Impact of Patient Prescription History on Emergency Department Opioid Prescribing for Acute Pain

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GLOSSARY OF ABBREVIATIONS

ED – Emergency Department

MA – Massachusetts

MCSR – Massachusetts Controlled Substance Registration

PA – Physician Assistant

PDMP – Prescription Drug Monitoring Program

PMP – Prescription Monitoring Program
WORK ATTRIBUTION AND ACKNOWLEDGEMENTS

The research concept, survey design and survey language were developed by Mr. Sueker and Dr. Weiner. Mr. Sueker created the survey in Qualtrics and performed the literature review. IRB submission was jointly drafted. The survey was distributed by Dr. Weiner. Results were analyzed and interpreted by Mr. Sueker. This report was written by Mr. Sueker, with Dr. Weiner’s input and revisions.

Dr. Weiner, thank you for shepherding me through this process. I look forward to continuing to work together. Special thanks to Professor Chase Harrison of the Harvard Center for Survey Research for valuable input on survey design and analysis. Thank you to Daniel Hercz for analysis advice and to the Scholars in Medicine Office for their guidance and most importantly, patience.
BACKGROUND

Statement of Research Purpose

The research question to be answered is whether viewing a patient’s schedule II-V prescription drug history changes the likelihood that a clinician will prescribe a short-acting opioid pain reliever for non-cancer pain in an emergency department context. The secondary research question is whether viewing a summative and interpretive overlay on the patient’s prescription drug history has a greater impact on opioid prescribing than the usual information that is currently displayed by the state.

The Opioid Epidemic

A significant body of evidence has emerged since the early 2000s that the United States is in the midst of an epidemic of prescription drug abuse, leading both to increased drug overdoses and deaths as well as increased heroin use. In 2006, Paulozzi et al published a paper using national data on overdose deaths which presented evidence that overdose deaths were increasing and that prescription opioids were playing an increasing role in them.(1) From 1979-1990, the rate of death from unintentional drug poisoning rose 57.9%, while from 1990-2002, the rate increased by 217.6%. By 1998, 85% of overdose deaths were attributed to opioids, cocaine, a combination of drugs often involving opioids or an unspecified drug. Between 1999-2002, the authors found that deaths listing opioid analgesics increased by 91%, while those listing cocaine or heroin increased 22.8% and 12.4%, respectively. Similarly, by 2002 opioid analgesics were listed among the causes of death 36.5% of unintentional drug poisoning cases, and cases attributed to opioid analgesics alone (i.e. without heroin or cocaine) accounted for 50% of the increased overdose deaths in this category from 1999-2002. A review of unintentional drug overdose deaths in West Virginia in 2006 found that opioid analgesics contributed to 93% of them, with less than half of these having associated documentation of a prescription.(2) In a 28-state sample from Centers for Disease Control and Prevention (CDC) data between 1997 and 2002, opioid involvement in drug-related deaths rose 96%.(3) In 2008, the CDC estimated that 54% of all drug overdose deaths were due to an opioid pain reliever. Their analysis also found that sales of opioid pain relievers quadrupled between 1999 and 2010.(4) A follow-up study found that rates of opioid abuse related to emergency department (ED) visits is rising faster among women than men.(5) Another follow-up study using CDC data found that prescription opioid use in grams per 100,000 people increased by 1,448% from 1996 to 2011. During that same period of time, ED visits attributed to opioid misuse increased by 4,680%.(6)

Concurrent to the increased direct role of prescription opioids in ED visits and drug overdoses, there is growing evidence suggesting that increased prescription opioid use nationally has contributed to increased adoption of heroin and injection drug use more generally. Multiple studies have identified patterns of prescription opioid abuse predating a transition to either injecting prescription opioids or using heroin. This is in contrast to many active heroin users in the 1960s-1980s for whom heroin was the first opioid recreationally used. Some study subjects describe transitioning to heroin as a substitute when prescription opioids were unavailable.(7)(8)(9)(10)
Emergency Department Opioid Prescribing

It has been difficult to characterize precisely the extent to which issues of increased opioid prescriptions affect the emergency department, but a number of studies point in the direction of an important role. According to a review of nationwide opioid prescriptions in 2009, emergency physicians as a specialty ranked third in terms of the total number of opioid prescriptions dispensed to patients in the 10-19 and 20-29 year age groups, and ranked fourth among those prescribed to patients 30-39.(11) Data from the U.S. CDC suggests that 60% of drug overdoses are correlated with long-term low (<100mg morphine equivalents) or high dose prescriptions from a single providers, while the remaining 40% of overdoses are associated with high dose prescriptions from multiple providers.(12) Clinicians in the emergency department who prescribe opioid analgesics are likely to be one of these ‘multiple providers.’

A few studies have directly focused on opioid prescribing from the ED. Beaudoin et al observed a prospective cohort of 85 patients prescribed opioids from a large academic emergency department.(13) Patients agreed at the time of prescription to 3 and 30 day follow-up by telephone. Of the 85, 42% reported prescription opioid misuse at one or both of the follow-up times. Of these misusers, 92% reported self-escalation, while 39% reported taking opioids without a doctor’s prescription. Presence of risk of abuse in the past 12 months as predicted by the DAST-10 questionnaire had an OR of 18 (4.5-73.5) associated with reported misuse in the study.

Peirce et al, though not directly studying ED patients, analyzed a cohort of all unique individuals prescribed a class II-IV controlled substance over a 1.5 year period from 2005-2007 in West Virginia. Those individuals who had died at the time of the study were classified as cases, matched to all other patients for controls. Of the deceased, one quarter were found to have engaged in doctor-shopping (3.6 % among controls), 17.5% were considered pharmacy shoppers (vs.1.3%). Of the doctor shoppers, 49% had 3 or more different substances dispensed (vs. 5.6%).(14)

Hoppe et al conducted a retrospective chart review of 296 patients who were discharged from a Colorado ED in October 2009 with an opioid prescription. They then used the Colorado online prescription monitoring program to assess for prior opioid prescription behavior. Though 69% of the patients had 0 or 1 prior opioid prescription in the preceding 6 months, the top decile of patients had an average of 7 prescriptions. Of these patients, an ED chart review found that more than 60% did not report a chronic pain condition or opioids as a regular medication. Also of note, the range for number of providers was 0-16 among all 296 patients, and the upper end of the range for pharmacies was 10.(15)

Another measure of the salience of the risks of opioid prescriptions from the ED is the perception of liability exposure. Physicians can and have been sued in cases of overdoses related to an ED opioid analgesic prescription. (16) Given the increasing attention being paid to the risks of ED opioid analgesic prescriptions, the American College of Emergency Physicians has released guidelines related to opioid prescriptions and on managing pain that emphasize minimizing use of opioids where possible, despite the paucity of large clinical trials to support many of their recommendations. (17)(18)
Prescription Drug Monitoring Programs

Prescription Drug Monitoring Programs (PDMPs) (sometimes also called Prescription Monitoring Programs (PMPs)) are U.S. state-based programs established to track the prescriptions of a range of U.S. Drug Enforcement Agency Schedule II-V (depending on the state) pharmaceuticals and to provide that information to relevant interested parties. In 1989 only 9 states had active PDMPs. By 2012, a rapid expansion partly supported by federal funding and coordination increased that number to 41, with an additional 8 states and 1 territory having passed legislation to establish PDMPs.(19)

The Massachusetts PDMP was established in 1992 and is administered by the Department of Public Health. It currently tracks all Schedule II-V substances either dispensed by pharmacies located physically in the Commonwealth or which deliver to residents of Massachusetts. As is the case for the majority of state programs, data on prescriptions filled in neighboring states, regardless of the residence of the patient or the location of the prescriber, is not recorded by the Massachusetts PDMP.(20) The 2006 National All Substances Prescription Electronic Reporting Act (NASPER) has provided some funding for inter-state data aggregation and currently 29 states obtain cross-border data.(21) PDMP data are typically reported to states by the pharmacies which dispense the monitored medications on a routine basis. These data are then collected by the state and made available to physicians often via a website. In Massachusetts, all physicians, dentists and podiatrists are automatically enrolled to have access to the web portal when their Massachusetts Controlled Substance Registration (MCSR) is obtained initially or renewed. Beginning in January, 2015, all advanced practice nurses and physician assistants (PA) with MCSR are automatically enrolled. With enrollment, prescribers must then obtain and maintain a username and password. PDMPs are rarely integrated into electronic medical records systems, requiring that a prescriber log into the PDMP portal for each patient they wish to look up. Moreover, Massachusetts law currently requires that prescribers “utilize the PMP prior to prescribing, to a patient for the first time, a narcotic prescription drug in Schedule II or III or a prescription drug containing a benzodiazepine.”(20) When a prescriber in Massachusetts looks up a patient in the PDMP by name, they are provided with the following data for the prior year, current to within 1-3 weeks of the date of inquiry: Patient Name and Date-of-birth, Drug name, Dose, Quantity of pills, Days’ supply, Date Filled, Prescriber name, Pharmacy with address, and Payment method (including “Self-Pay”).

Faced with this information on a patient, providers face a number of challenges in interpreting a PDMP report. This description will focus on Massachusetts, but many of these concerns are broadly applicable. These challenges can be roughly grouped into three categories: Trusting the data, making additional calculations, and determining whether a given profile provides evidence-based support for a prescribing decision. First, there are a few ways in which the provided prescription monitoring data may obscure the “complete picture.” Patients may provide different names to different providers, making it difficult to be certain that one has the complete history of a patient, especially one on whom little collateral information is available in the ED. Additionally, when multiple prescribers within the same group care for the same patient, the PDMP report may reflect the use of multiple providers by the patient – raising concerns for ‘doctor shopping’ – when in fact they may have been faithfully visiting one clinic. Additionally, as mentioned above, the PDMP will omit prescriptions filled in neighboring states. This is of particular relevance in a small northeastern state such as Massachusetts, and in particular for providers
and EDs located close to a state border or who otherwise have many interstate patients. Second, a number of the aggregate parameters that a prescriber may be interested in are not automatically calculated in the MA PDMP. These include total daily dose for each medication, total number of medications of each drug class prescribed in a given month (or other period), number of prescriptions refilled early, number of prescribers and number of pharmacies used. Calculating each of these values requires only simple arithmetic, but it is fair to assume that a busy clinician may not take the time to calculate them and instead, correctly or incorrectly, rely upon a ‘gestalt’ reading of the profile. Third, there are currently no well-established guidelines for identifying patients who are “high-risk” or whose profile is suggestive of “suspicious activity.”(19) There are likely many instances in which this is immaterial, such as if a clinician has a specific binary question such as whether or not a patient has recently been prescribed a given class of drug, whether a patient has received prescriptions from any other prescribers, or whether a patient has been faithfully filling prescriptions provided by the prescriber inquiring. These are questions often more typical of an outpatient setting in which a longitudinal relationship with the prescribers is established. By contrast, ED prescribers looking up their patients’ PDMP reports are often interested in a broader question. Some examples include: “Does my patient have a recent history of ‘doctor-shopping’?”, “Is my patient likely to be engaged in problematic use of a prescribed substance?”, and “In the context of my patient’s recent prescription history, would a prescription for drug “X” pose an increased danger to their health?” The current Massachusetts Prescriber Guide for interpreting PDMP data provides no specific guidance for using the PDMP to answer these types of questions.(20)

Risk Factors

There exists, however, a body of research that has identified risk factors related to the types of behaviors or outcomes a clinician may be concerned about, particularly the risk of overdose.

Paulozzi et al identified 300 deaths over two years in New Mexico due to licit or illicit drug overdose for whom at least one record existed in the NM PMP within the 6 months prior to their death.(22) These were paired with 5,993 matched controls from the PDMP records. Risk factors that were significant in the adjusted analysis included male sex (AOR 2.4, 95% CI 1.8-3.1), overlapping opioid prescriptions (OR 11.7, 95% CI 8.8-15.7), one or more sedative/hypnotic prescriptions (AOR 3.0, 95% CI 2.2-4.2), overlapping sedative hypnotic prescriptions (OR 11, 95% CI 8.2-14.7), an average daily dose in morphine milligram equivalents (MME) greater than 40 (OR 12.2, 95% CI 9.2-16.0), a history of buprenorphine (AOR 9.5, 95% CI 3-30) and all opioids and opiates with the exception of meperidine. A single peak daily MME greater than 40 was itself associated with an OR of 3.3 (95% CI 2.6-4.1). The unadjusted OR related to the number of prescriptions of any controlled substance within the prior 6 months was 1.8 after 2 prescriptions, rising almost linearly to 8.9 for 8-10 prescriptions. The OR for greater than 2 pharmacies was 2.3 (95% CI 2-2.5). For number of prescribers, the OR was 2.8 for 3, 3.5 for 4-5 prescribers and 8.2 for 10-30 prescribers.(22)

Paulozzi et al also studied a cohort of 789,457 non-cancer patients with at least one opioid prescription in 2008-2010 via an employer-sponsored health insurance claims database.(23) The group was able to track patients without opioid use in the first half of 2008 through the end of 2010. They found a positive
correlation between duration of continuous opioid use and both a diagnosis of drug abuse and all-drug and opioid analgesic-related overdose rates per 1000 people. Rates continued to increase with each progressive 6-month period in the study. The highest rates for those with 3 years of use were 25-30 per 1,000 people for drug abuse, 3 per 1,000 for all-drug overdose and 0.8-1.0 per 1,000 for opioid analgesic-associated overdose.

Baumblatt et al identified 592 unintentional or “undetermined” overdose deaths due to opioids during 2009 and 2010 in Tennessee who also existed in the Tennessee PDMP.(24) The odds ratio of overdose exceeded 4 for having 2-3 prescribers and was 15.4 (95% CI 12.6-18.5) for those with 4 or more prescribers in the past year. Similarly, the OR exceeded 5 with 2-3 pharmacies used was 20.9 (95% CI 16.3-26.8) for 4 or more. Receiving a mean daily dose of greater than 100 MME conferred an OR of 21.3 (95% CI 16.6-27.4).

Toblin et al studied the contributory effects of mental illness and psychotropic drugs including benzodiazepines on a group of 295 people who died in West Virginia of unintentional overdose due to a prescription medication (autopsy confirmed). Neither a benzodiazepine alone or in combination with other psychotropic drugs produced an OR of death different from 1. The combination of benzodiazepines and opioids was not assessed in this paper due to its focus on mental health disorders as antecedents to overdose.(25)

Gomes at al performed a case-control study utilizing Canadian patient data on 498 people whose death was opioid-related between 1997 and 2006. They found that escalating average daily doses in MMEs, as compared to a base dose of less than 20 MME/day, were correlated with increased opioid-related mortality risk. The dose related ORs were: 50-99 MME/d, OR 1.92 (95% CI 1.30-2.85); 100-199 MME/d, OR 2.04 (95% CI 1.28- 3.24; and 200 MME/d or greater, OR 2.88 (95% CI 1.79-4.63).(26) Dunn et al performed a similar analysis on 51 opioid-related overdoses (6 deaths among them) among patients enrolled in a pre-paid group health consortium in Washington State, 1997-2005. Compared to patients receiving an average daily dose of 1-20 MME in the 90 days prior to overdose, those receiving 50-99 MME/d had an OR of overdose of 3.7 (95% CI 1.5-9.5) and a 0.7% annualized overdose rate. Those receiving 100 MME/d or more had an OR of 8.9 (95% CI 4.0-19.7) and a 1.8% annual overdose rate.(27)

Hall et al performed a descriptive analysis of 295 overdose deaths related to a prescription pharmaceutical in 2006 in West Virginia. Sixty-three percent of patients had no record within West Virginia of a prescription for at least one the contributory prescription medications while 21.4% of decedents obtained a controlled substance from 5 or more different doctors in the preceding year. Ninety-three percent of decedents were taking opioid analgesics for which documentation of a prescription was available in less than half of cases.(2)

A number of authors have also looked at correlates of outcomes less severe than overdose or death, such as propensity for abuse, misuse or diversion. Rice et al utilized a large claims database to study 6380 patients diagnosed with an opioid substance use disorder and compare them with 815,536 patients who had used opioids without such a diagnosis.(28) Having filled 1-5 opioid prescriptions in the previous 12 months was associated with an OR of 2.23 (95% CI 1.99-2.51) for being diagnosed with a
substance use disorder while 6 or more prescriptions had an OR of 6.85 (95% CI 5.98-7.85). Filling prescriptions at 3 or more pharmacies had a slightly elevated OR of 1.61 (1.48-1.74) while have 3 or more prescribers did not yield a statistically significant result. White et al used the same approach to identify 875 patients as “opioid abusers” to compare with 115,507 opioid users from the Maine Health Care organization in 2005-6.(29) Using 1-3 opioid prescriptions in a 3-month period as the index, 4 or more prescriptions had an OR of 7.34 (95% CI 6.14-8.76). Two or more pharmacies yielded an OR of 2.14 (95% CI 1.82-2.51) and one or more early refills yielded an OR of 3.39 (95% CI 2.86-4.03). In a secondary model, having two or more prescribers was not statistically significant. Lastly, data from the U.S. CDC’s Drug Abuse Warning Network ED visit database found that of ED visits primarily related to opioid pain relievers or benzodiazepines, 18.5% and 27.2% of these visits, respectively, were complicated by co-occurring alcohol use.(30) Alcohol use, though not reported in a PDMP, may be included in a prescriber’s interpretation of a patient’s opioid use risk.

**PDMP Impact on Prescribing in the Emergency Department**

Attempts to evaluate the effect of PDMPs on the prescription of opioids have tended to focus on population-level, ecological data.(31)(32)(33)(34)(35)(36)(37) While the American College of Emergency Physicians has offered a limited endorsement of their use in clinical encounters pertaining to the possible prescription of opioids or sedative/hypnotic medications,(17)(38) there thus far exists a limited body of research documenting the impact that PDMPs have on clinical decision-making in an emergency department context. These are the studies upon which the current research is most directly modeled.

In 2010, Baehren et al published the results of a quasi-experimental study performed in Toledo, Ohio. Seventeen clinicians were included in the study for the evaluation of 179 clinically stable patients being evaluated for a chief complaint of pain.(39) After examining the patients, the clinicians where asked by research assistants how likely they were to query the Ohio PDMP (OARSS), how likely they were to write the patient a prescription for a controlled substance, and if likely, what and how much. Clinicians were then presented with the PDMP profile of their patient and re-assessed regarding their likelihood to prescribe, rated as “low”, “medium” or “high”. Providers were also asked to report non-PDMP factors that influenced their decision-making. Providers changed their decision to prescribe for 41% of patients, prescribing fewer or no opiates for 61% of these and prescribing more for 39%. Common reasons cited for management changes are familiar to the discussion of risk-factors for abuse and overdose previously discussed, including the number of prior prescriptions, the number of prescribers, the number of pharmacies used and the number of different patient addresses used. The authors note that the generalizability of the results is likely impacted by the fact that 4 of the 17 providers in the study were responsible for two-thirds of the patient encounters.(39)

In 2012, Grover and Garmel conducted a survey-based study of ED clinicians at their home institution using a series of six fictitious case vignettes. Respondents were presented with a patient who complains of long-standing back pain due to a “slipped disc” and who states he has run out of his regular prescription opioid and cannot get in touch with his primary provider. Each case then varied in the
patient prescription history as reported in a fictitious PDMP, with respondents asked in each case how likely they think the patient is to be “drug seeking.” Respondent assessment of drug-seeking behavior varied by case but was highest on aggregate for the patients with six prescriptions per month and six providers in a two-month period. The inter-rater agreement for each patient ranged from poor to moderate.(40)

Building on the work of Baehren and Grover, Weiner et al studied the correlation between provider clinical impression and PDMP data in assessing the likelihood of drug-seeking behavior in two academic EDs in Massachusetts. 544 emergency department patient encounters for chief complaints of back pain, dental pain or headache were included. After clinically evaluating each patient, providers were assessed prior to and after viewing the patient’s PDMP regarding their assessment of whether the patient was drug seeking, which patient factors led them to that conclusion, and their likelihood of prescribing an opioid pain medication. Drug seeking behavior was defined a priori as at least 4 prescriptions and 4 prescribers in the past 12 months. Clinician impression had a positive predictive value for drug seeking behavior by PDMP data of 41.2%. Between initial assessment and the post-PDMP assessment, clinicians changed their stated prescription plan for 9.5 of the patients involved.(41)

Our current study builds on the work of the three studies just described by focusing specifically on the impact that viewing a PDMP can have on the decision to prescribe a short-acting opioid pain reliever.
METHODS

Overview

The study design utilized an online survey instrument created within the Qualtrics web-based survey tool. The study design involved respondents indicating their likelihood to prescribe an opioid medication before and after exposure to a PDMP profile in order to measure the impact of that exposure. Each respondent was presented with the same three patient case vignettes in the same order. The patient vignettes and their associated PDMP profiles can be found in Appendix A. Screenshots of the full survey (No Interpretation version) can be found in Appendix B. For each case, the respondent was shown the vignette describing the patient presentation and key exam findings, followed by the question “Based on this information, how likely are you to prescribe a short-acting opioid pain medication (e.g. oxycodone or hydrocodone) for this patient?” There were four response options (select one): “Very Likely”, “Somewhat Likely”, “Somewhat Unlikely”, and “Very Unlikely”. Respondents were next shown a screenshot designed to appear similar to layout and coloring to a real Massachusetts PDMP profile and asked to review it “in light of the clinical question regarding whether or not to prescribe a short-acting opioid medication.” Below the PDMP profile, respondents were asked the following with the same four response options as above: “Given the information in this patient’s Prescription Drug Monitoring Program profile, how like now are you to prescribe a short-acting opioid pain medication (e.g. oxycodone or hydrocodone) for this patient?” Respondents were randomized at the consent page to either an Interpretation or No Interpretation group for the purposes of studying the secondary outcome. Respondents in the Interpretation group saw the same PDMP profile as the No Interpretation group for all three cases, but with a modification in the top left adding additional summary numbers and interpretation. The two PDMP versions for each case can be compared in Appendix A. All respondents then completed the same demographic and decision-making questions (Appendix B).

Recruitment of Respondents

Potential respondents were clinicians, either physicians or PAs, who are affiliated with the Brigham and Women’s Hospital Emergency Department, both in Boston, MA. Respondents were contacted via a recruitment email containing a link to the survey and were sent one reminder email over a two week period. Consent was provided at the outset of the survey (see screenshot in Appendix B), and respondents were free to close the survey at any time. Respondents were not compensated nor were any professional rewards made contingent on participation. The Partners IRB approved the study.

Selection of Patient Case Presentations

The goal of this study is to assess the impact that a patient’s schedule II-V prescription history has on a clinician’s decision to write for a short-acting opioid medication from the emergency department to treat acute non-cancer pain. Doing so requires a clinical scenario in which a prudent ED clinician could reasonably decide in favor or against prescribing an opioid analgesic without violating an established standard of care. As such, scenarios involving major trauma or significant fractures were avoided given the likelihood that most providers would offer opioids regardless of history. Pain likely due to an internal process requiring further immediate intervention – i.e. abdominal pain, renal colic – was also eschewed.
Headaches, though a common cause of opioid prescriptions in the U.S., were eschewed because increasing clinical consensus urges against use of opioids even as a second line. In all cases, patients report having already taken multiple maximum doses of NSAIDS with insufficient relief. In all clinical scenarios, the patients state that they have already attempted analgesia with appropriate starting doses of ibuprofen and acetaminophen. The three clinical vignettes can be found in Appendix A.

The first case, “Back Pain,” involved acute on chronic back pain with a normal neurologic exam and a story suggestive of muscle strain. This patient states that prior similar episodes have responded to a few days of oxycodone or hydrocodone. A 2007 systematic review suggests opioids may be appropriate as second-line therapy for acute back pain after NSAIDs.(42) The American College of Emergency Physicians, with level C evidence, concurs in a clinical guideline.(17) Other studies have found mixed evidence regarding the relationship between opioid prescriptions for severe low back pain and long-term outcomes.(43) The PDMP profile for this patient was given the following potentially concerning elements: Greater than 4 providers, providers affiliated with greater than one hospital system, greater than four pharmacies, 10 prescriptions, a history of early opioid refills and self-pay within the last 12 months. This profile was anticipated to be highly concerning to the average respondent.

The second case, “Chest Pain” involved a patient suffering from traumatic chest wall pain with an uncomplicated, non-displaced rib fracture. This patient reports a prior history of opioids and muscle relaxants for chronic low back pain without recent use. Though literature could not be found specific to this type of injury, it seemed reasonable to extrapolate from the back pain literature that an opioid could be an appropriate second line choice for this type of discomfort. The PDMP profile for this patient was demonstrated two months of a combination acetaminophen/oxycodone and a diazepam prescription three ending three months prior to the time of survey administration to respondents.

The third case involves dentalgia in a patient who cannot access outpatient dental services acutely but who has some swelling and erythema but no findings suggestive of an acute inpatient surgical emergency or systemic infection. The patient reports regular use of a low-dose opioid for chronic neck pain. Again, a literature review suggests that opioids can be a reasonable means of pain control for this presentation. Dental expert opinion supports NSAIDS as first line for non-surgical dentalgia in the ED requiring delayed treatment with opioids as second line.(44) In a survey study, a minority of endodontists recommend prescribing opioids as first line for severe endodontic pain requiring delayed treatment.(45) Another small study suggests opioids are more likely to provide relief than non-opioids (dosage unspecified) for symptomatic necrosis and irreversible pulpitis.(46) A fourth study found no statistical difference in uninjured tooth sensitivity in 16 female subjects pre-treated with Hydrocodone/Acetaminophen (10-1000mg) before being subjected to pulp and gum irritating procedures.(47) The PDMP profile for this patient demonstrates a sustained monthly prescription history of daily acetaminophen/hydrocodone or acetaminophen/oxycodone. The No Interpretation PDMP profile lists 7 prescribers in 12 months while the interpretation overlay clarifies that all 7 providers belong to the same hospital system.

Selection of Interpretive Intervention Details in PDMP
As reviewed in the Background, all of the following prescription history components have been found to be correlated specifically with increased risk of overdose and death and have been chosen for this reason to be included in the Interpretation (intervention) version of the PDMP profile in the survey.

4 or more providers in 12 months, Greater than 1 hospital system affiliation, 4 or more pharmacies in 12 months, A history of overlapping or early refills (defined as greater than 2 day overlap in this study), a history of long acting or extended release opioids, a history of buprenorphine use, a history of overlapping benzodiazepine and opioid prescriptions, and a history of private pay (no insurance use) for prescriptions.

Data Analysis

Surveys were collected in Qualtrics. Descriptive analysis was performed in Microsoft Excel 2010 and hypothesis testing was done in the R statistical package version 3.1.2. The primary outcome is a difference between respondents’ likelihood to prescribe an opioid analgesic prior to viewing the patient PDMP profile and post viewing. As the responses were non-continuous on a 1-4 scale and were non-normally distributed, the pre- and post-PDMP scores were compared using the Wilcoxon paired signed rank test for non-parametric variables.(48) The Wilcoxon test performs a pairwise comparison of the pre- and post- PDMP scores and a p-value of less than 0.05 implies that the two sets are statistically distinct.

The secondary outcome is a difference in the pre- vs. post- likelihood score change between respondents who were randomized to the Interpretation PDMP profiles (intervention group) compared to those who viewed the No Interpretation PDMP profiles (control group). The two sets of changes in score were compared using the unpaired Wilcoxon rank sum test for nonparametric data.
RESULTS

The survey was emailed to respondents on February 18, 2015, a reminder was sent on February 25 and it was closed on February 28. Eighty potential respondents, 53 attending physicians and 27 physician assistants, were emailed. Thirty-eight began the survey and 37 completed it (response rate = 46%). Descriptive characteristics of the respondents are summarized in Table 1. Men and women are similarly represented, and PAs were well represented in the sample. Respondents indicated primarily working in academic medical center emergency departments, consistent with expectations as it was administered at Brigham and Women’s Hospital. The mean number of years of post-training work experience was 6.5. Eighty-nine percent of respondents report being registered to access the MA PDMP portal electronically and these clinicians indicate that they utilize the PDMP regularly. The text of the demographic survey questions can be found in Appendix B.

Descriptive and analytic statistics of pre- and post-PDMP respondent likelihood to prescribe opioid medications in the three case vignettes are summarized in Figure 1 and Table 2. Patient vignettes and PDMP profiles – No Interpretation and Interpretation – are in Appendix A. In the Back Pain case, providers were on reasonably split on the decision to prescribe an opioid painkiller based on the vignette alone, with 56% being somewhat or very unlikely to prescribe (Figure 1). After viewing the PDMP, only 2 providers (5%) were somewhat likely and none were very likely. The mean likelihood (Table 2) shifted nearly a point in the unlikely direction following exposure to the PDMP, and this pairwise difference was statistically significant by the Wilcoxon signed-rank test indicating that the paired pre- and post-PDMP scores were statistically different. Analyzing the groups who viewed the Interpretation and No Interpretation PDMP profiles separately, the mean likelihood change for the Interpretation group was nearly threefold that of the No Interpretation group. The likelihood shift was significant for the Interpretation group but was not significant for the No Interpretation group. Notably, the pre-PDMP likelihood score mean for the Interpretation group was nearly a full point lower than the No Interpretation group, a pattern not consistent in the remaining two vignettes. The Wilcoxon sum rank test for unpaired data found the mean pairwise change between the two groups to be statistically different (the $p$ value associated with the Change Difference in Table 2), but this must be interpreted with caution given the $p$ value for the No Interpretation group.

In the Chest Pain case, 29 respondents (78%) indicated they were very likely to prescribe – and 35 (95%) were somewhat or very likely – prior to viewing the PDMP profile. This held largely stable on aggregate, with the Somewhat Likely group expanding post-PDMP but the total somewhat or very likely to prescribe remaining unchanged (Figure 1). The change in mean likelihood was 0.22, though the Wilcoxon test found concludes a real difference exists. Movement was slightly greater away from prescribing in the Interpretation group, with the Wilcoxon test suggesting that the No Interpretation group was unaffected by the PDMP profile (Table 2).

For the Dental Pain case, respondents pre-PDMP were split in their prescription likelihood almost identically to the Back Pain case, with a slightly larger number of responses occupying the middle two options of the 4-point scale (Figure 2). Mean likelihood moved away from prescribing, and that
difference was significant. In this case, the No Interpretation and Interpretation groups behaved similarly, with both groups having a real change after viewing the PDMP profile.

Table 3 summarizes the responses to questions pertaining to the details within the PDMP that survey respondents felt influenced their decision-making. The number of opioid prescriptions and the number of prescribers in the past year were both selected by the vast majority of respondents, with the Interpretation and No Interpretation groups responding similarly. Approximately half of respondents listed the overall number of prescriptions, of whom two-thirds saw No Interpretation profiles. A minority of respondents (11 of 37) selected early refills, equally split between No Interpretation and Interpretation despite the latter having it clearly displayed.

Table 1: Characteristics of Respondents (n=37)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17</td>
</tr>
<tr>
<td>Female</td>
<td>20</td>
</tr>
<tr>
<td>Typical Practice Environment</td>
<td></td>
</tr>
<tr>
<td>Academic</td>
<td>34</td>
</tr>
<tr>
<td>Community</td>
<td>3</td>
</tr>
<tr>
<td>Degree</td>
<td></td>
</tr>
<tr>
<td>MD/DO</td>
<td>22</td>
</tr>
<tr>
<td>Physician Assistant</td>
<td>15</td>
</tr>
<tr>
<td>Years out of residency/training</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>6.5</td>
</tr>
<tr>
<td>25th percentile</td>
<td>3</td>
</tr>
<tr>
<td>75th percentile</td>
<td>9</td>
</tr>
<tr>
<td>Registered for MA PDMP</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
</tr>
<tr>
<td>PDMP profiles viewed in typical ED shift (n=33)</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2.6</td>
</tr>
</tbody>
</table>
Figure 1: Distribution of Pre- and Post-PDMP Prescription Likelihood Responses
Table 2: Pre- and Post-PDMP Likelihood to prescribe on a four-point scale by Case

<table>
<thead>
<tr>
<th></th>
<th>Pre-PDMP</th>
<th>Post-PDMP</th>
<th>Change</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean^a</td>
<td>Mean^b</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Back Pain</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All (n=37)</td>
<td>2.68</td>
<td>3.65</td>
<td>0.97</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Uninterpreted (n=19)</td>
<td>3.11</td>
<td>3.53</td>
<td>0.42</td>
<td>0.066</td>
</tr>
<tr>
<td>Interpreted (n=18)</td>
<td>2.22</td>
<td>3.78</td>
<td>1.56</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Change Difference^e</td>
<td>1.13</td>
<td>1.13</td>
<td>&lt;0.0005</td>
<td></td>
</tr>
<tr>
<td><strong>Chest Pain</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All (n=37)</td>
<td>1.27</td>
<td>1.49</td>
<td>0.22</td>
<td>0.024</td>
</tr>
<tr>
<td>Uninterpreted (n=19)</td>
<td>1.32</td>
<td>1.47</td>
<td>0.16</td>
<td>0.299</td>
</tr>
<tr>
<td>Interpreted (n=18)</td>
<td>1.22</td>
<td>1.50</td>
<td>0.28</td>
<td>0.037</td>
</tr>
<tr>
<td><strong>Dental Pain</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All (n=37)</td>
<td>2.54</td>
<td>3.24</td>
<td>0.70</td>
<td>&lt;0.0005</td>
</tr>
<tr>
<td>Uninterpreted (n=19)</td>
<td>2.68</td>
<td>3.37</td>
<td>0.68</td>
<td>0.002</td>
</tr>
<tr>
<td>Interpreted (n=18)</td>
<td>2.39</td>
<td>3.11</td>
<td>0.72</td>
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<tr>
<td>Change Difference^e</td>
<td>0.44</td>
<td>0.60</td>
<td>0.760</td>
<td></td>
</tr>
</tbody>
</table>

^a Mean respondent likelihood of prescribing prior to viewing patient PDMP. 1 = "Very Likely", 4 = "Very Unlikely"

^b Mean respondent likelihood of prescribing after viewing patient PDMP. 1 = "Very Likely", 4 = "Very Unlikely"

^c The mean of the differences between each Pre- and Post-PDMP pairing.

^d Obtained using the Wilcoxon signed rank test of paired non-parametric means except in the case of the Change Difference calculation, in which the Wilcoxon rank sum test for unpaired non-parametric means was used.

^e The difference between the "Change" for the Uninterpreted vs. Interpreted responses. Calculated only if both the Interpreted and Uninterpreted Change was statistically significant (p<0.05).
Table 3: Self-Reported Factors Influencing Prescription Likelihood

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Uninterpreted Profiles</th>
<th>Interpreted Profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Prescriptions</td>
<td>17</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Number of Opiate Prescriptions</td>
<td>34</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Number of Prescribers</td>
<td>36</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>Number of Pharmacies</td>
<td>21</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Early Refills</td>
<td>11</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The primary objective of this study was to assess whether or not viewing a patient’s PDMP profile has a measurable effect on a prescriber’s likelihood to prescribe an opioid analgesic. In all three cases presented in the survey, respondents were less likely to prescribe after viewing the relevant PDMP profile. All three changes were statistically significant, and two of the three—Back Pain and Dental Pain—differed in a way that some will find clinically meaningful.

It is important to interpret these findings within the context of how the three cases were created. In order to study the potential impact of a PDMP profile on prescribing, one must avoid clinical scenarios in which a majority of clinicians agree that a patient’s prescription use history is effectively irrelevant. The hypothetical patient can therefore be neither to severely injured nor too obviously well nor have a condition for which a consensus increasingly exists that opioids are ineffective (e.g. headaches). Similarly, many clinicians have related to the authors that they only check PDMP profiles on patients for whom some suspicion of misuse or risk exists from their history and exam. Thus, a study scenario in which a benign history and a reasonably appropriate indication is paired with a high-risk PDMP profile would be very likely to demonstrate a PDMP effect, but would not accurately reflect common use and therefore likely real impact. The three clinical scenarios were all written with the expectation that based on history alone respondents would be more likely to prescribe than not. This was in part to increase the likelihood of observing an effect of the PDMP. The Back Pain case was written to most prominently evoke this pre- and post-PDMP split. However, a majority of respondents appear to have found the patient’s history alone sufficiently suspicious, or thought opioids sufficiently inappropriate for his condition, that the likelihood scale did not accommodate any further shift away from prescribing for many respondents. The Chest Pain case was written to be the most reassuring, both pre- and post-PDMP. This was in fact borne out by the results. However, even with the PDMP fully supporting the patient’s statements about prior prescriptions in the history, all groups were slightly less likely to prescribe after seeing it. The Dental Pain case was written in particular with the goal of identifying an impact of the Interpretation PDMP (discussed further below). Only with the Interpretation PDMP profile could a respondent know that what appear to be 7 distinct prescribers are all housed within the same clinic.
Nearly all of the respondents indicated that they were influenced by the total number of opioid prescriptions in the patient’s profile and number of different prescribers. Approximately half of respondents indicated influence by the total number of prescriptions and the number of different pharmacies. As discussed in the introduction, each of these characteristics can be indicative of a patient with a substance use problem who may be at risk for a significant adverse outcome due to prescription opioids.

The secondary objective of this study was to assess whether viewing a PDMP profile with interpretive summary statistics would change prescription behavior more significantly than viewing a standard PDMP profile would. This outcome was dependent on a difference being found in the primary outcome. The results of this outcome were more mixed. As mentioned above, the Dental Pain case was written with an eye to the secondary outcome, with the No Interpretation profile appearing more concerning (7 prescribers) than the Interpretation (“Prescribers affiliated with 2 or more hospital systems – No”). However, the difference between the two groups in the pre and post scores, though statistically significant, likely has little clinical meaning. It is entirely possible that given that the line in question on the Interpretation profile was one of many respondents are unfamiliar with seeing it was simply overlooked by a majority of respondents. It is also possible that a difference would be detected with a greater sample size. Only in the Back Pain case did the Interpretation group differ significantly from the No Interpretation group (Table 2). In that case, however, the majority of the difference between the groups is accounted for not by a different Post-PDMP likelihood but by a higher pre-PDMP likelihood for the Interpretation group. Only in the Back Pain case did the Pre-PDMP likelihood scores differ markedly between the two subgroups. The most likely explanation lies in random variation producing outsize impact through a small sample size. This should inspire caution when attempting to infer an effect. Nonetheless, the mean likelihood score for those in the Interpretation group, 3.78, represent an overwhelming consensus not to prescribe. In this group, not a single respondent was somewhat or very likely to prescribe. By contrast, the No Interpretation group’s likelihood represents an average of Somewhat Unlikely and Very Unlikely, with two respondents being Somewhat Likely in this cohort. Thus, though the sample size and the effect size are both small, these result could be viewed as tentatively supportive of the concept of a more detailed summary section within the PDMP.

It is worth considering further possible reasons why the Interpretation group did not differ more significantly in this survey. For one, the constraints of the scale range may have made it difficult to appreciate an effect. For the Back Pain case, there was limited further room on the scale for the Interpretation group to go. This was not the case with Dental or Chest pain, however. Another possibility is that the additional interpretation did not add sufficient additional information. It would be reasonable to assume that the average emergency department clinician is not familiar with the literature regarding the specific thresholds for prescriber number, pharmacy number, etc., that are correlated with increased risk of overdose and death. Thus, the text highlighting that these thresholds had been crossed may have had little additional meaning for most respondents. Perhaps a more meaningful or clinically useful interpretive overlay would contain a specific statement about elevated risk of overdose, death or abuse. A third possible reason relates to the varied rationales clinicians have for accessing a patient’s PDMP profile in the first place. The interpretation added to the profiles in this survey focused on factors
that correlate with increased risk of overdose or death. This is not the clinical question that we asked of the respondents, however. A prescribing clinician may be instead more focused on whether or not they are being “tricked” by a patient, or whether the patient is likely to turn around and sell the medication on the street. For many clinicians, the PDMP profiles without any overlay contain sufficient information to allow them to infer answers to these questions (rightly or wrongly), suggesting that for some respondents the interpretations may have answered a question they were not asking. Lastly, as alluded to above, the interpretation section, being new, multi-lined and small text may have simply not been displayed in a way to optimally convey information, particularly in instances like the total number of distinct clinics (rather than providers) where the interpretation effectively corrects rather than merely tabulates the standard profile.

This study has a number of limitations worth acknowledging. This was a survey-based study rather than a trial involving real patients. This design removes a number of elements of a real patient interaction which are expected to influence prescription decisions. In this vein, the response options asked respondents to indicate their likelihood to prescribe rather than a binary decision to prescribe or not. This choice was selected in part to increase the likelihood of observing an impact and in part in recognition that a binary decision to prescribe may in fact contain a range of meaningful confidence in the decision as well many additional decisions such as what to prescribe or how much not included in this study. This design will, in the eyes of some readers, make results less applicable to real clinical scenarios which do involve a binary decision. Second, the cases used were hypothetical, and may differ in important ways from actual clinical encounters readers have had. Specifically, the histories were written not to raise too many “red flags” in terms of substance abuse or doctor shopping to create room on the prescription likelihood scale for an impact by the PDMP profile. Similarly, none of the scenarios represented a patient for whom the history or presentation is highly suspicious but the PDMP profile appears entirely benign, so the results herein may not apply to such patients. Third, the sample size was relatively small and the non-respondents to the survey are unknown in how they may differ from the respondents in prescription likelihood or training. Fourth, this survey was performed predominantly among academic ED based providers who work predominantly at one Boston academic hospital. Important practice differences may exist by region, practice setting or familiarity with PDMPs that would change how other provider populations would respond. Fifth, this survey was focused on Massachusetts providers and used information contained within the MA PDMP profiles. As PDMP programs differ by state in what they report and how they display it, this could impact the generalizability of these results. Sixth, this survey focused specifically on the way PDMPs are likely to be used in an emergency department or perhaps urgent care context, where decisions need to be made quickly, patient relationships are rarely longitudinal and collateral information often unavailable. Outpatient providers with a longer history with their patients may be far less reliant on a single PDMP result, or may use it for a much more focused purpose.

Prescription Drug Monitoring Programs are now established in the vast majority of U.S. States and their use is encouraged by the federal government. Nonetheless, their utility, best practices for their use and their impact on provider-level decisions is not well studied. Moreover, with the wealth of information contained in them and thus the wide range of potential questions, their application likely varies widely
between clinicians. This study, though small and survey based, does suggest that in cases wherein an ED provider is deciding whether or not to prescribe an opioid analgesic for one of three common types of pain that the results of a PDMP profile may impact their prescription decisions. Further research plans involve modifying this survey instrument based upon these results and administering it to a larger sample size of clinicians represented a broader range of clinical practice settings. This work will hopefully spur others to further study how PDMP profiles are and can best be used to aid in safe and compassionate patient pain management.
APPENDIX A: CASE VIGNETTES AND ASSOCIATED PDMP PROFILES

Back Pain

1. Vignette text

The patient is a 35 year old male who presents with back pain. He was removing an air conditioning unit from a window yesterday and felt a pull in his right low back which has steadily worsened. He has tried acetaminophen 650 mg every 6 hours and ibuprofen 600 mg every 6 hours and still has severe pain. He has a normal neurologic examination, no abdominal pain, fever, or renal complaints. You are confident that his pain is musculoskeletal. He presents to the ED on Saturday morning and you are unable to reach his primary care physician. The patient reports that this has happened multiple times in the past few months, and it usually responds to a few days of oxycodone or hydrocodone.

2. PDMP – No Interpretation
3. PDMP – Interpretation

### Summary of High-Risk Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four or more prescribers in 12 months</td>
<td></td>
</tr>
<tr>
<td>Four or more pharmacies in 12 months</td>
<td></td>
</tr>
<tr>
<td>History of early refills of opioid medications</td>
<td></td>
</tr>
<tr>
<td>History of benzodiazepines and opioid together</td>
<td>No</td>
</tr>
<tr>
<td>History of long-acting or extended-release opioids</td>
<td>No</td>
</tr>
<tr>
<td>History of taking buprenorphine</td>
<td>No</td>
</tr>
<tr>
<td>History of self-pay (private pay) prescriptions</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># of prescriptions in 12 months</th>
<th>10</th>
<th># of private pay in 12 months</th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td># of prescribers in 12 months</td>
<td>10</td>
<td># of pharmacies in 12 months</td>
<td>6</td>
</tr>
</tbody>
</table>

### Prescriptions

<table>
<thead>
<tr>
<th>Drug (Generic Name)</th>
<th>Drug (Trade Name)</th>
<th>Strength</th>
<th>Form</th>
<th>Fll Date</th>
<th>Quantity</th>
<th>Days Supply</th>
<th>Prescriber</th>
<th>Pharmacy</th>
<th>Private Pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen/ hydrocodone HCl</td>
<td>HYDROCODONE BITARTRATE AND ACETAMINOPHEN</td>
<td>325 MG-5 MG</td>
<td>Tablet</td>
<td>11/22/14</td>
<td>10</td>
<td>4</td>
<td>Maria Welch</td>
<td>CVS Pharmacy 717</td>
<td>36 White St, Cambridge MA 02140</td>
</tr>
<tr>
<td>Acetaminophen/ hydrocodone HCl</td>
<td>HYDROCODONE BITARTRATE AND ACETAMINOPHEN</td>
<td>325 MG-5 MG</td>
<td>Tablet</td>
<td>11/20/14</td>
<td>10</td>
<td>2</td>
<td>Marcus Johansen</td>
<td>CVS Pharmacy 5592</td>
<td>468 Blue Hill Ave Dedham MA 02026</td>
</tr>
<tr>
<td>Acetaminophen/ hydrocodone HCl</td>
<td>HYDROCODONE BITARTRATE AND ACETAMINOPHEN</td>
<td>325 MG-5 MG</td>
<td>Tablet</td>
<td>10/24/14</td>
<td>10</td>
<td>1</td>
<td>Julius Hunter</td>
<td>CVS Pharmacy 717</td>
<td>463 Cambridge St, Allston MA 02134</td>
</tr>
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<td>HYDROCODONE BITARTRATE AND ACETAMINOPHEN</td>
<td>325 MG-5 MG</td>
<td>Tablet</td>
<td>10/23/14</td>
<td>5</td>
<td>2</td>
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<td>CVS Pharmacy 471</td>
<td>778 Dudley St, Dedham MA 02026</td>
</tr>
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<td>Acetaminophen/ hydrocodone HCl</td>
<td>HYDROCODONE BITARTRATE AND ACETAMINOPHEN</td>
<td>325 MG-5 MG</td>
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<td>10/16/14</td>
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<td>2</td>
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<td>CVS Pharmacy 5592</td>
<td>468 Blue Hill Ave Dedham MA 02026</td>
</tr>
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<td>Acetaminophen/ hydrocodone HCl</td>
<td>HYDROCODONE BITARTRATE AND ACETAMINOPHEN</td>
<td>325 MG-5 MG</td>
<td>Tablet</td>
<td>9/15/14</td>
<td>12</td>
<td>3</td>
<td>Harrison Ortiz</td>
<td>CVS Pharmacy 5592</td>
<td>468 Blue Hill Ave Dedham MA 02026</td>
</tr>
<tr>
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<td>APAP/HYDROCODONE</td>
<td>325 MG-5 MG</td>
<td>Tablet</td>
<td>9/12/14</td>
<td>15</td>
<td>4</td>
<td>Shoshon Patel</td>
<td>CVS Pharmacy 717</td>
<td>463 Cambridge St, Allston MA 02134</td>
</tr>
<tr>
<td>Hydrocodone HCl</td>
<td>HYDROCODONE</td>
<td>5 MG</td>
<td>Tablet</td>
<td>8/3/14</td>
<td>12</td>
<td>2</td>
<td>James Lee Ton</td>
<td>CVS Pharmacy 717</td>
<td>463 Cambridge St, Allston MA 02134</td>
</tr>
<tr>
<td>Acetaminophen/ hydrocodone HCl</td>
<td>APAP/HYDROCODONE</td>
<td>325 MG-5 MG</td>
<td>Tablet</td>
<td>7/27/14</td>
<td>15</td>
<td>3</td>
<td>Marvin Smith</td>
<td>CVS Pharmacy 5592</td>
<td>468 Blue Hill Ave Dedham MA 02026</td>
</tr>
</tbody>
</table>

### Chest Pain

1. **Vignette text**

   The patient is a 20 year old male who presents with traumatic chest wall pain. He was assaulted and struck on the right chest wall with a pipe. He has focal tenderness and bruising over a rib. He has tried acetaminophen 650 mg every 6 hours and ibuprofen 600 mg every 6 hours and still has severe pain. Chest radiographs demonstrate a single, non-displaced fracture without pneumothorax or other concerning findings. He presents to the ED on Saturday morning and you are unable to reach his primary care physician. The patient has chronic low back pain for which he says he was once prescribed opioids and muscle relaxants in the past. He states he is not currently using them.

2. **PDMP – No Interpretation**
3. PDMP – Interpretation

### Vignette text

The patient is a 29 year old female who presents with dental pain. She reports that she has a cavity that started throbbing severely. She suffers from anxiety and has chronic neck pain for which she is prescribed low-dose opioids. On exam, a dental caries is visible and there is surrounding gingival and mild facial swelling without a drain-able collection. She presents to the ED on Saturday morning and cannot see her dentist until Monday. She has tried acetaminophen 650 mg every 6 hours and ibuprofen 600 mg every 6 hours and still has severe pain. You plan to prescribe an appropriate antibiotic and refer her to for appropriate dental follow-up.

### Dental Pain

1. **Vignette text**

2. **PDMP – No Interpretation**
### 3. PDMP – Interpretation

#### Summary of High-Risk Factors
- Four or more providers in 12 months: Yes
- Prescriptions filled at 2 or more hospital systems: No
- Four or more pharmacies in 12 months: No
- History of early refills of opioid medications: No
- History of benzodiazepines and opioids together: No
- History of long-acting or extended-release opioids: No
- History of taking buprenorphine: No
- History of self-pay (private pay) prescriptions: No
- 

#### Prescriptions in 12 months

<table>
<thead>
<tr>
<th>Drug (Generic Name)</th>
<th>Drug (Trade Name)</th>
<th>Strength</th>
<th>Form</th>
<th>Fill Date</th>
<th>Days Supply</th>
<th>Prescriber</th>
<th>Pharmacy</th>
<th>Private Pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen/Hydrocodone Bitartrate</td>
<td>APAP/HYDROCODONE BITARTRATE</td>
<td>750 MG-7.5 MG</td>
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<td>12/7/14</td>
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<td>30</td>
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<td>409 W Broadway South Boston MA 02127</td>
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<tr>
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<td>APAP/HYDROCODONE BITARTRATE</td>
<td>750 MG-7.5 MG</td>
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<td>11/3/14</td>
<td>120</td>
<td>24</td>
<td>Robert Smith</td>
<td>409 W Broadway South Boston MA 02127</td>
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<tr>
<td>Acetaminophen/Hydrocodone Bitartrate</td>
<td>APAP/HYDROCODONE BITARTRATE</td>
<td>750 MG-7.5 MG</td>
<td>Tablet</td>
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<td>APAP/HYDROCODONE BITARTRATE</td>
<td>750 MG-7.5 MG</td>
<td>Tablet</td>
<td>9/3/14</td>
<td>120</td>
<td>24</td>
<td>James Jones</td>
<td>409 W Broadway South Boston MA 02127</td>
</tr>
<tr>
<td>Acetaminophen/Oxycodone Hydrochloride</td>
<td>APAP/OXYCODONE</td>
<td>325 MG-5 MG</td>
<td>Tablet</td>
<td>7/6/14</td>
<td>90</td>
<td>30</td>
<td>Jane Watson</td>
<td>409 W Broadway South Boston MA 02127</td>
</tr>
<tr>
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<td>APAP/OXYCODONE</td>
<td>325 MG-5 MG</td>
<td>Tablet</td>
<td>6/3/14</td>
<td>15</td>
<td>4</td>
<td>Thomas Toner</td>
<td>409 W Broadway South Boston MA 02127</td>
</tr>
<tr>
<td>Acetaminophen/Oxycodone Hydrochloride</td>
<td>APAP/OXYCODONE</td>
<td>325 MG-5 MG</td>
<td>Tablet</td>
<td>5/4/14</td>
<td>10</td>
<td>3</td>
<td>Massachusetts Medical Center</td>
<td>409 W Broadway South Boston MA 02127</td>
</tr>
<tr>
<td>Acetaminophen/Oxycodone Hydrochloride</td>
<td>APAP/OXYCODONE</td>
<td>325 MG-5 MG</td>
<td>Tablet</td>
<td>5/3/14</td>
<td>10</td>
<td>1</td>
<td>Judith Jeeap</td>
<td>409 W Broadway South Boston MA 02127</td>
</tr>
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<td>Tablet</td>
<td>10/5/13</td>
<td>60</td>
<td>20</td>
<td>Harri Rogers</td>
<td>409 W Broadway South Boston MA 02127</td>
</tr>
</tbody>
</table>
Dear Emergency Practitioner,

Thank you for responding to this short survey regarding opioid prescribing from the Emergency Department. You have received this survey because you are a provider in an Emergency Department (MD, nurse practitioner or physician assistant) who can prescribe opioid medications. Your responses will help us to better understand the knowledge, attitudes and practice of emergency care providers as they relate to the use and interpretation of prescription drug monitoring programs.

The survey is IRB-approved and should take approximately 10 minutes to complete. Your response is completely anonymous and only aggregate responses will be shared and published. Your participation is voluntary and you may stop the survey at any time by simply closing your browser window. We expect to collect ~200 responses.

If you should have any comments or concerns regarding this survey, please do not hesitate to contact us at sgreiner@partners.org.

Scott G. Weiner, MD, MPH
Judith Sueker, BA

Do you consent to participate?

YES - Continue the survey
NO - Exit the survey

Please respond as you would in your personal clinical practice

The patient is a 35 year old male who presents with back pain. He was removing an air conditioning unit from a window yesterday and felt a pull in his right low back which has steadily worsened. He has tried acetaminophen 650 mg every 6 hours and ibuprofen 600 mg every 6 hours and still has severe pain. He has a normal neurologic examination, no abdominal pain, fever, or renal complaints. You are confident that his pain is musculoskeletal. He presents to the ED on Saturday morning and you are unable to reach his primary care physician. The patient reports that this has happened multiple times in the past few months, and it usually responds to a few days of oxycodone or hydrocodone.

Q: Based only upon this information, how likely are you to prescribe a short-acting opioid pain medication (e.g. oxycodone or hydrocodone) for this patient?

Very Likely
Somewhat Likely
Somewhat Unlikely
Very Unlikely

CONTINUE
Before making a final decision, you have the opportunity to access this patient’s profile in the Massachusetts Prescription Drug Monitoring Program (graphic below).

Please review it in light of the clinical question regarding whether or not to prescribe a short-acting opioid medication.

Q: Given the information in this patient’s Prescription Drug Monitoring Program profile, how likely are you to prescribe a short-acting opioid pain medication (e.g., oxycodone or hydrocodone) for this patient?

Please respond as you would in your personal clinical practice.

The patient is a 20-year-old male who presents with traumatic chest wall pain. He was assaulted and struck on the right chest wall with a pipe. He has focal tenderness and bruising over a rib. He has tried acetaminophen 650 mg every 6 hours and ibuprofen 600 mg every 6 hours and still has severe pain. Chest radiographs demonstrate a single, non-displaced fracture without pneumothorax or other concerning findings. He presents to the ED on Saturday morning and you are unable to reach his primary care physician. The patient has chronic low back pain for which he says he was once prescribed opioids and muscle relaxants in the past. He states he is not currently using them.

Q: Based only upon this information, how likely are you to prescribe a short-acting opioid pain medication (e.g., oxycodone or hydrocodone) for this patient?
Before making a final decision, you have the opportunity to access this patient's profile in the Massachusetts Prescription Drug Monitoring Program (graphic below).

Please review it in light of the clinical question regarding whether or not to prescribe a short-acting opioid medication.

<table>
<thead>
<tr>
<th>Drug (Generic Name)</th>
<th>Drug (Trade Name)</th>
<th>Strength</th>
<th>Form</th>
<th>Fill Date</th>
<th>Quantity</th>
<th>Days Supply</th>
<th>Prescriber</th>
<th>Pharmacy</th>
<th>Private Pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen/Dicycload Hydrochloride</td>
<td>DARTCODEIN AND ACETAMINOHEN</td>
<td>325 MG 5 MG</td>
<td>Tablet</td>
<td>9/27/14</td>
<td>28</td>
<td>10</td>
<td>Tracey Patel</td>
<td>Rise Aid Pharmacy #101152</td>
<td>710 E Broadway South Boston MA 02127</td>
</tr>
<tr>
<td>Diazepam</td>
<td>DAZERAM</td>
<td>5 MG</td>
<td>Tablet</td>
<td>9/27/14</td>
<td>20</td>
<td>10</td>
<td>Tracey Patel</td>
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<td>Tablet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q: Given the information in this patient's Prescription Drug Monitoring Program profile, how likely now are you to prescribe a short-acting opioid pain medication (e.g., oxycodone or hydrocodone) for this patient?

Very Likely | Somewhat Likely | Somewhat Unlikely | Very Unlikely
---|---|---|---
C | C | C | C

Please respond as you would in your personal clinical practice.

The patient is a 29-year-old female who presents with dental pain. She reports that she has a cavity that started throbbing severely. She suffers from anxiety and has chronic neck pain for which she is prescribed low-dose opioids. On exam, a dental caries is visible and there is surrounding gingival and mild facial swelling without a drainable collection. She presents to the ED on Saturday morning and cannot see her dentist until Monday. She has tried acetaminophen 650 mg every 6 hours and ibuprofen 600 mg every 6 hours and still has severe pain. You plan to prescribe an appropriate antibiotic and refer her to a periodontist for appropriate dental follow-up.

Q: Based only upon this information, how likely are you to prescribe a short-acting opioid pain medication (e.g., oxycodone or hydrocodone) for this patient?

Very Likely | Somewhat Likely | Somewhat Unlikely | Very Unlikely
---|---|---|---
C | C | C | C
Before making a final decision, you have the opportunity to access this patient's profile in the Massachusetts Prescription Drug Monitoring Program (graphic below).

Please review it in light of the clinical question regarding whether or not to prescribe a short-acting opioid medication.

<table>
<thead>
<tr>
<th>Prescriptions</th>
<th>Drug (Generic Name)</th>
<th>Drug (Trade Name)</th>
<th>Strength</th>
<th>Form</th>
<th>Fill Date</th>
<th>Days Supply</th>
<th>Prescriber</th>
<th>Pharmacy</th>
<th>Private Pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen/Hydrocodone Bitartrate</td>
<td>APAP/HYDROCODONE BITARTRATE</td>
<td>750 MG/7.5 MG</td>
<td>Tablet</td>
<td>11/3/14</td>
<td>120</td>
<td>24</td>
<td>Robert Smith</td>
<td>403 W Broadway South Boston MA 02127</td>
<td>403 W Broadway South Boston MA 02128</td>
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<tr>
<td>Acetaminophen/Hydrocodone Bitartrate</td>
<td>APAP/HYDROCODONE BITARTRATE</td>
<td>750 MG/7.5 MG</td>
<td>Tablet</td>
<td>10/4/14</td>
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<td>24</td>
<td>Massachusetts Medical Center</td>
<td>403 W Broadway South Boston MA 02129</td>
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<tr>
<td>Acetaminophen/Hydrocodone Bitartrate</td>
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<td>750 MG/7.5 MG</td>
<td>Tablet</td>
<td>5/3/14</td>
<td>120</td>
<td>24</td>
<td>James Jones</td>
<td>403 W Broadway South Boston MA 02131</td>
<td>403 W Broadway South Boston MA 02132</td>
</tr>
<tr>
<td>Acetaminophen/Oxycodone Hydrochloride</td>
<td>APAP/OXYCODONE</td>
<td>321 MG/5 MG</td>
<td>Tablet</td>
<td>7/4/14</td>
<td>90</td>
<td>30</td>
<td>Jane Watson</td>
<td>403 W Broadway South Boston MA 02133</td>
<td>403 W Broadway South Boston MA 02134</td>
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<tr>
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<td>APAP/OXYCODONE</td>
<td>321 MG/5 MG</td>
<td>Tablet</td>
<td>6/2/14</td>
<td>15</td>
<td>4</td>
<td>Thomas Toner</td>
<td>403 W Broadway South Boston MA 02135</td>
<td>403 W Broadway South Boston MA 02136</td>
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<td>Tablet</td>
<td>5/14/14</td>
<td>10</td>
<td>3</td>
<td>Massachusetts Medical Center</td>
<td>403 W Broadway South Boston MA 02137</td>
<td>403 W Broadway South Boston MA 02138</td>
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<td>Tablet</td>
<td>5/3/14</td>
<td>10</td>
<td>1</td>
<td>Judith Jones</td>
<td>403 W Broadway South Boston MA 02139</td>
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<td>Tablet</td>
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<td>60</td>
<td>20</td>
<td>Harold Rogers</td>
<td>403 W Broadway South Boston MA 02141</td>
<td>403 W Broadway South Boston MA 02142</td>
</tr>
</tbody>
</table>

Q: Given the information in this patient's Prescription Drug Monitoring Program profile, how likely now are you to prescribe a short-acting opioid pain medication (e.g., oxycodone or hydrocodone) for this patient?

- Very Likely
- Somewhat Likely
- Somewhat Unlikely
- Very Unlikely

What factors in the patient profile from the Prescription Drug Monitoring Program influenced your decision to prescribe opioid pain medications?

- Total number of prescriptions
- Total number of opioid prescriptions
- Total number of prescribers
- Total number of pharmacies used
- Early refills
- Other: [ ]

What is your gender?

- Male
- Female

Which of the following best describes the clinical environment where you practice emergency medicine?

- Academic
- Community
Which clinical degree do you possess?

- MD/DO
- Physician Assistant
- Nurse Practitioner

How many years have you been out of residency or training?

- [ ]

Have you registered for the Massachusetts Prescription Drug Monitoring Program?

- [ ] Yes
- [ ] No

During a typical ER shift, how many patient profiles do you access through the Massachusetts Prescription Drug Monitoring Program?

- [ ] Have never looked up a patient
- [ ] Less than 1 per shift
- [ ] 1-2 per shift
- [ ] 3-5 per shift
- [ ] More than 5

Thank you for your participation in this survey. Do you have any comments?

- [ ]

CONTINUE


