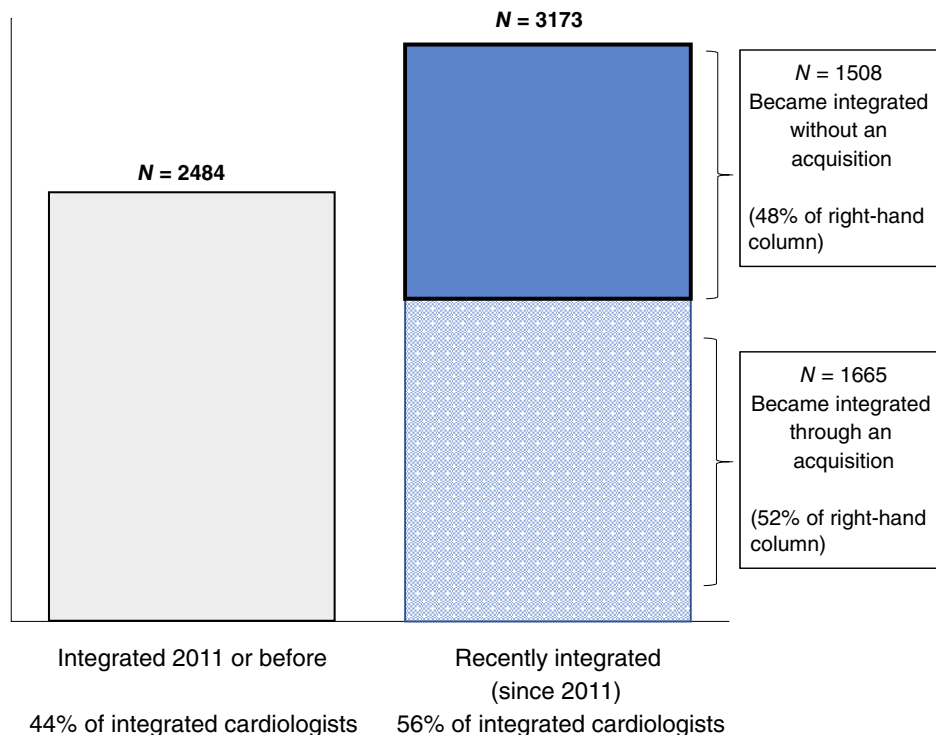
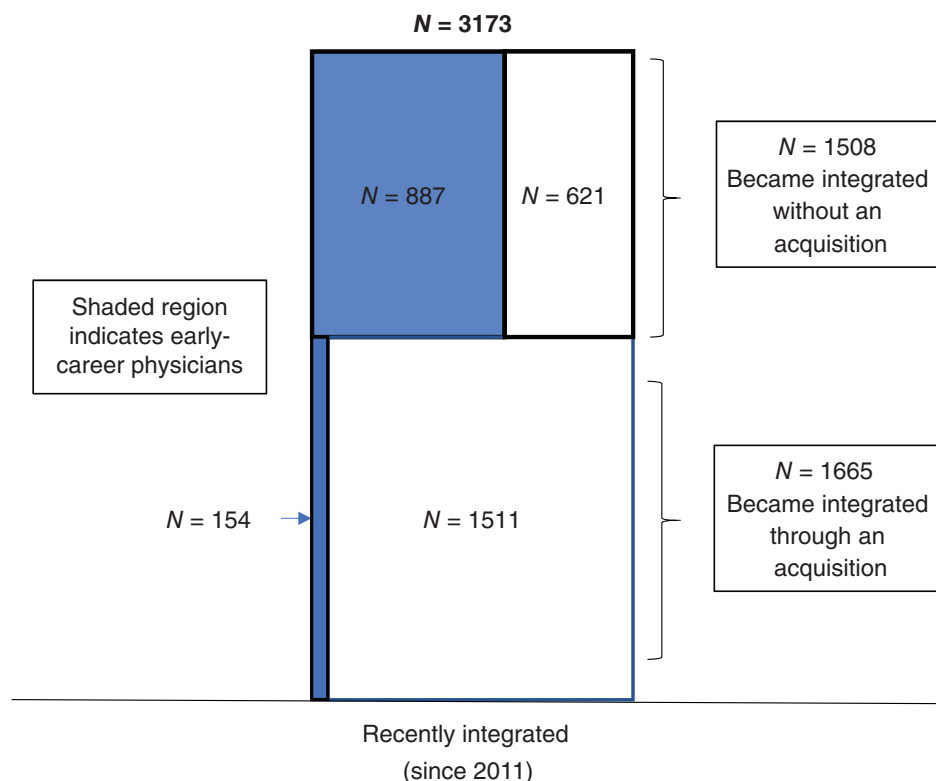


FIGURE 2 Recently integrated cardiologists by career stage. This graph provides further detail of the 3173 cardiologists from the rightmost column in Figure 1, that is, physicians who had recently joined hospital-owned practices. The shaded region indicates early-career physicians (who had completed fellowships within the previous 5 years), while the blank region indicates established physicians (six or more years since completing fellowship). Among physicians who had recently integrated and did so without an acquisition, about 59% (887 of 1508) were early career [Color figure can be viewed at wileyonlinelibrary.com]



In addition, a workforce-based framework could foster creative solutions: one point of intervention for policy makers could be physicians nearing the end of their fellowships, such as workforce incentive programs to join or form independent practices. Such programs may be especially critical right now, as the pandemic has brought many

practices to the brink of closure,³² which may increase the rate of acquisitions and/or make recruitment and retention especially difficult.

Investigators who study hospital-physician vertical integration may note that studying integration from both physician-level and practice-level perspectives will make the knowledge base more

comprehensive. Future research that illuminates these employment dynamics will help policy makers as they seek to support affordability and access in the face of weakening provider market competition.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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