Impact of the COVID-19 Pandemic on Opioid Overdose in California: An Analysis of Emergency Department Visit Trends from 2018 to 2022

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Background

- The COVID-19 pandemic has had a devastating impact on mental health across the United States, including California, which resulted in the highest rates of opioid overdose emergency department (ED) visits in 2020.
- This was likely the consequence of excessive stress and worsening mental health due to pandemic-associated lockdowns and isolation, compounded by the difficulties in access to Medications for Opioid Use Disorder.
- As California slowly returned to pre-pandemic normalcy in 2021 and 2022, it remains uncertain whether the rates of opioid overdoses have slowed down over time.

Objective and Hypothesis

- Our objective was to compare the trends of ED visits associated with opioid overdoses in the period before (Jan 2018 to Dec 2019) and during the pandemic (Apr 2020 to Dec 2022). A washout period between Jan 2020 and Mar 2020 was implemented due to widespread uncertainty regarding the nature of the pandemic during that timeframe.
- *We hypothesize that opioid overdose ED visit rates have worsened given the challenges that individuals faced during the pandemic while overcoming opioid addiction.*

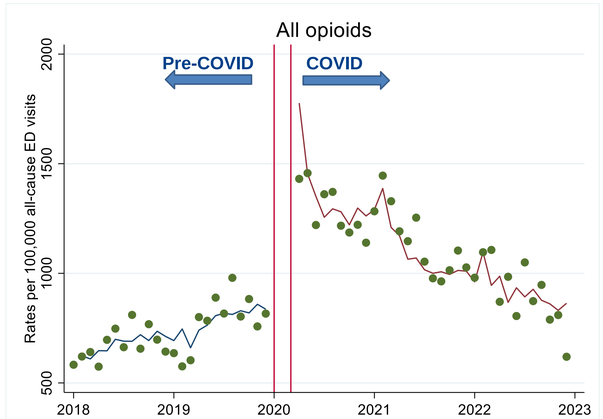
Methods

- **Data Source:** This analysis uses the ***University of California (UC) Health Data Warehouse***, a database of electronic health records from the six UC health centers. IRB review was not required for this de-identified data analysis.
- **Opioid overdose ED visits** were queried using SQL and defined using ICD-10-CM (F11 codes, and T40.0*, T40.1*, T40.2*, T40.3*, T40.4*, T40.6*), and then classified by types of opioids involved: heroin (T40.1*), prescription opioids (T40.2* or T40.3*), and synthetic opioids other than methadone (T40.4*).
- **Statistical Analysis:** ***Interrupted time analysis*** was performed to estimate the immediate (level) change and change in time trend (trend change) for each outcome with negative binomial regression adjusted for first order autoregression and using all-cause ED visit counts as the offset variable. Effect sizes were presented as rate ratios and 95% confidence intervals. Analyses were tested with α=.05 and completed with Stata v16.1.

Results

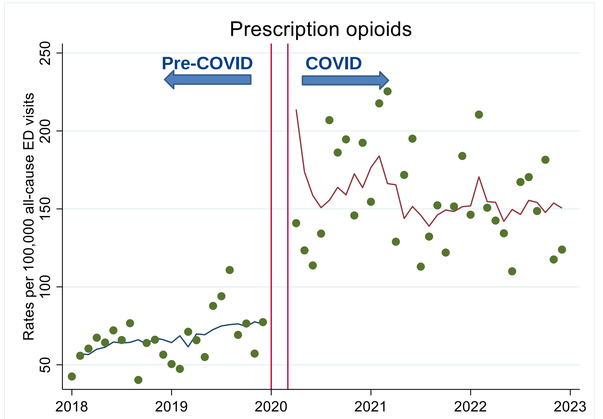
- Trends in opioid overdose ED visit rates were significantly different between the periods prior to and during COVID-19 ***(Figure 1)***.
- ***As of December 2022, prescription and synthetic opioids (Figure 1A-C) overdose ED visit rates were higher than pre-pandemic trends.*** In contrast, heroin overdose ***(Figure 1D)*** visits saw a downward trend during the pandemic.

(A)



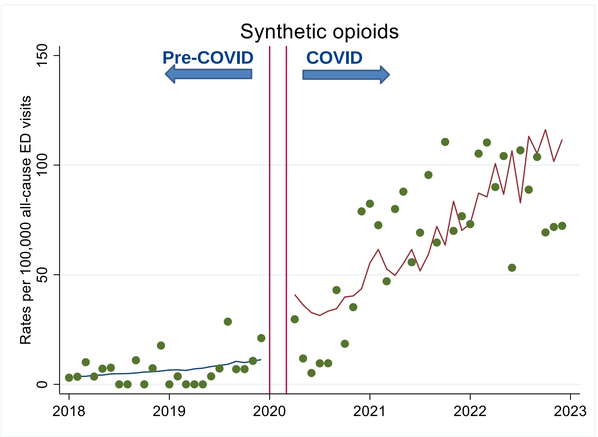
Parameters	Rate ratios (RRs)	% change	95% confidence intervals (CIs)	p
Slope pre-COVID (/mth)	1.01	+1%	1.006–1.02	***<0.001******
Immediate change	1.15	+15%	1.02–1.29	***0.020****
Slope COVID (/mth)	0.995	-0.5%	0.991–1.00	0.062

(B)



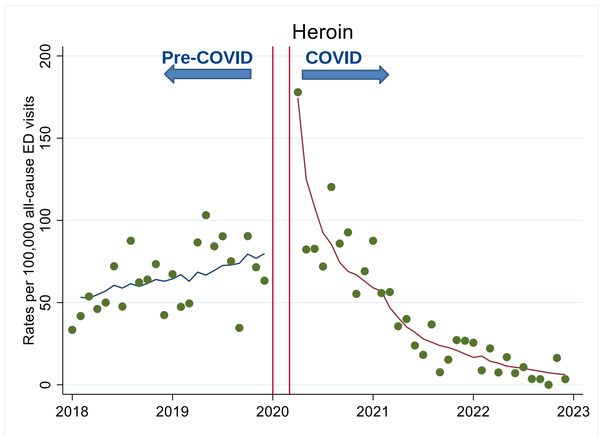
Parameters	Rate ratios (RRs)	% change	95% confidence intervals (CIs)	p
Slope pre-COVID (/mth)	1.01	+1%	1.002–1.02	***0.021****
Immediate change	1.44	+44%	1.10–1.89	***0.008****
Slope COVID (/mth)	1.01	+1%	0.998–1.02	0.116

(C)



Parameters	Rate ratios (RRs)	% change	95% confidence intervals (CIs)	p
Slope pre-COVID (/mth)	1.05	+5%	0.998–1.11	0.060
Immediate change	1.69	+69%	0.68–4.16	0.256
Slope COVID (/mth)	1.04	+4%	1.02–1.06	***0.001****

(D)



Parameters	Rate ratios (RRs)	% change	95% confidence intervals (CIs)	p
Slope pre-COVID (/mth)	1.02	+2%	1.006–1.03	***0.006****
Immediate change	1.20	+20%	0.86–1.67	0.282
Slope COVID (/mth)	0.92	-8%	0.90–0.93	***<0.001******

Figure 1. (A) Total opioid overdose ED visit rates increased immediately after Mar 2020 before decreasing every month, albeit without reaching statistical significance. **(B)** Similar trends were observed with prescription opioids, with a step before plateauing after Mar 2020. In contrast, ED visit rates for synthetic opioids poisoning **(C)** were increasing steadily every month, unlike heroin **(D)** which was observed with monthly reduction. No immediate increase in ED visit rates was observed for both types of opioids after Mar 2020. *(*p<0.05; **p<0.01; ***p<0.001)*

Discussion

- ***The COVID-19 pandemic brought to light the urgent need for multilevel innovative approaches to aid against the opioid epidemic in California.*** In particular, the pandemic has facilitated the worsening of trends related to synthetic and prescription opioids overdoses across the UC health centers with little signs of improvement as of December 2022.
- In 2023, numerous policy changes have been made to increase access to Medications for Opioid Use Disorder (MOUD) for reducing opioid overdose complications and deaths: (1) the removal of the X-Waiver, allowing physicians to prescribe buprenorphine in clinics without extensive training and registration, and (2) the FDA approval of Narcan®, the first over-the-counter naloxone nasal spray. ***Interventions that enhance facilitators and reduce barriers (e.g., telehealth prescribing, education, reducing stigma to seeking treatment, harm reduction services) will ensure that these policies work as intended (first responders to opioid overdose events).***
- ***Within University of California, there is immense potential for increased cross-institution collaborations*** to lead and address this highly complex public health issue using multilevel coordinated strategies (patient, family, clinicians, community and institutions).
- Using the UC Health Data Warehouse, future studies can investigate the risks of repeated opioid overdose admissions, create a dashboard for monitoring admission trends across UC Health institutions, develop prediction models for risk of opioid addiction and overdose events, and evaluate trends in stimulant-related overdose events (methamphetamine and cocaine).

Conclusions

- As of December 2022, rates of prescription and synthetic opioids overdoses were higher than pre-pandemic trends. ***These findings represent a call to action for an increase in California-focused research studies to arrest this worsening opioid epidemic as we return to pre-pandemic normalcy.***

References

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Gardner EA, et al. Forensic Sci Rev. 2022 Jan;34(1):43-70.
Ciccarone D. Curr Opin Psychiatry. 2021 Jul 1;34(4):344-350.