Congressional request on health care provider consolidation

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Chapter summary

In 2018, the chairman of the Committee on Energy and Commerce asked the Commission to report on the effects of hospital mergers and physician–hospital consolidation. The topics are important given the long-term trend toward greater hospital consolidation and hospital acquisition of physician practices. By 2017, in most markets, a single hospital system accounted for more than 50 percent of inpatient admissions.

The literature indicates that hospitals with large market shares have the leverage to negotiate relatively high prices from commercial insurers. The rewards of market power alone could drive consolidation, but additional reasons for hospital mergers include potential efficiency gains from eliminating excess capacity, relief from financial difficulties for hospitals seeking to be acquired, pursuit of greater bargaining leverage with suppliers of drugs and devices, and potential to increase care integration. Consistent with these incentives, hospitals have been consolidating into larger systems over several decades. Changes in federal policies have not materially altered the steady trend toward greater hospital consolidation over the past 30 years.

Similarly, changes in government policies do not appear to be the main driving force behind consolidation of physician practices. Medicare pays the same rates to large and small physician practices, and other Medicare policies—such as policies to encourage the formation of accountable care

In this chapter

- Recent trends in hospital consolidation and the impact of federal policy

- Commercial prices are high in markets with high levels of hospital consolidation

- Implications of hospital consolidation for hospitals' costs and patients' costs

- Physician–hospital integration has increased Medicare payments for physician services

- No clear effect of hospital consolidation on beneficiary coinsurance for drugs or related services

- Do 340B drug discounts create incentives for hospitals to choose more-expensive products?

organizations—appear to have played at most a small role in consolidation. The primary incentives for physicians to join larger practices appear to be the potential for higher commercial prices and the desire of younger physicians for a flexible lifestyle with fewer managerial and on-call duties. In addition, as physician-office technology becomes more expensive, operating small practices grows more costly.

In contrast, government policies have played a role in encouraging hospital acquisition of physician practices. For example, when hospitals acquire physician practices, Medicare payments increase due to facility fees that Medicare pays for physician services when they are integrated into a hospital's outpatient department. The potential for facility fees from Medicare and higher commercial prices encourages hospitals to acquire physician practices and have physicians become hospital employees.

The chairman of the Committee on Energy and Commerce also asked the Commission to examine the incentives in the 340B Drug Pricing Program for hospitals to use more-expensive Part B drugs. Hospitals participating in the 340B program are generally nonprofit and have higher shares of low-income patients, and they receive substantial discounts from drug companies on hospital-administered drugs covered by Medicare Part B. Because 340B price data were not available to the Commission, we could not directly address the question of whether 340B discounts create incentives for the selection of more-expensive products. Instead, we tested whether higher 340B market share is associated with greater average cancer drug spending in a market area. We specifically focused on cancer because drugs used exclusively or largely for cancer treatment account for nearly three-quarters of Part B drug spending in the hospital outpatient setting.

Committee questions and our responses

What are recent trends in hospital consolidation, and to what degree have recent federal policies accelerated consolidation?

Hospitals have been consolidating for decades. By 2017, in most markets, a single hospital system had more than a 50 percent market share of discharges. The primary incentives for mergers are to achieve higher prices from commercial payers and possibly to gain efficiencies. Changes in federal policies could have some small effect on mergers, but changes in Medicare payment rates, in health information technology incentives, and in overall hospital profitability have all occurred without materially altering the 30-year trend toward greater hospital consolidation. We infer from this experience that federal policies have not been the primary driving

force behind hospitals merging with other hospitals. However, we find that federal policies do create incentives for physician–hospital integration.

Do markets with higher levels of hospital consolidation have higher commercial prices than markets with lower levels of hospital consolidation?

The effect of consolidation on prices varies from study to study and market to market, but most studies find consolidation leads to higher commercial prices.

What are the implications of hospital consolidation on hospitals' costs and on patients' costs?

The effect of consolidation on hospitals' costs is not clear in theory or from our current analysis. From a theoretical standpoint, the merger of two hospitals could initially create some efficiencies and bargaining power with suppliers. But over time, higher prices from commercial payers could loosen hospitals' budget constraints and lead to higher cost growth, thus offsetting any efficiency gains.

With respect to market power, pricing, and hospitals' costs, we found the following:

- Greater market power has a statistically significant association with higher profit margins on non-Medicare patients.
- Higher non-Medicare margins have a statistically significant association with higher standardized costs per discharge.
- The direct association between market power and standardized costs per discharge is statistically insignificant.

The lack of statistical significance between market power and standardized costs could reflect limitations of our measures of market power. There may be a need to use smaller market areas than the whole core-based statistical areas we used to determine the full effect of market power on costs. Another limitation is that certain expenditures do not show up in our measure of inpatient costs per discharge. These include spending by hospitals with higher profit margins on acquisition or subsidization of physician practices.

With respect to patients' care costs, commercially insured patients appear to pay higher prices for care and higher prices for insurance in consolidated markets. By contrast, Medicare patients are initially insulated from the effect of hospital mergers because Medicare sets prices for hospital services administratively. However, an increasing differential between Medicare and commercial prices may create pressure to increase Medicare prices as well.

How has integration between physicians and hospitals affected Medicare payments for physician services?

Physician–hospital integration, specifically hospital acquisition of physician practices, has caused an increase in Medicare spending and beneficiary cost sharing due to the introduction of hospital facility fees for physician office services that are provided in hospital outpatient departments. Taxpayer and beneficiary costs can double when certain services are provided in a physician office that is deemed part of a hospital outpatient department.

Do markets with higher levels of hospital consolidation result in similarly situated Medicare beneficiaries facing higher spending for drugs or other treatments or services?

Because Medicare sets prices for Part B drugs, hospital consolidation has a limited effect on Medicare drug spending and on beneficiary coinsurance.

Under the 340B program, hospitals can acquire outpatient drugs at a substantial discount, leading to high profit margins on drugs for 340B hospitals, which has contributed to hospitals acquiring physician practices. Can the availability of 340B drug discounts create incentives for hospitals to choose more-expensive products in some cases? If so, what would be the impact on Medicare patients' cost sharing for such drugs in such cases?

Overall, we found evidence of an association between 340B market share and higher drug spending for some cancers between 2009 and 2017. Of the five cancer types we examined, our regression analysis for two cancer types (lung and prostate cancers) found that 340B market share had statistically significant effects of just over $300 per patient per month. Because spending for lung cancer is higher than that for prostate cancer, the effect is greater in percentage terms for prostate cancer than for lung cancer (28 percent vs. 11 percent, respectively). Those 340B effects, however, were much smaller than the effects of the general trend in oncology spending, which reflects both the effect of rising prices and shifts in the mix of drugs, including the launch of new products with higher prices. For example, between 2009 and 2017, cancer drug spending per month grew by more than $2,000 for patients with breast cancer, lung cancer, and leukemia/lymphoma. Given the relative size of the potential 340B effect, the overall effect on beneficiary cost sharing is likely to be modest and vary by beneficiaries' supplemental coverage. ∎

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Background: Request from the Energy and Commerce Committee

In August 2018, the chairman of the Committee on Energy and Commerce asked the Commission to study the effects of hospital consolidation and physician–hospital integration. Specifically, the Committee asked the Commission to address the following issues:

- Describe recent trends in hospital consolidation and to what degree current federal policies may accelerate consolidation.

- Do markets with higher levels of hospital consolidation have higher commercial prices than markets with lower levels of hospital consolidation?

- What are the implications of hospital consolidation on hospitals' costs and patients' costs?

- How has integration between physicians and hospitals affected Medicare payments for physician services?

- Do markets with higher levels of hospital consolidation result in similarly situated Medicare beneficiaries facing higher spending for drugs or other treatments or services?

- Under the 340B program, hospitals can acquire outpatient drugs at a substantial discount, leading to high profit margins on drugs for 340B hospitals, which has contributed to hospitals acquiring physician practices. Can the availability of 340B drug discounts create incentives for hospitals to choose more-expensive products in some cases? If so, what would be the impact on Medicare patients' cost sharing for such drugs in such cases?

In answering these questions, it is important to differentiate types of consolidation. *Horizontal consolidation* refers to mergers of businesses that operate in a similar position along the production process. For example, a merger of Ford and General Motors would be horizontal consolidation since both produce automobiles. By contrast, *vertical consolidation* (or vertical integration) refers to mergers of organizations that operate at different points along the production process. For example, a merger of Ford and U.S. Steel would be vertical integration since U.S. Steel produces some of the materials that Ford uses to manufacture cars. In health care, a hospital merging with another hospital and

a physician group merging with another physician group are both examples of horizontal consolidation; a hospital purchasing a physician practice is an example of vertical integration. Different types of consolidation historically have had different effects on prices paid for services.

To address the Committee's questions, we relied on the health economics literature to evaluate how horizontal consolidation and vertical integration affect prices. However, the literature lacks data on how providers' cost structures shift in the long run when they have market power. Therefore, we conducted our own analysis of how hospital inpatient costs per discharge are related to the market power of providers and insurers.

In addition to consolidation, we were asked to investigate the effects of the 340B program on Part B drug spending. Because a large and growing share of Part B drug spending is for cancer drugs, we evaluated the nationwide growth in cancer drug spending for specific types of cancer and whether average cancer drug spending in a market increased as the share of chemotherapy patients treated by 340B hospitals (as a measure of 340B hospitals' market share) increased.

Horizontal hospital consolidation and horizontal physician-practice consolidation

In the health care context, *horizontal consolidation* refers to hospitals (or hospital systems) merging with other hospitals (or hospital systems) or physician practices merging with other physician practices. If a hospital system already owns one physician practice and purchases a second physician practice, that is also considered horizontal consolidation because the hospital system's share of physicians increased. In general, the courts have been more concerned about the effect of horizontal consolidation on prices than vertical integration (Department of Justice and the Federal Trade Commission 1996, U.S. District Court for the District of Idaho 2014).

Physician–hospital vertical integration

Physicians are increasingly becoming employees of hospitals. This vertical integration could, in part, be driven by a desire of new physicians to be employees rather than entrepreneurs, but it could also partially stem from financial incentives in the Medicare and commercial payment systems (Medicare Payment Advisory Commission 2017a). In our June 2017 report to the Congress, we concluded that through 2014:

- Many physicians joined larger groups, hospitals, and health systems, often without moving the location of their practice, suggesting the delivery of services may not have changed materially.

- When a physician practice integrates with a hospital outpatient department, both commercial prices and Medicare prices (defined here as physician payment plus facility fees) increase.

- Higher prices create an opportunity for both hospitals and physicians to profit when hospitals purchase physician practices, regardless of whether efficiency improves.

While physicians increasingly are hospital employees, the potential remains for additional acquisitions of physician practices. We found that in 2014, 39 percent of physicians were affiliated with a health system or hospital, 23 percent were affiliated with a group practice (but not with a health system or hospital), 16 percent were solo practitioners, and 22 percent were categorized as "other" (Medicare Payment Advisory Commission 2017b).

Insurer–provider vertical integration

The effect of insurer–provider integration on costs and competitiveness with traditional insurers is less clear. Some vertically integrated organizations have been profitable and have strong reputations (e.g., Scott and White, Kaiser), but in other cases, integrated entities with strong reputations (e.g., Mayo Clinic) have divested their insurance organizations. In the case of Medicare, beneficiaries have increasingly joined Medicare Advantage (MA) plans, some of which integrate care of patients within a group or staff model HMO, while other MA plans have fee-for-service (FFS) contracts with unaffiliated providers.

Regarding consolidation of insurance and provider functions, our June 2017 report to the Congress found no dispositive evidence in the literature that integrated insurer–provider entities led to lower insurance premiums (Frakt et al. 2013, Medicare Payment Advisory Commission 2017a). Similarly, Burns and colleagues, in their broad 2013 review of the literature on horizontally and vertically integrated delivery models, concluded, "there continues to be an extremely thin evidentiary basis for recommending any particular approach" (Burns et al. 2013).

Recently, insurers have started to purchase physician practices (without owning hospitals) in a new form of vertical integration (UnitedHealth Group 2019). As of 2019, UnitedHealth was reported to have approximately 50,000 employed or affiliated physicians (Dyrda 2019). In addition, some providers have started their own insurance products (Kacik 2017). It is not clear whether these types of vertical integration will be more successful than past efforts to merge insurers and providers.

Recent trends in hospital consolidation and the impact of federal policy

Hospitals have been consolidating for decades. By 2017, in most markets, a single hospital system had more than a 50 percent market share of discharges. Plausible factors driving consolidation include the potential for higher commercial prices, efficiency gains, financial difficulties at acquired hospitals, and the acquirers' desire to grow their organization. Research suggests only 20 percent of acquired facilities were under financial stress (National Institute for Health Care Management 2019). Once a hospital market becomes heavily concentrated, new competitors rarely enter.
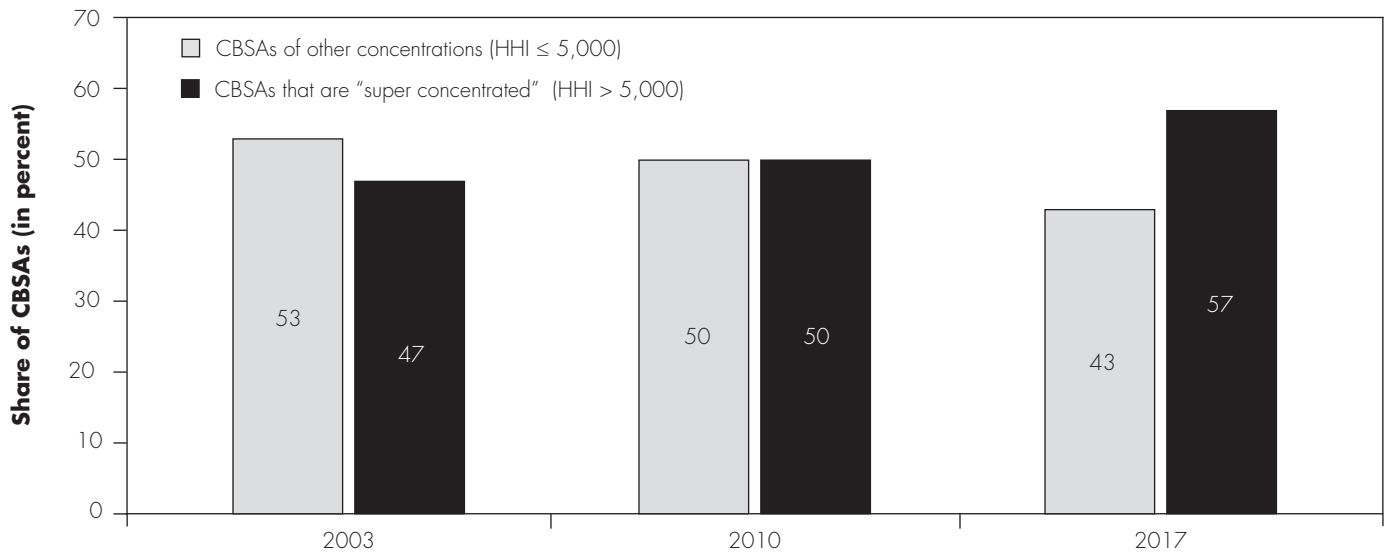
While changes in federal policies may have some small effect on mergers, changes in Medicare payment rates, changes in health information technology incentives, and changes in overall hospital profitability have all occurred without materially altering the steady 30-year trend toward greater hospital consolidation. Therefore, it appears that federal policies have not been the primary driving force behind hospital mergers.

Examining hospital concentration

To respond to the congressional inquiry, we examined trends in hospital consolidation and insurer consolidation. To examine hospital consolidation, we assessed each hospital system's market share in each core-based statistical area (CBSA) using the American Hospital Association's (AHA's) system membership identification.[1] As described by Cohen and colleagues, this information can be used to identify horizontally integrated hospitals as it "tracks hospitals' membership in a diversified single hospital or multihospital health care system" (Cohen et al. 2017). The AHA data describe a hospital system as "two

FIGURE
15–1

The share of CBSAs with "super-concentrated" hospital markets has increased since 2003

Note: CBSA (core-based statistical area), HHI (Herfindahl–Hirschman Index).

Source: MedPAC analysis of hospital systems' market share data from Medicare costs reports and from the American Hospital Association Annual Survey of Hospitals.

or more hospitals owned, leased, sponsored, or contract managed by a central organization" (American Hospital Association 2019a).

Market concentration is traditionally computed using the Herfindahl–Hirschman Index (HHI). The HHI is calculated by squaring the market share of each entity competing in the market and summing the results. The index approaches zero when a market is occupied by a large number of firms of relatively equal size and reaches its maximum of 10,000 points when a market is controlled by a single firm. The HHI increases both as the number of firms in the market decreases and as the disparity in size among those firms increases.

Using Department of Justice (DOJ) guidelines, markets with an HHI below 1,500 are considered unconcentrated; those with an HHI between 1,500 and 2,500 are considered moderately concentrated; and those above 2,500 are considered highly concentrated (Department of Justice and the Federal Trade Commission 2010). By 2017, 90 percent of hospital markets would be deemed highly concentrated by Federal Trade Commission (FTC)

standards. The most concentrated markets have an HHI above 5,000, meaning in a market with two systems, one of the systems has more than a 50 percent market share; these markets have been referred to as "super concentrated" (Fulton et al. 2018). The growth in hospital market concentration has continued steadily over the years. From 2003 to 2017, the share of CBSAs with a super-concentrated hospital market increased from 47 percent to 57 percent (Figure 15-1).

Hospital market power has grown over time

Our analysis compares the 2017 hospital profits and costs in the 57 percent of CBSAs with an HHI above 5,000 to the profits and costs in other, less competitive markets.

Of the 154 CBSAs with super-concentrated hospital markets in 2003, all but 10 had an HHI of over 5,000 in 2017 (Table 15-1, p. 464). Even among the 10 where the HHI dipped below 5,000, only 1 saw its concentration decline below an HHI of 4,000. However, that one case is not due to the entrance of one or more new hospital systems; instead, it is due to a redrawing of the CBSA

**TABLE
15–1**   Hospital consolidation has primarily been in one direction

	CBSAs with "super" hospital concentration in 2017 (HHI > 5,000)	Other CBSAs in 2017 (HHI ≤ 5,000)	Total
CBSAs with "super" hospital concentration in 2003 (HHI > 5,000)	45% (n = 144)	3% (n = 10)	48% (n = 154)
Other CBSAs in 2003 (HHI ≤ 5,000)	11% (n = 36)	40% (n = 128)	52% (n = 164)
Total	57% (n = 180)	43% (n = 138)	

Note: CBSA (core-based statistical area), HHI (Herfindahl–Hirschman Index). An HHI of over 5,000 indicates a "super-concentrated" market. Components may not sum to totals because of rounding.

Source: MedPAC analysis of hospital systems' market share data from Medicare costs reports and from the American Hospital Association Annual Survey of Hospitals.

boundaries that brought additional hospitals into a new, larger CBSA. Hospital consolidation appears to be a trend that is not easily reversed once started. It may be very difficult to unwind mergers and create more competition in markets, especially in markets where one system employs most physicians and controls most hospital beds.

Insurer market power has also grown

Along with increased hospital market power over time, insurer market power has also increased, with a consolidation of market share in fewer insurers. Figure 15-2 illustrates that by 2017, 21 of the 51 regions (states plus the District of Columbia) had super-concentrated group insurance markets (group insurance markets as defined here excludes Medicaid managed care and Medicare Advantage plans).
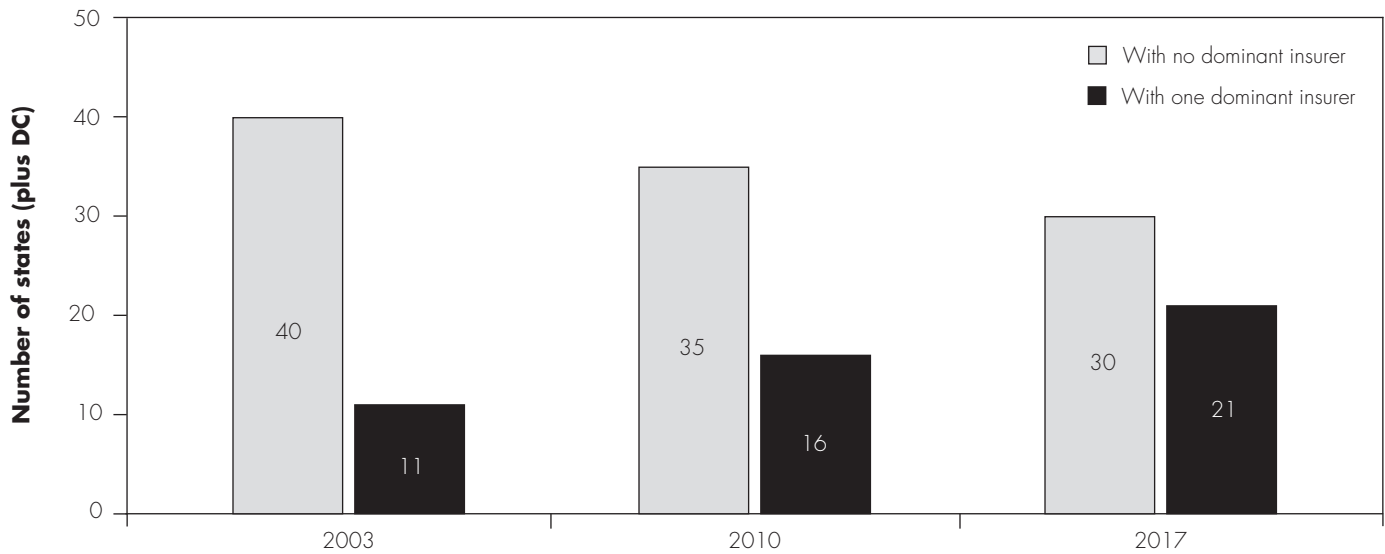
The potential for insurers to enter a highly consolidated market appears to be slightly greater than the potential for providers because large provider systems have started their own insurance products or partnered with insurers outside their markets. For example, a large health care system in one state could set up its own insurance company or contract with an insurer in another state to conduct their back-room insurance operations. Thus, in contrast to trends in hospital consolidation, there are examples of insurer market power declining in North Dakota and South Dakota, where providers have started their own insurance products.

Modest changes in antitrust enforcement had a minimal impact on consolidation

Researchers and other observers have reported growth in health care consolidation over the past 35 years. Relatively little change has occurred in antitrust policy and in FTC challenges of hospital mergers as a response to growing consolidation. For example, in 1984, a review of hospital mergers in the 1970s and 1980s stated, "growing concern has been expressed about the skyrocketing rate at which health care expenditures have increased. Some believe that part of the cause for these rapidly increasing costs is the lack of competition in the health care sector, particularly in the hospital and physician services" (Miles 1984). Another study concluded: "Stricter antimerger enforcement in the hospital industry may be one governmental response to the larger problem of rampant inflation in health care costs" (Schramm and Renn 1984). Similarly, a review of the consolidation literature from 1988 stated that, given concerns over market power leading to higher prices for hospital services, there was a need for antitrust enforcement and "close scrutiny of hospital mergers" (Baker 1988). Since then, hospitals have continued to merge, resulting in lower levels of competition, but there has been little corresponding change in antitrust regulation. In 2019, a group of researchers found hospital consolidation led to higher hospital prices and higher insurance premiums. They concluded that "these findings help underscore the importance of exploring

FIGURE
15–2

Insurer consolidation by state has increased since 2003

Note: A state with a "dominant insurer" is defined as a state with a Herfindahl–Hirschman Index exceeding 5,000 in the group insurance market.

Source: MedPAC analysis of insurers' market shares based on data from the National Association of Insurance Commissioners.

antitrust policy and other efforts that may reduce hospital concentration and help keep Marketplace premiums affordable" (Boozary et al. 2019). The calls in 1984 and 2019 for FTC enforcement highlight how little change there has been in observers' concerns.

The recent history of FTC enforcement was summarized by Capps, who divided efforts by the FTC and DOJ into three decades (Capps 2019). Capps reported that, in the 1990s, the DOJ and FTC lost several challenges to hospital mergers—in part due to the courts adopting broad geographic markets for determining competition. In the 2000s, Capps identified few challenges of mergers, but the academic research shifted to focus on examining increases in hospital leverage in negotiations with insurers, even in small markets. During the 2010s, the FTC won several challenges of hospital consolidation using new definitions of markets. However, the FTC challenged only 2 percent to 3 percent of mergers each

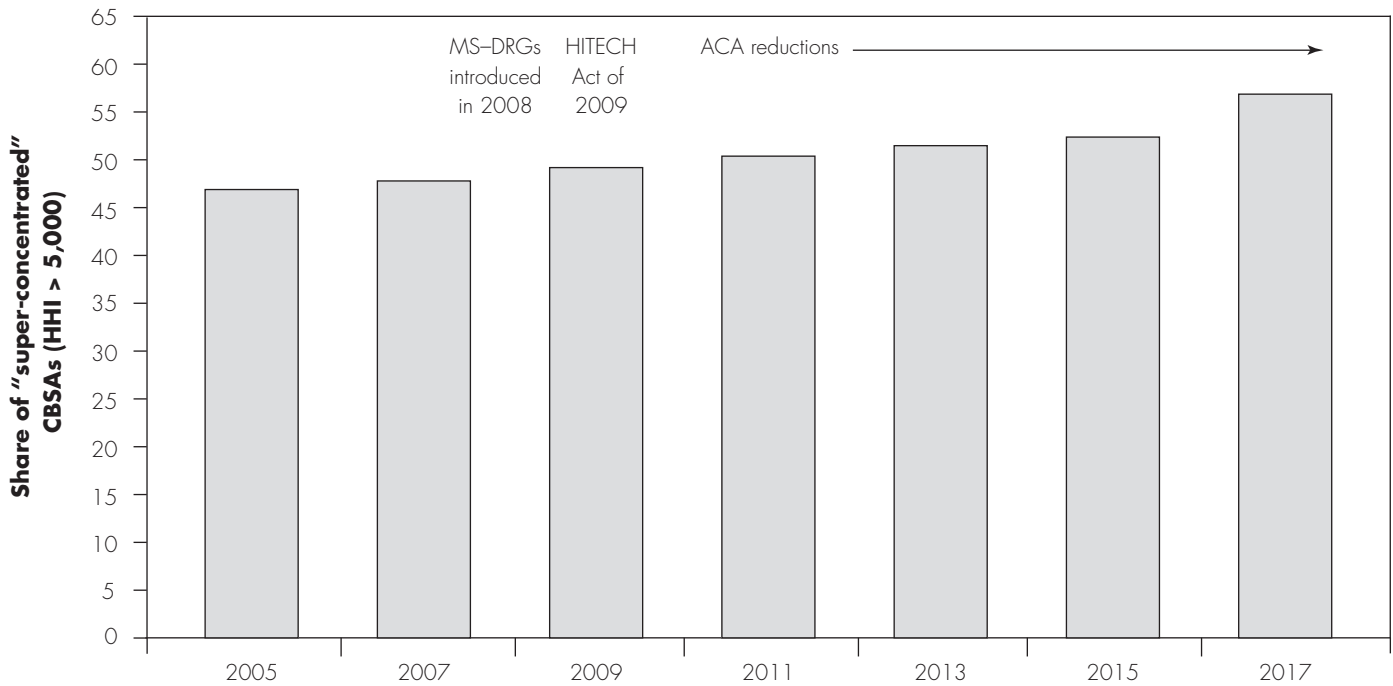year, and hospital markets continue to become more consolidated (Capps 2019).

Most hospital markets are now highly concentrated. With respect to the potential to unwind long-standing mergers, industry observers have concluded that it is often just too difficult to "unscramble the eggs" after hospitals have merged (Dafny 2014). It is also difficult for new hospitals to enter markets, especially in markets where physicians are already employees of existing hospital systems. Therefore, though improvements in FTC and DOJ enforcement of antitrust laws can slow the pace of consolidation, it is unlikely they will be able to stop or reverse the trend toward increasing hospital market power.

Changes in Medicare policy have not driven horizontal hospital consolidation

Because Medicare's hospital payment rates are set administratively, market dominance, which is pertinent to price negotiation between commercial payers and

FIGURE
15–3

The share of "super-concentrated" CBSAs has consistently increased over time

Note: CBSA (core-based statistical area), MS–DRGs (Medicare severity–diagnosis related group), HITECH (Heath Information Technology for Economic and Clinical Health), ACA (Affordable Care Act of 2010), HHI (Herfindahl–Hirschman Index). An HHI of over 5,000 indicates a "super-concentrated" market.

Source: MedPAC analysis of hospital systems' market share data from Medicare cost reports and from the American Hospital Association Annual Survey of Hospitals.

providers, is not a factor in Medicare's hospital payments to hospitals. Thus, if Medicare policies were driving increased hospital consolidation, it would have to be through a mechanism other than hospital payment rates. When we examined the implementation of three major policies affecting Medicare payment (the adoption of Medicare severity–diagnosis related groups (MS–DRGs), incentive payments for adopting health information technology, and a series of payment reductions mandated in the Affordable Care Act of 2010 (ACA)), we found that none of them materially affected the trajectory of increasing hospital consolidation.

Specifically, in 2008, CMS's adoption of the new payment classifications for hospitals, MS–DRGs, increased payments due to dramatic changes in hospitals' coding and documentation of patients' diagnoses at admission. In response, Medicare payments grew more rapidly

than anticipated from 2008 through 2010. Subsequently, in 2011, CMS began to slowly reduce the payment update to account for this excess payment growth. At the same time, the Health Information Technology for Economic and Clinical Health Act, which was part of the American Recovery and Reinvestment Act of 2009, created a program that provided hospitals with payments for the adoption and meaningful use of health information technology (electronic health records). From 2011 through 2016, CMS provided nearly $25 billion in incentive payments to eligible hospitals (https:// www.cms.gov/Regulations-and-Guidance/Legislation/ EHRIncentivePrograms/Downloads/October2018_ MedicareEHRIncentivePayments.pdf). In addition, in 2010, the ACA, in combination with the Health Care and Education Reconciliation Act, reduced payments to hospitals through reductions to the annual payment

TABLE
15–2

Aggregate hospital Medicare and total (all-payer) profit margins during three decades of provider consolidation

| | Average margin | |
Decade	Medicare	All payer
1989–1998	3.8%	4.8%
1999–2008	–0.7	4.1
2009–2018	–6.9	6.4

Note: The reported Medicare margins in the first decade reflect inpatient margins. Inpatient margins were the key to Medicare profitability at that time given that they were the largest source of revenue and outpatient services were paid based on costs before 2000. In the last two decades, margins primarily reflect hospital profitability on inpatient and outpatient services.

Source: MedPAC analysis of cost report data.

update and other programs that resulted in payment reductions (e.g., the readmission penalty program and changes to the disproportionate share hospital payments) while also increasing the share of insured individuals. The largest reductions to hospitals' payment updates occurred in 2017, 2018, and 2019. While changes in federal policies may have some small effect on mergers, changes in Medicare payment rates and changes in health information technology incentives have all occurred without materially altering the long-term trend of greater hospital consolidation (Figure 15-3).

Regarding other Medicare policies (those not involving payment rates), some have expressed a concern that the enactment of accountable care organizations (ACOs) for Medicare in 2010 could have given hospitals an incentive to merge into larger entities that can absorb more risk. ACOs are organizations that agree to be held accountable for beneficiaries' total Part A and Part B spending. While it is plausible that ACOs create an incentive for hospitals to merge into larger risk-bearing entities, the evidence on whether this type of merger is occurring is mixed. One recent study concluded that ACOs had no effect on consolidation, and the other concluded that there was a small effect (Kanter et al. 2019, Neprash et al. 2017).

Other federal payment policy changes could affect the organization of hospitals to a small degree. For example, hospitals can consolidate their oncology business within a hospital that qualifies for discounts on oncology drugs

through the 340B Drug Pricing Program. But these policies in general would have a greater effect on vertical consolidation with physicians than on horizontal hospital consolidation.

Therefore, it appears that individual federal policies have not had a large enough effect to change the long-term trajectory of hospitals merging into larger hospital systems. However, as we discuss later, federal policy does create some incentives for hospitals to integrate with physician practices.

Hospital profits were higher in years with higher levels of hospital consolidation

While the steady trend toward greater consolidation shown in Figure 15-3 did not appear to be altered by the three major policy shifts, some argue that the long-term trend in consolidation is associated with a long-term decline in Medicare margins. Lower Medicare margins could put financial pressure on hospitals to consolidate and raise commercial prices. While individual hospitals under financial strain may consolidate, this hypothesis does not account for most mergers (National Institute for Health Care Management 2019). In fact, the period with the highest level of hospital consolidation (the last 10 years) was also a period with relatively high total (all-payer) profit margins. We illustrate this trend by examining 30 years of Medicare and all-payer profitability (Table 15-2). We find that in the 1990s, Medicare profitability was relatively high and all-payer

profitability was moderate. During that decade, there was significant hospital consolidation and a significant number of purchases of physician practices (Burns and Wholey 2000, Capps and Dranove 2004, Dranove and Lindrooth 2003, Mark et al. 1998). During the next decade (the 2000s), hospitals roughly broke even on Medicare patients on average while total margins were moderate; consolidation continued (Capps 2019, Capps et al. 2015). In the most recent decade, consolidation continued with a very different margin picture. Medicare margins were clearly negative, but commercial profits increased enough to create record-high all-payer margins. By 2018, the aggregate total margin was 6.8 percent (close to the record high of 7.2 percent in 2013). For-profit hospitals had a 2018 all-payer profit margin of 11.3 percent, the highest we have ever recorded. Taken together, the data show that the decade of the highest hospital profit margins was also the decade of greatest hospital consolidation. Given that profit margins were near 30-year highs during the past 10 years, the recent wave of consolidation does not appear to be due to financial pressure on the industry.

Commercial prices are high in markets with high levels of hospital consolidation

The preponderance of the research suggests that hospital consolidation leads to higher prices for commercially insured patients. However, hospital market power is just one factor that affects prices. The literature also suggests that insurer market power can lead to lower hospital prices for commercially insured patients (though these savings may not flow through to lower insurance premiums). The combination of these two findings implies that through negotiations, hospitals generally seek to increase negotiated rates while insurers generally prefer to pay lower commercial rates.

High rates paid by commercial insurers primarily reflect traditional price discrimination rather than cost shifting

Commercial insurers pay hospitals relatively high prices on average, and these prices vary widely, depending on negotiations between hospitals and insurers. Commercial prices are often more than double international prices and double Medicare prices (Anderson et al. 2019, Maeda and Nelson 2017, Medicare Payment Advisory Commission 2019c, Squires 2012, White and Whaley

2019). These commercial prices are also high relative to costs; data from the AHA indicate that prices charged to commercial insurers are more than 50 percent above hospitals' costs (on average), indicating hospitals' market power to negotiate prices at this level (Medicare Payment Advisory Commission 2019a). Other studies note high commercial prices, but emphasize that prices for identical services can vary by more than 300 percent in the same market (Medicare Payment Advisory Commission 2017a, White and Whaley 2019). While it is clear that commercial prices are high and highly variable, researchers and industry representatives disagree as to why this variation exists.

Hospitals have long stated that they charge high prices to commercial insurers because Medicare and Medicaid prices are too low. The AHA stated that in 2017, Medicare and Medicaid payment rates on average were equal to 87 percent of costs (American Hospital Association 2019c). Hospitals contend they are forced to extract high profits from commercial patients to offset the losses on Medicare and Medicaid patients. This contention is referred to as the "cost-shift" hypothesis, wherein hospitals are forced to shift costs onto commercially insured patients (Fox 2008, Frakt 2015b). The cost-shift hypothesis has two key assumptions:

- Revenues do not affect costs. Under the complete cost-shifting hypothesis, if Medicare reduces a hospital's revenue by $1 million, the hospital will have to increase commercial revenue by $1 million. The assumption is that the hospital will not be able to reduce costs because costs will be the same whether or not the hospital has the additional $1 million of Medicare revenue. In contrast, if revenues affected costs, it could be argued that hospitals could respond to Medicare's lower price increases by constraining costs rather than requiring higher price increases from commercial insurers.

- Hospitals will negotiate prices only up to the point necessary to provide high-quality care. That is, they will use their market power only when necessary, which implies that hospitals will use their market power to negotiate higher commercial price increases when Medicare prices fall, but hospitals will agree to lower commercial price increases if Medicare prices increase significantly or if the hospital's profits are high. Cost shifting requires that the hospital hold some

market power in reserve that it uses only when it needs to increase rates due to financial difficulties.

To test whether hospital income affects costs, we annually look to see if hospitals with high commercial profits have higher costs per discharge. We have found that nonprofit hospitals with high non-Medicare profits consistently have higher costs per adjusted discharge, but that for-profit hospitals with high profits on non-Medicare cases have lower costs per discharge (Medicare Payment Advisory Commission 2019c). This finding suggests that—at least for nonprofit hospitals—how much a hospital spends per discharge is affected by how much money a hospital has available to spend.

Several other studies have tested whether commercial prices and hospital costs change when Medicare or Medicaid rates change. With respect to Medicare, the literature finds no or little cost shifting and concludes higher Medicare rates lead primarily to higher hospital expenditures with a smaller effect (or no effect) on commercial price growth (Cooper et al. 2017, Frakt 2015b, White 2013, Zwanziger and Bamezai 2006). In the case of Medicaid, Wagner examined markets in which individuals shifted from commercial insurance to Medicaid coverage. The cost-shift theory predicts an increase in charges and prices, but Wagner found a slowdown in charge growth, suggesting "hospitals are not employing cost-shifting strategies as they claim" (Wagner 2016).[2] One exception to the literature is a recent working paper that finds faster price growth at hospitals that were penalized under the Hospital Readmissions Reduction Program; however, the authors caution that it is not definitive evidence of cost shifting (Darden et al. 2019). Taken as a whole, the literature suggests that when Medicare or Medicaid revenues increase, hospitals still aim to negotiate larger, rather than smaller, rate increases from commercial insurers. The higher prices charged to commercial insurers therefore appear to primarily (though maybe not fully) reflect traditional price discrimination, where hospitals negotiate higher rates in situations where they have more market power. A comparison of the cost-shift and price discrimination arguments and their implications is attached as Appendix 15-A (pp. 497–499) to this chapter.

Most studies find that hospital consolidation leads to higher commercial prices

The effects of consolidation have received significant attention from the FTC, academics, and the press (Abelson 2018, Department of Justice and the Federal Trade

Commission 1996, Federal Trade Commission 2016a, Federal Trade Commission 2016b). A summary of older hospital merger literature states: "The magnitude of price increases when hospitals merge in concentrated markets is typically quite large, most exceeding 20 percent" (Gaynor and Town 2012b). In later work, Gaynor, Ho, and Town summarize the literature as follows: "Mergers between rival hospitals are likely to raise the price of inpatient care and these effects are larger in concentrated markets. The estimated magnitudes are heterogeneous and differ across market settings, hospitals, and insurers" (Gaynor et al. 2014). While the magnitude of the price increase associated with consolidation varies by study, most studies find consolidation leads to higher provider prices and higher premiums for private insurance (Boozary et al. 2019, Town et al. 2007).

The hospital industry generally disputes the assertion that market power causes an increase in prices. For example, a recent AHA-funded study concludes that, after being acquired by another hospital or system, the acquired hospitals' revenue per discharge fell by 3.5 percent and the hospitals' costs per discharge fell by 2.3 percent on average (American Hospital Association 2019b, Noether and May 2017). The AHA findings imply that the hospital mergers caused hospitals to improve efficiency and that the hospital chose to pass on 100 percent or more of those efficiencies on to insurers in the form of lower prices (at least in the short run). However, the AHA study has two major limitations. First, it does not use data on actual prices paid by commercial insurers; rather it creates a proxy for hospital prices by dividing hospitals' operating revenue (from Medicare cost reports) by adjusted admissions. But this price proxy (revenue per adjusted admission) could be affected by a number of factors: change in payer mix (e.g., fewer commercially insured patients); coding changes (e.g., more complete coding); changes in service mix (e.g., some complex surgeries may have shifted to the acquiring hospital); or changes in commercial prices. Second, the study looks only at short-term effects of mergers on revenue per discharge, which may be limited by agreements to cap price increases in order to obtain regulatory approval for mergers. Over the longer term, greater effects may be observed. Two peer-reviewed studies of mergers in the 1980s and 1990s also look at short-term price effects using a similar proxy for private sector prices. Their results are somewhat similar to the AHA findings, with mergers being followed by price decreases in some markets, but flat or increased prices in

less-competitive markets (Connor et al. 1997, Spang et al. 2001). A more recent study avoids the limitation of the price proxy by using actual price data from commercial claims in the Health Care Cost Institute data set. That study finds that hospital prices were 12 percent higher in monopoly markets than those markets with four or more competing hospitals and that mergers of hospitals in the same market raised prices by an average of 6 percent (Cooper et al. 2018). Another recent analysis finds that prices tend to increase faster in markets where consolidation increased (Health Care Cost Institute 2019). The most recent study from the California Healthcare Foundation uses a different source of prices (IBM Health MarketScan claims data); it finds higher prices of hospital services in California markets with higher levels of concentration (California Healthcare Foundation 2019).

Taken together, the preponderance of evidence suggests that hospital consolidation leads to higher prices. These findings imply that hospitals seek higher prices from insurers and will get them when they have greater bargaining power.

Insurer market power may lower hospital prices, but savings do not necessarily result in lower premiums for commercially insured patients

Insurer market power also appears to affect the prices insurers pay for physician and hospital services. In the physician market, Roberts and colleagues found that insurers with market shares over 15 percent paid prices for physician office visits that were, on average, 21 percent lower than prices paid by insurers with market share less than 5 percent (Roberts et al. 2017). Similarly, Scheffler and Arnold found insurers with larger market shares pay lower rates to hospitals (Scheffler and Arnold 2017). However, greater insurer concentration does not necessarily lead to lower premiums because higher profits could remain with the insurer (California Healthcare Foundation 2019, Trish and Herring 2015). A recent study found that hospital and insurer concentration both increase premiums in the ACA marketplace, but the effect of hospital concentration was generally larger than insurer concentration (Boozary et al. 2019). A California-specific study also found both hospital and insurer concentration associated with an increase in ACA premiums but found the insurer concentration had a larger effect (California Healthcare Foundation 2019).

Another question in the literature is whether insurers will act as traditional monopsonists and restrict the volume of hospital services demanded. However, it appears that insurers use their market power to directly negotiate lower hospital prices rather than use their market power to constrict the volume of services provided to patients (Bates and Santerre 2008, Feldman and Wholey 2001).

Examples of differences in insurer and provider market power

We can see how differences in the market power of hospitals and insurers can lead to different price levels. Under three scenarios, we see how hospitals can receive lower prices or obtain higher prices, depending on whether hospitals or insurers are dominant in the market:
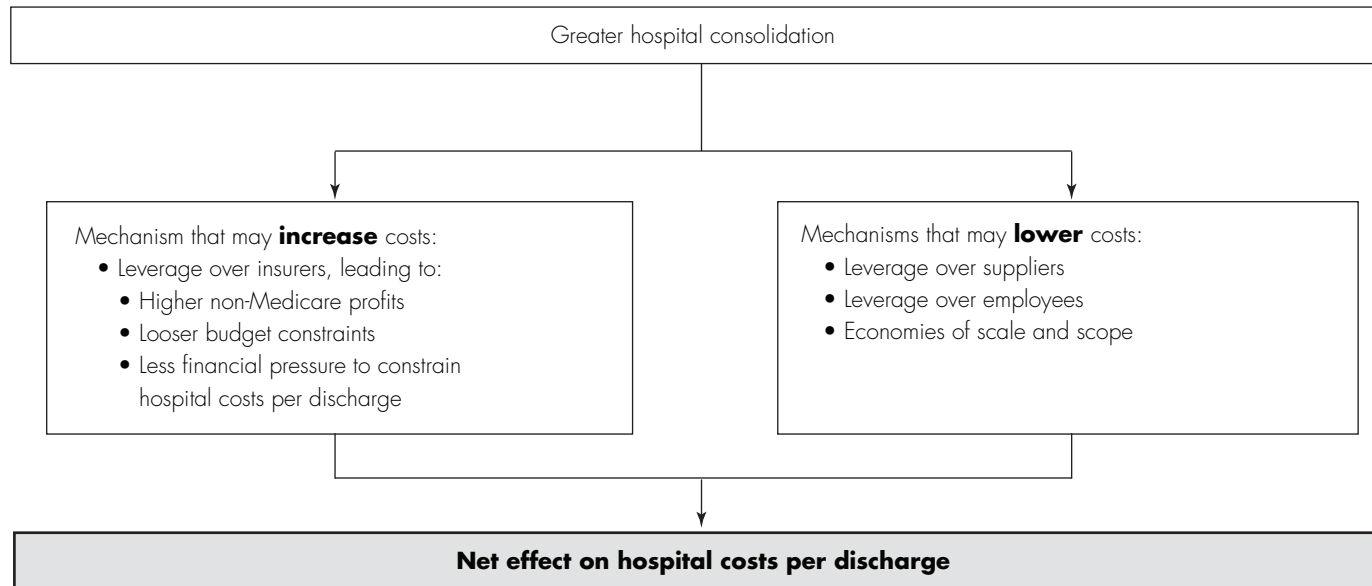
- *Low hospital market power.* Hospitals have little market power over MA plans because Medicare regulations allow MA plans to pay FFS rates if the hospital is out of network (Berenson et al. 2015). This policy and other factors have led to hospital prices for MA enrollees that are roughly equal to Medicare FFS prices (Maeda and Nelson 2017).

- *High insurer market power.* A 2005 Government Accountability Office study found that in some markets, such as Alabama, where a single insurer had a high share of the market, hospitals tended to receive below-average rates from the insurer (Government Accountability Office 2005).

- *High hospital market power.* Cooper and colleagues estimated the average monopolist hospital system obtains 12 percent higher rates than the average hospital (Cooper et al. 2018).

Market power may have greater long-term than short-term effects

The effect of hospital market power may differ in the short versus long term. For example, a 2004 study of hospital mergers from 1998 to 2000 found that the mergers resulted in modestly above-average price increases in the year following the merger in three of four markets studied, with the model predicting price changes in the 0 percent to 10 percent range (Capps and Dranove 2004). In contrast, a more recent study found that from 2004 to 2013, prices paid to California hospitals that were part of large systems grew substantially faster (113 percent) than the rate of growth at other California hospitals (70 percent). This suggests that hospitals do not immediately use all of their market power. Prices may not increase in the short term for

Greater hospital consolidation

Mechanism that may **increase** costs:
- Leverage over insurers, leading to:
  - Higher non-Medicare profits
  - Looser budget constraints
  - Less financial pressure to constrain hospital costs per discharge

Mechanisms that may **lower** costs:
- Leverage over suppliers
- Leverage over employees
- Economies of scale and scope

Net effect on hospital costs per discharge

several reasons: The acquired hospital may have multiyear contracts, the hospital system may have agreed to price limits as a condition of merger, it may want to avoid public (or board member) backlash over large immediate price increases, and negotiations may be psychologically "anchored" to prior-year prices (Kahneman 2011). This anchoring could limit price increases to a growth rate only slightly higher than it would be in a competitive market, though those higher price increases could continue for many years.

Implications of hospital consolidation for hospitals' costs and patients' costs

The literature and our data suggest that hospitals in systems with larger market shares tend to have higher profit margins on non-Medicare patients. We also find that higher profit margins on non-Medicare patients are associated with higher costs per Medicare discharge. In other words, nonprofit hospitals that make more money on non-Medicare patients tend to spend more per discharge on their Medicare patients.

However, in our analysis of CBSAs, we do not find a direct statistically significant association between "super-concentrated" hospital markets and costs per discharge, which could in part reflect the imprecision of our market power variables (e.g., calculating hospital HHI at the CBSA level). It could also reflect noise in the two-stage transmission of market power to costs, where the first stage is how market power affects commercial prices and profits and the second stage is how profits affect costs (Figure 15-4). We also examined the relationship between a continuous indicator of market power (the HHI) and costs on the hospital level. We did not find a statistically significant relationship at the hospital level of analysis.

Theoretical ways that market power could affect costs

Theoretical arguments have been offered on both sides as to whether hospital mergers increase or lower costs. On the one hand, hospital mergers could produce some efficiencies that could result in lower hospital costs. For example, hospitals could gain greater leverage with suppliers and pay lower prices for supplies, gain leverage over employees that results in slower wage

growth, or could merge two low-volume departments to reduce excess capacity. There could also be managerial efficiencies or lower capital costs. We would expect these effects to occur in the first few years after a merger.

On the other hand, mergers may lead to higher costs, which could occur if hospitals' revenues affect hospital spending. Hospitals may be able to negotiate higher prices with insurers for decades after a merger. The additional market power may cause negotiated prices to be slightly higher than they would have been for many years in the absence of market power, which could create higher profits on hospitals' commercial patients over a period of time. When nonprofit hospitals achieve higher profits on their non-Medicare patients, they tend to spend that money on hospital operations, resulting in higher costs per discharge (Medicare Payment Advisory Commission 2019c).

Figure 15-4 (p. 471) shows how market power can affect hospital costs in several ways.

The literature on the effects of consolidation on quality and cost

A key question is whether the pursuit of consolidation is justified by either improved quality or efficiency gains (lower hospital costs) of merged hospitals. To date, researchers are skeptical that consolidation is a necessary or sufficient condition for high-quality care or low costs of care (Federal Trade Commission 2016b, Frakt 2015a, Garthwaite 2019, Gaynor and Town 2012a, Tsai and Jha 2014).

With respect to quality, older studies that examined mortality from heart attacks and strokes have failed to show benefits from horizontal consolidation (Ho and Hamilton 2000, Kessler and McClellan 2000). However, others have emphasized how consolidating some complex surgeries in one location could improve outcomes (Cutler and Sahni 2013). This conclusion contrasts with the earlier finding from Kessler and McClellan that concluded that Medicare patients' risk-adjusted one-year mortality for heart attacks was significantly higher in more concentrated markets. More recently, an AHA-funded study of 611 hospital acquisitions from 2009 to 2017 concluded that risk-adjusted readmissions and mortality rates declined faster through 2017 for hospitals that were acquired by another hospital (American Hospital Association 2019b). In contrast with the AHA study, the Agency for Healthcare Research and Quality (AHRQ) funded a study of mergers between 2009 and 2013 (using data sources similar to

those of the AHA study) that concluded mergers had no effect on mortality or readmissions three years after the merger (Beaulieu et al. 2020). However, the AHRQ study did find a decline in patient satisfaction following hospital mergers, primarily when hospitals were acquired by a system with poor patient satisfaction at other hospitals (Beaulieu et al. 2020). Because the literature is mixed, we cannot make a definitive conclusion about the effect of mergers on the quality of care other than to say the effect is not large enough to result in consistent findings across studies.

Some older studies looking at short-term effects of mergers on hospitals' costs found small savings (at least in the short run). For example, some studies of data from the 1980s and 1990s have argued that consolidation can reduce the acquired hospital's costs (Spang et al. 2001). However, these savings appear to be limited to cases in which one hospital closed as opposed to having merged with a system (Cutler and Scott Morton 2013, Dranove and Lindrooth 2003). A recent working paper by Craig, Grennan, and Swanson found that the average acquired hospital saw a 1.9 percent decrease in input costs with no change in costs for the acquiring hospital (Craig et al. 2019). These savings appear to be driven by obtaining lower prices on "physician preference items" such as implantable devices. Schmitt examined mergers from 2000 to 2010 and estimated a 4 percent to 7 percent reduction in costs at the acquired hospital (Schmitt 2017). The previously cited AHA-funded study found a 3.5 percent reduction in costs per adjusted discharge (American Hospital Association 2019b). In contrast, an evaluation of 81 acquisitions from 2000 to 2010 in which a multihospital system acquired a hospital in a different market found no cost savings (Lewis and Pflum 2017). On balance, the studies found some evidence of slight short-term reductions in costs after a hospital is acquired. However, short-term savings may be eliminated over the long term if hospitals obtain higher payment rates from insurers and those higher revenues cause hospital costs to increase.

CBSA market concentration is associated with profits on non-Medicare patients

We used a broad measure of hospital markets (CBSA-level HHI for hospital systems) and a broad measure of insurer concentration (state-level insurer HHI). The objective was to see whether hospitals that have more market power relative to insurers have higher profits on their commercial

TABLE
15–3

TABLE 15–3   Median hospital non-Medicare profit margin by the CBSA's level of hospital and insurer market power, 2017

	Other hospital concentration (HHI ≤ 5,000)	"Super" hospital concentration (HHI > 5,000)	Total
Other insurer concentration (HHI ≤ 5,000)	9.3% (n = 123)	11.1% (n = 150)	10.1% (n = 273)
"Super" insurer concentration (HHI > 5,000)	11.9% (n = 50)	11.9% (n = 78)	11.9% (n = 128)
Total	10.0% (n = 173)	11.4% (n = 228)	

Note: CBSA (core-based statistical area), HHI (Herfindahl–Hirschman Index). The "non-Medicare profit margin" refers to the difference between non-Medicare revenue and non-Medicare costs divided by revenue for all services other than Medicare. The number of observations in each row and column are shown in parentheses. An HHI of over 5,000 indicates a "super-concentrated" market.

Source: MedPAC analyses of Medicare cost reports.

business. Because our data do not specifically break out commercial profit margins, we examined profits on hospitals' non-Medicare service lines (which combines commercial, Medicaid, and other patients). This imprecise measure likely understates the magnitude of market power on commercial profits alone, but we are limited to the data we have on Medicare's hospital costs reports.

On a CBSA level, we found that hospitals tend to have higher profits on non-Medicare patients in consolidated markets. Hospitals in markets with an HHI of 5,000 or less had a median non-Medicare margin of 10.0 percent, while hospitals in super-concentrated markets—defined as having an HHI of more than 5,000—had a median margin of 11.4 percent (Table 15-3). However, we found no difference across markets with high or low levels of hospital concentration in CBSAs with super concentration of insurers. The differences among the four quadrants of Table 15-3 are not statistically significant when adjusting for multiple comparisons using a Tukey mean separation test.

To corroborate the indications in Table 15-3, we also examined the correlation between market power and profit margins on a hospital level using one of two continuous measures: a CBSA-level HHI or an individual hospital's inpatient discharges within the CBSA. When looking at average effects across all levels of insurer power, we found a small but statistically significant association between the CBSA-level HHI and a hospital's non-Medicare margins (correlation = 0.08, $p < 0.01$). One caveat is that this approach does not account for differences in market power among hospitals within a market. We found a slightly larger correlation between individual hospitals' market share and their non-Medicare margins (correlation = 0.12, $p < 0.01$). The use of non-Medicare margins serves to focus more clearly on commercially insured patients, but all-payer margins show similar results. Monopolist hospitals had an average all-payer profit margin that was 1.2 percentage points higher than the average in markets with lower or moderate levels of concentration in 2017 (data not shown). While statistically significant, the differences are modest. The combination of our data and the literature suggest that hospital systems' market share is modestly associated with profit margins on non-Medicare patients.

We caution that our measures of market power are imprecise and measured at the CBSA level. Within each CBSA, we would expect prices and profits to be higher at hospitals with higher market shares than at hospitals with lower market shares. To account for this difference, the non-Medicare margin is a weighted average of the margins in the market. In addition, our analysis does not adjust for a hospital's unique factors, such as a hospital's location within the CBSA (e.g., in a high-income neighborhood) or the hospital's reputation, which could also affect the prices received by the hospital.

**TABLE
15–4**

Median hospital inpatient standardized costs per discharge by level of non-Medicare profit margins, 2017

	Level of non-Medicare margins			
	Low	**Medium**	**High**	**National**
Median standardized cost per discharge	$11,556 (*n* = 407)	$11,852 (*n* = 217)	$12,195 (*n* = 1,185)	$12,007 (*n* = 1,809)

Note: Costs have been adjusted for differences in local labor rates using relative wage data from the Bureau of Labor Statistics. Relative costs are based on all hospitals, but only metropolitan core-based statistical areas are in included in the analysis. Low levels of non-Medicare profit margin were defined as hospitals with 1 percent or lower median non-Medicare margins from 2011 to 2016. Non-Medicare margins equal the sum of net profit (or loss) on private-payer, Medicaid, self-pay, and charity cases, as well as nonpatient revenues and costs. Those hospitals with high non-Medicare margins had a non-Medicare margin over 5 percent during those years.

Source: MedPAC analysis of data from Medicare cost reports from CMS.

Higher non-Medicare profits are associated with higher costs per discharge

The correlation between non-Medicare profits and costs per discharge is statistically significant at the hospital level. In a previous analysis we found that, on average, hospitals with high non-Medicare margins had costs that were above the national median in 2017, and those with low non-Medicare margins had costs that were lower than the national average (Medicare Payment Advisory Commission 2019c).[3]

Among urban hospitals examined for this study, the difference in the median standardized costs between those with high and low non-Medicare margins was $639 per discharge, meaning those with stronger non-Medicare profits had costs that were about 5 percent higher on average (Table 15-4).[4] The differences are statistically significant.

Long-term effects of market power on costs

To examine how market power can affect costs over the long run, we examined standardized costs per discharge in markets with different levels of provider and insurer market power. Standard economic theory would posit that hospitals with strong market power would be employers with strong market power over employees and therefore would have lower wages. However, hospitals with more market power may also have higher revenues and thus less pressure to constrain costs. In fact, hospital systems in super-concentrated markets do not have lower costs.

Their costs are slightly higher, although the difference is not statistically significant. In contrast, Table 15-5 shows slightly lower costs in super-concentrated insurer markets, but again the difference is not statistically significant. We also tested the relationship between an individual hospital's market share (a continuous variable) and its costs and did not find any statistically significant relationship between the HHI and costs (data not shown).

Given some evidence that market concentration is correlated with higher non-Medicare margins and higher non-Medicare margins are correlated with higher costs (at least for nonprofit hospitals), we would expect higher costs in markets with greater hospital concentration. However, we find only a slight and not statistically significant relationship, which could indicate that our CBSA measures of hospital market power are too imprecise to meaningfully track a hospital's specific market power and inpatient costs. Another possibility is that the effect of additional non-Medicare revenue on Medicare costs is somewhat diluted by hospital spending on non-inpatient services. For example, any portion of the revenue hospitals receive from high prices on hospital services that is used to acquire or subsidize physician practices would not show up in measures of inpatient costs.

In addition, our analyses of standardized costs are adjusted for local wage costs and volume of services. When hospitals generate higher profits, they can both expand their service volume and negotiate higher compensation for employees (Cooper et al. 2017). If market power

**TABLE
15–5**

**Median hospital inpatient standardized costs per discharge
by CBSA's hospital and insurer concentration, 2017**

	Other hospital concentration (HHI ≤ 5,000)	"Super" hospital concentration (HHI > 5,000)	Total
Other insurer concentration (HHI ≤ 5,000)	$12,058 (n = 1,289)	$12,457 (n = 267)	$12,159 (n = 1,556)
"Super" insurer concentration (HHI > 5,000)	$11,846 (n = 404)	$11,968 (n = 150)	$11,866 (n = 554)
Total	$11,994 (n = 1,693)	$12,291 (n = 417)	

Note: CBSA (core-based statistical area), HHI (Herfindahl–Hirschman Index). An HHI of over 5,000 indicates a "super-concentrated" market. Costs have been adjusted for differences in local labor rates using relative wage data from the Bureau of Labor Statistics. Relative costs are based on all hospitals, but only metropolitan core-based statistical areas (CBSAs) are in included in the analysis. Insurer concentration is measured at the state level, whereas hospital concentration is measured at the CBSA level.

Source: MedPAC analysis of data from Medicare cost reports from CMS, the American Hospital Association Annual Survey of Hospitals, and the National Association of Insurance Commissioners.

induced higher costs through higher nurse or physician salaries, our inpatient costs per discharge would not fully pick up these differences because they would be "adjusted out" to some degree when we standardize costs for wage differentials across regions. Because of this possibility, we also tested whether consolidation has an upward or downward pressure on nurse wages.

Hospital and insurer market power have, at most, modest effects on nurse wages

Despite standard economic theory suggesting hospitals with high market share use their bargaining power (monopsony power) to reduce employees' wages, Hirsch and Schumacher found no evidence of lower wages in more concentrated markets (Hirsch and Shumacher 1995). This study bundled for-profit and nonprofit hospitals together and did not control for insurer market power. It is possible that for-profit and nonprofit hospitals act differently when they have the combination of greater market power over payers and greater market power over employees. We examined this possibility by comparing the wages paid to hospital employees in a market with the wages of other workers. We highlight the difference between registered nurse (RN) wages (which hospitals report) to wages of workers across the country with comparable education levels and hourly earnings who do not generally work in hospitals (in this case, secondary school teachers, computer systems analysts, accountants,

and dental hygienists). We tested the relationship between each hospital's hourly wage for RNs relative to a local index of wages for these four professions (Table 15-6, p. 476). The table shows that, in markets with the highest level of hospital concentration but lower levels of insurer concentration, RNs earn an average of 94 percent of the combined average wage of the other four professions in their markets. By comparison, in super-concentrated insurance markets with lower hospital concentration, RNs earn a wage equal to 90 percent of the other professions. The differences suggest that when hospitals have relatively high market power and insurers do not, nurse wages may be slightly higher than when insurers have relatively more market power, but the differences are not statistically significant. We further examined the data separately for for-profit and nonprofit hospitals; again, the findings were not statistically significant (data not shown). Because market power's effect on nurse salaries is too small to be statistically significant, it is unlikely that the effect of market power on hospital employee salaries is large enough to cause us to materially underestimate the effect of hospital concentration on costs.

Horizontal consolidation increases commercial patient costs but not Medicare patient costs

As hospital prices on commercially insured patients rise, the costs of patients who pay a share of the negotiated

**TABLE
15–6**

Median ratio of hospital nurse wages to the average wage of comparable professions by CBSA's level of provider and insurer market power, 2016

	Other hospital concentration (HHI ≤ 5,000)	"Super" hospital concentration (HHI > 5,000)	Total
Other insurer concentration (HHI ≤ 5,000)	0.93 (n = 114)	0.94 (n = 143)	0.93 (n = 257)
"Super" insurer concentration (HHI > 5,000)	0.90 (n = 50)	0.93 (n = 69)	0.92 (n = 119)
Total	0.91 (n = 162)	0.93 (n = 212)	

Note: CBSA (core-based statistical area), HHI (Herfindahl–Hirschman Index). An HHI of over 5,000 indicates a "super-concentrated" market. The data reflect the average registered nurse (RN) wage at a hospital in the market in relation to the average wage in the metropolitan statistical area for secondary teachers, accountants, computer systems analysts, and dental hygienists. Each wage is standardized. For example, if RNs earn an average of $95,000 and the other four professions earn an average of $100,000, the table would report a value of 0.95, indicating that nurses are paid 95 percent of what we would expect, given wages of the other four professions in that same market.

Source: MedPAC analysis of data from the Bureau of Labor Statistics, occupation mix survey data from CMS, Medicare cost reports from CMS, the American Hospital Association Annual Survey of Hospitals, and the National Association of Insurance Commissioners.

rate as coinsurance will rise in proportion. In contrast, under Medicare's prospective payment systems for hospital inpatient and outpatient services, beneficiaries are protected from changes in hospital market power.

An exception is in critical access hospitals (CAHs). Medicare patients in CAHs pay coinsurance equal to 20 percent of charges, not prices. The Medicare program pays these hospitals their costs, less patient coinsurance. The result is that as charges increase, patient coinsurance increases, and program payments become a smaller share of total payments. As noted in our 2012 report to the Congress, CAHs' charge-based coinsurance can result in patients paying most of the cost of their care in CAHs (Medicare Payment Advisory Commission 2012a). We are not aware of any studies that examine whether CAHs increase charges when they are acquired by a system as opposed to being controlled by a local board of directors.

Physician–hospital integration has increased Medicare payments for physician services

We define physician practices as vertically integrated if a hospital owns the practice or a hospital directly employs its physicians.[5] Using this definition, vertical integration

has increased in recent years. The literature suggests that the net results of increases in hospital–physician integration have been higher physician prices, higher spending for commercial payers, and higher spending for Medicare.

One of the key reasons that hospital–physician integration leads to higher prices is that Medicare pays more for the same service when it is performed in hospital outpatient departments (HOPDs) than it does if performed in a physician's office. Paying higher prices based on setting distorts competition. The result is that markets may gravitate toward a particular delivery model (in this case, a vertically integrated one) not because that model is the most efficient at delivering high-quality care, but because it generates higher revenues. If payment rates were aligned across sites of service, hospitals and physicians would integrate only when doing so generated efficiencies.

Hospital–physician integration has increased

Vertical integration between hospitals and physicians increased over the last few decades and has continued to increase in recent years. Researchers have documented increasing levels of hospital–physician integration over a long period of time (Post et al. 2018). More recently, one survey found that, from 2012 to 2018, the share of physicians who worked for hospitals increased from 29 percent to 35 percent (Kane 2019).

Much of the increase in vertical integration is likely driven by hospitals directly hiring individual physicians or acquisitions of small physician practices. One study found that most of the growth of very large physician groups (which may be physician owned or hospital owned) was due to direct hiring of physicians or acquisitions of practices that had 10 or fewer physicians (Capps et al. 2017).While the acquisition of large physician groups might garner more media attention, direct hiring and small acquisitions are important because:

- Younger physicians increasingly prefer employment to becoming a partner in a practice. Direct hiring of these physicians can result in a greater concentration of physicians in hospital systems (Merritt Hawkins 2019).

- In 2018, nearly 57 percent of physicians worked in practices of 10 or fewer physicians, so the pool of potential acquisition targets often consists of small group practices (Kane 2019).

The fact that small acquisitions and direct hiring contribute to increases in vertical integration makes federal antitrust enforcement more difficult. First, some researchers have suggested that hiring new physicians likely falls outside the purview of antitrust laws, and, by itself, each small acquisition likely has a correspondingly small effect on market competitiveness (Capps et al. 2017). Second, many acquisitions of physician practices are too small to require the parties to notify the Federal Trade Commission before the transaction occurs; in 2019, the acquisition must have been valued at $90 million or more to trigger this notification requirement (Federal Trade Commission 2019). Third, even to the extent that federal authorities are aware of the acquisition, they have limited resources to challenge the very large number of small transactions.

Hospital–physician integration increases prices and total spending

Researchers have consistently found that increases in hospital–physician integration lead to higher prices (the professional fee plus the facility fee) for physician visits by Medicare and commercially insured patients.[6] Increases in hospital–physician integration can lead to higher prices in two ways. First, hospital acquisitions of physician practices can consolidate physician services into large hospital-owned practices (a form of horizontal physician consolidation). For example, if a hospital that employs 25 percent of the physicians in a market acquires a practice that employs an additional 25 percent of physicians, the

resultant entity (with 50 percent of the physician market) will likely be able to negotiate higher commercial prices because of its dominant market position (Medicare Payment Advisory Commission 2017a). Second, the literature shows that increases in hospital–physician integration further increase prices for physician services beyond what can be explained by increases in horizontal concentration alone. For example, after controlling for the level of horizontal concentration of physician services, three recent studies found that hospital–physician integration led to commercial price increases of 3 percent to 14 percent (Capps et al. 2018, Medicare Payment Advisory Commission 2017a, Neprash et al. 2015).

Hospital–physician integration also increases the price for physician services for Medicare because of site-of-service differentials. Medicare often pays more for the same service when it is billed in an HOPD instead of a physician office. Once physicians are acquired by a hospital, Medicare has historically allowed them to bill as an outpatient department of the acquiring hospital.[7] The Commission has repeatedly found that these site-of-service differentials increase Medicare and beneficiary spending by billions of dollars a year. While FFS Medicare often pays for services performed in HOPDs at a higher rate as a matter of policy, other insurers are not required to follow this convention. However, in practice, some do. One study found that nearly half of the commercial price increase that occurred after hospitals acquired physicians was due to site-of-service differentials (Capps et al. 2018).

The higher prices that result from hospital–physician integration have not been offset by a lower volume of services. One of the theoretical benefits of vertical integration is improved coordination, which could translate into avoiding unnecessary or duplicative services. However, the literature suggests that hospital–physician integration does not have a substantial effect on hospital or physician volume (Baker et al. 2014, Cuellar and Gertler 2006, Neprash et al. 2015). Therefore, the net result is that growth in hospital–physician integration leads to higher total spending because prices increase without countervailing efficiencies (Capps et al. 2018, Robinson and Miller 2014).

Maryland's system of paying hospitals under global budgets provides an interesting exception to the traditional incentives in the Medicare FFS program. Because Maryland hospitals operate under global budgets, shifting patients from physician offices to hospital outpatient departments does not necessarily increase hospital

TABLE 15–7

TABLE 15–7 Volume of services for chemotherapy administration, echocardiography, cardiac imaging, and office visits shifted from physician offices to hospitals, 2012–2018

	HOPD			Physician office		
	Millions of services		Percent change	Millions of services		Percent change
Service	2012	2018		2012	2018	
Chemotherapy administration	3.0	4.5	53.3%	5.5	4.5	−16.6%
Echocardiography	1.7	2.3	33.8	3.1	3.0	−4.8
Cardiac imaging	0.86	0.86	0.0	1.27	0.94	−26.3
Office visits	23.4	32.0	37.0	220.6	216.0	−2.0

Note: HOPD (hospital outpatient department). Volume is measured as aggregate totals for fee-for-service Medicare patients. "Physician office" refers to being paid under the physician fee schedule.

Source: MedPAC analysis of standard analytic claims files from 2012 and 2018.

revenues. Compared with beneficiaries in the rest of the country, we found that beneficiaries in Maryland had a lower share of their office visits performed in hospitals and that the shift of office visits to hospitals has been slower in Maryland. This observation further suggests that hospital facility fees (which increase hospitals' revenues in states other than Maryland) may partially be driving the movement of services to hospitals in the other 49 states (see text box on shifting office visits to hospitals under Maryland's global-budget system, pp. 480–481).

Medicare pays higher rates for services in outpatient departments than in physician offices

As hospitals have integrated physician offices through acquisition, the billing of services has shifted from the physician fee schedule (PFS) to the outpatient prospective payment system (OPPS). Payment rates for the same service are usually higher under the OPPS relative to the PFS. For example, in 2019 the payment rates for a midlevel (Level 4) office visit for an established patient were $110.28 if done in an office and $195.86 if done in an HOPD.

Medicare payments increase as services shift from physician offices to hospitals

The integration of hospitals and physician practices has substantially shifted the billing from the PFS to the OPPS for four service categories: chemotherapy administration, echocardiography, cardiac imaging, and office visits. From 2012 to 2018, the billing of these services under the PFS decreased (substantially in some categories) and

increased under the OPPS (Table 15-7). Over this period, the volume of OPPS clinic visits increased by 37 percent and chemotherapy administration by 53 percent. At the same time, the volume of physician visits in freestanding offices decreased by 2.0 percent, and chemotherapy administration by 16.6 percent.

It is difficult to know precisely how much the shift in billing of these services from the PFS to the OPPS has increased Medicare spending because many ancillary items that are paid separately under the PFS are packaged into the payment rate of a primary service under the OPPS. Nevertheless, we are certain that this shift has increased Medicare spending.

In a previous report, the Commission identified a number of services for which the packaging of ancillary items into the payment rates is minimal (Medicare Payment Advisory Commission 2014). Because of the minimal packaging, we can more easily compare the PFS and OPPS payment rates for these services. We found that, on average, the OPPS payment rates were 43 percent higher than the PFS payment rates for the services in these ambulatory payment classifications.[8]

To address the increased spending that results from the shift in billing from the PFS to the OPPS, the Commission has recommended adjusting OPPS payment rates for office visits so that Medicare payment is the same in freestanding physician offices and HOPDs (Medicare Payment Advisory Commission 2012b). The Commission has also recommended adjusting OPPS payment rates for

a selected set of other services so that payment rates are equal or more closely aligned across these two settings (Medicare Payment Advisory Commission 2014).

Hospital–physician integration alters referral patterns and has an indeterminate effect on quality

Physicians who are vertically integrated with hospitals have substantially different referral patterns compared with other physicians. Vertically integrated physicians tend to refer a greater share of their patients to hospital-based facilities, in general, and particularly to the hospital that employs them. One study found that patients were more likely to choose a high-cost, low-quality hospital when their physician is employed by that hospital (Baker et al. 2016). Other studies found that vertically integrated physicians were more likely to refer patients for hospital-based MRI scans compared with other physicians. After their practices were acquired by hospitals, physicians began billing more services in the hospital setting (and fewer in the office setting) and reducing their activities at other hospitals (Chernew et al. 2018, Koch et al. 2017).

These referral and admission patterns suggest that one motivation for hospitals' acquisition of physician practices is to ensure a steady stream of referrals. This referral pipeline can make it more difficult for competitors to enter the market. If a hospital employs the dominant share of local physicians, new competitors would not only have to build a new hospital but also bring in a sufficient number of physicians to supply patients to the hospital. For this reason, vertical integration can affect the degree of horizontal competition.

Vertical integration and quality

Whether the shift of ambulatory care toward hospital outpatient departments has created better quality of care or lower internal costs is not known conclusively. However, most studies on hospital–physician integration show ambiguous or no effects on quality (Post et al. 2018). For example, one study found that hospital acquisition of physician practices had little effect on a range of beneficiary health outcomes, such as mortality, acute circulatory conditions, and diabetes complications (Koch et al. 2019). Another recent study found vertical integration had a limited effect on quality metrics reported by CMS (Short and Ho 2019). While there are particular vertically integrated entities that score very high on quality (e.g., Mayo Clinic), it is not clear that vertical integration in general improves outcomes.

Because not every type of vertical integration appears to improve quality, the Commission has recommended paying for quality directly and setting rates for nonemergency HOPD services that can be provided in physician offices equal to the rates paid in physician offices (Medicare Payment Advisory Commission 2015). Under our recommendation, hospitals would still have an incentive to vertically integrate when it improves quality (to receive quality bonuses), but hospitals would no longer have a financial incentive under Medicare (charging facility fees) to vertically integrate if the integration does not generate some quality or cost improvements.

No clear effect of hospital consolidation on beneficiary coinsurance for drugs or related services

Horizontal hospital consolidation is unlikely to significantly affect Medicare beneficiaries' coinsurance for drugs. However, Medicare beneficiaries' cost sharing for certain drugs and for drug administration can be affected when hospitals purchase physician practices and shift services to the hospital campus.

Medicare pays similar payment rates for drugs in the PFS and the OPPS. Legislation has established payment rates for drugs billed under the PFS at average sales price (ASP) + 6 percent. Likewise, legislation has established payment rates for drugs that have pass-through status under the OPPS at ASP + 6 percent. Finally, CMS has chosen to pay for drugs that have separately payable status (but not pass-through status) under the OPPS at a rate of ASP + 6 percent if hospitals do not obtain them through the 340B Drug Pricing Program and at a rate of ASP – 22.5 percent if hospitals obtain them through the 340B program. Therefore, beneficiaries' cost sharing is 28.5 percentage points lower for non-pass-through drugs when hospitals obtain them through the 340B program. The effect of vertical integration on coinsurance for drugs is usually limited to situations in which the physician practice is acquired by a 340B hospital and the drug being prescribed qualifies for the 340B discount.[9]

While vertical integration reduces coinsurance associated with the Medicare payment for certain drugs in some limited circumstances, it increases coinsurance associated with the payment for drug administration. The cost to beneficiaries for drug administration is usually higher when billed under the OPPS than under the PFS,

Shift of office visits to hospitals slowed modestly after Maryland implemented global budgets in 2014

In 2014, all Maryland hospitals began operating under all-payer global budgets. These global budgets covered nearly all hospital inpatient and outpatient services, but excluded services outside of hospitals, such as physician and post-acute care services.[10]

Global budgets operated as total spending targets for hospitals in Maryland. If a hospital was on track to exceed its global budget in a given year, the payment rates it received for services were lowered to not exceed the global spending target. Therefore, Maryland hospitals whose volume increased rapidly could face payment rate cuts in order to keep their total spending under their global budget; alternatively, hospital payment rates could increase if volume decreased. Therefore, Maryland hospitals operating under global budgets had an incentive to shift services to settings outside of hospitals, such as physician offices. In contrast, hospitals operating under Medicare's standard fee-for-service (FFS) payment systems have a strong incentive to shift services into hospitals because Medicare often pays far more for the same service when performed in a hospital instead of a physician office.

To analyze the extent to which these differing incentives have resulted in shifts in the settings where services were delivered, we analyzed the share of evaluation and management (E&M) office visits performed in hospital outpatient departments (HOPDs) in Maryland compared with the rest of the country, using Medicare FFS claims.[11] We analyzed data from 2009 through 2018 to establish utilization patterns before and after global budgets were implemented in Maryland in 2014.

We found that the implementation of global budgets in Maryland in 2014 appeared to modestly slow the shift of office visits to HOPDs compared with the rest of the country (Figure 15-5). Before global budgets were implemented (2009 to 2013), the share of office visits performed in HOPDs among beneficiaries who lived in Maryland increased from 3.6 percent to 5.8 percent, an increase of about 0.5 percentage point a year. After

global budgets were implemented, the share of office visits performed in HOPDs rose about 0.1 percentage point a year from 2014 to 2018. While the shift to HOPDs in the rest of the country was faster both before and after 2014, the difference between Maryland and the rest of the country was larger after global budgets were implemented. These different trends suggest global budgets may have modestly slowed the shift of services to HOPDs and resulted in a widening gap between the share of office visits performed in HOPDs in Maryland compared with the rest of the country.

While the implementation of global budgets in Maryland appears to have modestly slowed the shift of office visits to HOPDs, these data should be interpreted with caution for several reasons.

First, the shift of office visits to HOPDs in Maryland was slower than the rest of the country even before the state implemented global budgets, suggesting that patterns of care in Maryland could be systematically different from patterns in the rest of the country for reasons other than global budgets. Even before global budgets, Maryland set all-payer rates for each hospital, which were substantially above standard Medicare FFS rates but lower than prevailing private-payer rates. The state updated these payment amounts annually to account for factors such as inflation and demographic changes. However, during the early part of our study period (2009 to 2013), the state implemented a volume adjustment methodology that paid hospitals a rate equal to 85 percent of their standard rate for volume growth above a baseline (Murray and Berenson 2015). The fact that hospitals were not fully reimbursed for excess volume growth could have reduced the incentive for hospitals to shift E&M services to hospitals.

Second, while the shift to HOPDs was slower in Maryland compared with the rest of the country, the share of office visits performed in HOPDs varied substantially across the country, and several states had lower shares of office visits performed in HOPDs compared with Maryland. In 2018, the share of office visits performed in HOPDs ranged from 3.5 percent
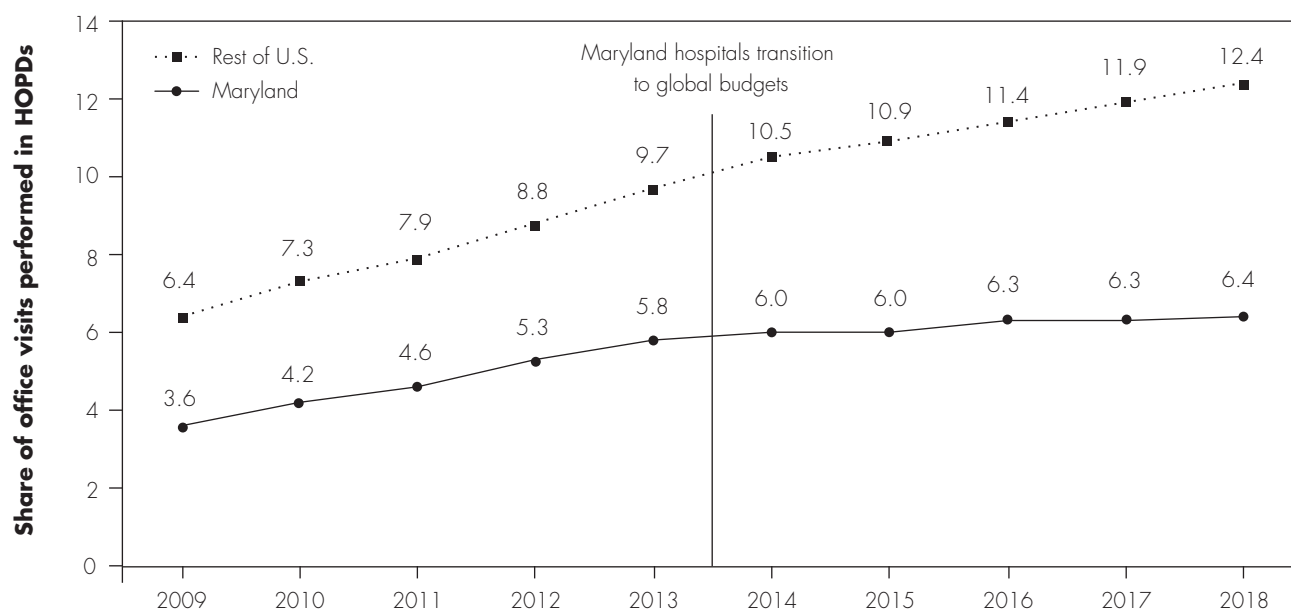
(continued next page)

in Nevada to 57.9 percent in Vermont. Among the 50 states and the District of Columbia, Maryland ranked 41st in the share of office visits performed in HOPDs before global budgets (2013); a few years after global budgets were implemented (2018), the state ranked 44th. However, several states—including Florida, Georgia, Nevada, New Jersey, and South Carolina—had a lower share of office visits performed in HOPDs

(in 2018) and a smaller shift of services to HOPDs over our study period (2009 to 2018) compared with Maryland. These data suggest that Maryland's global budgets may have modestly slowed the shift of services to HOPDs but also suggest that finding appropriate comparison areas is important given the substantial heterogeneity in trends across the country. ∎

FIGURE
15–5

Growth in the share of E&M office visits performed in HOPDs slowed modestly after Maryland hospitals transitioned to global budgets

Note: E&M (evaluation and management), HOPD (hospital outpatient department). E&M office visits include Healthcare Common Procedure Coding System codes 99201–99205 and 99211–99215. While most Maryland hospitals began operating under global budgets in 2014, 10 rural hospitals operated under global budgets before 2014. We re-ran our analysis after excluding areas served by these hospitals, and the results were similar to those presented in the figure.

Source: MedPAC analysis of the 100 percent carrier file.

irrespective of the drug's pass-through status or whether the hospital obtains the drug through the 340B program. For example, the method of administering chemotherapy that has the highest Medicare spending under the OPPS has a Medicare payment rate of $145 when performed

in a freestanding office and $298 when performed in an HOPD. Beneficiary coinsurance is $30 higher for administration in the hospital (($298 − $145) × 0.20). In aggregate, beneficiary cost sharing under the OPPS is much lower for drug administration services than for the

drugs ($0.5 billion coinsurance for drug administration cost sharing and $2.2 billion coinsurance for drug price cost sharing in 2018).

It should be noted that most beneficiaries have supplemental coverage that substantially reduces or eliminates beneficiaries' out-of-pocket spending for coinsurance. However, higher cost sharing paid by supplemental plans can result in higher premiums.

Do 340B drug discounts create incentives for hospitals to choose more-expensive products?

Hospitals participating in the 340B program are generally nonprofit and have high shares of low-income patients, and they receive substantial discounts from drug companies on hospital-administered drugs covered by Medicare Part B. In light of hospital consolidation and acquisition of physician practices by hospitals that participate in the 340B Drug Discount Program, questions have been raised regarding whether the substantial discounts that 340B hospitals receive through the program give their clinicians an incentive to choose more-expensive products than they otherwise would absent the 340B program.

There are several ways the 340B program might influence prescribing patterns. Some have theorized that substantial margins from the 340B program affect prescribing choices and favor high-priced drugs. Given that the availability of 340B discounts has historically made a wide range of drugs profitable for 340B hospitals, another way that the 340B program could have influenced spending is by potentially encouraging providers to prescribe more products than they otherwise would.

The extent to which expensive drugs have offered 340B providers greater margins than less-expensive products remains an open question. Because 340B prices are not publicly available, we are unable to calculate the margin 340B providers earn when treating a Medicare patient with a particular product. However, analysis by the Office of Inspector General (OIG) provides examples of the margin available to 340B providers on a few de-identified Part B drugs, which suggests that in some, but not all, cases, higher priced drugs have greater margins than lower priced drugs.

While the Commission does not have information on 340B discounts at the individual product level to

determine whether 340B discounts create incentives for the selection of more-expensive products, we examine whether the Medicare program and beneficiaries receiving chemotherapy incur higher overall cancer drug costs when treated by 340B hospitals compared with other providers. Our analysis looks only at spending per chemotherapy user and does not examine whether the 340B program creates incentives for providers to initiate chemotherapy treatment on new patients more often than they otherwise would. Determining any effects of 340B on initiation of chemotherapy versus other types of cancer treatment is outside the scope of this study. Our analysis focuses on cancer drug spending because drugs used exclusively or largely for cancer treatment account for a large share (73 percent) of Part B drug spending in HOPDs.

To measure the effect of 340B participation on combined Medicare Part B and Part D cancer drug spending, we conducted both descriptive analyses and regression analyses of cancer drug spending for five types of cancer: breast, colorectal, prostate, lung, and leukemia/lymphoma. Our analysis shows that 340B hospitals differ in characteristics from other providers treating chemotherapy patients. For example, 340B hospitals tend to be larger and are more likely to be teaching hospitals. They are also more likely to treat low-income, younger (under age 65), and disabled beneficiaries compared with other oncology providers. Unadjusted for these differences, patients treated by 340B hospitals had consistently higher average cancer drug spending than patients treated by other hospitals for each of the five types of cancer we examined. Other explanations for higher spending could exist, including differences in patient mix and hospital characteristics that are difficult to fully account for with a hospital-level analysis. Comparing cancer drug spending for 340B hospitals with physician offices, spending patterns were mixed, with neither setting having consistently higher average drug spending across the five cancer types.

To isolate the effects of the 340B program on cancer drug spending from the effects of the difference in patient characteristics across settings, we conducted regression analyses to examine the relationship between average cancer drug spending and the share of chemotherapy patients treated by 340B hospitals (340B market share) at the market level over time. Although we do not have detailed data on cancer stage or other, more-granular clinical data, our market-level approach helps control for differences in clinical characteristics between patients treated by 340B hospitals and other providers. Overall,

we found evidence of an association between higher 340B market share and higher drug spending for some cancers. Of the five cancer types, our regression analysis for two cancer types (lung and prostate cancers) found that 340B market share had statistically significant effects of just over $300 per patient month. Because spending for lung cancer is higher than that for prostate cancer, the effect is greater in percentage terms for prostate cancer than for lung cancer (28 percent vs. 11 percent, respectively). Those 340B effects, however, were much smaller than the effects of the general increase in oncology spending, which reflects both the effect of rising prices and shifts in the mix of drugs, including the launch of new products with higher prices. For example, between 2009 and 2017, cancer drug spending grew by more than $2,000 per patient month for patients with breast cancer, lung cancer, and leukemia/lymphoma.

The findings of our analysis are limited to the five types of cancers examined and are not generalizable to other cancers or to other (noncancer) conditions. Any relationship that exists today between the 340B program and Medicare's spending will likely change with the evolution of standard treatments and entries of new therapies. Finally, we note that beginning in 2018, Medicare lowered some payment rates for Part B drugs furnished by 340B hospitals, and our data do not incorporate this policy change.[12]

Given our findings on the relative size of the 340B effect for some cancers, the overall effect of 340B on Part B cost sharing is also likely be modest and vary by beneficiaries' supplemental coverage. Beginning in 2018, Medicare's payment rate for certain Part B drugs provided at 340B hospitals is less than the payment rate at other hospitals and physician offices, so, potentially, Part B cost sharing after 2017 could be lower for patients treated by 340B hospitals compared with patients treated in other settings. With respect to Part D drugs, any potential effect of 340B on beneficiary cost sharing is likely to be mixed. Beneficiaries who receive the low-income subsidy (LIS) pay nominal cost sharing and are likely to be unaffected. Other Part D beneficiaries could face higher Part D cost sharing if 340B is associated with higher spending, but it would depend on the plan's formulary and cost-sharing structure.

Background on the 340B program and Medicare payment for Part B drugs

Under the 340B Drug Pricing Program, nonprofit hospitals with high shares of Medicaid and low-income Medicare patients who participate in the program receive substantial

discounts (23 percent or more for brand-name drugs) from drug companies on hospital-administered drugs covered by Medicare Part B. In addition, some 340B hospitals receive discounts on retail pharmacy drugs covered by Medicare Part D that are dispensed by the hospital's in-house pharmacy or by outside pharmacies with which the hospital contracts.

Several types of hospitals, as well as certain clinics (e.g., federally qualified health centers and Ryan White grantees), may enroll in the 340B program. To participate in the 340B program, a provider must register with the Health Resources & Services Administration (HRSA), be approved by the agency, and follow program requirements. Eligible hospitals include disproportionate share (DSH) hospitals, rural referral centers, sole community hospitals, children's hospitals, freestanding cancer hospitals, and critical access hospitals (CAHs). Each type of eligible hospital (with the exception of CAHs) must have a minimum DSH adjustment percentage, which is based on the share of a hospital's inpatients who are Medicaid and low-income Medicare patients. Only hospitals with nonprofit, state government, or local government ownership are eligible for the 340B program. In addition, nonprofit hospitals must meet additional eligibility criteria (such as having contracts with a state or local government to provide services to low-income patients who are not eligible for Medicare or Medicaid). According to HRSA, the intent of the 340B program is to allow certain providers to stretch scarce federal resources as far as possible to provide more care to more patients (Health Resources and Services Administration 2014). For a detailed discussion of the 340B program, see our May 2015 report on the 340B program, available at http://www.medpac.gov.

Drug manufacturers are required to sell outpatient drugs to 340B hospitals for discounted prices that are no higher than the 340B ceiling price. The 340B ceiling price is based on a statutory formula. Specifically, the ceiling price is the drug's average manufacturer price (AMP) less a unit rebate amount (URA). For brand drugs, the URA includes a basic rebate and, if the product's price has risen faster than inflation, an inflation rebate. The basic rebate for brand products is the greater of 23.1 percent of AMP or the difference between AMP and best price. The inflation rebate is the difference between AMP and what AMP would have been if it had risen at the same rate as the consumer price index for urban consumers between a base year and the current period. The URA is less for generic drugs (13 percent of AMP and, beginning in 2017,

TABLE
15–8

**340B hospitals' margins on Part B drugs in 2013 varied
substantially by product, according to OIG**

Comparison of Medicare payment amount and 340B ceiling price	Number of products	Share of products
Medicare payment rate exceeds 340B ceiling price by:		
Less than 25%	79	19%
25% to 49%	149	35
50% to 79%	53	13
80% to 100%	22	5
More than 100%	95	23
Medicare payment rate is less than 340B ceiling price	22	5
All	420	100

Note: OIG (Office of Inspector General).

Source: OIG report on Part B payments for 340B purchased drugs. https://oig.hhs.gov/oei/reports/oei-12-14-00030.asp.

an inflation rebate if AMP has risen faster than inflation). HRSA calculates the 340B ceiling prices and discloses the prices to 340B entities, but not to the public.

Medicare pays providers for Part B drugs administered in outpatient hospitals and physician offices based on the manufacturer's reported average sales price (ASP). Until 2018, hospitals that received 340B discounts on Part B drugs were paid the same rate by Medicare—generally ASP + 6 percent—as hospitals that did not receive these discounts.[13] Since 2018, Medicare pays 340B hospitals ASP – 22.5 percent for Part B drugs obtained at 340B prices, with the exception of pass-through drugs, which continue to be paid ASP + 6 percent for the two to three years they receive pass-through status.

Although payment for Part D drugs works differently from payment for Part B drugs, some hospitals receive 340B discounts on Part D drugs dispensed by in-house pharmacies or contract pharmacies. Most contract pharmacies are retail pharmacies that receive fees and/or a portion of the spread between insurers' payments to the pharmacy and the 340B discounted prices. Entities with 340B status can retain the difference between a contract pharmacy's reimbursement and the entity's 340B acquisition cost (Fein 2016).[14]

Potential effects of 340B discounts before 2018

Before 2018, Medicare paid ASP + 6 percent for separately payable Part B drugs furnished by 340B hospitals, and 340B hospitals earned substantial margins on a wide range of Part B drugs furnished to Medicare beneficiaries. Consequently, the 340B program created potential incentives for 340B hospitals to use more drugs and to select more-profitable drugs. However, the extent to which higher priced products offered 340B hospitals greater profit margins than lower priced products is not clear. More-expensive drugs may have resulted in higher margins for 340B hospitals than less-expensive drugs in some, but not all, situations. Literature to date suggests that drug spending in 340B hospitals is generally higher than in other hospitals, although most studies have not generally controlled for differences in patient mix across hospitals.

OIG study shows that, historically, 340B hospitals have earned substantial margins on Part B drugs, with margins varying across drug products OIG conducted a study comparing actual 340B ceiling prices with Medicare payment rates for individual drugs and found that 340B hospitals earned a substantial margin on Part B drugs (Office of Inspector General 2015). Specifically, OIG found that 2013 Medicare payments to 340B entities

	2013		
	Medicare payment amount	**340B ceiling price**	**Margin**
Drug 1	$20,517	$14,768	$5,749
Drug 2	18,506	9,268	9,238
Drug 3	22,573	13,411	9,162
Drug 4	20,044	8,914	11,130
Drug 5	27,207	13,871	13,336

Note: OIG (Office of Inspector General). OIG analysis of five high-expenditure cancer drugs as of 2013.

Source: Office of Inspector General, Department of Health and Human Services. 2015. *Part B payments for 340B-purchased drugs.* Washington, DC: OIG.

for Part B drugs exceeded the 340B ceiling price by 58 percent, meaning that Medicare paid 340B entities $3.5 billion for Part B drugs while the 340B ceiling price for these drugs was $2.2 billion, yielding a margin of $1.3 billion in 2013.[15]

The OIG study also found that margins on 340B drugs varied across products. For a sample of 420 Part B drugs, OIG found that Medicare's payments in 2013 exceeded the ceiling prices for 95 percent of the drugs. Of the products examined, the amount by which payments exceeded costs ranged from less than 25 percent to more than 100 percent (Table 15-8). The varied margin across products likely reflects several factors, such as the difference in the basic rebate of 23.1 percent for brands and 13 percent for generics as well as variation in the size of the inflation rebate across brand products. It is also possible that some brand products could have had a basic rebate in excess of 23.1 percent due to the best-price provision of the brand rebate formula (because the basic rebate for brand products is the greater of 23.1 percent of AMP or the difference between AMP and best price).

Historically, when Medicare paid 340B hospitals ASP + 6 percent for drugs, higher priced products may have been more profitable for 340B hospitals than lower priced products in some, but not all, situations, depending on the relative size of the basic rebate and inflation rebate for the comparable products. All else being equal, if a provider was choosing among brand products, a higher priced product would yield a higher margin for the 340B

hospital than the lower priced product because of the 23.1 percent basic rebate. However, because the ceiling price also incorporates an inflation rebate, it is possible a lower priced brand product that experienced substantial inflation could have been more profitable for a 340B hospital than a higher priced brand product.[16] Similarly, the best-price provision of the basic rebate could theoretically result in a lower priced product having a higher margin than a higher priced product if the lower priced product had a substantial best-price discount. In contrast, if a provider was choosing between a high-priced brand product and a different, lower priced generic drug, we would generally expect a greater margin on the brand drug than the generic drug.[17]

OIG's analysis of Medicare payment rates and 340B ceiling prices for five cancer drugs in 2013 demonstrates the varied relationship between price and margin. Among the five products, the product with the highest Medicare payment amount (Drug 5) had the greatest margin (Table 15-9). However, sometimes products with lower Medicare payment amounts had greater margins than products with higher Medicare payment amounts. For example, Drug 2 had a lower Medicare payment amount than Drug 1 ($18,506 vs. $20,517, respectively) but a greater margin ($9,238 vs. $5,749, respectively). In the case of these five drugs, whether there were financial incentives to use products with higher or lower Medicare payment rates would depend on which, if any, of these products were therapeutic alternatives for one another. The OIG report does not provide information on the names of the products or whether they were alternatives for one another.

340B discounts may have provided incentives to use more-expensive drugs As demonstrated by the OIG analysis, when 340B hospitals were paid ASP + 6 percent for Part B drugs, higher priced drugs may have offered providers greater margins than lower priced drugs in some, but not all, situations. To the extent that 340B hospitals received a greater margin on higher priced products compared with lower priced therapeutic alternatives, the 340B program may have created incentives for the use of higher priced products.

Although the OIG study is the only one to look at actual 340B hospital profitability at the individual drug level for Medicare patients, several other studies have looked at differences in Part B drug spending for patients treated at 340B hospitals and other hospitals.

A descriptive analysis by the Government Accountability Office (GAO) found that among DSH hospitals, those that participated in the 340B program had higher Part B oncology drug spending per cancer patient in 2008 and 2012 compared with other DSH hospitals (Government Accountability Office 2015). For example, GAO found that in 2012, Part B cancer drug spending per patient was about $7,800 in 340B DSH hospitals compared with $5,432 in other DSH hospitals. GAO concluded that these differences in spending levels were not explained by differences in risk scores or teaching status.

The peer-reviewed studies and white papers that have examined differences in drug spending between 340B hospitals and other hospitals have generally found increased drug use by 340B hospitals compared with the other hospitals. However, our literature review did not find any studies that examined how the type of cancer, drug mix, or retail pharmacy drug use contributes to differences in drug spending between 340B and other hospitals.

- Hunter and colleagues aimed to replicate the GAO study but focused on the commercially insured population (Hunter et al. 2018). The researchers found that, in 2015, average per patient spending for commercial patients on outpatient drugs at 340B DSH hospitals was between 2.6 and 2.9 times the average spending for commercial patients at other hospitals. However, the difference in average drug spending for oncology drugs was less pronounced than for all drugs. Average per patient drug spending for outpatient oncology drugs at 340B DSH hospitals was 1.1 to 1.3 times the average spending at other hospitals. Neither

patients' health status nor hospitals' teaching status accounted for differences in outpatient drug spending between 340B hospitals and the other hospitals. A limitation of this study was that commercial drug prices were imputed based on Medicare drug pricing and the overall difference in prices across all drugs between commercial and Medicare pricing.

- Blalock examined Medicare drug spending in the 12 months before and after 379 DSH hospitals started to participate in the 340B program, between 2009 and 2016 (Blalock 2018). Per beneficiary outpatient drug spending increased by 32 percent among the newly enrolled 340B hospitals compared with spending growth of 13 percent among beneficiaries treated during the same period at a control group of other hospitals. A limitation of this study is that it included only beneficiaries treated at a given 340B hospital before and after the hospital's enrollment in the program. In addition, the study did not control for differences in the conditions treated at 340B hospitals and other facilities.

- Dobson and colleagues found that 340B DSH hospitals incur higher drug spending compared to non-340B hospitals due to the type of patients they treat and the characteristics of the facilities they operate (Dobson et al. 2017). Accounting for differing patient and facility characteristics using propensity score matching (that matched 340B hospitals to non-340B hospitals based on patients' and hospitals' characteristics), Part B spending per beneficiary in 2013 was 15 percent greater at 340B DSH hospitals than at non-340B hospitals ($3,204 versus $2,794). However, because 58 percent of the 340B DSH hospitals that could not be matched to non-340B hospitals were therefore excluded from the analysis, a limitation of this study is that it may not be generalized to all 340B DSH hospitals.

- Desai and McWilliams concluded that 340B eligibility was associated with greater Medicare outpatient drug use (as measured by Part B drug claims billed per year and hospitals' annual Medicare payments for Part B drugs) for drugs furnished by clinicians specializing in hematology-oncology and ophthalmology but not rheumatology (Desai and McWilliams 2018).[18] A limitation of this study is that the authors excluded hospitals with DSH percentages that were within 1 percentage point of the eligibility threshold.

- Jung and colleagues concluded that 340B eligibility was not associated with increased cancer drug spending in markets that newly gained a 340B hospital between 2010 and 2013 compared with markets with no 340B hospitals during this period (Jung et al. 2018). Similar to the Commission's approach, Jung and colleagues focused on only Medicare beneficiaries with cancer and controlled for market and year fixed effects using a linear regression model. However, this study did not differentiate by type of cancer, did not include spending for Part D drugs, and included critical access hospitals (which are not paid under the OPPS).

Some studies have examined whether the 340B program is expanding in ways that could maximize participants' ability to generate profits from the program's drug discounts. For example, Conti and Bach found that affiliated outpatient clinics associated with DSH hospitals participating in the 340B program after 2004 were more likely to be located in communities with lower poverty and uninsured levels and higher median and mean household income compared with outpatient clinics participating in the program before 2004 (Conti and Bach 2014). Similarly, Nikpay and colleagues found that compared with hospitals that began participating in 340B since 2004, earlier participants tended to be larger, disproportionately public, academic, and located in counties with lower income levels and higher levels of uninsured patients (Nikpay et al. 2018).

Potential effects of 340B discounts from 2018 onward

Beginning in 2018, Medicare lowered its payment rates to 340B hospitals for separately payable Part B drugs without pass-through status to ASP – 22.5 percent. This reduced payment rate roughly eliminates the margin 340B hospitals had been earning from the 23.1 percent basic rebate on brand non-pass-through products, but 340B hospitals will continue to earn a margin on non-pass-through drugs that receive an inflation rebate (which for some products may be a substantial rebate).[19] Among competing brand products without pass-through status, the payment reduction to ASP – 22.5 percent decreases, but does not necessarily eliminate, any margin advantage that may have previously existed for higher priced products over lower priced products. The lower payment rates do not apply to new drugs with pass-through status, which will continue to be paid ASP + 6 percent for the

first two to three years on the market. Thus, the policy change increases the relative profitability of newer, more-expensive pass-through products paid at ASP + 6 percent over existing products without pass-through status paid ASP – 22.5 percent.

Analysis of the relationship between the 340B program and cancer drug spending

An important question raised by the GAO study is what is driving the differences in oncology drug spending between 340B and other hospitals. It could be that the 340B program induces participating hospitals to prescribe more drugs or higher priced drugs. Alternatively, it could be that 340B providers compared with others serve a different mix of patients who need a different mix of drugs (e.g., because of a different mix of diseases or different severity level). In fact, 340B providers have some characteristics that are different from the average hospital—they are larger and more likely to be major teaching hospitals—suggesting higher spending may be driven at least in part by differences in patient mix.

To determine whether the 340B program induces hospitals to furnish more-expensive drugs, we evaluated whether Medicare payments for chemotherapy and supportive drugs are higher among cancer patients treated by 340B hospitals compared with patients treated by other providers. Our analysis has two parts. First, we provide descriptive statistics comparing 340B hospitals and other hospitals and oncology patients served across the different settings. Second, we conducted a regression analysis focusing on the market-level impact of higher 340B market share (defined as the share of chemotherapy patients in a market treated at 340B entities) on cancer drug spending using metropolitan statistical areas (MSAs) as the unit of analysis. We contracted with Acumen LLC to provide assistance with relevant clinical information on chemotherapy drug and supportive therapies used for the treatment of cancer and to conduct the data analysis. One unique aspect of this study is that it combines Part B and Part D spending for cancer drugs. Another unique aspect of this study is that it examines cancer drug spending by type of cancer to better account for differences in patients' clinical characteristics.

The study population was limited to FFS beneficiaries with a cancer diagnosis who received at least one Part B provider-administered chemotherapy drug during the year of analysis.[20] Since these cancer patients may have received both provider-administered drugs (covered under Part B)

TABLE 15–10

Beneficiary characteristics by site of care, 2017

	Beneficiaries predominantly receiving chemotherapy in:		
	340B hospitals	**Non-340B hospitals**	**Physician offices**
Age			
≤65	14%	10%	6%
66–84	67%	69%	64%
85+	19%	22%	30%
Female	49%	48%	33%
Share with Part D low-income subsidy	30%	20%	19%
Disabled	24%	18%	15%
Average risk score	2.6	2.6	2.4
Type of cancer			
Breast	16.4%	16.2%	11.8%
Colorectal	9.4%	9.3%	7.8%
Prostate	18.8%	19.4%	41.1%
Lung	17.2%	17.3%	12.5%
Leukemia/lymphoma	16.0%	16.2%	12.2%
Number of beneficiaries	110,666	51,960	181,632

Note: Analysis is limited to beneficiaries receiving provider-administered chemotherapy for a cancer diagnosis who had a predominant site of care (defined as the site from which the beneficiary received at least 75 percent of provider-administered chemotherapy visits). The data in this table include beneficiaries identified from claims data by the receipt of at least one Part B–covered provider-administered chemotherapy drug for a cancer diagnosis in 2017. Included in this table are beneficiaries with the five listed cancer diagnoses and with other diagnoses. The share of beneficiaries by type of cancer does not sum to 100 percent because some beneficiaries have other diagnoses and some have multiple diagnoses. The share of beneficiaries by age group may not sum to 100 percent due to rounding.

Source: Acumen LLC analysis of Part A, Part B, and Part D claims data for MedPAC.

and drugs dispensed at retail pharmacies (covered under Part D), we further limited the study sample to include only beneficiaries who were continuously enrolled in Part A, Part B, and Part D during the study period. For each year of our analysis, we used cancer drug spending per patient month (PPM), defined as spending on chemotherapy products and cancer supportive drugs (which we refer to as "cancer drugs").[21] Because there may be differences in the types of cancer (and, therefore, chemotherapies used) among patients treated at 340B hospitals and patients treated in other care settings, our analysis focused on five cancer types (breast cancer, colorectal cancer, prostate cancer, lung cancer, and leukemia/lymphoma). See Appendix 15-B (pp. 500–502) for more details on the methodology.

Descriptive analysis

The demographic characteristics of patients who predominantly received chemotherapy in 340B hospitals show some differences from patients treated in other hospitals and physician offices (Table 15-10). A greater proportion of beneficiaries treated at 340B hospitals receive Part D's LIS (30 percent) compared with beneficiaries treated at other hospitals (20 percent) and physician offices (19 percent). Beneficiaries treated at 340B hospitals are also more likely to be younger and disabled compared with beneficiaries treated in other settings.

The mix of patients by type of cancer and risk scores (i.e., hierarchical condition category risk scores) is generally

TABLE
15–11

Cancer drug spending varies by diagnosis and has been increasing substantially

	Part B and Part D cancer drug spending per patient month		
Cancer diagnosis	**2013**	**2017**	**Percent change 2013–2017**
All*	$2,234	$3,495	56%
Breast	2,939	4,781	63
Colorectal	2,766	3,350	21
Prostate	1,101	1,784	62
Lung	2,886	5,045	75
Leukemia/lymphoma	3,806	5,156	35

Note: *"All" cancer includes a broad set of cancer types in addition to the five specific cancer types shown.

Source: Acumen LLC analysis of Part A, Part B, and Part D claims data for MedPAC.

similar between 340B hospitals and other hospitals but differs from the mix at physician offices (Table 15-10). The average risk score is similar for 340B and other hospitals' chemotherapy patients and is slightly higher than for patients treated in physician offices. The share of patients with the five types of cancer examined is similar between 340B hospitals and other hospitals, but chemotherapy patients treated in the physician office setting are much more likely to have prostate cancer than those treated at hospitals.

Hospitals that participate in the 340B program tend to be larger than other hospitals and are more likely to be teaching hospitals (data not shown). Among 340B hospitals in 2017, about 54 percent of providers were teaching hospitals (20 percent major teaching and 34 percent other teaching) compared with 36 percent for non-340B hospitals (7 percent major teaching and 29 percent other teaching). In 2017, the average 340B hospital furnished Part B–covered chemotherapy to 122 Medicare FFS patients (for whom that hospital was the predominant site of chemotherapy administration) compared with 50 patients for the average non-340B hospital.

Overall, spending on chemotherapy and supportive drugs varies by type of cancer (Table 15-11). On average, in 2017, combined Part B and Part D spending on chemotherapy and supportive drugs was $3,495 PPM. Focusing on beneficiaries with one of the five types of

cancer examined, cancer drug spending ranged from $1,784 PPM for prostate cancer patients to $5,156 PPM for leukemia/lymphoma patients in 2017. Part D spending accounted for nearly one-quarter of chemotherapy and supportive drug spending, with its role varying by type of cancer (data not shown). The Part D share of total cancer drug spending ranged from 8 percent for lung cancer to 47 percent for prostate cancer. Spending on cancer drugs increased substantially between 2013 and 2017, with the greatest percentage increases for breast, prostate, and lung cancer (62 percent to 75 percent) and somewhat lower for colorectal cancer (21 percent) and leukemia/lymphoma (35 percent).

Overall, in 2017, average cancer drug spending PPM was higher at 340B hospitals than at other settings when patients with all cancer diagnoses were grouped together.[22] However, for patients grouped with the same diagnosis, no uniform pattern existed for which site had higher costs (Table 15-12, p. 490). For all diagnoses combined, average spending PPM was higher for patients at 340B hospitals ($4,113) than at other hospitals ($3,920) and physician offices ($3,015). However, when patients were grouped by diagnoses, we found that patients treated at 340B hospitals had the highest spending for three cancers (colorectal, prostate, and leukemia/lymphoma) and at physician offices for two cancers (breast and lung), although the differences were generally modest. Compared with physician offices, average spending by cancer type at 340B hospitals

**TABLE
15–12**

**The site of care with the highest cancer drug spending
per patient month varied by type of cancer, 2017**

Cancer diagnosis and beneficiary age	Average Part B and Part D cancer drug spending per patient month by predominant site of care		
	340B hospital	Non-340B hospital	Physician office setting
All diagnoses*			
All ages	$4,113	$3,920	$3,015
Age <65	4,819	4,844	4,518
Age ≥65	4,001	3,818	2,921
Breast cancer			
All ages	4,794	4,629	4,812
Age <65	5,411	5,305	5,488
Age ≥65	4,658	4,510	4,725
Colorectal cancer			
All ages	3,416	3,289	3,322
Age <65	3,826	3,483	4,014
Age ≥65	3,333	3,262	3,251
Prostate cancer			
All ages	2,547	2,438	1,471
Age <65	2,964	2,861	1,834
Age ≥65	2,529	2,426	1,463
Lung cancer			
All ages	5,041	4,933	5,076
Age <65	5,050	4,883	5,055
Age ≥65	5,040	4,939	5,079
Leukemia/lymphoma			
All ages	5,356	5,114	5,008
Age <65	6,154	6,017	5,758
Age ≥65	5,242	5,033	4,961

Note: "Predominant site of care" refers to the site (a 340B hospital, a non-340B hospital, or the physician office setting) where the beneficiary received at least 75 percent of provider-administered chemotherapy visits. Beneficiaries without a predominant site of care were excluded from the analysis. All of a beneficiary's spending on Part B and Part D chemotherapy and supportive drugs is attributed to the predominant site of care, regardless of where the care took place.
    *The "all diagnoses" label includes a broad set of cancer types in addition to the five cancer types shown.

Source: Acumen LLC analysis of Part A, Part B, and Part D claims data for MedPAC.

generally ranged from 1 percent lower to 7 percent higher than at physician offices (with the exception of prostate cancer, where average spending is substantially lower in physician offices because of a different mix of drugs). If we focused only on patients treated at hospitals, those treated at 340B hospitals had consistently higher cancer drug spending than those treated at other hospitals for the five types of cancer examined, with average spending

PPM by cancer type at 340B hospitals ranging from 2 percent to 5 percent higher than other hospitals.

One factor that contributes to differences in average cancer drug spending PPM is patient age: higher for younger patients compared with older patients. For example, patients under age 65 generally had higher spending per patient month than patients 65 and over (Table 15-12).

Hospitals that changed their 340B status compared with those with no status change between 2013 and 2017

	Type of cancer					
	All*	Breast	Colorectal	Prostate	Lung	Leukemia/ lymphoma
Total number of hospitals	1,853	1,204	1,116	1,213	1,184	1,216
Share of hospitals by 340B status						
Gained 340B status	11.1%	11.0%	10.8%	10.6%	11.4%	10.8%
Always 340B	43.8	52.9	54.3	51.6	52.9	51.2
Never 340B	43.1	34.5	33.2	35.9	34.0	36.0
2017 average cancer drug spending per patient month						
Gained 340B status	$3,898	$4,616	$3,346	$2,426	$4,808	$5,341
Always 340B	4,081	4,743	3,306	2,491	4,926	5,281
Never 340B	3,780	4,624	3,248	2,259	4,872	4,955
Increase in average cancer drug spending per patient month between 2013 and 2017						
Gained 340B status	51%	57%	26%	53%	66%	39%
Always 340B	54	60	19	45	82	39
Never 340B	49	58	20	46	73	27

Note: Analysis is limited to hospitals that furnished chemotherapy and were paid under Medicare's outpatient prospective payment system (OPPS) and were operating within the 50 states and the District of Columbia. Hospitals that were paid on a cost basis or at a rate that differs from Medicare's OPPS rate were also excluded. *"All" includes a broad set of cancer types in addition to the five cancer types shown. "Share of hospitals by 340B status" does not sum to 100 percent because the table excludes the small share of hospitals that lost 340B status during the period.

Source: Acumen LLC analysis of Part A, Part B, and Part D claims data for MedPAC.

Since younger patients make up a higher share of patients at 340B hospitals than at other hospitals and physician offices, this factor could contribute to spending differences across the settings. However, when patients in the same age category were compared, patients at 340B hospitals generally had higher spending than patients at other hospitals (Table 15-12).

Among new 340B hospitals, no clear evidence of changes in spending as a result of 340B status

Our comparison of the hospital-level data suggests that 340B hospitals, on average, have higher cancer drug spending compared with other hospitals and that some of the difference may be related to the differences in hospital characteristics (such as the teaching status) and patients' demographic characteristics (such as age).

However, among new 340B hospitals alone, we found no clear evidence of increased spending on cancer drugs attributable to the hospitals' 340B status.

Our analysis focused on a subset of hospitals that gained 340B status between 2013 and 2017 compared with other hospitals. We included all hospitals paid under the OPPS and patients treated for cancer in both 2013 and 2017 (2017 was the most recent year of data available at the time analysis was conducted).[23] For each of the five types of cancer, among the hospitals in our analysis, roughly 11 percent gained 340B status between 2013 and 2017, about half were 340B participants in both 2013 and 2017 ("always 340B"), and another one-third did not participate in 340B in any of the years of the study period ("never 340B") (a very small share of providers lost their 340B status during the period; data not shown) (Table 15-13).

The characteristics of hospitals that newly gained 340B status fell somewhere between that of existing 340B hospitals and non-340B hospitals. For example, the average cancer patient census at the newly 340B hospitals was greater than at non-340B hospitals but below that of the 340B hospitals. Both new and existing 340B hospitals were more likely to be teaching hospitals than non-340B hospitals, but existing 340B hospitals were more likely to have major teaching status compared with new 340B hospitals.

About 80 percent of the newly 340B hospitals were located in states that, as of 2013, had expanded Medicaid coverage under the Affordable Care Act of 2010.[24] That share is higher than the overall share in the Medicaid expansion states (about 60 percent of hospitals), suggesting that Medicaid coverage expansion may have increased the DSH percentage for some hospitals and increased the likelihood that they met the 340B eligibility criteria.

In general, hospitals that gained 340B status, on average, had cancer drug spending that was similar to other hospitals and they experienced spending growth that did not consistently differ from those of other hospitals. In 2013 and 2017, always-340B hospitals tended to have higher cancer drug spending than never-340B hospitals, while hospitals that gained 340B status tended to have spending that was somewhere in between spending for never-340B and always-340B hospitals. However, the differences were relatively small in both years. For example, in 2017, average cancer drug spending for breast cancer patients ranged from $4,624 PPM for never-340B hospitals to $4,743 PPM for always-340B hospitals, or a difference of about 3 percent (Table 15-13, p. 491).

Average cancer drug spending increased for all hospitals, regardless of their 340B status, between 2013 and 2017. The incremental increases for hospitals that gained 340B status showed no clear pattern relative to other hospitals. For example, the increase in spending among hospitals that gained 340B status was lower than at other hospitals for breast and lung cancers, while it was higher than at other hospitals for colorectal and prostate cancers. For patients with leukemia/lymphoma, the increase in spending for hospitals that gained 340B status was comparable with always-340B hospitals (39 percent) and higher than never-340B hospitals (27 percent).

While we do not find evidence of changes in hospitals' prescribing behaviors after gaining 340B status, we note a few caveats. Only 11 percent of hospitals gained 340B status between 2013 and 2017. For most cancer types, that translates to about 130 hospitals. In addition to the relatively small number of hospitals, it is not clear how quickly hospitals and their clinicians change their prescribing, if at all, in response to changes in financial incentives for individual drug products. Depending on the timing of the conversion to a 340B hospital, our data may not capture the full impact of the 340B program on Medicare's cancer drug spending.

MSA-level analysis suggests higher 340B market share is associated with higher drug spending for some cancers

A key question raised by any analysis comparing cancer drug spending for patients treated by 340B hospitals with those treated by other providers is whether differences in patients' clinical characteristics may be driving the results. In our analysis, although we have information on patients' cancer type, we do not have more-granular clinical information (e.g., stage of cancer, cancer subtype, or genomic markers) that may affect the cancer drug regimen that is appropriate for a given patient. One way to address concerns about possible differences in patient clinical characteristics by type of provider is to employ a market-level, rather than provider-level, analysis. With a market-level approach, we can look at the association between the share of patients treated in a market by 340B providers and average cancer drug spending PPM in the market (with average drug spending calculated across all cancer patients in the market regardless of whether they were treated by 340B hospitals or other providers). This market-level approach overcomes concerns present in hospital-level analyses about possible differences in patient mix between 340B hospitals and other providers affecting the results. For example, if it were true that patients with certain clinical characteristics that required higher priced drugs were shifted from physicians' offices to 340B hospitals, but these patients received the same drugs at the 340B hospitals as they would have received at physicians' offices, a hospital-level analysis would incorrectly suggest in this scenario that the 340B program increases drug spending, whereas a market-level analysis would not.

Our market-level analysis focuses on the effect of the 340B program on average cancer drug spending PPM at the MSA level using a linear regression model with a fixed effect for each of the over 300 MSAs. The MSA

fixed effects allow us to observe the changes in the 340B market share (defined as the share of chemotherapy patients treated by 340B entities) within each MSA over time. This analysis measured the effects of 340B market share using five years of data (2009, 2011, 2013, 2015, and 2017), controlling for general trends in oncology drug spending and other systematic differences across MSAs. With this approach, the estimated impact of 340B status is derived entirely from the within-MSA variation in 340B market share and cancer drug costs. If 340B providers were influenced by financial incentives and prescribed higher priced or more products, we would expect to see cancer drug spending in a market increase as the share of chemotherapy patients treated by 340B providers in that market increased.

Data for the MSA-level analysis included cancer patients treated by physician practices in addition to those treated at 340B and non-340B hospitals.[25,26] This broader market-level analysis allowed us to gauge whether growth of the 340B program through hospitals' acquisition of physician practices led to the region's higher cancer drug spending. (When a hospital acquires a physician office, that office becomes part of the outpatient department of the acquiring hospital.) Our goal was to separate the changes in cancer drug spending attributable to expansion of 340B market share from the effects of general increase in hospital market share. To make this distinction, we included two variables in our regression model: share of patients treated by 340B hospitals and share of patients treated by outpatient hospitals of any kind.

The analysis consisted of six regression models: one model for all cancer patients and five separate models that limited the analysis to individual types of cancer patients (breast cancer, colorectal cancer, prostate cancer, lung cancer, and leukemia/lymphoma patients). Because cancer drug spending varies widely across cancer types, any measured effects from an all-cancer model would be confounded by the differences in the mix of cancer patients.[27] While results for an all-cancer model are similar to individual cancer results, our discussion of the findings focuses on the five cancer patient types. All models controlled for differences across MSAs in demographic characteristics, such as gender, age, and whether an individual received Part D's LIS.[28]

We found a statistically significant and positive relationship between the 340B market share and cancer drug spending for prostate cancer and lung cancer (Table 15-14, p. 494). (We used a significance level of $p \leq 0.05$.)

In both cases, the 340B program was associated with higher cancer drug spending, by $310 PPM for prostate cancer and $313 PPM for lung cancer, on average.[29] Because average monthly drug spending for lung cancer ($2,886 PPM in 2013) is 2.6 times that of prostate cancer ($1,101 PPM in 2013), the 340B effect for prostate cancer spending is greater (about 28 percent) than for lung cancer spending (about 11 percent) (see Table 15-11, p. 489, for average drug spending by cancer type).[30] The 340B program effects were all positive and similar in magnitude, but they were not statistically significant at a 0.05 level for the other three cancer types.[31]

Another notable finding is that the variable measuring the extent of hospital–physician integration (i.e., hospital acquisition of physician practices) in a given market ("share of beneficiaries treated at HOPDs" in Table 15-14 (p. 494)) was not statistically significant in all five models. This finding suggests that the general trend toward more hospital–physician integration did not affect cancer drug spending for the five cancers we examined.

The general increase in oncology drug spending over time (represented by the year variables in Table 15-14, p. 494) was statistically significant. For example, between 2009 and 2017, average cancer drug spending for patients with leukemia/lymphoma rose by $2,362 PPM, about a 90 percent increase since 2009 (Table 15-14). Being age 65 or younger was significantly correlated with higher cancer drug spending for breast cancer ($2,668 PPM increase in spending), colorectal cancer ($1,270 PPM), and prostate cancer ($1,527 PPM) and for leukemia/lymphoma ($1,220 PPM). The correlation likely reflects the use of more aggressive cancer treatments with younger patients, which may be less clinically appropriate in older patients (i.e., patients age 80 or older). Finally, Part D's LIS status was associated with lower cancer drug spending for patients with lung cancer and leukemia/lymphoma (–$831 and –$950, respectively). This last finding is somewhat counterintuitive. In a separate sensitivity analysis, we found that Part D chemotherapy drug spending was positively correlated with the share of LIS beneficiaries in a region, while that was not the case for Part B chemotherapy drugs (data not shown). Because Part B cancer drug spending is typically 3 to 11 times the amount spent on Part D cancer drugs, the effects of LIS share on combined Part B and Part D cancer spending mostly reflects the effects of Part B spending.[32] Because LIS beneficiaries are more likely to be younger (under age 65) and female, the negative coefficients could be due to these other demographic variables that have statistically

**TABLE
15–14**

**MSA-level analysis finds 340B program effects for lung cancer
and prostate cancer spending but not for other cancers**

	Type of cancer				
	Breast	**Colorectal**	**Prostate**	**Lung**	**Leukemia/ lymphoma**
Number of beneficiaries (in 2017)	48,451	29,604	106,596	51,231	49,004
Adjusted *R*-squared[a]	0.61	0.06	0.50	0.65	0.61
Variables					
340B market share[b,c]	$256	$330	$310[g]	$313[g]	$262
340B effect as a share of 2013 spending[d]	9%	12%	28%	11%	7%
Change in average cancer drug spending relative to 2009					
2011	$35	$176[g]	$164[g]	$173[g]	$617[g]
2013	371[g]	–91	552[g]	357[g]	1,200[g]
2015	1,007[g]	1	986[g]	772[g]	1,640[g]
2017	2,069[g]	271[g]	1,105[g]	2,410[g]	2,362[g]
MSA-level beneficiary characteristics					
Share of beneficiaries treated at HOPDs[e]	–$163	–$427	$202	–$181	–$282
Share of beneficiaries with LIS	–$208	–$432	–$174	–$831[g]	–$950[g]
Share of beneficiaries under age 65	2,668[g]	1,270[g]	1,527[g]	679	1,220[g]
Share of beneficiaries ages 65–79	1,039[g]	1,746[g]	512[g]	388	420
Share female	1,944[g]	223	N/A	499[g]	634[g]
Share with less than 548 days since 1st diagnosis[f]	266	–750[g]	–260	–215	1,119[g]

Note: MSA (metropolitan statistical area), HOPD (hospital outpatient department), LIS (low-income subsidy), N/A (not applicable). We used MSA-level data that consisted of between 1,677 and 1,709 MSA–year combinations. Dollar amounts reflect effect on spending per patient month.
[a]*R*-squared is adjusted for clustering (MSA fixed effects).
[b]Share of cancer patients who received chemotherapy from a 340B hospital in each respective MSA for each year.
[c]The *p*-values for breast cancer and leukemia/lymphoma were both between 0.05 and 0.10, meaning they would have met the statistical significance test at the 0.10 level. The *p*-value for colorectal cancer was 0.1099.
[d]Percentage by which spending at 340B hospitals exceeds that of non-340B hospitals (see also endnote 29).
[e]This variable measures the effects of the general trend toward more hospital–physician integration on cancer drug spending.
[f]This variable is a proxy for recent cancer diagnosis as opposed to patients who had been diagnosed less recently.
[g]Denotes statistical significance at the 0.05 level.

Source: Acumen LLC analysis of 100 percent Part A, Part B, and Part D claims data for MedPAC.

significant and positive effects on spending (Medicare Payment Advisory Commission 2019a).

The 340B discount program may have an effect on some cancer drug spending

Our MSA regression shows that 340B hospitals have higher cancer drug spending for two types cancer, independent of any difference in patient mix among 340B hospitals and other providers. The reason for higher spending among patients treated at 340B entities appears to be specific to

the type of cancer and chemotherapies that are available. In the case of lung cancer, higher spending at 340B entities was driven by higher costs per Part B drug administered. A closer examination of drug products used in the two settings showed that spending for the newer immuno-oncology products could account for some of the higher per administration costs. Both the share of patients receiving certain high-cost immune-oncology products and spending on those products per user was slightly higher for patients treated at 340B entities compared with other entities.

However, we cannot conclude that the use of higher priced products for lung cancer was driven by 340B discounts because higher prices are not necessarily associated with higher 340B discounts.

For prostate cancer drugs, an analysis of the underlying data suggests that spending for both Part B and Part D drugs likely contributed to our findings that Medicare spending at 340B entities is higher than spending at non-340B entities. For example, we found that unit costs at 340B entities were higher for both Part B and Part D drugs, reflecting differences in the mix of drugs used. In addition, we found a somewhat higher number of Part D drugs prescribed by clinicians at 340B entities compared with those at other entities (8.1 prescriptions vs. 7.5 prescriptions per patient). However, unlike in our regression analysis, because our analysis of the underlying data on number of prescriptions and price per unit does not control for patient mix, we cannot conclusively determine the role of 340B discounts in explaining the greater number of Part D prescriptions for prostate cancer patients treated by 340B hospitals. For example, 340B entities have a higher share of younger patients (under 65) and higher share of patients who receive Part D's LIS compared with other entities, allowing for more aggressive cancer treatments (in the case of younger patients) or for patients to be more adherent to prescribed medications, as the LIS eliminates nearly all cost-sharing liabilities for Part D drugs.

Effects of the 340B discount program on Medicare patients' cost sharing has likely been small overall and varied

Given our findings on the relative size of the 340B effect for some cancers, the overall effect of 340B on Part B cost sharing is likely modest and varied across patients. Because Medicare beneficiaries are liable for 20 percent of Part B drug costs, if the 340B program led to higher Part B drug spending, it would translate into higher Part B cost-sharing liability. In addition, to the extent that beneficiaries have supplemental coverage through Medigap, employer-sponsored supplemental coverage, or Medicaid, they are protected from increases in cost sharing (although higher spending can affect supplemental premiums). Beginning in 2018, Medicare's payment rate for certain Part B drugs provided at 340B hospitals is less than the payment rate at other hospitals and physician offices, so, potentially, Part B cost sharing could be lower for patients treated at 340B hospitals compared with patients treated after 2017 in other settings. With respect to Part D drugs, any effect of 340B status on beneficiary cost sharing is likely

to be mixed. Beneficiaries who receive Part D's LIS pay nominal cost sharing and are likely to be unaffected. Other Part D beneficiaries could face higher Part D cost sharing if the 340B program is associated with higher spending, but it would depend on the plan's formulary and cost-sharing structure.

In summary, the Commission examined whether the 340B program induces hospitals to furnish more-expensive cancer drugs, using a regression analysis that focused on the market-level impact of higher 340B market share on cancer drug spending at the MSA level. Overall, we found evidence, between 2009 and 2017, of an association between 340B market share and higher drug spending for some cancers. Of the five cancer types we examined, our regression analysis for two cancer types (lung and prostate cancers) found that 340B market share had statistically significant effects of just over $300 PPM. Those 340B effects, however, were much smaller than the effects of the general increase in oncology drug spending, which reflects both the effect of rising prices and shifts in the mix of drugs, including the launch of new products with higher prices. For example, between 2009 and 2017, cancer drug spending per month grew by more than $2,000 PPM for patients with breast cancer, lung cancer, and leukemia/lymphoma. Given our findings on the relative size of the 340B effect for some cancers, the overall effect on beneficiary cost sharing is likely to be modest and vary by beneficiaries' supplemental coverage.

The Commission's market-level regression analysis augments prior research on the effects of the 340B program by examining:

- cancer drug spending by type of cancer to account for patients' clinical characteristics and

- all Medicare-covered prescription spending, including both Part B and Part D utilization and spending data in the analysis.

In addition, the market-level approach that we used helps address unobserved clinical characteristics (such as information on the cancer stage since these data are not generally available).

This analysis has several caveats. Because 340B ceiling price data were not available to the Commission, we did not examine whether drug profitability affected providers' prescribing patterns. The analysis was limited to examining 340B effects on cancer drug spending for the five common cancer types (breast, colorectal,

leukemia/lymphoma, lung, and prostate) identified in CMS's Medicare Beneficiary Survey File (MBSF). The MBSF does not report on the diagnosis of other common cancer types, such as bladder, kidney, liver, pancreatic, and thyroid cancer and melanoma.

Our study does not address whether 340B status affects spending for other (nondrug) cancer-related services, such as chemotherapy infusion, radiation therapy, imaging, diagnostic testing, and laboratory testing. In addition, we did not address the migration of nondrug services—including evaluation and management (E&M) visits—from physicians' offices to HOPDs. For example, from 2012 to 2018, the number of outpatient hospital-based E&M visits increased by 37 percent, compared with a 2 percent decline in physician office–based E&M visits. At the same time, the number of chemotherapy administration services per beneficiary delivered in HOPDs grew by 53 percent, while the number provided in physician offices declined 17 percent. The migration to the HOPD increases overall Medicare program spending and beneficiary cost sharing because Medicare generally pays more for the same or similar nondrug services in HOPDs than in freestanding offices. ∎

Traditional price discrimination or cost shifting?

On average, commercial hospital prices are almost double Medicare hospital prices, although the reason for this is controversial. In general, the academic research suggests that hospitals engage in traditional price discrimination in areas where they have the market power to negotiate higher rates charged to insurers. In contrast, some industry representatives assert that cost shifting is responsible, arguing that providers charge higher rates only to commercially insured patients to offset low Medicare rates. Table 15-A1 contrasts the expected findings on market power and hospital costs under the price discrimination versus cost-shifting theories and presents a summary of the evidence in the literature. In general, the literature supports the proposition that the difference in commercial prices and Medicare prices is due primarily to traditional price discrimination, and cost shifting has only a small or no role in the setting of prices. There are no studies suggesting that when Medicare raises its rates to a particular provider, that provider reduces prices it negotiates with insurers. There is also very limited evidence that insurers will materially increase their negotiated rates when Medicare prices decline for a particular hospital. ∎

TABLE
15–A1

Price discrimination or cost shifting?

	Traditional price-discrimination model	Complete cost-shifting model	The evidence
Fundamental theory as to why hospitals' commercial prices tend to exceed Medicare prices	All hospitals prefer to charge higher rather than lower rates. They negotiate higher rates from payers when they have strong negotiating leverage. Negotiated prices vary based on the relative market power of the hospital and the insurer.	Because Medicare and Medicaid rates are below costs, hospitals are forced to charge high rates to commercial patients. When hospitals are in good shape financially (and not forced to raise commercial prices), they will not try to maximize profit and will want to "leave money on the table" when negotiating.	The literature is more supportive of traditional price discrimination than cost shifting (Frakt 2015b).
Will hospitals have high all-payer profit margins?	It depends. Those with strong market power will have higher prices and higher margins.	No. Hospitals want only enough funds to provide high-quality care.	Some hospitals have high all-payer profit margins. Average all-payer margins from 2015 to 2017 exceeded 10 percent for 25 percent of hospitals and exceeded 17 percent for 10 percent of hospitals.
Does revenue affect expenditures?	Maybe. Nonprofit hospitals with more money may spend more money per discharge. Costs are not necessarily exogenous.	No. Hospitals will only spend what is needed for operations.	Nonprofit hospitals with higher non-Medicare profits have higher standardized costs (Medicare Payment Advisory Commission 2019).
Will commercial prices vary widely?	Prices may vary widely depending on provider and insurer market power.	Price differences should be modest and reflect only the different needs of providers.	Prices vary widely (RAND 2019).
If Medicare rates go up, will providers negotiate lower rates from insurers?	No	Yes	No. Higher Medicare revenues appear to result in higher spending rather than reductions in prices negotiated with insurers (Cooper et al. 2017).
Will hospital market power lead to higher commercial prices?	Yes	No effect	Most literature says it leads to higher prices (Cooper et al. 2018).
Will insurer market power lead to lower hospital prices?	Yes	No clear effect. Hospitals will only ask for the minimum needed.	Most literature suggests insurers with more market power pay lower rates, all else equal (Scheffler and Arnold 2017).

Details on methodology used in the 340B analysis

Included beneficiaries

- Analysis focuses on beneficiaries who received at least one Part B–covered provider-administered chemotherapy drug for a cancer diagnosis during the year of analysis.

- We restricted the analysis to beneficiaries who had a predominant location of care.

  - For descriptive analysis, only beneficiaries who received at least 75 percent of their chemotherapy administration visits at a particular hospital or in the physician office setting were included.

  - For the metropolitan statistical area (MSA) analysis, only beneficiaries who received at least 75 percent of their chemotherapy administration visits (regardless of setting) in a particular MSA were included. Beneficiaries who predominantly received chemotherapy in non-MSA rural areas were excluded.

- We restricted the analysis to fee-for-service (FFS) beneficiaries with continuous Part A, Part B, and Part D enrollment in the year of analysis.

- In the population of cancer patients identified with the above criteria, we identified subgroups of patients with certain types of cancer based on data from the Medicare Beneficiary Summary File (MBSF). The five cancers we identified with these data were breast, colorectal, prostate, lung, and leukemia/lymphoma.

- Descriptive statistics in the study referring to "all" beneficiaries receiving chemotherapy include beneficiaries with one of the five cancer diagnoses as identified by the MBSF and beneficiaries with other cancers (identified from claims data by the receipt of at least one Part B–covered provider-administered chemotherapy drug for a cancer diagnosis in the year of analysis, but not having one of the five cancer diagnoses indicated in the MBSF).

Included spending

- The study includes spending on chemotherapy and cancer supportive drugs covered by Medicare Part B and Part D for beneficiaries meeting the inclusion criteria.

- Acumen LLC constructed a list of chemotherapy drugs and cancer supportive drugs. Because some drugs have multiple uses, we required Part B–covered drugs included in the analysis to have a cancer diagnosis on the claim. Part D drug claims do not have a diagnosis code, so they were not subject to this requirement. (See endnote 21 for more details on how we identified chemotherapy and supportive drugs.)

- For beneficiaries who met the study inclusion criteria, we identified all Part B and Part D spending on chemotherapy and supportive drugs and we attributed that spending for the beneficiary to the predominant location of care (including spending that did not occur at that location).

- For beneficiaries receiving provider-administered chemotherapy during the study year, we included all 12 months of the beneficiary's data, with a few exceptions. For beneficiaries who did not receive provider-administered chemotherapy in the prior year, we included a partial year of data beginning the first month the beneficiary received chemotherapy for a cancer diagnosis. For beneficiaries who died during the study year, we excluded the remaining calendar months of the study year after death.

- The descriptive and MSA analyses excluded chemotherapy furnished at critical access hospitals and in territories and areas outside the U.S. The descriptive analysis comparing hospitals that recently joined the 340B program with other hospitals also excluded Maryland hospitals.

Spending measures

- For Part B drugs, we included Medicare program payments and beneficiary cost sharing. For Part B–covered drugs furnished by outpatient hospitals that are packaged and not separately payable, we estimated the cost of those drugs using the rates paid in the physician office setting or, where not available, other pricing benchmarks.

- For Part D drugs, we included gross drug costs (not net of rebates) as our measure of spending.

Regression analysis

- We used a fixed-effects regression model using panel data to examine whether cancer drug spending per beneficiary per month increased in an MSA as the share of patients treated by 340B hospitals in that MSA increased.

- The dependent variable was average cancer drug spending per patient month in the MSA for patients with one of five particular types of cancer.

- We conducted regressions for each of the five cancer types.

- We used ordinary least squares regressions:

  - Panel data for five years (2009, 2011, 2013, 2015, 2017)

  - One observation per MSA per year

- Independent variables were:

  - MSA

  - year

  - share of cancer patients in MSA who received some chemotherapy from a 340B hospital

  - Other control variables—share of cancer patients in MSA who:

    - received some chemotherapy from outpatient hospitals

    - received the Part D low-income subsidy

    - were under age 65, ages 65 to 79, or ages 80 and over

    - were recently diagnosed (i.e., diagnosed in the study year or in the six months preceding the study year)

    - were female ∎

Endnotes

1 We measured consolidation using metropolitan areas as a proxy for markets, as has been done elsewhere in the literature (Fulton et al. 2018). An alternative definition of markets are hospital referral regions (HRRs), which include urban areas and their surrounding rural areas from which they obtain referrals (Cutler and Scott Morton 2013). Using 2011 data, Cutler and Scott Morton found that, on average, the largest system in an HRR had a 42 percent market share, which is slightly lower than our results due to using older data and considering rural hospitals outside the CBSA as competitors to the urban hospitals. In contrast with nationwide studies that compute the Herfindahl–Hirschman Index (HHI) for CBSAs or HRRs, litigants contesting a specific merger between two hospitals evaluate how much a particular merger would affect hospital pricing power for selected services (Gaynor and Pflum 2017). It is not practical to examine all combinations of hospitals in this way when looking at national trends in consolidation. Therefore, the national studies tend to use CBSAs or HRRs and compute HHIs for those areas.

2 However, the Wagner study is weaker than the other studies because it uses change in charges rather than data on actual prices paid.

3 A *high non-Medicare margin* was defined as having a median non-Medicare margin greater than 5 percent in the prior five years. Nonprofit hospitals with high non-Medicare profits had 5 percent higher inpatient costs per discharge in 2017. In contrast, for-profit hospitals with high non-Medicare profits continued to have inpatient costs that averaged 4 percent below the national median, suggesting that for-profit hospitals with high non-Medicare profit margins tend to retain the funds as higher profits for shareholders rather than increase inpatient spending. In contrast, nonprofit hospitals appear to spend a larger share of any increases in commercial revenue than for-profit hospitals.

4 Standardized costs are equal to costs per discharge adjusted for case mix, wage index, outliers, transfer cases, interest expense, and the empirically estimated effect of teaching and low-income Medicare patients on costs per discharge. We adjust for interest expense to prevent hospitals that fund their capital costs with equity from looking more efficient than those that fund capital costs with debt.

5 We focus on financial arrangements between physicians and hospitals to define vertical integration because we have less evidence about other aspects of integration, such as clinical integration.

6 Researchers have also examined the effect of hospital–physician integration on hospital prices; this topic is beyond the scope of this work.

7 The Bipartisan Budget Act of 2015 prohibited providers who began billing under the outpatient prospective payment system (OPPS) on or after November 2, 2015, and are located off a hospital campus from billing under the OPPS after January 1, 2017. CMS implemented additional restrictions on billing for certain evaluation and management services in off-campus HOPDs, but these additional restrictions are subject to an ongoing court challenge.

8 The OPPS payment rates relative to the PFS payment rates differ widely among these ambulatory payment classifications.

9 One exception is that coinsurance for Part B drugs administered in OPPS hospitals is limited to the hospital inpatient deductible ($1,364 in 2019). Therefore, coinsurance for Part B drugs in non-340B OPPS hospitals and for Part B pass-through drugs in 340B hospitals could also be less than in physicians' offices for a drug costing more than $6,820 per administration.

10 In 2019, Maryland implemented the Total Cost of Care Model, which sets a per capita limit on Medicare total cost of care in Maryland. This new model includes global budgets for hospitals; it also includes efforts to address care furnished outside of hospitals through the Care Redesign Program and the Maryland Primary Care Program.

11 Throughout our study period, nearly all E&M office visits were performed in just two settings—physician offices and HOPDs—in both Maryland and the rest of the U.S. Specifically, in 2018, about 98 percent of office visits were performed in these two settings in both Maryland and the rest of the U.S.

12 CMS's policy beginning in 2018 to reduce payment rates for Part B drugs in 340B hospitals has been subject to legal challenges from hospital groups, and those challenges remain pending.

13 Before 2013, the payment rate for separately payable drugs without pass-through status in outpatient hospitals was less than ASP + 6 percent in some years (e.g., ASP + 4 percent from 2009 to 2010 and in 2012 and ASP + 5 percent in 2011).

14 The financial arrangements between a contract pharmacy and the 340B entity can be complex, involving a software vendor that verifies patients' eligibility for the 340B discounts and a wholesaler mechanism for chargebacks that ensures

340B discounted prices are applied to the pharmacy claims of 340B-eligible patients. The profits of 340B hospitals are reduced by fees paid to contract pharmacies and the software vendor.

15 Of the $3.5 billion in Part B drug payments made to Medicare providers, hospital outpatient departments accounted for the vast majority ($3.2 billion). The remaining $0.3 billion in payments were made to other types of providers (e.g., hemophilia clinics) that are eligible for the 340B program.

16 In general, the inflation rebate can result in the margin on a lower priced drug being greater than the margin on a higher priced drug. However, if the price difference between the lower priced and higher priced drug is very large, there can be situations where it is never possible for the margin on the lower priced drug to be greater than the margin on the higher priced drug. For example, assuming 340B providers are paid ASP + 6 percent for drugs, if a lower priced drug's AMP is 73 percent or more below the AMP of the higher priced drugs, the higher priced drug will always yield a greater margin than the lower priced drug if we assume ASP equals AMP. (Although AMP and ASP are not usually equal, they are often relatively similar. OIG found that in 2011, the difference between ASP and AMP was 3 percent at the median, with ASP generally lower than AMP (Office of Inspector General 2013)).

17 Brand drugs are generally expected to offer providers a greater rebate than generics because the ceiling price incorporates a larger basic rebate for brand drugs (23.1 percent) than generic drugs (13 percent) and because low-priced drugs are packaged into the payment rate for other services and not separately paid under the OPPS.

18 Across all three specialties, there was a statistically significant positive relationship between treatment in hospital-owned settings and Part B drug use (spending and the number of claims for Part B drugs); a not statistically significant positive relationship between treatment in the physician office setting and Part B drug use; and a not statistically significant positive relationship between treatment across hospital-owned and physician office settings and Part B drug use (Desai and McWilliams 2018). According to the researchers, these findings, taken together, suggest that at least part of the increase in drug provision in the hospital setting might represent a shift from the physician office setting to the hospital setting. Because the analysis was not sufficiently powered, the authors did not reject the possibility of a meaningful effect of the 340B program on total drug use in communities served by eligible hospitals.

19 We do not have access to 340B ceiling price data to calculate the margin that 340B hospitals earn under the ASP – 22.5 percent payment rates for particular products or overall.

However, the 2015 OIG report showed some products with spreads between Medicare's payment rate (ASP + 6 percent) and the 340B ceiling price in 2013 that were well in excess of the amount that would be expected if a product was only receiving a 23.1 percent basic rebate.

20 Our study period includes five years of data (2009, 2011, 2013, 2015, and 2017). For the hospital-level analysis, we examined data for 2013 and 2017.

21 Clinicians from Acumen LLC developed a list of chemotherapy and supportive drugs for inclusion in the analysis. For chemotherapy drugs, Acumen relied on the list of chemotherapy drugs in CMS's Oncology Care Model. To develop a list of supportive drugs, Acumen reviewed various resources on supportive drugs for the treatment of cancer patients such as those from the National Cancer Institute, Canadian Cancer Society, and RAND (Oncology Model Design Report). The types of products that we considered supportive drugs are those used to treat the following conditions or symptoms, or that fall into the following categories: anemia, anorexia/cachexia, cytokine release syndrome, diarrhea/constipation, mucositis, nausea and vomiting, neuroendocrine side effects, neutropenia, pain, specific drug toxicity, thrombocytopenia, and tumor lysis syndrome. For beneficiaries to be included in the study, they must have received a provider-administered Part B chemotherapy drug in the year of analysis, with a cancer diagnosis present on that claim. For beneficiaries who meet this criterion, we included all Part B and Part D chemotherapy and supportive drug spending, with the requirement that a cancer diagnosis must also be present on the claim for any Part B drug included in the analysis. Part D drug claims do not have diagnosis information, so we could not include this requirement.

22 For the descriptive analysis comparing beneficiaries receiving care in different settings, we only included beneficiaries who received at least 75 percent of their chemotherapy administration visits in a 340B hospital, a non-340B hospital, or the physician office setting. We attributed all of a beneficiary's cancer drug spending to the predominant location of care. About 8 percent of beneficiaries who received chemotherapy in a hospital and who otherwise met the study inclusion criteria were excluded from the analysis due to this requirement. Of the remaining beneficiaries who received chemotherapy in a hospital, more than 97 percent received about 100 percent of their chemotherapy administrations in a single hospital.

23 Specifically, the analysis excluded hospitals that are paid on a cost basis or at a rate that differs from Medicare's OPPS rate (i.e., critical access hospitals, cancer hospitals, Maryland hospitals, Indian Health Service hospitals, rural health clinics, and federally qualified health centers). We also excluded hospitals operating outside the 50 states and the District of Columbia.

24 There were 20 states that had not expanded Medicaid coverage as of 2013 (Commonwealth Fund 2013).

25 For the MSA analysis, only beneficiaries who received at least 75 percent of their chemotherapy administration visits (regardless of setting) in a single MSA were included in the analysis. About 3 percent of beneficiaries who otherwise met the study inclusion criteria were excluded from the analysis due to this requirement. Of the remaining beneficiaries, about 98 percent received about 100 percent their chemotherapy administrations in the MSA to which they were attributed. Beneficiaries who predominantly received chemotherapy in non-MSA rural areas were excluded from the analysis.

26 Across MSAs, the extent to which 340B plays a role in the growth in the number of Medicare cancer patients treated by HOPDs, varies. Between 2009 and 2017, 16 percent of MSAs experienced no growth in the number of Medicare cancer patients treated at HOPDs. For 41 percent of MSAs, 340B hospitals accounted for all of the growth in cancer patients treated by HOPDs; for another 20 percent of MSAs, 340B hospitals accounted for more than half of HOPD growth; and for the remaining 22 percent of MSAs, HOPD growth was mostly or entirely driven by non-340B hospitals. (These percentages do not sum to 100 percent due to rounding.)

27 While we were able to control for the five cancer types we identified based on the Medicare Beneficiary Summary File (MBSF), the data for all cancer patients included a broader set of cancer types. However, given the time and data constraints, our analysis mostly focused on the five cancer types reported in the MBSF.

28 To adjust for differences in patients' income across MSAs, we used the share of individuals who received Part D's low-income subsidy, which includes all individuals who are dually eligible for both Medicare and Medicaid.

29 The estimated effect applies to the average cancer drug spending at the MSA level, after accounting for effects of other variables in the model, including the growth in cancer drug spending between 2009 and 2017. As a result, the 340B effect represents an average effect for all five years included in the model. The coefficient of $300 means that, if all patients in an MSA received their cancer drugs at 340B hospitals, the average cancer drug spending in an MSA would be higher by $300 per patient per month than if all patients in an MSA received their cancer drugs at non-340B hospitals.

30 The estimated effects in terms of percent are sensitive to the specific year and characteristics chosen to calculate average cancer drug spending. We used the midpoint of the study period (2013) to illustrate the effects in percentage terms. The estimated effects would be a larger percentage if average spending for earlier years (i.e., 2009 or 2011) were used, and vice versa.

31 *P*-values for breast cancer and leukemia and lymphoma were both less than 0.10, meaning they would have met the statistical significance test at the 0.10 level. The *p*-value for colorectal cancer was 0.1099.

32 The exception is prostate cancer drugs, where spending for Part B and Part D drugs differed by less than $300 in both 2013 and 2017.

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