

Indiana's Soaring Hospital Prices and Unaffordable Insurance Premiums: Causes and Potential Solutions

by

James R. Godwin, PhD*
Brent D. Fulton, PhD, MBA
Daniel R. Arnold, PhD
Ola A. Abdelhadi, PhD
Richard M. Scheffler, PhD**

Nicholas C. Petris Center on Health Care Markets and Consumer Welfare
School of Public Health
University of California, Berkeley
<https://petris.org/>

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****Corresponding Author:**

Richard M. Scheffler, PhD
Professor of the Graduate School at the School of Public Health and
the Goldman School of Public Policy
Director, Nicholas C. Petris Center on Health Care Markets and Consumer Welfare
School of Public Health
2121 Berkeley Way, Room 5302
University of California, Berkeley
Berkeley, California 94720-7360
Email: rscheff@berkeley.edu

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Abstract

The residents of Indiana receive healthcare from poorly functioning markets that need immediate attention. Our study of Indiana's healthcare markets builds on the work of others that found hospital prices in Indiana are among the highest in the country. We provide empirical evidence that shows hospital mergers are an important contributor to these high prices, yet hospital mergers in the state have not been challenged in court by federal or state antitrust regulators. Moreover, the higher prices from these mergers lead to higher health insurance premiums paid by employers, causing a reduction in wages. We examined measures of healthcare quality but found no evidence that mergers produced higher quality. At the same time, the major hospital systems have amassed significant financial reserves, far higher than most hospitals in the rest of the country. On the payer side, insurer markets are highly concentrated, including some markets that became significantly more concentrated over the past decade. Collectively, these factors contribute to health insurance premiums being less affordable in Indiana as compared with neighboring states and the country. Based on these findings, we suggest policies that the state legislature and regulators could implement to ameliorate the situation, so that residents of Indiana will have better access to more affordable and higher quality healthcare.

Executive Summary

For American sports fans, the state of Indiana may bring to mind basketball legends like Bobby Knight and Larry Bird, IndyCar racing and the Indianapolis 500, and Notre Dame's legacy of excellence in football. However, in recent years, the state has achieved a more dubious distinction. Research has shown that the prices paid by commercial health insurers for hospital care in Indiana are among the highest in the nation. These high hospital prices were brought to national attention by a series of studies conducted by the RAND Corporation and researchers at Harvard University that compared the prices paid by commercial insurers to those paid by Medicare. Because Medicare payments are set based on factors that affect cost of care, such as local wage levels and whether the hospital provides medical training, they provide an excellent benchmark for the study of commercial prices, which now exceed 300% of those paid by Medicare in Indiana. These high hospital prices lead to higher insurance premiums for employers, employees, and household. Many stakeholders, including the state government, are seeking answers to ensure affordable healthcare in Indiana.

This report conducts analyses to better understand some of the reasons why Indiana faces high hospital prices, and analyzes the state's hospital, physician, and insurer markets. We now turn to an overview of the major findings of the report.

Regional dominance of large health systems results in highly concentrated hospital markets that are associated with the state's high hospital prices and significant health system cash reserves. Although Indiana has six major hospital systems, their hospitals are distributed such that only one or two systems own hospitals in most markets. Eleven of 15 metropolitan statistical areas (MSAs) are highly concentrated per U.S. Department of Justice (DOJ) and Federal Trade Commission's (FTC) *Horizontal Merger Guidelines*. The Herfindahl-Hirschman Index (HHI), a commonly used measure of market concentration, ranged from 4,868 to 10,000 in 2020 across these MSAs, far exceeding the 2,500 HHI threshold for a highly concentrated market. The remaining four MSAs include large cities that likely contain more than one hospital market, and three of the MSAs are located primarily in other states. These highly concentrated markets contribute to Indiana having standardized hospital prices per admission that are more than \$2,000 to \$3,000 higher than those in nearby states (Illinois, Michigan, Ohio, and Wisconsin).

To understand the effects of hospital market concentration in Indiana, we identified 27 hospitals that merged between 2005 and 2015, and our analysis found that hospital mergers led to price increases of 10.6%, with no observed increase in quality. These price increases lead to higher health insurance premiums paid by employers, causing a reduction in market wages, totaling approximately \$1.5 billion per year. Based on our research, none of these mergers was challenged in court by federal or state antitrust authorities.¹ High hospital prices may also be one reason why Indiana's large hospital systems have amassed significant financial reserves. For five of the six major hospital systems, financial measures were generally above the industry median, often exceeding the 75th percentile and sometimes even the 90th percentile, providing evidence that these systems are charging high prices relative to costs.

¹ Federal and state reviews of proposed mergers and acquisitions are often confidential, both their content and existence; hence, the public record mostly includes public court filings.

Indiana’s primary care physician markets have rapidly consolidated over the past decade. Out of the 15 MSAs in Indiana, the number that met the DOJ and FTC’s threshold for having “highly concentrated” primary care physician markets increased from 5 to 11 between 2010 to 2018. The mean MSA-level share of vertically integrated primary care physicians—defined as physicians directly employed by a hospital or health system or working in physician organizations owned by a hospital or health system—increased from 33% to 60% over the same time period. Our analysis of healthcare claims data in Indiana found that this vertical integration was associated with a 2.1% to 5.0% higher price for office-based care. Based on our research, neither federal nor state antitrust authorities challenged acquisitions of physician organizations by hospitals in court.² Furthermore, private equity investments in this space have been increasing. From 2010 to 2017, private equity firms acquired six firms in Indiana that were classified as “clinics/outpatient services,” whereas from 2018 to 2022, private equity firms acquired 41 such firms.

Insurance markets are highly concentrated and health insurance premiums are less affordable as compared with nearby states. In 2010, all 15 of Indiana’s MSAs had highly concentrated insurance markets (HHI > 2,500), and in 2021, all were still highly concentrated. The median change in the HHI in Indiana’s MSAs between 2010 and 2021 was 368 points. In spite of highly concentrated insurance markets and high hospital prices, employer-sponsored premiums in Indiana are similar to the average premium in comparison states (i.e., the other four states in its census division: Illinois, Michigan, Ohio, and Wisconsin) and the United States as a whole. For example, in 2020, premiums for a single-enrollee plan (i.e., a subscriber with no dependents) in Indiana (\$7,319) were only moderately higher than in the comparison states (\$7,075) and the national average (\$7,149). However, when Indiana’s lower wages are considered, health insurance in Indiana is significantly less affordable. In 2020, employer-sponsored insurance premiums for a single-enrollee plan was 14.1% of workers’ average annual pay, while it was only 12.1% on average in the comparison states and 11.2% in the United States. To achieve the same affordability as in the comparison states—12.1% of workers’ average annual pay—premiums in Indiana would need to decrease to \$6,281, a decrease of \$1,038 (or by 14.2%). And to achieve the same affordability as in the whole United States, premiums in Indiana would need to decrease by \$1,517 (or by 20.7%). When we examined employer-sponsored family premium affordability in the same manner, the results were consistent with the single-enrollee premium affordability results.

Conclusion and Policy Recommendations. Concerns over healthcare prices and premiums have become a major political issue in Indiana. In January 2022, the state legislature tasked payers and providers with outlining an actionable plan to contain cost growth, suggesting that the legislature may step in and pursue regulatory solutions to high prices if these stakeholders are unable to control healthcare costs.

The findings in this report inform deliberations over how to address Indiana’s healthcare prices and premiums. Given the effects of market consolidation on prices, health spending, and quality, legislators and key stakeholders should consider the following policy solutions. In order to prevent further anti-competitive market consolidation, policymakers should consider enhancing antitrust enforcement and state merger notification and reviewing authority to

² Federal and state reviews of proposed mergers and acquisitions are often confidential, both their content and existence; hence, the public record mostly includes public court filings.

scrutinize proposed mergers. Because Indiana's healthcare markets are already highly concentrated, policymakers should take steps to mitigate the effects of these less competitive markets. For example, they could restrict the use of anti-competitive contract clauses and encourage the use of site-neutral payments across all payers. Legislators and regulators could create incentives to increase compliance with state and federal price transparency efforts. They could also evaluate the tax-exempt status of nonprofit corporations to determine whether they are operating for the public benefit as compared with the value of their tax exemptions. Finally, stakeholders in Indiana may need to consider establishing a healthcare affordability commission or directly regulating prices if these steps prove insufficient to ensure affordable healthcare in the state. These policy recommendations are intended to help the residents of Indiana have better access to more affordable and higher quality health care.

Section 1: Introduction and Background

The high prices paid to hospitals by commercial payers in Indiana have become a political flashpoint, engaging employers, hospitals, researchers, and policymakers in a contentious debate over healthcare access and affordability in the state (Hubbard and Blase 2022; Russell 2022). The debate was stimulated by a series of studies by the RAND Corporation and researchers at Harvard University showing that hospital care in Indiana is among the highest-priced in the nation (Whaley et al. 2020; White 2017; White and Whaley 2019; Whaley et al. 2022). These studies are important because they benchmark commercial prices against Medicare payments that are adjusted for hospital-level factors and regional economic conditions, allowing the researchers to control for these when comparing state price levels. The first RAND study focused on hospitals in Indiana, finding that hospitals belonging to large health systems in the state earned higher prices and steeper price increases over time than other hospitals, and that prices for a given service varied widely in the state (White 2017). Subsequent RAND studies added price data from other states, finding that Indiana is the sixth highest-priced state in the country for hospital care, relative to Medicare prices (Whaley et al. 2020; White and Whaley 2019). These findings were echoed in a 2020 study led by Michael Chernew at Harvard, which found that Indiana's commercial hospital prices were the third highest in the country relative to Medicare using a different claims data set (Chernew, Hicks, and Shah 2020). Additional studies have found that Indiana's high prices are associated with high profit margins, aggressive collection practices, elevated costs, and low efficiency, and a lack of competitive healthcare markets in Indiana (Seibold 2019; Corlette, Keith, and Hoppe 2019).

This study builds upon this prior work by leveraging new data sources to identify factors associated with high hospital prices and by extending the scope to include office-based physician prices and insurance premiums. The report is organized as follows. The next three sections analyze hospital, physician, and insurance markets, respectively, followed by a concluding section that offers policy recommendations to address uncompetitive healthcare markets in Indiana to improve healthcare affordability and quality.

Section 2: Hospital Markets

A series of recent studies have shown prices paid by commercial insurers to hospitals in Indiana as among the highest in the nation (Whaley et al. 2020; White and Whaley 2019; White 2017; Whaley et al. 2022; Chernew, Hicks, and Shah 2020), and these prices have become the focus of legislative efforts to curb healthcare costs in the state. Approximately one-third of every dollar spent on healthcare in the US goes to hospitals (Hartman et al. 2022), and high prices per admission contribute to total spending (Anderson, Hussey, and Petrosyan 2019). This section presents evidence on price trends and the key factors underlying Indiana's high hospital prices by analyzing the association between those high prices and Indiana's concentrated markets and dominant health systems.

This section begins by characterizing hospital market structure and concentration in Indiana. These descriptive analyses demonstrate the dominant cross-state and regional presence of Indiana's health systems and track their growth over time. While mergers and acquisitions activity in Indiana hospital markets has slowed in recent years, our analysis shows that these systems' acquisitions between 2005 and 2015 were associated with higher hospital prices, despite not finding evidence for quality improvements. Finally, an analysis of financial information from these systems shows that high prices have likely contributed to significant cash reserves.

Major Hospital Systems

Previous research has documented the presence of major hospital systems in Indiana (Corlette, Keith, and Hoppe 2019). For our analysis of hospital systems and hospitals, we rely on the 2019 American Hospital Association Annual Survey Database, which surveys all hospitals and imputes data for nonrespondents. Hospitals were restricted to community hospitals, which AHA defines as nonfederal, short-term general and specialty hospitals (e.g., children's, surgical, acute long-term care, and rehabilitation) with facilities and services available to the public.

That 2019 AHA survey reported that Indiana had 129 community hospitals, with 66 (or 51%) of these hospitals belong to one of six major systems operating in the state: Ascension (16 hospitals), Indiana University Health (14 hospitals), Franciscan Health (11 hospitals), Community Health Systems (11 hospitals), Community Health Network (6 hospitals), and Parkview Health (8 hospitals) (Table 2.1).

Next, we discuss each system in turn, describing their locations in Indiana and growth over time. This description of each health system is followed by maps showing the locations of each system's hospitals across the state and in the Indianapolis-Carmel-Anderson MSA (Figures 2.1, 2.2 and 2.3), followed by a flowchart showing major acquisitions of these systems since 2000 (Figure 2.4), and ending with a table showing the resulting hospital market concentration by MSA (Table 2.2).

Table 2.1: Attributes of Major Hospital Systems in Indiana, 2019

System Name	Headquarters	Number of Hospitals in Indiana	Number of Beds in Indiana
Indiana University Health	Indianapolis, IN	14	2,653
Franciscan Health	Mishawaka, IN	11	2,099
Ascension	St. Louis, MO	16	2,048
Community Health Systems	Franklin, TN	11	1,502
Community Health Network	Indianapolis, IN	6	1,071
Parkview Health	Fort Wayne, IN	8	972
Total		66	10,345

Notes: Hospitals were restricted to community hospitals, which AHA defines as nonfederal, short-term general and specialty hospitals (e.g., children's, surgical, acute long-term care and rehabilitation) with facilities and services available to the public. The hospital counts are based on the main AHA Database file and do not incorporate the "units" file (see limitations). Health systems are ordered according to the number of hospital beds in Indiana.

Source: Petris Center analysis of 2019 AHA Annual Survey Database

Indiana University Health (IU Health) operates 14 hospitals in Indiana and is the largest health system in the state by total beds (2,653). IU Health's hospitals are located centrally in Bloomington and the Indianapolis-Carmel-Anderson MSAs. IU Health was created in 1997 when three Indianapolis hospitals—Methodist Hospital, Riley Hospital for Children, and Indiana University Hospital (teaching hospital)—merged to form Clarian Health Partners (Zaltsberg 2019). The name was later changed to Indiana University Health in 2011 as part of a name recognition marketing campaign (Zaltsberg 2019). IU Health expanded into the Indianapolis suburbs with two hospital acquisitions that same year, IU Health North hospital (170-bed, full-service hospital) and IU Health West hospital (123-bed, full-service hospital) (IU Health, 2021a, 2021b). However, due to a change in strategy to pursue outpatient care expansion and the growth of the system's health insurance arm, IU Health sold three hospitals in 2015—two of which were bought by Community Health Systems, a national health system with 11 hospitals in Indiana (Evans 2015).

Franciscan Health is the second largest health system in Indiana with 2,099 beds across 11 hospitals in the state, primarily in Indianapolis and MSAs to the north and west such as Lafayette and Michigan City. Franciscan Health is a regional Catholic health system based in Indiana (Franciscan Health 2022). Most of Franciscan's facilities are located in Indiana, and the system's growth has primarily come through building facilities rather than mergers and acquisitions. However, Franciscan Health acquired Jasper County Hospital in 2015.

Ascension is the third largest hospital system in the state by beds (2,048), but is the largest by number of facilities with its 16 hospitals. These hospitals are spread around the state, including clusters in large urban MSAs such as Indianapolis-Carmel-Anderson, as well as many rural areas. Though Ascension, like Franciscan Health, is a nonprofit Catholic system, it is a

national system that expanded into Indiana in the late 1990s, acquiring St. Vincent's as a regional hospital system. Ascension made a number of acquisitions between 1998 and 2003, but growth in Indiana has since slowed, with only one additional acquisition occurring in 2010: a 25-bed acute care facility in Salem that was formerly owned by the county.

Community Health Systems is the fourth largest health system in the state by number of hospital beds (1,502) and owns 11 hospitals in Indiana. Community Health Systems is a national for-profit system that specializes in rural hospitals; its hospitals in Indiana are located primarily in the northern part of the state, which includes Fort Wayne and suburban counties included in the Chicago-Naperville-Elgin MSA. The system bought two acute care facilities operating under the name Porter Health in 2007 and acquired two additional rural hospitals, IU Health La Porte Hospital and IU Health Starke Hospital, from Indiana University Health in 2016.

Community Health Network is the second smallest of the major systems with 1,071 beds and 6 hospitals. Community Health Network is a regional system, with hospitals primarily located in the Indianapolis-Carmel-Anderson and Kokomo MSAs. Community Health Network has not been involved with recent mergers or acquisitions.

Parkview Health is the smallest of the six major systems with 972 beds across eight hospitals located in northeastern Indiana, including one of the largest hospitals in the state, Parkview Regional Medical Center in Fort Wayne, and several smaller facilities in rural areas surrounding Fort Wayne. Parkview Health acquired Wabash County hospitals (50 beds, previously two independent community hospitals) and DeKalb Hospital (56-bed, independent acute care community hospital) in 2015 and 2019, respectively.

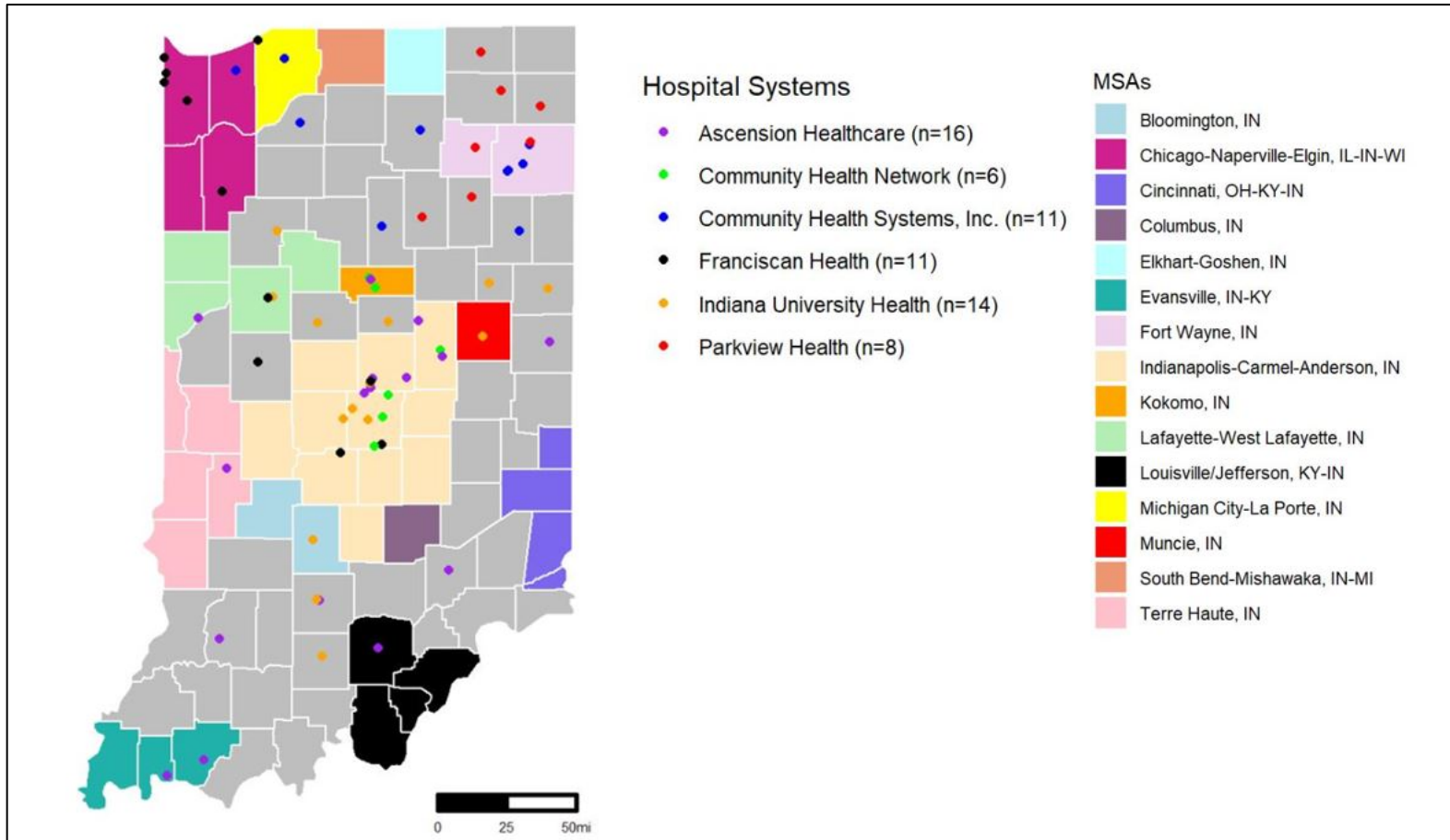
To show the locations of hospitals from the six major hospital systems, Figure 2.1 plots each system's hospitals by MSA and their surrounding counties, and Figure 2.2 adds the locations of hospitals that are not part of these six systems. Figure 2.1 shows that while these systems are distributed across Indiana, most are concentrated in one or a few MSAs and their surrounding counties, such as Parkview Health in the Fort Wayne MSA, Community Health Network in the Indianapolis-Carmel-Anderson MSA, Franciscan Health in the Chicago-Naperville-Elgin and Indianapolis-Carmel-Anderson MSAs, and Community Health Systems in the Fort Wayne, Chicago-Naperville-Elgin, and Michigan City-La Porte MSAs. In contrast, Indiana University Health spans from its base in the Indianapolis-Carmel-Anderson MSA throughout the central part of the state, and Ascension Healthcare spans across the state. Figure 2.2 is similar to Figure 2.1, but also includes Indiana's 63 community hospitals that are not part of the six major systems, with the size of each hospital's location marker scaled to the number of admissions in 2019.

The AHA Annual Survey Database has a few limitations that are important for this context. While the database is often used for studies on hospital systems, markets, and mergers (Furukawa et al. 2020; Cooper et al. 2019a; Fulton 2017), it has been known to lag or not capture some hospital mergers (Cooper et al. 2019b; Madison 2004). Therefore, for the six major hospital systems in Indiana, we compared the hospital counts reported on the hospital systems' websites (as of June 2022) to the AHA Database's 2019 counts, and found the systems' websites generally reported more hospitals. One primary reason is that the AHA

Database contains a “units” file, whereby a unit is a separately identified site of care that is a part of a larger (or parent) hospital that is in the main file.³

³ Some units are in separate locations from the parent hospital, whereas other units might be located within the parent hospital (e.g., a specialty unit on a floor of the parent hospital). Regardless, the parent hospital incorporates the unit’s measures into its survey responses (e.g., number of beds, number of inpatient admissions), but this only occurs at an aggregate level such that the unit’s information is not separately reported. The AHA does not include “units” as separate hospitals in its reporting (American Hospital Association 2021), and it was beyond the scope of this study to determine which units were standalone hospitals. However, if “units” were treated as separate standalone hospitals, then the differences between the counts on the hospital systems’ websites and the counts in the AHA Database become much smaller, except for Parkview Health because the AHA Database did not include five of its specialty hospitals. Another reason for the differences is that the website may include non-community hospitals, while we restricted our sample to community hospitals. Lastly, hospitals that have been built or expanded upon since 2019 are not included in the AHA Database, such as the Franciscan Health Orthopedic Hospital Carmel that opened in April 2022 (Stuteville 2022).

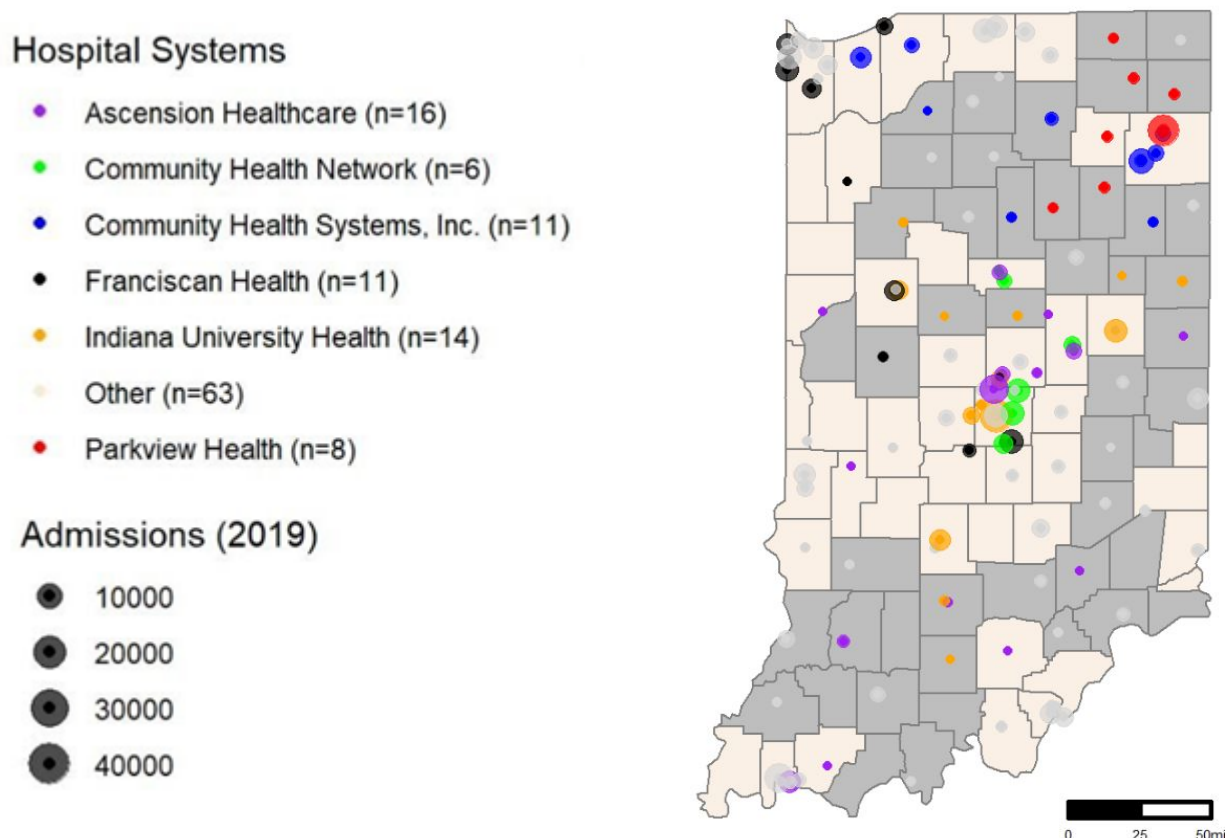
Figure 2.1: Hospital Locations for Major Hospital Systems by Metropolitan Statistical Area, 2019



Notes: Each hospital system is denoted by the color in the legend (e.g., Ascension Healthcare is indicated by purple points). Each point on the map represents a community hospital from one of the six major systems.

Source: Petris Center analysis of the 2019 AHA Annual Survey Database

Figure 2.2: Hospital Locations for Major Hospital Systems and Other Hospitals, 2019



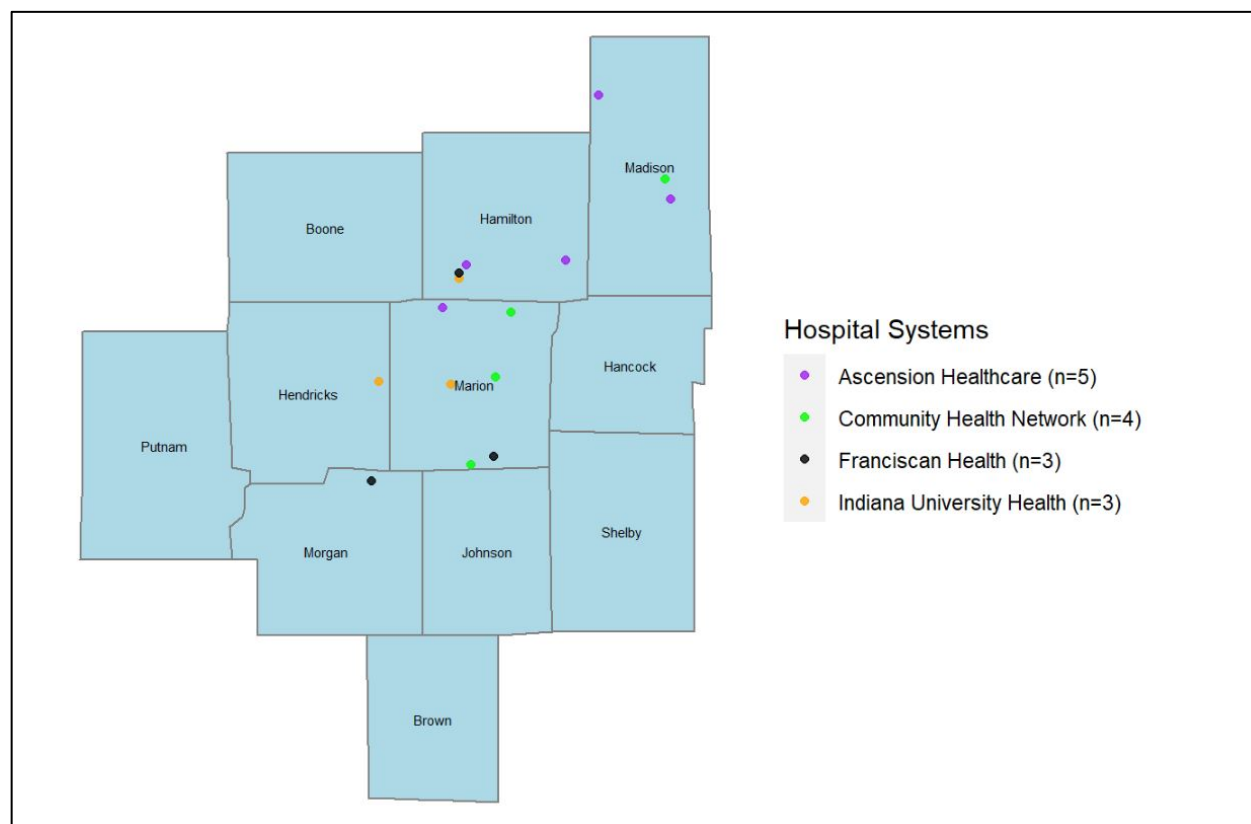
Notes: Points correspond to hospital locations of major health systems in Indiana. Colors of points correspond to the health system of the hospital. Light gray points represent hospitals that are not part of the six major systems operating in Indiana. The size of each dot is scaled based on the number of admissions to a hospital in 2019. Tan counties represent MSAs while gray counties are non-MSAs.

Source: Petris Center analysis of the 2019 AHA Annual Survey Database

Figure 2.3 shows the locations of hospitals from major health systems located in the Indianapolis-Carmel-Anderson MSA. Four of Indiana's six major hospital systems (Ascension, Community Health Network, Franciscan Health, and IU Health) have facilities in this MSA, which is the largest in the state. A study on state health insurance regulations found that each major hospital system had historically enjoyed "mini-monopolies" within their respective areas of the city of Indianapolis, with Indiana University Health dominant in the central and western part of the city, Ascension St. Vincent dominant in the northern part, Community Health Network dominant in the southern part, and Franciscan Health dominant in the southeast part (Corlette, Keith, and Hoppe 2019). After the repeal of certificate of need (CON) laws in 1995, these health systems built a number of new facilities that somewhat blurred these mini-monopolies, but they are still somewhat apparent in Figure 2.3. The four major health systems have also expanded

by acquiring physician groups, freestanding emergency departments, and facilities providing imaging services in the suburbs (Employer's Forum of Indiana 2021).

Figure 2.3: Hospital Locations in Indianapolis-Carmel-Anderson MSA by Hospital System, 2019



Notes: Each hospital system is denoted by the color in the legend (e.g., Ascension Healthcare is purple). Each point on the map represents a community hospital from one of the four major systems. Four of the six major hospital systems in Indiana have hospitals in the Indianapolis-Carmel-Anderson MSA.

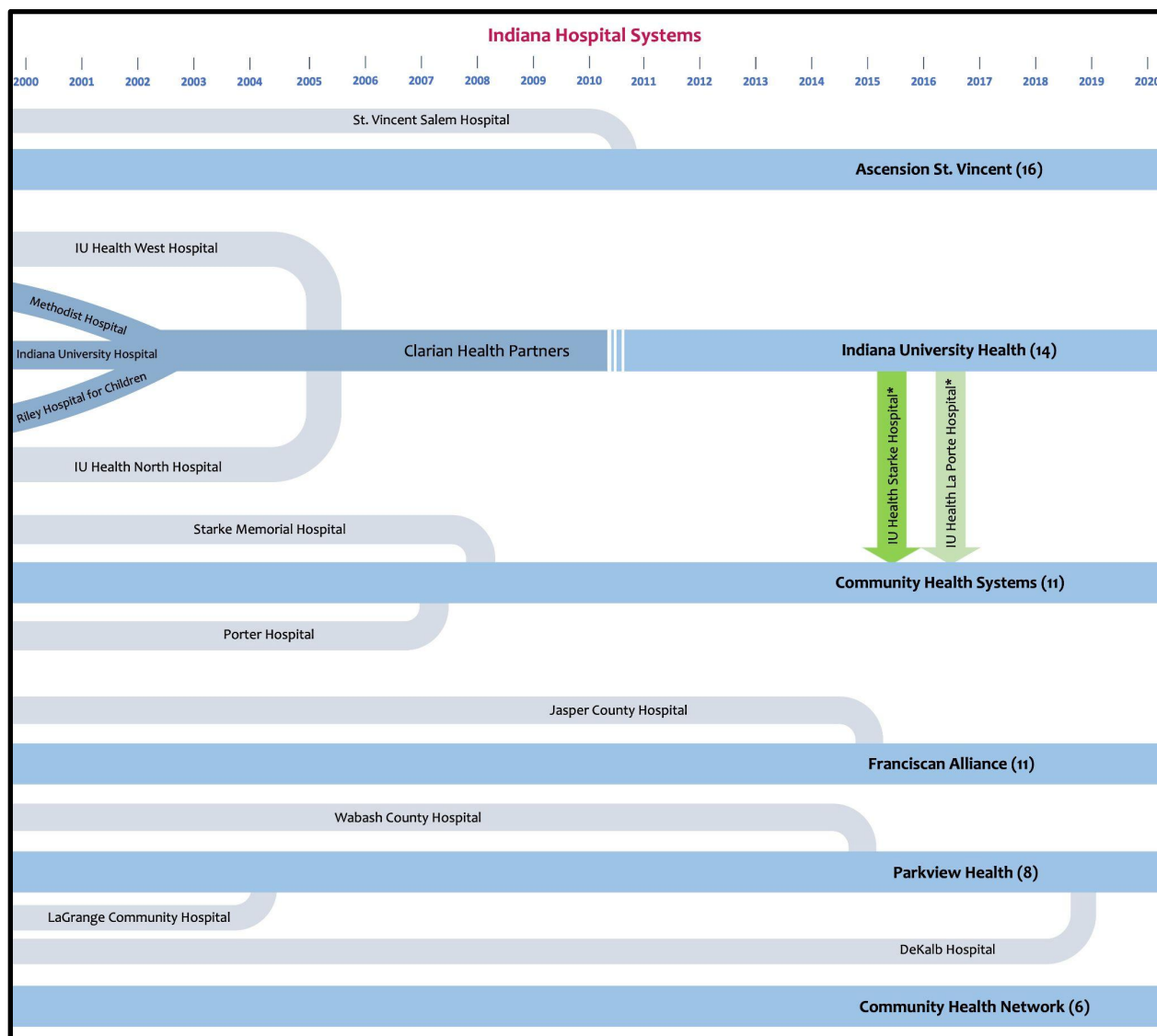
Source: Petris Center analysis of the 2019 AHA Annual Survey Database

In the last decade, however, merger and acquisition activity has been limited for the six major hospital systems, which is consistent with the relatively limited change in hospital market concentration over this period. Indiana's hospital markets were highly concentrated in 2010, and major health systems in the state have remained relatively constant in size over the past decade. Figure 2.4 tracks mergers and acquisitions involving the six systems. Each blue horizontal line represents a hospital system in the state and the number of hospitals owned by the system is shown in parentheses. Each gray bar represents a hospital that was acquired by the system. The gray bars join the hospital systems at the time of the acquisition. The mergers and acquisition data were gathered from Irving Levin Associates Healthcare M&A Database, health system websites, and the Employer's Forum of Indiana (Employer's Forum of Indiana 2021).⁴

Despite slowing mergers and acquisitions activity by Indiana's large hospital systems in recent years, descriptive analysis of these systems and their locations indicates that they may have strong positions in Indiana's regional healthcare markets (see maps above). Hospitals in these systems are distributed such that they face relatively few competitors from other systems within MSAs. The following section supplements this analysis of Indiana's hospital systems by describing the aggregate structure of Indiana's hospital markets and trends in market structure over time.

⁴ Irving Levin Healthcare M&A Database was the primary source for the identification of health system acquisitions. Hospital system websites and Employers Forum of Indiana (2021) were secondary sources. Some mergers and acquisitions may not have been included due to smaller size or lack of coverage. News coverage on mergers and acquisitions in the state, although limited, supports our current findings.

Figure 2.4: Mergers & Acquisitions Involving Indiana's Major Hospital Systems, 2000-2019



*Bought by Community Health Systems from Indiana University Health

Notes: Numbers next to hospital system names refers to the number of hospitals owned by the system based on Petris Center analysis of the 2019 AHA Annual Survey Database.

Source: Petris Center analysis of Irving Levin Associates Healthcare M&A Database, health system websites, and Employer's Forum of Indiana (Employer's Forum of Indiana 2021)

Hospital Market Structure Trends

One consequence of the growth of Indiana's dominant health systems is highly concentrated hospital markets. We analyzed Indiana's hospital market structure using the Herfindahl-Hirschman Index (HHI), a common measure of market concentration used in the Department of Justice and Federal Trade Commission's *Horizontal Merger Guidelines* to determine the level of scrutiny proposed mergers should face (U.S. Department of Justice and Federal Trade Commission 2010). Each market's HHI is calculated by summing the square of each firm's market share, resulting in a number just above 0 to 10,000, the latter being a pure monopoly. The *Horizontal Merger Guidelines* use the following HHI thresholds to categorize market concentration:

- <1,500: Unconcentrated
- 1,500-2,500: Moderately concentrated
- > 2,500: Highly concentrated

For our analysis, market shares were based on a hospital's number of inpatient admissions as reported in the AHA Annual Survey Database. The market share of hospitals within the same system and same MSA were summed and treated as a single entity.

In 2019, the HHI in 11 of the 12 MSAs primarily located in Indiana was above the highly concentrated threshold (HHI>2,500) (Table 2.2). Only the Indianapolis-Carmel-Anderson MSA had an HHI below 2,500, at 1,918, which is still considered moderately concentrated. Large MSAs such as Indianapolis-Carmel-Anderson—which includes 11 counties—likely contain more than one market, resulting in the HHI to be understated. Previous work has characterized this MSA as being subdivided by large health systems into smaller areas with less competition (Corlette, Keith, and Hoppe 2019).

Between 2009 and 2019, the Evansville, IN-KY, MSA experienced the largest increase in HHI (1,709), mostly as a result of Deaconess Health System acquiring Methodist Hospital in Henderson, KY.⁵ According to the *Horizontal Merger Guidelines*, a merger that increases HHI by more than 200 points that results in a highly concentrated market (HHI > 2,500) is “presumed to be likely to enhance market power” (U.S. Department of Justice and Federal Trade Commission 2010). Despite the large increase in the HHI as a result of the merger, Deaconess' acquisition of Methodist was not challenged in court by the Federal Trade Commission or state antitrust regulators in Indiana or Kentucky.⁶ Aside from Deaconess-Methodist, to our knowledge, there were no hospital mergers in Indiana between 2009 and 2019 that potentially warranted scrutiny based on the HHI level and HHI increase as a result of the merger. Although the combination of the increase in the HHI and the resulting market concentration is a key criterion that antitrust regulators use to determine whether a merger warrants concern and scrutiny, they use many nuanced criteria to evaluate markets and do not apply these thresholds strictly (Shapiro 2010). Moreover, the regulators may have not used the MSA to define the market. Lastly, most of the

⁵ This merger was captured in the fiscal year 2019 AHA Annual Survey Database despite the merger closing on July 1, 2020 according to a press release from Deaconess: <https://www.deaconess.com/News-Room/News/Methodist-Health-to-Join-Deaconess-Health-System>

⁶ Federal and state reviews of proposed mergers and acquisitions are often confidential, both their content and existence; hence, the public record mostly includes public court filings.

hospital merger activity in Indiana occurred prior to 2009 (Figure 2.4), but based on our research, none of these mergers was challenged in court by federal or state antitrust authorities either.⁷

Terre Haute was the other MSA that experienced a large increase in HHI between 2009 and 2019, whereby its HHI increased by 753. This increase was mostly because the largest hospital in the MSA by market share increased its market share via internal growth, not from a merger or acquisition.

Table 2.2: Hospital Market HHI by MSA, 2009 and 2019

MSA	HHI (2009)	HHI (2019)	Change in the HHI
Bloomington, IN	8118	8532	414
Columbus, IN	10000	10000	0
Elkhart-Goshen, IN	5681	5480	-201
Evansville, IN-KY	4097	5805	1709
Fort Wayne, IN	5105	5071	-34
Indianapolis-Carmel-Anderson, IN	1809	1918	109
Kokomo, IN	5006	5006	0
Lafayette-West Lafayette, IN	5453	5033	-420
Michigan City-La Porte, IN	5035	5146	111
Muncie, IN	10000	10000	0
South Bend-Mishawaka, IN-MI	4897	4868	-29
Terre Haute, IN	4349	5102	753
Chicago-Naperville-Elgin, IL-IN-WI	424	724	300
Cincinnati, OH-KY-IN	1506	1586	80
Louisville/Jefferson County, KY-IN	2448	2724	276
Median	5006	5071	80

Notes: HHI = Herfindahl-Hirschman Index. The HHIs were calculated using each health system or hospital's market share of total MSA admissions. MSAs located primarily in other states are shaded gray. The "Median" row shows the median for each column, including the change in the HHI. The change in the HHI was calculated using more precision than the displayed values, so the apparent difference may be different than the calculated difference.

HHI categories:

HHI < 1,500: Unconcentrated

1,500 ≤ HHI ≤ 2,500: Moderately concentrated

HHI > 2,500: Highly concentrated

Source: Petris Center analysis of AHA Annual Survey Database

⁷ Federal and state reviews of proposed mergers and acquisitions are often confidential, both their content and existence; hence, the public record mostly includes public court filings.

More concentrated hospital markets as the result of mergers and acquisitions are associated with higher prices, despite no consistent evidence of improved quality (Gaynor 2021; Beaulieu et al. 2020; Cooper et al., 2019a; Gaynor, Ho, and Town 2015; Gaynor & Town 2012; Dafny 2009). The next two subsections compare hospital prices and quality in Indiana to nearby states, followed by a subsection that estimates the impact of hospital mergers in Indiana on hospital prices, hospital quality, and wages.

Hospital Prices in Indiana Compared with Nearby States

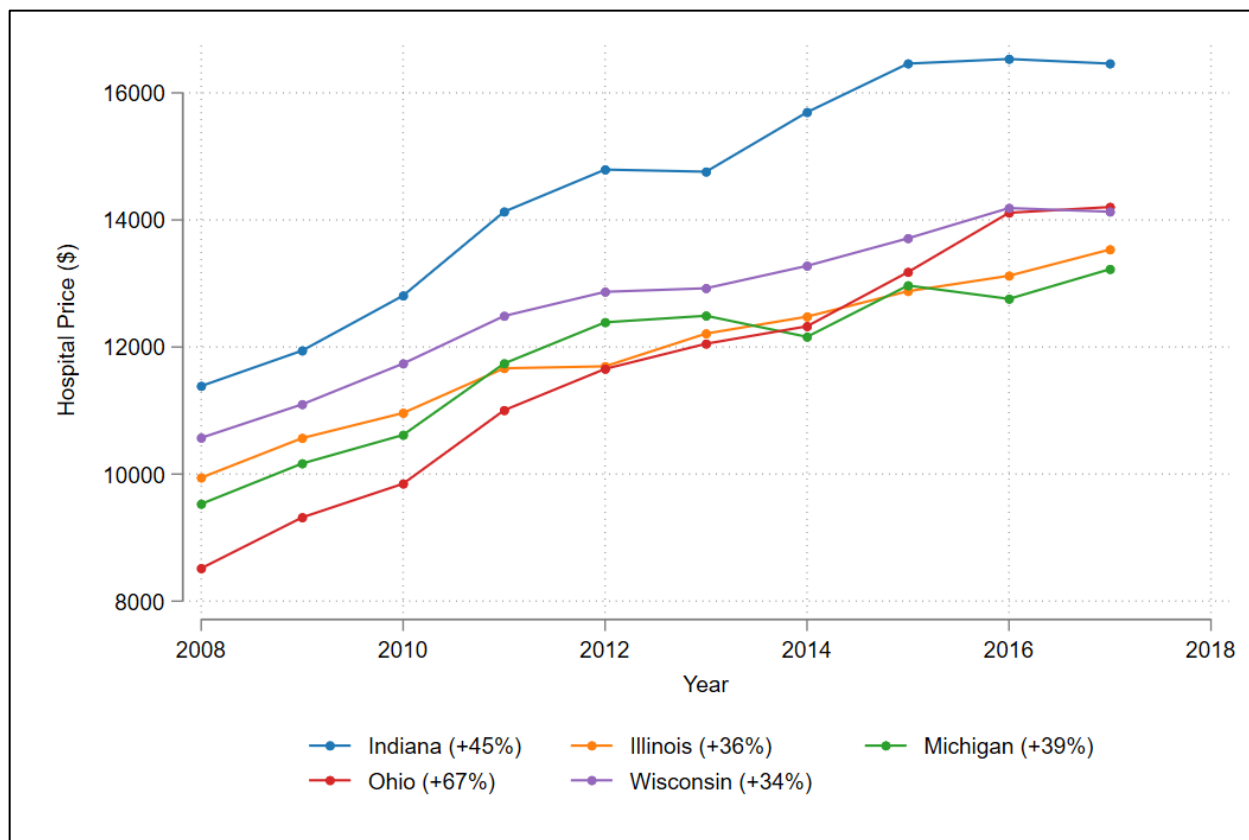
The economics literature suggests that high levels of concentration in Indiana's hospital markets may contribute to the state's high hospital prices, which are three times greater than what Medicare pays on average per previous research (Gaynor 2020; Whaley et al. 2022). Hospital expenditures constitute roughly one-third of total national health expenditures (Hartman et al., 2022), and high hospital prices contribute to Indiana's overall health spending. High levels of hospital market concentration have significant and negative implications for access to care and affordability of care.

Our analysis in this section documents hospital price growth in Indiana between 2008 and 2017 and compares it to the growth in neighboring states—Illinois, Michigan, Ohio, and Wisconsin—that, with Indiana, constitute the East North Central US Census Division. We used healthcare claims data from the Health Care Cost Institute (HCCI)'s 1.0 claims database to calculate MSA-level hospital prices from 2008 to 2017. The HCCI data pools medical claims data from three large US health insurers—Aetna, Humana, and UnitedHealthcare—that includes an average of 42 million individuals under age 65 per year with employer-sponsored insurance from every metropolitan statistical area in Indiana.

We calculated prices for a standardized hospital admission for each MSA-year following the method used in Arnold and Whaley (2020). The standardized price equals the total amount paid for inpatient services in an MSA divided by the number of standardized admissions in the MSA. The amount paid is the amount paid by the health insurers plus the out-of-pocket amount paid by patients, including deductibles, copayments, and coinsurance. A standardized admission is an admission of average intensity with a relative weight equal to 1, but admissions that deviate from the average intensity receive a relative weight that reflects their intensity. We used MS-DRG relative weights, which assign relative weights based on the clinical characteristics of the inpatient stay and the expected resource requirements. For example, a kidney transplant is more complicated and requires more clinical resources than an uncomplicated childbirth. In 2017, a kidney transplant had a relative weight of 3.3—in other words, accounting for 3.3 standardized admissions—compared with an uncomplicated childbirth, which had a relative weight of 0.6.

Figure 2.5 reports state-level prices from weighting MSA-level prices by the number of standardized admissions in each state's MSAs. Indiana is clearly an outlier in terms of hospital prices compared with its neighboring states. The hospital price in Indiana was \$11,385 in 2008 and grew to \$16,461 by 2017—a 45% increase over the period, the second highest rate of growth among the five states, despite starting the period with the highest prices. In 2017, the hospital price in Indiana was \$2,258 (or 16%) above the price in Ohio and \$3,236 (or 24%) above the price in Michigan (the states with the second highest prices and the lowest prices, respectively).

Figure 2.5: Standardized Hospital Prices in Indiana and Comparison States, 2008-2017

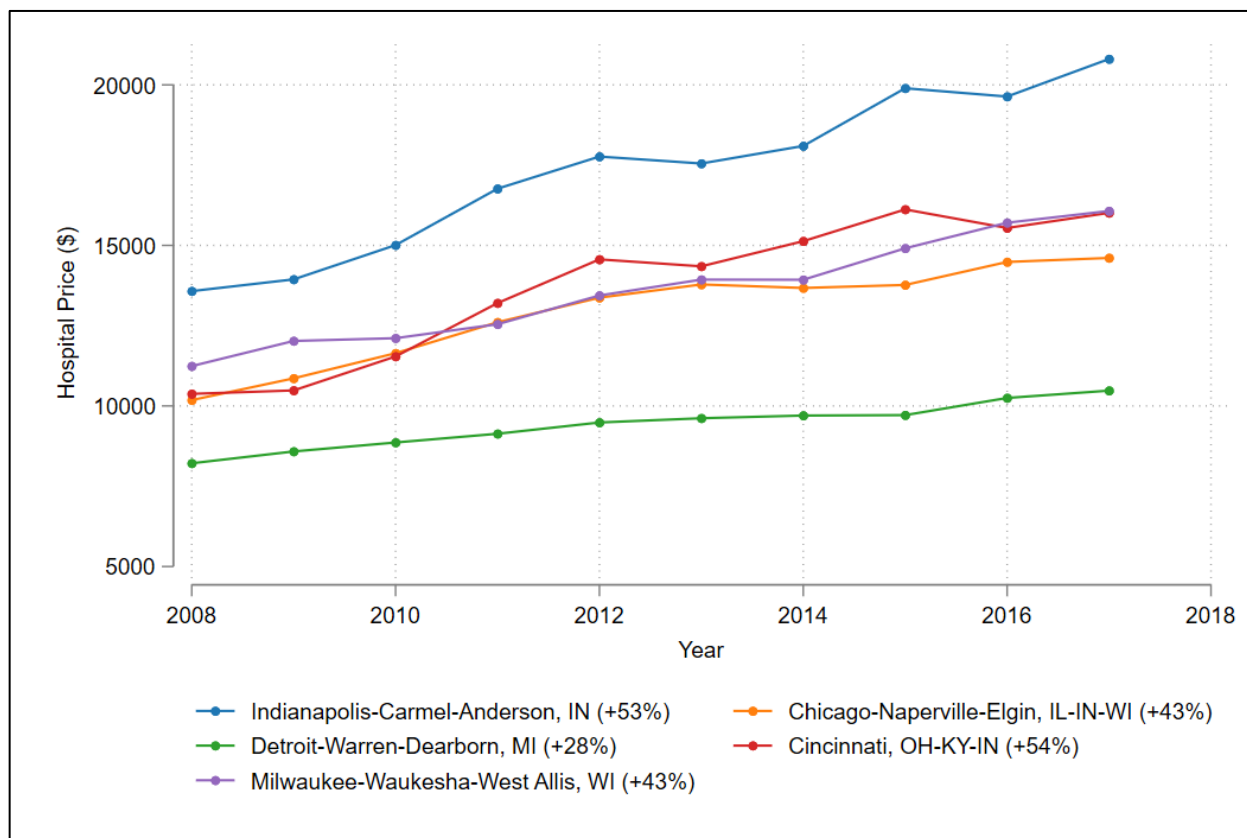


Notes: State-level prices were calculated by weighting MSA-level prices by the number of standardized admissions in each state's MSAs. Prices are reported in current-year dollars. The percentages in the legend indicate the price growth in each state from 2008-2017.

Source: Petris Center analysis of the 2008 to 2017 Health Care Cost Institute (HCCI)'s 1.0 healthcare claims data

To provide another comparison of hospital prices among these states, Figure 2.6 shows the standardized hospital prices from 2008 to 2017 for the most populous MSA in each state (Indiana, Illinois, Michigan, Ohio, and Wisconsin). The standardized hospital price in Indiana's most populous MSA (Indianapolis-Carmel-Anderson, IN) was an outlier in 2008 and continued to be an outlier through 2017. In 2008, the hospital price was \$2,334 (or 21%) above the price in Wisconsin's most populous MSA (Milwaukee-Waukesha-West Allis, WI)—the MSA with the second highest prices in 2008. In 2017, the average hospital price in the Indianapolis-Carmel-Anderson MSA was \$4,732 (or 29%) above that in the Milwaukee-Waukesha-West Allis MSA—the MSA with the second highest prices in 2017. In the Indianapolis-Carmel-Anderson MSA, hospital price growth from 2008 to 2017 was the second fastest (+53% increase) among the five MSAs, despite starting the period with the highest hospital prices.

Figure 2.6: Standardized Hospital Prices in the Most Populous MSAs in Indiana and Comparison States, 2008-2017



Notes: Prices are reported in current-year dollars. The percentages in the legend indicate the price growth in each MSA from 2008-2017.

Source: Petris Center analysis of the Health Care Cost Institute (HCCI)'s 1.0 healthcare commercial claims data

One limitation of HCCI is that it does not include claims from Anthem Blue Cross Blue Shield of Indiana, which is the largest commercial payer in the state.⁸ Previous research found that Anthem's large market share allows it to negotiate larger discounts than other insurers (Corlette, Keith, and Hoppe 2019), meaning our estimates of hospital prices in Indiana may be higher than they would be if Anthem claims were included. However, our results were generally consistent with another study that found Indiana had some of the highest inpatient prices relative to Medicare in the country (Whaley et al. 2020).

⁸ In June 2022, Anthem changed its corporate name to Elevance Health.

Hospital Quality in Indiana Compared with Nearby States

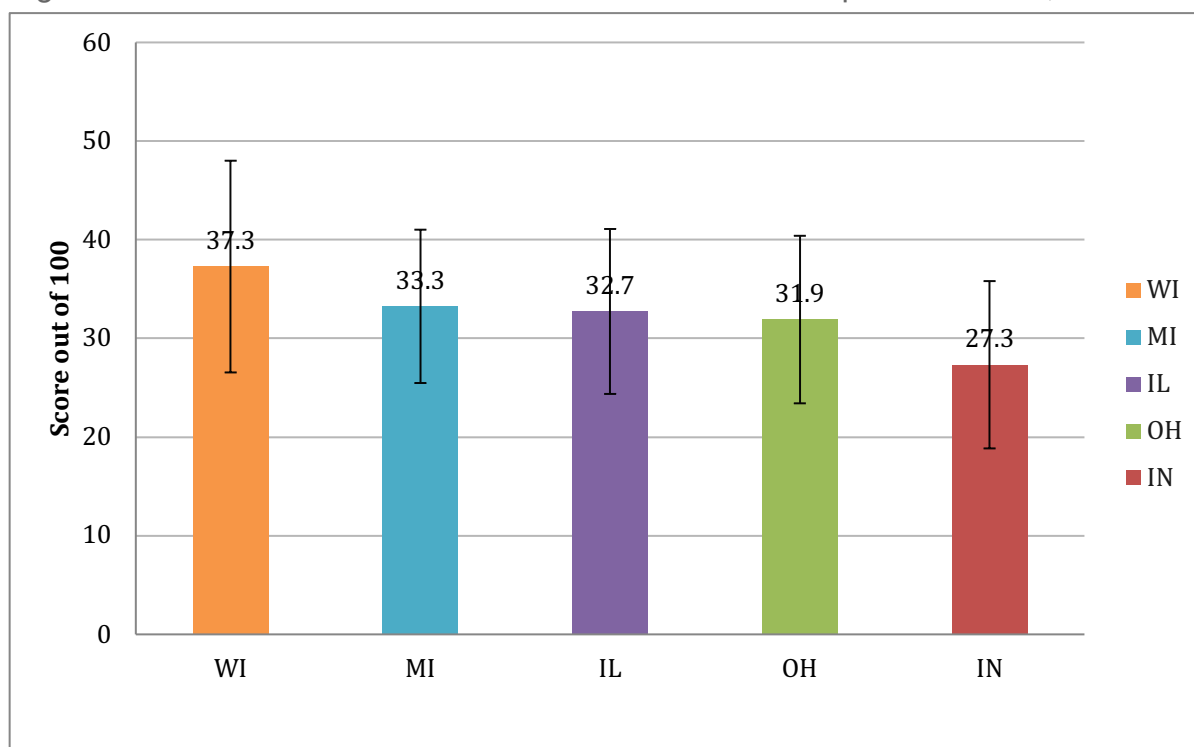
Next, we turn to analyzing hospital quality using several measures from the Centers for Medicare & Medicaid Services' Hospital Compare datasets (Centers for Medicare & Medicaid Services, 2022a). These hospital-level data are collected to help consumers compare the quality of care among Medicare-certified hospitals and to enable CMS to make quality-adjusted payments to hospitals. These data have also been used in academic research studies (e.g., Beaulieu et al. 2020). For hospitals in Indiana and in the other states in Indiana's census division (Illinois, Michigan, Ohio and Wisconsin), we analyzed the total performance score, healthcare-associated infections, and patient experience measures. Despite the high hospital prices presented in the section above, Indiana's performance on these hospital quality measures is not better than the performance in comparison states.

Total Performance Score

The total performance score is one of the measures used by the CMS to pay hospitals based on the quality of care. We used the hospital value-based purchasing (HVPB) program files from Hospital Compare to extract data of hospital total performance in Indiana and the four comparison states. The total performance score was calculated using the following four equally weighted factors at 25% each: clinical care, patient- and caregiver-centered experience of care/care coordination, safety, and efficiency and cost reduction. The mean score for each state was calculated by averaging the scores across hospitals in each state, weighted by the number of inpatient discharges by hospital. Implementing value-based performance has been found to be an effective way to measure and improve the quality of healthcare among hospitals (Harrison et al. 2017).

Figure 2.7 shows the mean total performance scores for hospitals in Indiana compared with hospitals in nearby states. Although Indiana had the lowest mean score among these states, the differences were not statistically significant at the 0.05 level.

Figure 2.7: Total Performance Scores for Indiana and Comparison States, 2021



Notes: Total performance scores include the following components: clinical care (25%), patient- and caregiver-centered experience of care/care coordination (25%), safety (25%), and efficiency and cost reduction (25%). At the state level, total performance scores are the mean score across hospitals located in within each state, weighted by the number of inpatient discharges by hospital. The number of hospitals in each state was as follows: Wisconsin (34), Michigan (78), Illinois (97), Ohio (105) and Indiana (67). The error bars represent 95% confidence intervals of the mean total performance score among hospitals in each state.

Source: Petris center analysis of CMS Hospital Compare Hospital Value-Based Purchasing (HVBP) program data

Healthcare-Associated Infections

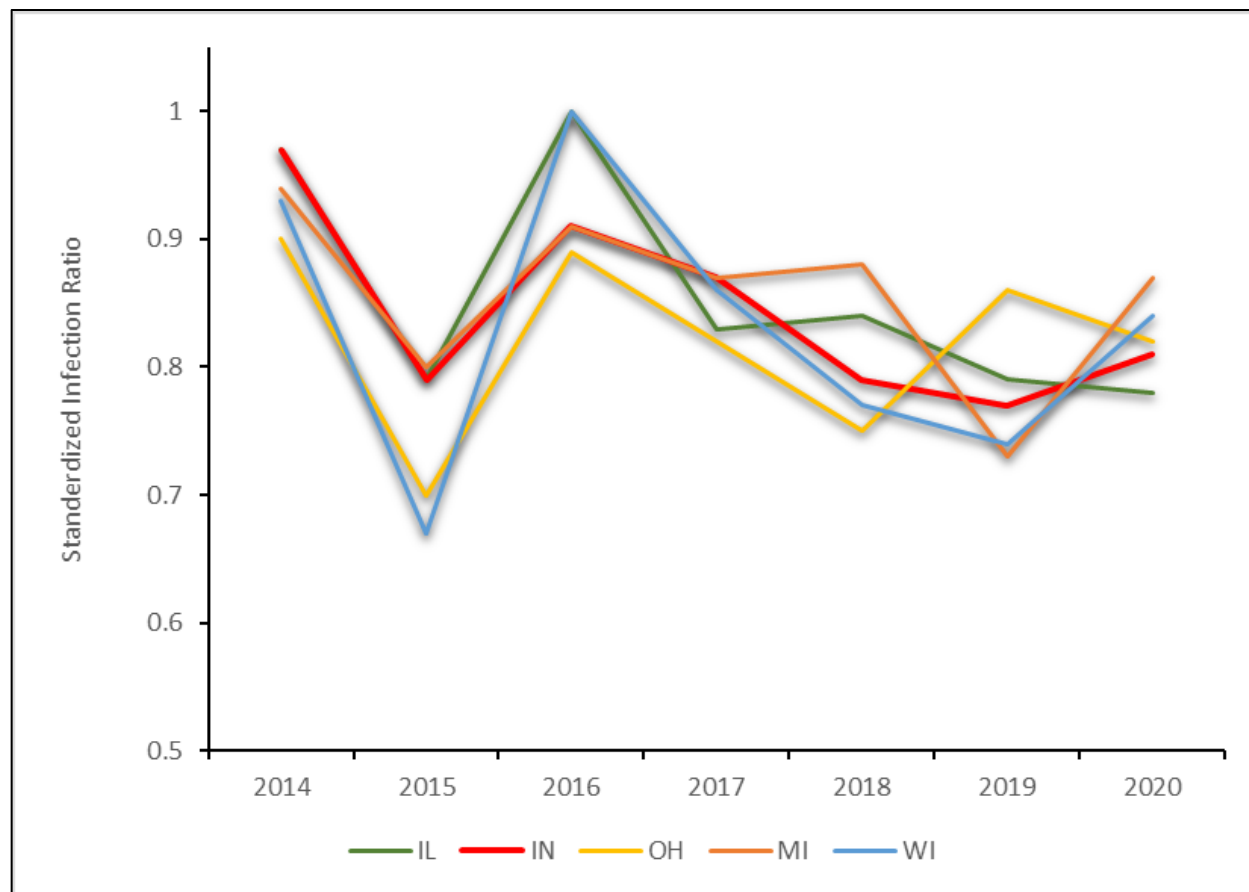
Measuring and controlling healthcare-associated infections is a cornerstone for improving the quality in healthcare systems. Patients seek healthcare services to improve health outcomes, but they sometimes acquire infections while being treated for another health problem. Healthcare-associated infections put patients' safety at risk and increase healthcare spending, which is why preventing these infections is a top priority for the Centers for Disease Control and Prevention (CDC). The CDC has developed programs such as the Prevention Epicenters program and the Safety and Healthcare Epidemiology Prevention Research and Development (SHEPherd) program to understand, measure, and prevent healthcare-associated infections.

Healthcare-associated infections are measured using a standardized infection ratio (SIR). The SIR is calculated as the observed number of infections divided by the predicted number of infections, which is based on a patient risk-adjustment model. An SIR below 1 means there were fewer observed infections than predicted, and an SIR above 1 means there were more observed infections than predicted.

To compare SIRs between Indiana and nearby states, we used the state-level healthcare-associated infection files from Hospital Compare. In Figure 2.8, we report the mean

of the six included SIR measures of hospitals in Indiana and nearby states from 2014 to 2020. (The six SIR measures are shown in Figure 2.9, and we refer to the mean of these measures as the overall SIR.) Figure 2.8 shows that Indiana's overall SIR was similar to other states during this period. Among all the states, including Indiana, the overall SIR decreased during this time period. However, the overall SIR increased in Indiana, Michigan and Wisconsin between 2019 and 2020, likely because of the impact of COVID-19 (Weiner-Lastinger et al. 2022).

Figure 2.8: Healthcare-Associated Infections in Indiana and Comparison States, 2014-2020

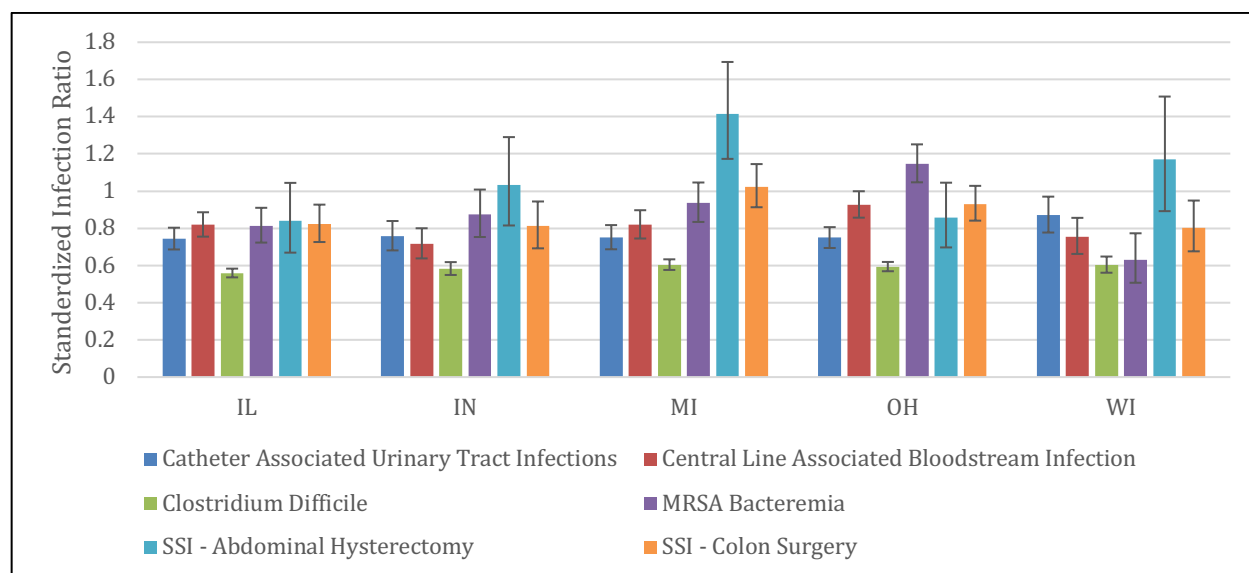


Notes: The standardized infection ratio (SIR) in this figure is the mean of the six SIR measures included in the state-level healthcare-associated infection files from Hospital Compare (see Figure 2.9). SIR for a particular measure is calculated as the observed number of infections divided by the predicted number of infections. An SIR that is less than 1 means the healthcare-associated infection rate was better than predicted, and an SIR greater than 1 means the healthcare-associated infection rate was worse than predicted.

Source: Petris Center analysis of CMS Hospital Compare's Healthcare-associated Infection files from 2014-2020

The six SIRs used to create Figure 2.8 were catheter-associated urinary tract infections, central line associated bloodstream infection, clostridium difficile, methicillin-resistant Staphylococcus aureus (MRSA) bacteremia, and surgical site infection (SSI) for abdominal hysterectomy, and SSI for colon surgery (Figure 2.9). In general, the SIRs in Indiana for these particular health-care associated infections were similar to the SIRs in nearby states.

Figure 2.9: Healthcare-Associated Infections in Indiana and Comparison States, 2021



MRSA: methicillin-resistant Staphylococcus aureus. SSI: surgical site infection.

Notes: Standardized infection ratio (SIR) is calculated as the observed number of infections divided by the predicted number of infections. An SIR that is less than 1 means the healthcare-associated infection rate was better than predicted, and an SIR greater than 1 means the healthcare-associated infection rate was worse than predicted. The error bars are the 95% confidence intervals for the estimated standardized infection ratio.

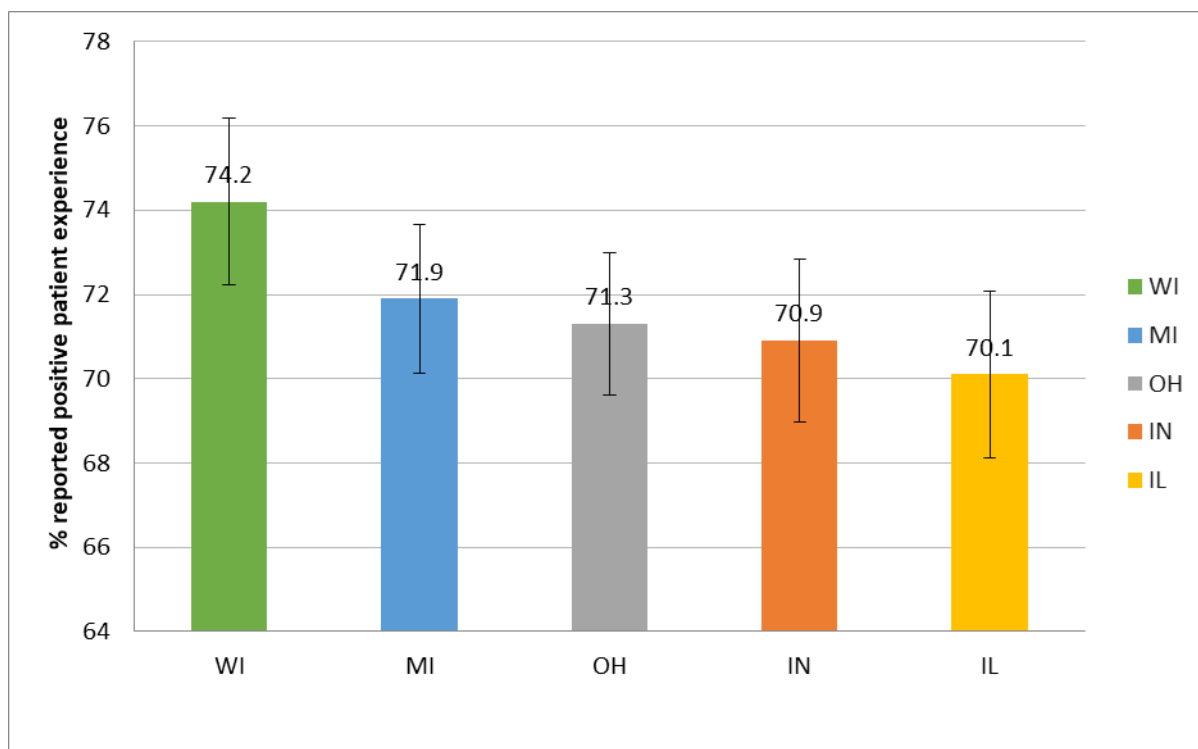
Source: Petris Center analysis of CMS Hospital Compare's Healthcare-associated Infection files in 2021

Patient Experience

A patient's experience of care is another essential healthcare quality measure because it provides valuable information about the patient's access to appropriate care that satisfies their needs and respects their values (Anhang Price et al. 2014). To examine patient experience, we used the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) patient survey from Hospital Compare. This survey contains 19 substantive items that measure patients' perceptions of their hospital experience, such as communication and responsiveness of hospital staff, instructions about medicines, discharge information, cleanliness and quietness of the hospital environment, and transition of care instructions. Each measure is based on potential responses from patients, such as "yes" or "no" regarding whether they are given information about managing their recovery at home, or "always," "usually," and "sometimes/never" regarding whether clinicians explained the medicines prior to giving them. For an example measure of doctor communication and potential responses, see Figure A2.1 in the appendix.

We used the state-level HCAHPS data, and for each measure in the data, we calculated the percentage of the responses that were in the best category (which we called “positive”) and averaged these percentages for each state. We performed a Chi-Square test to test whether the state-level percentages were statistically different, which was possible because HCAHPS provides counts on the number of patients that responded to the survey in each state. Figure 2.10 shows the percentages of patients who reported, on average across the measures, a positive hospital experience in Indiana compared with nearby states, but the differences between Indiana and the other states were not statistically significant at the 0.05 level.

Figure 2.10: Share of Patients that Reported a Positive Patient Experience in Indiana and Comparison States, 2020-2021

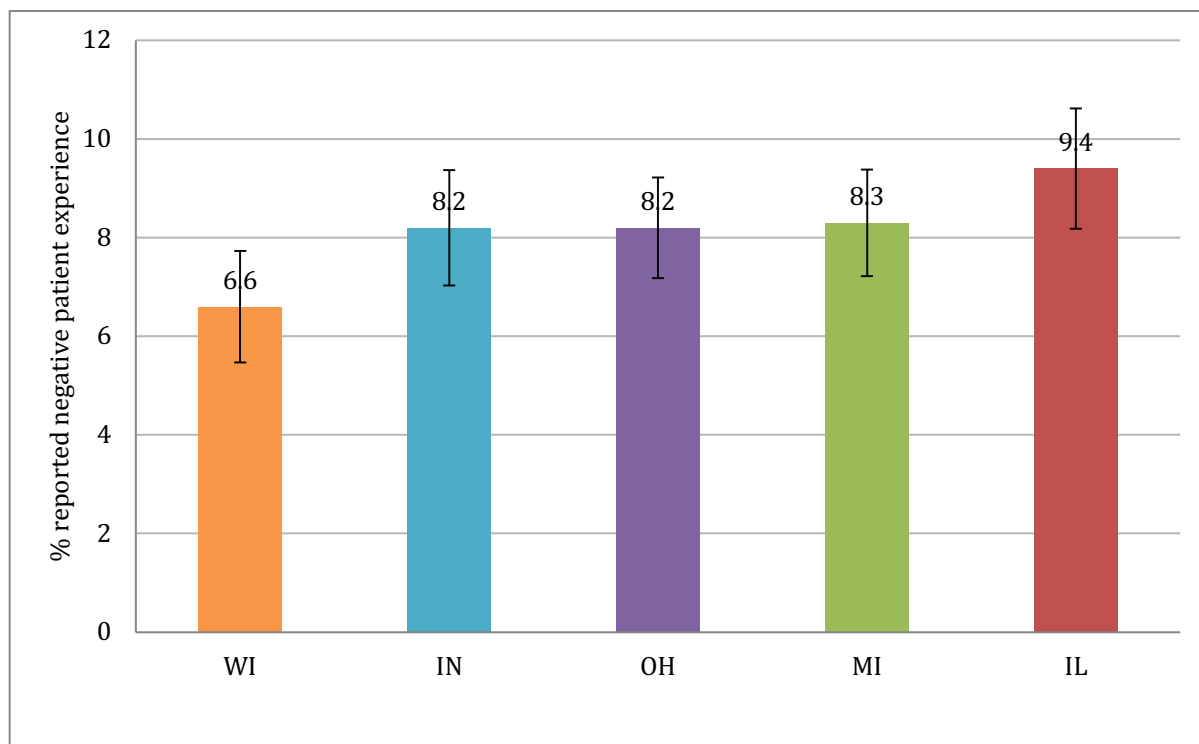


Notes: The percentage of patients who reported a positive experience was based on all HCAHPS measures of patient experience.

Source: Petris Center analysis of CMS Hospital Compare’s Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) files for the period July 1, 2020 to March 31, 2021

For each measure in the data, we also calculated the percentage of the responses that were in the worst category (which we called “negative”) and averaged these percentages for each state. Figure 2.11 shows the percentages of patients who reported, on average across all measures, a negative hospital experience in Indiana compared with nearby states, but the differences between Indiana and the other states were not statistically significant at the 0.05 level.

Figure 2.11: Share of Patients that Reported a Negative Patient Experience in Indiana and Comparison States, 2020-2021



Notes: The percentage of patients who reported a negative experience was based on all HCAHPS measures of patient experience.

Source: Petris Center analysis of CMS Hospital Compare's Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) files for the period July 1, 2020 to March 31, 2021

Impact of Hospital Mergers on Price, Quality, and Wages

In this section, we analyzed the impact of hospital mergers and acquisitions (M&A) on hospital prices, hospital quality, and income from wages of non-healthcare workers. For the hospital prices and hospital quality outcome measures, we estimated a separate regression model that compared the change in the outcome measure before and after the merger to the change in outcome measure of hospitals that did not merge during the study period.⁹ The hospitals that merged—both the acquirer and the target—are called the “treatment group,”¹⁰ and the hospitals that did not merge are called the “control group” (also referred to as the comparison group). This empirical approach is known as a difference-in-differences research design, which is powerful because it controls for time-invariant outcome differences between the treatment and comparison groups. It also controls for secular outcome trends that affect both groups.

The difference-in-differences regression model is shown in Equation 1, in which i indexes hospitals and t indexes years. In the equation, Y is the outcome variable; $M\&A$ is a binary variable that indicates whether a hospital was part of one or more merger and acquisition transactions during the study period;¹¹ $post$ is a binary variable that indicates whether the year is after the transaction occurred (including the year of the transaction); I is a vector of hospital fixed effects to control for time-invariant outcome differences between the treatment and comparison groups; $year$ is a vector of year fixed effects to control for secular outcome trends that affect both groups; X is a vector of timing-varying variables that affect the outcome (see Table 2.3 for these variables used in each model); and ε is the error term. The parameter of interest is β_1 because the interaction term, $M\&A \times post$, compares the change in outcome measure (e.g., hospital prices) before and after the transaction to the change in hospital prices of hospitals that did not merge during the study period.

$$Y_{i,t} = \beta_0 + \beta_1 M\&A_i \times post_t + \beta_2 I_i + \beta_3 year_t + \beta_4 X_{i,t} + \varepsilon_{i,t} \quad (1)$$

In the next two subsections—hospital prices and hospital quality—we describe the regression model for each outcome in more detail and present unadjusted trends in the outcomes for the treated versus comparison hospitals. The subsequent subsection presents the difference-in-differences regression results for each outcome. We found that hospital mergers were associated with a 10.6% (95% CI: 1.5% to 20.7%) increase in the merging hospitals’ prices for an inpatient admission, but the mergers were not associated with an improvement in quality.¹² The concluding subsection describes a study used to estimate the effect of hospital mergers on wages, which, when applied to Indiana, resulted in an estimate of annual income from wages being \$1.5 billion less in Indiana due to hospital mergers.

⁹ For the wages outcome, we relied on estimates from a national study (Arnold and Whaley 2020), which is discussed in the Wages subsection.

¹⁰ If a merging hospital was part of a system, then all of the hospitals in the system were considered “treated”.

¹¹ If a merging hospital was part of a system, then all of the hospitals in the system were considered to be a part of the transaction.

¹² CI is confidence interval.

Hospital Prices

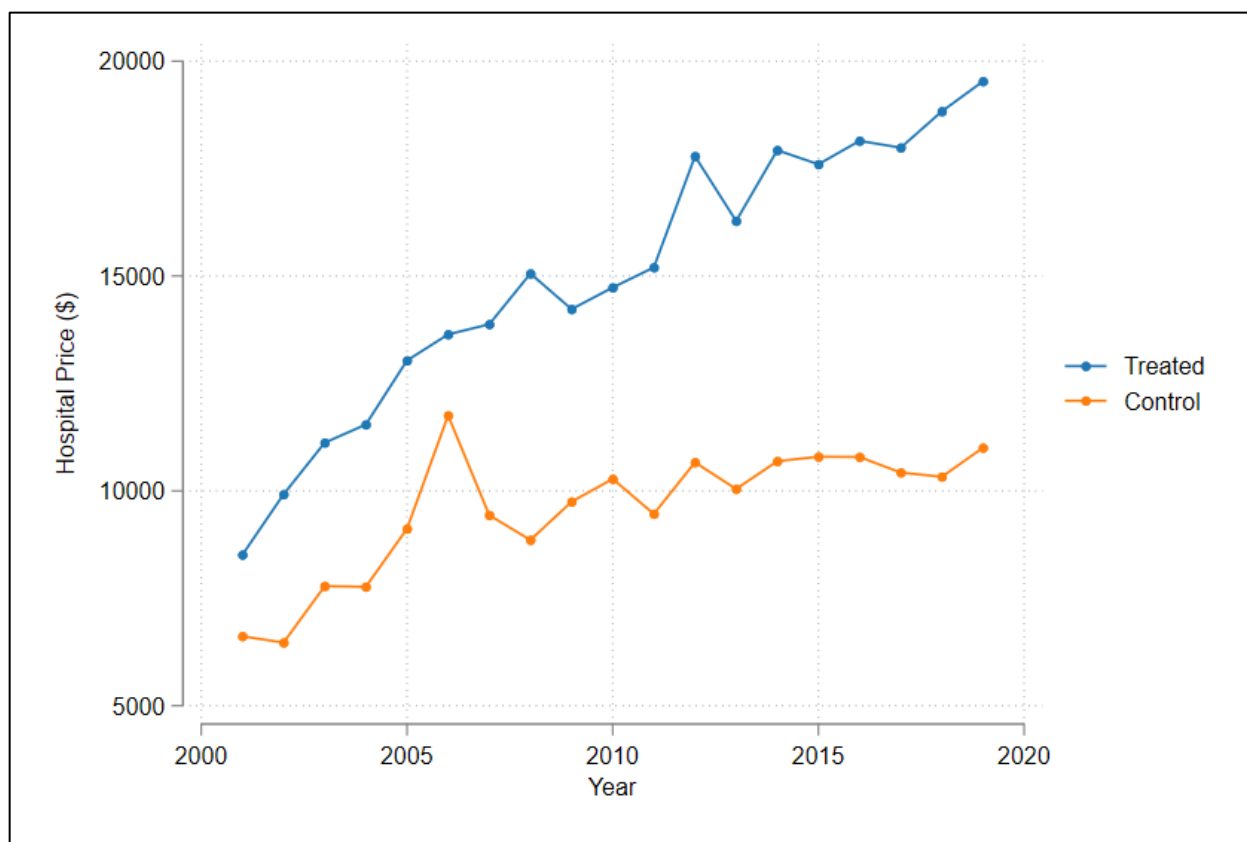
Our price model is a hospital-level model in which the “treated” hospitals are hospitals in Indiana that were part of a merger and acquisition transaction, either as the acquirer or the target, from 2005 to 2015. The “control” (or comparison) hospitals in Indiana were those that were not the target or acquirer in any hospital merger from 2005 to 2015. The price data spanned from 2001 to 2019, ensuring there was at least four years of pre- and post-merger price data for the treated hospitals in our sample. We excluded hospitals with missing price data because their prices had a high degree of within-hospital variance. The balanced panel comprised 27 treated hospitals and 27 control hospitals, totaling 1,026 observations (54 hospitals x 19 years).¹³ As a sensitivity analysis, we estimated a model that included all hospitals.

In the model, hospital price was the dependent variable, calculated by dividing non-Medicare inpatient hospital revenue by non-Medicare inpatient hospital discharges. This price measure was calculated using RAND Hospital Data, which pulls in CMS Healthcare Cost Report Information System (HCRIS) data and makes it more accessible to researchers (RAND Corporation 2022). HCRIS has been used as a measure of hospital prices in several academic studies (Dafny 2009; Schmitt 2017, 2018). One key advantage of this price measure is that it accounts for reimbursement from Anthem Blue Cross Blue Shield of Indiana, unlike the hospital price measure as estimated using HCCI 1.0 claims above.

Figure 2.12 shows the price trends of treated and control hospitals from 2001 to 2019. A weighted (by inpatient discharges) average price for each year is shown for both groups. The prices of treated hospitals grew much faster than control hospitals. From 2001 to 2019 prices grew 4.9% per year on average for treated hospitals versus 3.5% for control hospitals. Over the entire study period, prices grew by 129% for treated hospitals versus 66% for control hospitals. These descriptive trends suggest that being acquired leads a hospital to increase prices faster than it would have otherwise, or that hospitals with greater potential for price growth are more likely to be acquired. These interpretations are consistent with estimates from our econometric models (Table 2.3).

¹³ A balanced panel means each hospital’s outcome and covariates are observed in each year.

Figure 2.12: Hospital Prices for Treated and Control Hospitals, 2001-2019



Notes: The figure shows the unadjusted mean price weighted by the number of inpatient discharges for treated and control hospitals from 2001 to 2019.

“Treated” = hospitals that were acquired during the study period.

“Control” = hospitals that were not part of any merger or acquisition during the study period.

Source: Authors’ analysis of the RAND Hospital Data (<https://www.hospitaldatasets.org/>) (prices) and Irving Levin Associates Healthcare M&A Database (mergers)

Hospital Quality

Our quality model is a hospital-level model in which the “treated” hospitals are hospitals in Indiana that were part of a merger and acquisition transaction, either as the acquirer or the target, between 2010 and 2017. The “control” (or comparison) hospitals in Indiana were those that were not the target or acquirer in any hospital merger from 2010 to 2017. The quality data spanned from 2007 to 2020, ensuring there was at least three years of pre- and post-merger price data for the treated hospitals in our sample.¹⁴ The sample included 19 treated and 52 control hospitals. We did not require a balanced panel because of the small sample, but as a sensitivity analysis, we estimated the models with a balanced sample.

Because of the long study period, it was difficult to find quality measures that were reported each year in a consistent manner. For example, we considered including process measures, but in 2015, hospitals stopped reporting many of the measures they were previously reporting. We settled on three patient experience measures of quality that were extracted at the

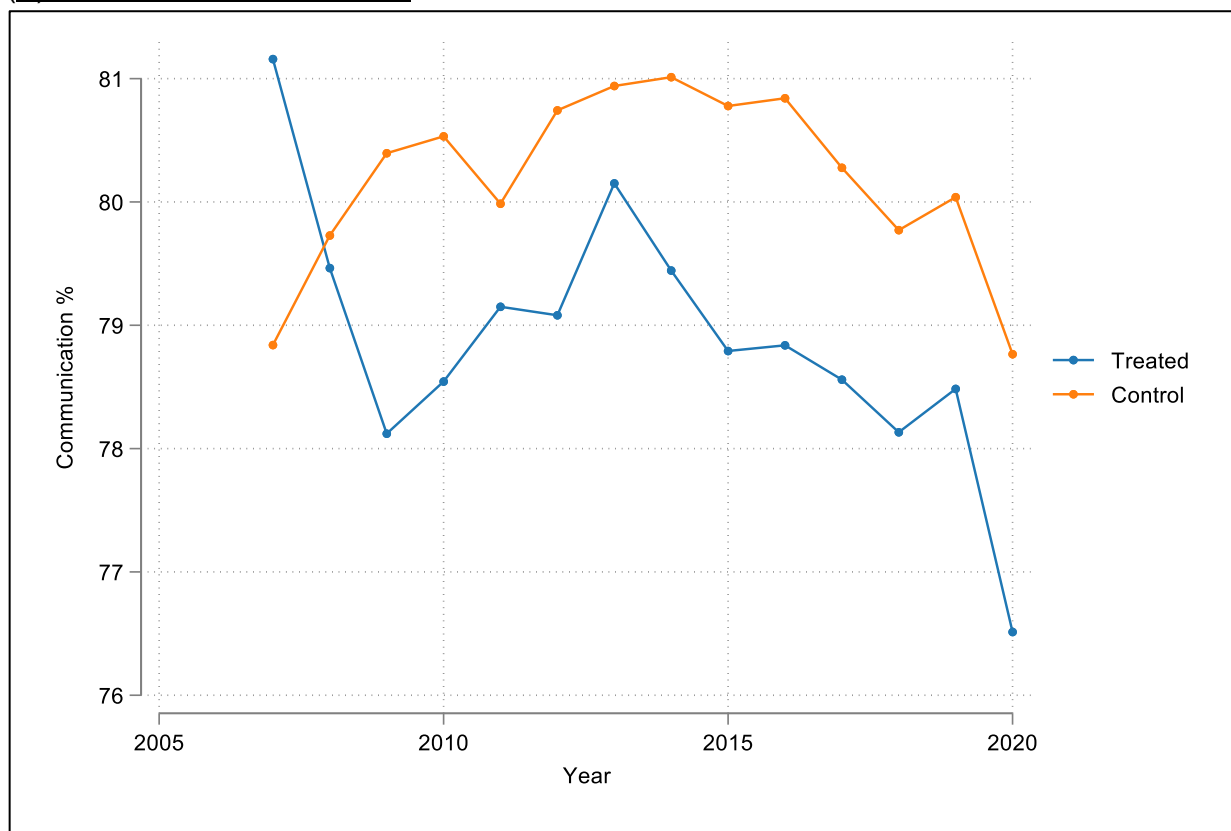
¹⁴ The first year that quality data for our measures was available was 2007.

hospital level from Hospital Compare: (a) doctor communicated well, (b) received help when needed, and (c) would recommend the hospital. For the first two measures, the potential responses were “always”, “usually”, and “sometimes/never”. For the third measure, the potential responses were “yes”, “probably”, and “no”. For each measure, we selected the response that indicated the highest quality, “always” for the first two measures and “yes” for the third measure.

Figure 2.13 shows average quality by year weighted by the number of patients discharged for the treated and control hospitals for each of the three patient experience measures we analyzed: doctor communicated well (Panel A), received help when needed (Panel B), and would recommend the hospital (Panel C). The plots show mixed results as to whether the quality of treated hospitals change relative to that of control hospitals; hence, a difference-in-differences regression framework is needed, particularly because treated hospitals become treated in different years.

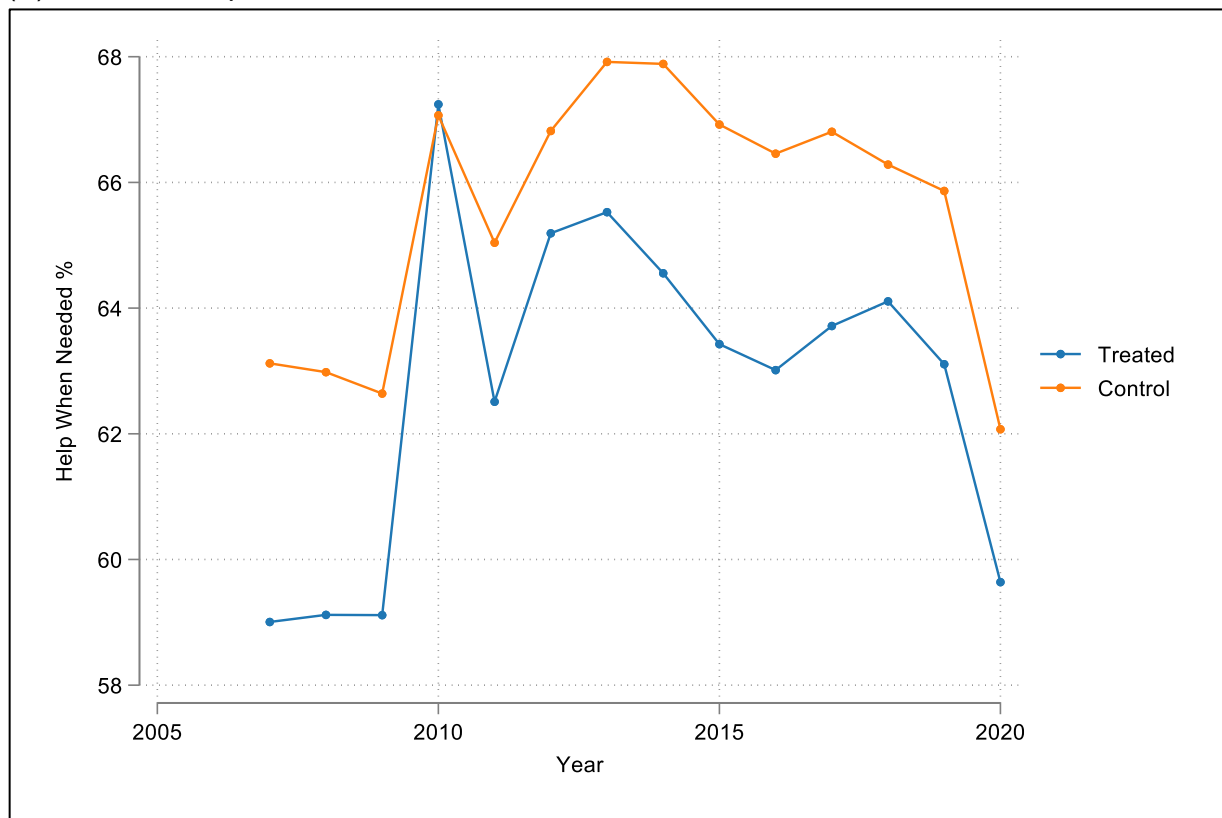
Figure 2.13: Hospital Quality for Treated and Control Hospitals, 2007-2020

(A) Doctor Communicated Well



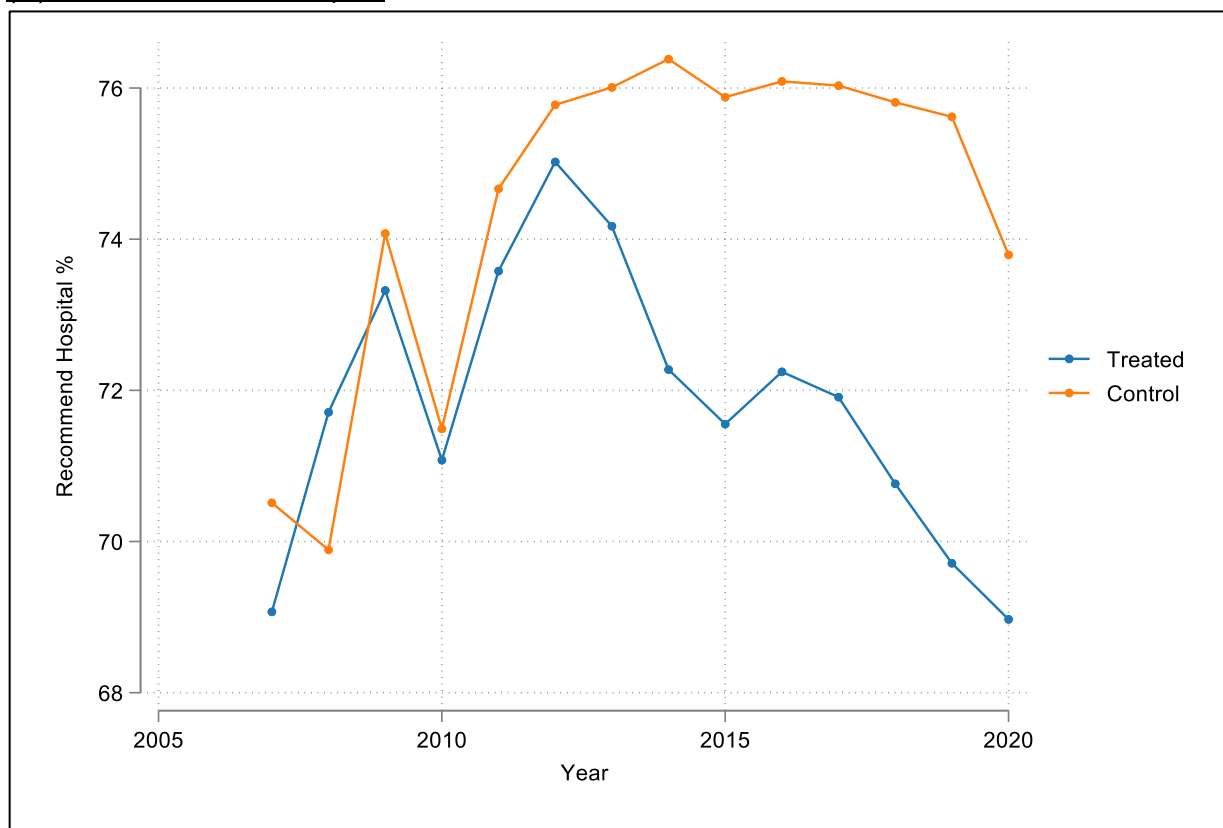
Notes: The percentage is the average share of patients by hospital who reported that the doctor “always” communicated well, weighted by the number of discharges by hospital.

(B) Received Help When Needed



Notes: The percentage is the average share of patients by hospital who reported that they “always” received help when needed, weighted by the number of discharges by hospital.

(C) Recommend the Hospital



Notes: The percentage is the average share of patients by hospital who reported “yes” that they would recommend the hospital, weighted by the number of discharges by hospital.

Notes for all panels:

“Treated” = hospitals that were involved in a merger and acquisition transaction during the study period.

“Control” = hospitals that were not part of any merger or acquisition transaction during the study period.

Source: Authors’ analysis of Hospital Compare (quality) and Irving Levin Associates Healthcare M&A Database (mergers)

Hospital Price and Quality Regression Results

Table 2.3 presents the difference-in-differences regression results that analyzed the association between hospital mergers and both hospital prices and hospital quality. Hospital mergers were associated with a 10.6% (95% CI: 1.5% to 20.7%) increase in the merging hospitals’ prices (model 1).¹⁵ As a sensitivity analysis, we included all hospitals—including those that missing price data for some years and high within-hospital price variance—resulting in 43 “treated” hospitals and 46 “control” hospitals. The results were consistent with the original model, with the difference-in-differences coefficient estimate equaling 0.082 with a standard error of 0.042 ($p=0.055$, $N=1,447$).

In contrast, hospital mergers were not associated with improved quality for the measures we evaluated, including how well doctors communicated with patients (model 2), whether patients got help when needed (model 3), and whether patients would recommend the hospital

¹⁵ CI is confidence interval.

(model 4). In fact, hospital mergers were associated with a 1.63 percentage point (95% CI: 0.09 to 3.18) reduction in the measure that the doctor communicated well ($p<0.05$) (model 2), as well as a 3.09 percentage point (95% CI: 0.40 to 5.77) reduction in the measure of recommend the hospital ($p<0.05$) (model 4). As a sensitivity analysis, we estimated the same models using a balanced sample that included 16 treated and 41 control hospitals, and the results were consistent with the original models. The p -values slightly increased because of the smaller sample size, but they were still significant at the 0.10 level for model 2 ($p=0.09$) and model 4 ($p=0.06$) with the p -values still being significant at the 0.10. As an additional sensitivity analysis, we estimated the original models using the full sample (that is, not restricting the sample to treated hospitals with at least three years of pre- and post-merger quality data) without balancing, resulting in 29 treated and 52 control hospitals, and, again, the results were consistent with the original models.

Table 2.3: Hospital Price and Quality Regression Estimates from Hospital Mergers and Acquisitions in Indiana

	Price	Quality Measures		
Measure	(1) ln(Price) ^a	(2) Doctor Communicated Well	(3) Help When Needed	(4) Recommend the Hospital
M&A × Post	0.101** (0.043)	-1.63** (0.77)	0.09 (1.35)	-3.09** (1.35)
Control Variables (X)	Beds, Ownership status, CMI, Medicaid share of inpatient discharges	Beds, Ownership status, CMI, Teaching status	Beds, Ownership status, CMI, Teaching status	Beds, Ownership status, CMI, Teaching status
Fixed Effects	Hospital, Year	Hospital, Year	Hospital, Year	Hospital, Year
Study period	2001-2019	2007-2020	2007-2020	2007-2020
Observations	1,026	904	890	902
Dependent Variable mean (SD)	\$12,775 ^b (\$7,147)	79.97% (3.33%)	65.08% (6.12%)	74.04% (6.97%)
R-squared	0.83	0.50	0.57	0.61

*** p<0.01 ** p<0.05 * p<0.1

ln: natural log. CMI: case mix index. SD: standard deviation. Ownership status is whether the hospital was for-profit vs non-profit.

^aIn model 1, the outcome is the natural log of hospital price, so the coefficient estimate represents the following difference-in-differences percent change in price: $100 * (\exp(B) - 1)$ in which B is the coefficient estimate. For example, $100 * (\exp(.101) - 1) = 10.6\%$

^bThe price dependent variable is reported here in levels for ease of interpretation.

Notes: All models were weighted by the number of inpatient discharges. Coefficients and standard errors (in parentheses) are presented for the *M&A × post* variable, which is the difference-in-differences variable of interest. Standard errors were estimated by clustering at the hospital level.

Source: Authors' analysis of the RAND Hospital Data (<https://www.hospitaldatasets.org/>) (prices), CMS Hospital Compare (quality), and Irving Levin Associates Healthcare M&A Database (mergers)

Our results are consistent with national and review studies that found hospital mergers and acquisitions are associated with price increases without a commensurate increase in quality (Gaynor 2021; Beaulieu et al. 2020; Cooper et al., 2019a; Gaynor, Ho, and Town 2015; Gaynor & Town 2012; Dafny 2009). Notwithstanding, our results should be interpreted in the context of the following limitations. One key assumption of a difference-in-differences model is that pre-treatment (i.e., pre-hospital merger) outcome trends between the treatment and comparison

hospitals are parallel. If they are not parallel, then absent the treatment, the non-parallel trends may have persisted into the treatment period, biasing the results. To test this assumption, we estimated fully dynamic event study models (Sun & Abraham 2021), which did not show evidence of differences in price and quality trends prior to the merger. These results have been submitted to an academic journal for publication, precluding us from displaying them in this report.

While the difference-in-differences models estimate a well-controlled association between hospital mergers and outcomes, the results could be biased if there are unobserved characteristics of merging hospitals that are associated with mergers. For example, if hospital systems acquire hospitals that have untapped potential to raise prices, the estimated price increases associated with acquisitions may be biased upward compared to the price increase for a hospital without this potential.

Lastly, additional quality measures should be analyzed to determine whether our results are robust to other measures. As stated above, it was difficult to find quality measures that were reported each year in a consistent manner over the study period.

Wages

Hospital price increases cause insurance premiums to increase, and because employer-paid insurance premiums are part of the overall compensation package of workers, an increase in premiums may result in a reduction in wages. A national study found that hospital mergers were associated with a \$638 reduction in wages in MSAs that had at least one hospital merger during the study period of 2010 to 2018 (Whaley & Arnold 2020). The study used a difference-in-differences model to estimate effects of hospital mergers on annual income from wages of non-healthcare workers by comparing the difference in wage income between workers in MSAs that had a hospital merger during the study period (“treated MSAs”) versus workers in MSAs that did not have a hospital merger during the study period (“control MSAs”). The unit of analysis was a worker, and the worker sample included workers insured by an employer, but excluded healthcare workers because a hospital merger may directly affect their wages.

We re-estimated the same model with the same data, but only with MSAs in Indiana, including seven MSAs that had at least one hospital merger during the study period (2010 to 2018) and five MSAs that did not.¹⁶ However, the model was statistically underpowered to provide a precise estimate for the effect of hospital mergers on income from wages in an MSA. Therefore, to test whether the effect in Indiana was statistically different from the effect in the rest of the country, we re-estimated the national model by including an interaction term for Indiana observations. The interaction term was not statistically significant, meaning the effect was not statistically different in Indiana as compared with the rest of the country. Therefore, we applied the national coefficient estimate (\$638) in Arnold & Whaley (2020) to estimate how much wages were reduced in Indiana were over the period as a result of hospital mergers. In

¹⁶ The seven treated MSAs were Bloomington, IN; Chicago-Naperville-Elgin, IL-IN-WI; Cincinnati, OH-KY-IN; Elkhart-Goshen, IN; Indianapolis-Carmel-Anderson, IN; Louisville/Jefferson County, KY-IN; and Michigan City-La Porte, IN. The five control MSAs were Evansville, IN-KY; Fort Wayne, IN; Lafayette-West Lafayette, IN; Muncie, IN; and Terre Haute, IN. Three of Indiana’s MSA were not included in the original study, so they were not included in our analysis: Columbus, IN; Kokomo, IN; and South Bend-Mishawaka, IN-MI.

July 1, 2021, the combined population of the seven Indiana MSAs with at least one hospital merger was 3.7 million (see Table A.1 in the appendix). Applying the \$638 reduction in wages to the 3.7 million population multiplied by the state's labor force participation of 63%¹⁷ results in approximately \$1.5 billion in lower wages per year due to hospital mergers.¹⁸

These results should be interpreted in the context of the following limitations. Because we did not have the statistical power to estimate the effect of hospital mergers on wages in Indiana, we assumed the effect in Indiana was the same as the national average after testing whether the effect in Indiana was different than the effect in the rest of the country. However, the effect may be practically different (even though it was not statistically different). Notwithstanding, actuarial and economic theory and evidence is well-established, linking higher hospital prices to higher insurance premiums and linking higher premiums to a reduction in wages.

Hospital System Financial Analysis

The financial performance of a hospital system provides evidence as to whether the price the system charges its commercial payers exceeds hospital expenses. Measures of hospital system performance include current-year operating expenses and long-term capital costs and debt obligations. When a hospital's revenue exceeds its expenses in a given year, the difference is called surplus for a nonprofit hospital and profit for a for-profit hospital. The surplus or profit could be used for various purposes: invested in capital projects, used to pay off debt, returned to the community in the form of community benefits, or paid to shareholders as dividends (only for-profit hospitals). Surplus or profit can also be retained by the hospital in the form of cash, cash equivalents, or non-operating investments (hereafter "unrestricted reserves"). While some unrestricted reserves are needed for hospital operations (known as working capital), long-term debt obligations, and long-term capital projects, a hospital could have unrestricted reserves that exceed those needs. To examine this potential in Indiana, we analyzed credit rating agency reports and financial statements of the six largest hospital systems in the state.

A hospital system's financial performance was assessed using measures of liquidity, solvency, and capital adequacy. Liquidity and solvency measures assess a hospital's ability to pay its short-term and long-term liabilities. Capital adequacy measures a hospital's ability to invest in new facilities and equipment and to renovate existing facilities and equipment. We analyzed financial measures that are commonly used by credit rating agencies: unrestricted days of cash on hand, unrestricted reserves divided by total long-term debt, unrestricted reserves divided by contingent liabilities, capital expenditure divided by depreciation and amortization, and average age of the plant, all of which are defined in Table 2.4 (S&P Global Ratings 2018). We analyzed these financial measures that were reported in credit rating agency reports and financial statements for Indiana's six largest hospital systems: Indiana University Health, Franciscan Health, Parkview Health, Ascension, Community Health Network, and Community Health Systems. All of these systems are nonprofit systems, except for Community Health Systems, which is for-profit, and may therefore have a different capital structure with its

¹⁷ The labor force participation rate is as of July 2021 (Federal Reserve Bank of St. Louis 2021).

¹⁸ $\$638 \times 3,684,874 \times 0.63 = \$1,481,098,256$.

access to the equity markets. Credit rating agencies assess a hospital's capacity and willingness to meet its financial commitments as they come due and assign the system or a particular obligation (e.g., debt obligation) a rating (S&P Global Ratings 2021). When credit rating reports were unavailable, the financial measures were calculated from the consolidated financial statements or Forms 10-K.

Table 2.4: Financial Measures' Descriptions and Calculations

Financial Measure	Description	Calculation
Unrestricted Days of Cash on Hand	The number of days a hospital can continue to pay daily operating expenses without additional revenues.	$\text{Unrestricted Reserves} / [(\text{Operating Expenses Minus Depreciation and Amortization Expenses}) / 365]$
Unrestricted Reserves/Total Long-Term Debt	A hospital's ability to repay its long-term debt with unrestricted reserves.	$\text{Unrestricted Reserves} / \text{Long-Term Debt} * 100$
Unrestricted Reserves/Contingent Liabilities	A hospital's ability to pay potential liabilities such as pending lawsuits with unrestricted reserves.	$\text{Unrestricted Reserves} / \text{Contingent Liabilities} * 100$
Capital Expenditure/Depreciation & Amortization	A hospital's investment in property, plant, and equipment relative to annual depreciation expense.	$\text{Purchases of Property, Plant, and Equipment} / \text{Depreciation and Amortization Expenses} * 100$
Average Age of Plant	The number of years of a hospital's fixed asset.	$\text{Accumulated Depreciation} / \text{Depreciation Expense}$

Source: Adapted from S&P Global Ratings (2018) and Kane et al. (2021)

We then compared the financial measures of the six major hospital systems to the distribution of these measures for the hospital industry based on a report from Ziegler, a healthcare investment banking firm (Hanley 2021). The report compiled industry statistics from a broad set of hospital systems that consisted of hospitals and hospital systems from the three primary credit rating agencies: Moody's, S&P Global Ratings ("S&P"), and Fitch Ratings. Each credit reporting agency used four credit rating grades; for example, S&P used AA, A, BBB, and Speculative Grade.¹⁹ The Ziegler sample contained 318 health systems, 41 hospital districts, 28

¹⁹ The following definitions are from *S&P Global Ratings Definitions* (S&P Global Ratings, 2021, Table 3). AA: An obligor rated 'AA' has very strong capacity to meet its financial commitments. A: An obligor rated 'A' has strong capacity to meet its financial commitments but is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligors in higher-rated

critical access hospitals, 26 children's hospitals, and 5 specialty hospitals. This sample is the most comprehensive sample available, but we could not verify whether it was representative of the industry. However, for comparison, the Ziegler medians in 2020 and 2019 were relatively consistent with the S&P Global Ratings medians for the two most common hospital credit rating grades: A and BBB (Pickett 2022; Hanley 2021; Hanley 2020).

For the year 2020, Table 2.5 includes the key liquidity, solvency, and capital measures for the six largest hospital systems in Indiana and compares them with industry statistics (i.e., median, 75th percentile, and 95th percentile) of these measures. For 5 of the 6 hospital systems, their financial measures were generally above the industry median, often exceeding the 75th percentile and sometimes even the 90th percentile, providing evidence that these systems are charging high prices relative to costs. The systems are ordered based on the days of cash on hand, starting with Franciscan Health (437.9 days) and Indiana University Health (425.0 days), both of which were above the 90th percentile for the industry (419.4 days). These systems were followed by Parkview Health (331.3 days), which was above the 75th percentile for the industry (297.7 days), then Community Health Network (264.2 days) and Ascension (251.7 days), both of which were above the industry median (213.3 days). Community Health Systems (60.5 days) had the fewest number of days of cash on hand.

The first five hospital systems above also had unrestricted reserves-to-total long-term debt above the industry median, indicating they are in a strong position to repay their long-term debt if their unrestricted reserves were allocated to debt obligations. Indiana University Health (608.3%) was above the 90th percentile for the industry (375.7%). Most of the other systems—Franciscan Health (249.8%), Parkview Health (232.4%), Community Health Network (179.5%), and Ascension (222.2%)—had ratios that were between the industry median (167.2%) and 75th percentile (264.2%). Community Health Systems (13.9%) was below the median, the lowest ratio of the six systems.

Our next two measures, unrestricted reserves/contingent liabilities and capital expenditure/depreciation & amortization, were consistent with the other measures showing strong financial liquidity and solvency. Indiana University Health had the highest ratios for these two measures. For example, capital expenditure/depreciation & amortization for Indiana University Health (225.0%) shows that this system was adding capital at a rate that is double their depreciation and amortization costs.

For the last measure, average age of plant, Indiana University Health (13.5 years) is the only system above the industry median (12.0 years), although Indiana University Health has since opened a new hospital in Bloomington (IU Health 2021c), lowering the system's average age of plant. The remaining systems that reported the average age of their plant, Parkview Health (9.0 years), Community Health Network (11.4 years), and Ascension (9.1 years), were all below the industry median. Since the financial ages of these systems are below the industry median, they may not have a high need for short-term capital investments in facilities.

categories. BBB: An obligor rated 'BBB' has adequate capacity to meet its financial commitments; however, adverse economic conditions or changing circumstances are more likely to weaken the obligor's capacity to meet its financial commitments. Speculative Grade: Obligor's rated 'BB', 'B', 'CCC', and 'CC' are regarded as having significant speculative characteristics. 'BB' indicates the least degree of speculation and 'CC' the highest. While such obligors will likely have some quality and protective characteristics, these may be outweighed by large uncertainties or major exposure to adverse conditions.

Because pensions can be a large liability of hospital systems, we analyzed pension obligations of these systems using their consolidated financial statements, but found they are a minimal portion of their liabilities. As of December 31, 2020, pension liabilities as a percentage of total liabilities were as follows: Ascension Health (11.0%), Parkview Health (4.4%), Franciscan Health (3.0%), Indiana University Health (0.07%), and Parkview (0.03%). Community Health Network reported accrued pension expenses as a percentage of total operating expenses (0.7%).

To compare these financial measures to the prior year, Table 2.6 shows these same measures as of 2019. Five out of the 6 hospital systems experienced an increase in the days of cash on hand, which may have been because hospitals received federal funding for the COVID-19 pandemic that exceeded their losses from the pandemic (Kane et al. 2021). Other explanations might be reduced capital spending or issuance of debt for financial flexibility. The days of cash on hand for Community Health Systems increased the most from 6.6 to 60.5 days (or 817%). The days of cash on hand for Franciscan Health, Parkview Health, and Community Health Network increased by 22.7%, 12.8% and 10.9%, respectively, indicating the operating liquidity of these hospital systems increased. Meanwhile, the days of cash on hand of Indiana University Health stayed relatively the same, only increasing by 1.1% from 2019 to 2020. Ascension's days of cash on hand decreased from 268.6 to 252.7 days (or -6.3%). The unrestricted reserves/total long-term debt for Franciscan Health, Community Health Network, and Ascension stayed relatively the same, with percent changes of only 1.5%, 2.2%, and -1.9%, respectively, and varied for the remaining systems. The unrestricted reserves/contingent liabilities increased significantly for all six systems, with Indiana University Health's percentage tripling from 2019 to 2020. The capital expenditure/depreciation & amortization stayed relatively the same for Parkview Health, decreasing by 4.9%, but varied for the remaining systems. The average age of the plants stayed relatively the same with Ascension having the greatest change at 0.4 years.

It is important to interpret our findings by understanding each system's distinguishing characteristics and financial obligations, such as imminent capital expenditures for building new hospitals or renovating existing ones. For example, Indiana University Health, which has the highest average age of plant among the systems, announced plans to build a new hospital in Indianapolis with an estimated cost of \$1.6 billion that will be completed in 2026 (IU Health 2021d). Additionally, unlike other major systems in the state, Indiana University Health contains an academic medical center. Previous analysis found that academic medical centers enjoy favorable market positions and generally have stronger financial health than other nonprofit hospitals (Becker's Hospital Review 2014), possibly due to high prices resulting from "must-have" status in insurer contracting. Indiana University Health may be more comparable to other systems containing academic medical centers than it is to Indiana's other major hospital systems or to the industry as a whole, as measured in Hanley (2021, 2020).

In summary, the financial measures of 5 of 6 major hospital systems in Indiana—Franciscan Health, Indiana University Health, Parkview Health, Community Health Network, and Ascension—suggest that they have amassed excess unrestricted reserves as compared with their short- and long-term financial obligations. Their financial measures were generally above the industry median, often exceeding the 75th percentile and sometimes even the 90th percentile.

Table 2.5: Financial Liquidity and Solvency Measures for Indiana's Major Hospital Systems, 2020

Financial Measures	Industry			Hospital Systems					
	Median	75th per-centile	90th per-centile	Franciscan Health ^a	Indiana University Health	Parkview Health	Community Health Network	Ascension ^a	Community Health Systems ^a
Operating Revenue (\$000s)	N/A	N/A	N/A	3,309,888	7,016,050	2,206,911	2,681,671	25,243,837	11,789,000
Unrestricted Reserves (\$000s)	N/A	N/A	N/A	2,903,621 ^b	7,267,764	1,822,469	1,814,422	16,922,885	1,676,000 ^{b, c}
Unrestricted Days Cash on Hand	213.3	297.7	419.4	437.9 ^b	425.0	331.3	264.2	251.7	60.5 ^b
Unrestricted Reserves/Total Long-Term Debt (%)	167.2	264.2	375.7	249.8 ^b	608.3	232.4	179.5	222.2	13.9 ^b
Unrestricted Reserves/Contingent Liabilities (%)	N/A	N/A	N/A	N/A	3,351.4	528.4	1,180.0	1,236.4	N/A
Capital Expenditure/Depreciation & Amortization (%)	106.6	152.8	230.3	199.1 ^b	225.0	101.7	68.8	139.9	38.7 ^b
Average age of plant (years)	12.0	14.9	17.6	N/A	13.5	9.0	11.4	9.1	N/A
Long-term Credit Rating	N/A	N/A	N/A	AA	AA	AA-	A+	AA+	CCC

N/A: Not available

Notes:

- a. Ascension, Community Health Systems, and Franciscan Health own hospitals outside of Indiana that are included in these measures because it was not possible to subset on only hospitals located in Indiana. While most of Ascension's and Community Health Systems' hospitals are located outside of Indiana, only one of Franciscan Health's hospitals is located outside of Indiana.

- b. Calculated measures are based on more precision than what is displayed in the table. A calculated measure is one that was not reported directly. For example, the Unrestricted Reserves/Total Long-Term Debt (%) and Capital Expenditure/Depreciation & Amortization (%) for Franciscan Health and Community Health Systems were calculated.
- c. Community Health Systems: in the Form 10K, the balance sheet reported \$1,676 million in cash and cash equivalents, which we used for unrestricted reserves. In Note 7, which reported the fair value of financial instruments, it also included the following assets: equity securities (\$129 million), debt securities (\$110 million), and trading securities (\$12 million), which we did not include as unrestricted reserves because it was unclear whether these assets were unrestricted and Note 7 did not appear in the balance sheet.

Sources:

Petris Center analysis of the following sources:

Industry Measures: Hanley (2021), which is the report published by Ziegler as of calendar year 2020.

Franciscan Health: Franciscan Health Consolidated Financial Statement ending June 30, 2020 for the financial measures; Fitch Rating for Franciscan as of December 31, 2020 for the long-term credit rating (Fitch Ratings 2021).

Indiana University Health: Bretz & Gildner (2021), which is the S&P Global Ratings report based on financial information for the year ending December 31, 2020.

Community Health Network: Desai & Bertand (2021), which is the S&P Global Ratings report based on financial information for the year ending December 31, 2020.

Ascension: Infranco & Desai (2021), which is the S&P Global Ratings report based on financial information for the year ending as of June 30, 2020.

Parkview Health: Shah & Gildner (2021), which is the S&P Global Ratings report based on the financial information for the year ending as of December 31, 2020.

Community Health Systems: Form 10-K for the year ending December 31, 2020 for the financial measures; Fitch Rating for Community Health Systems as of 2020 for the long-term rating (Fitch Ratings 2020).

Table 2.6: Financial Liquidity and Solvency Measures for Indiana's Major Hospital Systems, 2019

Financial Measures	Industry			Hospital Systems					
	Median	75th percentile	90th percentile	Franciscan Health ^a	Indiana University Health	Parkview Health	Community Health Network	Ascension ^a	Community Health Systems ^a
Operating Revenue (\$000s)	N/A	N/A	N/A	3,302,708	6,681,363	2,037,218	2,638,015	25,229,747	13,210,000 ^{b, c}
Unrestricted Reserves (\$000s)	N/A	N/A	N/A	2,903,621 ^b	6,823,782	1,490,297	1,585,834	17,676,265	216,000 ^b
Unrestricted Days Cash on Hand	193	284.1	397.4	356.8 ^b	420.3	295.6	238.3	268.6	6.6 ^b
Unrestricted Reserves/Total Long-Term Debt (%)	167.2	264.2	375.7	246.1 ^b	387.6	210.1	175.6	226.6	1.6 ^b
Unrestricted Reserves/Contingent Liabilities (%)	N/A	N/A	N/A	N/A	1,114	426.8	946.8	1,100	N/A
Capital Expenditure/Depreciation & Amortization (%)	111.1	162.3	253.5	180.7 ^b	179	106.9	117.7	120.1	35.5 ^b
Average age of plant (years)	11.7	14.4	17	N/A	13.4	9.1	11.4	8.7	N/A
Long-term Credit Rating	N/A	N/A	N/A	AA	AA	AA-	A+	AA+	CCC

N/A: Not available

Notes:

- a. Ascension, Community Health Systems, and Franciscan Health own hospitals outside of Indiana that are included in these measures because it was not possible to subset on only hospitals located in Indiana. While most of Ascension's and Community Health Systems' hospitals are located outside of Indiana, only one of Franciscan Health's hospitals is located outside of Indiana.

- b. Calculated measures are based on more precision than what is displayed in the table. A calculated measure is one that was not reported directly. For example, the Unrestricted Reserves/Total Long-Term Debt (%) and Capital Expenditure/Depreciation & Amortization (%) for Franciscan Health and Community Health Systems were calculated.
- c. Community Health Systems: In the Form 10K, the balance sheet reported \$216 million in cash and cash equivalents, which we used for unrestricted reserves. In Note 7, which reported the fair value of financial instruments, it also included the following assets: equity securities (\$141 million), debt securities (\$101 million), and trading securities (\$12 million), which we did not include as unrestricted reserves because it was unclear whether these assets were unrestricted and Note 7 did not appear in the balance sheet.

Sources:

Petris Center analysis of the following sources:

Industry Measures: Hanley (2020), which is the report published by Ziegler as of calendar year 2019.

Franciscan Health: Franciscan Health Consolidated Financial Statement ending June 30, 2019 for the financial measures; Fitch Rating for Franciscan as of 2019 for the long-term credit rating (Fitch Ratings, 2019a).

Indiana University Health: Bretz & Gildner (2021), which is the S&P Global Ratings report based on financial information for the year ending December 31, 2020.

Community Health Network: Desai & Bertand (2021), which is the S&P Global Ratings report based on financial information for the year ending December 31, 2019.

Ascension: Infranco & Desai (2021), which is the S&P Global Ratings report based on financial information for the year ending as of June 30, 2019.

Parkview Health: Shah & Gildner (2021), which is the S&P Global Ratings report based on the financial information for the year ending as of December 31, 2019.

Community Health Systems: Form 10-K for the year ending December 31, 2019 for the financial measures; Fitch Rating for Community Health Systems as of 2019 for the long-term rating (Fitch Ratings, 2019b)

Section 3: Physician Markets

As shown in the previous section, Indiana's hospital systems remained relatively stable at high levels of concentration during the past decade, with regionally dominant health systems able to negotiate high prices and facing few competitors. In contrast, physician markets have become more concentrated since 2010 and an increasing share of physicians are vertically integrated with hospitals. Vertical integration means a physician is either directly employed by a hospital or is part of a physician organization owned by a hospital, often as a result of the hospital acquiring the physician organization.

Despite the marked increase in physician market concentration and vertical integration with hospitals, Indiana's physician prices remain relatively low. We analyzed physician prices from claims data in Indiana and comparison states, defined as other states in Indiana's census division (Illinois, Michigan, Ohio and Wisconsin). From 2010 to 2017, we found that physician prices in Indiana grew at a lower rate than in comparison states, with Indiana's price levels in 2017 remaining below those of comparison states and the national average. Other studies have also found that Indiana has relatively low physician prices (Whaley et al. 2020; Chernew, Hicks, and Shah 2020). However, our analysis found that physician prices for a routine office visit after becoming vertically integrated increased relative to a comparison group of physicians who did not vertically integrate.

This section begins by describing physician market concentration and hospital-physician vertical integration trends. In order to characterize changes in market structure, we report the number and discuss trends of physician practice mergers and acquisitions, including acquisitions by private equity firms. We then compare physician price trends in Indiana to the comparison states (defined above). We end by estimating the price effect of physicians being vertically integrated with hospitals, finding that vertical integration is associated with a 2.1% to 5.0% price increase for a moderate-intensity office visit.

Physician Market Structure Trends

To analyze physician market concentration and the share of physicians vertically integrated with hospitals, we focused on primary care physicians, a large segment of the physician market. To conduct our analyses, we used the SK&A Office Based Physicians Database provided by IQVIA (hereafter, SK&A), which has been used in other studies conducting similar analyses (Godwin et al. 2021; Fulton 2017; Dunn and Shapiro 2014). Next, we discuss the methods used to estimate physician market concentration and the share of physicians vertically integrated with hospitals. For more details, see Fulton (2017).

Market concentration was measured using the HHI, whereby market shares were based on the number of full-time-equivalent (FTE) primary care physicians that were part of a physician practice. If the physician practice had an owner (e.g., a hospital), then the FTEs were combined at the owner level to calculate market shares. Market shares were calculated at the primary care service area (PCSA) level. To calculate the HHI at that level, we summed the squares of the market shares. The HHIs at the PCSA level were then aggregated to HHIs at the

MSA level by calculating the average HHI of the PCSAs in each MSA, weighted by the number of FTE primary care physicians in the PCSA.

To calculate the share of vertically-integrated primary care physicians, physicians were classified as being vertically integrated if they were directly employed by a hospital or health system, or were part of a physician organization owned by the hospital or health system (hereafter, simply “hospital”). The remainder of the physicians worked as sole practitioners or in a practice that was independent of a hospital or health system (e.g., owned by the physicians themselves). The share of vertically-integrated primary care physicians in each MSA was the number of FTE vertically-integrated primary care physicians divided by total number of FTE primary care physicians.

Next, we turn to the results. While hospital market structure in Indiana remained relatively stable over the previous decade, the state’s physician markets underwent significant changes over the same period (Table 3.1). Horizontal market concentration of primary care physicians increased in most MSAs. In 2010, 5 of the 15 MSAs in Indiana were considered to be highly concentrated ($HHI > 2,500$) under the Department of Justice and Federal Trade Commission’s Horizontal Merger Guidelines. By 2018, 11 MSAs were highly concentrated, including two of the fastest growing MSAs by population in the state—Lafayette/West Lafayette and Fort Wayne (U.S. Department of Justice and Federal Trade Commission 2010).

Seven of the 12 MSAs primarily located in Indiana had increases in their HHI of 1,000 or more, with the largest increase in occurring in the Bloomington MSA, increasing from 1,990 to 5,653 (or by 3,663). Based on our research, we are not aware of the Federal Trade Commission or the Office of the Attorney General in Indiana challenging acquisitions that contributed to these increases in market concentration in court.²⁰

²⁰ Federal and state reviews of proposed mergers and acquisitions are often confidential, both their content and existence; hence, the public record mostly includes public court filings.

Table 3.1: Primary Care Physician Market HHI by MSA, 2010 and 2018

MSA	HHI (2010)	HHI (2018)	Change in the HHI
Bloomington, IN	1990	5653	3663
Columbus, IN	4025	3167	-858
Elkhart-Goshen, IN	2544	2881	337
Evansville, IN-KY	1278	3392	2114
Fort Wayne, IN	2741	3934	1193
Indianapolis-Carmel-Anderson, IN	1980	3307	1327
Kokomo, IN	1307	2842	1535
Lafayette-West Lafayette, IN	1585	2711	1126
Michigan City-La Porte, IN	1425	2217	792
Muncie, IN	2892	4677	1785
South Bend-Mishawaka, IN-MI	2697	3209	512
Terre Haute, IN	1570	1827	257
Chicago-Naperville-Elgin, IL-IN-WI	721	1393	672
Cincinnati, OH-KY-IN	1670	3007	1337
Louisville/Jefferson County, KY-IN	1070	2126	1056
Median	1670	3007	1126

Notes: HHI = Herfindahl-Hirschman Index. The HHIs were first calculated at the primary care service area level (PCSA), then aggregated to the MSA level by calculating the average HHI of the PCSAs in an MSA, weighted by the number of FTE primary care physicians in the PCSA. MSAs located primarily in other states are shaded gray. The “Median” row shows the median for each column, including the change in the HHI. The change in the HHI was calculated using more precision than the displayed values, so the apparent difference may be different than the calculated difference.

HHI categories:

HHI < 1,500: Unconcentrated

1,500 ≤ HHI ≤ 2,500: Moderately concentrated

HHI > 2,500: Highly concentrated

Source: Petris Center analysis of SK&A Office Based Physicians Database provided by IQVIA

The increase in horizontal physician market concentration was accompanied by an increase in vertical integration between physicians and hospitals (Table 3.2). In 2010, the median share of vertically integrated physicians in Indiana's MSAs was 32.6%, and as of 2018 the median share was 60.1%—an increase of 84%. While physician markets nationwide trended towards becoming more vertically integrated over this period, Indiana markets outpaced the rest of the US (the median share of vertically-integrated physicians for MSAs across the US was 45% in 2018). While industrywide trends such as value-based contracts have incentivized physicians and hospitals to become vertically integrated at a national level, Indiana's relatively low physician prices have been cited as a factor driving vertical integration in the state (Corlette, Keith, and Hoppe 2019). A recent national analysis found that shares of vertically-integrated physicians increased another 19% between 2019 and 2021, meaning Indiana's physician markets likely became more vertically integrated during this period as well (Avalere Health 2022).

The reshaping of Bloomington's physician markets from 2010 to 2018 highlights the striking consolidation that occurred during this period. Bloomington is one of Indiana's most concentrated hospital markets, with an HHI above 8,500 (Table 2.2) and only one of Indiana's dominant health systems (IU Health) having facilities within the MSA. In 2010, its primary care physician HHI was 1,990 (moderately concentrated) and only 21% of its primary care physicians were vertically integrated. By 2018, however, the primary care HHI and the share of vertically-integrated primary care physicians had both dramatically increased, with the primary care physician HHI reaching 5,653 and the share of vertically-integrated primary care physicians reaching 84%.

Horizontal market concentration and vertical integration have both been linked to higher prices and total health spending, but have not shown consistent associations with improved quality of care (Machta et al., 2019; Post, Buchmueller, and Ryan 2018; Dunn and Shapiro 2014). Based on our research, none of the mergers and acquisitions involving physician organizations in Indiana was challenged in court by federal or state antitrust authorities.²¹

²¹ Federal and state reviews of proposed mergers and acquisitions are often confidential, both their content and existence; hence, the public record mostly includes public court filings.

Table 3.2: Share of Primary Care Physicians Vertically Integrated with a Hospital or Health System by MSA, 2010 and 2018

MSA	Vertically Integrated (2010)	Vertically Integrated (2018)	Change in Vertical Integration (percentage points)
Bloomington, IN	20.9%	84.3%	63.4
Columbus, IN	63.3%	54.5%	-8.8
Elkhart-Goshen, IN	42.7%	56.1%	13.4
Evansville, IN-KY	46.9%	79.8%	32.9
Fort Wayne, IN	31.2%	75.4%	44.3
Indianapolis-Carmel-Anderson, IN	55.0%	74.5%	19.4
Kokomo, IN	28.6%	63.2%	34.7
Lafayette-West Lafayette, IN	32.6%	50.6%	17.9
Michigan City-La Porte, IN	31.2%	60.1%	28.9
Muncie, IN	54.4%	59.2%	4.8
South Bend-Mishawaka, IN-MI	41.0%	46.4%	5.4
Terre Haute, IN	16.4%	36.2%	19.8
Chicago-Naperville-Elgin, IL-IN-WI	25.5%	49.8%	24.3
Cincinnati, OH-KY-IN	27.0%	66.7%	39.6
Louisville/Jefferson County, KY-IN	34.6%	60.2%	25.6
Median	32.6%	60.1%	24.3

Notes: MSAs located primarily in other states are shaded gray. The “Median” row shows the median for each column, including the change in vertical integration. The change in vertical integration was calculated using more precision than the displayed values, so the apparent difference may be different than the calculated difference.

Source: Petris Center analysis of SK&A Office Based Physicians Database provided by IQVIA

Despite the tremendous increase in the share of physicians employed by hospitals or health systems across MSAs in the state, data from Irving Levin Associates Healthcare M&A Database identified only 44 mergers and acquisitions of physician practices and groups (hereafter “practices”) being acquired by hospitals since 1994. This may be attributable to the nature of physician practices, including many small practices that may not be captured by Irving Levin Associates because of their small size and lack of press coverage (Burns, Goldsmith, and Sen 2014). Irving Levin Associates Healthcare M&A Database is typically used to identify acquisitions of larger practices.

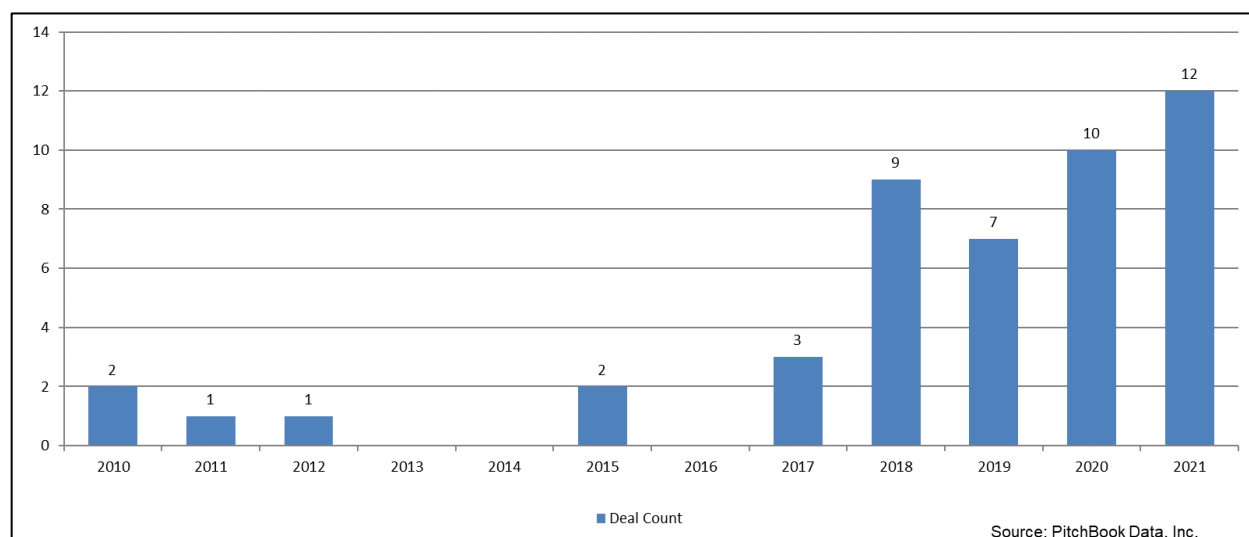
The most distinctive acquisition pattern from this data is the emergence of private equity groups as acquirers of physician practices. Of the 21 acquisitions that occurred in Indiana from

2010 to 2021, 12 involved acquirers that were either private equity firms or private equity-backed companies (Table A3.1 in the appendix). All of these acquisitions occurred during or after 2017. The practices acquired by private equity firms fall under specialties favored by these investors, such as women’s health, optometry/ophthalmology, dermatology, and dental services (Scheffler, Alexander, and Godwin 2021; Appelbaum and Batt 2020).

This trend towards private equity acquisitions in outpatient services mirrors what has occurred nationwide, drawing concern from academics, clinicians, regulators, and legislators. Private equity firms typically seek short-term returns, which are often achieved in healthcare through cost-cutting, sale of real estate owned by targets, and aggressive, debt-fueled acquisition strategies that can further concentrate healthcare markets and jeopardize the long-term financial health of target practices (Scheffler, Alexander, and Godwin 2021; Appelbaum and Batt 2020).

We supplemented our analysis of the Irving Levin Associates Healthcare M&A Database with additional analysis of PitchBook data. PitchBook is an industry-leading data platform focused on private equity and venture capital investments. We searched PitchBook for private equity acquisitions in the clinics and outpatient services sector, which includes physician practices. Figure 3.1 confirms the trend found through Irving Levin Associates data, showing an increase in the number of acquisitions in Indiana by private equity firms. This trend includes 41 acquisitions occurring during or after 2017, with a high of 12 acquisitions in 2021. The number of acquisitions by private equity firms identified using PitchBook may be higher than the number of acquisitions identified using Irving Levin Associates because PitchBook specializes in private equity merger and acquisition deals, and the clinics and outpatient services sector is broader than physician practices.

Figure 3.1: Number of Acquisitions in the Clinics and Outpatient Services Sector by Private Equity Firms, 2010-2021



Notes: Data as of 3/16/2022.

Source: Petris Center analysis of data from PitchBook Data, Inc. Data has not been reviewed by PitchBook analysts

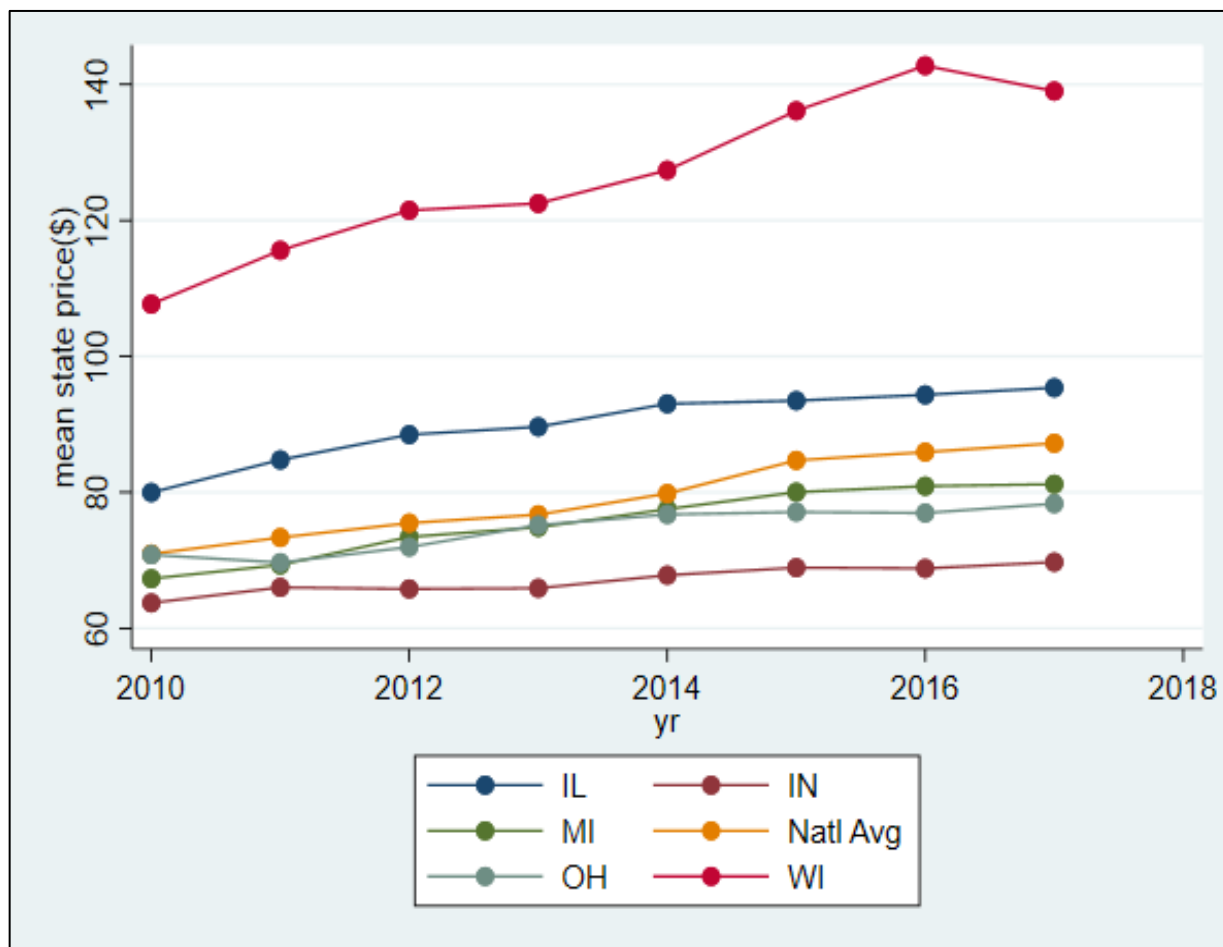
Physician Prices in Indiana Compared with Nearby States

While Indiana is known for high hospital prices, prior studies have found that physician prices in the state are relatively low (Whaley et al. 2020; Chernew, Hicks, and Shah 2020). This section confirms those findings using healthcare claims data from the Health Care Cost Institute (HCCI) 1.0 database, which is described in Section 2. We present trends over time in physician service prices, comparing mean prices in Indiana to those in comparison states and national averages. We selected procedures that were among the most commonly billed (physician fees for office visits and a newborn delivery with routine obstetric care) because prices for these procedures may have a significant impact on health expenditures.

Figure 3.2 plots mean physician price over time for a moderate-intensity office visit (CPT 99213) for PPO enrollees in Indiana versus comparison states and the national average. CPT 99213 was the most common CPT code in the HCCI claims database, making it useful for comparing physician prices. The figure shows that Indiana's prices are significantly lower than the national average (\$70 versus \$87 in 2017) and prices in other states in the East North Central census division. Price increases over time were also low in Indiana relative to other states. Indiana's mean price for this visit was \$64 in 2010 and \$70 in 2017, a 9% increase. Nationally, prices for this visit increased from \$71 to \$87 over this period, a 23% increase. Figures 3.3 and 3.4 show prices for other common physician visits: a higher-intensity office visit (CPT 99214) and a total obstetrical care package, including antepartum care, vaginal delivery, and postpartum care (CPT 59400). These figures show similar patterns to Figure 3.2, with Indiana's physician prices being consistently lower than those in other states and the national average.

As with our descriptive analysis of hospital prices, this analysis was conducted using HCCI claims data, which do not include claims from Anthem Blue Cross Blue Shield of Indiana, the largest insurer by enrollment in the employer-sponsored market. Therefore, while these data show that Indiana has lower physician prices than those in comparison states and the national average, they may still be overestimates of physician prices in the state, as previous work has shown that Anthem is able to negotiate lower prices than its competitors (Corlette, Keith, and Hoppe 2019).

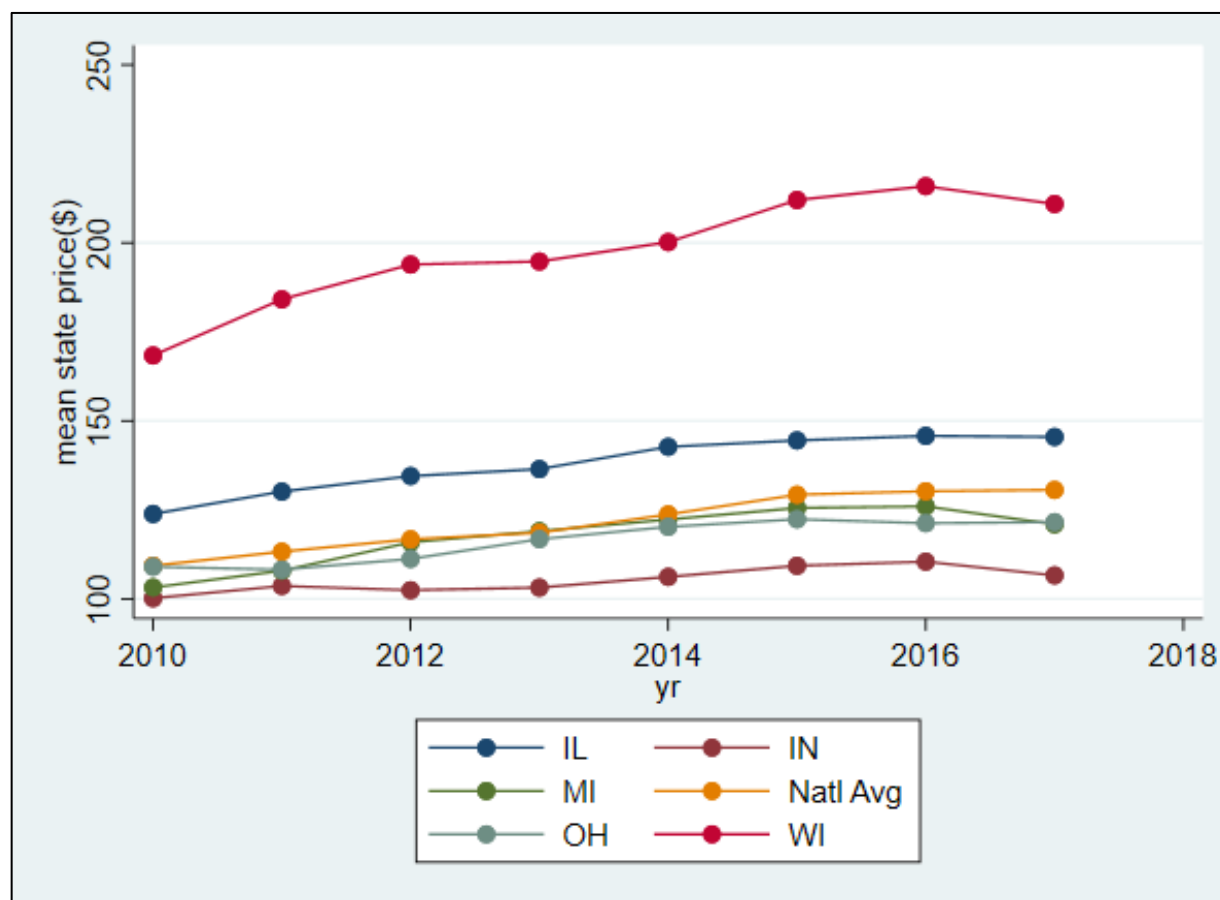
Figure 3.2: Prices for a Moderate-Intensity Office Visit in Indiana and Comparison States, 2010-2017



Notes: Natl Avg: National Average. The reported prices are means. Claims data restricted to PPO enrollees for consistency. The CPT code for a moderate-intensity office visit is 99213, which is for a 20- to 29-minute visit for an established patient.

Source: Petris Center analysis of Health Care Cost Institute 1.0 claims data

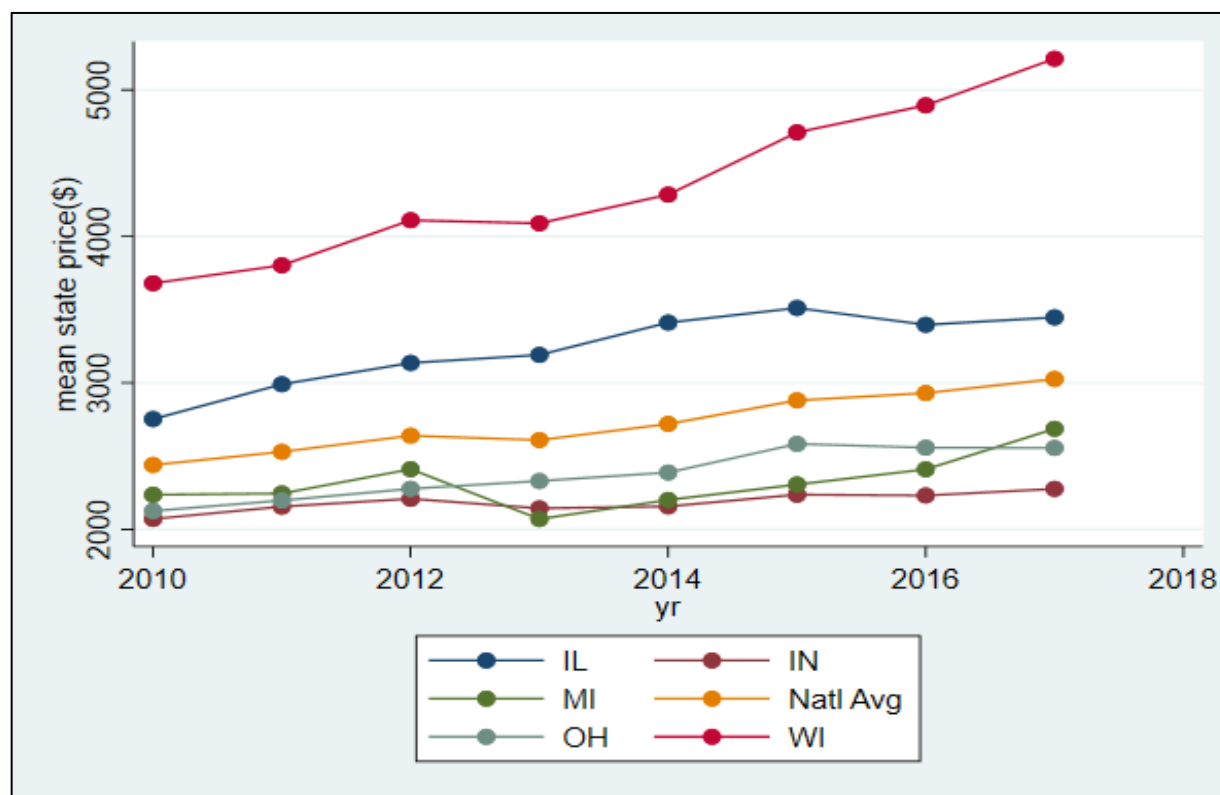
Figure 3.3: Prices for a Higher-Intensity Office Visit in Indiana and Comparison States, 2010-2017



Notes: Natl Avg: National Average. The reported prices are means. Claims data restricted to PPO enrollees for consistency. The CPT code for a higher-intensity office visit is 99214, which is for a 30- to 39-minute visit for an established patient.

Source: Petris Center analysis of Health Care Cost Institute 1.0 claims data

Figure 3.4: Prices for Total Obstetrical Package in Indiana and Comparison States, 2010-2017



Notes: Natl Avg: National Average. The reported prices are means. Claims data restricted to PPO enrollees for consistency. The CPT code for total obstetrical package is 59400, which includes antepartum care, vaginal delivery, and postpartum care.

Source: Petris Center analysis of Health Care Cost Institute 1.0 claims data

Impact of Hospital-Physician Vertical Integration on Physician Prices

In the United States, more physicians are becoming vertically integrated with hospitals, meaning physicians are either directly employed by the hospital or are part of a physician organization owned by the hospital, often as a result of the hospital acquiring the physician organization (Furukawa et al., 2020; Fulton, 2017). Two review studies examined evidence on the impact of hospital-physician vertical integration and found it generally led to higher healthcare prices and expenditures, while having small and generally insignificant relationships with quality of care (Machta et al., 2019; Post, Buchmueller, and Ryan 2018).

Physician billing practices, market power, and physician referral patterns are three key reasons why vertical integration can lead to higher prices. When patients visit physicians who are vertically integrated with hospitals, Medicare reimbursement policy, which is often followed by private payers, allows patients to be billed the hospital overhead rate (Post et al. 2021; Clemens and Gottlieb 2015). For example, when patients visit a primary care physician who works in a practice that is independently owned (e.g., by the physicians themselves), a single healthcare claim is generated for professional services that incorporates overhead costs for the visit, covering expenses such as office staff and space. In contrast, if that practice is acquired by a hospital, that same patient visit to the same physician office location will often generate two claims: one for the professional service fee (excluding overhead costs) and one for the hospital's overhead costs, called a facility fee. The combined amount of the two claims often exceeds the amount of the single claim that was generated before the acquisition. This may be a factor leading to high levels of vertical integration in Indiana (Table 3.2).

Medicare and some commercial payers are moving towards implementing policies that provide the same total reimbursement for outpatient services claims, regardless of whether facility claims are submitted alongside physician claims. However, vertical integration may lead to higher prices and spending even after implementing these policy changes. Studies have found that vertical integration may lead to higher unit prices for physician services, as hospitals may be able to negotiate higher rates with insurers than independent physicians or physician groups due to the superior bargaining power of hospitals and health systems (Godwin et al. 2021; Capps, Dranove, and Ody 2017; Scheffler, Arnold, and Whaley 2018).

Additionally, physicians that are vertically integrated have more expensive referral patterns to facilities owned by the health systems they are vertically integrated with (Baker, Bundorf, and Kessler 2015; Whaley et al. 2021; Richards, Seward, and Whaley 2022). For example, when physicians become vertically integrated with hospitals, they become more likely to refer patients to inpatient facilities than ambulatory surgery centers, and refer patients for diagnostic imaging tests at higher rates (Whaley et al. 2021; Richards, Seward, and Whaley 2022). These referrals to in-system facilities may be a form of anticompetitive behavior known as “vertical foreclosure,” in which hospitals are able to increase their market share relative to their competitors by employing physicians directly and capturing a greater number of referrals (Post, Buchmueller, and Ryan 2018).

To analyze the impact of physicians in Indiana becoming vertically integrated with hospitals, we compared the change in prices of physician services before and after the integration to the change in prices of physicians who did not become vertically integrated during the study period, 2010 to 2017. The physicians who became vertically integrated are called the “treatment group,” and the physicians who did become vertically integrated are called the

“comparison group.” This empirical approach is known as a difference-in-differences research design, which is powerful because it controls for time-invariant price differences between the treatment and comparison groups, as well as secular price trends that affect both groups.

The difference-in-differences regression model is shown in Equation 2, which is similar to the equation used for the hospital merger difference-in-differences analysis. In Equation 2, i indexes physicians and t indexes years. In the equation, Y is the outcome variable; VI is a binary variable that indicates whether a physician became vertically integrated with a hospital during the study period; $post$ is a binary variable that indicates whether the year is after the vertical integration occurred (including the year of the vertical integration); I is a vector of physician fixed effects to control for time-invariant outcome differences between the treatment and comparison physicians; $year$ is a vector of year fixed effects to control for secular outcome trends that affect both groups of physicians; and ε is the error term. The parameter of interest is β_1 because the interaction term, $VI \times post$, compares the change in the outcome measure (i.e., prices) before and after the vertical integration to the change in physician prices of physicians that did not vertically integrate during the study period.

$$Y_{i,t} = \beta_0 + \beta_1 VI_i \times post_t + \beta_2 I_i + \beta_3 year_t + \varepsilon_{i,t} \quad (2)$$

Next, we describe the physician price measures and present unadjusted trends of these measures for vertically integrated versus comparison physicians. The final subsection presents the difference-in-differences regression results for each price measure. We found that primary care physicians becoming vertically integrated with a hospital was associated with a 2.1% to 5.0% price increase for a moderate-intensity office visit.

Physician Price Measures

Physician prices were extracted from healthcare claims data from the Health Care Cost Institute (HCCI) 1.0 database, and a physician’s vertical integration status was based on our analysis of the SK&A Office Based Physician Database provided by IQVIA. Physicians were classified as being vertically integrated if they were directly employed by a hospital or health system or were part of a physician organization owned by the hospital or health system. The remainder of the physicians worked as sole practitioners or in a practice that was independent of a hospital or health system (e.g., owned by the physicians themselves). Because both datasets contain the Physician National Provider Identifier (NPI), the vertical integration status of a physician could be merged into each claim in HCCI.

Because prices vary by physician specialty, the analysis was limited to physicians with a primary care specialty. Physicians were dropped from the sample if they could not be observed in HCCI and SK&A data for the full 8-year study period (2010 to 2017), and individual physician-year observations were dropped if they had fewer than 10 claims or exceeded the 99th percentile of prices. In order to conduct a difference-in-differences analysis estimating the effect of a single “treatment” (becoming vertically integrated), we dropped physicians that were vertically integrated at the outset of the analysis (2010) or became vertically integrated during the study period, but returned to being not vertically integrated during the study period.

Physician prices were measured using the mean allowed amount paid to each physician in each year for a moderate-intensity office visit by an established patient (CPT code: 99213).

Because there are two ways vertical integration can increase prices, prices were analyzed using two related measures of prices: one reflecting the prices paid to physicians (physician prices) and one reflecting the total reimbursement in terms of physician prices and facility fee (combined physician price and hospital outpatient facility fee).

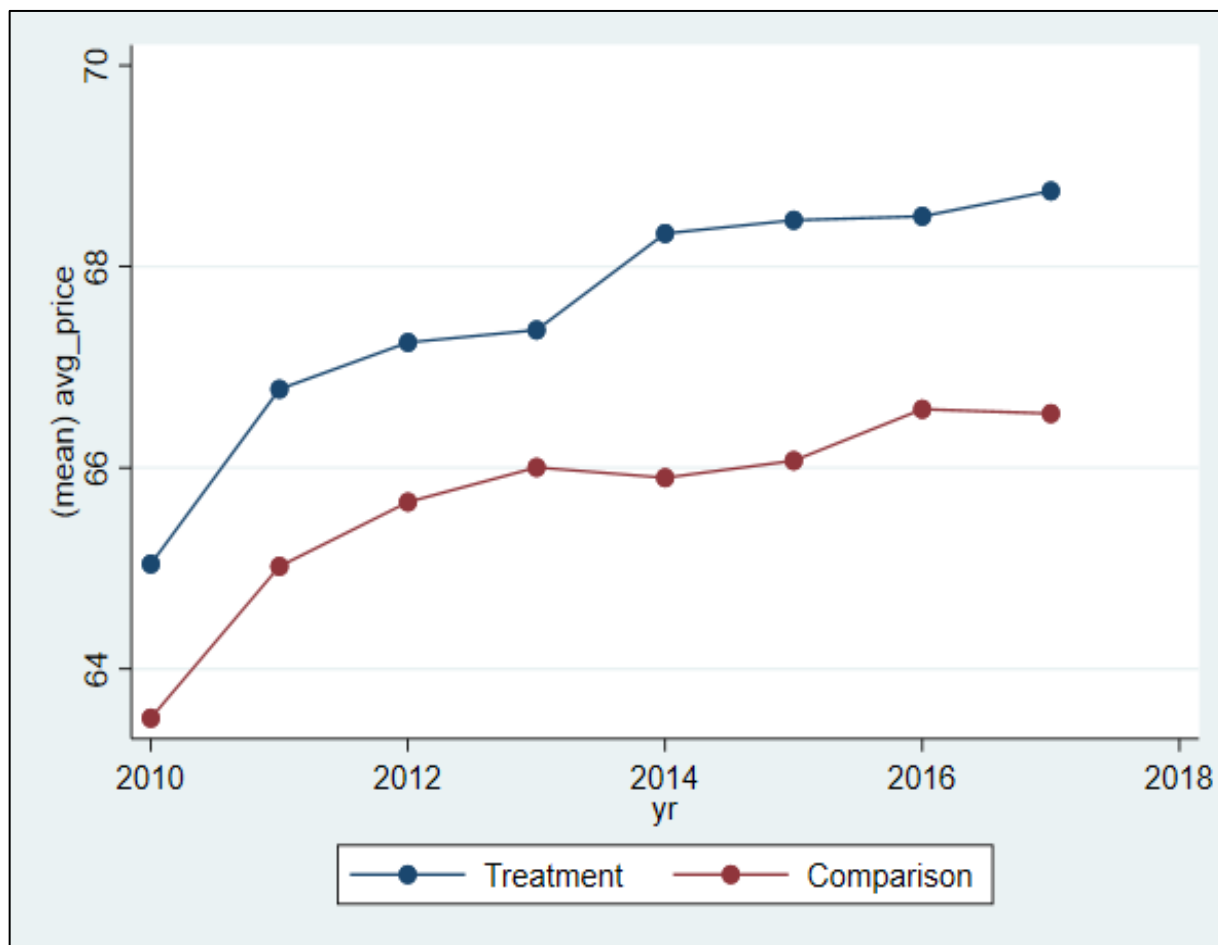
To assess the physician price outcome, we limited claims to those occurring in the “office” setting because claims with this place of service can only be reimbursed with a physician fee. To limit the influence of outliers, each physician-year mean price was natural log transformed, which is a common transformation in research on healthcare prices and spending. The natural log transformation means that the difference-in-differences coefficient in our regression analysis can approximately be interpreted as the percent change in prices associated with becoming vertically integrated.²²

Constructing the physician and hospital outpatient price outcome measure was more complicated, as physician and facility claims are submitted separately. Following previous work in this area, we added any hospital outpatient department spending attributed to the same patient on the same date as the physician price for the CPT code 99213 (Capps, Dranove, and Ody 2017). We then calculated means of this price measure for each physician-year observation and applied a natural log transformation to this measure. Claims from all place-of-service types were included in this sample. After matching claims data to our physician sample, the panel had 341 treated physicians and 781 comparison physicians for the physician price analysis, and 342 treated physicians and 783 comparison physicians for the physician and hospital outpatient price analysis. We identified slightly larger samples for the second price measure (physician and hospital outpatient price) due to the inclusion of claims from all places of service types.

Figures 3.5 and 3.6 plot price trends over the study period for the two price measures, comparing unadjusted mean price trends for physicians that became vertically integrated with physicians that did not become vertically integrated. Trends for physician price measures are found in Figure 3.5, which shows that in 2010, physicians who became vertically integrated had higher prices than comparison physicians (\$65.04 versus \$63.51). Price levels in this group were also higher in 2017 (\$68.75 versus \$66.54). Both differences were statistically significant at the 0.05 level.

²² The precise change equals $100 * (\exp(B) - 1)$, in which B is the difference-in-differences parameter estimate.

Figure 3.5: Physician Prices for Moderate-Intensity Office Visit for Physicians that Became Vertically Integrated versus Comparison Group, 2010-2017

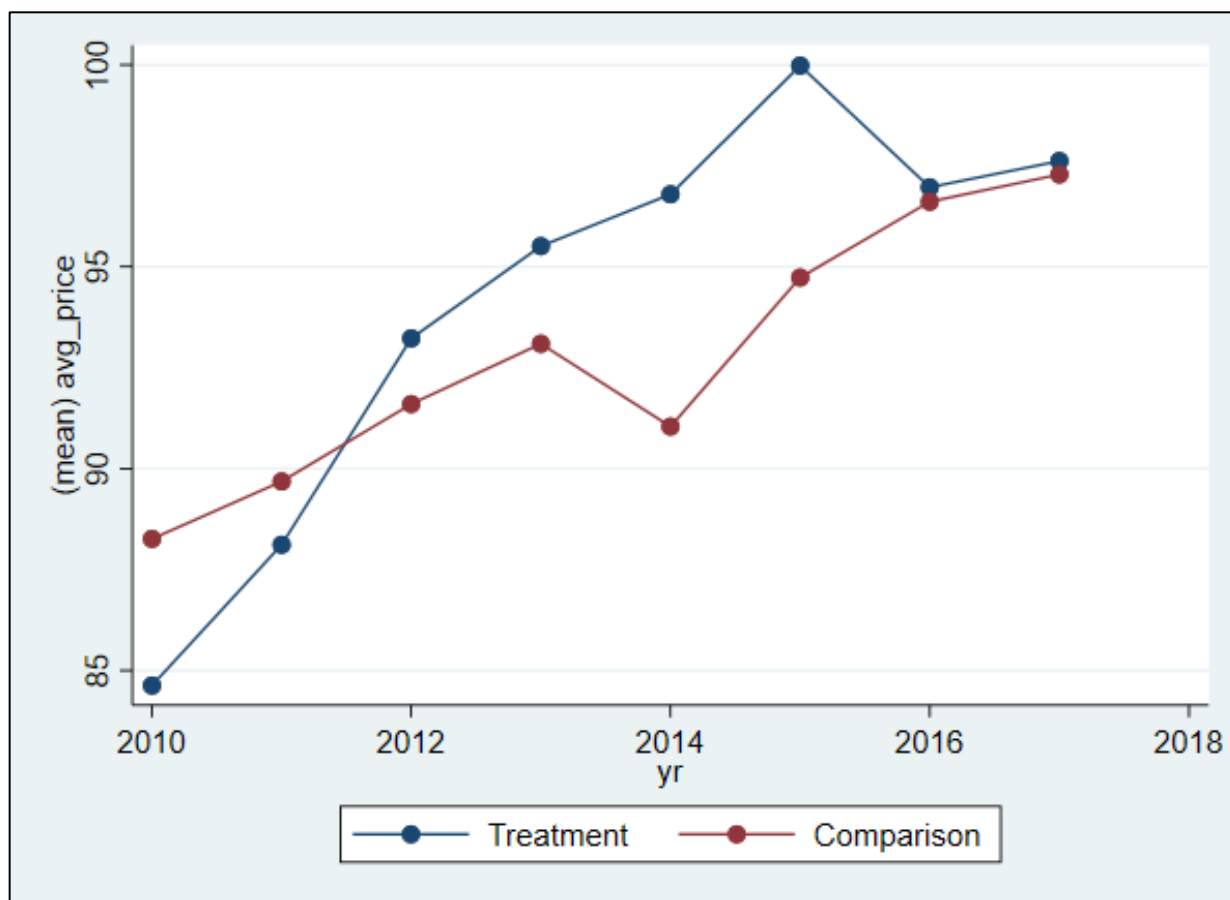


Note: The price measure is the physician's professional fee that incorporates overhead costs. Mean prices are reported. "Treatment" includes physicians that became vertically integrated during the study period, whereas "Comparison" includes physicians that did not become vertically integrated. Vertical axis is the mean price in current dollars by group (treatment vs. comparison group) and year. The "Physician price" measure reflects reimbursement for physician services for moderate-intensity office visit (CPT 99213) that was not submitted with an additional facility fee.

Source: Petris Center analysis of HCCI 1.0 claims data

Compared with Figure 3.5, Figure 3.6 shows a different trend in the combined physician price and hospital outpatient facility fee measure. Using this combined price measure, physicians that became vertically integrated had lower prices in 2010 (\$84.63 versus \$88.26), but by 2017 this difference had reversed. Physicians that became vertically integrated had higher prices in 2017 (\$97.61 versus \$97.28). Differences in these two groups were statistically significant at the 0.05 level in 2010, but they were not statistically significant in 2017.

Figure 3.6: Combined Physician Price and Hospital Outpatient Facility Fee for Moderate-Intensity Office Visit for Physicians that Became Vertically Integrated versus Comparison Group, 2010-2017



Notes: The price measure is the combined physician professional fee (that excludes overhead costs) and the hospital outpatient facility fee. Mean prices are reported. “Treatment” includes physicians that became vertically integrated during the study period, whereas “Comparison” includes physicians that did not become vertically integrated. Vertical axis is the mean price in current dollars by group (treatment vs. comparison group) and year. The “Physician and hospital outpatient price” measure is the combined physician and hospital outpatient fee reimbursement for a moderate-intensity office visit (CPT 99213).

Source: Petris Center analysis of HCCI 1.0 claims data

Regression Results

Table 3.3 shows the results of the difference-in-differences regression models that estimated the effect of vertical integration on physician prices (model 1) and physician prices that include hospital facility fees (model 2) for a moderate-intensity office visit (CPT 99213). We selected this office visit type because it is the most common type of visit in the HCCI database. Model 1 shows that vertical integration was associated with a statistically significant 2.1% (95% CI: 0.3% to 3.9%) increase in physician prices.²³ In 2017, the mean price for this visit among physicians in the comparison group was \$66.53, and a 2.1% increase in this price would be \$1.37.

Model 2 shows that vertical integration was associated with larger price increases when accounting for billing of facility fees for this visit, resulting in a 5.0% (95% CI: 1.9% to 8.3%) increase in the combined physician and facility fee price measure. In 2017, the mean price for this measure among physicians in the comparison group was \$97.28, and a 5.0% increase in this price would be \$4.86.

Table 3.3: Moderate-Intensity Office Visit Price Difference-in-Differences Regression Results

	Model 1 ln(Physician Price)	Model 2 ln(Physician Price + Hospital Outpatient Facility Fee)
Vertical Integration × Post	0.0204** (0.0091)	0.0491*** (0.0156)
Fixed Effects	Physician, Year	Physician, Year
Study period	2010-2017	2010-2017
Observations	8,694	8,733
Weighted	Yes, # office visit claims	Yes, # office visit claims
R-squared	0.784	0.541

*** p<0.001 ** p<0.01 * p<0.05

ln: natural log

Notes: For model 1, the physician price is the professional fee that incorporates overhead costs for a moderate-intensity office visit (CPT 99213) that was not submitted with an additional facility fee. For model 2, the price measure is the combined physician professional fee (that excludes overhead costs) and the hospital outpatient facility fee for a moderate-intensity office visit. The coefficient estimates and standard errors (in parentheses) are based on the natural log transformation of these price measures, so a coefficient estimate represents the following difference-in-differences percent change in price: $100 * (\exp(B) - 1)$, in which B is the parameter estimate. For model 1, the calculation is $100 * (\exp(.0204) - 1) = 2.1\%$, and for model 2, the calculation is $100 * (\exp(.0491) - 1) = 5.0\%$. Standard errors were estimated by clustering at the physician level.

Source: Authors' analysis of HCCI 1.0 claims data and SK&A Office Based Physicians Database provided by IQVIA

²³ CI is confidence interval.

The results of these analyses should be interpreted in the context of the following limitations. One key assumption of a difference-in-differences model is that pre-treatment (i.e., pre-vertical integration) price trends between the treatment and the comparison physicians are parallel. If they are not parallel, then absent the treatment, the non-parallel trends may have persisted into the treatment period, biasing the results. To test this assumption, we estimated fully dynamic event study models (Sun & Abraham 2021) (see Figures A3.1 and A3.2 in the appendix). The results in those figures are consistent with the difference-in-differences results and show that the event-study-adjusted outcome trends were mostly parallel between treatment and comparison groups prior to the treatment (i.e., the vertical integration). In a future study, more years of pre-vertical integration price data could more strongly confirm this assumption for model 2 (Figure A3.2). A second limitation of these analyses is that we used HCCI data, which does not include claims from Anthem Blue Cross Blue Shield of Indiana claims, so our results may not be generalizable to that payer. Third, although the moderate-intensity office visit (CPT 99213) was the most common type of visit in the HCCI database, a future study could examine additional CPT codes to determine if the price effect is heterogeneous. Fourth, while physician-fixed effects control for time-invariant physician characteristics, risk-adjusting the patient populations attributed to physicians was beyond the scope of this analysis. Consequently, year-to-year changes in patients treated could affect our results. Fifth, a study reported that the SK&A data sometimes lags in capturing physicians vertically integrating (Capps, Dranove, and Ody 2018); this would attenuate regression results toward zero, understating the price effect we found.

Despite the limitations of this analysis, the findings presented here are consistent with prior work, although the price increases associated with vertical integration in this study are somewhat smaller. For instance, a major study found reimbursement increases as high as 14% associated with the acquisition of physician practices by hospitals and health systems (Capps, Dranove, and Ody 2018). Furthermore, while this analysis found fairly small price increases associated with vertical integration, vertical integration can also raise total healthcare spending as a result of higher hospital prices, less competitive markets due to vertical foreclosure, and more expensive referral patterns (Whaley et al. 2021; Richards, Seward, and Whaley 2022; Baker, Bundorf, and Kessler 2014; 2015).

Section 4: Health Insurance Markets

Insurer market power is an important factor in determining healthcare prices and insurance premiums. Studies have found that concentrated insurance markets may limit provider price growth because insurers can use market power to attain lower prices from hospitals and physicians (Scheffler and Arnold 2017; Trish and Herring 2015). However, that market power can also be used to negotiate greater premium increases with employers, meaning that lower provider price growth may not translate into more affordable insurance premiums (Trish and Herring 2015; Dafny, Duggan, and Ramanarayanan 2012).

Indiana's health insurance markets are highly concentrated and dominated by Anthem Blue Cross Blue Shield of Indiana, particularly in the employer-sponsored and off-exchange markets with a combined market share of 65% in 2021. Across the four market segments we analyzed—employer-sponsored market, individual market (on- and off-exchange), Medicaid managed care, and Medicare Advantage—it had over half the enrollment with a 53% market share.

All 15 MSAs in Indiana had highly concentrated ($\text{HHI} > 2,500$) commercial markets in both 2010 and 2021 and the median HHI increase across MSAs was 133 over the period.²⁴ Although Indiana had some of the highest hospital prices in the country coupled with highly concentrated health insurance markets, its health insurance premiums in the employer-sponsored market were similar to the national average in 2020: \$7,319 versus \$7,149 (or 2.4% higher) for a single-enrollee premium (i.e., a subscriber with no dependents), and \$20,125 versus \$20,758 (or 3.0% lower) for a family premium. However, these premiums were much less affordable for the average worker in Indiana because workers' average annual pay was \$51,957, or 18.8% less than the national average of \$64,021. Hence, single-enrollee premiums accounted for 14.1% of pay in Indiana versus only 11.2% of pay in the United States. If Indiana's single-enrollee premiums decreased to be 11.2% of workers' average annual pay—the same as the national average—then premiums would need to decrease from \$7,319 to \$5,802 (or 20.7%). The equivalent percentage decrease needed for family premiums would be 16.3%.

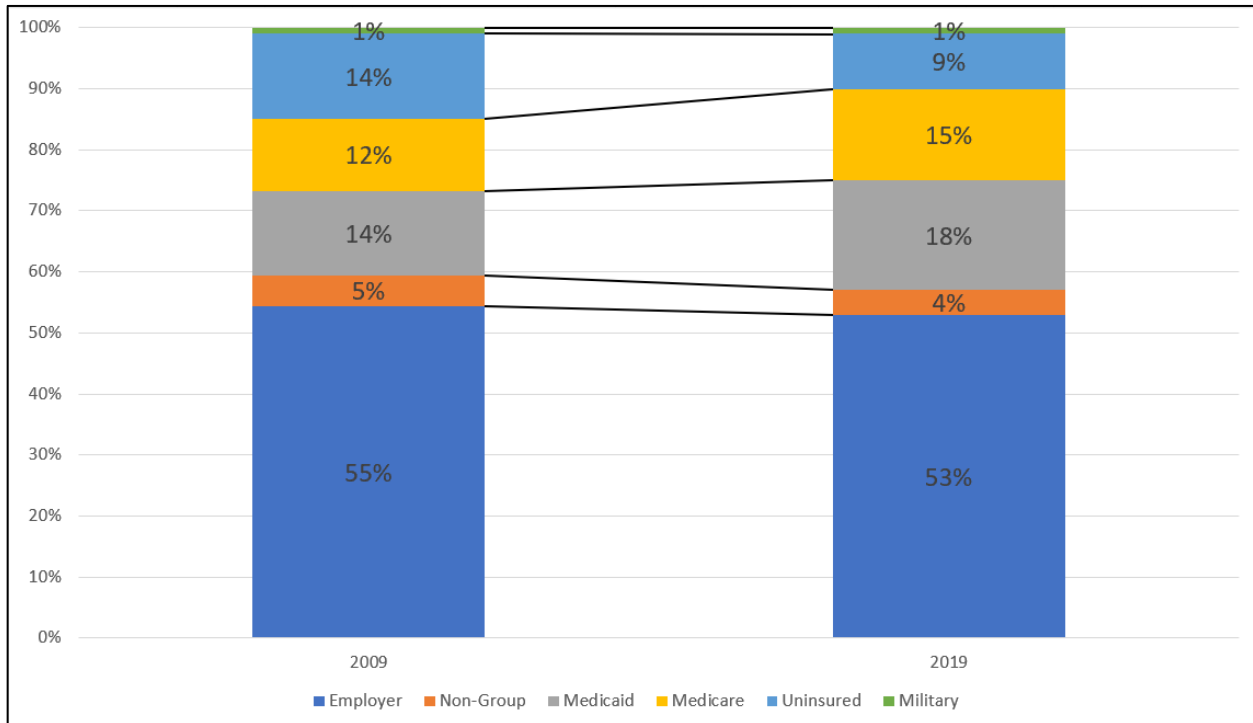
In this section, we present descriptive analyses of the insurance status of Indiana residents, insurer market structure, health insurance premium levels, and premium levels as a share of workers' average annual pay, which serves as a measure of health insurance affordability in the state.

²⁴ For the market concentration analysis, commercial markets included the combined number of enrollees by insurer in the employer-sponsored and individual markets (both on- and off-exchange).

Insurance Coverage by Market Segment

Between 2009 and 2019, the major change in insurance coverage among Indiana's population was that the share of residents who were uninsured decreased from 14% to 9%, primarily because of the Affordable Care Act, including Indiana's decision to expand Medicaid effective February 1, 2015 (Figure 4.1). In 2019, however, most (53%) of Indiana's residents still had insurance through their employer.

Figure 4.1: Health Insurance Coverage by Market Segment in Indiana, 2009 and 2019

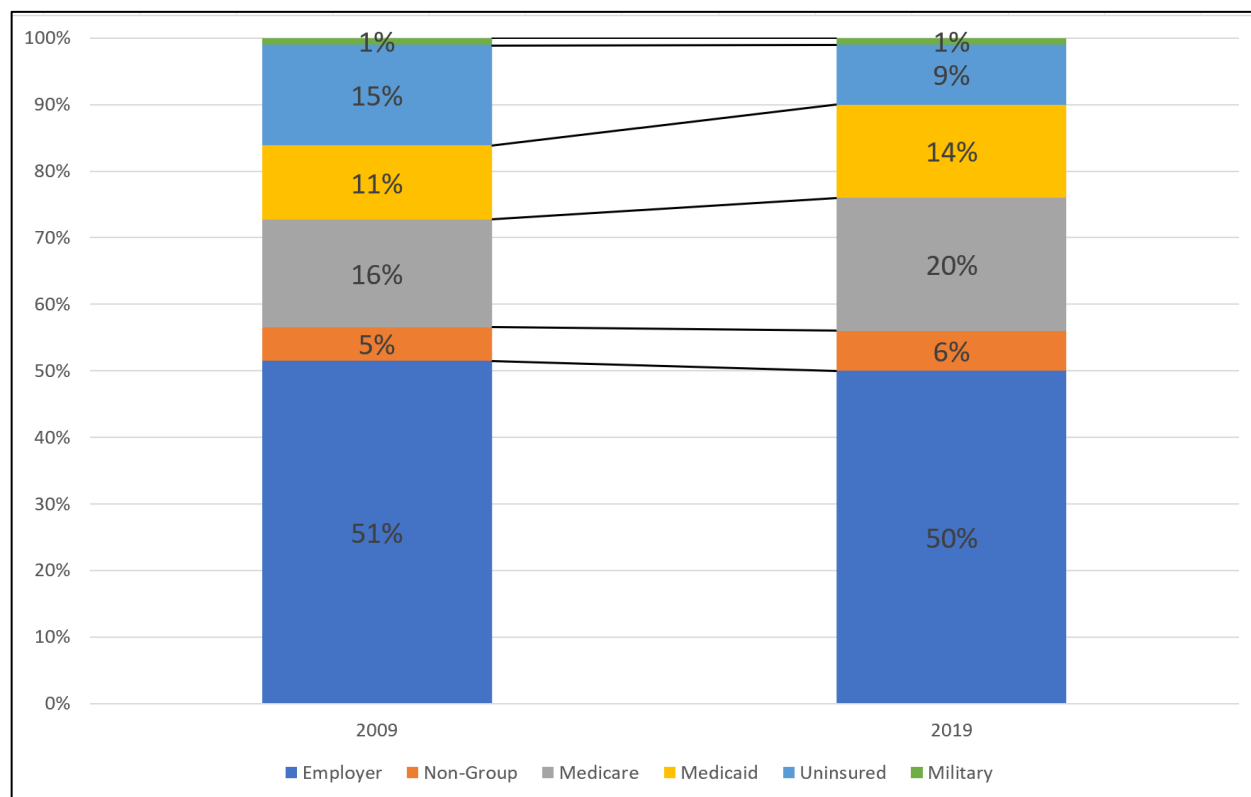


Notes: Individuals enrolled in both Medicaid and Medicare, known as dual eligibles, are classified as Medicare. Totals may not sum to 100% due to rounding.

Source: Petris Center analysis of Kaiser Family Foundation's analysis of the American Community Survey's Annual Social and Economic Supplement (Kaiser Family Foundation 2022)

For a comparison to Indiana, Figure 4.2 shows insurance coverage by market segment for the United States, which was similar in percentage terms to Indiana.

Figure 4.2: Health Insurance Coverage by Market Segment in the United States, 2009 and 2019



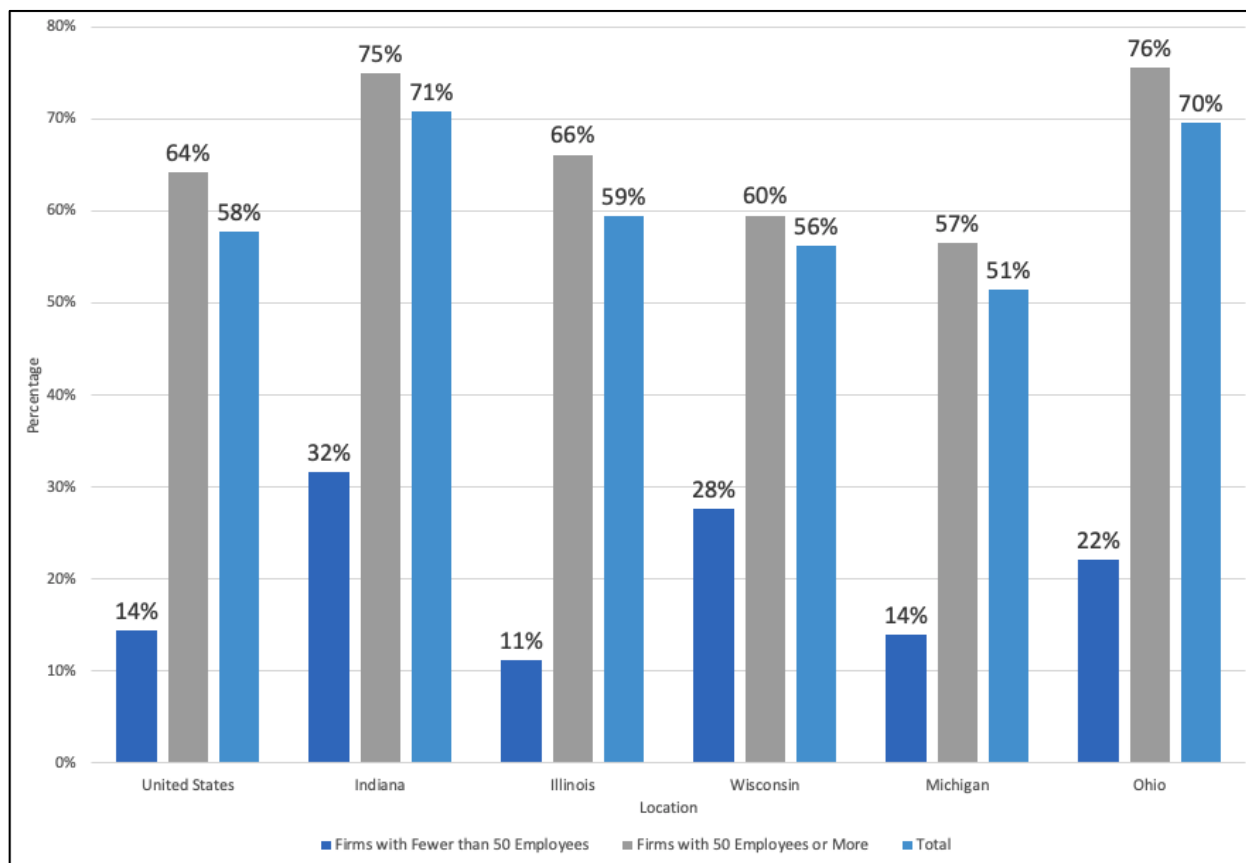
Notes: Individuals enrolled in both Medicaid and Medicare, known as dual eligibles, are classified as Medicare. Totals may not sum to 100% due to rounding.

Source: Petris Center analysis of Kaiser Family Foundation's analysis of the American Community Survey's Annual Social and Economic Supplement (Kaiser Family Foundation 2022)

Indiana had a higher percentage of private sector enrollees in self-insured plans in 2020 compared with the national average and nearby states (Figure 4.3). For firms with 50 or more employees, 75% of private sector enrollees were enrolled in self-insured plans in Indiana, which is significantly higher than the national average of 64% and second highest when compared to nearby states (Ohio at 76%). Among firms with fewer than 50 employees, 32% of Indiana's private sector enrollees were in self-insured plans, which was again significantly higher than the national average (14%) and the highest among nearby states (Wisconsin was second at 28%). Across firms of all sizes, 71% of Indiana's private sector enrollees were in self-insured plans, 13 percentage points above the national average of 58%.

Employers often choose self-insured plans to avoid state-mandated benefits and state premium taxes. Instead of contracting with an insurance company to cover the healthcare costs employees may accrue, employers can pay healthcare claims directly under a self-insured plan with a third-party administrator. The risks of self-insurance can be mitigated through the purchase of stop-loss insurance and may be worthwhile for employers due to the significant savings that can be achieved through reduced insurer payments, regulatory burden, and state taxes on premiums. The prices paid under self-insured plans have been shown to be largely a function of provider market power, meaning self-insurance alone is insufficient to contain price growth (Sachdev, White, and Bai 2019).

Figure 4.3: Share of Private-Sector Enrollees Enrolled in Self-Insured Plans in Indiana and Comparison States, 2020



Notes: This figure shows the share of private sector enrollees enrolled in self-insured plans in 2020, which is based on information from the Medical Expenditure Panel Survey (MEPS) Insurance Component, an annual survey of establishments that collects information about employer-sponsored health insurance offerings in the US. The total percentages are based on a weighted average of the number of employees in firms with fewer than 50 employees versus firms with 50 or more employees.

Source: Petris Center analysis of Kaiser Family Foundation's analysis of Medical Expenditure Panel Survey - Insurance Component (MEPS-IC) (Kaiser Family Foundation 2022)

Health Insurance Market Structure Trends

To examine health insurance markets in Indiana, we used Decision Resources Group's (DRG's) Managed Market Surveyor, an often-used data source to measure insurance market structure (Guardado and Kane 2021; Fulton 2017; Trish and Herring 2015). The dominant insurer by enrollment is Blue Cross Blue Shield of Indiana, which in 2021 had over half of the enrollment with a 53% market share (Table 4.1).²⁵ It had the largest market share for the combined employer-sponsored and off-exchange markets (65%) and the Medicaid managed care market (44%), combined with a sizeable market share in the Medicare Advantage market (22%). BCBS of Indiana is owned by Anthem (now called Elevance Health), headquartered in Indianapolis, Indiana, and Anthem owns Blue Cross and Blue Shield licensed insurance companies in 14 states. The other large national insurers—UnitedHealth Group, Aetna (CVS Health), Cigna, and Humana—also have enrollment in the state, but their market shares are much smaller than BCBS of Indiana's. Together with Anthem, these national insurers are known as the "Big Five Health Insurers" (Schoen and Collins 2017).

Next, we discuss the largest insurers in each market segment in 2021 (except for the Indiana exchange, which is for 2020).²⁶ In the employer-sponsored and off-exchange markets, Anthem BCBS of Indiana was the dominant insurer with 65% of the enrollment. The next largest was UnitedHealth Group with 14% of enrollment, followed by Cigna (8%) and CVS Health (Aetna) (7%).

As part of the Affordable Care Act, Indiana began enrolling individuals as a federally facilitated exchange, effective January 1, 2014. In 2020, only two insurers offered plans, with CareSource having 57% market share and Centene having the remaining 43%. CareSource is based in Dayton, Ohio, and specializes in Medicaid managed care and the exchange markets in six states. Similarly, Centene is a national insurer also specializing in Medicaid managed care and the exchange markets, operating as Ambetter from Managed Health Services in the Indiana exchange. In 2022, along with CareSource and Centene, Anthem BCBS of Indiana and U.S. Health and Life (owned by Ascension) also offer plans.

Indiana expanded Medicaid under its Healthy Indiana Plan, effective February 1, 2015. In the Medicaid managed care market in 2021, Anthem BCBS of Indiana was the largest insurer with 44% of the enrollment, followed by McLaren with 25% market share, then Centene (operating as Managed Health Services in this market segment in Indiana) with 22% market share.

²⁵ In Table 4.1, enrollees of out-of-state Blues plans were assigned to BCBS of Indiana if the enrollee resided in Indiana. For instance, just over 700,000 of the 1.8 million enrollees in the employer-sponsored and off-exchange markets assigned to BCBS of Indiana were from other Blues plans, mainly Health Care Service Corporation, which owns BCBS of Illinois and Blues in four other states, and Highmark, which owns Blues in Pennsylvania, West Virginia, and Delaware. When employers based outside of Indiana (e.g., Illinois) have employees residing in Indiana, then BCBS of Illinois is called their home plan and BCBS of Indiana is called their host plan because the plans participate in the national BlueCard Program (Blue Cross Blue Shield of Illinois 2020). The home plan is responsible to pay the healthcare claims of its members, but the claim is processed by the host plan based on rates that it negotiated with the provider because the home plan generally does not have contracted rates with out-of-state providers. Hence, from the perspective of healthcare providers, when the host plan negotiates with them, the market power of the host plan is derived not only from its own members (that reside in the host's state), but also from other BCBS plan members that reside in the host's state.

²⁶ See Table 4.1, Note b, for why we report 2020 information for the exchange.

Medicare Advantage is the final market segment shown in the table, including these market shares for the three largest insurers in 2021: UnitedHealth Group (35%), Humana (28%), and BCBS of Indiana (22%).

The last column in the table is the total market share across the four market segments, weighted for the enrollment in each segment, showing that BCBS of Indiana had over half the enrollment with a 53% market share in 2021.

Table 4.1: Market Share of Major Insurers by Market, 2021

Insurer	Employer + Off-Exchange ^a	Exchange (Individual + SHOP) ^b	Medicaid Managed Care	Medicare Advantage	Total ^c
Anthem Blue Cross Blue Shield of Indiana ^d	65%	0%	44%	22%	53%
UnitedHealth Group	14%	0%	0%	35%	12%
Centene ^e	0%	43%	22%	0%	8%
McLaren	0%	0%	25%	0%	7%
CVS Health (Aetna)	7%	0%	0%	11%	5%
Cigna	8%	0%	0%	0%	4%
CareSource	0%	57%	9%	0%	4%
Humana	1%	0%	0%	28%	4%
Other	5%	0%	0%	4%	4%
Total	100%	100%	100%	100%	100%
Market Size (enrollees)	2,748,284	125,488	1,413,925	507,774	4,795,471

SHOP: Small Business Health Options Program

Notes: Enrollment is as of January 1, 2021, for all markets except for the Indiana exchange market. For that market enrollment is as of December 31, 2020 (see Note b below).

^aEnrollees in employer-sponsored market and off-exchange individual market are reported together because it was not possible to separate their enrollment, but the employer-market enrollees account for the vast majority of these enrollees.

^bIn 2021, Anthem Blue Cross Blue Shield of Indiana also participated in the Indiana exchange, but the enrollment for the Indiana exchange in this table is as of December 31, 2020 because the Managed Market Surveyor did not incorporate Anthem's exchange enrollment as of January 1, 2021.

^cTotal is based on the market shares in each market weighted for enrollment.

^dIn June 2022, Anthem change its corporate name to Elevance Health.

^eCentene operates as Ambetter from Managed Health Services in the Indiana exchange and as Managed Health Services in Indiana's Medicaid managed care market.

Source: Petris Center analysis of Managed Market Surveyor provided by Decision Resources Group (now Clarivate)

Next, we calculated the market concentration in each of Indiana's 15 MSAs for 2010 and 2021. The enrollees included in this calculation were enrollees in the employer-sponsored and on- and off-exchange markets (Table 4.1, columns 1 and 2 combined, hereafter "commercial enrollees"). We calculated market shares using each insurer's share of enrollees in each MSA.

In 2010, all 15 MSAs in Indiana had an HHI that was above the U.S. Department of Justice and Federal Trade Commission's threshold to be considered highly concentrated (HHI > 2,500) (Table 4.2). By 2021, all 15 MSAs were still highly concentrated, and the median change in HHI across the MSAs was 368, but there was significant variation in this change. The HHI in the Evansville and Louisville/Jefferson County MSAs both increased by over 1,500. In both of these cases, our analysis found that competitors of Anthem either exited these markets entirely or lost significant market share to Anthem.

Table 4.2: Insurer Market HHI for Commercial Enrollees by MSA, 2010 and 2021

MSA	HHI (2010)	HHI (2021)	Change in the HHI
Bloomington, IN	4058	4434	376
Columbus, IN	4521	4625	104
Elkhart-Goshen, IN	4587	4273	-314
Evansville, IN-KY	2906	5012	2106
Fort Wayne, IN	3604	3139	-465
Indianapolis-Carmel-Anderson, IN	4041	4160	119
Kokomo, IN	3762	4452	690
Lafayette-West Lafayette, IN	2847	4241	1394
Michigan City-La Porte, IN	4723	5091	368
Muncie, IN	4418	3746	-672
South Bend-Mishawaka, IN-MI	4353	4460	107
Terre Haute, IN	5855	5632	-223
Chicago-Naperville-Elgin, IL-IN-WI	4608	5001	393
Cincinnati, OH-KY-IN	2670	3239	569
Louisville/Jefferson County, KY-IN	2972	4670	1698
Median	4058	4452	368

Notes: HHI = Herfindahl-Hirschman Index. The HHIs were calculated using insurer market share of enrollment in commercial markets, defined as the combined number of enrollees by insurer in the employer-sponsored and individual markets (both on- and off-exchange). MSAs located primarily in other states are shaded gray. The “Median” row shows the median for each column, including the change in the HHI. The change in the HHI was calculated using more precision than the displayed values, so the apparent difference may be different than the calculated difference. HHI categories:

HHI < 1,500: Unconcentrated

1,500 ≤ HHI ≤ 2,500: Moderately concentrated

HHI > 2,500: Highly concentrated

Source: Petris Center analysis of Managed Market Surveyor provided by Decision Resources Group (now Clarivate)

Our estimates of Indiana’s insurance market concentration in 2021 (Table 4.2) were slightly higher compared with previously published estimates (Guardado and Kane 2021). This may be the result of our data being more recent (by one year) or our inclusion of Blue Cross Blue Shield plans in neighboring states that have enrollees living in Indiana, such as Blue Cross Blue Shield Illinois. These enrollees were excluded from the Guardado and Kane study, but we included them because out-of-state Blue enrollees affect BCBS of Indiana’s market power via the national BlueCard program (described above).

Although DRG’s Managed Market Surveyor is often used to study health insurance market concentration (Guardado and Kane 2021; Fulton 2017; Trish and Herring 2015), the results should be interpreted based on an understanding of its strengths and limitations. Neither the U.S. government nor Indiana’s government maintains a database of insurers’ enrollees by market segment and geographic area, so proprietary databases (such as the Managed Market Surveyor), surveys, financial filings, insurance filings, and government and insurer websites are used to make these estimates. The core of the Managed Market Surveyor’s enrollment information is based on the DRG National Medical and Pharmacy Census, whereby insurers directly report enrollment information in January and July each year (Clarivate, 2021).²⁷ Hence, non-responses by insurers is a limitation, but DRG supplements its census with the sources listed above. In the appendix, we discuss these sources in more detail and compare the Managed Market Surveyor’s market-level estimates to a frequently-used survey to estimate insurance coverage—the American Community Survey’s Annual Social and Economic Supplement—and also compare the Managed Market Surveyor’s market-share estimates to insurer filings to the National Association of Insurance Commissioners (NAIC). In summary, MMS enrollment information is consistent with these sources, but it has less enrollment in the employer-sponsored market. Nevertheless, we do not think the difference would bias our market share estimates for one particular insurer over another.

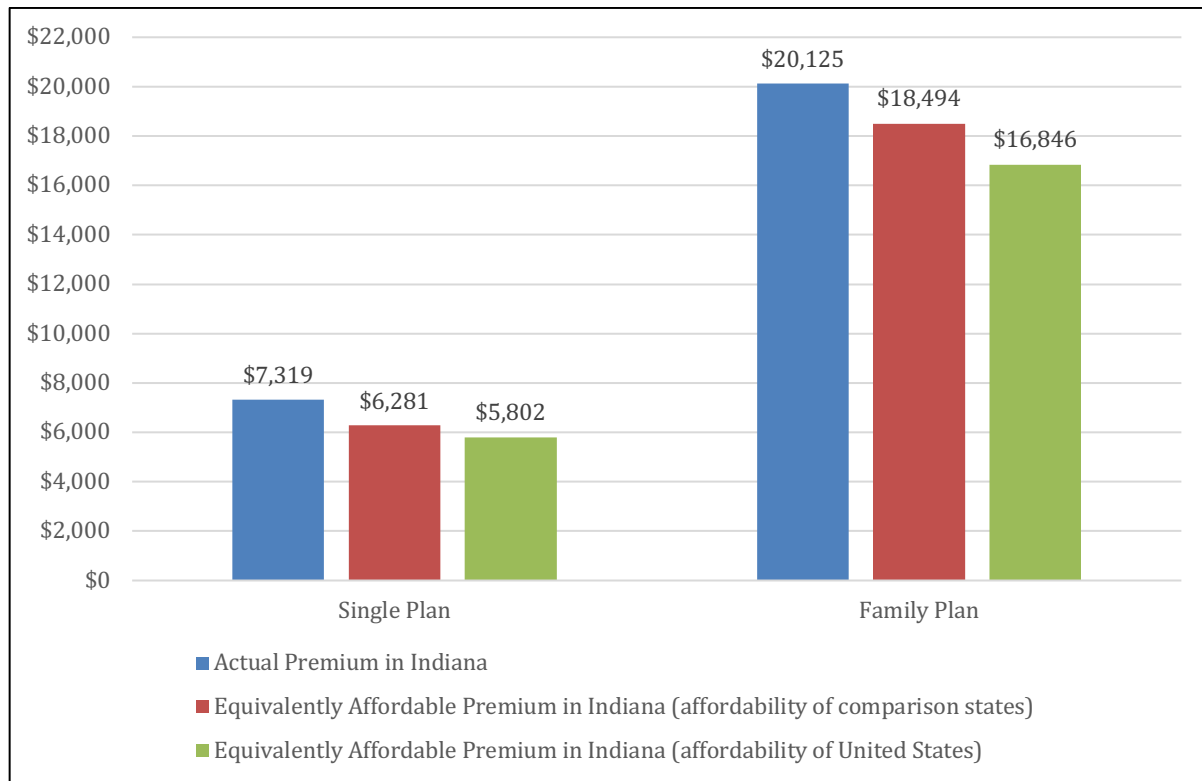
²⁷ Clarivate acquired Decision Resources Group in 2020.

Health Insurance Premiums and Affordability

In this section, we examine Indiana's health insurance premiums in the employer-sponsored market, both the premium level and the level as a percentage of wages. The employer-sponsored market was selected because over half (53%) of Indiana's population is insured through an employer (Figure 4.1). We calculated premiums as a percentage of wages to measure health insurance affordability because workers often pay a portion of premiums, and an employer's contribution to premiums is mostly borne by workers through lower market wages. In addition, because local wages influence healthcare and insurance costs, calculating premiums as a percentage of wages improves upon merely comparing premiums across states. Hence, we not only compare premium levels, but we also compare premium affordability in Indiana to the other states in its census division (Illinois, Ohio, Michigan and Wisconsin) and to the United States as a whole.

The main finding is that health insurance is less affordable in Indiana. In 2020, employer-sponsored insurance premiums for a single-enrollee plan (i.e., a subscriber with no dependents) were 14.1% of workers' average annual pay, while they were only 12.1% on average in the comparison states and 11.2% in the United States. The share of 14.1% in Indiana is based on a premium of \$7,319 and average annual pay of \$51,597. To achieve the same affordability as in the comparison states—12.1% of workers' average annual pay—premiums in Indiana would need to decrease to \$6,281, a decrease of \$1,038 (or by 14.2%) (Figure 4.4). And to achieve the same affordability as in the whole United States, premiums in Indiana would need to decrease by \$1,517 (or by 20.7%).

Figure 4.4: Indiana's Average Annual Actual and Equivalently Affordable Premiums for Employer-Sponsored Insurance, 2020



Notes: Comparison states are Illinois, Michigan, Ohio and Wisconsin. For that comparison, the equivalently affordable premiums in Indiana was calculated using the (simple) average affordability in those states.

Source: Petris Center analysis of Kaiser Family Foundation's analysis of Medical Expenditure Panel Survey - Insurance Component (MEPS-IC) (Kaiser Family Foundation 2022); and Petris Center analysis of the average annual pay measure from the Quarterly Census of Employment and Wages (U.S. Bureau of Labor Statistics 2022a)

When we examined employer-sponsored family premium affordability in the same manner, the results were consistent with those of the single-enrollee premium affordability. Family premiums in Indiana would need to decrease from \$20,125 to \$18,494 (or 8.1%) to meet the affordability in the comparison states, and premiums would need to decrease from \$20,125 to \$16,846 (or 16.3%) to meet the affordability in the United States (Figure 4.4). In addition, when we examined affordability for single-enrollee and family premiums from 2013 to 2019, the results were consistent with the 2020 results.

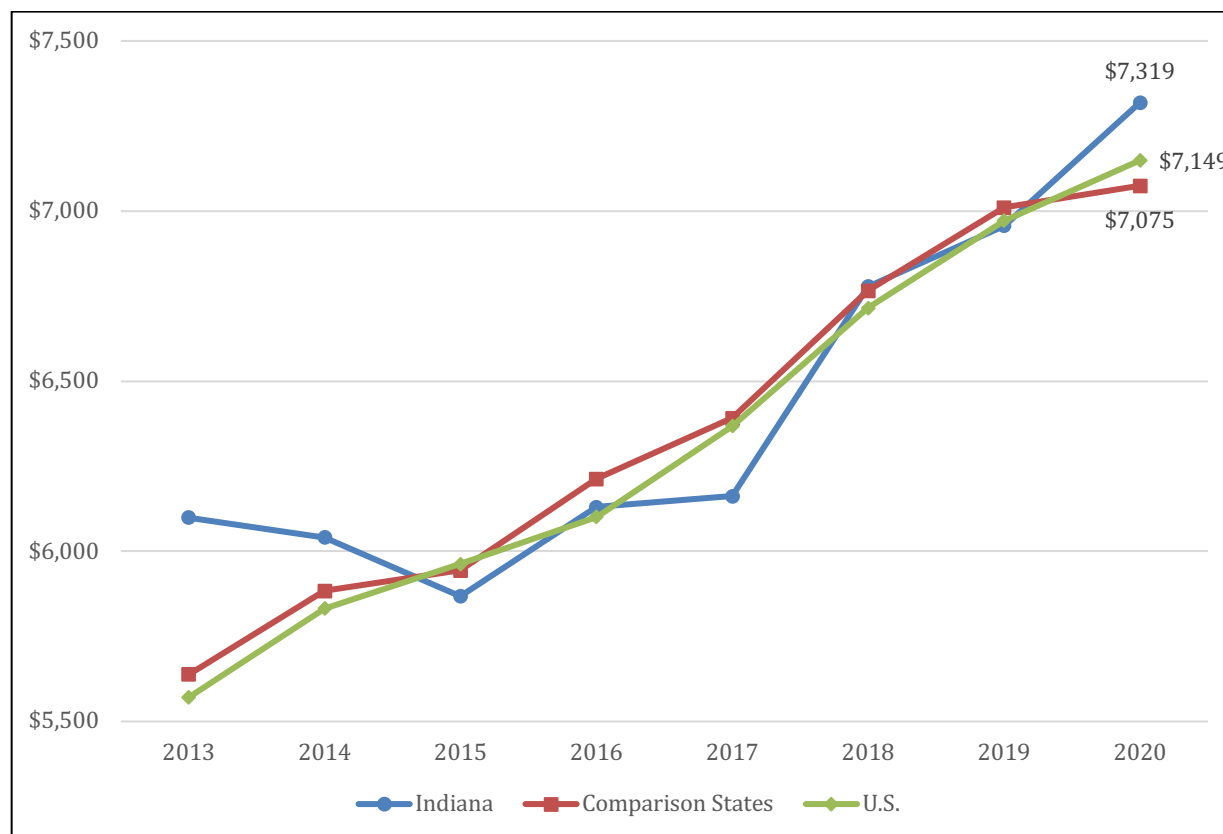
Next, we explain our data sources and present the results above. The source for health insurance premiums is the Medical Expenditure Panel Survey (MEPS) - Insurance Component from 2013 to 2020 as reported by the Kaiser Family Foundation (Kaiser Family Foundation, 2022). The MEPS-IC is an annual survey that began in 1996 and collects information about employer-sponsored health insurance offerings in each state in the United States (Agency for Healthcare Research and Quality 2022a). The sample frame is a nationally representative sample of employers developed from the Census Bureau lists for the private sector and state and local governments, but the frame is also designed to produce reliable state-level estimates.

In 2020, the sample included 40,605 private sector establishments and 3,327 state and local government units (Agency for Healthcare Research and Quality 2022b).

The source for workers' pay was the Quarterly Census of Employment and Wages (QCEW) administered by the U.S. Bureau of Labor Statistics (U.S. Bureau of Labor Statistics, 2022a). The QCEW is based on a quarterly count of employment and wages reported by employers for all workers covered by state unemployment insurance (UI) laws and federal workers covered by the Unemployment Compensation for Federal Employees (UCFE) program, accounting for more than 95% of jobs in the United States. The data are available at several geographic levels, including the state level by industry. For our analysis, we downloaded the QCEW by state for the years 2013 to 2020 and extracted average annual pay for all industries combined. The QCEW calculates average annual pay for a state by dividing total annual pay of employees by the average monthly number of employees (U.S. Bureau of Labor Statistics, 2022b). Average annual pay includes salaries, bonuses, tips and other gratuities, and other forms of compensation provided by an employer.

Next, we turn to the results. Figure 4.5 shows that from 2013 to 2017, premiums for single-enrollee plans (i.e., an individual enrollee with no family members covered in the plan) in Indiana's employer-sponsored market remained relatively constant, increasing by only 1%, while premiums increased by 13% in the comparison states and by 14% in the United States. However, from 2017 to 2020, premiums in Indiana increased by 19%, higher than the rates in comparison states (11%) and the national average (12%). In 2020, premiums in Indiana (\$7,319) were moderately higher than the comparison states (\$7,075) and the national average (\$7,149).

Figure 4.5: Average Annual Single Premium per Employee with Employer-Sponsored Insurance in Indiana and Comparison States, 2013-2020



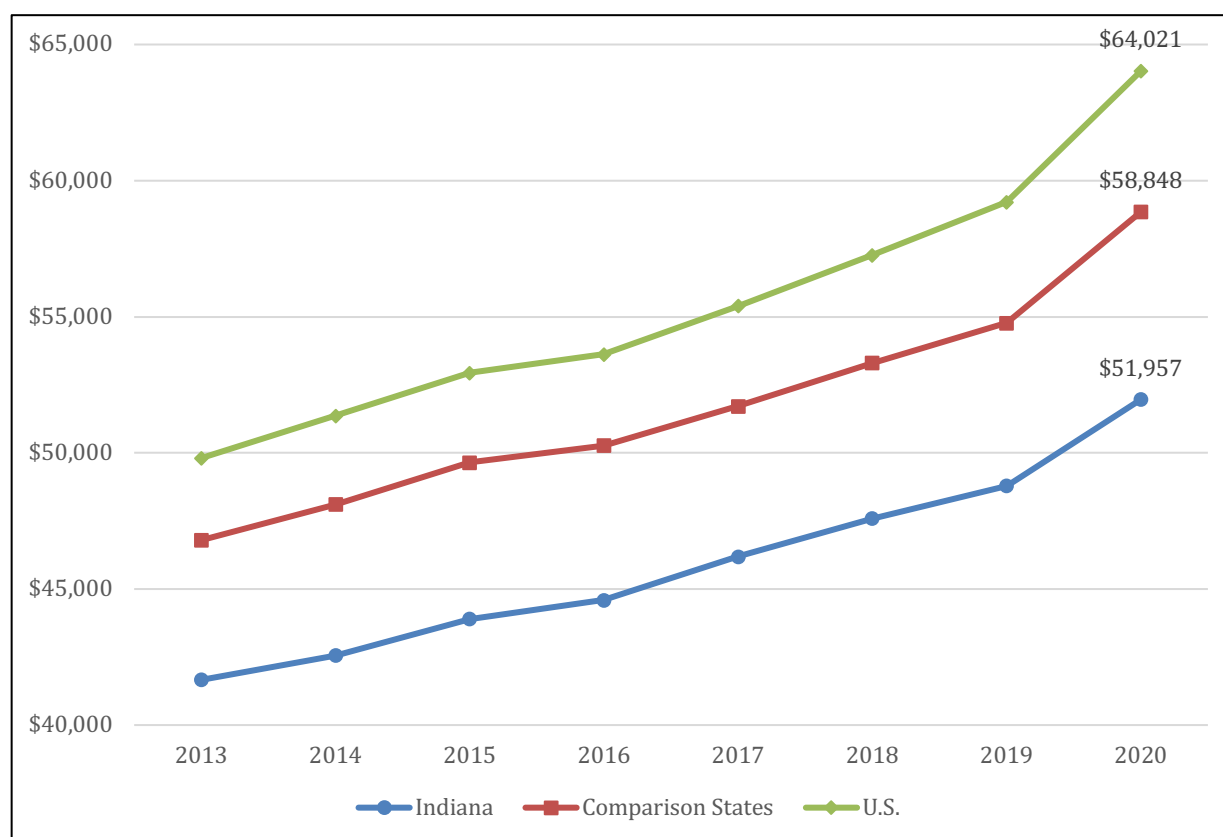
Notes: Comparison states are Illinois, Michigan, Ohio and Wisconsin. The values for the comparison states are based on a simple average of the states' values each year.

Source: Petris Center analysis of Kaiser Family Foundation's analysis of Medical Expenditure Panel Survey - Insurance Component (MEPS-IC) (Kaiser Family Foundation 2022)

In the appendix, we also plot average annual family premium levels per employee with employer-sponsored insurance in Indiana and the comparison states (Figure A4.1). Because the family premium covers dependents in addition to the employee subscriber, the levels are higher, but the similarity of levels among Indiana, the comparison states, and the United States are similar to the single-enrollee premium plot.

Figure 4.6 shows that workers' average annual pay in Indiana has been significantly less than the pay in comparison states and the United States as a whole. For example, in 2020 workers' average annual pay in Indiana was \$51,957, which was 12% less than the pay in the comparison states and 19% less than the pay in the United States. These differences reach back until at least 2013.

Figure 4.6: Workers' Average Annual Pay in Indiana and Comparison States, 2013-2020

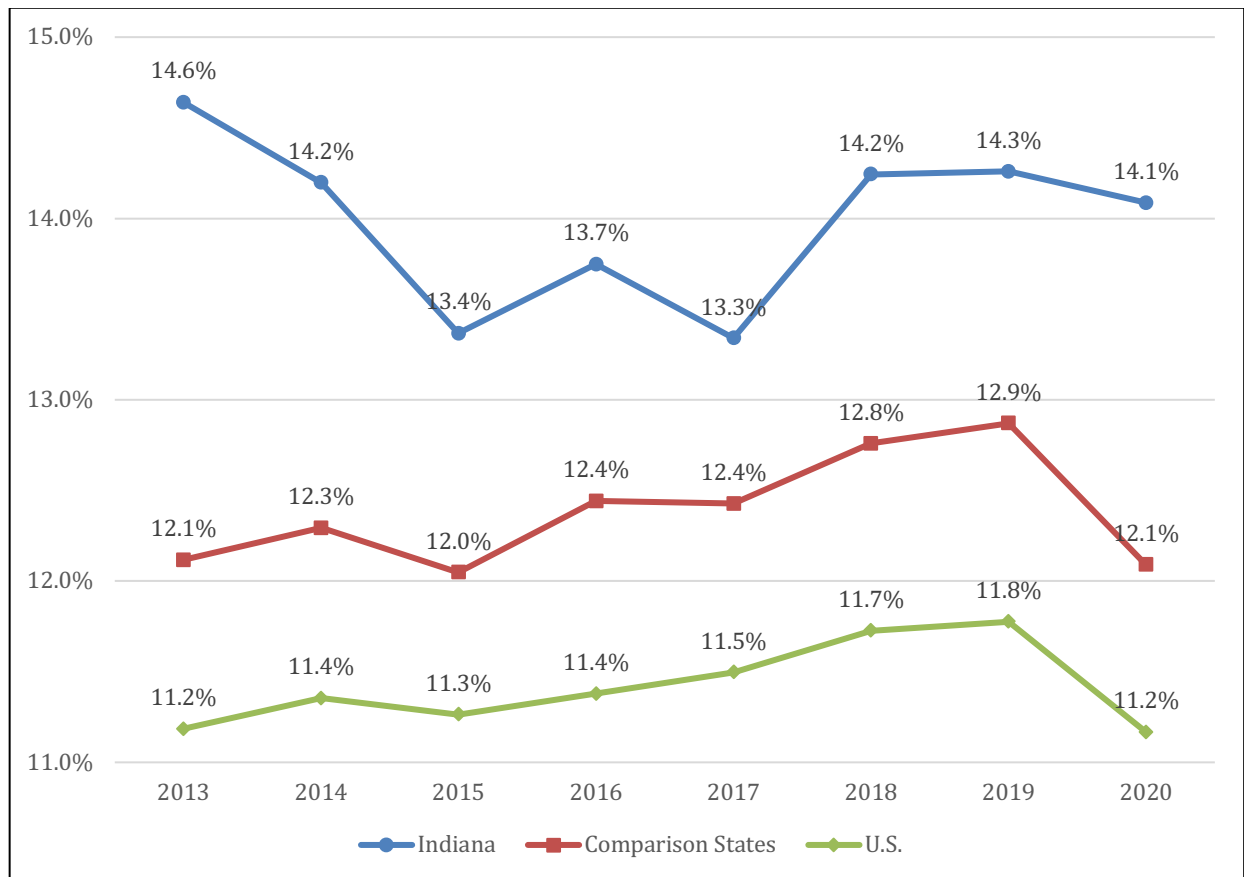


Notes: Comparison states are Illinois, Michigan, Ohio and Wisconsin. The values for the comparison states are based on a simple average of the states' values each year.

Source: Petris Center analysis of the average annual pay measure from the Quarterly Census of Employment and Wages (U.S. Bureau of Labor Statistics 2022a)

Next, we combine the information in the two figures above to calculate health insurance premium affordability in each state and year. The calculation divides average single-enrollee premiums per worker by workers' average annual pay, resulting in an affordability percentage (Figure 4.7). In 2020, premiums were 14.1% of workers' annual average pay in Indiana, a higher share than in the comparison states (12.1%) and the United States as a whole (11.2%). Indiana's insurance has been less affordable in terms of workers' average annual pay since at least 2013.

Figure 4.7: Average Annual Single Premium as a Share of Workers' Average Annual Pay in Indiana and Comparison States, 2013-2020



Notes: Comparison states are Illinois, Michigan, Ohio and Wisconsin. The values for the comparison states are based on a simple average of the states' values each year.

Source: Petris Center analysis of Kaiser Family Foundation's analysis of Medical Expenditure Panel Survey - Insurance Component (MEPS-IC) (Kaiser Family Foundation 2022); and Petris Center analysis of the average annual pay measure from the Quarterly Census of Employment and Wages (U.S. Bureau of Labor Statistics 2022a)

In the appendix, we plot the same affordability measure, but plot it for the average annual family premium levels per employee as a percentage of workers' average annual pay assuming 1.5 workers per family plan (Figure A4.2). This plot also shows that family premiums in Indiana are less affordable than family premiums in the comparison states and the United States as a whole.

This exercise measured health insurance premium levels and premium levels as a percentage of workers' average annual pay, finding that Indiana has less affordable health insurance based on the latter measure. Health insurance may be less affordable in Indiana for several reasons beyond the wage differences among the states that we controlled for. Health insurance premiums levels are based on local market conditions. The key supply-side factors are competition among insurers, insurance benefit design (including provider network breadth and patient cost sharing), population health, healthcare provider competition, and costs, including wages (for that specific industry), capital, and technology. Higher hospital prices in Indiana contribute to its premiums being less affordable. Health insurance markets are highly concentrated in the state (Table 4.2), which may be another factor causing the low affordability of insurance in Indiana (Dafny, Duggan, and Ramanarayanan 2012), but it was beyond the scope of this study to examine health insurance markets in other states. The key demand-side factors affecting premiums are household income, employer demand, population health, size of population, education, and other demographic factors. Further study is needed to identify the key factors that make health insurance less affordable in Indiana.

Section 5: Conclusion and Policy Recommendations

In this report, we reviewed the structure and performance of Indiana's healthcare markets and found that, as compared with other states in the same census division (Illinois, Michigan, Ohio, and Wisconsin), Indiana has significantly higher inpatient hospital prices, stemming from highly concentrated hospital markets and hospital mergers. We found hospital mergers were associated with a 10.6% increase in the merging hospitals' prices for an inpatient admission, but did not find a commensurate increase in quality. High hospital prices may be one reason why Indiana's large hospital systems have amassed significant financial reserves as compared with other hospitals in the United States. Moreover, these price increases lead to higher health insurance premiums paid by employers, causing a reduction in market wages, totaling approximately \$1.5 billion per year in Indiana. Based on our research, neither federal nor state antitrust authorities challenged a recent hospital merger in Indiana in court.²⁸

Primary care physician markets have become highly concentrated, and primary care physicians have become vertically integrated with hospitals, defined as physicians being directly employed by the hospital or working in physician organizations owned by a hospital, mostly through acquisitions. From 2010 to 2018, the share of primary care physicians who were vertically integrated with a hospital in Indiana increased from 33% to 60%. Our analysis of healthcare claims data found that this vertical integration was associated with a 2.1% to 5.0% higher price for office-based care. Again, based on our research, neither federal nor state antitrust authorities challenged the acquisitions of physician organizations by hospitals in court.²⁹

Even though our research did not discover a case in which federal or state antitrust authorities filed a lawsuit to challenge a horizontal hospital merger or a hospital acquisition of a physician organization, it is difficult to determine the scrutiny that these transactions received because reviews are often confidential, both their content and existence. Every proposed transaction with a value above the Hart-Scott-Rodino threshold (which is \$102 million in 2022) must report to federal antitrust authorities at least 30 days before the transaction can close. During that waiting period, a federal antitrust agency—usually the FTC in the case of hospitals and physician groups—reviews the transaction. The review may result in the FTC approving the transaction, filing a lawsuit to block the transaction because of the likely anticompetitive harm, or negotiating a settlement with the merging parties to avoid a court challenge. The settlement may include the imposition of conditions, such as requiring the merged entity to divest facilities that create risk for anticompetitive harm. Additionally, the review may cause the parties to abandon the transaction. For example, in 2014, Beacon Health System suspended its proposed acquisition of the South Bend Clinic physician group because of the uncertainty over when the FTC would approve the acquisition, given that its review was taking longer than expected (HealthExec 2014).

Albeit with less resources than the federal government, state antitrust authorities also review proposed merger and acquisition transactions, which may result with them not opposing

²⁸ Federal and state reviews of proposed mergers and acquisitions are often confidential, both their content and existence; hence, the public record mostly includes public court filings.

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the transaction, or conversely, challenging the transaction in court or negotiating a settlement with the merging parties to avoid a court challenge. In Indiana specifically, the attorney general must approve transaction involving non-profit entities, but this is an administrative review (Fulton et al. 2021). This review likely assesses whether the charitable purposes of the entities will continue after the transaction; however, the study did not find evidence that this review assesses whether the transaction harms competition (Fulton et al. 2021). Like federal reviews, state reviews are also confidential so it is difficult to know the scrutiny that a particular proposed transaction received. In summary, horizontal hospital mergers and hospital acquisitions of primary physician organizations have contributed to these markets becoming concentrated, and the publicly available evidence suggests that these transactions proceeded with little regulatory scrutiny at the federal and state levels at the time they were proposed.³⁰

Indiana's health insurance markets are also highly concentrated. In spite of highly concentrated insurance markets and high hospital prices, employer-sponsored premiums in Indiana are similar to the average premium in comparison states (in its census division) and the United States as a whole. However, when Indiana's lower wages are considered, health insurance in Indiana is significantly less affordable. In 2020, employer-sponsored insurance premiums for a single-enrollee plan were 14.1% of workers' average annual pay, while they were only 12.1% on average in the comparison states and 11.2% in the United States. To achieve the same affordability as in the comparison states—12.1% of workers' average annual pay—premiums in Indiana would need to decrease to \$6,281, a decrease of \$1,038 (14.2%). And to achieve the same affordability as in the whole United States, premiums in Indiana would need to decrease by \$1,517 (or by 20.7%). When we examined employer-sponsored family premium affordability in the same manner, the results were consistent with the single-enrollee premium affordability results.

High hospital prices and less affordable health insurance premiums resulting from poorly functioning markets may have broadly-felt adverse effects, from increased health insurance premiums and cost sharing to an increased burden of healthcare spending for households in Indiana. Researchers, stakeholders, and policy experts have suggested a range of policy options at the state and federal levels to address high healthcare prices and spending resulting from poorly-functioning and highly concentrated markets (Menachemi and Halverson 2020; Gaynor 2020). These policy approaches broadly fall into three categories: (1) policies that seek to avert further market consolidation, (2) policies that may stimulate competition in healthcare markets, and (3) policies that attempt to promote high-value care and control cost growth through mechanisms other than competition. Examples of policies in the first category typically call for increased funding for antitrust enforcement and active intervention in proposed mergers and acquisitions in healthcare, with the goal of preventing further consolidation (Gaynor 2020). Within the second category, a number of policy proposals can be categorized as attempting to encourage competition in healthcare on prices and quality. Examples of these types of policies include changes to reimbursement design, such as reference pricing that encourages patients to select lower-priced providers, and other price transparency tools such as all-payer claims databases. Policy recommendations in the third category that have been proposed in previous work include increased investment in public health efforts, changes to scope of practice laws

³⁰ Federal and state reviews of proposed mergers and acquisitions are often confidential, both their content and existence; hence, the public record mostly includes public court filings.

that govern non-physician practitioners, and policies to encourage the use and availability of telemedicine (Menachemi and Halverson 2020).

Indiana's high hospital prices and less affordable health insurance premiums are the result of several factors. Policymakers at the state and federal level should consider policy tools from all three categories described above to ensure patients can access affordable, high-quality healthcare and health insurance. Because this report analyzed the state's healthcare markets and found high levels of concentration across MSAs and across the key industries of the healthcare sector in Indiana, we focus our recommendations on policy tools falling under the first and second categories, those seeking to prevent further consolidation of healthcare markets and to stimulate competition within existing markets. Recommendations are organized into pre-merger and post-merger policy recommendations.

Pre-merger Policy Recommendations

- **Increase antitrust enforcement.** Increasing federal and state antitrust enforcement in healthcare provider and insurance markets is important to prevent anti-competitive mergers from happening. Traditionally, the FTC has purview over healthcare provider mergers, and the DOJ has purview over health insurer mergers. However, the number of FTC and DOJ merger challenges per year has not increased while the number of mergers occurring across all sectors of the US economy has reached record levels, and patients in the US healthcare system may be paying the price (Gaynor 2020; Gaynor 2021). Federal regulatory agencies require sufficient staffing and funding to challenge a greater number of mergers. Hence, Congress should prioritize increasing the FTC's and DOJ's budgets to review and challenge proposed mergers that may substantially lessen competition. State attorneys general have the authority to use federal antitrust law to challenge proposed mergers, and AG offices in some states have taken an active role in litigating proposed healthcare mergers and promoting competition (King et al. 2020).
- **Enhance state merger review authority.** State laws can serve as complements and substitutes for federal antitrust statutes. Some states have explicitly delegated merger approval authority to the AG's office, while others are leveraging charitable trust, nonprofit corporation, health and safety, and certificate-of-need laws³¹ to increase oversight of healthcare market consolidation (Fulton et al., 2021). These laws empower states to be notified of, review, and challenge proposed healthcare mergers through administrative processes. The state of Indiana has limited authority under these types of laws, only being able to review mergers to ensure the merger follows general charitable trust laws that aim to ensure the charitable purposes of the entities will continue after the merger. Indiana could follow states such as Rhode Island and Connecticut, which enacted laws to give them the authority to review and disapprove hospital mergers using competition-based criteria without having to file suit in court, which is required to block a merger using antitrust statutes. In doing so, the state could also increase transparency around healthcare market consolidation. State merger notification requirements can greatly increase transparency around healthcare market consolidation, as many

³¹ While certificate-of-need laws can be relevant to a state's merger review authority, the principal purpose of these laws is to control costs by ensuring unneeded capacity is not built; however, the laws can be anticompetitive by creating barriers to entry.

healthcare mergers—particularly acquisitions of physician groups—fall under the dollar value thresholds requiring federal merger notification (King et al. 2020).

Post-merger Policy Recommendations

- **Restrict anti-competitive contracting.** Indiana has some existing restrictions on anti-competitive contracting practices. For example, Indiana prohibits most-favored-nation clauses, in which an insurer requires a hospital to grant it the lowest (i.e., “most-favored”) rate among the insurers it contracts with (The Source on Healthcare Price & Competition 2020). These most-favored-nation clauses were found to be anti-competitive (Arnold et al., 2022). However, Indiana’s restrictions on anti-competitive contracting should be expanded. Four specific categories of anti-competitive contracting practices that could be restricted or further restricted are:
 - Anti-tiering/anti-steering clauses: These types of clauses can prevent insurers from using incentives to direct patients towards lower-cost and higher-value care.
 - All-or-nothing contracting: This type of contracting occurs when multi-hospital systems require insurers to contract with all facilities in the system as opposed to allowing insurers to contract with a subset of facilities. This provision limits insurers’ ability to contract with only high-value facilities or establish narrow networks that generate volume discounts.
 - Exclusive contract provisions: Exclusive contracts between payers and providers can reduce provider and insurer competition in a market by limiting access to certain providers or facilities. Illinois and Wisconsin limit or prohibit these types of contracts.
 - Non-compete physician contract provisions: These contract provisions can reduce physician market competition by limiting the ability of physicians to change employers. Indiana has a non-comprehensive mandate on these contract provisions (The Source on Healthcare Price & Competition 2020).

HB 1117 in Indiana would have increased prohibitions on most-favored-nation clauses and initiated prohibitions on anti-tiering/anti-steering and all-or-nothing contract provisions, but the bill was not passed (The Source on Healthcare Price & Competition 2022).

- **Institute site-neutral payments.** Our analysis of Indiana’s physician markets found that the vertical integration of physicians with hospitals increased dramatically from 2010 to 2020, with the median MSA share of vertically-integrated primary care physicians increasing from 32% to 60%. This integration was associated with significant outpatient price increases, partially because when facility fees are added to the physician reimbursement, that total exceeds the non-integrated physician reimbursement. Under site-neutral payments, the total reimbursement would be the same in an outpatient setting, regardless of whether the physician was employed by a hospital. Hence, site-neutral payments would remove a major incentive to vertically integrate and limit the effects of this integration trend on healthcare expenditures in Indiana. While Medicare has implemented site-neutral payments (Paavola 2021), it is unclear whether other payers will be able to follow suit. Indiana policymakers should consider enacting

legislation to enable commercial, Medicare Advantage, and Medicaid managed care payers to move towards site-neutral reimbursement policies.

- **Increase price transparency.** Indiana has recently begun working to implement an all-payer claims database that will increase price transparency in the state, and CMS has introduced hospital price transparency requirements at the federal level (Schaibley 2021; Muoio 2021). However, compliance with the federal hospital price transparency program has been mixed, and some hospitals may struggle to comply with reporting requirements (Muoio 2021). The Indiana legislature should consider policy levers to encourage compliance with state and CMS hospital price transparency measures and to provide technical support to hospitals struggling with reporting requirements if such support is needed.
- **Re-evaluate tax exempt status.** High hospital prices may also be one reason why Indiana's large hospital systems have amassed significant financial reserves as compared with other hospitals in the United States. Most of these systems are nonprofit systems, and non-profit corporations are typically exempt from federal and state corporate income taxes and local property taxes because they operate to benefit public (not private) interests. At a national level, there is renewed attention comparing non-profit hospitals' community benefits to the value of their tax exemption. A recent study found that non-profit hospitals spent 5.9% of their expenses on community benefits and received 4.3% of their total expenses in tax exemptions (Zare et al., 2022). However, charity care, an important component of the community benefit, was only 1.3% of expenses, resulting in 86% of hospitals receiving tax exemptions that exceeded the value of their charity care. In another context, high reserves were one factor that was likely used to determine whether a nonprofit corporation should continue to be exempt from paying corporate income taxes. In February 2014, the California Franchise Tax Board revoked Blue Shield of California's state tax exemption, and although it did not disclose its reasons, one likely reason was Blue Shield of California's high reserves (Gold 2015). Indiana could conduct a similar review of its nonprofit hospitals, hospital systems, and major insurers to determine whether tax exemptions should continue.
- **Establish a state affordability commission.** In recent years, a growing number of states struggling with high healthcare costs have implemented commissions with oversight over pricing and premiums. The Massachusetts Health Policy Commission, which measures commercial healthcare spending relative to projected benchmarks, scrutinizes drivers of excess spending, and offers policy recommendations to ensure healthcare affordability, has successfully kept health spending in the state under benchmarks set by the commission in three of the first five years since its inception (Waugh and McCarthy 2020). In 2023, California will implement its Office of Health Care Affordability, which will collect price and insurance premium data from hospital systems, physician groups, and health insurers, and set enforceable spending growth targets (Marashi 2022).
- **Institute hospital rate regulation.** In a letter addressed to Indiana's hospitals and insurers in December 2021, Indiana House Speaker Todd Huston and Senate President Rodic Bray stated that the legislature may consider avenues to "statutorily reduce prices" if stakeholder groups are unable to agree on plans to reduce healthcare prices in the

state (Russell 2022). All-payer rate regulation could be an effective way to reduce healthcare spending in the state, as shown in an analysis by the RAND Corporation predicting reductions in hospital spending between 2 and 7% (Liu et al. 2021). However, price regulations can be challenging to implement. Prices must be sustainable for both providers and insurers, and many states that have attempted healthcare rate setting have abandoned these attempts. Policymakers should consider taking cues from the Maryland Health Services Cost Review Commission's current CMS waiver (Centers for Medicare & Medicaid Services 2022b), which reflects the knowledge gained from decades of successful price regulation in a state with highly concentrated hospital markets (Japinga and McClellan 2020).

These policy recommendations are intended to help the residents of Indiana have better access to more affordable and higher quality health care.

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Appendix

This appendix includes tables and figures referenced in the text and additional supplementary analyses. First, we provide a brief review of population demographics in Indiana. The remaining sections are organized following the structure of the report, with supplementary content relating to hospital markets, physician markets, and insurance markets.

A.1 Population by Metropolitan Statistical Area

As of July 1, 2021, Indiana had a population of 6,805,985 across 92 counties, with 45 counties being classified as part of an MSA, 27 counties being classified as part of a micropolitan statistical area, and the remaining 20 counties being unclassified (Table A1.1). Almost 80% of the population resided in a metropolitan statistical area (MSA), which the Office of Management and Budget defines as areas linking an urban core of at least 50,000 people to surrounding communities based on economic and social factors (Office of Management and Budget 2020). The remainder of the population resided in rural areas, either in a micropolitan statistical area, defined as counties linked to an urban cluster with a population between 10,000 and 49,999, or in an unclassified county.

From 2010 to 2021, Indiana's total population grew 5.0%, with the growth concentrated in MSAs, which increased by 6.7%. The MSA with the largest population, Indianapolis-Carmel-Anderson, experienced the greatest population growth during this period, increasing by 12.6%. The Columbus, Fort Wayne, Lafayette-West Lafayette, and Louisville/Jefferson County (Indiana portion) MSAs also experienced high population growth, between about 7% and 9%. Only the Muncie and Terre Haute MSAs experienced a population decrease. Similarly, the population of Indiana's micropolitan counties decreased by 0.4% and the population in unclassified counties decreased by 2.2%.

Table A1.1: Population of Metropolitan Statistical Areas and Other Areas in Indiana, 2010 and 2021

Geographic Area	Population (April 1, 2010)	Population (July 1, 2021)	Population Change
15 MSAs (45 counties)			
Bloomington, IN	159,530	161,321	1.1%
Columbus, IN	76,782	82,475	7.4%
Elkhart-Goshen, IN	197,569	206,921	4.7%
Evansville, IN-KY	265,302	269,617	1.6%
Fort Wayne, IN	388,626	423,038	8.9%
Indianapolis-Carmel-Anderson, IN	1,888,078	2,126,804	12.6%
Kokomo, IN	82,748	83,687	1.1%
Lafayette-West Lafayette, IN	210,308	224,709	6.8%
Michigan City-La Porte, IN	111,466	112,390	0.8%
Muncie, IN	117,674	111,871	-4.9%
South Bend-Mishawaka, IN-MI	266,914	272,212	2.0%
Terre Haute, IN	189,778	184,910	-2.6%
Chicago-Naperville-Elgin, IL-IN-WI	708,210	719,700	1.6%
Cincinnati, OH-KY-IN	86,513	86,683	0.2%
Louisville/Jefferson County, KY-IN	252,419	271,055	7.4%
Subtotal (MSAs)	5,001,917	5,337,393	6.7%
Micropolitan Counties (27 counties)	1,064,465	1,060,304	-0.4%
Unclassified Counties (20 counties)	417,536	408,288	-2.2%
Total Population	6,483,918	6,805,985	5.0%

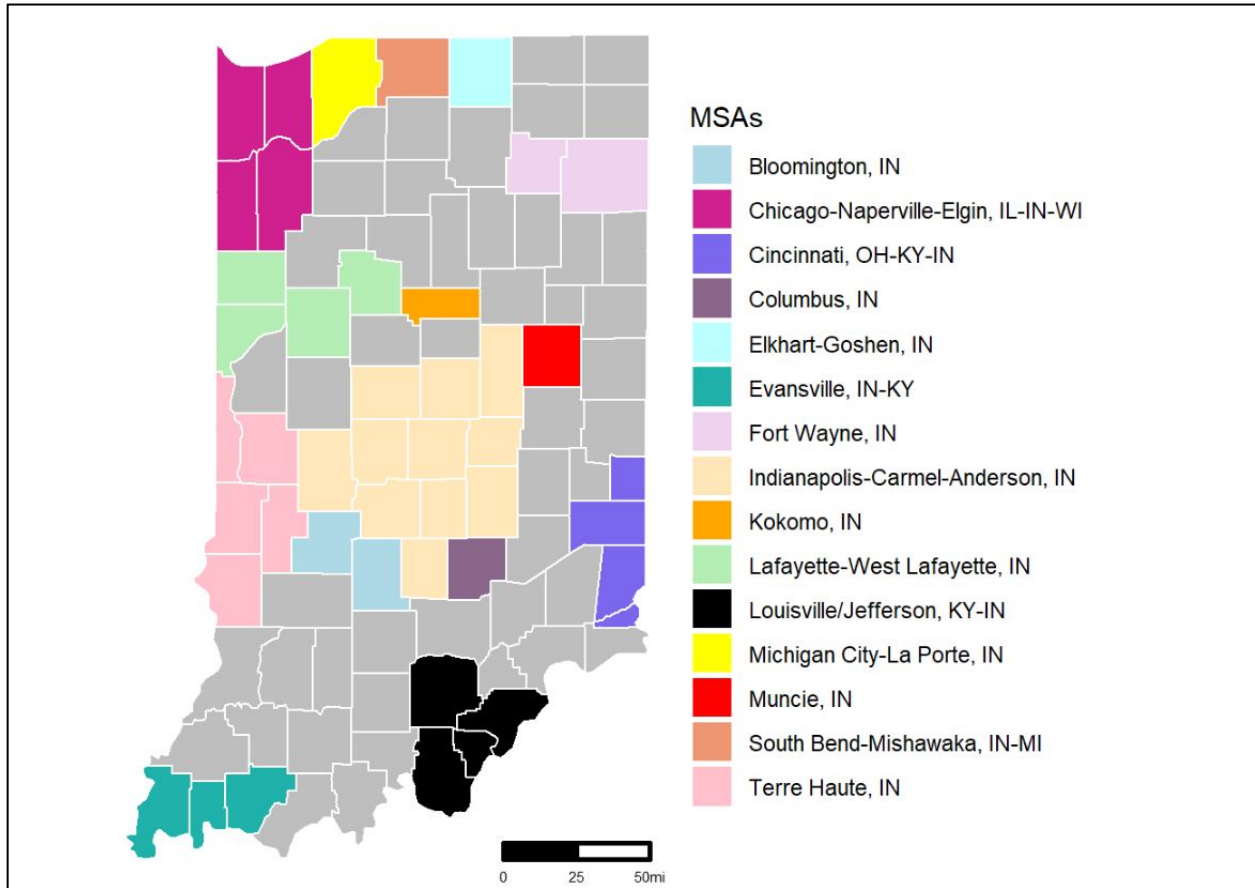
MSA: metropolitan statistical area

Note: MSAs located primarily in other states are shaded gray. MSAs are based on the Office of Management and Budget's most recent delineations of MSAs, as of March 6, 2020 (Office of Management and Budget 2020). For the MSAs that include counties in states bordering Indiana, the reported population includes only the population of counties within Indiana. Unclassified counties are those that are neither within a metropolitan statistical area nor a micropolitan statistical area.

Source: Petris Center analysis of the U.S. Census Bureau population estimates (U.S. Census Bureau 2021a, 2021b, 2022a, 2022b)

Figure A1.1 shows the location of each of the 15 MSAs in Indiana based on a county-level map.

Figure A1.1: Map of Indiana's Metropolitan Statistical Areas, 2020



Note: This county-level map of Indiana is based on the Office of Management and Budget's most recent delineations of MSAs, as of March 6, 2020 (Office of Management and Budget 2020). Each MSA is represented by a different color. For example, the Indianapolis-Carmel-Anderson MSA, located in the middle of the state, is light orange. Counties located outside of MSAs are gray.

Source: Petris Center analysis of Office of Management and Budget (2020)

A.2 Supplemental Information on Hospital Markets

From 2015 to 2020, there were 10 recorded mergers and acquisitions involving hospitals per Irving Levin Associates Healthcare M&A Database. Franciscan Health, Parkview Health, and Community Health Systems (CHS), 3 out of the 6 largest hospital systems in the state, were involved in 4 out of the 10 mergers in this time period. The largest acquisition in terms of deal value was the acquisition of Floyd Memorial Hospital and Health Services by Baptist Health in 2016 for \$276 million.

Table A2.1: Hospital Mergers and Acquisitions in Indiana, 2015-2020

Target	Acquirer	Announcement Date	Price
Highpoint Health	St. Elizabeth Healthcare	11/7/2020	NA
DeKalb Hospital	Parkview Health	10/1/2019	NA
Fayette Regional Health System	Reid Health	5/3/2019	\$12,750,000
Unity Medical and Surgical Hospital	Medical Facilities Corporation	7/15/2016	\$53,630,000
Floyd Memorial Hospital and Health Services	Baptist Health	6/28/2016	\$276,000,000
2 IU Health Hospitals	Community Health Systems	12/29/2015	\$96,000,000
Clark Memorial Hospital	Regional Health Network	8/3/2015	\$80,000,000
Jasper County Hospital	Franciscan Alliance*	6/2/2015	NA
Wabash County Hospital	Parkview Health	1/1/2015	NA

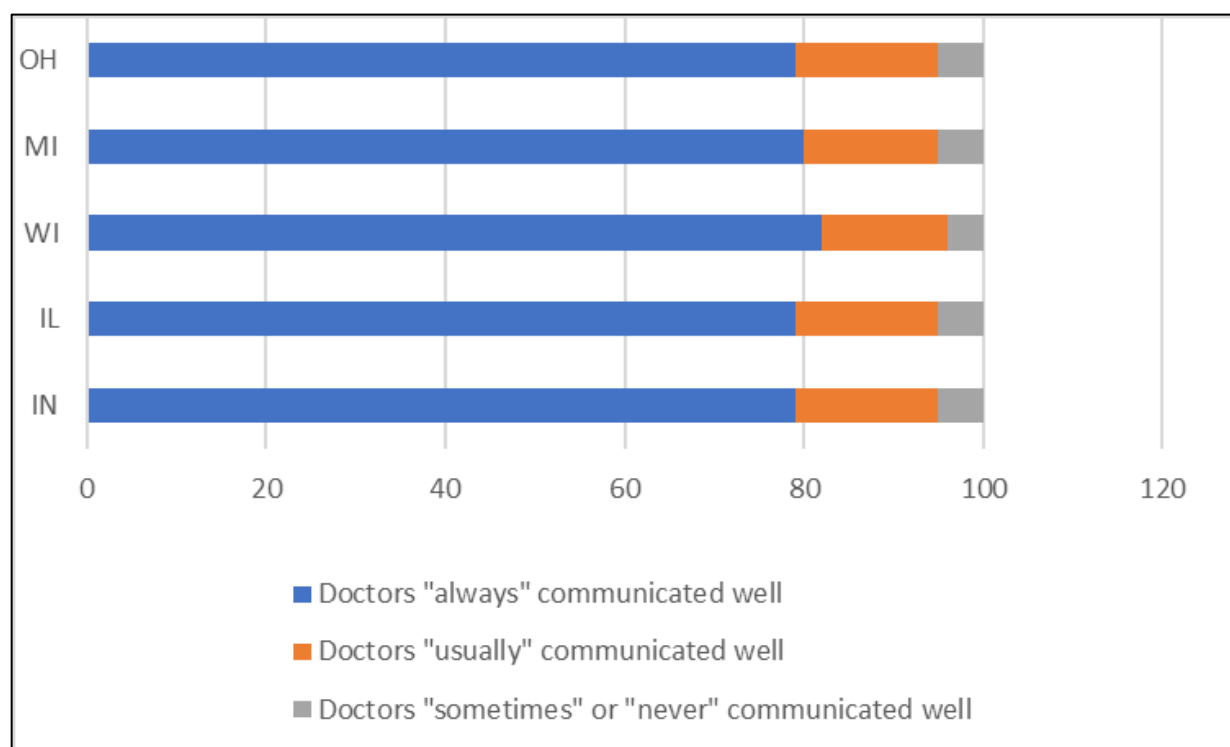
*Franciscan Alliance is now called Franciscan Health

NA: Not available

Source: Petris Center analysis of Irving Levin Associates Healthcare M&A Database

The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) patient survey from Hospital Compare measures patients' perceptions of their hospital experience. In the main report, we analyzed "positive" versus "negative" responses. To provide an example of the full distribution of responses, Figure A2.1 shows the distribution of responses for whether the doctor communicated well in Indiana and the comparison states. For this measure, "positive" corresponds to always communicated well, and "negative" corresponds to sometimes or never communicated well. As we found in the main report, the responses of patients in Indiana were not statistically different than those in the comparison states.

Figure A2.1: Patient Experience Ratings for Doctor Communication in Indiana and Comparison States, 2020-2021



Source: Petris Center analysis of CMS Hospital Compare's Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) files for the period July 1, 2020 to March 31, 2021

A.3 Supplemental Information on Physician Markets

Using the Irving Levin Associates Healthcare M&A Database, we found that of the 21 acquisitions of physician groups that occurred in Indiana from 2010 to 2021, 12 involved acquirers that were either private equity firms or private equity-backed companies, all occurring since 2017 (Table A3.1).

Table A3.1: Physician Group Mergers and Acquisitions in Indiana, 2010-2021

Target	Target Specialty	Acquirer	Acquirer Category	Announced Date	Price
Midwest Eye Consultants	Optometry/Ophthalmology	Sentinel Capital Partners	Private Equity	9/13/2021	NA
Valparaiso Family Dentistry	Dental	Great Lakes Dental Partners	Private Equity Backed	6/29/2021	NA
The South Bend Clinic	Primary Care	DuPage Medical Group*	Private Equity Backed	6/16/2021	NA
2 anesthesia practices	Anesthesia	CRH Medical Corporation	Corporate Backed (WELL Health Technologies)	5/27/2021	NA
OB/GYN of Indiana	Women's Health	Axia Women's Health	Private Equity Backed	11/5/2019	NA
Indianapolis Gastroenterology and Hepatology	Gastroenterology/Hepatology	GI Alliance	Private Equity Backed	11/4/2019	NA
Northern Indiana Neonatal Associates, PC	Neonatology	Mednax, Inc.	Public Company	8/30/2019	NA
Activate Healthcare	Primary Care	Paladina Health**	Private Equity Backed	1/17/2019	NA
Anesthesia Care Associates, LLC	Anesthesia	CRH Medical Corporation	Corporate Backed (WELL Health Technologies)	1/2/2019	\$5,355,028
Duneland Dermatology	Dermatology	Pinnacle Dermatology, LLC	Private Equity Backed	8/6/2018	NA

Target	Target Specialty	Acquirer	Acquirer Category	Announced Date	Price
American Family Dental Group	Dental	Mortenson Dental Partners	Private Company	8/3/2018	NA
Darr & Associates	Audiology	Alpaca Audiology, LLC	Private Equity Backed	8/3/2018	NA
Midwest Fertility Specialists	Women's Health	Ovation Fertility	Private Equity Backed	7/12/2018	NA
Spencer Dermatology Associates	Dermatology	Pinnacle Dermatology	Private Equity Backed	5/15/2018	NA
Horizon Oncology	Oncology	Pharos Capital Group, LLC	Private Equity	3/19/2018	NA
American Pain Consortium Holdings, LLC	Pain management	American Discovery Capital	Merchant Bank	2/27/2018	NA
Resolution Hearing Group, LLC	Audiology	Alpacas Audiology, LLC	Private Equity Backed	10/3/2017	NA
Premier Healthcare	Primary Care/ Multispecialty	IU Health Southern Indiana Physicians	Health System	2/16/2017	NA
University Dermatology, Inc.	Dermatology	Indiana University Health	Health System	6/1/2011	\$0
Hammond Clinic	Primary Care/ Multispecialty	Franciscan Alliance***	Health System	2/10/2011	\$0
Cancer Care Center of Indiana, LLC	Oncology	Floyd Memorial Hospital and Health Services	Health System	4/2/2010	\$1,000,000

*DuPage Medical Group is now called Duly Health and Care

**Paladina Health is now called Everside Health

***Franciscan Alliance is now called Franciscan Health

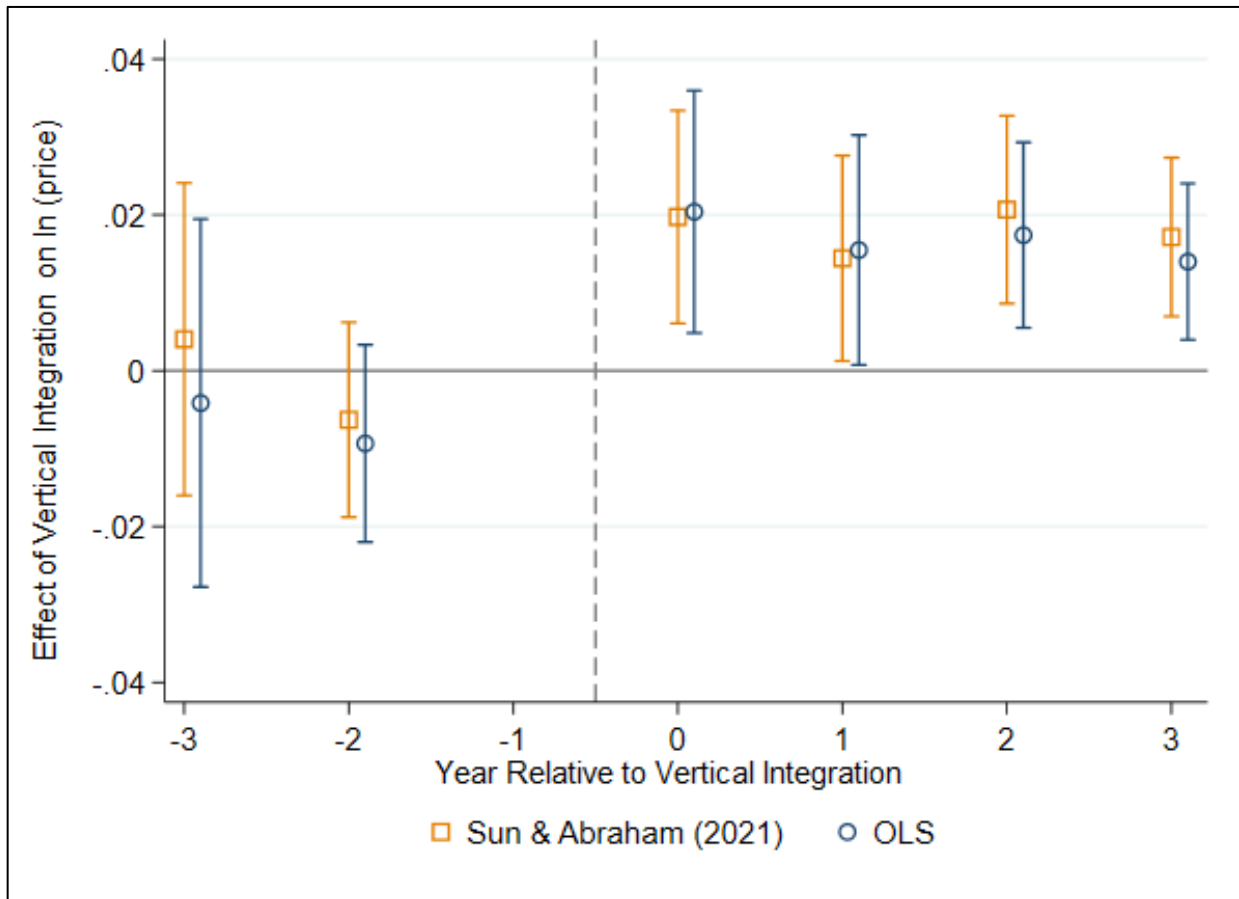
NA: Not available

Source: Petris Center analysis of Irving Levin Associates Healthcare M&A Database

In Section 3, Table 3.3 showed the results of regression analyses estimating the effect of hospital-physician vertical integration on office visit prices that we evaluated using difference-in-differences models. Figures A3.1 and A3.2 show the results of fully dynamic event-study models using the same price measures—physician prices from model 1 (Figure A3.1) and the combined physician price and hospital outpatient facility fee from model 2 (Figure A3.2). Each figure shows the conventional ordinary least squares event-study results and the corrected event-study results (based on Sun & Abraham, 2021), which were similar in each figure.

The results displayed in the figures are consistent with the difference-in-differences results, as they also show that the prices increased for moderate-intensity office visits (CPT 99213) after physicians became vertically integrated with hospitals. Figure A3.1 shows that the event-study estimates for the change in physician prices after vertical integration occurred—about 0.02 each year—are similar to the difference-in-differences estimate of 0.0204 (Table 3.3, model 1). The figure also shows that the event-study-adjusted outcome trends were nearly parallel between treatment and comparison groups prior to the vertical integration.

Figure A3.1: Physician Price Event Study Regression Results for Moderate-Intensity Office Visit

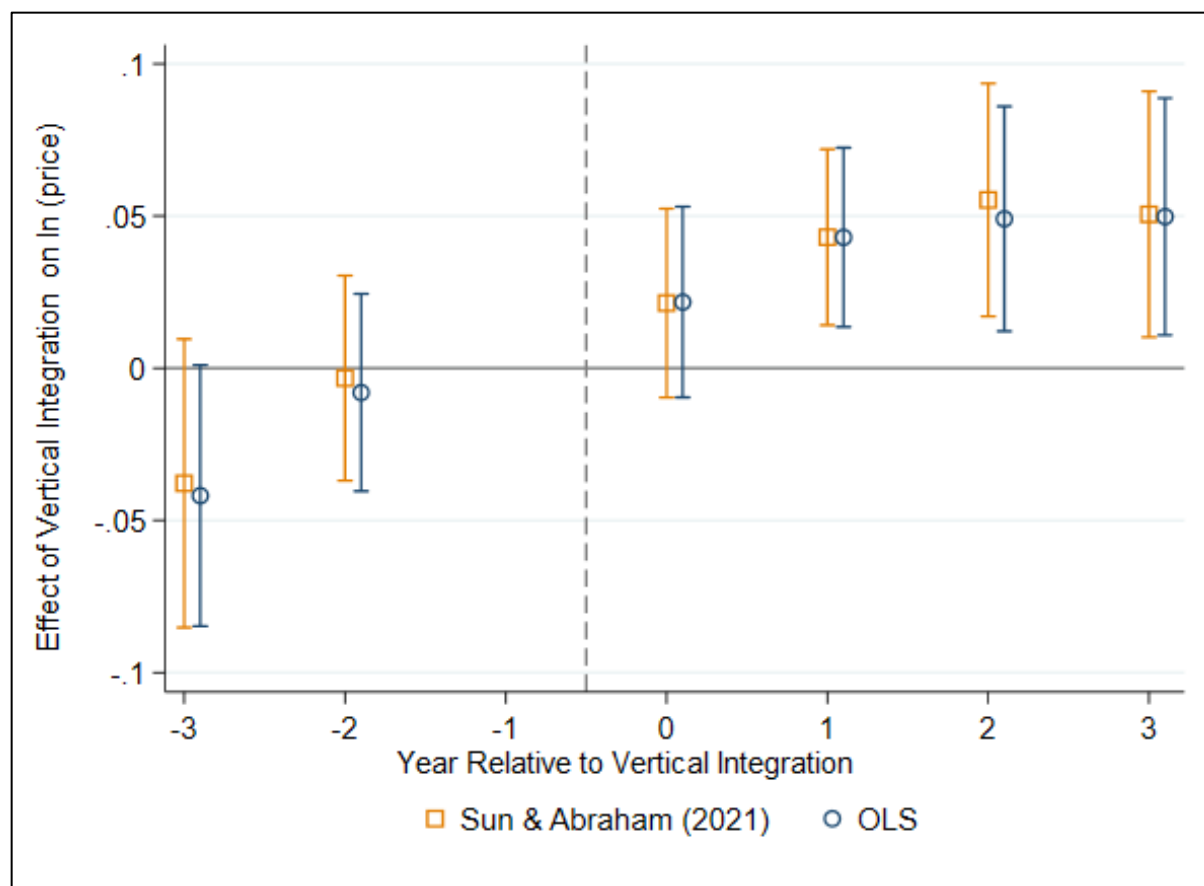


Note: The physician price is the professional fee that incorporates overhead costs for a moderate-intensity office visit (CPT 99213) that was not submitted with an additional facility fee. The dependent variable is the natural log of this price measure, so the coefficient estimates on the vertical axis represent the following difference-in-differences percent change in price relative to the reference period of $Year = -1$ (the year prior to vertical integration): $100 * (\exp(B) - 1)$ in which B is the coefficient estimate. Each plotted point is the coefficient for the interaction of treatment group with time relative to the year in which a physician became vertically integrated with a hospital or health system. The error bars show the 95% confidence interval for the coefficient estimate. Standard errors were estimated by clustering at the physician level. Yellow bands correspond to “corrected” event-study estimates based on Sun & Abraham (2021), whereas blue bands correspond to ordinary least squares (OLS) event-study estimates. Source: Petris Center analysis of Health Care Cost Institute (HCCI) 1.0 claims data and SK&A Office Based Physician Database provided by IQVIA

Figure A3.2 also shows that the event-study estimates for the change in the combined physician price and hospital outpatient facility fee after vertical integration occurred—reaching about 0.05 one year after vertical integration—are similar to the difference-in-differences estimate of 0.0491 (Table 3.3, model 2). Although the event-study-adjusted outcome trends were not statistically different between the treatment and comparison groups prior to vertical integration, the coefficient estimate three years prior to the vertical integration almost reached significance at the 0.05 level. However, the coefficient estimate two years prior to the vertical integration was near zero, the same as the coefficient one year prior to the vertical integration,

which is fixed at zero because it is the reference year. Notwithstanding, future studies with additional years of pre-vertical integration price data should examine whether the estimate three years prior to vertical integration was an anomaly or part of an upward price trend.

Figure A3.2: Combined Physician Price and Hospital Outpatient Facility Fee Event Study Regression Results for Moderate-Intensity Office Visit



Note: The price measure is the combined physician professional fee (that excludes overhead costs) and the hospital outpatient facility fee for a moderate-intensity office visit (CPT 99213). The dependent variable is the natural log of this price measure, so the coefficient estimates on the vertical axis represent the following difference-in-differences percent change in price relative to the reference period of *Year* equal to -1 (the year prior to vertical integration): $100 * (\exp(B) - 1)$ in which B is the coefficient estimate. Each plotted point is the coefficient for the interaction of treatment group with time relative to the year in which a physician became vertically integrated with a hospital or health system. The error bars show the 95% confidence interval for the coefficient estimate. Standard errors were estimated by clustering at the physician level. Yellow bands correspond to “corrected” event-study estimates based on Sun & Abraham (2021), whereas blue bands correspond to ordinary least squares (OLS) event-study estimates. Source: Petris Center analysis of Health Care Cost Institute (HCCI) 1.0 claims data and SK&A Office Based Physician Database provided by IQVIA

A.4 Supplemental Information on Health Insurance Markets

In Section 4, we summarized the limitations of the Managed Market Survey provided by Decision Resources Group (DRG) (now Clarivate), which was used to analyze the health insurance market structure in Indiana. Neither the U.S. government nor Indiana's government maintains a database of insurers' enrollees by market segment and geographic area, so proprietary databases (such as the Managed Market Surveyor), surveys, financial filings, insurance filings, and government and insurer websites are used to make these estimates. We begin this section describing the sources DRG uses to maintain and update the Managed Market Surveyor. Next, we compare the Managed Market Surveyor's market-level estimates to an often-used survey to estimate insurance coverage—the American Community Survey's Annual Social and Economic Supplement—and also compare the Managed Market Surveyor's market-share estimates to insurer filings to the National Association of Insurance Commissioners (NAIC).

The core of the Managed Market Surveyor's enrollment information is based on the DRG National Medical and Pharmacy Census, whereby insurers directly report enrollment information in January and July each year (Clarivate, 2021).³² The DRG Census is used to estimate commercial enrollment (i.e., the fully- and self-insured employer-sponsored market, on- and off-exchange individual market, Medicaid managed care, and Medicare Advantage); hence, non-responses by insurers is a limitation. However, DRG's secondary sources are able to either directly or indirectly provide enrollment information. DRG supplements its census with payer and state insurance department websites, along with insurers' financial filings to the U.S. Securities and Exchange Commission and National Association of Insurance Commissioners. For the exchange (or Health Insurance Marketplaces) enrollment, DRG supplements its census using federal- and state-reported enrollment; for Medicaid managed care enrollment, it supplements using data from relevant state department websites; and for Medicaid Advantage enrollment, it supplements using data from CMS.

We compared the Managed Market Surveyor to two external sources. First, we compared the Managed Market Surveyor aggregate enrollment numbers by market segment to estimates from the American Community Survey as reported by Kaiser Family Foundation (Kaiser Family Foundation, 2022). The latest estimates available from Kaiser Family Foundation are for 2019, which is based on the American Community Survey's Annual Social and Economic Supplement fielded in from February to April 2020 and included 91,500 households across the United States (Keisler-Starkey & Bunch, 2020). Although aggregate commercial enrollment (i.e., the fully- and self-insured employer-sponsored market, on- and off-exchange individual market, Medicaid managed care, and Medicare Advantage) was similar between the two sources, the Managed Market Surveyor reported 24% lower employer-sponsored and individual (on- and off-exchange) market enrollment for three possible reasons.³³ First, the Managed Market Surveyor may have undercounted enrollees from self-insured employer plans, which are harder to capture. Second, employer-sponsored enrollment decreased between 2019, the latest year

³² Clarivate acquired Decision Resources Group in 2020.

³³ Because the Managed Market Surveyor combines enrollment for the employer-sponsored market and the off-exchange individual market, it was not possible to examine the employer-sponsored market enrollment separately. Notwithstanding, its enrollees represent the vast majority of the combined enrollment.

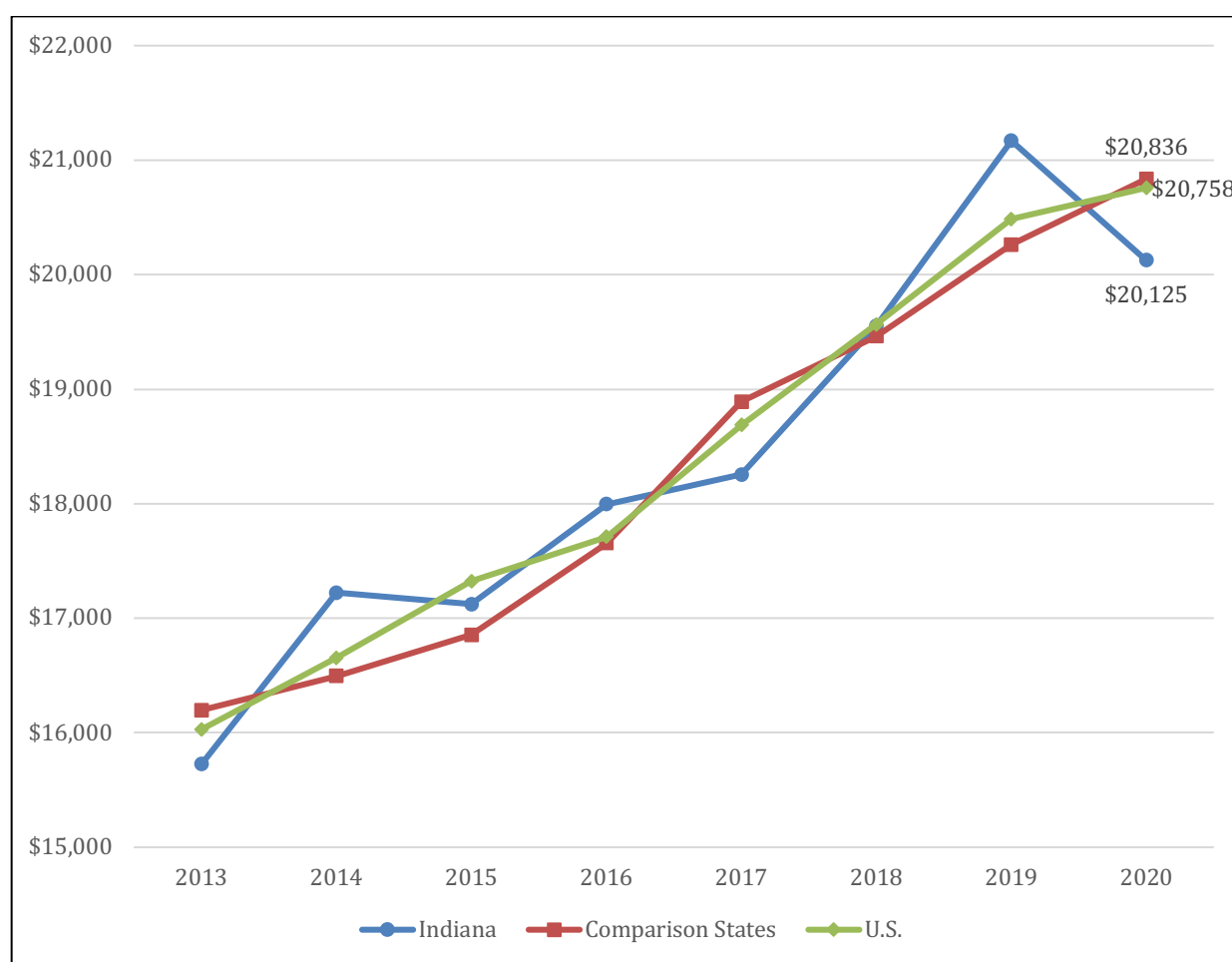
Kaiser Family Foundation estimates are available, and January 1, 2021, the effective date of the Managed Market Surveyor, because of the COVID-19 pandemic. Third, like all surveys, the American Community Survey's Annual Social and Economic Supplement relies on a sample; therefore, while it is a reputable survey, particularly for U.S. estimates of insurance coverage, its state-level estimates rely on smaller samples. In summary, although there were differences between the estimates in Managed Market Surveyor and American Community Survey's Annual Social and Economic Supplement, we do not think the differences would bias our market share estimates for one particular insurer over another.

Our second comparison involved comparing the Managed Market Surveyor's insurer market shares to National Association of Insurance Commissioners' (NAIC) insurer market shares as of 2021 (National Association of Insurance Commissioners, 2022). The NAIC reports market shares by the dollar amounts of premiums written for both health and life insurance, which could not be separated. The top five insurers in Indiana by market share were Anthem BCBS of Indiana (34.6%), UnitedHealth Group (15.9%), Centene (10.1%), Humana (9.3%), and McClaren (6.8%), which were also the top five insurers in the Managed Market Surveyor in terms of enrollment. However, the market share percentages are different between the two sources because the NAIC report is based on premiums, which significantly differ among the market segments. For example, the premium per enrollee in the employer-sponsored market, in which Anthem BCBS of Indiana has the highest market share by enrollment, is much lower than the premium per enrollee in Medicare Advantage, in which Anthem BCBS of Indiana has a relatively lower market share by enrollment.

In Section 4, we presented health insurance premium levels and premium levels as a percentages of workers' average annual pay for single-enrollee plans (i.e., a subscriber with no dependents) in the employer-sponsored market. In the next two figures, we present the same information for family plans in the employer-sponsored market.

Figure A4.1 shows that average annual family premium levels per employee with employer-sponsored insurance in Indiana have been similar to comparison states and the United States from 2013 to 2020. In 2013, the premiums were approximately \$16,000, then increased to between \$20,000 and \$21,000 by 2020. However, Indiana's premiums increased relatively more between 2017 and 2019, before decreasing in 2020.

Figure A4.1: Average Annual Family Premium per Employee with Employer-Sponsored Insurance in Indiana and Comparison States, 2013-2020



Notes: Comparison states are Illinois, Michigan, Ohio, and Wisconsin. The values for the comparison states are based on a simple average of the states' values each year.

Source: Petris Center analysis of Kaiser Family Foundation's analysis of Medical Expenditure Panel Survey - Insurance Component (MEPS-IC) (Kaiser Family Foundation 2022)

Calculating the affordability of a single-enrollee plan (i.e., a subscriber with no dependents) is straightforward because the plan covers one enrollee, which corresponds to one worker, the subscriber. For a family plan, which includes a subscriber plus two or more dependents, the plan might cover more than one worker—most often the subscriber’s spouse or domestic partner, who is also working. However, working spouses and domestic partners can be covered by another employer or in a plan from another market segment (e.g., individual market). To our knowledge, no estimate has been published that reports the average number of workers that are covered by a family plan, so we examined a report on household composition in the United States (Mather et al. 2019) and an estimate by the U.S. Bureau of Labor Statistics for the number of working spouses per married couple (U.S. Bureau of Labor Statistics 2021).³⁴ We concluded that, on average, approximately 1.5 workers are covered by a family plan.

Hence, to calculate the affordability of a family plan in Indiana and the comparison states, we multiplied workers’ average annual pay in each state by 1.5, the factor we estimated. This estimated factor was based on a number of assumptions discussed below; however, because we multiplied the workers’ average annual pay in each state by the same factor, the comparison of the affordability of a family premium in Indiana versus the other states (and the United States as a whole) is not sensitive to the particular value of this factor because it is applied across all states.

Next, we discuss the steps we used to reach the estimate that an average of 1.5 workers were covered by a family plan in 2020. The Population Reference Bureau examined the American Community Survey and reported 65% of households were comprised of families, which they separated into categories. Because a family plan is for a subscriber plus two or more dependents, the most likely categories of families that would be covered by a family plan include either married couples with children or a single parent with children. For these two categories, we made the following assumptions to estimate the number of workers per family that would be covered by the plan.

- Married couples with children (19% of households): assumed all of these households were covered by a family plan with an average of 1.6 workers (U.S. Department of Labor 2021).³⁵
- Single parent with children (9% of households): assumed 38% of these households were covered by a family plan based on 38% of households having three or more persons (Mather et al. 2019); therefore, 3.4% of households would be covered by a family plan with one worker.³⁶

Based on these two categories of households being covered by a family plan—19% with 1.6 workers and 3.4% with one worker—the weighted average is 1.5 workers per family plan. Because the composition of families changes slowly, we used this factor for the entire 2013 to 2020 period.

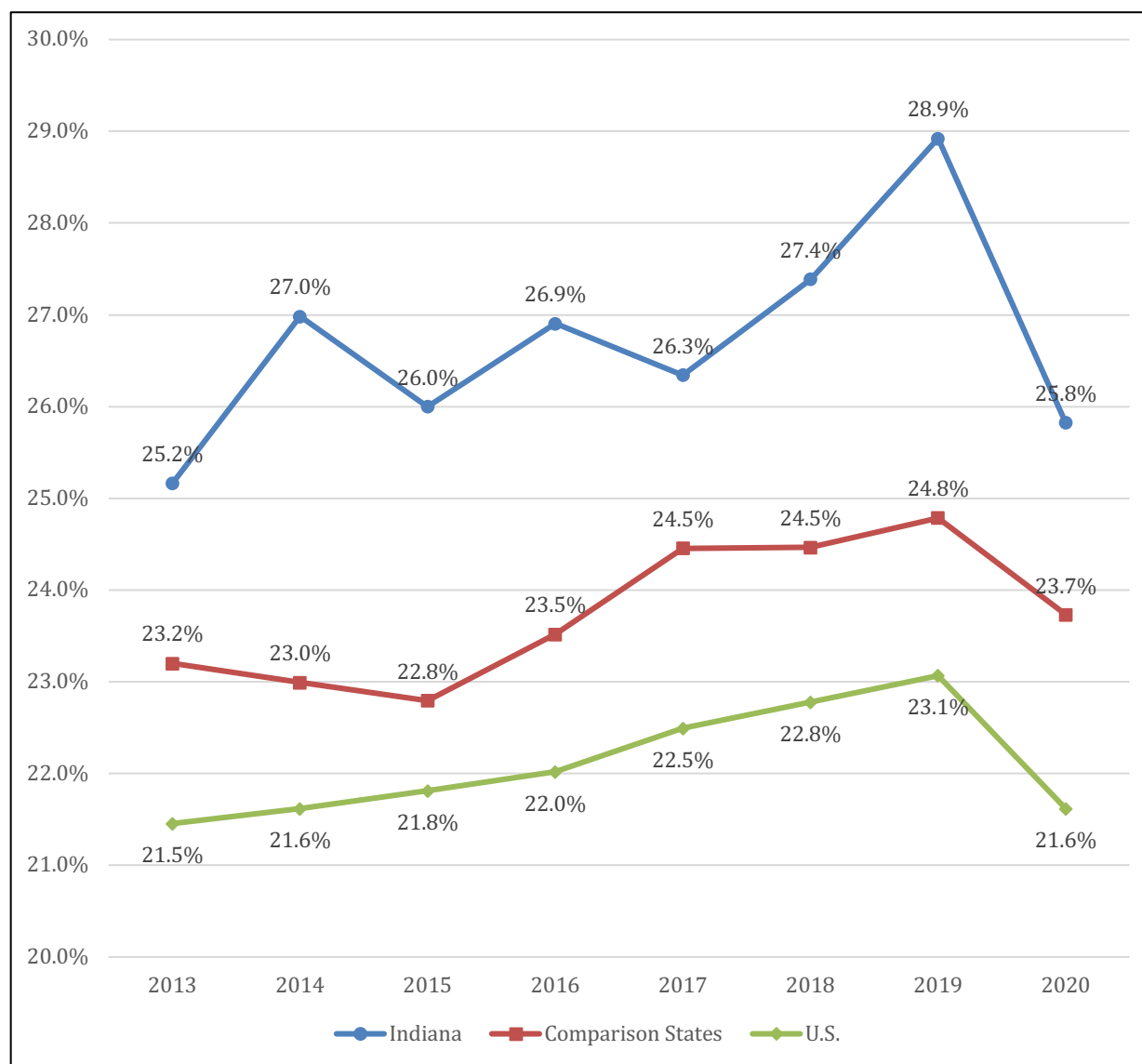
³⁴ These sources and other sources we examined did not include Indiana-specific information.

³⁵ Among married couples with children, 95.3% had at least one employed spouse. Of that set of families, 37.3% had one working spouse and 62.7% had two working spouses, resulting in a weighted average of 1.6 workers per family with at least one working spouse (U.S. Department of Labor 2021). Some married couples are covered by two separate plans, but we did not find an estimate for that share.

³⁶ Single parents with children likely include more families with smaller households than the U.S. average, but this report did not provide that estimate.

Figure A4.2 shows the average annual family premium levels per employee as a percentage average annual pay, assuming 1.5 workers per family plan. In 2020, premiums were 25.8% of 1.5 workers' annual average pay in Indiana, a higher share than in comparison states (23.7%) and the United States as a whole (21.6%). Indiana's insurance has been less affordable in terms of workers' average annual pay since at least 2013.

Figure A4.2: Average Annual Family Premium as a Share of Workers' Average Annual Pay in Indiana and Comparison States, 2013-2020



Notes: Comparison states are Illinois, Michigan, Ohio, and Wisconsin. The values for the comparison states are based on a simple average of the states' values each year. A family premium covers the employee subscriber plus dependents, so we assumed 1.5 workers' average annual pay contributed to the premium.

Source: Petris Center analysis of Kaiser Family Foundation's analysis of Medical Expenditure Panel Survey - Insurance Component (MEPS-IC) (Kaiser Family Foundation 2022); and Petris Center analysis of the average annual pay measure from the Quarterly Census of Employment and Wages (U.S. Bureau of Labor Statistics 2022a)