



# Public Health Data Challenge: Opioid Crisis

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# Opioid Crisis

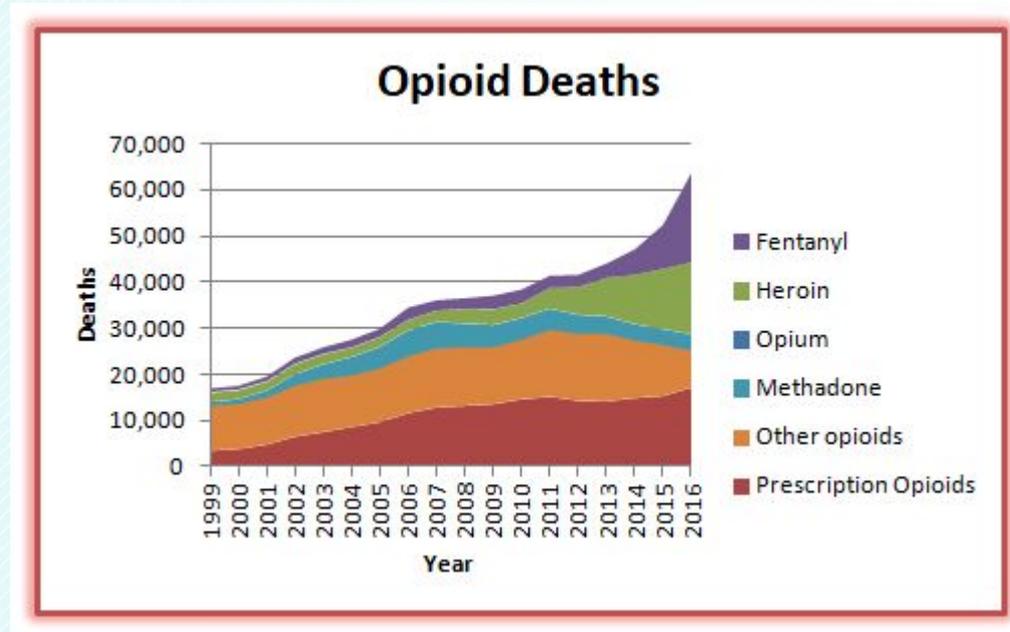
The opioid epidemic is the increasing misuse and addiction to opioids such as prescription pain relievers, synthetic opioids, heroin, and others.

The graph shows that opioid death rates have been increasing since 1999. Recent data shows a sharper increase in deaths in 2015-2016 caused by increases in fentanyl and heroin overdoses.

Possible solutions to the opioid crisis

- State or federal laws regulating the use and prescription of opioids
- Drug addiction treatment facilities
- Anti-addiction medications ex. Narcan, Buprenorphine, Methadone
- Educating on the danger of drug addiction

Data from the CDC show that more than 72,000 people are predicted to have died from drug overdoses in 2017- nearly 200 a day.



## **Purpose:**

- **Indicate which state policies have the most positive effect on reducing drug overdose mortality rate.**
  - **Visualize and analyze data using technology such as R, JMP, and Excel.**

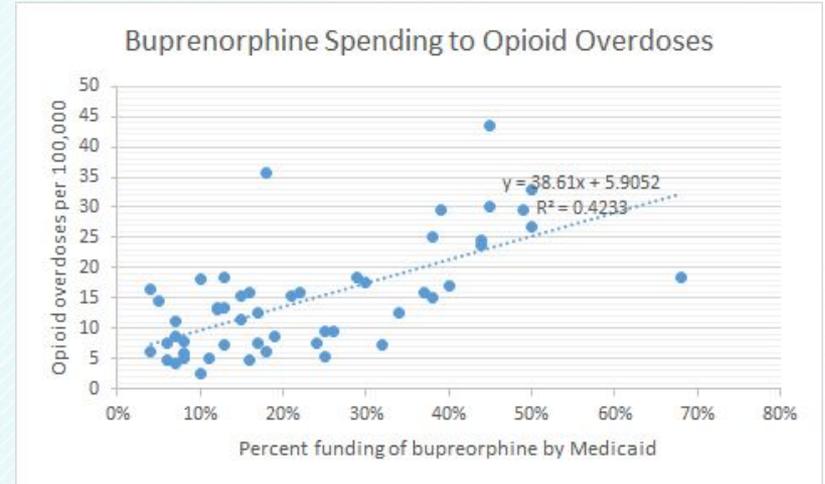
# Buprenorphine Spending and the Problem with Interstate Comparisons

Buprenorphine is a drug used to treat substance use disorders by reducing compulsive behavior and constant cravings.

The graph has  $r^2 = .4233$ , indicating that 42.33% of variation in buprenorphine spending can be explained by a linear relationship with opioid overdose deaths.

The moderate positive linear correlation ( $r = .6506$ ) shows that funding for buprenorphine increases as overdose rate increases.

This is not cause and effect! The confounding variable that states with greater opioid issues would spend more on buprenorphine gives the false appearance that increased spending leads to high deaths.



\*Each dot represents data for 1 state

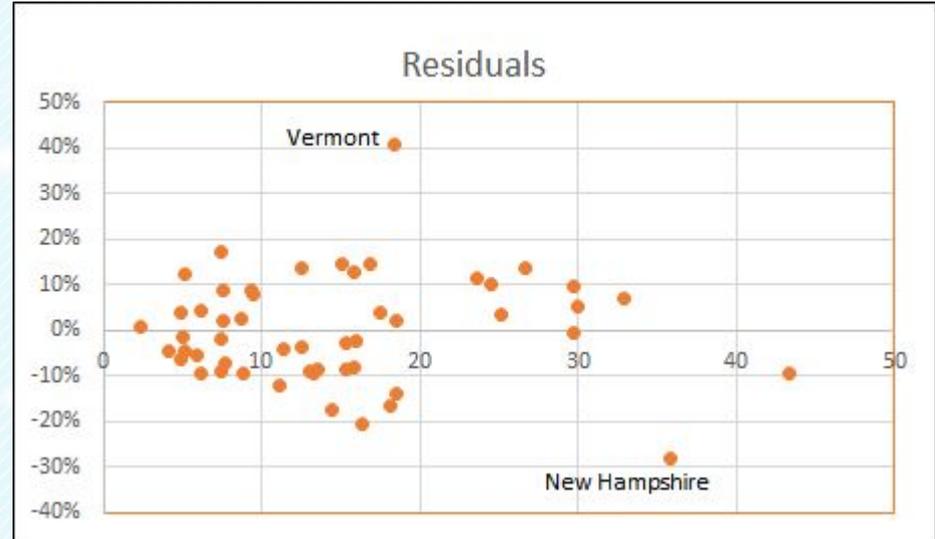
# Analysis of Buprenorphine Spending to Overdose Deaths

This plot shows the residual plot of the linear model (shown in the previous slide) for buprenorphine spending funding by Medicaid to overdose death rates.

There are two outliers shown: Vermont has a positive residual of 41% and New Hampshire has a negative residual of -28%. Each is more than two  $s_e$  from the least squares line

Further research could confirm or contradict the effectiveness of buprenorphine funding in these two extreme states.

The  $s_e = 0.12$ , the standard deviation of residuals, is the magnitude of a typical standard deviation from the prediction of the least squares line, about the overdose death.

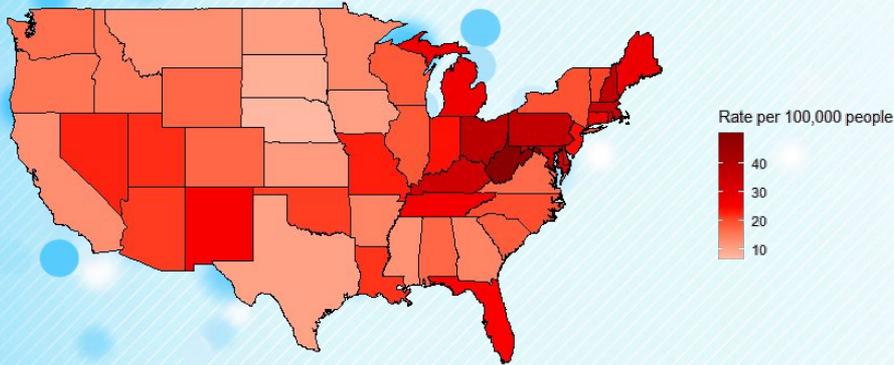


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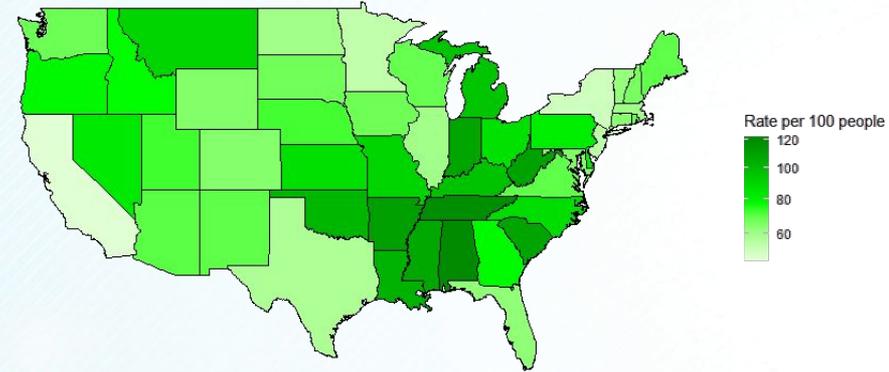
# Opioid Overdose Data for Each State

Graphs created in R,  
JMP, and excel.

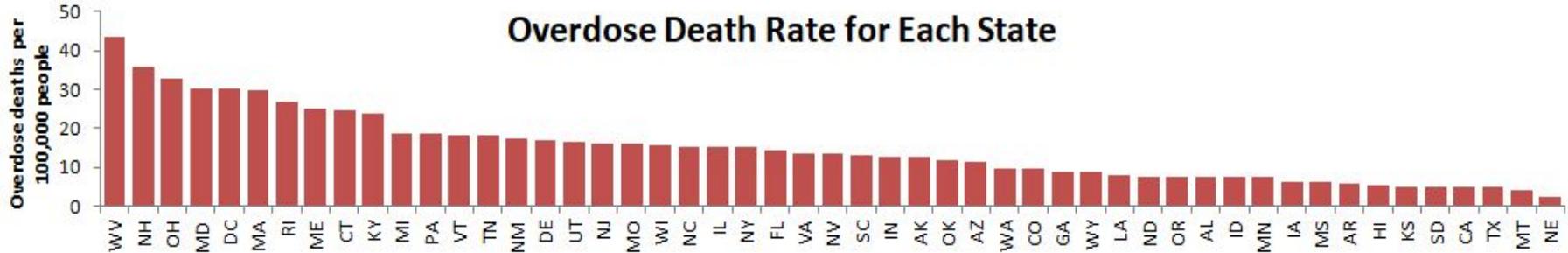
Opioid Overdose Deaths



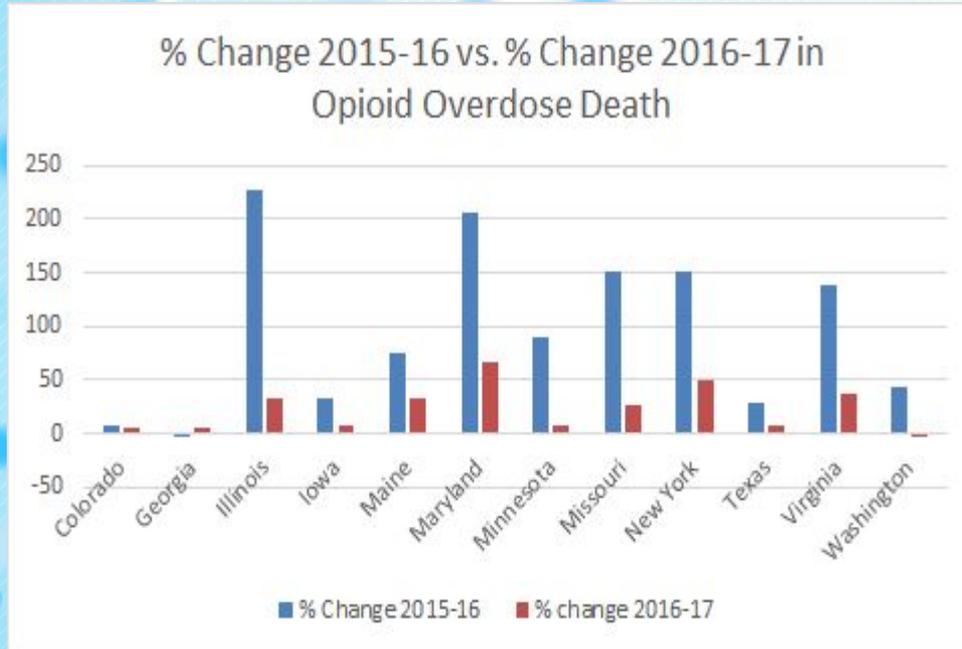
Opioid Prescription Rate



## Overdose Death Rate for Each State

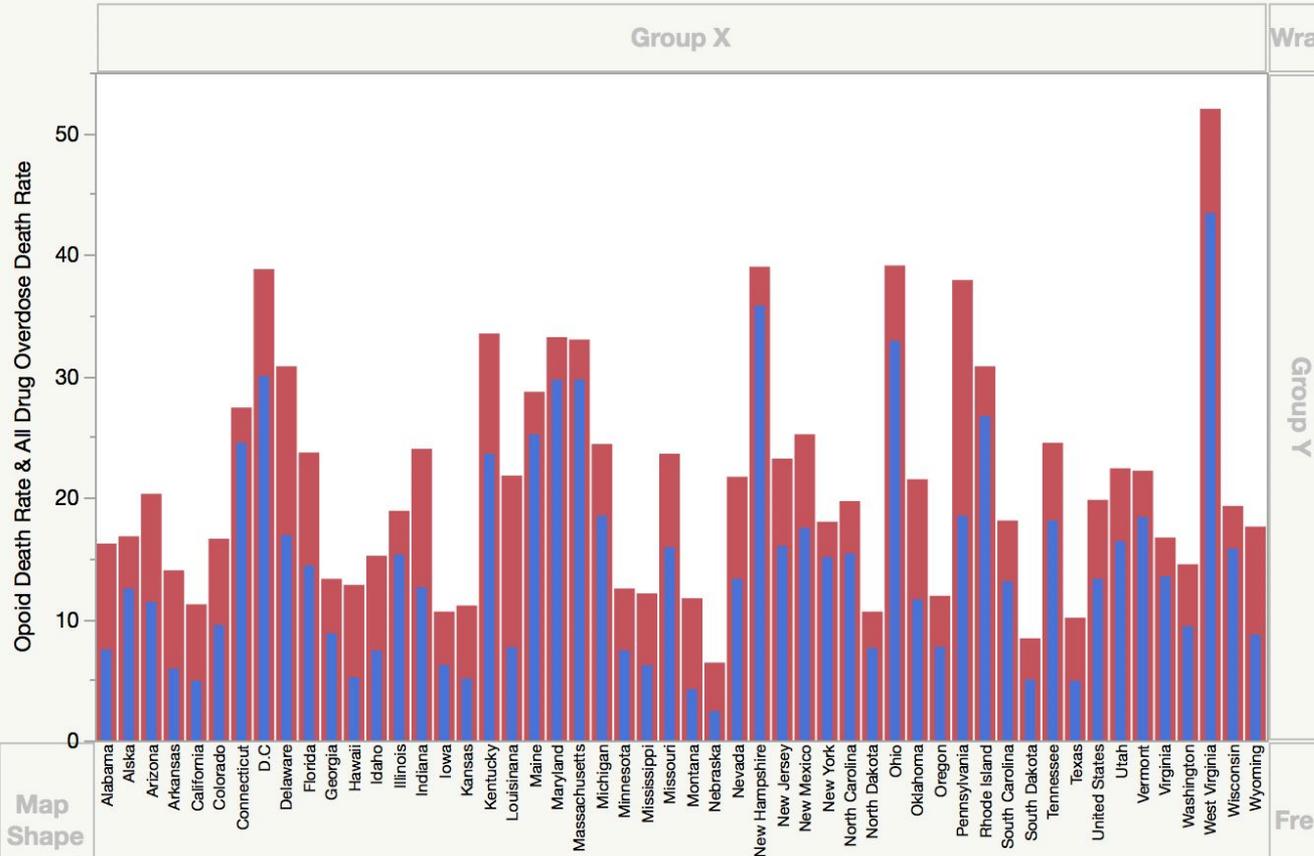


# Opioid Overdose Change by State



- Illinois has the greatest improvement.
- In 2014, Illinois physicians checked PMP only 20% of the time.
- In early 2017, Illinois required prescribers to check Prescription Monitoring Program before assigning potentially addictive medications.
- Other states that have adopted must-access laws such as Texas have also shown improvements.
- Suggestion: require PMP check before opioid prescription.

## Opioid Death Rate & All Drug Overdose Death Rate vs. Location



**Description:** Comparing the overdose death rate of opioids when compared to overall overdose death rate of all drugs in the United States

**Data Analysis:** Opioid Overdose deaths makes up the majority of overdose drug deaths in the United States.

West Virginia has the highest rate of drug deaths for both overall and opioids. This may offer insight into issues in drug management policies or funding.

Nebraska has the lowest rate of overdose deaths and opioid deaths. This may offer insight into potential solutions in funding / drug policies

■ = All Other Drug Deaths

■ = Opioid Deaths

# Conclusion

- The analysis examined associations between buprenorphine spending financed by Medicaid and opioid overdose deaths per 100,000 people.
- States with less access to clinics with opioids have significantly lower death rates relating to opioids in comparison to their respective urban counterparts states.
- Illinois has indicated recent progress with respect to opioid mortality rate by using the Prescription Monitoring Program.
- Nebraska has the lowest rate of opioid mortality rate
- West Virginia has the highest rate of opioid mortality

**Recommendations:** Due to limited time, we have not had time to research but feel it is apt to further study recent legislation and enforcement in Nebraska and long-standing policies in Nebraska. One may also see if there are any clear reasons West Virginia has the highest death rate.

# Works Cited

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- <https://www.kff.org/other/state-indicator/opioid-overdose-deaths-by-type-of-opioid/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>
- [https://www.kff.org/other/state-indicator/opioid-overdose-death-rates/?currentTimeframe=0&selectedDistributions=opioid-overdose-death-rate-age-adjusted--all-drug-overdose-death-rate-age-adjusted--percent-change-in-opioid-overdose-death-rate-from-prior-year--percent-change-in-all-drug-overdose-death-rate-from-prior-year&sortModel=%7B%22colId%22:%22Opioid%20Overdose%20Death%20Rate%20\(Age-Adjusted\)%22,%22sort%22:%22desc%22%7D](https://www.kff.org/other/state-indicator/opioid-overdose-death-rates/?currentTimeframe=0&selectedDistributions=opioid-overdose-death-rate-age-adjusted--all-drug-overdose-death-rate-age-adjusted--percent-change-in-opioid-overdose-death-rate-from-prior-year--percent-change-in-all-drug-overdose-death-rate-from-prior-year&sortModel=%7B%22colId%22:%22Opioid%20Overdose%20Death%20Rate%20(Age-Adjusted)%22,%22sort%22:%22desc%22%7D)
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