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Opioid Prescribing Trends before and after Electronic Prescribing for Controlled Substances Legislation

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Abstract

Background: The opioid epidemic is an ongoing public health crisis in the United States. In response, states have implemented various programs to combat it effectively, including implementation of prescription drug monitoring programs (PDMP) and mandating electronic prescribing (e-Rx) of opioids. However, the effectiveness of e-Rx is poorly understood.

Objective: To examine the trends of opioid prescribing patterns before and after the implementation of an e-Rx mandate in Pennsylvania.

Methods: Data pertaining to opioid prescribing habits as listed below were obtained from the Pennsylvania Department of Health (PA DOH) who administers the PDMP in Pennsylvania. Study data that were of interest and provided by the PDMP were: Drug name, quantity of prescriptions, average daily MME, and days supplied. Prescribing patterns of opioids were compared for a quarter before e-Rx (Q1 2017) compared to a quarter after e-Rx was mandated (Q1 2020).

Results: Pennsylvania saw a 33% decrease in overall quantity of opioid prescriptions and an 18% decrease in the authorized refill count from a quarter prior to e-Rx implementation to the quarter following. The largest absolute decrease in prescriptions was from Oxycodone (258,727 or 29%) and Hydrocodone (236,868 or 39%). There also was a larger decrease in intermediate and longer-term opioid prescriptions (>7 days) compared to short term prescriptions (<7 days) (43% *vs* 27%).

Discussion: There was a 33% decrease in the total number of opioids prescribed and an 18% decrease in opioid refills authorized between the two quarters before and after mandated implementation of e-Rx of opioids.

Conclusion: Pennsylvania's numbers of opioid prescriptions continued to decline alongside the implementation of an e-Rx mandate statewide. More research is needed to outline the significance of e-Rx on opioid prescription trends directly.

Keywords: Opioid overdoses; Pennsylvania; Public health; Electronic prescribing

Introduction

More than seventy thousand people died from drug overdose in 2019, the majority of which occurred were opioid related [1,2]. In 2019, an average of 38 people died every day from opioid overdoses [3]. A significant effort has been made to try and address this growing concern which has led to the implementation multiple programs aimed at combating the problem with varying success. The most recent epidemic stems from the stark rise in synthetic opioids as a cheaper and more available option than their prescription counterparts [4]. Among the 38 states with available prescription opioid overdose death data, 17 states saw a decline between 2017-2018 and none experienced a significant increase [5].

Alongside significant statewide measures to combat the opioid crises, Pennsylvania implemented a mandate requiring the electronic prescribing of controlled substances (EPCS, E-Prescribe, e-Rx). The mandate, which was implemented on October 24th, 2019, states that "practitioners, excluding those with statutory exceptions, are required to issue electronic prescriptions for Schedule II-V controlled substances" [6]. The mandate was part of an effort to try to limit the possibility of fraud in situations such as prescription forgery, diversion, and theft in the state of Pennsylvania. E-Rx has the added benefit of enabling cross-referencing of prescription drug monitoring program (PDMP) databases. State PDMPs are electronic databases that collect and analyze patient prescription data on controlled substances and allow physicians the ability to access that information before prescribing. Thirty-four states have similar laws either already implemented, due to be implemented within the next year, or pending legislative approval [7]. Existing knowledge regarding the effectiveness of e-Rx is limited. Pennsylvania is a state with a newly implemented e-Rx law and this study aims to outline the trend in opioid prescribing habits alongside the implementation of a e-Rx law.

Methods

Data pertaining to opioid prescribing habits as listed below were obtained from the Pennsylvania Department of Health (PA DOH) who administers the PDMP in Pennsylvania. A request for data was filed and approved by the PA DOH along with IRB approval for this project. Data was delivered on 11/24/2020 and recent to Q1 of 2020. The PDMP monitors Schedule II through Schedule V controlled substances. These substances are defined by the United States Drug Enforcement Administration [8]. As of January 1, 2017 all prescribers who are licensed, registered or otherwise lawfully authorized to distribute, dispense, or administer a controlled substance, other drug, or device in

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the course of professional practice or research in the Commonwealth are required to register with and query the PDMP in certain situations.

Study data that were of interest and provided by the PDMP were: Days supplied, quantity, partial fill, and authorized refill count. Quantity was defined as total number of opioid pills prescribed. Partial fill was defined as number of prescriptions for opioids that were only partially filled. Refill count was defined as total number of refills prescribed for opioid medication. Notes provided by the PA DOH included: values between 1 and 5 have been suppressed, If the value from only one group (e.g. county) during any given quarter required suppression, the next lowest value has also been suppressed, and authorized refill count data reflects the number of prescriptions with an authorized refill. Data was suppressed in this case to maintain confidentiality.

Data provided by the PA DOH is categorized by quarters, each equaling 3 months of the year. Since the PA PDMP was implemented later in August of 2016, the fourth quarter of 2016 was ignored, and the study analyses began from Q1 2017 through Q1 2020.

Differences and percent changes along the timelines listed above were used to assess how the number of opioid prescriptions changed. All statistical analyses were done using Microsoft Excel (Version 16.43).

Results

The state of Pennsylvania experienced a 33% decrease in overall quantity of opioids prescribed and an 18% decrease in the authorized refill count from a quarter pre-e-Rx implementation to the quarter following. The largest absolute decrease in prescriptions were from Oxycodone (258,727 or 29%) and Hydrocodone (236,868 or 39%) (Figure 1).

A closer look at the trends revealed a larger decrease in intermediate and longer-term prescriptions (>7 days) compared to short term prescriptions (43% vs 27%). Mirroring this finding, prescriptions for more than 22 pills saw an average decrease of 37% in pills prescribed against only a 21% decrease for 21 or fewer pills prescribed (Figures 2 and 3).

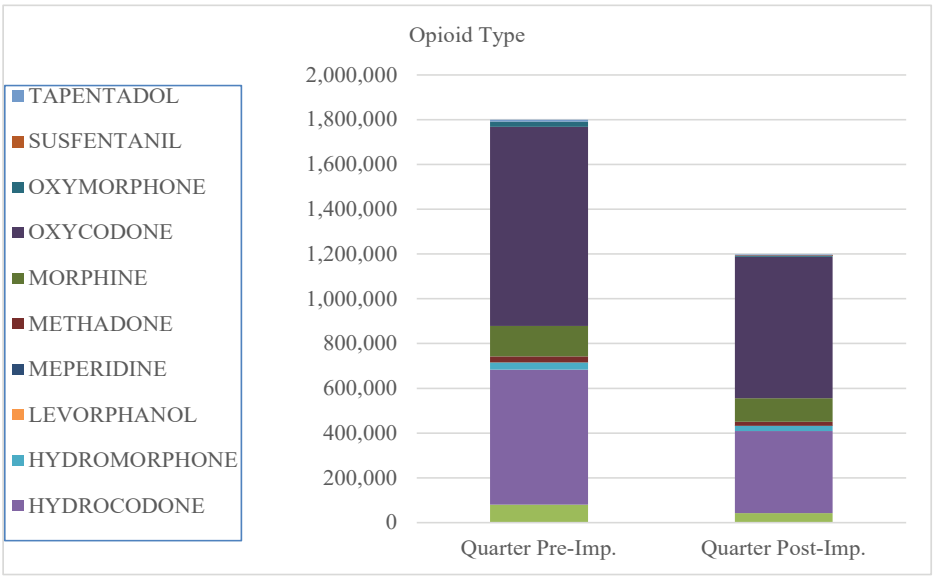

Figure 1: Opioid quantity prescribed between Q1 2017 until Q1 2020. Pennsylvania's PDMP was required for use in specific instances on January 1st, 2017.

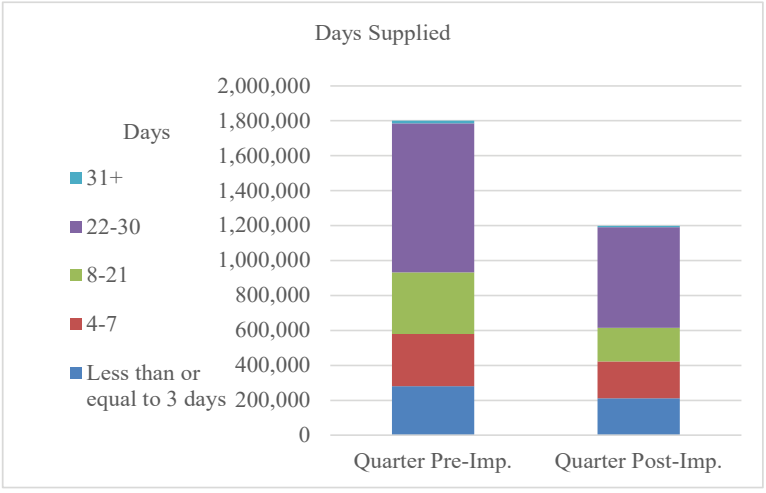

Figure 2: Days supplied for opioid prescriptions between Q1 2017 (Pre-Implementation) until Q1 2020 (Post-Implementation).

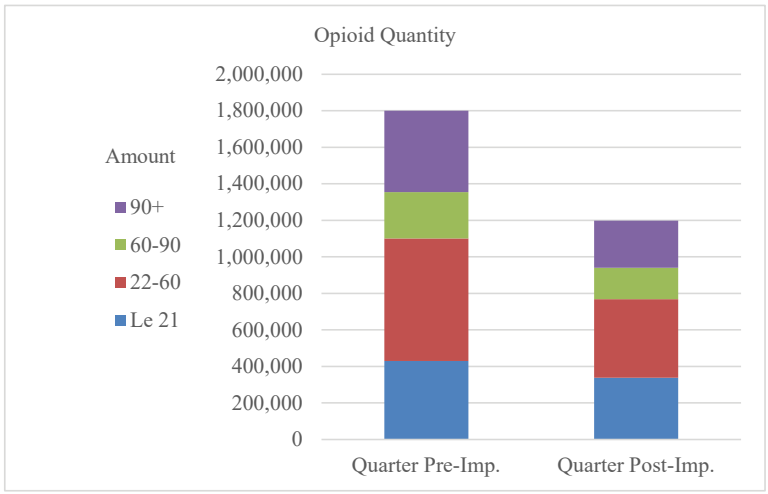

Figure 3: Opioid quantity prescribed between Q1 2017 (Pre-Implementation) until Q1 2020 (Post-Implementation).

Discussion

Study data showed a 33% decrease in overall quantity of opioids prescribed and an 18% decrease in the authorized refill count, since the first quarter of 2017. We found a larger decrease in long term prescriptions of opioids (>7 days prescribed) versus short term prescriptions (<7 Days). Pennsylvania also experienced decreases in opioid quantity of pills prescribed and refill count.

This data contributes to the existing knowledge on the effectiveness of a statewide e-Rx mandate. One study found no association between hospitals that implemented E-Prescribing and lower opioid prescribing habits in the surrounding counties [8]. However, a study done after the implementation of New York's I-STOP program showed a decrease in opioids prescribed by Emergency Medicine Physicians [9]. This study failed to showed significance when compared to other groups with no mandate, especially during a trend of decreasing overall opioid prescribing. Everson et al. (2020) found no association between implementation of E-Prescribe and lower opioid prescribing rates among 13 states [10].

A frequently cited purpose of the e-Rx mandate is to reduce the potential for fraud in opioid prescribing. E-Rx mandates aim to target duplicate prescriptions, doctor shopping, and over-prescribing. Abramson et al. found relatively low rates of prescribing errors with early and prolonged use of an electronic prescribing program [11]. Of note, prescriptions for opioid medication have remained stagnant or even declined since 2011, making illegally obtained opioids a more significant risk factor for opioid abuse and overdose [12]. However, the integration of e-Rx with a statewide PDMP, could benefit enforcement of mandatory querying and thereby limit initial exposure to opioid prescription excess. Statewide drug monitoring programs that include stronger data integration - among other parameters - have been shown to be more successful in changing prescribing patterns [13]. As more states pass mandates for e-Rx, including the federal government mandating its use for Medicare Part D medications, more data is needed to understand the long-term benefits on opioid prescribing habits.

Mandating the use of electronic prescribing could have negative consequences on prescriber workflow. Legislators and medical boards tasked with creating electronic prescribing programs for physicians should understand the barrios to successful implementation. A recent systemic review found these barriers to include design and technical concerns, interoperability, the relevance of displayed content to prescribers, the resistance of prescribers who are comfortable with their previous setup, productivity (efficiency), and resources available for technical support [14]. A successful e-Rx platform is tailored around the prescriber so as to provide the right amount of clinically important information as well as an efficient alternative to traditional prescribing.

An e-Rx platform that makes prescribing opioids too easy may have an unintended negative consequence as well. The ease of which a physician could send a prescription may convince certain prescribers to prescribe more for their patients rather than less. This was hypothesized in a paper by Everson et al. after they found a slight increase in daily MMEs prescribed following implementation of a EPCS mandate [10]. With this in mind, EPCS mandates need to be supplemented with further enforcement of opioid prescribing reports that may alert authorities to prescribers who are at high risk of fraudulent behavior.

Conclusion

National rates of prescription opioid prescribing have decreased steadily since the early 2010's. Pennsylvania has been one of the hardest hit states in the opioid epidemic and continues to make significant strides in limiting opioids prescribed unnecessarily. During the study timeline, and over the course of a statewide mandatory e-Rx program, Pennsylvania saw large declines in opioid prescribing measures. While no one program can be identified as the driving force for this change, the implementation of a wide spectrum of targeted legislation could be successful in combating the opioid crisis.

Limitations

Pennsylvania's PDMP was the first significant program to effectively track opioids prescribed and filled. Due to incomplete data prior to its implementation, the paper looked at opioid trends following - and not directly prior to – it's implementation. It is necessary to note that while the trends of opioids prescribed showed a decrease, this could be not purely because of the PDMP. Increased education, the PDMP use and registration mandate, and increased legal ramifications for physicians who overprescribe opioids could have influenced these trends.

Currently, data is only available for less than a year post implementation of E-Prescribe in Pennsylvania at the time of this study. While a large decrease has been shown, longer term studies

are needed to address the lasting impact of a E-Prescribe on opioid prescribing habits.

Conflicts of Interest

None of the authors or their family members has conflicts of interest related to the execution of the study or production of the manuscript.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

All listed authors contributed equally to the study.

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Not Applicable

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