Physician-Ownership Of Ambulatory Surgery Centers Linked To Higher Volume Of Surgeries

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Physician-Ownership Of Ambulatory Surgery Centers Linked To Higher Volume Of Surgeries

**ABSTRACT** Many physicians confronting declining reimbursement from insurers have invested in ambulatory surgery centers, where they perform outpatient surgical and diagnostic procedures. An ownership stake entitles physicians to a share of the facility’s profits from self-referrals. This arrangement can create a potential conflict of interest between physicians’ financial incentives and patients’ clinical needs. Our analysis of Florida data for five common procedures revealed a significant association between physician-ownership and higher surgical volume. Possible remedies include revising federal law to require disclosure of investment arrangements; reducing facility payments to dilute ownership incentives; and reforms (such as accountable care organizations) that discourage an excessive rate of procedures.

The past decade represented an era of expansion for ambulatory surgery centers. Commonly referred to as surgicenters, these are non-hospital-based facilities that exclusively furnish ambulatory surgical services (that is, procedures not requiring hospitalization, such as cataract removals, certain knee and ear surgeries, and colonoscopies). Between 2000 and 2007, the number of Medicare-certified surgicenters increased by nearly 50 percent to 5,349.1 This growth was largely underwritten by the investment of physicians, who had a stake in 83 percent of these facilities and owned 43 percent outright.2

Increasing investment in these centers may reflect an attempt by providers to assert greater control over their professional lives, such as by having greater authority in scheduling surgeries and in purchasing equipment. They may also be enabled to deliver care more efficiently.3 Alternatively, this investment trend may be explained by declining reimbursements for physician services and rising practice costs. These economic pressures have intensified providers’ interest in nontraditional revenue sources, such as surgicenter investment, as a means of generating extra income.4 Regardless of the reason for increasing investment in them, it is important to note that surgicenter ownership creates a potential conflict of interest for physicians. Ownership entitles physicians to collect a share of the facility’s profits from referrals in addition to their professional fees. Insofar as physicians feel pressure to see their investment succeed, physician-owners may lower their thresholds for intervention,5 exposing the health care system to the harms and additional costs associated with unnecessary treatment.

**Prior Studies**

The study of physician investment in surgicenters is hampered by the fact that direct owner-
ship declarations are unavailable on a large scale. Much of the past work has focused on physician-owners’ skimming their most lucrative patients away from full-service hospitals. Jon Gabel and colleagues showed that providers at physician-owned surgicenters tended to route well-insured patients to their own facilities.6 Ariel Winter demonstrated differences in case-mix between surgicenters and hospital outpatient departments and found that patients who were more medically complex tended to receive treatment at the latter.7

Despite these advances, there remains a dearth of studies examining the effect of physicians’ investment in surgicenters on surgery use. Jean Mitchell illustrated that the financial incentives linked to ownership influence the use of orthopedic procedures performed at specialty hospitals.8 However, surgicenters are less complex to develop than specialty hospitals are; they require less capital and are subject to less stringent certificate-of-need regulations.9 Thus, it is unclear whether or not Mitchell’s findings can be extrapolated to physician-owned surgicenters.

To help fill this knowledge gap, we measured the association between surgicenter ownership and surgery use among five common ambulatory procedures. Further, to see whether the establishment of an investment interest altered surgery use, we compared the practice patterns of physician-owners of surgicenters, before and after they acquired ownership, to those of physician-nonowners over the same time period. These analyses will provide information that legislators, employers, and third-party payers can use when they make decisions on ambulatory surgery reimbursement related to the site of care delivery. The analyses also should advance the debate that surrounds current federal regulations permitting physicians’ investment in surgicenters.

**Study Data And Methods**

**Data Source and Subjects**

Using the Healthcare Cost and Utilization Project’s State Ambulatory Surgery Databases, we analyzed data from Florida over the years 2003–2005, which capture 100 percent of ambulatory procedures.10 We chose to use Florida data because they allow for the tracking of individual surgeons, regardless of the site of care delivery.

Using Current Procedural Terminology (CPT) codes (Appendix A of the online supplement),11 we identified all patients who underwent carpal tunnel release, cataract excision, colonoscopy, knee arthroscopy, and myringotomy with tympanostomy tube placement (a treatment for chronic ear infections). We chose these procedures for two reasons. First, advances in surgical technique and anesthesia have improved postoperative care, allowing these procedures to be performed almost entirely on an ambulatory basis.12 Second, given the substantial variation that exists in their use,13–17 they are susceptible to the influences of financial incentives associated with surgicenter ownership.

**Defining ‘Ownership’**

We empirically determined which physicians were owners of surgicenters using an externally validated measure.18 Briefly, ownership is generally limited to those physicians who can both refer patients to and treat patients at the facility in question.19,20 In 1999, the Office of Inspector General, U.S. Department of Health and Human Services, issued four categories of safe harbors under the federal anti-kickback statute applicable to surgicenters. These safe harbors require that owners perform at least one-third of their outpatient cases at the surgicenter in which they are invested.21 Therefore, we considered a physician to be an owner if he or she carried out 30 percent or more of his or her ambulatory surgeries at a given surgicenter in a year.

With the physician-year serving as our unit of analysis, we identified 1,482 owners and 1,716 nonowners performing carpal tunnel release; 2,000 owners and 1,058 nonowners performing cataract excision; 2,815 owners and 3,908 nonowners performing colonoscopy; 1,534 owners and 1,595 nonowners performing knee arthroscopy; and 727 owners and 985 nonowners performing myringotomy with tympanostomy tube placement.

**Statistical Analysis**

For all analyses, our outcome measure was a count of one of the five procedures that a given physician performed over a year, including those carried out at the hospital and the surgicenter. For our primary analysis, we measured the association between a physician’s annual caseload and the physician’s ownership status, using linear mixed models.22 To account for differences in the populations served by physicians, we adjusted our models for patients’ age, sex, race, payer, and socioeconomic status. Given the possibility of health care variation across markets, as well as changes in physician practice that can occur over time, we also made adjustments for the Hospital Referral Region in which a surgeon operated and the year in which a procedure was performed.23 Additional details on model specification are available in Appendix B of the online supplement.11

We recognized the potential for misclassification of some physicians’ ownership status (that is, given our 30 percent threshold, we may have categorized as owners those nonowners who
prefer to use surgicenters, and we may have counted as nonowners some owners who do not actively support their investment by referring patients to their center and thus generating revenue. Therefore, we performed a sensitivity analysis in which we created a distinct nonowner category by redefining owners as those who concentrated 60 percent or more of their outpatient surgeries at a surgicenter, and nonowners as those who performed 20 percent or less at a surgicenter. Despite our removal of the ambiguous middle group, the association between a physician’s ownership status and the physician’s annual caseload persisted. To further evaluate for measurement error, following work by Mitchell, we varied the threshold used to constitute ownership status and repeated our primary analysis.

Finally, to better understand how the acquisition of ownership status affects a surgeon’s practice patterns, we performed a secondary analysis using a multiple time series research design. This approach helps reduce bias by controlling for the independent effects of trends over time, as well as initial differences in practice patterns between owners and nonowners. Prior to 2003, a change in the physician identifier supplied by the data source occurred that did not conform to the documented pattern, and we could not track physicians across years with the most contemporary data. Therefore, we used historical data to identify physicians who acquired ownership in a surgicenter (based on our 30 percent threshold) during 1999. We then used a difference-in-differences test to assess whether the jump in these new owners’ annual caseloads (between 1998 and 2000) exceeded that in a control group (that is, the subset of physicians who were never owners). A more detailed description of these models can be found in Appendix B of the online supplement.

Study Results

Differences in Patient Mix Across procedure types, there were statistically significant differences between owners’ and nonowners’ patients for most of the demographic characteristics examined (as illustrated for carpal tunnel release and cataract excision in Exhibit 1). But the magnitudes of these differences were small, and it is likely that they have little implication for clinical practice. However, owners, on average, did operate on a healthier group of patients than nonowners did. For all surgeries, the proportion of owners’ patients with zero accompanying health conditions was two or more times greater than that for nonowners. The p value for each comparison was less than 0.01; from a statistical standpoint, this means that the likelihood of the tested relationships’ occurring by chance alone is less than 1 percent.

Differences in Annual Caseloads During the study period, the mean annual caseloads for owners, on average, were at least twofold greater than those for nonowners (p < 0.01 for each comparison; again, unlikely to be due to chance). Although nonowners’ annual caseloads remained relatively stable, owners’ caseloads increased during the study period (see Appendix C in the online supplement). Even after differences between patients and health care markets were adjusted for, physicians with ownership in a surgicenter were found to perform more of all five procedures examined, compared with nonowners. For a physician-owner who performed carpal tunnel surgery, cataract surgery, gastrointestinal endoscopy, knee surgery, or ear surgery, this association would translate into an additional 16 carpal tunnel releases, 204 cataract excisions, 366 colonoscopies, 53 knee arthroscopies, or 15 myringotomies annually (p < 0.01 for each procedure, again, unlikely to be due to chance). This association held true regardless of the threshold used to constitute ownership status (see Appendix D of the online supplement).

Changes in Annual Caseloads The multiple time series analysis revealed changes in caseload related to acquiring ownership status in a surgicenter (Exhibit 3). In the pre-ownership period, eventual owners who performed cataract excision, colonoscopy, and knee arthroscopy had annual caseloads that were twice the size of those of their nonowner counterparts. While nonowners who performed carpal tunnel releases,
colonoscopies, and knee arthroscopies experienced significant increases in their annual case-loads between the pre-ownership and ownership time periods, owners’ annual caseload increases were much more striking. The resulting difference-in-differences tests were highly significant ($p = 0.01$, $p < 0.01$, and $p = 0.02$, respectively; again, unlikely to be due to chance). Further, the 50 percent increase in the surgical volume of owners who performed cataract surgery, combined with the slight decline among nonowners, also yielded a highly significant difference-in-differences test ($p < 0.01$, unlikely to be due to chance). These data imply that the use of these four procedures rose much more rapidly among physicians who acquired ownership compared to those who never did.

**Discussion**

Our analysis revealed a significant association between physician-ownership of surgicenters and greater use of five common outpatient procedures. Moreover, our data reveal that the acquisition of ownership status coincided with significant increases in a physician’s use of carpal tunnel release, cataract excision, colonoscopy, and knee arthroscopy. As evident in the health reform legislation passed by the Senate in December 2009, which would eliminate the “whole-hospital exception” to the physician self-referral law (commonly referred to as the Stark law) for future physician-owned specialty hospitals and would place restrictions on current ones,26 most of the policy debate surrounding physicians’ investment has focused on the specialty hospital. However, given that there are at least fifty times more surgicenters nationwide than specialty hospitals, the clinical and economic implications of our findings on surgicenter ownership are considerably more far-reaching.

The association between surgicenter ownership and increased surgery use may be ex-
### EXHIBIT 3

**Results Of Multiple Time Series Analysis, Comparing Annual Caseloads Of Physician-Owners Versus Nonowners Of Surgical Facilities Before And After Their Acquisition Of Ownership Status**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Surgicenter owners</th>
<th>Nonowners</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual caseload</td>
<td></td>
<td>Change in annual caseload</td>
<td>Annual caseload</td>
<td>Change in annual caseload</td>
<td>Difference-in-differences</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-ownership period (A)</td>
<td>Ownership period (B)</td>
<td>(C – B – A)</td>
<td>Pre-ownership period (D)</td>
<td>Ownership period (E)</td>
<td>(F – E – D)</td>
<td>(G – C – F)</td>
<td></td>
</tr>
<tr>
<td>Carpal tunnel release</td>
<td>7</td>
<td>15</td>
<td>+8 (p = 0.02)</td>
<td>7</td>
<td>9</td>
<td>+2 (p &lt; 0.01)</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Cataract excision</td>
<td>131</td>
<td>197</td>
<td>+66 (p &lt; 0.01)</td>
<td>60</td>
<td>56</td>
<td>-4 (p = 0.22)</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Colonoscopy</td>
<td>101</td>
<td>318</td>
<td>+217 (p &lt; 0.01)</td>
<td>53</td>
<td>73</td>
<td>+20 (p &lt; 0.01)</td>
<td>197</td>
<td>197</td>
</tr>
<tr>
<td>Knee arthroscopy</td>
<td>73</td>
<td>96</td>
<td>+23 (p = 0.01)</td>
<td>41</td>
<td>44</td>
<td>+3 (p = 0.04)</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Myringotomy with tube placement</td>
<td>47</td>
<td>45</td>
<td>-2 (p = 0.82)</td>
<td>42</td>
<td>46</td>
<td>+4 (p = 0.15)</td>
<td>-6 (p = 0.52)</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Authors' analysis of Florida data from the State Ambulatory Surgery Databases, Healthcare Cost and Utilization Project.

**Notes:** If the difference-in-differences test is positive, then the rate of change in physicians’ annual caseload increased more (or decreased less) among owners compared to nonowners. The converse is true if the difference-in-differences test is negative. For a p value less than or equal to 0.05, the likelihood of having the observed difference between owners and nonowners occur by chance alone is less than or equal to 5 percent, which suggests that it is real.

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### EXHIBIT 2

**Patient Mix In Florida Physician-Owned Surgical Facilities, By Site Of Care Delivery, For Two Selected Procedures**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Hospital</th>
<th>Surgicenter</th>
<th>Hospital</th>
<th>Surgicenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>235,675</td>
<td>1,067,959</td>
<td>28,359</td>
<td>150,951</td>
</tr>
<tr>
<td>Mean age, years (SD)</td>
<td>60 (14)</td>
<td>62 (13)**</td>
<td>46 (17)</td>
<td>50 (16)**</td>
</tr>
<tr>
<td>Percent female</td>
<td>56%</td>
<td>54%***</td>
<td>48%</td>
<td>49%**</td>
</tr>
<tr>
<td>RACE/ETHNICITY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>77%</td>
<td>82%***</td>
<td>80%</td>
<td>80%***</td>
</tr>
<tr>
<td>Black</td>
<td>9</td>
<td>6</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Hispanic</td>
<td>11</td>
<td>9</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Asian</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>PAYER</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicare</td>
<td>36%</td>
<td>40%***</td>
<td>16%</td>
<td>18%***</td>
</tr>
<tr>
<td>Medicaid</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Private</td>
<td>57</td>
<td>56</td>
<td>64</td>
<td>65</td>
</tr>
<tr>
<td>Self-pay</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>2</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>SOCIOECONOMIC STATUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>32%</td>
<td>30%***</td>
<td>33%</td>
<td>31%***</td>
</tr>
<tr>
<td>Medium</td>
<td>30</td>
<td>35</td>
<td>33</td>
<td>32</td>
</tr>
<tr>
<td>High</td>
<td>38</td>
<td>35</td>
<td>34</td>
<td>37</td>
</tr>
<tr>
<td>NUMBER OF COBORBIDITIES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>8%</td>
<td>53%***</td>
<td>25%</td>
<td>52%***</td>
</tr>
<tr>
<td>1</td>
<td>17</td>
<td>23</td>
<td>25</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>15</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
<td>5</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>24</td>
<td>3</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>5+</td>
<td>10</td>
<td>1</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

**Source:** Authors' analysis of Florida data from the State Ambulatory Surgery Databases, Healthcare Cost and Utilization Project.

**Notes:** T-tests were performed for continuous variables. Chi-square tests were performed for all categorical variables. For a table showing all five procedures, see Appendix F of the online supplement, which can be accessed by clicking the Appendices link in the box to the right of the article online. SD is standard deviation. Statistical significance denotes difference between owners and nonowners. **p ≤ 0.05 ***p ≤ 0.01
explained, in part, by physician specialization. In particular, eventual owners might carry the high caseloads necessary to justify the initial financial outlay of surgicenter investment and, thus, choose to buy into one. Indeed, we found that for three procedures (cataract excision, colonoscopy, and knee arthroscopy) the surgical volumes of eventual owners were greater during the pre-ownership period than those of their nonowner counterparts. However, after accounting for this baseline difference, our multiple time series analysis revealed that the acquisition of ownership status kicked owners’ already high volumes up even higher. This would suggest that what underlies the association between ownership and surgery use is more than just a “high-volume surgeon” phenomenon alone. In other words, it isn’t just that the surgeons who own surgicenters tend to be high-volume ones; it’s that surgeons become high-volume surgeons once they become owners of surgicenters.

Specifically, our results imply that investing in a surgicenter serves as an important driver of surgery use. Along these lines, our work corroborates prior research on ownership in the specialty hospital literature.8 This link may relate to orates prior research on ownership in the specialty hospital literature.8 This link may relate to desire for financial gain, some owners might serve to inform the policy debate surrounding current provisions in the federal law permitting physicians to invest in surgicenters and their close relative, specialty hospitals.26 Further, the findings reveal a need for further studies that examine how ownership status relates to patients’ outcomes and the cost of care.

It is important to realize that the profit motive works similarly among all physicians, and earnings for owners and nonowners are maximized in the same way: by operating more. However, owners derive additional compensation from their facility’s profits. Thus, by virtue of their desire for financial gain, some owners might lower their thresholds for intervention. In addition, we determined ownership based on the proportion of a physician’s cases performed at a surgicenter in a given year. Depending on the cutoff used, we may have misclassified some physicians. However, we addressed possible measurement error in two sensitivity analyses.

First, as noted above, we created a distinct nonowner category. We redefined owners as those who concentrated 60 percent or more of their outpatient surgeries at a surgicenter, and nonowners as those who performed 20 percent or less at a surgicenter. Then we repeated our primary analysis. Second, we varied the share of a physician’s cases in a given year at a surgicenter to constitute ownership and reran our models. Our findings held up under these assumption changes.

CONCLUSIONS AND POLICY IMPLICATIONS Despite these limitations, our study fills an important knowledge gap in the literature on physicians’ investment in surgicenters. Our data quantify the relationship between surgicenter ownership and surgical volume. Moreover, our analysis is the first to suggest increased surgery use subsequent to a physician’s acquisition of ownership status in a surgicenter. Our findings serve to inform the policy debate surrounding current provisions in the federal law permitting physicians to invest in surgicenters and their close relative, specialty hospitals.26 Further, the findings reveal a need for further studies that examine how ownership status relates to patients’ outcomes and the cost of care.

If our observed trends do reflect physician-induced demand, then possible remedies include revising current federal law to require public disclosure of investment arrangements or barring surgicenter ownership by small groups of physicians, for whom incentives are greatest.

Alternatively, the government could intervene through physician reimbursement. As a major stakeholder in outpatient surgical care, Medicare possesses the leverage necessary to affect providers’ behavior.27 The government may consider further reducing facility payments to dilute the incentives of ownership. Ultimately, partial capitation or global payment schemes, or both, implemented in the context of proposed delivery system reforms (such as accountable care organizations) may be needed to discourage the overuse that fee-for-service payment rewards.

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NOTES


11 The Appendices can be accessed by clicking the Appendices link in the box to the right of the article online.


