American Pain Society
RESEARCH
EDUCATION
TREATMENT
ADVOCACY
PUBLISHED BY
ELSEVIER

The Journal of Pain, Vol ■■, No ■■ (■■), 2017: pp ■■-■■
Available online at www.jpain.org and www.sciencedirect.com

Original Report

The Effect of a Statewide Mandatory Prescription Drug Monitoring Program on Opioid Prescribing by Emergency Medicine Providers Across 15 Hospitals in a Single Health System

Brian Suffoletto, Michael Lynch, Charissa B. Pacella, Donald M. Yealy, and Clifton W. Callaway

Department of Emergency Medicine, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania.

Abstract: **Prescription drug monitoring programs (PDMPs) enable registered prescribers to obtain real-time information on patients' prescription history of controlled medications. We sought to describe the effect of a state-mandated PDMP on opioid prescribing by emergency medicine providers. We retrospectively analyzed electronic medical records of 122,732 adult patients discharged with an opioid prescription from 15 emergency departments in a single health system in Pennsylvania from July 2015 to March, 2017. We used an interrupted time series design to evaluate the percentage of patients discharged each month with an opioid prescription before and after state law-mandated PDMP use on August 25, 2016. From August (pre-PDMP) to September, 2016 (post-PDMP), the opioid prescribing rate decreased from 12.4% (95% confidence interval [CI], 10.8%-14.1%) to 10.2% (95% CI, 8.8%-11.8%). For each month between September 2016 to March 2017, there was a mean decline of .46% (95% CI, –.38% to –.53%) in the percentage of patients discharged with an opioid prescription. There was heterogeneity in opioid prescribing across hospitals as well as according to patient diagnosis.**

Perspective: ***This study examined the effect of a state-mandated PDMP on opioid prescribing among emergency medicine providers from 15 different hospitals in a single health system. Findings support current PDMP mandates in reducing opioid prescriptions, which could curb the prescription opioid epidemic and may ultimately reduce abuse, misuse, and overdose death.***

Key words: *Opioids, prescription, emergency.*

In the United States, prescription opioid misuse is a major and urgent public health concern. Rates of prescription opioid deaths are climbing, with 22,598 deaths due to prescription opioid overdoses in 2015, more than deaths due to illicit opioids.[13] Using the most recent available data, acute care visits involving the misuse of prescription opioids appear to be increasing[20] and there is evidence that prescription opioid misuse often leads to downstream illicit opioid use, further amplifying risks.[8] Because many of these trends coincide with increases in prescribing of opioid analgesics,[7] health care providershave become a target for interventions aimed at reducing opioid prescribing.[12]

One way to assist providers in reducing inappropriate opioid prescribing is through access to real-time data on a patient's past use of controlled medications. Currently, 49 states maintain prescription drug monitoring programs (PDMPs) with electronic databases containing records of controlled substances dispensed from pharmacies that can be accessed and queried by

Received August 7, 2017; Revised November 14, 2017; Accepted November 28, 2017.

Research funding was provided by an internal grant from the Department of Emergency Medicine at the University of Pittsburgh. B. Suffoletto is supported by a K23 from NIAAA (AA023284-01).

The authors have no conflicts of interest to declare.

Supplementary data accompanying this article are available online at www.jpain.org and www.sciencedirect.com.

Address reprint requests to Brian Suffoletto, MD, MS, Department of Emergency Medicine, University of Pittsburgh School of Medicine, Iroquois Building, Suite 400A, 3600 Forbes Avenue, Pittsburgh, PA 15261. E-mail: suffbp@upmc.edu

1526-5900/$36.00

https://doi.org/10.1016/j.jpain.2017.11.010

prescribers.[9] The belief is that implementation of PDMPs will reduce opioid prescribing by providers to individuals at greater risk for opioid diversion and misuse and thus lower frequency of negative consequences such as opioid abuse and mortality associated with overdose.[3] Studies examining the association between PDMP implementation and opioid prescribing do not indicate a consistent pattern of effects[4,14,15,18] which is thought to be due to the variability in legislated components as well as in implementation strategies. For example, only 29 states currently mandate prescribers to check the PDMP for each patient to whom they are considering prescribing an opioid.

In this study, we sought to determine if implementation of state-mandated PDMP in a single health system through an e-mail awareness campaign altered opioid prescribing among emergency medicine (EM) providers. EM is a medical specialty that has received significant attention related to opioid prescribing.[2,5] Reasons include the high frequency of pain-related EM care[21] and the high proportion of patients who receive an opioid prescription by EM providers.[16] Our primary hypothesis was that the percentage of adult patients discharged by EM providers with an opioid prescription would decrease immediately after implementation of the mandatory PDMP. To explore any heterogeneity, we sought to identify any differences in the total number of opioid prescriptions according to: 1) site characteristics (EM training vs nontraining; major metropolitan vs nonmetropolitan), and 2) EM provider type (MD/DO vs midlevel), and key patient characteristics (age, sex, pain severity, diagnosis categories). To understand how the PDMP affected higher count prescriptions, we examined the change in the percentage of opioid prescriptions for >12 tablets (equivalent to 3 days of treatment on the basis of most common dosing schedules) over time.

Methods

Study Design and Setting

We used interrupted time series analyses (ITSA) of retrospective electronic medical record data from 15 emergency departments (EDs) in a single health system to compare monthly rates of opioid prescribing by EM providers before and after a state law-mandated PDMP went live in Pennsylvania on August 25, 2016. The state law required all prescribing providers to query the PDMP and to document their query "each time a patient is prescribed an opioid drug product or benzodiazepine." Approximately 1 month before the "go-live" date, EM providers in our health system received an e-mail from the health system, which instructed them to register an account with the state PDMP by August 25, 2016. Approximately 1 week before the "go-live" date, EM providers were reminded through a follow-up e-mail that they are mandated by state law to query the PDMP "each time a patient is prescribed an opioid drug product or benzodiazepine or if a prescriber believes or has reason to believe, using sound clinical judgment, that a patient may be abusing or diverting drugs". When indicated, providers opened a Web browser, navigated to the state PDMP Web site (https://pennsylvania.pmpaware.net/login), logged in with their credentials, and entered patient name and birth date into the search fields. The Web site would then list all prescriptions for controlled substances filled at a pharmacy in Pennsylvania in the past 12 months.

In addition to describing the change in rates from before to after an intervention, interrupted time series designs identify any underlying trend and changes in trends post-intervention. We chose to examine pre-implementation rates of change up to >1 year before the PDMP to control for other cultural-temporal changes and examine at least 6 months post-implementation to understand durability of changes. This study was approved by the institutional review board at The University of Pittsburgh with a waiver of individual consent of patients and providers.

Selection of Participants

We collected data from the electronic medical record of all patients age 18 years or older discharged with an opioid prescription from the 15 EDs in the University of Pittsburgh Medical Center system from July 2015 to March 2017. During this study period, all opioid prescriptions in our health system were written and stored electronically. We included patients who may have been admitted for ED-based observation care and patients prescribed opioids by physicians as well as advance practice nonphysician (ie, midevel) providers. We collected the data on number of adults discharged each month from each site over the same time from the hospital registration system, which served as the denominator in our primary outcome measure.

Methods of Measurement

We extracted the following data from the electronic medical record: 1) patient age, 2) patient sex, 3) initial triage numeric pain scale (NPS) score (score ranges 0-10), 4) discharge diagnosis codes (International Classification of Diseases, 10th Revision; up to 3 per patient encounter), 5) site of patient encounter (ie, hospital), 6) EM prescriber name and qualifications (MD, DO, nurse practitioner [NP], physician assistant [PA]), 7) date and time of encounter, 8) name of opioid, strength (ie, 5 mg), and formulation (ie, acetaminophen-oxycodone), and 9) opioid quantity dispensed. We categorized patient age into quartiles and NPS scores into tertiles and EM prescribers into MD/DO versus PA/NP. We categorized sites into EM training versus non-EM training sites and into large central metropolitan versus noncentral metropolitan/rural on the basis of the 2013 National Center for Health Statistics Classification Scheme for Counties.[11] We created diagnosis categories of the most common pain-related diagnoses on the basis of the National Hospital Ambulatory Care Survey (2014)[17] using International Classification of Diseases, 10th Revision codes as follows: 1) lower (S72; S82; S92) and upper extremity fractures (S42; S52; S62), 2) abdominal pain (R10), 3) low back sprain/