

# Opioid prescriptions and overdose deaths in the U.S.

“The Opioid Epidemic”



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# Opioids: a nationwide public health crisis

- **Research question:**
  - Are there **demographic groups or locations** where **fatal opioid overdoses are more prevalent**?
  - If so, is there a relationship between prescribing practices and opioid related mortalities in these demographics/locations?
- Analysis of current high quality surveillance data can lead to increased programmatic response and identify changing trends in these demographics/localities
- Data sources/tools:
  - [CDC Wonder](#)
  - [Kaiser Family Foundation](#)
  - [CMS Medicare Part D](#)
  - Utilization of **Google APIs**

## 1. Reference CDC study

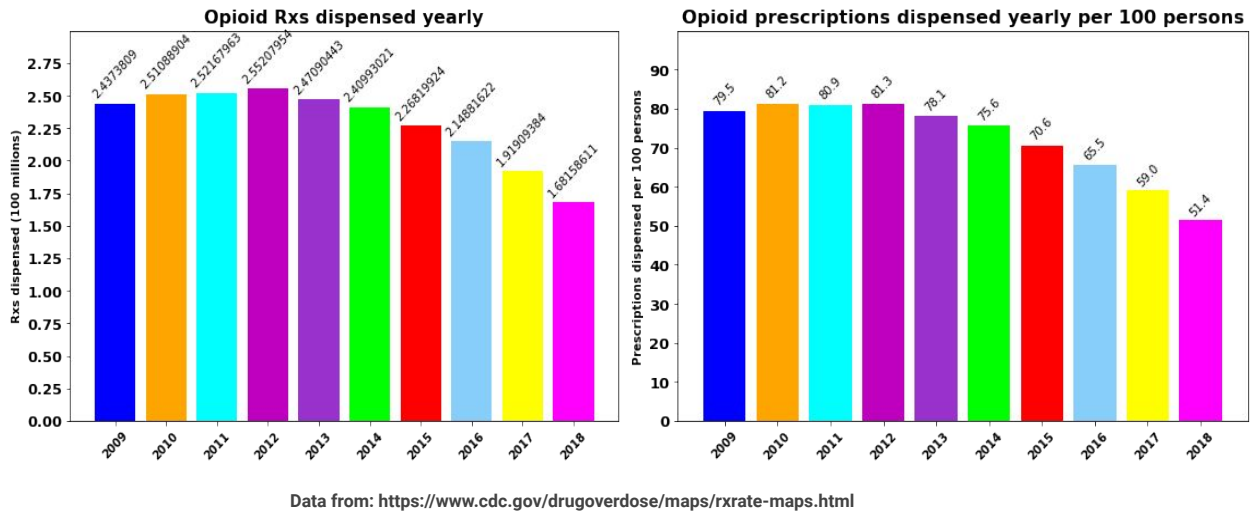
[https://1drv.ms/u/s!ApiRJp9AVroogacGqi3c4MeT\\_gMbNQ](https://1drv.ms/u/s!ApiRJp9AVroogacGqi3c4MeT_gMbNQ)

<https://idhdp.com/en/resources/news/may-2019/in-cities-where-it-once-reigned-heroin-is-disappearing.aspx>

- Longtime users who managed to survive decades injecting heroin are now at far higher risk of dying from an overdose. That is because synthetic fentanyl, a deadlier drug that is much cheaper to produce and distribute than heroin, has all but replaced it. The dramatic rise of fentanyl, which can be 50 times stronger than heroin, has been well documented. But its effect on many older, urban users of heroin, who had been able to manage their addiction for years, has been less noticed. The shift from heroin to fentanyl in cities has contributed to surging overdose deaths among older people and African-Americans and deeply unnerved many.
- Throughout our study we take a deeper look at different trends in the data pertaining to opioid overdoses and fatalities as they are associated with age groups, rates of increase or decrease over time, differences on the state and national level, and prescriber data which gives us an amazing look at how many specialties of physicians out there are treating patients with opioids for unknown conditions which vary greatly. We will provide better statistical analyses, raw data analyses, and data visualizations to go along with our findings. This will provide us all with a better perspective of the depth of this crisis and its effects on different demographics/age groups, etc..

- CDC Wonder citation: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2018 on CDC WONDER Online Database released in 2020. Data are from the Multiple Cause of Death Files, 1999-2018, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. (2020 February 14) Retrieved from <http://wonder.cdc.gov/mcd-icd10.html>

# Nationwide trend in number of opioid prescriptions



Data from: <https://www.cdc.gov/drugoverdose/maps/rxrate-maps.html> and from [cdc\\_prescribing\\_info.ipynb](#)

Here we have two visualizations from the CDC source listed below the graphs. The one on your left is the # of OPIOID RXS DISPENSED YEARLY, NATIONWIDE, expressed in 100 millions

And we can clearly see that there are a seriously large amount of opioid Rx's per year written and dispensed. We see from 2009 to 2012 a continuous increase in the number dispensed but we

Then see a more drastic decrease beginning in 2013 and continuing until 2018. This is likely due to multiple factors: public awareness, legislation, actions that the DEA has taken to combat

The opioid epidemic. Many doctors have been shut down due to overprescribing habits or underreporting the number of patients and hence way overprescribing per person reported, etc. We

Cannot say with any degree of certainty why we see this phenomenon but research from the CDC does show the above reasons as valid and partially responsible for this pattern.

We see a Similar pattern with the graph on the right which is OPIOID RXS DISPENSED ANNUALLY PER 100 PERSONS, note the number per 100 people, we can also consider this a percentage

If you think about it, as it is per 100 people it is a percentage, so if we have say 79.5 per 100 in 2009 that's 79.5% of the population receiving opioid Rx's, that's very high, even after the decline

Beginning in 2013 and continuing to 2018.

Conclusion here: we are seeing what is properly coined "the Opioid Epidemic" and there are two side to this epidemic, we have Medically Trained individuals who go through grueling

educational processes and owe an arm and a leg, and they go and let's assume for profit, or optimistically viewing it in an effort to help individuals suffering from chronic pain disorders, they

Knowingly understand the consequences of continuous ingestion of

individuals with nowhere to turn,

physical withdrawal kicks in and people do desperate things, like turn to the street solution, which they believe is heroin. They know nothing of heroin and how much to use, but the opioid

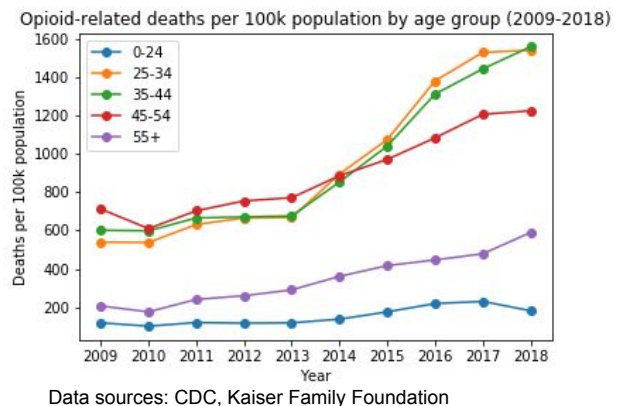
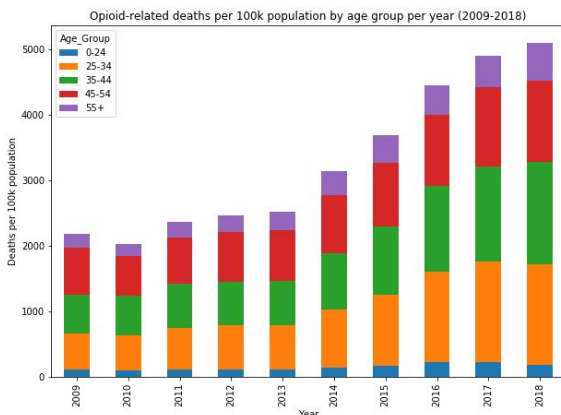
fatalities begin spiking b/c this heroin they now are buying is almost 100% fentanyl and possibly carfentanyl (up to 50-100 times stronger than fentanyl which already is a killer). They

sometime use once and overdose and die, some are more lucky and maybe survive a while developing a "heroin/fentanyl" habit and eventually that one unintentionally deadly strong bag

comes along and that is the end of them. It's a vicious cycle and the data shows things are improving but the numbers show, there's still a serious problem in existence

# Visualization by age group

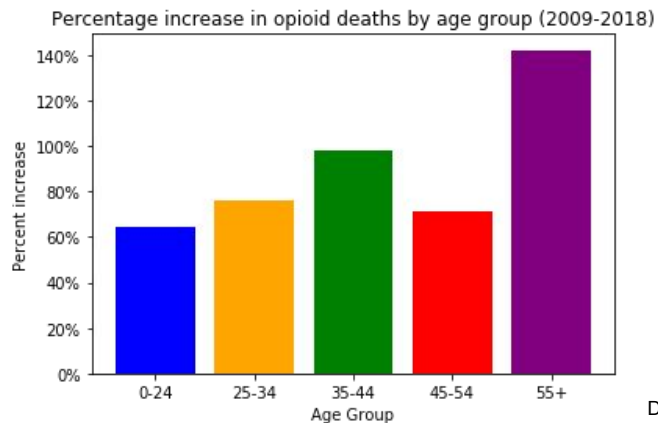
An overall increase in opioid-related deaths per 100K population across all age groups from 2009 to 2018



- Where Are there demographics that are at greater risk of fatal opioid overdose?
- Data sources: CDC, Kaiser Family Foundation
- Explain cleanup/merge of KFF and CDC data
- **Bar chart:** Gives overall (total) deaths per 100k for each age group per year from 2009 to 2018. A steady increase except for 2009-2010.
- **Line plot:** Direct trend of deaths per 100k by age group. 0-24: relatively flat.

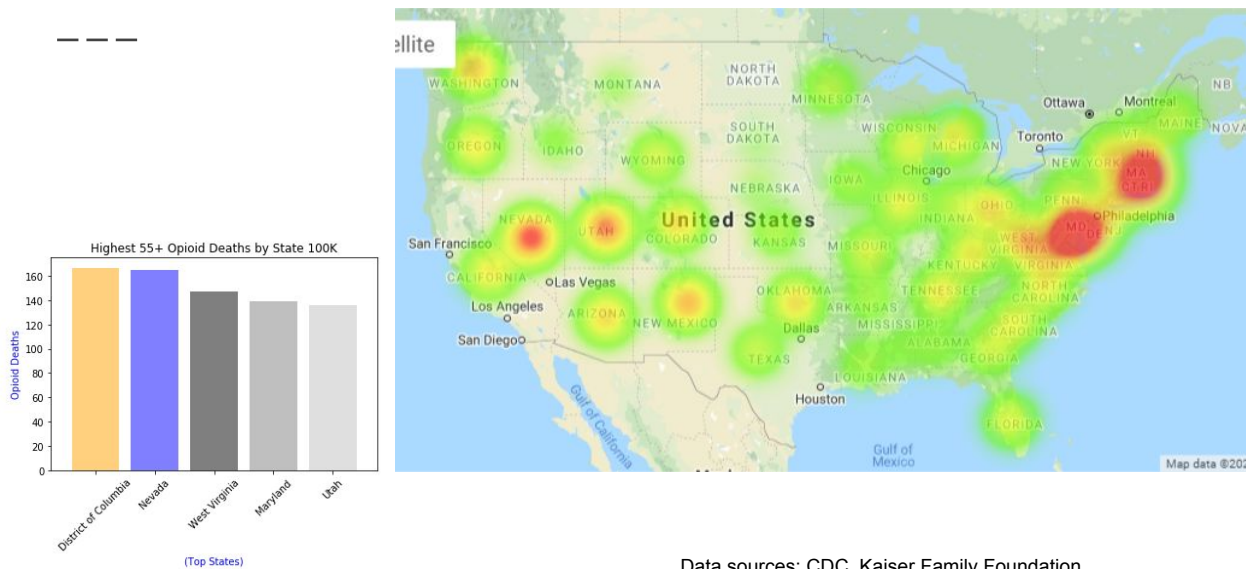
## Percent change in opioid deaths by age group (2009-2018)

While the overall number of deaths for the 55+ age group is small, they have shown the greatest increase over time



- Are the at risk demographics changing over time?

## % of deaths for 55+ years old that are opioid related by state, 2009-2018



- Are there certain locations that are at greater risks of fatal opioid overdose for the over 55 population?
  - Washington DC, Nevada, West Virginia Maryland and Utah had the most opioid overdose deaths over time for the 55+ population.



## Examining prescribing practices of Medicare Part D providers of opioids

— — One in three Medicare Part D beneficiaries received a prescription opioid.



In total, 1,162,898 providers wrote prescriptions for opioids.



\*HHS OIG Data Brief • July 2017 • OEI-02-17-00250

<https://oig.hhs.gov/oei/reports/oei-02-17-00250.pdf#:~:text=In%20addition%20to%20the%20risk,likelihood%20of%20falls%20and%20fractures>

The Medicare Part D Opioid Prescriber Summary File for 2017, which is published by CMS (Centers for Medicare & Medicaid Services) for public use. The prescriber level of the file, had information on provider, total claims, and opioid claims for Part D enrollees. In total, the data contained 1,162,898 providers but after excluding missing and invalid observations, our final analysis file had 826,438 providers.

# Number of top providers for Part D population (2017)

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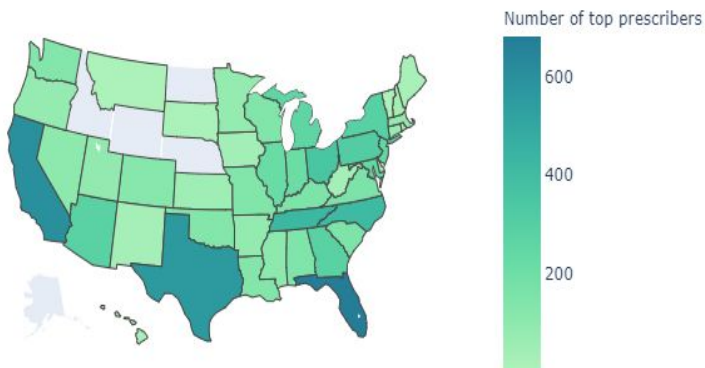
Top opioid prescribers (2017)

## Top opioid prescribers:

Top 5th percentile for opioid  
claim count

&

Top 5th percentile for opioid  
prescribing rate



Data source: CMS Medicare Part D Opioid Prescriber Summary File 2017

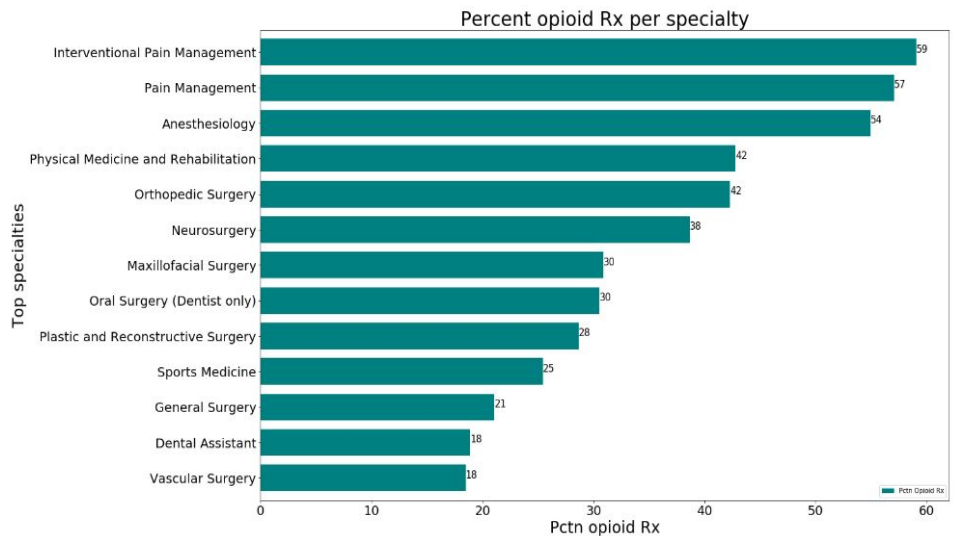
Data Source: Medicare Part D Opioid Prescriber Summary File 2017

<https://data.world/cms/sakz-a2rp>

# Prescriptions by top medical specialties

## Top opioid prescribing specialties:

Top 25th percentile for  
opioid claim count  
&  
Top 25th percentile for  
opioid prescribing rate

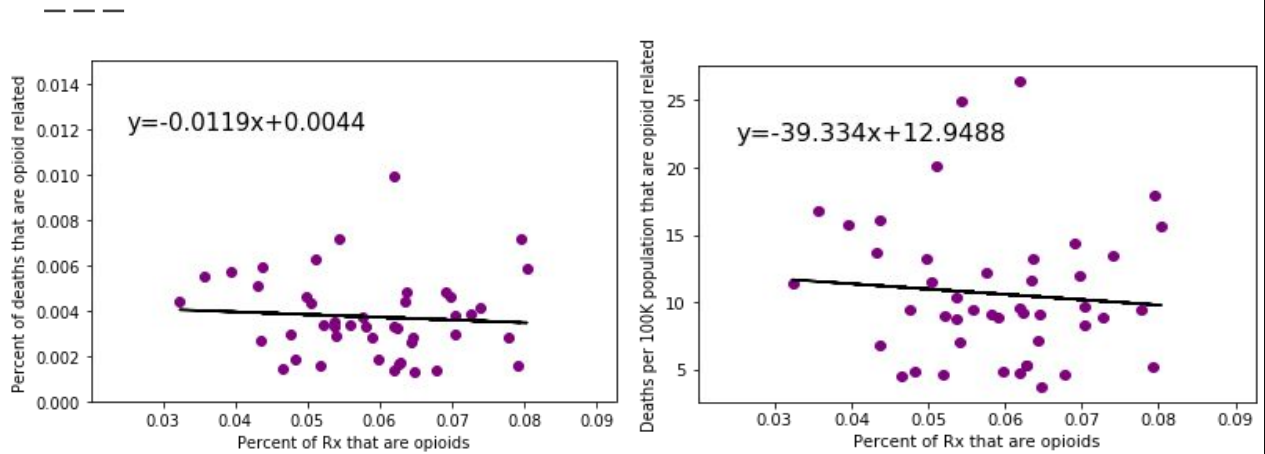


Data source: CMS Medicare Part D Opioid Prescriber Summary File 2017

Data Source: Medicare Part D Opioid Prescriber Summary File 2017

<https://data.world/cms/sakz-a2rp>

# Relationship between opioid scripts and opioid deaths



Data sources: CMS, Kaiser Family Foundation, CDC

- Is there a relationship between number of opioid scripts and fatal opioid overdose?

# Conclusion

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- **Findings**

- The number of opioid prescriptions are decreasing, but opioid deaths are increasing
  - National Center for Health Statistics: drug overdose deaths involving synthetic opioids other than methadone (drugs such as) increased by 10%, from 9.0 in 2017 to 9.9 in 2018.
- Opioid deaths are increasing most in the 55+ population
- States with high levels of prescribing do not correspond to those with the highest death rates

- **Limitation of our analyses**

- Age group for death and prescriptions not directly aligned (55/65)
- CMS data does not include prescriptions filled through private insurance or illegally obtained opioids
- Data is delayed 3 years, limiting functionality for surveillance

NIDA. 2020, July 2. Washington D.C.: Opioid-Involved Deaths and Related Harms.

Retrieved from

<https://www.drugabuse.gov/drug-topics/opioids/opioid-summaries-by-state/washington-dc-opioid-involved-deaths-related-harms> on 2020, July 28

Aging Today: Rural Older Adults Hit Hard by Opioid Epidemic:

<https://www.asaging.org/blog/rural-older-adults-hit-hard-opioid-epidemic>