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Brief Reports

EFFECT OF NEW YORK STATE ELECTRONIC PRESCRIBING MANDATE ON OPIOID PRESCRIBING PATTERNS

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☐ **Abstract—Background: Drug overdose was the leading cause of injury and death in 2013, with drug misuse and abuse causing approximately 2.5 million emergency department (ED) visits in 2011. The Electronic Prescriptions for Controlled Substances (EPCS) program was created with the goal of decreasing rates of prescription opioid addiction, abuse, diversion, and death by making it more difficult to "doctor-shop" and alter prescriptions. Objective: In this study, we describe the opioid-prescribing patterns of emergency physicians after the introduction of the New York State EPCS mandate. Methods: We conducted a retrospective, single-center, descriptive study with a pre-/post-test design. The pre-implementation period used for comparison was April 1–July 31, 2015 and the post-implementation period was April 1–July 31, 2016. All ED discharge prescriptions for opioid medications prior to and after the initiation of New York State EPCS were identified. Results: During the pre-implementation study period, 22,221 patient visits were identified with 1366 patients receiving an opioid prescription. During the post-implementation study period, 22,405 patient visits were identified with 642 patients receiving an opioid prescription. This represented an absolute decrease of 724 (53%) opioid prescriptions ($p < 0.0001$), which is an absolute difference of 2.3% (95% confidence interval 2.0–2.6%). Conclusions: There was a significant decline in the overall number of opioid prescriptions after implementation of the New York EPCS mandate.**

☐ **Keywords—opioid; prescription; abuse; electronic; mandate**

INTRODUCTION

Drug overdose was the leading cause of injury and death in 2013, with drug misuse and abuse causing approximately 2.5 million emergency department (ED) visits in 2011 (1). Of these, more than 1.4 million ED visits were related to prescription drugs (2). Illegal narcotic diversion for profit and illicit use, as well as accidental overdose and inadvertent addiction, are potentially preventable causes of death. Between 2001 and 2010, the percentage of ED visits for painful conditions increased only modestly, while the percentage of visits during which an opioid analgesic was prescribed increased from about 20.8% to 31.0% (3).

The Electronic Prescriptions for Controlled Substances (EPCS) program was created by the Drug Enforcement Administration, and has several key benefits. These include the potential to decrease medication errors by eliminating illegible handwritten prescriptions; improving patient safety by utilizing databases that provide warnings for drug interactions and allergy checking; reduces fraud, abuse, and diversion of controlled

The study was approved by the Staten Island University Hospital Institutional Review Board.

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medications; and streamlining the prescription process benefiting prescribers and patients (4,5). Despite these benefits, electronic prescribing is required in just a few states.

In New York State, all practitioners were mandated to electronically prescribe both controlled and non-controlled substances as of March 27, 2016. The Emergency Department Information System (EDIS) at Staten Island University Hospital was updated to meet the legal requirements to fulfill this mandate. Providers were also provided with the two-factor authentication identity proofing, as required by law, to ensure the security of these prescriptions (6).

We describe the opioid prescribing patterns of emergency physicians after the introduction of the New York State EPCS mandate.

METHODS

We conducted a single-center, descriptive study with a pre-/post-test design, based on retrospective reviews of electronic medical records (EMRs). The study was conducted at Staten Island University Hospital, a 700-bed, tertiary-care teaching hospital in Staten Island, NY. The ED has a census of 90,000 patient visits per year, with an estimated 75% discharge rate. The ED is staffed by 55 full-time, part-time, and per-diem board-certified emergency physicians. The study was approved by the Institutional Review Board.

The study included two 4-month periods, 1 year apart. The pre-implementation period used for comparison was April 1–July 31, 2015 and the post-implementation period was April 1–July 31, 2016. The pre-implementation period was chosen to avoid any bias related to seasonal differences in patient visits. All ED discharge prescriptions for opioid medications during the study period were identified and included in the analysis. The intervention was the initiation of New York State EPCS. The New York State EPCS became effective on March 27, 2016 and mandated practitioners to electronically prescribe both controlled and non-controlled substances. The mandate also required a two-factor authentication, which was accomplished by the use of a hard token at Staten Island University Hospital (SIUH). At SIUH, only attending physicians were trained and provided with EPCS tokens. Mid-level providers, which include physician assistants and residents, were not provided with tokens. All ED discharge prescriptions for opioid medications prior to and after the initiation of New York State EPCS were identified and included in the final analysis. Patients who were admitted to the hospital were excluded from analysis.

The primary outcome measure was the number of prescriptions for opioid medications prescribed upon discharge from the ED. Prescription drug names, patient self-reported demographics, and primary diagnosis were also obtained from an electronic database. The reason for opioid prescription was inferred from the primary diagnosis in the chart.

Prescriptions were then assigned to 1 of 15 pre-determined categories. These categories were based on the primary discharge diagnosis. Prescriptions that did not fit into one of the pre-determined categories were assigned to the "other" category.

The data were collected by the study investigators, and managed using Research Electronic Data Capture (REDCap), a secure, web-based application designed to support data capture for research studies at SIUH. Demographic and baseline clinical characteristics were calculated as means for continuous variables and numbers with percentages for categorical variables. Differences in the primary outcome variable of the number of opioid analgesic prescriptions between the time periods of pre–New York State EPCS and post–New York State EPCS were compared with two-sample z-test for the difference between proportions. The analyses were performed for each primary diagnosis separately, as well as for the overall prescriptions. All statistical tests are two-sided and $p < 0.05$ was considered to indicate statistical significance. All data analyses were performed using the SAS software, version 9.3 (SAS Inc, Cary, NC).

RESULTS

During the pre-implementation study period, 22,221 patient visits were identified with 1366 patients receiving an opioid prescription. During the post-implementation study period, 22,405 patient visits were identified, with 642 patients receiving an opioid prescription. No patients received more than one opioid prescription. This represented an absolute decrease of 724 (53%) opioid prescriptions ($p < 0.0001$), and an absolute difference of 2.3% (95% confidence interval 2.0–2.6%). While the overall number of prescriptions to male patients decreased, the percentage of these prescriptions increased by 6%. Demographic characteristics of subjects in each study period are listed in Table 1.

The absolute number of prescriptions for nearly every category was lower in the post-implementation period, while the percentage of prescriptions in these categories remained the same. There were statistically significant decreases in the percentage of patients receiving opioid prescriptions in each category, except urinary tract infection (UTI) and corneal abrasions (Figure 1).

DISCUSSION

This study demonstrates that the overall number of opioid prescriptions has decreased significantly for both male

Table 1. Demographics Characteristics of Populations in the Pre- and Post-Intervention Groups

Characteristics	Pre-Intervention	Post-Intervention	*p* Value
ED census (n)	22,221	22,405	
Opioid prescriptions, n (%)	1366 (6.1)	642 (2.9)	
Age, y, mean (SD)	47.5 (16.7)	48.2 (16.8)	0.4322
Sex, male, n (%)	655 (48)	347 (54)	0.0117
Insurance statues, n (%)			
Private	682 (49.9)	340 (53.0)	0.2077
Governmental	532 (38.9)	222 (34.6)	0.0658
Uninsured	152 (11.1)	80 (12.3)	0.4122
Ethnicity, n (%)			
Asian	48 (3.5)	22 (3.4)	0.9362
Black	204 (14.9)	75 (11.7)	0.0574
White	858 (62.8)	441 (68.7)	0.0121
Other	256 (18.7)	104 (16.2)	0.1676

ED = emergency department; IQR = interquartile range.

and female patients after implementation of the New York State EPCS mandate. Interestingly, the percentage of total prescriptions written for males increased by 6%. The etiology of this increase is unclear, and the issue of sex differences in prescribing patterns may require further investigation. The evaluation of opioid prescriptions resulted in a statistically significant decrease in every category, except UTI and corneal abrasions. The percentage of patients with UTIs and corneal abrasions obtaining opioids was very small, which may explain why a significant decrease was not appreciated. It should also be noted that during the study period, there was no significant changes in the patient census, attending staffing, or mid-level provider staffing, which would affect prescribing patterns.

EPCS has the capability to decrease opioid fraud and abuse. In a large practice setting, such as an ED, where patients who return for multiple visits and will typically be seen by multiple clinicians, EPCS allows providers to track opioid usage. In addition, EPCS systems often integrate safety measures, which can also enhance patient safety. These safety measures include drug dosage reminders and drug–drug interactions.

Incorporating prescription drug monitoring programs (PDMPs) into EPCS allows physicians to track and monitor existing opioid prescriptions. Internet System for Tracking Over-Prescribing, commonly referred to as I-STOP, is the PMDP for NY State. ED providers are currently exempt from the usual requirement to check I-STOP prior to writing an opioid-containing prescription. This exemption applies if the prescription is for five days or less. Creating a PDMP that can be easily integrated into the EMRs of multiple EDs will help eliminate the valuable time needed to log into another platform such as I-STOP.

A recent study evaluating the effect of statewide mandatory PDMPs on opioid prescribing patterns in an ED across 15 hospitals in a single health care system in Pennsylvania demonstrated that PDMPs led to a decrease in opioid prescriptions (7). SIUH utilizes Surescripts (Surescripts, Arlington, VA) as their electronic intermediary between the EDIS and the receiving pharmacy. The program displays prior prescriptions for a patient to whom opioids were prescribed through SureScripts (8). EPCS, therefore, allows providers to see patients' medication histories at the point of care, within a given location, and aids in the assessment of behaviors associated with drug abuse. EPCS also ensures prescriptions are securely transmitted from provider to pharmacy without the risk of forgery. It is still too early to report on most other states that have recently implemented the mandate. New York has the most recent data and in April 2017,

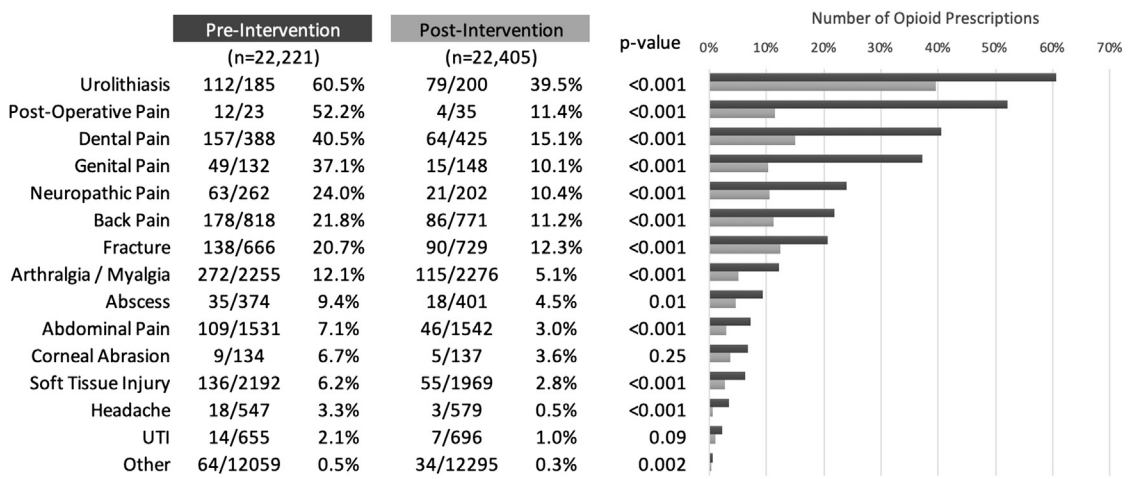

Figure 1. Opioid prescriptions by diagnosis category. UTI = urinary tract infection.

New York State reported a decline in the prescriptions of opioid analgesics from 2014 to 2016 (9).

The results of this study demonstrated that the opioid prescribing patterns of physicians at SIUH are consistent with the American College of Emergency Physicians (ACEP) clinical policy for the prescribing of opioids for adult patients in the ED. Specifically, as recommended by ACEP and demonstrated in our study, providers who are discharging patients from the ED with acute lower back pain should consider non-opioid analgesics for initial pain control. Additionally, ACEP recommends that clinicians avoid the routine prescribing of outpatient opioids in patients with an acute exacerbation of chronic non-cancer pain. In these patients, the recommendation is a limited duration of, for example, less than 1 week. Finally, the policy published in 2012 suggests that the use of a state PDMP may help identify patients who are at high risk for prescription opioid diversion or doctor shopping (10).

The decrease in the overall number of opioid prescriptions at SIUH after implementation of the New York State mandate are likely attributed to several factors. First, as discussed previously, EPCS appears to be functioning as intended by allowing providers to see patients' medication histories prior to initiating new prescriptions. In addition, there are other practical measures that are likely contributing to the decrease in prescribing patterns. The two-factor authentication identity proofing required for EPCS increases the number of actions and time required to write a prescription. This additional time may provide physicians with the opportunity to consider whether an opioid prescription is truly necessary. Furthermore, at our institution, only attending physicians, not mid-level providers, have the ability to order these prescriptions. Consequently, attending physicians may be less likely to add this task to their already busy workflow. Prior to the EPCS mandate, the ED attending physician was responsible for determining whether to prescribe opioids; however, a mid-level provider had the ability to order and print the prescription.

Limitations

This study has several limitations. We conducted a retrospective study at a single community hospital. As a result, the study is subject to the limitations inherent in such studies and the results may not be generalizable to other practice settings. Moreover, the 15 categories of reasons an opioid prescription was given were based on the primary discharge diagnosis. It is possible that an alternative reason for the prescription was missed because the medical decision making of the chart was not reviewed. In addition, the study was constructed using a pre–post intervention design. The pre–post design inherently limits the ability to definitively conclude that the protocol change caused the observed change in prescribing patterns, as it is impossible to control for and exclude any other changes that occurred between the study periods.

At SIUH, only attending physicians were given tokens for EPCS. Other EDs may allow different EPCS privileges, which could affect prescribing patterns. Furthermore, many prescribers reported the new EPCS to be cumbersome and slow, which possibly influenced their prescribing patterns. In addition, our EDIS system included a link that displayed prior prescriptions for a patient that was prescribed medications through SureScripts. Surescripts' interoperable network connected 1.3 million health care professionals with secure patient data for 230 million Americans, or 71% of the population (10). This feature may function as a limited surrogate for a PDMP. Most states have implemented a PDMP whereby providers can review their patients' prescription histories, allowing safer prescribing practices and potentially decreasing abuse. Physicians have been surveyed regarding these programs and their opinions are mixed regarding how PDMPs impact their prescribing practices (4,11,12). Specific to EDs, the ACEP published a clinical policy that addressed the utility of state PDMPs (13). They found a lack of data to describe the effects of a real-time PDMP on the prescribing patterns of emergency physicians. Finally, the alteration of physician prescribing patterns due to their awareness of their actions are possibly being observed and recorded in an electronic database cannot be excluded. In response to this, the authors plan to repeat this analysis after the 2-year anniversary of the New York State EPCS.

CONCLUSIONS

Based on the results of the study done at SIUH, it has been demonstrated that there was a significant decline in the overall number of opioid prescriptions after implementation of the New York State electronic prescribing of controlled substances mandate. Electronic prescribing should be considered by institutions seeking methods of safely transmitting opioid prescriptions and reducing the overall number of opioids prescribed. The long-term effects of this mandate still need to be assessed.

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ARTICLE SUMMARY

1. Why is this topic important?

Drug overdose is a leading cause of injury and death. Drug misuse and abuse are common reasons for emergency department visits.

2. What does this study attempt to show?

Describe the opioid prescribing patterns of emergency physicians after the introduction of the New York State Electronic Prescribing of Controlled Substances mandate.

3. What are the key findings?

There was a significant decline in the overall number of opioid prescriptions after implementation of the New York State Electronic Prescribing of Controlled Substances mandate.

4. How is patient care impacted?

Electronic prescribing of controlled substances may change clinician's opioid prescribing patterns. In addition, electronic prescribing can help decrease opioid fraud and abuse.