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Institutional Opioid Prescription Guidelines are Effective in Reducing Post-Operative Prescriptions Following Urologic Surgery: Results From the American Urologic Association 2018 Census

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OBJECTIVE	To assess provider and practice characteristics that drive opioid prescription behavior using the American Urological Association census data.
METHODS	Stratified weighted analysis using 1,157 census samples was performed to represent 12,660 urologists who practiced in the United States in 2018. We compared urologists according to their opioid prescription patterns to evaluate factors and motivations behind opioid use in the post-operative setting.
RESULTS	Overall, 11,205 (88.5%) urologists prescribe opioids in the post-operative setting. The presence of procedure-specific institutional prescribing guidelines was associated with a greater tendency to prescribe ≤ 10 pills, and lesser tendency to prescribe 11 to 49 and ≥ 50 tablets following open abdominal ($P = .003$), laparoscopic ($P < .001$), scrotal ($P < .001$), and endoscopic surgeries ($P < .001$). The presence of institutional prescribing guidelines was associated with decreasing opioid prescriptions over a three-year period whereas not having guidelines was associated with an unchanged prescription practice over time. Basing current prescriptions on what was given to prior patients was reported by 85% and was more likely to result in an unchanged amount of prescriptions over time (29.2% vs 13.3%, $P = .007$). Motivations to avoid patient phone calls were reported by 23.8% and were more likely to increase the opioids provided within the next 3 years (3.2% vs 0.1%, $P < .001$).
CONCLUSION	Practitioners who endorsed using institutional guidelines prescribed fewer opioids following all types of surgery and were more likely to decrease their prescription behavior over time. This data supports continued efforts to provide urologists with more evidence-based guidance on best practice opioid prescribing in the future. UROLOGY 158: 5–10, 2021. © 2021 Elsevier Inc.

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Substance abuse disorder is a significant public health concern that has reached epidemic levels across the country in the past two decades. The United States (US) currently has historically high mortality rates, with an accelerating rate of opioid-related deaths since the start of the new millennium by at least 200%.¹⁻³ Excessive opioid prescriptions in opioid naïve patients has been linked to opioid dependence in a large amount of studies of both acute⁴ and post-operative analgesia.⁵⁻⁸

Most patients who are discharged after urologic surgery receive excessive opioid prescriptions.⁹ Studies of routine ambulatory adult and pediatric urology procedures show that most patients had post-discharge medication that was unused, with the majority using less than half of what was prescribed.¹⁰⁻¹² Furthermore, larger prescriptions often compel patients to take more opioid than is necessary. In one study of post-prostatectomy opioid prescriptions, prescription size was correlated with higher use amongst post-operative patients following discharge.¹¹ These data demonstrate that post-operative prescriptions provide a significant source of opioids in the community.

Variability of opioid prescriptions across urologic procedures has been documented extensively.^{9,13} It has been hypothesized that this variability is multifactorial: with patient education and surgeon-specific practice as the most likely explanations.¹² Although many studies address patient behavior regarding opioid use, there is a paucity of studies that discuss the motivation behind the behavior of the provider.

In this study, we sought to assess the characteristics of the practice environment that drive the prescription behavior of providers. We hypothesized that the use of standardized practice, through institutional opioid guidelines, would be associated with a reduction in post-operative opioid prescriptions.

METHODS

Data Source

We analyzed data from the 2018 American Urological Association (AUA) census. The AUA's annual census is a systematically designed, representative survey of the current urology workforce. Data collection for the 2018 census started in May 2018 and concluded at the end of September 2018. The results on US practicing urologists were adjusted for non-responses.

All data was de-identified, and the study was exempt from the corresponding author's Institutional Review Board. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline for cross-sectional studies was followed for design and reporting of this study.¹⁴ Census samples were weighted to represent all 12,660 urologists who practiced in the US in 2018. Urologists were presented with opioid-specific clinical situations and asked to choose the elements of prescription behavior that they regularly use for their practice. These questions, and the answer choices available, included:

1: Do you prescribe opioids for patients undergoing surgical procedures? (Answer: "Yes" or "No"); 2: How many opioid pills, on average, do you prescribe at discharge for patients post operatively for: (1) open abdominal surgery, (2) laparoscopic surgery, (3) scrotal surgery, and (4) endoscopic surgery; 3: Reasons for choosing the number of opioid pills at discharge. (Answer: "This worked well for my patient in the past", "I want to avoid patients having to call my office during their recovery" or "My practice/institution developed guidelines for procedure-specific prescribing"); 4: Compared to three years ago, the number of opioid prescriptions I currently prescribe for patients undergoing surgical procedures has: (Answer: "Increased", "Remain unchanged", "Decreased" or "I don't know").

We examined several variables as predictors: age group; sex; race (White, Asian, African American / Black, Other); ethnicity (Hispanic, non-Hispanic); age at completion of residency; fellowship training; level of rurality (metropolitan vs non-metropolitan); years of practice since completion of residency; practice setting (academic, non-academic, private practice); quality programs present in practice in the past 12 months; patient safety initiatives within practice in the past 12 months; number of urologists, physician assistants, and nurse practitioners in practice; number of patients per week; number of surgeries per month; standardization of clinical care through protocols or guidelines; regular use of quality improvement tools to change practice; practice characteristics related to opioid prescription (ie, presence of institutional guideline for procedure-specific prescribing, reasons for choosing the number of opioid pills at discharge, and hours spent on learning about the science of patient safety or quality).

Statistical Analysis

Of 1,157 samples were weighted to represent a total of 12,660 urologists practicing in the US in 2018. Weighted analysis was performed using complex samples through sample weights and strata variables (region, gender, and number of years since initial board certification in groups). Summary statistics were used to describe patterns of post-operative opioid prescription in addition to the motivation behind their answers. Univariate analysis was performed using chi-square tests or linear regression. Multivariate logistic regression was performed using backward stepwise selection to assess factors associated with presence of guidelines for procedure-specific prescribing. Model fit was assessed using a Hosmer-Lemeshow goodness-of-fit test. All statistical analysis was performed using Stata, version 16.1. All tests were two-sided with a $P < .05$ considered significant.

RESULTS

Most providers surveyed were male (90.8%), white (79.6%), and worked in a metropolitan area (89.4%) (Appendix A). 37.4% were fellowship trained. There was a represented range of physician age groups, years in practice, and geographical areas. 30% of respondents had been in practice for ≥ 31 years, with approximately equivalent representation of individuals in each decade of life after 35 years of age.

Overall, 11,205 (88.5%) urologists prescribe opioids in the post-operative setting. The presence of institution procedure-specific prescribing guidelines was associated with a greater tendency to prescribe ≤ 10 pills and lesser tendency to prescribe 11 to 49 and ≥ 50 tablets following open abdominal surgery ($P = .003$), laparoscopic surgery ($P < .001$), and endoscopic surgery ($P < .001$). The presence of guidelines was also associated with a greater tendency to prescribe ≤ 10 pills and a lesser tendency to prescribe 11–49 tablets ($P < 0.001$) for scrotal surgery (Fig. 1).

In total, 14.7% of urologists reported the presence of guidelines for procedure-specific opioid prescribing within their practice. Guidelines were significantly more common in academic institutions and metropolitan areas. Institutions with practice guidelines were significantly associated with programs where urologists participate in standardization of clinical care, a quality education curriculum, best practice collaboratives, a patient safety education curriculum, and the collection of quality metrics for internal review. Additionally, univariate analysis identified

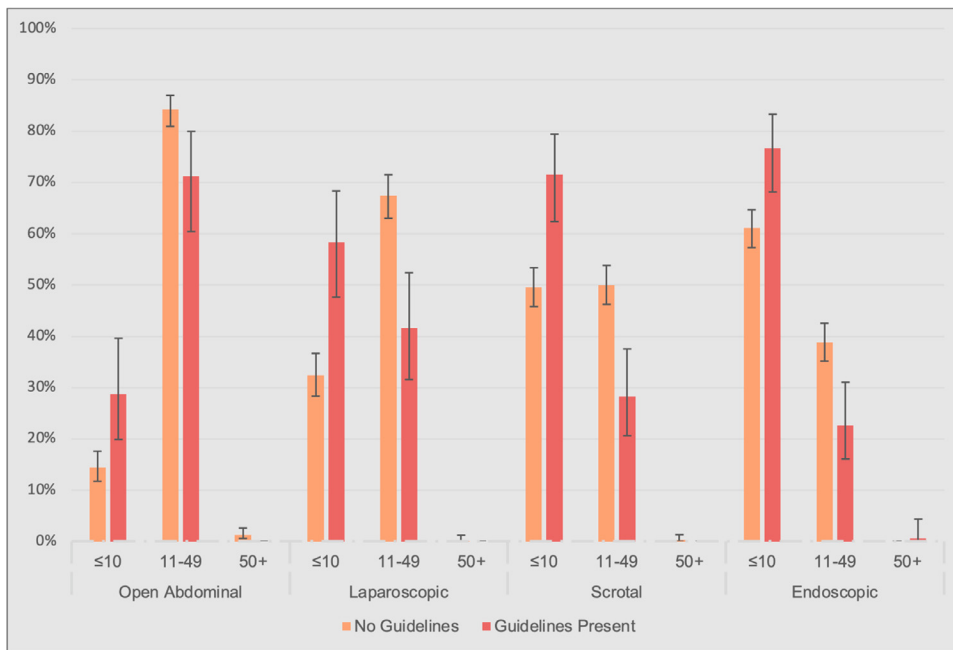


Figure 1. Number of opioid pills prescribed per surgery type stratified by use of procedure-specific prescribing guidelines. Error bars represent 95% confidence interval. (Color version available online.)

that practices which use guidelines have increased numbers of urologists, physician assistants, nurse practitioners, and perform a greater number of surgeries per month (Table 1). When adjusting for confounding factors in a multivariate analysis, practices with greater numbers of urologists and mid-level providers, in a metropolitan setting, and which use quality improvement tools and protocols to guide clinical care were factors that were significantly more likely to be associated with the use of procedure-specific guidelines for opioid prescription (Table 2).

Table 3 demonstrates the association of the change in prescribed quantity over time according to potential influences on the urologist. Most urologists decreased (72.3%) or did not change (26.8%) the amount of prescribed opioid over a 3-year period. When providers were faced with describing the quantity of opioid prescribed over the three-year timeline, the presence of institutional guidelines was more likely to lead to a smaller prescription. An unchanged prescription practice over time was nearly twice as likely in the absence of such guidelines. In contrast, those that tended to prescribe patients opioid prescriptions based off of historical experience, defined by basing their decision on “what worked well for patients in the past,” were over twice as likely to not change the amount and 15% less likely to decrease the quantity of the prescription over the 3-year period ($P = .007$). 24% of urologists were influenced by prescribing an amount of opioid that would hopefully avoid a phone call to the office. These physicians demonstrated higher odds of increasing or unchanging and less likely to decrease the prescription over time ($P < 0.001$). Lastly, the numbers of hours devoted to the education of patient safety or quality improvement were increasingly associated with a decreased tendency to prescribe opioids over time ($P = .001$).

COMMENT

In this report, we demonstrated the importance of establishing a guideline-based protocol for urologists to safely

decrease their opioid prescribing behaviors. Secondly, we described the climate of the institutions where procedure specific guidelines are more likely to be present.

The motivation behind opioid prescribing behavior has been previously evaluated in the literature. One thematic analysis amongst Emergency Department physicians demonstrated that the decision to treat pain with opioids was the result of a complex and multifaceted process. This study found that several factors are taken into consideration, including the provider assessment of pain characteristics, patient-based considerations, health systems, policy, and practice-related issues. Many physicians were influenced by patient satisfaction scores in determining prescribing patterns, with some directly stating that they prescribe more opioids than appropriate due to the fear of negative scores.¹⁵ In response to this conflict between appropriate management of opioid prescription and patient satisfaction, the Centers for Medicare and Medicaid Services have recently removed pain questions from the Hospital Consumer Assessment of Healthcare Providers and Systems patient experience survey, beginning with October 2019 discharges. These questions provided financial incentives for patient feedback relating to pain during their hospital stay, how often hospital staff talked with them about how much pain they had, and how often hospital staff talked with them about how to treat their pain. Eliminating these benchmarks should reduce the potential pressure physicians may feel to overprescribe.

The finding that most providers prescribe opioids empirically is common in the literature. Participants in the Emergency Department study discussed the importance of the patient’s diagnosis when considering prescribing opioids for pain. Though interestingly, the patient’s perception of pain severity was not mentioned by any of

Table 1. Factors associated with the presence of procedure-specific opioid prescribing

Practice Characteristics	Presence of Practice Guidelines for Procedure-Specific Prescribing		P
	Yes (%)	No (%)	
Practice setting (%)			<.001
Academic institution (25)	20.8	79.2	
Non-academic institution (18.1)	11.2	88.8	
Private practice (56.9)	10	90	
Metropolitan area (%)			.009
Yes (89.4)	13.9	86.1	
No (10.6)	5.6	94.4	
What quality programs have you or your practice participated in over the last 12 mo?			<.001
Standardization of clinical care through protocols or guidelines (%)			<.001
Yes (53.4)	18.8	81.2	
No (46.6)	6.3	93.7	
Quality education curriculum (%)			<.001
Yes (39.6)	17.8	82.2	
No (60.4)	9.8	90.2	
Collection of quality metrics for internal review (%)			.057
Yes (53.1)	15.1	84.9	
No (46.9)	10.6	89.4	
What patient safety initiatives have you or your practice participated in over the last 12 mo?			<.001
Patient safety education curriculum (%)			<.001
Yes (32.4)	19.1	80.9	
No (67.7)	10.1	89.9	
Which of the following quality and patient safety domains are present within your practice group?			<.001
Learning collaborative that shares best practices to change practice (%)			<.001
Yes (26.2)	20.3	79.7	
No (73.8)	10.4	89.6	
Regular use of quality improvement tools to change practice (%)			<.001
Yes (39)	21.1	78.9	
No (61)	7.9	92.1	
Regular use of patient safety tools to change practice (%)			<.001
Yes (28)	21.9	78.1	
No (72)	9.6	90.4	
Number of urologists in practice, mean (SE)	12.1 (1.04)	9.7 (0.43)	.036
Number of physician assistants in practice, mean (SE)	4.2 (0.53)	3.1 (0.15)	.049
Number of nurse practitioners in practice, mean (SE)	2.21 (0.26)	1.36 (0.07)	.002
Number of patients per week, mean (SE)	69 (3.3)	74.4 (1.3)	.135
Number of surgeries per month, mean (SE)	10.8 (0.83)	8.72 (0.35)	.022

SE, Standard Error.

the participants.¹⁵ Our study uncovered similar systems and patient care issues. We identified that most Urologists (85%) based current prescriptions on their prior experience and not a patient-specific approach. Additionally, almost 25% of Urologists surveyed in our study stated that avoiding patient phone calls played a role in their prescription behavior. These findings emphasize that the behavioral tendencies of the provider are important factors in opioid prescription patterns, which are not patient-centered, or evidence based. In fact, there is evidence to support that patient contact does not increase when the prescription amount is lowered.¹⁶

One study of opioid prescription patterns in post-vasectomy patients demonstrated that in a survey of 136 urologists, 51.5% of surgeons routinely prescribed opioids despite 50.4% of practitioners having 'no idea' how many patients actually needed a prescription.¹⁷ In a recent study of 158 surgical patients, 91% of those who used zero opioids in the last 24 hours of admission received opioid prescriptions at discharge. Moreover, there was no correlation between the amount of opioid intake during the last 24 hours and opioid prescription dose at discharge.¹⁸

To address these inconsistencies in practitioner behavior, pathways have been designed to provide evidence-

Table 2. Multivariate analysis of factors associated with presence of guidelines for procedure-specific prescribing

Practice Characteristics	OR	95% CI	P
Metropolitan (vs non-metropolitan)	15.80	1.81-138.2	.013
Number of urologists in practice	0.96	0.93-0.98	.004
Number of physician assistants in practice	1.09	1.01-1.17	.013
Number of nurse practitioners in practice	1.13	1.01-1.26	.021
Standardization of clinical care through protocols or guidelines (yes vs no)	2.21	1.07-4.58	.032
Regular use of quality improvement tools to change practice (yes vs no)	2.30	1.31-4.03	.003

CI, Confidence Interval; OR, Odds Ratio.

based, procedure-specific pain management protocols to help improve post-surgical recovery and guide opioid prescribing practices.^{11,19-21} These Enhanced Recovery Pathways (ERPs) are standardized pathways, commonly composed of 21 to 24 perioperative elements to improve post-surgical recovery. ERPs have been shown to be safe and effective, though have been under-utilized across surgical subspecialties.²²⁻²⁴ For example, a recent study of 113 Pediatric Urologists demonstrated that 61% were somewhat familiar or not familiar with standardized ERPs. While 54% utilized some individual ERP elements, only 20% had a complete standardized pathway.²⁵ In our study, 85% of Urologists indicated that opioid prescriptions are not guided by institutional guidelines. This is consistent with these findings, which joins an increasing body of

evidence that opioid prescription behavior is not standardized.

Our study demonstrated that when urologists used procedure-specific guidelines to influence their prescription behavior, there was a significant tendency to reduce the number of opioid pills prescribed following all surgical types (ie, open abdominal, laparoscopic, scrotal, and endoscopic). This has been also demonstrated in the literature.²⁶ A prospective cohort study at an academic urban level I trauma center of 90 patients undergoing outpatient orthopedic trauma surgery demonstrated that implementation of pain management guidelines caused a drop in the percentage of patients receiving oxycodone from 100% to 27%, with these patients receiving the less potent hydrocodone instead.²⁷ Additionally, in a previous study of patients undergoing partial mastectomy, cholecystectomy, or hernia repair, defining postoperative opioid requirements through patient surveys and disseminating operation-specific guidelines for opioid prescribing to surgeons was able to decrease the number of opioids initially prescribed by more than half without subsequently increasing refill prescriptions.²⁸

There are several key limitations of the study to note. First, retrospective self-reported practice patterns are subject to recall bias. Next, when discussing the presence of an institutional guideline, we are unable to discern what type of guideline this is—if it is an institutional initiative, attributable to safety training, a more thorough recommendation by the institution to set post-operative expectation, or an ERP that has been developed for a specific surgery. We also do not know what the process is that created this guideline; however, we infer that it is the result of evidence based and quality control initiatives. Furthermore, while we identified key aspects of institutions that had guidelines available for urologists to base prescriptions

Table 3. Practice patterns of urologists and how this influenced prescription trends over time

Practice Characteristics	Number of Post-op Opioid Prescriptions over 3 Y has:			P
	Increased (%)	Unchanged (%)	Decreased (%)	
My practice/institution developed guidelines for procedure-specific prescribing (%)				.017
Yes (14.7)	0	16.6	83.4	
No (85.3)	1.0	28.6	70.3	
I chose the number of opioid pills because this worked well for my patients in the past (%)				.007
Yes (85.3)	0.7	29.2	70.1	
No (14.7)	1.5	13.3	85.2	
I chose the number of opioid pills because I want to avoid phone calls from patients to my practice (%)				<.001
Yes (23.8)	3.2	32.1	64.7	
No (76.2)	0.1	25.2	74.7	
How many hours have you devoted to learning about the science of patient safety or quality (%)				
None (11.9)	2.3	35.2	62.5	.059
<1 (13.0)	0.5	35.5	63.9	.076
1-4 (47.6)	0.7	26.2	73.1	.838
5-9 (14.7)	1.6	16.7	81.7	.058
≥10 (12.7)	0	17.2	82.8	.037
Total	0.9	26.8	72.3	

from, it is unclear whether these factors are directly responsible for generating them or are simply associated with their presence. As a result, while our data supports the correlation of these guidelines with opioid prescription behavior, our cross-sectional data cannot demonstrate causation. Therefore, the observed change in provider behavior could be the result of these additional institutional initiatives that were found to coincide with opioid guidelines. Additional studies are warranted to clarify what is the nature of the initiatives that have been effective in this significant prescription reduction.

CONCLUSION

Over prescribing in the post-operative period is a common practice in urologic surgery. Opioid prescription appears to be based off subjective provider-driven experiences and not evidence-based practices or patient-specific factors. When provided institutional guidance, urologists demonstrated a significantly higher tendency to reduce the amount of prescribed opioid following all types of surgery. While several notable practice characteristics were found to be associated with post-operative practice guidelines, additional studies are needed to identify what specific types of guidelines demonstrate the most benefit in titrating the amount of opioid to a level that is a necessary for sufficient pain control, while minimizing the dangers of over prescription.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at <https://doi.org/10.1016/j.urology.2021.08.033>.

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