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# Original Contributions

## ASSOCIATION OF THE "CDC GUIDELINE FOR PRESCRIBING OPIOIDS FOR CHRONIC PAIN" WITH EMERGENCY DEPARTMENT OPIOID PRESCRIBING

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☐ **Abstract—Background: The number of unintentional deaths due to prescription drug overdose has risen in recent years due to the increased utilization of opioid analgesics. Pain is one of the most common reasons for patients to visit an emergency department (ED) and is often treated with opioid analgesics. In 2016, the Centers for Disease Control and Prevention (CDC) released guidelines for primary care providers on prescribing opioids for chronic pain. Objectives: The objective of this study was to determine if release of the 2016 CDC guidelines for prescribing opioids for chronic pain was associated with changes in prescribing habits in the ED of an academic medical center. Methods: The data were extracted from patient electronic health records between January 2015 and June 2017. The primary endpoint of the study was average morphine equivalent daily dose (MEDD) for the pre- and postguideline cohorts. Results: A total of 8652 patients were included in the analysis (4389 in the preguideline cohort and 4263 in the postguideline cohort). The average MEDD decreased significantly from 30.6 ± 20.2 MEDD in the preguideline cohort to 29.8 ± 19.5 MEDD in the postguideline cohort ($p = 0.0460$). There was also a significant decrease in the rate of concomitant opioid and benzodiazepine prescribing as well as average days' supply per prescription in the postguideline cohort, as compared with the preguideline cohort. Conclusions: The average MEDD prescribed in the ED of an academic medical center decreased after the release of the CDC guidelines on opioid prescribing for chronic pain.** © **2019 Elsevier Inc. All rights reserved.**

☐ **Keywords—opioids; emergency department; guidelines; pain; prescribing**

## INTRODUCTION

Over 42,000 Americans died from an opioid overdose in 2016; 40% of these overdoses were due to prescription opioids (1). Pain is one of the most common reasons for patients to visit an emergency department (ED) and is often treated with opioid analgesics (2–4). The percentage of ED visits for which an opioid was prescribed rose from 21% to 31% between 2001 and 2010 (5). Although administration of opioid analgesics may be necessary for some types of pain, initial prescriptions written for longer durations of therapy may be associated with long-term use. Of patients prescribed an initial 1-day supply of opioid therapy, 6.0% would be using opioids 1 year later (i.e., long-term opioid use); however, the rate of long-term opioid therapy for those prescribed an initial 8-day or more or 31-day or more supply initially increased to 13.5% and 29.9%, respectively (6).

In 2016, the Centers for Disease Control and Prevention (CDC) released guidelines for primary care providers on prescribing opioids for chronic pain. The guidelines

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aim to help primary care providers better manage patients' chronic pain while simultaneously reducing the risk of opioid abuse and overdose. The guidelines recommend that, for most patients, the morphine equivalent daily dose (MEDD) be ≤ 50 mg and to avoid increasing the dose to ≥ 90 mg MEDD unless there is careful consideration and justification. If opioids must be prescribed for acute pain, then the supply should preferably not exceed 3 days. To reduce the potential for harm from opioid use, the CDC recommends avoiding prescribing opioids to patients currently taking benzodiazepines (7). Relatedly, the American College of Emergency Physicians issued a clinical policy on opioid prescribing for adult patients in the ED in 2012 (8). These recommendations were generally broader than the 2016 CDC guidelines, but recommended avoiding routine prescribing and using the lowest possible dose for a limited duration.

### *Importance*

The literature has shown the effects of the CDC guidelines on opioid prescribing for chronic pain spillover into special populations such as in patients with cancer and sickle cell disease (9). Previous studies have also shown that EDs are a substantial source of opioid prescriptions. Development and implementation of strategies to decrease the number of opioid prescriptions and average MEDD of these prescriptions is important to help combat the rise of opioid overdose, as well as prevent inappropriate long-term opioid use.

### *Goals of this Investigation*

The objective of this study was to determine if release of the 2016 CDC guidelines for prescribing opioids for chronic pain was associated with changes in prescribing habits in the ED at an academic medical center.

## MATERIALS AND METHODS

### *Setting*

This study included one ED that averages 60,000 visits per year with a 30% admission rate, and is the state's only Level I trauma center (10). The study was approved by the institutional review board.

### *Study Design*

This retrospective cohort study aimed to observe opioid-prescribing patterns of physicians in an ED located in an academic medical center prior to and after the March 2016 release of the CDC'S "Guideline for Prescribing Opioids for Chronic Pain" (7). The primary endpoint of the study was average MEDD of ED opioid prescriptions. This endpoint was compared between pre- and postguideline cohorts. MEDD was calculated for each opioid prescription using the CDC guidelines and Centers for Medicare and Medicaid Services conversion factors (11). Secondary outcomes were opioid prescribing rate, average day supply of opioid prescriptions, and the rate of opioid prescriptions with current benzodiazepine or opioid therapy already listed in the patient's medication history.

Data were extracted from patient electronic health records from January 2015 to June 2017 and included all ED visits that met inclusion criteria. These dates were chosen so there would be a washout period of 6 months (January–June 2016) and 12 months of data prior to and after release of the guidelines. The inclusion criteria consisted of subjects 18 years of age or older who were prescribed an opioid upon release from the ED. Subjects were excluded from this study if they had a history of cancer, were currently pregnant or incarcerated, or if the visit resulted in a hospital admission.

The cohort demographic and clinical characteristics were extracted from the electronic health record with the assistance of the Arkansas Clinical Data Repository. The available data were limited to only those characteristics that were collected at every ED visit. These characteristics included age, gender, pain score, race, opioid(s) prescribed (Appendix A, available online), indication(s) for opioid prescription(s), dose, formulation (immediate release or extended release), number of units prescribed, and day supply of the medication. Instances in which patients received a discharge opioid prescription and already had a current opioid or benzodiazepine prescription on their medication list were also documented (Appendix B, available online). Pain diagnoses were classified using the associated International Classification of Diseases, Ninth Revision codes: 780–799 as pain, 710–739 were categorized as musculoskeletal, 520–579 as digestive, and 580–629 as genitourinary (12,13).

### *Statistical Analysis*

We used descriptive statistics to summarize cohort demographic and clinical characteristics. The primary endpoint and other continuous variables were examined using independent *t*-tests. For categorical variables, including cohort characteristics and patients prescribed an opioid with concomitant benzodiazepine or opioid therapy, chi-squared tests were used. All analyses used an alpha of 0.05.

## RESULTS

A total of 8652 patients were prescribed an opioid upon discharge, with 4389 patients in the preguideline cohort

**Table 1. Demographic and Clinical Characteristics**

| Demographic or Characteristic | Preguideline Cohort (n = 4389) | Postguideline Cohort (n = 4263) | *p*-Value |
|---|---|---|---|
| Age, mean ± (SD) | 41.0 (14.7) | 41.8 (15.2) | 0.0072 |
| Female, n (%) | 2301 (52.4) | 2238 (52.5) | 0.9468 |
| Race/ethnicity, n (%) | | | |
| White | 2019 (46.2) | 1917 (45.0) | 0.1326 |
| Black | 2149 (49.2) | 2120 (49.8) | |
| Hispanic | 188 (4.3) | 219 (5.2) | |
| Any pain diagnosis, n (%) | 2067 (47.1) | 2169 (50.9) | 0.0585 |
| Musculoskeletal, n (%) | 1462 (33.3) | 1607 (37.7) | 0.0035 |
| Digestive, n (%) | 884 (20.1) | 798 (18.7) | 0.0459 |
| Genitourinary, n (%) | 691 (15.7) | 687 (16.1) | 0.9833 |

and 4263 patients in the postguideline cohort. The average age of the pre- and postguideline cohorts differed significantly ($p = 0.0072$), with average age being 41.0 years and 41.8 years, respectively (Table 1). The percentage of patients with musculoskeletal diagnoses increased (33.3% vs. 37.7%; $p = 0.0035$) and the percentage with digestive diagnoses decreased slightly (20.1% vs 18.7%; $p = 0.0459$). Overall pain diagnosis rate for opioid recipients was not statistically different (47.1% vs. 50.9%; $p = 0.0585$).

The average MEDD decreased significantly ($p = 0.0460$), from 30.6 mg morphine equivalant (ME) in the preguideline cohort to 29.8 mg ME in the postguideline cohort (Table 2). The percentage of patients prescribed an opioid upon discharge with a concomitant opioid prescription on their medication list decreased significantly ($p \leq 0.0001$), from 18.7% to 15.0% in pre- and postguideline cohorts, respectively. The percentage of patients prescribed an opioid upon discharge with a concomitant benzodiazepine prescription also decreased significantly, from 2.5% to 1.6% ($p \leq 0.0001$). The average day's supply of opioids prescribed upon discharge decreased from 4.8 days to 4.5 days ($p \leq 0.0001$).

## DISCUSSION

Prior studies have demonstrated the impact of implementing opioid-prescribing policies in EDs. In several retrospective chart reviews, the implementation of prescribing policies or guidelines for opioid use in chronic pain has led to a decrease in the number of opioid prescriptions. One of these retrospective reviews utilized Ohio's prescription drug-monitoring program and found that the number of opioid prescriptions decreased after the implementation of statewide ED opioid-prescribing guidelines (14). Another study observed a decrease in the number of discharge opioid prescriptions but not in the number of morphine milligram equivalents per prescription (15). Our institution's ED recommends following the Arkansas Emergency Department Opioid Prescribing Guidelines that were developed in 2013 (16). The dates for the study were purposefully chosen to start collecting data after the above-mentioned guidelines were implemented and we chose our end date of June 2017 because monitoring the Arkansas Prescription Monitoring Program prior to prescribing an opioid became a mandatory requirement at our institution in August 2017.

Although we found a statistically significant relative decrease of 2.6% in the average MEDD from preguideline release to postguideline release, the clinical significance of this change is debatable. Because ED prescriptions were, on average, already below the 50 MEDD recommendation from the CDC, the 0.8 mg-MEDD decrease shows a small association between the release of the guidelines and MEDD. However, it is also encouraging to see that the average MEDD was well below the 50-MEDD recommendation from CDC. Although a statistically significant decrease was seen in days' supply between the groups, the average day supply for both groups was greater than the 3-day supply recommendation provided by the CDC, which means the average patient in this ED may be using opioid therapy for longer than necessary and may be at increased risk for subsequent long-term use of opioids. This is an area to consider for quality improvement. In both cohorts,

**Table 2. Primary and Secondary Outcomes**

| Outcome | Preguideline Cohort (n = 4389) | Postguideline Cohort (n = 4263) | *p*-Value |
|---|---|---|---|
| Average MEDD, mean ± (SD) | 30.6 (20.2) | 29.8 (19.5) | 0.0460 |
| Concomitant opioid, n (%) | 819 (18.7) | 638 (15.0) | <0.0001 |
| Concomitant benzodiazepine, n (%) | 110 (2.5) | 69 (1.6) | <0.0001 |
| Average days' supply, mean ± (SD) | 4.8 (2.7) | 4.5 (2.7) | <0.0001 |

MEDD = morphine equivalent daily dose.

only half of patients who received an opioid prescription had a pain diagnosis recorded. This is alarming and may indicate an appropriate area for intervention. There should be appropriate documentation in the medical record, especially when prescribing an opioid. Although it is possible that a painful event was mentioned in the encounter note, a pain diagnosis should have been included if opioids were prescribed on release.

Patients currently receiving opioid and benzodiazepine prescriptions based on their medication list at the time of their ED visit saw relatively low rates of opioid prescribing during their visit, and these rates decreased further after the guideline release. This is a positive finding due to the increased risk of harm with concomitant opioid and benzodiazepine use (17). As mentioned previously, beginning in August 2017, all prescribers in the ED who write a prescription for an opioid must check the prescription-monitoring program and document that they have monitored it. There were small changes in the rates of pain diagnoses between the cohorts. Of note, the musculoskeletal pain diagnoses increased in the post-guideline release cohort. This is interesting given that opioid prescriptions decreased after release of the guidelines.

### *Limitations*

There are several limitations worth noting for this study. The data consisted of patients from a single ED. A larger, more diverse population would likely give more generalizable results. Because the aim of the study was to observe the association of the release of the CDC guidelines with opioid prescribing, only opioids listed in the CDC guidelines with conversion factors were included. Other opioid prescriptions, notably meperidine, that were not listed in the CDC guideline were not included in this study. In addition, the data are limited to electronic health record data. Other sources of opioids or benzodiazepines would not be captured unless the patients self-reported use during the medication reconciliation process or the prescriber consulted the state prescription drug-monitoring program (PDMP) that was available, however, use of the PDMP in this setting was not mandatory in Arkansas during this timeframe. This could underestimate the rate of concurrent opioid or benzodiazepine use; however, it is expected that this underestimation would be similar across cohorts. For this study, we collected medications that were listed on the patient's medication list. Additionally, we were limited to data collected at every ED visit that were subsequently stored as structured variables rather than free text (i.e., data in the progress note). Further, the extent to which prescribers in the ED were educated regarding the CDC guidelines is unknown. Also, the guidelines were intended for treatment of chronic pain, although there were implications for acute pain in the guidelines as well; however, the goal of this study was to look at the spillover effect of the guidelines on opioid prescribing in the ED.

## CONCLUSIONS

There was a decrease in average MEDD, opioid day supply, and concomitant opioid and benzodiazepine prescriptions in the ED after the release of the CDC guidelines. Although this is a positive change, it is an unintended spillover effect from the guidelines, which were intended, not to impact prescribing in the ED, but to improve opioid prescribing in primary care for chronic pain. These changes occurred without specific local intervention, suggesting that opioid prescribing in diverse settings could be impacted. Given this association and the need for more guidance in the ED, the American College of Emergency Physicians should consider updating their 2012 clinical policy on opioid prescribing in the ED to address the rapidly changing landscape of opioid prescribing and pain management.

*Acknowledgment*—Data for the study were provided by the Arkansas Clinical Data Repository (AR-CDR) maintained by the Department of Biomedical Informatics in the College of Medicine at the University of Arkansas for Medical Sciences (UAMS). The AR-CDR is approved to operate as an enterprise data resource to support research across UAMS. Data in the AR-CDR comes from UAMS Electronic Medical Record (EMR), tumor registry, billing, and cancer genomic data and comprises encounters since 05/01/2014.

## SUPPLEMENTARY DATA

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jemermed.2019.07.016.

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## ARTICLE SUMMARY

**1. Why is this topic important?**

The number of deaths due to opioid overdose has risen over the last several years, with many of these deaths occurring as a result of prescribed opioid therapy. Emergency departments (EDs) are a substantial source of opioid prescriptions, which makes them an ideal location for intervention.

**2. What does this study attempt to show?**

This study aimed to determine if physician prescribing habits in an ED at an academic medical center changed after release of the 2016 Centers for Disease Control and Prevention (CDC) opioid-prescribing guidelines for chronic pain.

**3. What are the key findings?**

There was a decrease in average morphine equivalent daily dose prescribed in the ED after the release of the CDC guidelines. There was a significant decrease in the rate of concomitant opioid and benzodiazepine prescribing as well as average day supply per prescription in the postguideline cohort, as compared with the preguideline cohort.

**4. How is patient care impacted?**

Overall, this study showed that one academic medical center's ED changed their opioid-prescribing practices after the release of the 2016 CDC chronic pain guidelines. This change helped to provide safer care for patients.