

The United States Opioid Epidemic: Data and Visualizations

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Abstract:

This project is an analysis of the growing opioid epidemic in the United States. Through statistics and visualizations, we search for insight to better understand this concerning phenomenon. This project includes correlations between medically-prescribed opioids and drug-related deaths, temporal analysis, and geographical variance in opioid use.

Introduction:

Opioids are a group of drugs used for pain relief. Lower doses of Opioid can make the patient sleepy, whereas, the higher doses can slow down breathing and heart rate, that can prove to be fatal. When this medication travels through blood and reaches the opioid receptors in our brain cells, the cells release signals that manipulate the perception of pain and enhances the feelings of pleasure. A strong urge to continue this feeling of pleasure often leads to addiction of the drug.[\[1\]](#)

Prescription Opioids are normally safe when taken as prescribed. The same prescription can be misused by an addict. More than 100 lives are estimated to be lost every day in the country due to Opioid overdose. This is a national crisis that is affecting social as well as economic welfare of the nation. [\[2\]](#)

“The Centers for Disease Control and Prevention estimates that the total "economic burden" of prescription opioid misuse alone in the United States is \$78.5 billion a year, including the costs of healthcare, lost productivity, addiction treatment, and criminal justice involvement.”[\[3\]](#) Aware of the severity of the complication, our team decided to analyze the data collected by Center for Disease Control [CDC]. We are looking forward to develop an application that will provide the visual statistics of the epidemic across the country.

Background and Related work:

Here are some the related works on the field that motivated us to research into the topic further:

- In the 1980s, some academic articles believed that the addictiveness of opioids was not serious at all. A five-sentence long letter published in the New England Journal of

Medicine (In the January 10, 1980), Jane Porter and Dr. Hershel Jick mentioned that "the development of addiction is rare in medical patients with no history of addiction." [4]

- From that time, the major opioid manufacturers in the United States promised that taking opioid analgesics would not be addictive and vigorously promoted, and the amount of prescription drugs rose rapidly. The US population accounts for about 5% of the world's population, and opioids consumed account for 80% of the world's total [5].
- Manchikanti et al (2012) described various aspects of crisis of opioid use in the United States. By analyzing and visualizing the available data source, like National Survey on Drug Use and Health, the authors concluded that in the United States, over the past 20 years, there has been a rapid increase of the medical use of opioids as well as their abuse and misuse. The study showed that "an estimated 22.6 million, or 8.9% of Americans, aged 12 or older, were current or past month illicit drug users." The survey also indicates that "just behind the 7 million people who had used marijuana, 5.1 million had used pain relievers." Moreover, this study also showed that there is a significant relationship between sales of opioid pain relievers and deaths [6].
- The study published by Rudd et al (2016) also showed that deaths from opioid overdoses are increasing in the United States. The authors utilized the National Vital Statistics System multiple cause-of-death mortality files to identify drug overdose deaths. This study indicated that during 2014, 47,055 drug overdose deaths occurred in the United States. 61% of drug overdose deaths involved some type of opioid. It concluded that increases in opioid overdose deaths were the main reason in the increase in drug overdose deaths [7].

Research Question, hypothesis or objectives, data set description:

According to drugabuse.gov, the misuse and addiction to opioids-include prescription pain relievers, heroin, cocaine, and synthetic opioids such a fentanyl and others. There are lot of research has been done on opioid overdose, the source of these research data has been contributed in multiple websites.

This project will be using data from several sources but not limited to CDC.gov, Medicaid.gov, Drugabuse.gov, HHS.gov and ahrq.gov. The data will be extracted from these sources, cleaned, transformed and will be prepared for visualization to tell the story of opioid epidemic in the United States of America. The project will also aim to find correlation between the variables such as opioid addiction vs deaths by overdose/poisoning by substance abuse.

As we keep collecting the data we may be able to find new variables that can be helpful to make visualization better as well provide more insights. At this moment, project will be focused on gathering the data elements such as, year, month, quarter, country, state, Drug name, Supplier, Units, number of prescriptions, Medicaid amount reimbursement, Total

Reimbursement, Deaths, Deaths by overdose. The data will include the time frame of at least one year or less based upon the processing power of ordinary quad core processor and resources. However, these features will be subject to change based on the analysis of the data.

Objective:

To provide the insights through visualization the Opioid epidemic in United States of America.

References:

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