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# Private Equity Acquisitions Of Ambulatory Surgical Centers Were Not Associated With Quality, Cost, Or Volume Changes

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**ABSTRACT** Ambulatory surgical centers (ASCs) are increasingly being acquired by private equity firms, yet the implications for patients remain understudied. In this study we employed a quasi-experimental difference-in-differences design within an event study framework to assess changes in outcomes associated with the acquisition of ASCs by private equity entities. Using a two-way fixed effects model, we assessed the baseline probability of an unplanned hospital visit, total costs, and total encounters three years preacquisition compared with three years postacquisition in ASCs acquired by private equity versus those acquired by non-private equity entities. We identified ninety-one ASCs acquired by private equity and fifty-seven ASCs acquired by non-private equity entities during the period 2011–14. There was no statistically significant observed change in the probability of an unplanned hospital visit, total costs, or total encounters after acquisition by private equity relative to acquisition by non-private equity entities. When we compared private equity-acquired ASCs with matched ASCs that were never acquired, we also found no statistically significant relative change in the probability of an unplanned hospital visit, total costs, or total encounters. Regulators should ensure that data on private equity acquisitions are transparent and that data are available to track the long-term quality and financial implications of these acquisitions.

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**A**mbulatory surgical centers (ASCs) have become major sites of surgical care delivery in the US. ASCs are facilities that operate exclusively for the purpose of providing surgical services to patients who do not require an overnight stay.<sup>1</sup> These centers operate independent of hospitals and cannot share space or functions with other health care delivery sites.<sup>2</sup> Although some analyses suggest that the opening of an ASC in a market is associated with greater discretionary surgery use,<sup>3</sup> ASCs have generally been viewed as a source of value in the health care system. This is because ASC procedures are reimbursed at rates 35–50 percent lower than

those for comparable procedures performed at hospital outpatient departments and thus are considered more cost-efficient.<sup>4</sup> The proportion of surgeries occurring at ASCs has substantially accelerated during the past fifteen years: 60 percent of all outpatient surgeries were performed in ASCs in 2020, an increase from 41 percent in 2005.<sup>5</sup> Projections indicate that 68 percent of all orthopedic surgeries will take place at ASCs by the mid-2020s, up from 52 percent in 2018.<sup>4</sup>

As part of a broader trend in the acquisition of health care providers by for-profit financial entities, private equity firms have pursued major acquisitions of ASCs in recent years.<sup>6</sup> Among US ASCs in 2017, 64 percent were physician owned,

24 percent were physician and hospital owned, and 9 percent were fully or partially corporate owned (including by private equity).<sup>7</sup> ASCs are attractive targets for private equity for a number of reasons. First, the major shift toward outpatient surgical procedures occurring at ASCs presents lucrative opportunities for private equity firms to control surgical and procedural market share without directly acquiring a hospital facility.<sup>6</sup> ASCs allow private equity firms to increase market share for procedures that are predominantly performed in the ambulatory setting, such as cataract surgery, gastrointestinal endoscopy, joint arthroscopy, and interventional pain procedures.

Second, because ASCs are most often owned by physician practices, private equity firms can consolidate medical and surgical practices within a market and negotiate with insurers for better reimbursement.<sup>8</sup> Third, private equity firms can streamline administrative and overhead costs across their acquired ASCs and reduce ancillary expenditures, such as surgical implant or supply costs. Selling to private equity may be appealing to physicians because of the high purchase price that private equity firms offer, coupled with the expectation that physicians will have more patient involvement and less administrative burden after a sale.<sup>9,10</sup>

Beyond ASCs, private equity acquisitions are increasing across a range of health care delivery types.<sup>11–18</sup> There is growing concern that private equity's profit-driven strategy may conflict with patient-centered, high-quality care and result in increased spending.<sup>19</sup> For example, private equity firms often restructure acquired health care entities with outside debt, thus increasing the risk for default.<sup>14</sup> To date, studies that have investigated the influence of private equity acquisitions on clinical and process outcomes are limited. Results are generally mixed, tend to differ across health care subsectors, and might not apply to ASCs.<sup>20–23</sup> As the number of procedures performed at ASCs increases and private equity activity within this subsector grows, empirical data are needed to assess whether acquisition of ASCs has been associated with worse patient outcomes and access.

Using national Medicare claims data, we explored three questions. First, what are the characteristics of ASCs acquired by private equity and non-private equity entities? Second, was acquisition by private equity relative to non-private equity entities associated with a higher probability of a seven-day postprocedure unplanned hospital visit? Last, was acquisition by private equity relative to non-private equity entities associated with increases in total costs or volume, as measured by total encounters?

## Study Data And Methods

**DATA** We created a novel data set of ASCs in the US that were acquired during the period 2011–14. Our entire study period spans the years 2009–17, to allow for pre- and postacquisition observations. There are no existing, publicly available databases that provide comprehensive information on ASC acquisitions. To identify acquisitions, we used several sources including quarterly merger and acquisition reports by Irving Levin Associates and Becker's ASC Review (see online appendix exhibit A1).<sup>24</sup> We confirmed acquisitions and located facilities by using company information detailed in annual 10-K forms, made publicly available by the Securities and Exchange Commission. We also reviewed press release statements and online news sources. When a listing of the facilities acquired during a transaction was not available, we used the Web Archive to locate and identify facilities at the time of acquisition. This methodology is consistent with other published studies of private equity acquisitions in health care.<sup>13,20</sup>

In some acquisitions the acquirer received only partial control of the ASC or its parent company. When percentage of ownership was reported, we only included acquisitions where the acquirer owned 50 percent or more of the facility. To verify that the acquirer or its parent company was a private equity firm, we consulted PitchBook and Bloomberg databases, which offer information on company profiles.<sup>25,26</sup> In addition to the above methods, we also included all ASC facilities that reported changing ownership during the period 2011–14 in the Provider of Services files available through the Centers for Medicare and Medicaid Services (CMS). Using the above resources, we assembled a data set of ninety-one ASCs that were acquired by private equity and fifty-seven ASCs that were acquired by non-private equity entities. To compile claims data on the ASCs of interest, we used the CMS Carrier File, which includes fee-for-service claims submitted by professional and organizational providers, including ASCs. Carrier claims from the period 2009–10 were from a 5 percent sample of Medicare beneficiaries, and claims from the period 2011–17 were from a 20 percent sample of Medicare beneficiaries. In total, there were 154,253 encounters that occurred at 148 unique ASCs across the study time frame.

**VARIABLES** Our primary outcome was the probability of a seven-day unplanned hospital visit. We chose this as a primary measure of clinical quality and outcomes, as it is reflected in the Medicare Hospital Outpatient Prospective Payment System and Ambulatory Surgical Center Quality Reporting Program.<sup>27</sup> Given that procedures performed at ASCs are low-risk proce-

# We found no signal of decreased quality of care associated with private equity acquisition of ASCs.

dures, standard measures of inpatient surgical quality such as risk-adjusted thirty-day mortality have limited variability in the context of ASCs. We calculated seven-day unplanned hospital visit data by using the Medicare Inpatient file for 2009–17 and Medicare Outpatient files for the same period. An unplanned hospital visit was defined as any hospital admission or emergency department visit within seven days after a surgical encounter at a given ASC. We also calculated the standardized payments associated with an encounter, which includes the professional and facility fees. These payments (hereafter referred to as total costs) were standardized to adjust for geographic and wage-index variations. We calculated total costs at the encounter level by adding both the facility costs and the physician costs associated with the encounter.

Our final outcome was the volume of patient encounters at an ASC. We chose this as an outcome measure, as it reflects both financial performance of the ASC and access to ambulatory surgical care for patients. In the event that an ASC changes with respect to types of procedures offered, preferred payer types, or marketing of services, we might expect to see corresponding changes in volume.

We included additional variables to control for case-mix variation across ASCs. We grouped procedures into twelve general categories (for example, cataract surgery, colonoscopy, and upper gastrointestinal endoscopy), using the Healthcare Common Procedural Coding System. This approach has been used in prior studies to compare outcomes in procedures performed at hospital outpatient departments and ASCs.<sup>28</sup> We also included control variables for the patient's age, race and ethnicity, and gender/sex. To appropriately adjust for each patient's unique health profile, we used the CMS Hierarchical Condition Categories (HCC) risk score for each patient, which is based on the patient's demographics and comorbidities.<sup>29</sup> To account for differences in health care markets across the country, we used hospital referral region (HRR) data ob-

tained from the Dartmouth Atlas.<sup>30</sup> We used 2010 rural-urban commuting area codes from the Department of Agriculture to account for urban or rural location of ASCs. Rural-urban commuting area scores range from 1 (highly urban) to 10 (highly rural).<sup>31</sup> We labeled ASCs with rural-urban commuting area scores less than 4 as urban.

**STATISTICAL ANALYSIS** First, to assess differences, we ran chi-square tests across categorical baseline variables for the group acquired by private equity and those acquired by non-private equity entities, as well as two-sample *t*-tests on continuous variables. We then conducted a quasi-experimental difference-in-differences design within an event study framework to assess changes in outcomes associated with the acquisition of ASCs. We aligned all ASCs and their outcome data at time 0 (the year of acquisition). Then we constructed a three-year window from the date of acquisition. This window captured data up to three years before acquisition and up to three years after. (ASCs acquired in 2011 contributed two years of data before acquisition, as we only used claims data starting from 2009.) In our primary analysis, we excluded observations at time 0 for ASCs that were acquired, to allow for a washout period.

We compared changes in outcomes among ASCs that were acquired by private equity in the post period with those among ASCs that were acquired by non-private equity entities. We used a two-way fixed-effects model with year fixed effects and ASC fixed effects to model relative changes pre- to postacquisition. We evaluated changes in the probability of an unplanned hospital visit and total costs at the encounter level and controlled for patient age, race and ethnicity, gender/sex, procedure group, and HCC score. We then aggregated encounters to the ASC level; performed a two-way fixed-effects model; and controlled for a set of covariates at the ASC level, including mean age, proportion of encounters by race and ethnicity, proportion of encounters by gender/sex, and mean HCC score. To estimate the full 100 percent volume for Medicare patients, we multiplied by 20 the facility-level observations from the period 2009–10, for which a 5 percent sample of claims was used, and we multiplied by 5 the facility-level observations from the period 2011–17, for which a 20 percent sample was used.

We conducted several sensitivity analyses. First, because of the small sample of ASCs acquired by non-private equity entities, we evaluated relative changes for private equity-acquired ASCs compared with ASCs that were never acquired (referred to as “never-acquired ASCs” in the sensitivity analysis results). We matched

these two groups of ASCs based on surgical specialty to address possible differences in procedure mix and patient population. We allowed up to three control ASCs per private equity-acquired ASC. We performed a two-way fixed-effects model and included HRR fixed effects. Second, we restricted the sample to only encounters that were within the twelve procedure groups. We also tested for differences in pre-acquisition trends between ASCs acquired by private equity and those acquired by non-private equity entities. Finally, we evaluated relative changes in seven-day mortality in the event that measuring the probability of an unplanned hospital visit did not fully capture quality changes. We also removed HCC score as an explanatory variable and evaluated relative changes in HCC score to assess whether private equity-acquired ASCs were selecting fewer sick patients.

**LIMITATIONS** Findings of our study should be interpreted in consideration of the study's limitations. Unplanned hospital visits after procedures at ASCs are generally infrequent and do not capture the range of quality metrics that may be used to compare different ASCs. It is important to note that operational changes in staffing and administration that can occur after an acquisition might not necessarily affect the probability of an unplanned hospital visit. Our study re-

lied on a random sample of Medicare claims data; as a consequence, in certain facility years there were fewer observations than were observed in the full Medicare system, resulting in less power to detect differences. Because we employed an ASC fixed-effects approach in our main analysis, we could not employ a reliability adjustment using Bayesian techniques.<sup>32</sup>

Our results reflect only ninety-one private equity-acquired ASCs within the 2011–14 time frame. We stopped at 2014 to have post data on acquisitions. Although this is not a large sample of ASCs, the results may offer some preliminary evidence as to what we might expect from the most recent acquisitions for which post data are unavailable.<sup>6</sup> Moreover, we found some evidence of differential trends in total costs before acquisition, limiting our ability to draw conclusions on this outcome.

Because our findings only reflect Medicare patients, the probability of an unplanned hospital visit and volume outcomes may be different for other patient populations. In particular, the effects of private equity acquisition on costs may be specific to privately insured patients where private equity firms can bargain with insurers on price. We captured changes in acquisitions of ASCs during the period 2011–14; however, there have been substantial acquisitions in the years since 2014 that will be important to analyze as postacquisition data become available.

Finally, although physician-owners make up the overwhelming majority of ASCs, hospitals and non-private equity entities may also acquire ASCs. Differences in incentives and business strategies across these owner types may affect outcomes differentially.

## Study Results

Private equity entities acquired ASCs in 2011 (34), 2012 (1), 2013 (22), and 2014 (34), and non-private equity entities acquired ASCs in 2011 (21), 2012 (11), 2013 (13), and 2014 (12).

ASC-level characteristics varied significantly across ASCs acquired by private equity and those acquired by non-private equity entities (exhibit 1). Thirty-five percent of private equity-acquired ASCs were located in the South, and 34 percent were located in the Midwest. Forty-four percent of ASCs acquired by non-private equity entities were located in the West, and 28 percent were located in the South (exhibits 1 and 2). Private equity-acquired ASCs were primarily urban, as were ASCs acquired by non-private equity entities (exhibit 1).

The average unadjusted probability of an unplanned hospital visit for private equity-acquired ASCs was 1.33 percent in the pre period

### EXHIBIT 1

**Characteristics of US ambulatory surgical centers (ASCs) acquired by private equity and those acquired by non-private equity entities during the pre period, 2009–14**

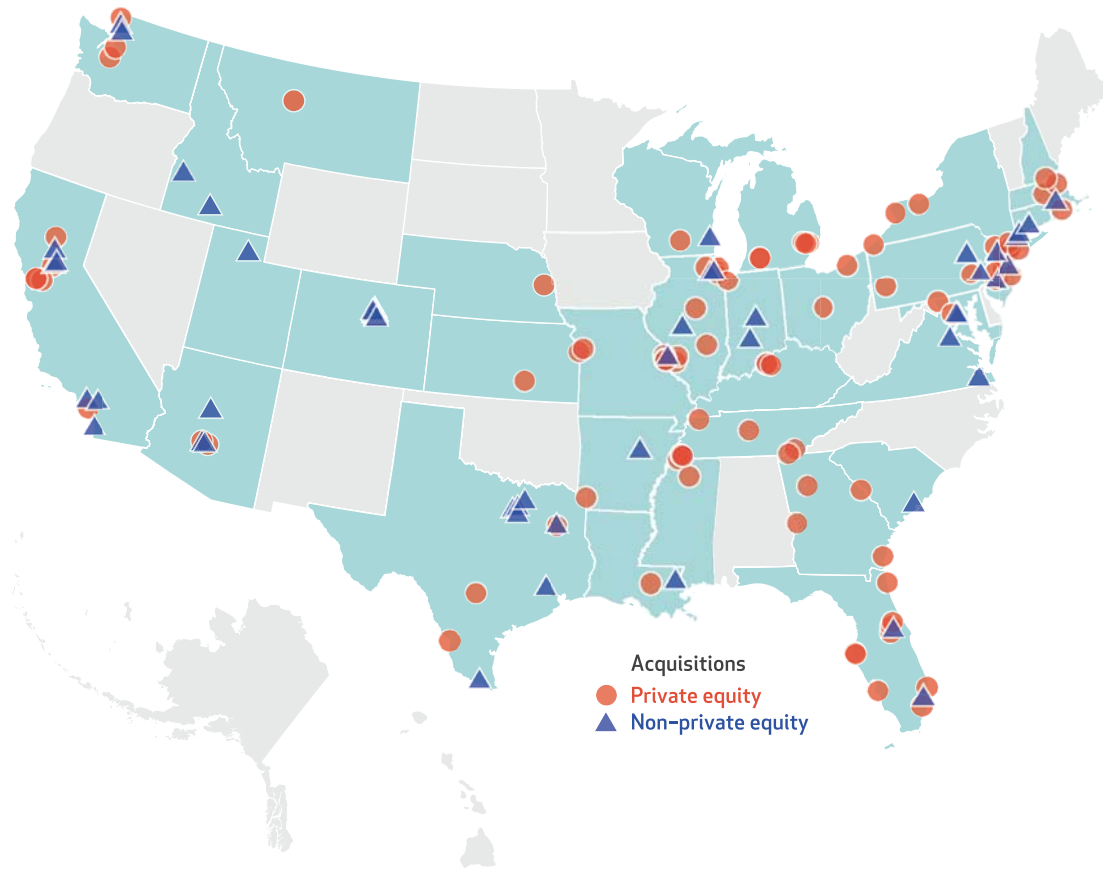
ASC characteristics	Acquired by private equity	Acquired by non-private equity entities
No. of ASCs	91	57
No. of encounters	37,883	17,589
Region (% of facilities) <sup>***</sup>		
Northeast	17.58	14.04
South	35.16	28.07
Midwest	34.07	14.04
West	13.19	43.86
Patient race and ethnicity (% of encounters) <sup>***</sup>		
White	88.71	91.14
Black	6.85	5.13
Other	1.28	1.48
Asian	1.14	1.06
Hispanic	1.39	0.90
Native American	0.22	0.09
Women (% of encounters)	57.97	57.97
Patient HCC risk score <sup>***</sup>	0.79	0.82
Urban (% of facilities) <sup>***</sup>	93.41	94.74

**SOURCE** Authors' analysis of data from the Centers for Medicare and Medicaid Services Carrier File.

**NOTES** We ran chi-square tests across categorical baseline variables for the ASCs acquired by private equity and those acquired by non-private equity entities, as well as two-sample t-tests on continuous variables. "Pre period" refers to the three years before acquisition. HCC is Hierarchical Condition Categories. <sup>\*\*\*</sup> $p < 0.01$

**EXHIBIT 2**

**Locations of 148 ambulatory surgery centers acquired by private equity and those acquired by non-private equity entities, 2011-14**



**SOURCE** Authors' analysis of facility addresses from the Centers for Medicare and Medicaid Services Carrier File. **NOTE** States shaded in gray had no acquisitions.

and 1.32 percent in the post period (exhibit 3). The average adjusted change in probability of an unplanned hospital visit for encounters at ASCs acquired by private equity relative to ASCs acquired by non-private equity entities was 0.09 percentage points ( $p = 0.48$ ). The average

adjusted change in total costs for ASCs acquired by private equity relative to ASCs acquired by non-private equity entities was \$50.25 ( $p = 0.29$ ). The average adjusted change in number of encounters at the ASC level for ASCs acquired by private equity relative to those ac-

**EXHIBIT 3**

**Changes in the probability of an unplanned hospital visit, total costs, and total encounters: ambulatory surgical centers (ASCs) acquired by private equity and those acquired by non-private equity entities, 2009-17**

	Acquired by private equity			Acquired by non-private equity entities			Differential change	
	Pre	Post	Change	Pre	Post	Change	Adjusted	95% CI
Unplanned hospital visits (%)	1.33	1.32	-0.01 <sup>a</sup>	1.29	1.31	0.02 <sup>a</sup>	0.09 <sup>a</sup>	-0.16, 0.33
Total costs (\$)	1,330.66	1,391.11	60.44	1,438.60	1,389.11	-49.50	50.25	-42.30, 142.80
Total encounters	1,155.63	1,167.41	11.78	1,041.68	1,091.19	49.51	-49.09	-238.97, 140.78

**SOURCE** Authors' analysis of data from the Centers for Medicare and Medicaid Services Carrier File. **NOTES** Unadjusted outcomes for pre periods were calculated using annual data 3 years before acquisition; those for post periods were calculated using annual data 3 years after acquisition. Total costs were per encounter. There were 91 ASCs acquired by private equity and 57 ASCs acquired by non-private equity entities. <sup>a</sup>Percentage points.

quired by non-private equity entities was  $-49.09$  ( $p = 0.61$ ).

**SENSITIVITY ANALYSES** Given the heterogeneity of surgical procedures offered at ASCs, as reflected by the specialties of providers (exhibit 4), we conducted the following robustness checks: We matched private equity-acquired ASCs to never-acquired ASCs by surgical specialty practiced at ASCs and included HRR fixed effects. Our results remained generally consistent (appendix exhibit A2).<sup>24</sup> We also restricted the sample to observations that fit within the twelve procedure groups (appendix exhibit A3);<sup>24</sup> our results remained consistent (appendix exhibit A4).<sup>24</sup> In addition, we examined pre trends and found no evidence that trends in the pre period diverged across groups for the probability of an unplanned hospital visit or the number of patient encounters (appendix exhibits A5 and A6).<sup>24</sup> When we looked at pre trends for total costs, we found evidence of a differential change in the pre trend for two of the three years before acquisition. We found no significant relative changes for the probability of seven-day mortality or HCC score (appendix exhibit A7).<sup>24</sup>

## Discussion

In a national analysis of private equity acquisitions of ASCs during the period 2011–14, we found that acquired ASCs were primarily urban and located in the South and Midwest. Overall, there did not appear to be greater relative changes in the probability of an unplanned hospital visit, total costs, or patient encounters associated with private equity acquisitions of ASCs.

Our findings contribute to the growing litera-

ture on the role of private equity ownership of US physician practices and facilities. As the majority of ASCs are for profit and physician owned, acquisition of ASCs by private equity likely coincides with acquisition of surgical practices. Jessica Billig and colleagues found a growing trend in private equity acquisition of surgical practices and ASCs, with a mean price of acquisition of \$143 million.<sup>6</sup> This follows the acceleration of private equity acquisitions across medical specialties in the past decade.<sup>14–16</sup> In addition to increasing private equity acquisition of surgical practices and ASCs, there has been a corresponding trend in the consolidation of surgical practices.<sup>33</sup> The effects of these dual trends should be closely monitored by policy makers to ensure the quality of care and equitable access for patients. A primary contribution to the literature from our findings is directly assessing the effect of private equity acquisitions on the quality of care. Overall, we found no signal of decreased quality of care associated with private equity acquisition of ASCs.

These findings add to the handful of recent studies on hospitals, dermatology practices, and nursing homes that have evaluated private equity's influence but tend to show mixed results in terms of quality measurements.<sup>20–23</sup> It is possible that we did not observe relative changes in quality or volume because the acquiring companies do not meaningfully change the management, workflow, or staffing of ASCs after acquisitions. For example, private equity firms may keep clinical and administrative leaders in place over the short term after an acquisition. As historical financial performance based on clinical reimbursement is a major component of the valuation of physician practices, acquirers of ASCs may be motivated to ensure the continued operating margin of the ASC by retaining current surgeons and clinical staff.<sup>34</sup> It may also take several years for a private equity firm to contract with new physician practices after an acquisition. Although our findings suggest no detriment to the quality of care by private equity firms, continued monitoring of both quality of and access to care at private equity-acquired ASCs is needed.

Given the consistent wave of private equity acquisition of ASCs, our findings have significant implications for policy makers and regulators. First, policy makers should monitor the financial performance of ASCs to ascertain the impact of private equity acquisitions on overall US health care cost growth. It remains unknown how the changing market share of ASCs may influence reimbursement negotiations between payers and private equity-owned health systems or physician practices. After an acquisition, ASCs

### EXHIBIT 4

**Surgical specialties practiced in ambulatory surgical centers (ASCs) acquired by private equity and those acquired by non-private equity entities, 2009–17**

	Acquired by private equity	Acquired by non-private equity entities
All ASCs	91	57
Surgical specialties		
Podiatric	38	28
Neurological	10	5
Obstetric and gynecological	27	16
Ophthalmological	48	27
Oral	15	6
Orthopedic	40	29
Otorhinolaryngological	35	27
Plastic	36	24
General	38	22
Multispecialty	48	36

**SOURCE** Authors' analysis of data from the Medicare Provider of Services Current Files. **NOTE** ASCs can be single specialty or multispecialty.

# Continued monitoring of both quality of and access to care at private equity-acquired ASCs is needed.

may increase prices, which would be consistent with price increases observed after other forms of provider consolidation.<sup>35–37</sup>

Second, although hospitals report cost information to Medicare through the Healthcare Cost Report Information System, reporting to CMS on clinical margin, charge-to-cost ratio, and other metrics of financial performance is not required for ASCs. The Medicare Payment Advisory Commission has recommended reporting of cost information by ASCs to better understand over- or underpayment to them.<sup>1</sup> These data are especially needed in the context of ASCs, as private equity firms may restructure acquired facilities with massive debt, which could financially imperil ASCs over the long term and decrease access to ambulatory surgical care for patients.

Third, greater transparency on private equity acquisition of ASCs is needed for better evalua-

tion and oversight. Although ownership information on Medicare providers is reported on Medicare enrollment applications, the data are often incomplete or inaccurate and do not adequately capture private equity ownership. Policies that enforce full disclosure of all parent companies (including private equity) on these applications should be considered to ensure transparency of ownership in the US health care system and to facilitate evaluation and oversight.

Fourth, the eventual resale of ASCs by private equity firms also needs to be closely monitored. Although the majority of ASCs are physician owned, it is possible that after acquisition by private equity firms, ASCs are in turn sold to hospitals and converted to hospital outpatient departments or otherwise integrated into the overall health system. This may have the potential of increasing market share by health systems, with resulting anticompetitive effects on price and quality.

## Conclusion

ASCs have become major sites of care for outpatient surgical treatment. Large acquisitions in recent years, particularly by private equity firms, raise noteworthy questions as to whether and how these acquisitions affect patients. We found that private equity acquisitions during 2011–14 were not associated with relative changes in the probability of an unplanned hospital visit, total costs, or patient encounters, but monitoring and further research are needed. ■

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