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The Opioid Crisis and Surgeons: National Survey of Prescribing Patterns and the Influence of Motivators, Experience, and Gender



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ABSTRACT

Background: Surgeons are the fifth largest prescribers of opioids in the US. Few studies exist to describe surgeon prescribing practices.

Methods: A survey was conducted of surgical providers at all ACGME-accredited surgical residency programs. Statistical comparisons between groups were made.

Results: A total of 114 providers from 21 states responded; 58% male, 57% residents. Only 8% reported being told they were over-prescribing opioids.

Oxycodone ± acetaminophen was most commonly prescribed (49%). Median opioids prescribed exceeded guidelines for acute pain management for every procedure except laparoscopic appendectomy/cholecystectomy, lumpectomy and laparoscopic inguinal hernia repair. Attending surgeons more often gave no opioids after laparoscopic appendectomy/cholecystectomy (9% vs 0%; $p=0.012$), more likely reported patient attempts to return opioids to them (33% vs 16%; $p=0.04$), and less likely considered patients giving their opioids to someone else (39% vs. 74%; $p<0.001$). PGY 1-2 residents prescribe fewer opioids than advanced residents for simple mastectomy ($p=0.04$), exploratory laparotomy ($p=0.05$), and thoracotomy ($p=0.03$).

Conclusions: Surgeons vary significantly in their opioid prescriptions, even for the same operation. There are few differences by gender but some important differences by experience.

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Introduction

Opioid overdose-related deaths and emergency department utilization for opioid-related visits have greatly increased over the last several years. This has led to heightened awareness and a call to action by leaders in medicine and government.^{1–6} Surgeons are the fifth largest provider of narcotic analgesics in the United States, accounting for nearly 30 million narcotic medications in a single year.⁷ Additionally, nearly one-fifth of patients who receive a first opioid prescription after a procedure progress to episodic use with over 5% progressing to chronic opioid dependence.⁸ The Centers for Disease Control (CDC) has determined that 20% of opioid abusers report receiving their narcotics from a physician while nearly half receive them from a friend or family member.⁹ Despite new recommendations for postoperative prescribing of narcotic

medications,¹⁰ attempts to reformulate narcotics, and increased pharmacy distribution monitoring, opioid abuse and overdose remains a significant public health issue.

While improving in the recent years, there is a relative paucity of literature on prescribing practices and motivations behind opioid prescribing among surgeons. Therefore, we sought to determine opioid prescribing practices and rationale among surgical providers to identify potential areas for improvement. We hypothesized there would be significant variability among surgeons in opioid prescriptions and that the number of opioids prescribed would be associated with experience level and personal experience with surgery.

Material and methods

Survey creation

After Institutional Review Board (IRB) approval, an anonymous

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online survey was conducted of surgical attendings, residents, and advanced practice providers (APPs) at all health care institutions with an Accreditation Council for Graduate Medical Education (ACGME)-accredited surgical residency program as of the 2016–2017 academic year. Using the online survey website, surveymonkey.com, a 21-question survey was created (supplement 1) to determine prescribing patterns of surgical providers. Detailed survey questions are found at <https://www.surveymonkey.com/r/ZXLSPQ5>. Each survey from a specific IP address was only allowed to be taken once to avoid duplication but IP address was not recorded as part of the data.

Survey distribution

Emails containing the hyperlink to the survey were sent to the primary contact for each ACGME surgical program (either program coordinator or program director) with the request to distribute to all surgical providers, including APPs. Attending surgeons, preliminary or categorical residents, fellows and APP providers in any of the following specialties were invited to participate: general surgery, surgical oncology, pediatric surgery, minimally invasive surgery, bariatric surgery, cardiac and thoracic surgery, plastic surgery, colon and rectal surgery, vascular surgery, trauma surgery and burn surgery. The following surgical specialties were excluded from invitation to the survey: neurosurgery, orthopedic surgery, otolaryngology, obstetrics and gynecology, ophthalmology, and urology as we wished to focus the study on general surgery providers.

Statistics

Data were available for download from the survey website. Descriptive statistics were utilized for demographic and geographic information as well as motivations behind prescribing practices for survey responders. Comparisons between groups were made using chi-square or Kruskal-Wallis as appropriate. Statistical analysis was performed using SAS version 9.4 (SAS Institute Inc, Cary, NC). Statistical significance was defined as $p \leq 0.05$.

Results

Demographics

A total of 269 ACGME-accredited surgery residency contacts were emailed. Although residency program information was not collected to maintain anonymity, 21 different states were represented among the respondents. A total of 114 providers responded; 58% were male and 57% were residents. The total number of providers at these institutions is unknown, so the response rate cannot be calculated. Table 1 displays the demographic details of survey respondents. Fig. 1 demonstrates the geographic distribution of respondents. Among non-resident providers, the most common specialty represented was general surgery (33.3%), followed by trauma/critical care and/or burn surgery (15.7%), and colon and rectal surgery (9.8%). A plurality of respondents were in the 30–39 year age range (37.8%) followed by 20–29 (24.3%) and 40–49 (19.8%).

Prescribing patterns and motivations

Immediate release oxycodone or oxycodone-acetaminophen combinations were most commonly prescribed (49%). The median number of opioids reportedly prescribed exceeded CDC guidelines (no more than 7 days narcotics, and in most cases 3 or fewer days will suffice¹⁰) for acute pain management for every

Table 1
Respondent demographics.

Gender	
Male	64 (57.7%)
Female	47 (42.3%)
Age of respondents	
20–29	27 (24.3%)
30–39	42 (37.8%)
40–49	22 (19.8%)
50–59	9 (8.1%)
60–69	11 (9.9%)
Type of training facility	
Academic/Training	74 (67.9%)
Community/Rural Training	24 (22.0%)
Private Community/Rural	2 (1.8%)
Private Urban	9 (8.3%)
Surgical Specialty (non-resident respondents)	
General Surgery	17 (33.3%)
Trauma/Critical Care and/or Burn Surgery	8 (15.7%)
Colon and Rectal Surgery	5 (9.8%)
Minimally Invasive and/or Bariatric Surgery	3 (5.9%)
Pediatric surgery	3 (5.9%)
Plastic Surgery	3 (5.9%)
Surgical Oncology	3 (5.9%)
Thoracic Surgery	3 (5.9%)
Breast Surgery	3 (5.9%)
Vascular Surgery	3 (5.9%)
Year in training (trainees only)	
Categorical PGY1	16 (23.9%)
Preliminary PGY1	3 (4.5%)
PGY2	17 (25.4%)
PGY3	7 (10.4%)
PGY4	11 (16.4%)
PGY5	10 (14.9%)
PGY6 or greater	3 (4.5%)
Respondents with DEA number	
No	33 (30.3%)
Yes	76 (69.7%)
Respondents who have had surgery and been given narcotics previously	
No	46 (41.8%)
Yes	64 (58.2%)



Fig. 1. Distribution of survey respondents by geographic region.

procedure queried except laparoscopic appendectomy/cholecystectomy, breast lumpectomy and laparoscopic inguinal hernia repair (Table 2). The highest number of opioids reportedly prescribed was for open thoracotomy (median 45 [IQR 30, 50]). Markedly excessive (≥ 4 week) opioid supplies were reported to be prescribed by 18% of respondents for thoracotomy; 11% for breast reconstruction and laparotomy; 7% for video-assisted thoracoscopic surgery, laparoscopic ventral hernia repair, and open cholecystectomy; 3% for laparoscopic bowel/stoma surgery; 2% for open inguinal hernia repair; and 1% for simple mastectomy. Among all respondents, only 8% reported ever being told they were over-

Table 2
Number of pills reportedly prescribed for surgical procedures, all respondents.

Procedure	Median Number Pills Prescribed [IQR]	Range
Laparoscopic Appendectomy or Cholecystectomy	20 [20, 30]	0–50
Lumpectomy	20 [12, 30]	0–60
Simple Mastectomy	30 [20, 30]	0–60
Breast Reconstruction (DIEP, implants)	40 [30, 50]	0–90
Exploratory Laparotomy	40 [30, 50]	10–80
Open Inguinal Hernia Repair	30 [20, 30]	0–60
Laparoscopic Inguinal Hernia Repair	20 [18, 30]	5–60
Laparoscopic Ventral Hernia Repair	30 [20, 38]	10–60
Laparoscopic Bowel Resection/Stoma Creation	30 [20, 38]	1–60
Video-Assisted Thoracoscopic Surgery (VATS)	30 [20, 40]	0–60
Open Thoracotomy	45 [30, 50]	0–100
Open Cholecystectomy	30 [30, 45]	10–60
Laparoscopic Gastric Bypass	30 [20, 30]	0–60
Laparoscopic Fundoplication	30 [20, 30]	0–60
IR Abdominal Drainage Procedure	10 [0, 15]	0–30
IR Thoracic Drainage Procedure	10 [0, 18]	0–40

prescribing opioids by a patient, supervising physician or drug authority. There were no significant differences in number of opioids prescribed by male vs. female surgeons. Male surgeons more commonly reported not wanting their patients to be in pain (96.5% vs. 81%, $p = 0.011$).

Over one-third (38%) reported prescribing more opioids to those who complain during hospitalization or because of the inability to call in another prescription if needed (41%), while 42% considered not wanting to receive a patient call about pain when prescribing. Sixty percent reported considering that the patient may give their opioids to someone else, and 86% reported considering possible misuse of opioids when prescribing. Over one-fourth of respondents (26%) have had a patient report giving their prescription to someone else. None of the providers reported being lawfully disciplined for opioid prescribing practices or being sued for inadequate pain control. Over half (56%) of survey respondents reported giving fewer opioids to elderly patients.

Attending vs non-attending prescribers

Responding attending surgeons were more likely to be male (78%) than non-attending providers (47%, $p = 0.002$). When comparing attending surgeons versus non-attending providers, attending surgeons more often reported giving no opioids after laparoscopic appendectomy/cholecystectomy (9% vs 0%; $p = 0.048$), while non-attending providers were more likely to prescribe a two week supply of narcotics for the same procedures (10% vs 3%; $p = 0.048$). There were no significant differences in weeks or number of pills reportedly prescribed for all other procedures between attending and non-attending providers. Attending surgeons were more likely to report patient attempts to return opioids to them (33% vs 16%; $p = 0.04$), were less likely to give fewer opioids to young patients (ages 19–26 years; 3% vs. 20%, $p = 0.013$), and were less likely to consider that patients may give their opioid pills to someone else when prescribing (39% vs. 74%, $p < 0.001$).

Post-graduate year 1–2 vs older trainees

Post-graduate year (PGY)1 and 2 (junior) residents were more likely than senior-level residents to give one week or less of narcotics for simple mastectomy ($p = 0.004$). Junior residents also reported prescribing fewer median narcotic pills than senior-level residents for simple mastectomy, open inguinal hernia repair and open thoracotomy (25 [20, 30] vs 30 [24, 40], $p = 0.038$; 25 [15, 30] vs 30 [20, 30], $p = 0.048$; 50 [40, 60] vs 40 [30, 50], $p = 0.024$, respectively). Fifty-two percent of senior residents agreed that they

prescribe more narcotics because of inability to call in a prescription over the phone while only 17% of junior residents agreed with this statement ($p = 0.007$).

Respondents with previous history of surgery

Of all respondents, 58% reported having a personal history of previous surgery and being given narcotic medications. Those with previous surgery reported prescribing more opioids for patients undergoing laparoscopic inguinal hernia repair ($p = 0.01$). There were no other differences found based on personal history of surgery. They were also more likely to consider inability to call in a refill when deciding on an opioid prescription ($p < 0.001$), and were more likely to consult prescription drug monitoring databases to determine a patient's opioid history (57% vs. 34%, $p = 0.026$) compared with respondents without a previous history of surgery.

Discussion

Opioid overprescribing occurs at a high rate among surgical providers.^{11–13} General guidelines for opioid prescribing practices advocate for the lowest effective dose and anticipated duration of pain for management of acute pain.¹⁰ Regarding postoperative pain, however, there are fewer evidence-based recommendations. Within these guidelines, there are exceptions and discretion for patients who have had more extensive surgery or who have undergone a particularly difficult postoperative course. However, as demonstrated in this survey, only three procedures (laparoscopic appendectomy/cholecystectomy, lumpectomy, laparoscopic inguinal hernia repair) were within the recommended guidelines for postoperative opioid prescription, which states that no more than 7 days' worth of narcotics should be given for the management of acute pain.¹⁰ Subsequent to this survey being performed, the Michigan Opioid Prescribing Engagement Network (OPEN) published more specific recommendations for opioid prescribing for individual operations (<https://opioidprescribing.info/>). Additionally, the current survey demonstrated significant variability among surgical providers for the same procedures. For example, for patients who have undergone a lumpectomy, respondents reported prescribing anywhere from zero to greater than 50 narcotic pills. Defining the prescribing practices of surgeons is in its early stages in the literature, however a recent large American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) study demonstrated significant variation exists among procedures and hospitals within the same organization in the prescribing of narcotics.¹¹ Another large database study evaluated

the rates of opioid prescription filling as well as median postoperative days requiring narcotics and found that the majority of general surgery procedures required fewer than nine days of narcotics.¹³ In the present survey, several providers reported giving more than four weeks of narcotics to patients undergoing a variety of general surgical procedures, demonstrating a discrepancy in pain management for acute postoperative pain. Similarly, other studies have demonstrated that surgeons overprescribe in 80% of opioid-naïve patients.¹¹ While over-prescribing is a well-known phenomenon, only 8% of providers report ever having been told they were overprescribing, indicating an issue for educators as well as trainees.

In the current study, there were no major trends by gender. Experiences with patients did vary by level of provider professional experience. Patient factors, such as level of complaints in the hospital, and system factors, such as the inconvenience of prescribing additional narcotics if needed, influence prescriber decisions regarding the number of narcotics given to patients. Provider personal experiences can also influence narcotic prescribing, as evidenced by the differences among those that have and have not had previous surgery themselves.

The data showing junior-level trainees generally prescribed fewer pills for certain major general surgical procedures may be indicative of trends towards educating providers about the opioid epidemic and ramifications as well as general increased awareness of the problem. On the other hand, there have been some studies that have shown that resident physicians are more likely than attending physicians to refill prescriptions early for primary care patients, suggesting inadequate misuse monitoring.¹⁴ As an attempt to combat the opioid crisis, certain medical schools have adopted training modules dedicated to help trainees identify at-risk patients, appropriate prescribing habits and management of pathologic opioid use.^{15,16} However, there are currently no reports in the literature regarding education of opioid prescribing practices in surgical trainees, thus indicating an opportunity for improvement. Ideally, surgical education would emphasize the use of multimodal pain management, such as use of transversus abdominus plane (TAP) blocks and minimizing use of narcotics. Secondly, additional education regarding the resources for opioid-use monitoring would prevent providers from over-prescribing for patients requesting additional prescriptions after the initial encounter.

Alternative therapies and over-the-counter analgesics may contribute to a decrease in postoperative use of opioids, while prescription disposal programs may allow for a decrease in circulating narcotics, especially given that nearly half of abusers receive narcotics from a family or friend.^{9,17–19} In this small survey alone, 26% of providers admitted having a patient share their narcotics with a family member or friend. However, only 18% of providers reported counseling patients to return leftover prescriptions to a takeback program. This demonstrates a need for increased awareness of these programs and encouraged use of them. During a single Drug Enforcement Administration (DEA) National Prescription Drug Take Back Day, over 400 tons of prescription medications can be returned safely that otherwise would remain in circulation.²⁰ This is of particular importance given that in a recent study, nearly 80% of post-procedural patients had leftover pain medications with over 50% planning on keeping the leftover medications.²¹ The responsibility of the surgical provider is to provide appropriate counseling and to set realistic expectations regarding the amount of pain the patient may experience postoperatively. While this is a subjective experience, patients may have a misunderstanding about the expected pain they may have in addition to the management of postoperative pain.

While the etiology of the opioid crisis is multi-factorial,

surgeons can help combat the epidemic by utilizing adjunctive therapies and over the counter medications, encouraging return of narcotics, and through further investigations to standardize prescription patterns. As such, the authors are currently in the process of a prospective observational study of general surgery patients' utilization of postoperative pain medication to attempt to quantify the actual need for postoperative narcotics as a means of decreasing prescriber variation.

There are several limitations to this study including bias inherent in survey-based studies. The authors judge that a small proportion of invited providers responded to the survey, though the survey method precluded a precise determination of the number invited. This may lead to a response/selection bias. Finally, providers may have responded regarding surgical procedures in which they do not participate, which may have led to an under- or over-estimation of narcotics given postoperatively.

Conclusions

Surgeons vary significantly in their opioid prescriptions, even for the same operation. This is related to several important underlying motivators that must be considered in changing these patterns. There are few differences by gender but some important differences by level of experience. Increased awareness of the wide variability for surgical prescribers along with an increase in evidence-based guidelines for postoperative prescribing are needed.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amjsurg.2018.11.032>.

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