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Original Contributions

IMPACT OF AN OPIOID PRESCRIBING GUIDELINE IN THE ACUTE CARE SETTING

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☐ **Abstract—Background: Death from opioid abuse is a major public health issue. The death rate associated with opioid overdose nearly quadrupled from 1999 to 2008. Acute care settings are a major source of opioid prescriptions, often for minor conditions and chronic noncancer pain. Objective: Our aim was to determine whether a voluntary opioid prescribing guideline reduces the proportion of patients prescribed opioids for minor and chronic conditions. Methods: A retrospective chart review was performed on records of adult emergency department visits from January 2012 to July 2014 for dental, neck, back, or unspecified chronic pain, and the proportion of patients receiving opioid prescriptions at discharge was compared before and after the guideline. Attending emergency physicians were surveyed on their perceptions regarding the impact of the guideline on prescribing patterns, patient satisfaction, and physician–patient interactions. Results: In our sample of 13,187 patient visits, there was a significant ($p < 0.001$) and sustained decrease in rates of opioid prescriptions for dental, neck, back, or unspecified chronic pain. The rate of opioid prescribing decreased from 52.7% before the guideline to 29.8% immediately after its introduction, and to 33.8% at an interval of 12 to 18 months later. The decrease in opioid prescriptions was observed in all of these diagnosis groups and in all age groups. All 31 eligible prescribing physicians completed a survey. The opioid prescribing guideline was supported by 100% of survey respondents. Conclusions: An opioid prescribing guideline significantly decreased the rates at which opioids were prescribed for minor and chronic complaints in an acute care setting.** © 2016 Elsevier Inc.

☐ **Keywords—narcotic; opioid abuse; emergency department; overdose; prescribing guideline**

INTRODUCTION

There is a crisis regarding the abuse of prescription drug opioids in the United States (1,2). In 2010, nearly 1 in 20 persons over the age of 12 years used opioids nonmedically (1). Nearly three-quarters (73.8%) of prescription drug-related deaths in 2008 involved opioids. The United States (US) death rate from prescription opioid overdose now exceeds the combined death rates from heroin and cocaine. From 1999 to 2008, the death rate associated with opioid overdose nearly quadrupled (2).

Emergency departments (EDs) are a major source of prescription opioids. A 2009 study demonstrated that emergency medicine was one of the top five specialties prescribing opioids to every age group under 40 years (3). From 2001 to 2010, the percentage of ED visits that resulted in opioids being prescribed increased from 20.8% to 31.0% (4). It is believed that the increased regulatory attention to the treatment of pain as a "vital sign" has contributed to the rise in the prescribing of opioids for less serious conditions (5). For example, according to data from the National Hospital Ambulatory Medical Care Survey, opioids were prescribed at 59.4% of ED visits for nontraumatic dental conditions from 2003 to 2007 (6).

The US Department of Health and Human Services identifies death from opioid abuse as a major public health issue, and recommends the synthesis of pain management guidelines and the creation of clinical decision support tools (7). Some medical organizations have

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recently created guidelines for prescribing opioids to maximize safety and avoid misuse and diversion (8,9). The impact of these guidelines has not been studied in the acute care setting. The purpose of our study is to describe the impact of an opioid prescribing guideline in two large affiliated urban emergency departments. We hypothesized that the rate at which opioids were prescribed in the emergency department for dental, neck/back, and chronic pain would decrease after adoption of an opioid prescribing guideline. We also hypothesized that physicians would support the use of an opioid prescribing guideline.

MATERIALS AND METHODS

Study Design

This retrospective observational study used data from two hospital sites in Philadelphia. One site is a tertiary care academic medical center with an annual emergency department census of > 75,000 visits. The other is an affiliated community hospital with an annual emergency department census of approximately 45,000. The emergency physicians at these sites are all members of a university practice plan.

An opioid prescribing guideline (Appendix A) was developed using an existing medical society guideline (9). It was submitted for faculty consensus review and adopted at a meeting of the emergency medicine faculty. It was then electronically disseminated to all emergency medicine attendings, residents, and physician assistants on January 3, 2013. Hard copies and electronic copies were available in the emergency department. There was no individual or group feedback regarding the use of the guideline during the study period.

We compared the rate of opioid prescriptions for specific complaints before and after adoption of the guideline. The study was approved by the Temple University Institutional Review Board.

Study Protocol

Retrospective chart review was performed by querying the electronic medical record for all visits by patients aged 18 years or older who were discharged from the emergency department during three different time periods with any of the following coded discharge diagnoses: dental abscess, dental caries, dental pain, dentalgia, tooth pain, back pain, back pain with sciatica, sciatica, acute back pain, acute low back pain, acute mid back pain, acute upper back pain, chronic back pain, chronic low back pain, chronic mid back pain, chronic upper back pain, cervical radiculopathy, lumbar radiculopathy, neck pain, chronic neck pain, and pain syndrome-chronic. The three time periods chosen were 6 to 12 months before adoption of the guideline (January to July 2012), the 6 months immediately after adoption of the guideline (January to July 2013), and 12 to 18 months after adoption of the guideline (January to July 2014).

Medications prescribed at the time of discharge were reviewed to identify patients who were prescribed any of the following opioids or opioid-analgesic combinations: oxycodone, oxycodone-acetaminophen, hydrocodone, hydrocodone-acetaminophen, hydrocodone-ibuprofen, acetaminophen with codeine (#3 or #4), and hydromorphone. We queried the data using brand names for these compounds as well. These represent the most commonly prescribed opioid analgesics in our emergency departments. Extended-release formulations and more recent market entrants with limited market shares (e.g., oxymorphone and tapentadol) are rarely, if ever, prescribed from our emergency departments and thus were not included. Tramadol was not included in our analysis as it became a scheduled medication after the study period (on August 18, 2014).

In addition to collecting the prescription data, a survey was administered to the faculty emergency medicine physicians who were practicing at one or both emergency departments during each of the time periods studied. The survey could be completed anonymously online. They were asked to rate their agreement with several statements regarding changes in opioid prescribing and perceptions of patient interactions.

Outcomes

The primary outcome was the proportion of patients seen for dental, neck/back, or chronic pain that were prescribed an opioid upon discharge from the emergency department. Secondary outcomes were physician attitudes regarding whether the guideline had changed prescribing practices, the effect of the guideline on physician–patient interactions, and overall level of support from emergency physicians for the implementation of the guideline.

Statistical Analysis

Statistical analyses were performed with the use of STATA software, version 13 (StataCorp LP, College Station, Texas). Two-sided χ^2 tests with an a priori level of significance of $p \leq 0.05$ were considered to indicate statistical significance. All reported p values are two-tailed and have not been adjusted for multiple comparisons. Multinomial logistic regression tests were used to calculate relative risk of being prescribed an opioid and corresponding 95% confidence intervals. The results from the survey are reported by combining agree and

strongly agree as positive and disagree and strongly disagree as negative responses.

RESULTS

A total of 13,187 patient visits met inclusion criteria. The groups did not differ with respect to baseline characteristics (Table 1). There was an initial decrease in emergency department visits for these complaints in the 6-month period immediately after the adoption of the guideline, but volume of patient visits had returned to baseline within 12 to 18 months. The opioid prescribing guideline had an immediate and sustained impact on opioid prescribing rates for all age groups and for each of the three categories of complaints (dental, neck/back pain, and chronic pain) with a high degree of statistical significance (Table 2). There was an increase in prescription rates in the latter time period, but it continued to be significantly lower than preguideline levels.

All 31 eligible attending physicians completed the survey (Table 3). The majority (84%) felt that their own opioid prescription rate had decreased, and 94% believed that overall opioid prescription rates from our emergency departments were lower after the guideline. Only 13% of respondents believed the guideline had affected patient satisfaction, and the same number felt that patients with legitimate indications for opioids were being denied access to appropriate analgesia. Most (97%) felt the guideline had facilitated discussions with patients when opioids were being withheld, and nearly three-quarters of respondents reported encountering less hostility from patients since adoption of the guideline. One hundred percent of the respondents supported the use of an opioid prescribing guideline.

Table 1. Patient Characteristics

Characteristics	6 to 12 Months Before Guideline	0 to 6 Months After Guideline	12 to 18 Months After Guideline
No. of patients	4540	4122	4525
Age, n (% of total)			
18 to 35 y	1797 (39.6)	1594 (38.7)	1769 (39.1)
36 to 53 y	1892 (41.7)	1611 (39.1)	1842 (40.7)
54 to 70 y	747 (16.5)	794 (19.3)	778 (17.2)
>70 y	104 (2.3)	123 (3.0)	136 (3.0)
Male sex, n (%)	2220 (48.9)	2001 (48.5)	2229 (49.3)
Complaint, n (%)			
Dental pain	1357 (29.9)	1262 (30.6)	1435 (31.7)
Back/neck pain	3007 (66.2)	2693 (65.3)	2921 (64.6)
Chronic pain NOS	176 (3.9)	167 (4.1)	169 (3.7)
Site, n (%)			
Academic	2541 (56.0)	2534 (61.5)	2760 (61.0)
Community affiliate	1999 (44.0)	1588 (38.5)	1765 (39.0)

NOS = not otherwise specified.

DISCUSSION

Opioid prescribing guidelines form one facet of a multidimensional approach to addressing the public health crisis of rising opioid abuse, misuse, and diversion. To our knowledge, this is the first study of the impact of such a guideline. Our results demonstrate the significant potential for both immediate and sustained impact that such guidelines may have in an acute care setting. In contrast to other strategies that have been proposed or implemented to address the opioid problem, proven guidelines such as ours require no increase in overhead or equipment costs and require minimal training.

Prescription drug monitoring programs (PDMPs) are databases of controlled substance prescriptions organized and operated at the state level. Our study was conducted in the state of Pennsylvania where, at the time of the study, physicians did not have access to such a program. In theory, PDMPs should help prescribers identify patients at risk for opioid abuse or diversion by analysis of their prescription history. A 2010 study showed that PDMPs impacted emergency department opioid prescribing practices in 41% of cases (10). While most states have PDMPs, there is no standardization in terms of format, expectations for how they are to be used, or even whether physicians or only law enforcement officials can gain access. Even clinicians who do have access to PDMPs cite several barriers to their use, including time restraints and difficulty navigating the database (5). Therefore, while PDMPs are potentially an extremely valuable tool, a multimodal approach is recommended for acute care settings.

There are many challenges to striking a balance that provides appropriate analgesia for patients without creating or exacerbating drug dependence. The experience of pain severity is subjective and therefore self-reported pain scales are inherently unreliable (11). The Joint Commission mandate to treat pain as the "fifth vital sign" and the linking of patient satisfaction scores to physician compensation create incentives for physicians to meet patient expectations, reasonable or not, around prescription of analgesics. Emergency physicians have identified themselves as targets for patients who seek opioids for nonmedical purposes, yet it can be difficult for clinicians to distinguish drug-seeking behavior from legitimate need (12). Recognizing the importance of clinician discretion at the bedside, adherence to our guideline was voluntary. In cases where the clinician judges opioids to be inappropriate, a prescribing guideline provides a "higher authority" for physicians to cite in the decision to withhold them.

Table 2. Immediate and Long-Term Impact of Guideline on Prescriptions for Opioids

	6 to 12 Months Before Guideline	0 to 6 Months After Guideline	12 to 18 Months After Guideline
Patients prescribed opioids			
n (%)	2392/4540 (52.7)	1229/4122 (29.8)	1528/4525 (33.8)
p Value, relative risk (95% CI)		<0.001, 0.38 (0.35 to 0.42)	<0.001, 0.68 (0.65 to 0.71)
Opioid prescriptions as percentage of total visits by complaint			
Dental pain			
n (%)	859/1357 (63.3)	481/1262 (38.1)	656/1435 (45.7)
p Value, relative risk (95% CI)		<0.001, 0.36 (0.30 to 0.42)	<0.001, 0.70 (0.65 to 0.75)
Back/neck pain			
n (%)	1477/3007 (49.1)	729/2693 (27.1)	847/2921 (29.0)
p Value, relative risk (95% CI)		<0.001, 0.38 (0.34 to 0.43)	<0.001, 0.65 (0.62 to 0.69)
Chronic pain, not otherwise specified			
n (%)	56/176 (31.8)	19/167 (11.4)	25/169 (14.8)
p Value, relative risk (95% CI)		<0.001, 0.28 (0.16 to 0.49)	<0.001, 0.61 (0.47 to 0.80)
Opioids prescriptions as percentage of total visits by age			
18 to 35 y			
n (%)	901/1797 (50.1)	434/1594 (27.2)	568/1769 (32.1)
p Value, relative risk (95% CI)		<0.001, 0.37 (0.32 to 0.43)	<0.001, 0.69 (0.64 to 0.73)
36 to 53 y			
n (%)	994/1892 (52.5)	498/1611 (30.9)	602/1842 (32.7)
p Value, relative risk (95% CI)		<0.001, 0.40 (0.35 to 0.46)	<0.001, 0.66 (0.62 to 0.71)
54 to 70 y			
n (%)	432/747 (57.8)	253/794 (31.9)	291/778 (37.4)
p Value, relative risk (95% CI)		<0.001, 0.34 (0.28 to 0.42)	<0.001, 0.66 (0.60 to 0.73)
> 70 y			
n (%)	65/104 (62.5)	44/123 (35.8)	67/136 (49.3)
p Value, relative risk (95% CI)		<0.001, 0.33 (0.19 to 0.57)	<0.05, 0.76 (0.59 to 0.99)

CI = confidence interval.

Limitations

Major strengths of our study include the large sample size and use of the medical record itself, rather than insurance information, to determine the proportion of opioid prescriptions in our population. Some limitations should be noted. Our study setting was the emergency departments of two urban hospitals, one a tertiary care academic center and the other an affiliate community hospital within the same health system. Further studies would be required in community and hybrid settings, and perhaps in suburban and rural settings, to assess the degree to which our findings could be generalized to these practice environments.

Our study also employed a survey of attending physicians regarding their perceptions of the guideline. This retrospective survey was subject to recall bias and as there was overwhelming support for the guideline, there may have been some halo effect with regard to the more specific questions about patient satisfaction or degree of

Table 3. Survey of Prescribers responses (n = 31)

Since the Adoption of an Opioid Prescribing Guideline	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The rate with which I prescribe opioids has decreased.	0	3	13	58	26
The rate with which our faculty as a whole prescribes opioids has decreased.	0	3	6.5	55	35.5
Patients are overall less satisfied with the care they receive in the emergency department.	10	58	19	6.5	6.5
The guideline has made it easier for me to discuss with patients my decision to deny requests for opioids when I feel they are not indicated.	0	0	3	42	55
I have encountered less hostility during discussions related to the prescribing of narcotic analgesics.	3	16	6.5	48	26
Patients with legitimate indications for opioids are being denied access to appropriate analgesia.	58	26	3	13	0
I support the use of an opioid prescribing guideline in the emergency department.	0	0	0	19	81

Values are percentages.

hostility encountered before and after the guideline was adopted.

Further longitudinal studies should be conducted to investigate the longer-term impact of opioid prescribing guidelines. The rebound in opioid prescribing at the 12- to 18-month interval raises the possibility of a diminishing effect over time, although it should be noted that prescribing rates were still significantly lower than baseline levels before the guideline. Future studies may also investigate the combination of an opioid prescribing guideline and routine use of a PDMP.

CONCLUSIONS

We acknowledge the myriad challenges to addressing issues of chemical dependence and opioid abuse. We do not pretend that a guideline alone will solve this problem, but rather we believe that guidelines are one of a number of tools that should be considered in parallel. Heroin overdose deaths have continued to rise, even more dramatically since the plateau of nationwide opioid prescriptions after 2011 (13). While experts point to the rise in opioid prescriptions as a major contributor to heroin deaths, we are mindful that limiting the supply of opioids may provide a catalyst for drug substitution. Therefore, in addition to interventions such as guidelines or PDMPs that aim to restrict the inappropriate prescription of opioids, it is crucial that state and local health authorities invest heavily in furnishing appropriate addiction treatment.

For the presenting complaints examined in this study, a prescribing guideline significantly reduced the number of opioid prescriptions delivered in the acute care setting. The guideline was supported by physicians who perceived that it assisted them in their interactions with patients regarding the prescribing of opioids.

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APPENDIX A: EMERGENCY DEPARTMENT (ED) OPIOID PRESCRIBING GUIDELINE

Date of Issue: January 3, 2013
Guidelines for treating noncancer pain:

1. Narcotic analgesics are appropriate for acute illness or injury
   a. Discharge prescriptions are limited to the amount needed until follow-up and should not exceed 7 days worth.
   b. Oxycodone (Percocet) and hydromorphone (Dilaudid) have high abuse potential and the physician should consider using hydrocodone (Vicodin) or tramadol (Ultram).
2. The patient should not receive narcotic prescriptions from multiple doctors. Emergency physicians should not prescribe additional narcotics for a condition previously treated in our ED, by another ED or another physician
3. Patients with chronic noncancer pain should not receive injections of narcotic analgesics in the ED
4. Emergency physicians should not prescribe long acting narcotic agents such as oxycontin, extended release morphine or methadone.
5. Emergency physicians should not replace lost or stolen prescriptions for controlled substances
6. Emergency physicians should not fill prescriptions for patients who have run out of pain medications. Refills are to be arranged with the primary or specialty prescribing physician
7. Narcotic pain medication is discouraged for dental and back pain whether acute or chronic
   a. Non-narcotic alternatives such as dental block or nonsteroidal anti-inflammatory drugs are available
8. Narcotic pain medication should not be used to treat migraines, gastroparesis and chronic abdominal or pelvic pain.
9. Physicians should consider drug screening as needed to guide treatment decisions
10. Patients with suspected addictive behavior will be referred to the Psychiatric Crisis Response Center or other detoxification resources.
11. Patients identified with multiple ED visits for pain, problematic or dishonest behavior (abusive, altering prescriptions, false reports), or use of multiple hospitals for pain will be reviewed by the ED physician leadership team, which is authorized to send a certified letter stating the patient will no longer be provided narcotics in the ED.

ARTICLE SUMMARY

1. Why is this topic important?

Death from opioid overdose is a major public health threat, and emergency departments serve as a major source of opioid prescriptions. This epidemic challenges providers in acute care settings to devise and implement strategies to limit inappropriate prescription of opioids.

2. What does this study attempt to show?

This study shows that a voluntary opioid prescribing guideline significantly decreases the rates at which opioids are prescribed for minor and chronic complaints in an acute care setting.

3. What are the key findings?

There was a significant and sustained decrease in rates of opioid prescriptions for dental, neck, back, or unspecified chronic pain. The decrease in opioid prescriptions was observed in all of the diagnosis groups and in all age groups. The opioid prescribing guideline was supported by 100% of the physicians surveyed.

4. How is patient care impacted?

An opioid prescribing guideline is one of a number of tools that may be used in parallel to address chemical dependence and opioid abuse. By limiting supply of opioid prescriptions for minor complaints and chronic noncancer pain, we hope to impact the abuse and diversion of these drugs.