Use of Unsolicited Patient Observations to Identify Surgeons With Increased Risk for Postoperative Complications

William O. Cooper, Vanderbilt University
Oscar Guillamondegui, Vanderbilt University
O. Joe Hines, University of California Los Angeles
C. Scott Hultman, University of North Carolina
Rachel R. Kelz, University of Pennsylvania
Perry Shen, Wake Forest University
David A. Spain, Stanford University
John F Sweeney, Emory University
Ilene N. Moore, Vanderbilt University
Joseph Hopkins, Stanford University

Only first 10 authors above; see publication for full author list.

Journal Title: JAMA Surgery
Volume: Volume 152, Number 6
Publisher: American Medical Association (AMA) | 2017-06-01, Pages 522-529
Type of Work: Article | Final Publisher PDF
Publisher DOI: 10.1001/jamasurg.2016.5703
Permanent URL: https://pid.emory.edu/ark:/25593/s8mz2

Final published version: http://dx.doi.org/10.1001/jamasurg.2016.5703

Copyright information:
© 2017 American Medical Association. All rights reserved.

Accessed March 18, 2020 4:40 AM EDT
Use of Unsolicited Patient Observations to Identify Surgeons With Increased Risk for Postoperative Complications

William O. Cooper, MD, MPH; Oscar Guillamondegui, MD, MPH; O. Joe Hines, MD; C. Scott Hultman, MD, MBA; Rachel R. Kelz, MD, MSCE; Perry Shen, MD; David A. Spain, MD; John F. Sweeney, MD; Ilene N. Moore, MD, JD; Joseph Hopkins, MD, MMM; Ira R. Horowitz, MD; Russell M. Howerton, RM, MD; J. Wayne Meredith, MD; Nathan O. Spell, MD; Patricia Sullivan, PhD; Henry J. Domenico, MS; James W. Pichert, PhD; Thomas F. Catron, PhD; Lynn E. Webb, PhD; Roger R. Dmochowski, MD; Jan Karrass, MBA, PhD; Gerald B. Hickson, MD

IMPORTANCE Unsolicited patient observations are associated with risk of medical malpractice claims. Because lawsuits may be triggered by an unexpected adverse outcome superimposed on a strained patient-physician relationship, a question remains as to whether behaviors that generate patient dissatisfaction might also contribute to the genesis of adverse outcomes themselves.

OBJECTIVE To examine whether patients of surgeons with a history of higher numbers of unsolicited patient observations are at greater risk for postoperative complications than patients whose surgeons generate fewer such unsolicited patient observations.

DESIGN, SETTING, AND PARTICIPANTS This retrospective cohort study used data from 7 academic medical centers participating in the National Surgical Quality Improvement Program and the Vanderbilt Patient Advocacy Reporting System from January 1, 2011, to December 31, 2013. Patients older than 18 years included in the National Surgical Quality Improvement Program who underwent inpatient or outpatient operations at 1 of the participating sites during the study period were included. Patients were excluded if the attending surgeon had less than 24 months of data in the Vanderbilt Patient Advocacy Reporting System preceding the date of the operation. Data analysis was conducted from June 1, 2015, to October 20, 2016.

EXPOSURES Unsolicited patient observations for the patient’s surgeon in the 24 months preceding the date of the operation.

MAIN OUTCOMES AND MEASURES Postoperative surgical or medical complications as defined by the National Surgical Quality Improvement Program within 30 days of the operation of interest.

RESULTS Among the 32,125 patients in the cohort (13,230 men, 18,895 women; mean [SD] age, 55.8 [15.8] years), 3501 (10.9%) experienced a complication, including 1754 (5.5%) surgical and 2422 (7.5%) medical complications. Prior unsolicited patient observations for a surgeon were significantly associated with the risk of a patient having any complication (odds ratio, 1.0063; 95% CI, 1.0004-1.0123; \( P = .03 \)), any surgical complication (odds ratio, 1.0104; 95% CI, 1.0022-1.0186; \( P = .01 \)), any medical complication (odds ratio, 1.0079; 95% CI, 1.0009-1.0148; \( P = .03 \)), and being readmitted (odds ratio, 1.0088, 95% CI, 1.0024-1.0151; \( P = .007 \)). The adjusted rate of complications was 13.9% higher for patients whose surgeon was in the highest quartile of unsolicited patient observations compared with patients whose surgeon was in the lowest quartile.

CONCLUSIONS AND RELEVANCE Patients whose surgeons have large numbers of unsolicited patient observations in the 24 months prior to the patient’s operation are at increased risk of surgical and medical complications. Efforts to promote patient safety and address risk of malpractice claims should continue to focus on surgeons’ ability to communicate respectfully and effectively with patients and other medical professionals.

Published online February 15, 2017.

© 2017 American Medical Association. All rights reserved.
he distribution of malpractice claims among physicians is not random; a small number of clinicians account for a disproportionate share of total cases of and expenditures associated with malpractice. Studies designed to understand why some physicians are associated with greater numbers of malpractice claims have identified certain surgical specialties, higher clinical activity relative to peers, and unsolicited patient observations as associated with higher risk. Of the factors identified, however, unsolicited patient observations have the strongest association with risk of malpractice claims. This finding is not surprising in that interviews with families who have filed malpractice lawsuits reveal that factors other than money, such as lost trust in the physician and an unmet need for information, are primary drivers behind patients’ and families’ desire to sue a physician after an unexpected adverse outcome.

An intriguing question remains as to whether factors that generate patient dissatisfaction might also contribute to the genesis of adverse outcomes themselves. Previous studies have shown that failure to model respect affects team performance in a variety of clinical settings, including the operating room. A recent analysis of unsolicited patient observations from a single health care organization found that surgeons with higher numbers of unsolicited patient observations were associated with higher risk of complications, particularly in the most complex surgical cases. Collectively, these studies suggest that the surgeons with the highest number of unsolicited patient observations may interact with team members in the operating room and other perioperative care settings in ways that could negatively affect team performance and contribute to risk for complications. We hypothesized that patients of surgeons with higher numbers of unsolicited patient observations would be at greater risk for postoperative complications than patients whose surgeons generated fewer such unsolicited patient observations.

### Methods

**Setting and Data Sources**

We performed a retrospective cohort study to examine the association between a patient’s risk of experiencing a complication and their surgeon’s history of unsolicited patient observations in the 24 months prior to the operation. The study used data from the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) and the Vanderbilt Patient Advocacy Reporting System (PARS), an established patient reporting system used previously to study concerns about professionalism and risk of malpractice claims. Seven academic health care systems that participate in the NSQIP and the PARS program contributed data to the study. The NSQIP files provided an efficient source for identifying the cohort and supplying information about the operations, patient characteristics, and operative characteristics that might be associated with surgical and medical complications. The NSQIP uses a systematic sampling process to identify cases that is designed to avoid bias in case selection and to ensure a diverse mix of surgical cases. Surgical clinical reviewers at each site, who are trained and undergo regular audits and quality checks, collect data on more than 150 variables using standardized NSQIP definitions, including preoperative risk, intraoperative variables, and 30-day postoperative morbidity and mortality outcomes. After data are uploaded to a central NSQIP site, quality audits are performed to ensure data integrity. One site began contributing data to the NSQIP after 2011; we used data for that site from the first date that the site contributed data to the NSQIP through the end of the study period. The other 6 sites contributed data throughout the study period. The study was reviewed by the institutional review boards at each study site, including Vanderbilt University Medical Center; University of California, Los Angeles Medical Center; University of North Carolina; University of Pennsylvania Health System; Wake Forest University; Emory University School of Medicine; and Stanford University. The study qualified as nonhuman participant research pursuant to CFR 46.102(f)(2) because the deidentified information on individuals in the cohort would not readily be ascertainable by the investigators.

The PARS program includes a reliable system to process and code unsolicited observations from patients and families, which allows identification and intervention with physicians at high risk for malpractice claims. Data from the PARS program for the study encompassed all previously coded observations from patients and their families attributed to any cohort member’s attending surgeon, as recorded by the medical center’s patient relations staff. Some unsolicited patient observations described behaviors that might intimidate or deter communication:

“Dr X rushed us through the appointment so quickly; she didn’t even explain why she was recommending this procedure over other treatment approaches.”

Other unsolicited patient observations included patients’ observations of a physician’s disrespectful or rude interaction with other health care team members that might distract focus:
“I witnessed a tense exchange between Dr Z and a nurse. It was difficult to watch someone try to humiliate another person like that. I was embarrassed and it made me feel vulnerable.”

All unsolicited patient observations were uploaded securely to the PARS program database within the Vanderbilt Center for Patient and Professional Advocacy (CPPA).2,4,20,24,25,28,29 Individuals trained by the Vanderbilt CPPA in PARS coding reviewed unsolicited patient observations and assigned unique observations to general categories19,20 involving care and treatment, unsolicited patient observations and assigned unique observations, that could not be linked to an individual.

To protect physician confidentiality, an independent computer analyst who did not participate in conducting the study’s analyses used a probabilistic linkage algorithm to link the NSQIP record to each surgeon’s PARS data. Once data files were linked, all identifiers for surgeons were removed and a unique number for the site and number for the surgeon were created that could not be linked to an individual.

Cohort and Follow-up
The study cohort included patients in the NSQIP database who underwent inpatient or outpatient operations between January 1, 2011, and December 31, 2013, at 1 of the participating sites. Patients were excluded if they were younger than 18 years on the date of the operation or if the attending surgeon had less than 24 months of PARS data preceding the date of the operation. Follow-up for each patient began on the date of the operation, defined as t₀, and continued through the subsequent 30 days or death (Figure 1).31

Outcomes
The primary outcome was any postoperative complication, as defined by the NSQIP, occurring within 30 days of the operation of interest.22 Surgical site infections and wound disruptions were considered surgical complications. Pulmonary conditions (pneumonia, reintubation, or mechanical ventilation), renal conditions (renal insufficiency or acute renal failure), stroke, cardiovascular conditions (cardiac arrest or acute myo-cardial infarction), thromboembolic conditions (pulmonary embolism or deep venous thrombosis), and infectious conditions (sepsis, septic shock, or urinary tract infections) were considered medical complications.31 Conditions included in the group of possible surgical or medical complications that were present at the time of the operative procedure were excluded.22 Secondary outcomes included reoperations, readmissions, and 30-day mortality.

Statistical Analysis
Statistical analysis was conducted from June 1, 2015, to October 20, 2016. Multivariable logistic regression was used to create separate models of the association between the surgeon’s total unsolicited patient observations in the 24 months preceding the date of the operation and the patient’s risk for any complication, any surgical complication, and any medical complication. Regression models using the patient as the unit of analysis included variables thought to be the most important potential confounders. Models included total unsolicited patient observations, patient factors (age, sex, race/ethnicity, body mass index, functional status, American Society of Anesthesiologists class, ventilator dependence, chronic obstructive pulmonary disease, congestive heart failure, diabetes, renal failure, and disseminated cancer),22 operative characteristics (surgical specialty, number of cases contributed to the study cohort by the surgeon [as a surrogate for surgical volume], case urgency, wound classification [ie, clean vs contaminated], operative time >75th percentile for each Current Procedural Terminology code), and deidentified study site. We also analyzed the risk of complications by quartile of unsolicited patient observations (quartile 1, 0-4 observations; quartile 2, 5-9 observations; quartile 3, 10-13 observations; and quartile 4, 14-60 observations) and calculated the adjusted incidence of complications for each quartile by multiplying the unadjusted incidence rate by the rate ratio obtained from logistic regression models.32 We performed power calculations a priori and anticipated that, with 80% power, we would have the ability to detect an increase in complications of 1.7% between patients whose surgeons had lower numbers of unsolicited patient observations relative to patients whose surgeons had higher numbers of unsolicited patient observations.

We used R statistical software, version 3.2.3 (R Foundation for Statistical Computing) to perform all analyses. For all comparisons, α = .05 denoted a statistically significant difference.

Results
The cohort included 32,125 patients who underwent an operation performed by 1 of 817 surgeons during the study period. Patients in the cohort underwent 17,255 general surgical, 4,583 orthopedic, 2,288 vascular, 2,139 gynecologic, 1,810 plastic surgery, 1,272 neurosurgical, 1,118 otolaryngologic, 1,046 urologic, 606 cardiothoracic, and 8 other specialty (not specified by the NSQIP) operations. In the 24 months preceding the date of the operations, surgeons of cohort patients received a mean of 10.6 unsolicited patient observations (range, 0–60) (Table 1).
Across quartiles of unsolicited patient observations, patients were comparable in terms of age, race/ethnicity, functional status, and ventilator dependence at the time of the procedure (Table 1). Patients whose surgeons were in the highest quartiles of unsolicited patient observations were more likely to have histories of chronic obstructive pulmonary disease, congestive heart failure, preoperative renal failure, disseminated cancer at time of operation, and emergency cases. They also had a higher rate of preoperative infections, transfusions, and ASA classifications of severe or life-threatening illness. The table shows the characteristics of the cohort across quartiles of the operating surgeon's unsolicited patient observations in the 24 months preceding the operation.
Among the patients in the cohort, 3501 (10.9%) experienced any complication, including 1754 (5.5%) surgical and 2422 (7.5%) medical complications (Table 2). Within 30 days, 1326 patients (4.1%) had to return to the operating room, 2436 (7.6%) were readmitted, and 427 (1.3%) died. Patients whose surgeons were named in more unsolicited patient observations were more likely to have congestive heart failure (41 [0.5%] vs 45 [0.7%]) or disseminated cancer (325 [4.0%] vs 338 [5.2%]). Patients whose surgeons were associated with higher numbers of complication of any type (948 of 8104 [11.7%]) than patients whose surgeons generated fewer unsolicited patient observations (622 of 6501 [9.6%]) (P = .007). Table 2. Complications Across Quartiles of the Operating Surgeon’s Unsolicited Patient Observations in the 24 Months Preceding the Operation

<table>
<thead>
<tr>
<th>Outcome</th>
<th>All (N = 32 125)</th>
<th>Quartile 1 (n = 6501)</th>
<th>Quartile 2 (n = 9535)</th>
<th>Quartile 3 (n = 7985)</th>
<th>Quartile 4 (n = 8104)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any complications</td>
<td>3501 (10.9)</td>
<td>622 (9.6)</td>
<td>992 (10.4)</td>
<td>939 (11.8)</td>
<td>948 (11.7)</td>
<td>.007</td>
</tr>
<tr>
<td>Surgical complications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any surgical complication</td>
<td>1754 (5.5)</td>
<td>305 (4.7)</td>
<td>489 (5.1)</td>
<td>497 (6.2)</td>
<td>463 (5.7)</td>
<td>.01</td>
</tr>
<tr>
<td>Surgical site infection</td>
<td>1640 (5.1)</td>
<td>279 (4.3)</td>
<td>458 (4.8)</td>
<td>461 (5.8)</td>
<td>442 (5.5)</td>
<td>.001</td>
</tr>
<tr>
<td>Wound disruption</td>
<td>200 (0.6)</td>
<td>39 (0.6)</td>
<td>56 (0.6)</td>
<td>60 (0.8)</td>
<td>45 (0.6)</td>
<td>.79</td>
</tr>
<tr>
<td>Medical complications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any medical complication</td>
<td>2422 (7.5)</td>
<td>410 (6.3)</td>
<td>687 (7.2)</td>
<td>633 (7.9)</td>
<td>692 (8.5)</td>
<td>.006</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>922 (2.9)</td>
<td>143 (2.2)</td>
<td>276 (2.9)</td>
<td>250 (3.1)</td>
<td>253 (3.1)</td>
<td>.25</td>
</tr>
<tr>
<td>Renal</td>
<td>300 (0.9)</td>
<td>38 (0.6)</td>
<td>94 (1.0)</td>
<td>76 (1.0)</td>
<td>92 (1.1)</td>
<td>.38</td>
</tr>
<tr>
<td>Central nervous system</td>
<td>77 (0.2)</td>
<td>19 (0.3)</td>
<td>23 (0.2)</td>
<td>23 (0.3)</td>
<td>12 (0.1)</td>
<td>.88</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>237 (0.7)</td>
<td>38 (0.6)</td>
<td>72 (0.8)</td>
<td>61 (0.8)</td>
<td>66 (0.8)</td>
<td>.88</td>
</tr>
<tr>
<td>Thromboembolic</td>
<td>363 (1.1)</td>
<td>52 (0.8)</td>
<td>119 (1.2)</td>
<td>96 (1.2)</td>
<td>96 (1.2)</td>
<td>.92</td>
</tr>
<tr>
<td>Infectious sepsis</td>
<td>1017 (3.2)</td>
<td>156 (2.4)</td>
<td>282 (3.0)</td>
<td>264 (3.3)</td>
<td>315 (3.9)</td>
<td>.003</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>518 (1.6)</td>
<td>94 (1.4)</td>
<td>147 (1.5)</td>
<td>135 (1.7)</td>
<td>142 (1.8)</td>
<td>.003</td>
</tr>
<tr>
<td>Other complications within 30 d</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>427 (1.3)</td>
<td>62 (1.0)</td>
<td>127 (1.3)</td>
<td>116 (1.5)</td>
<td>122 (1.5)</td>
<td>.10</td>
</tr>
<tr>
<td>Reoperation</td>
<td>1326 (4.1)</td>
<td>250 (3.8)</td>
<td>365 (3.8)</td>
<td>333 (4.2)</td>
<td>378 (4.7)</td>
<td>.28</td>
</tr>
<tr>
<td>Readmission</td>
<td>2436 (7.6)</td>
<td>474 (7.3)</td>
<td>681 (7.1)</td>
<td>641 (8.0)</td>
<td>640 (7.9)</td>
<td>.69</td>
</tr>
</tbody>
</table>

*Quartile 1, 0-4 observations; quartile 2, 5-9 observations; quartile 3, 10-13 observations; and quartile 4, 14-60 observations.

In multivariable analyses controlling for patient, surgeon, and operative characteristics, a surgeon’s prior unsolicited patient observations were significantly associated with the risk of a patient having any complication (odds ratio, 1.0063; 95% CI, 1.0004-1.0123; P = .03), any surgical complication (odds ratio, 1.0104; 95% CI, 1.0022-1.0186; P = .01), and any medical complication (odds ratio, 1.0079; 95% CI, 1.0009-1.0148; P = .03), and readmission (odds ratio, 1.0088, 95% CI, 1.0024-1.0151; P = .007) (Figure 2). Each unsolicited patient observation with which the surgeon was associated in the 24 months preceding the operation significantly increased the risk for surgical and medical complications in the statistical models. There was no statistically significant association between a surgeon’s prior unsolicited patient observations and reoperation, readmission, or patient death within 30 days in multivariable models.

The adjusted complication rate was 13.9% higher for patients whose surgeon was in the highest quartile compared with patients whose surgeon was in the lowest quartile (Figure 3). If surgeons in the highest 3 quartiles had performed at the level of those in the first quartile, the cohort would have experienced 426 fewer complications.

Discussion

Patients whose surgeons were associated with higher numbers of unsolicited patient observations in the 24 months prior to their operation experienced more surgical and medical

quartile (n = 8104; 14-60 observations) were more likely than those whose surgeons were in the lowest quartile (n = 6501; 0-4 observations) to have type 1 or 2 diabetes (1369 [16.9%] vs 936 [14.4%]), dyspepsia (1027 [12.7%] vs 418 [6.4%]), chronic obstructive pulmonary disease (447 [5.5%] vs 242 [3.7%]), and renal failure (30 [0.4%] vs 18 [0.3%]) but less likely to have congestive heart failure (41 [0.5%] vs 45 [0.7%]) or disseminated cancer (325 [4.0%] vs 338 [5.2%]). Patients whose surgeons were in the highest quartile were more likely than those whose surgeons were in the lowest quartile to be classified with higher preoperative American Society of Anesthesiologists risk (severe, life-threatening, or moribund: 5127 [63.3%] vs 3535 [54.4%]), but their cases were less likely to be emergency cases (423 [5.2%] vs 411 [6.3%]), and their surgical wounds were more likely to be classified by the NSQIP as clean (4566 [56.3%] vs 3320 [51.1%]) vs contaminated (434 [5.4%] vs 335 [5.2%]).
Identifying Surgeons With Increased Risk for Postoperative Complications

Complications than did patients receiving care from surgeons with fewer unsolicited patient observations. The differences remained when controlling for a variety of patient, operative, and surgeon factors. The study cohort included 32,125 patients at 7 geographically diverse sites across the United States. If extrapolated to the entire United States, where 27,000,000 surgical procedures are performed annually,33 failures to model respect, communicate effectively, and be available to patients could contribute to more than 350,000 additional complications and more than $3 billion in additional costs to the US health care system each year.34

Our study follows a previous single NSQIP site study of surgical outcomes and unsolicited patient observations, which found that patients of surgeons with high numbers of unsolicited patient observations had a greater risk of complications in more complex surgical cases than did patients of their colleagues with low numbers of unsolicited patient observations.35 Our study assessed risk for individual patients and controlled for several factors associated with the patient, the operation, and the surgeon. A surgeon's unsolicited patient observations were limited to those from the 24 months prior to the operation to avoid the bias that might be introduced by including observations from patients in the cohort who experienced complications associated with the operation included in the NSQIP data.30 Our study was adequately powered to detect clinically relevant differences in outcomes and included a geographically diverse population, increasing the generalizability of the findings.

Patients and families are uniquely positioned to observe physicians’ behavior and performance. Although anesthetized patients cannot observe what happens in the operating arena or outside their hospital room, analysis of their collective stories offers insight into how physicians may also interact with other medical professionals.4,6,24 Disrespect and rudeness toward other professionals affect willingness to share information and seek help and, in turn, may affect both procedural and diagnostic performance.35–38 Concerns about a surgeon who previously lashed out at an anesthesiologist during an intraoperative emergency may distract the anesthesiologist from recognizing a change in the patient’s status or inhibit him or her from speaking up about a change in status if he or she fears the surgeon’s response.39,40 If a nurse notes a break in the sterile field or violation of safety protocols, such as surgical time-outs (a process performed immediately before the operation in which the team stops and verbally renews the commitment to a safe operation), operative characteristics (surgeon specialty, number of cases contributed to the study cohort by the surgeon, case urgency, wound classification, long operative time [calculated as operative time >75th percentile for each Current Procedural Terminology code]), and deidentified study site. Horizontal lines indicate 95% CIs.

Adjusted for total unsolicited patient observations, patient factors (age, sex, race/ethnicity as recorded in the site’s medical record, body mass index, functional status, American Society of Anesthesiologists class, ventilator dependence, history of severe chronic obstructive pulmonary disease, history of severe congestive heart failure, diabetes prior to the procedure, hypertension requiring medication in the prior 30 days, preoperative renal failure, or disseminated cancer at the time of the operation), operative characteristics (surgeon specialty, number of cases contributed to the study cohort by the surgeon, case urgency, wound classification, long operative time [calculated as operative time >75th percentile for each Current Procedural Terminology code]), and deidentified study site. Vertical lines indicate 95% CIs. Dashed horizontal line indicates the complication rate for the lowest quartile of unsolicited patient observations (9.6%).

Figure 2. Adjusted Odds Ratios for Surgical Complications

Figure 3. Adjusted Complication Rate by Quartiles of the Operating Surgeon’s Unsolicited Patient Observations in the 24 Months Preceding the Operation

Adjusted for total unsolicited patient observations, patient factors (age, sex, race/ethnicity as recorded in the site’s medical record, body mass index, functional status, American Society of Anesthesiologists class, ventilator dependence, history of severe chronic obstructive pulmonary disease, history of severe congestive heart failure, diabetes prior to the procedure, hypertension requiring medication in the prior 30 days, preoperative renal failure, or disseminated cancer at the time of the operation), operative characteristics (surgeon specialty, number of cases contributed to the study cohort by the surgeon, case urgency, wound classification, long operative time [calculated as operative time >75th percentile for each Current Procedural Terminology code]), and deidentified study site. Horizontal lines indicate 95% CIs. Dashed horizontal line indicates the complication rate for the lowest quartile of unsolicited patient observations (9.6%).

Adjusted for total unsolicited patient observations, patient factors (age, sex, race/ethnicity as recorded in the site’s medical record, body mass index, functional status, American Society of Anesthesiologists class, ventilator dependence, history of severe chronic obstructive pulmonary disease, history of severe congestive heart failure, diabetes prior to the procedure, hypertension requiring medication in the prior 30 days, preoperative renal failure, or disseminated cancer at the time of the operation), operative characteristics (surgeon specialty, number of cases contributed to the study cohort by the surgeon, case urgency, wound classification, long operative time [calculated as operative time >75th percentile for each Current Procedural Terminology code]), and deidentified study site. Vertical lines indicate 95% CIs. Dashed horizontal line indicates the complication rate for the lowest quartile of unsolicited patient observations (9.6%).

Adjusted for total unsolicited patient observations, patient factors (age, sex, race/ethnicity as recorded in the site’s medical record, body mass index, functional status, American Society of Anesthesiologists class, ventilator dependence, history of severe chronic obstructive pulmonary disease, history of severe congestive heart failure, diabetes prior to the procedure, hypertension requiring medication in the prior 30 days, preoperative renal failure, or disseminated cancer at the time of the operation), operative characteristics (surgeon specialty, number of cases contributed to the study cohort by the surgeon, case urgency, wound classification, long operative time [calculated as operative time >75th percentile for each Current Procedural Terminology code]), and deidentified study site. Vertical lines indicate 95% CIs. Dashed horizontal line indicates the complication rate for the lowest quartile of unsolicited patient observations (9.6%).
alter the work environment, contributing to enhanced team performance and reducing the likelihood of complications. Other future lines of inquiry might focus on the analysis of different types of unsolicited patient observations.

Limitations

This study has several limitations. The NSQIP uses a systematic sampling algorithm designed to avoid bias in case selection to select each participating site’s cases, so it is possible that the cases included for an individual surgeon may not reflect his or her overall experience. It is possible that some patients in the cohort had incomplete follow-up in the 30-day postoperative period, but data quality checks performed by the NSQIP are designed to reduce incomplete data, and we do not anticipate that loss to follow-up would be differentially distributed among our exposure categories. We did have complete follow-up data for all surgeons included in the study. To account for possible changes in the complexity of cases sampled by the NSQIP over time, we created an individualized 2-year time window to sample a surgeon’s unsolicited patient observations for each case. Environment and systems issues beyond a surgeon’s immediate control (eg, lost laboratory results) may lead to unsolicited patient observations. However, we included surgeons from the same institutions who presumably practice in the same environments and do not generate as many unsolicited patient observations. We also included sites in our multivariable models to account for other unmeasured factors by site (eg, types of cases sampled, variation in capture of unsolicited patient observations). Patient and operative characteristics differed across the quartiles, but patients in the higher quartiles did not consistently have a higher likelihood of having characteristics associated with risk for surgical complications. It is also possible that unmeasured factors contributed to the associations between unsolicited patient observations and complications. For example, surgeons who are more aggressive and who might offer surgery inappropriately or operate on higher-risk patients might also generate more unsolicited patient observations. However, the analysis included several variables thought to be the most important potential confounders. Another limitation arises from the fact that the study was performed at 7 large academic medical centers. Thus, the generalizability of the results to other settings, including nonteaching hospitals, is potentially limited. Nonetheless, previous work assessing the association of the risk of malpractice claims and large numbers of unsolicited patient observations found strikingly similar results between academic and community hospital settings from all regions of the country.

Conclusions

A surgeon’s pattern of generating a large number of unsolicited patient observations in the 24 months prior to a patient’s operation was associated with an increased risk of surgical and medical complications, even when controlling for patient, surgeon, and operative factors. Efforts to promote patient safety and address the risk of malpractice claims should continue to focus on surgeons’ ability to communicate respectfully and effectively with patients and other medical professionals.

ARTICLE INFORMATION

Accepted for Publication: December 4, 2016.
Published Online: February 15, 2017.
doi:10.1001/jamasurg.2016.5703

Author Affiliations:

Center for Patient and Professional Advocacy, Vanderbilt University Medical Center, Nashville, Tennessee (Cooper, Moore, Pichert, Catron, Webb, Dmochowski, Karrass, Hickson); Section of Surgical Sciences, Vanderbilt University Medical Center, Nashville, Tennessee (Guillamondegui, Dmochowski); Division of General Surgery, University of California, Los Angeles Medical Center (Hines); Department of Surgery, University of North Carolina, Chapel Hill (Hultman); Department of Surgery, Perelman School of Medicine, University of Pennsylvania, Philadelphia (Kellz); Department of Surgery, Wake Forest University, Winston-Salem, North Carolina (Shen, Howerton, Meredith); Department of Surgery, Stanford University, Stanford, California (Spain); Department of Internal Medicine, Emory University School of Medicine, Atlanta, Georgia (Sweeney, Horowitz, Spell); Department of Medicine, Stanford University, Stanford, California (Hopkins); Department of Quality and Patient Safety, University of Pennsylvania Health System, Philadelphia (Sullivan); Department of Biostatistics, Vanderbilt University Medical Center, Nashville, Tennessee (Domenico); Center for Quality, Safety and Risk Prevention, Vanderbilt University Medical Center, Nashville, Tennessee (Hickson).

Author Contributions: Dr Cooper and Mr Domenico had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Cooper, Guillamondegui, Hines, Hultman, Kellz, Spain, Sweeney, Moore, Hopkins, Howerton, Meredith, Spell, Sullivan, Catron, Dmochowski, Karrass, Hickson.

Acquisition, analysis, or interpretation of data: Cooper, Hines, Hultman, Kellz, Shen, Spain, Horowitz, Meredith, Domenico, Pichert, Webb, Dmochowski, Karrass.

Drafting of the manuscript: Cooper, Guillamondegui, Hultman, Moore, Hopkins, Horowitz, Sullivan, Domenico, Hickson.

Critical revision of the manuscript for important intellectual content: Cooper, Guillamondegui, Hines, Hultman, Kellz, Shen, Spain, Sweeney, Moore, Howerton, Meredith, Spell, Sullivan, Domenico, Pichert, Catron, Webb, Dmochowski, Karrass, Hickson.

Statistical analysis: Cooper, Domenico, Karrass.

Administrative, technical, or material support: Cooper, Hines, Hultman, Kellz, Sweeney, Webb, Karrass, Hickson.

Study supervision: Cooper, Hultman, Spain, Sweeney, Howerton, Catron, Dmochowski.

Conflict of Interest Disclosures: None reported.

Funding/Support: This study presents independent research that was funded through the Vanderbilt Center for Patient and Professional Advocacy.

Role of the Funder/Sponsor: The funding source had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Additional Contributions: The National Surgical Quality Improvement Program (NSQIP) Teams at Emory University, Stanford University, University of California, Los Angeles; University of North Carolina; Hospital of the University of Pennsylvania; Vanderbilt University Medical Center; and Wake Forest University identified and sampled cases, abstracted data, performed quality controls, and uploaded data to the NSQIP database. Members of the NSQIP Teams were not compensated specifically for this study; rather, they were employees of the individual health care organizations and performed these duties as a part of their employment. Judith A. Dudley, BS, Vanderbilt University Medical Center, combined the data sets and created the analysis files for the study. Barbara Martin, MBA, RN, Vanderbilt University Medical Center, Judy Lewis, RN, MSN, ANP, Emory University School of Medicine, Amy Newell, RN, BSN, Emory University School of Medicine, and Sebastian Perez, MSPH, Emory University School of Medicine, provided information about the operation of the NSQIP at the local level. Shannon Stratton, BS, Vanderbilt University Medical Center, served as the study coordinator and supported institutional review board review, protocol development, study.
Identifying Surgeons With Increased Risk for Postoperative Complications

Original Investigation Research


