Characteristics Associated with Overdose after Opioid Prescription to Younger Individuals

Scott G. Weiner[1], Kacey Little[2], Jiah Yoo[2], Diana P. Flores[2], Sanae El Ibrahimi[2]

1. Brigham and Women's Hospital, Harvard Medical School; 2. Comagine Health

Introduction

- Adolescents and young adults are experiencing increases in opioid overdose-related deaths.
- From 1999 to 2016, opioid-related mortality among individuals aged 13 to 25 years increased 268.2%. Part of the reason for this trend in mortality is the presence of illicitly manufactured fentanyl.
- Although fentanyl is a driver of mortality, prescription opioids remain a risk for adolescents.
- Recreational misuse of opioids follows a different profile when compared with adults, as teenagers may be more likely to experiment with prescription opioids.
- It is therefore still of importance that prescriptions of opioids to adolescents be done with careful consideration.
- The **goal of this study is to determine the risk of prescribing opioids to formerly opioid-naïve children, adolescents and young adults by analyzing a comprehensive public health dataset from Oregon**.

Methods

Data Source: Retrospective study of the Oregon Comprehensive Opioid Risk Registry (CORR) dataset, which combines the voluntary Oregon All Payer Claims Database (APCD) with the Oregon PDMP, Oregon vital records death certificates, the Oregon hospital discharge database, emergency medical services (EMS), and ED discharges.

Sample: Individuals aged 2-24 as of January 1, 2016, and who had ≥1 opioid prescriptions filled between January 1, 2016 and December 31, 2019 were included. The patient's first opioid prescription in this period was the index prescription. Patient age was categorized into age bands (2-11, 12-17, 18-24 years). Comorbid conditions were identified using Elixhauser comorbidity measures and categorized into 0 or ≥1. Characteristics of the index prescription, such as the opioid type, duration of action, days' supply, and morphine milligram equivalents (MMEs) of the prescription were computed.

Analysis: The main outcome was an incident non-fatal or fatal overdose at 12 months following the index prescription. Logistic regression models were used to calculate the odds ratios of patient and prescription level risk factors with respect to opioid overdose.

Results

- ✓ 117,693 patients met inclusion criteria:
  - ✓ 7.7% (n=9,002) 2-11 years, 30.4% (n=35,577) 12-17 years, and 61.9% (n=72,467) 18-24 years.
- ✓ More patients were female (n=64,929, 55.5%).
- ✓ Insurance: 50.0% (n=58,470) commercial and 49.7% (n=58,137) Medicaid.
- ✓ 45,696 (38.8%) patients had ≥1 Elixhauser comorbidity coded.
- ✓ 4,643 (3.9%) patients had a substance use disorder coded.
- ✓ Index prescriptions included:
  - ✓ hydrocodone short-acting (n=72,503, 61.9%), oxycodone short-acting (n=32,495, 27.8%), codeine (n=7,197, 6.2%), and tramadol (n=4,141, 3.5%).
  - ✓ Long-acting formulations were rarely prescribed (n=101, 0.1%).
  - ✓ Most prescriptions were for <7 days' duration (n=107,043, 91.5%).
- ✓ There were 92 overdoses within 12 months of index prescription (0.08%).
- ✓ No overdoses in 2-11-year-olds, 20 in 12-17-year-olds, 72 in 18-24-year-olds.

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits		P value
Age 18-24 (vs. 12-17)	1.51	0.91	2.50	0.1122
Sex male (vs. demale)	1.37	0.90	2.07	0.1402
Payer (Medicaid vs. other)	1.25	0.80	1.95	0.3255
Elihauser (≥1 vs. 0)	**2.90**	**1.76**	**4.77**	**<.0001**
Pain diagnosis (≥1 vs. 0)	1.02	0.66	1.56	0.942
SUD diagnosis (vs. no)	**5.49**	**3.32**	**9.09**	**<.0001**
Index MME ≥75 (vs <75)	**0.49**	**0.31**	**0.78**	**0.0025**
Index Rx codeine (vs. hydrocodone)	0.68	0.25	1.90	0.4657
Index Rx oxycodone (vs. hydrocodone)	1.49	0.90	2.47	0.1204
Index Rx tramadol (vs. hydrocodone)	1.02	0.37	2.83	0.9749
Index Rx long-acting (vs. not)	3.07	0.30	31.63	0.3461

Conclusions

- **Opioid overdose after initial prescription of opioids to younger patients is rare in Oregon (0.08%).**
- Certain patients appear to be more at risk: those with medical comorbidities or a history of substance use disorder.
- There were no detectable differences in subsequent overdose based upon which opioid was prescribed, including long-acting vs. short-acting opioids, and prescriptions for MME > 75 mg were less associated with overdose.
- Studies involving younger individuals in states where opioid overdose occurs more frequently or on a national level may elucidate other risk factors.
- **An initial opioid prescription to younger individuals should still be done with caution, and educating about the risk of fentanyl, including in illicitly manufactured pills, is paramount in this population.**

References

1. Gaither, J. R., Shabanova, V., & Leventhal, J. M. (2018). US National Trends in Pediatric Deaths From Prescription and Illicit Opioids, 1999-2016. JAMA network open, 1(8), e186558.
2. Lee, H., & Singh, G. K. (2022). Monthly Trends in Drug Overdose Mortality among Youth Aged 15-34 Years in the United States, 2018-2021: Measuring the Impact of the COVID-19 Pandemic. International journal of MCH and AIDS, 11(2), e583.
3. Friedman, J., Godvin, M., Shover, C. L., Gone, J. P., Hansen, H., & Schriger, D. L. (2022). Trends in Drug Overdose Deaths Among US Adolescents, January 2010 to June 2021. JAMA, 327(14), 1398–1400.
4. Sandelich, S., Hooley, G., Hsu, G., Rose, E., Ruttan, T., Schwarz, E. S., Simon, E., Sulton, C., Wall, J., & Dietrich, A. M. (2024). Acute opioid overdose in pediatric patients. Journal of the American College of Emergency Physicians open, 5(2), e13134.
5. Hallvik, S. E., Dameshghi, N., El Ibrahimi, S., Hendricks, M. A., Hildebran, C., Bishop, C. J., & Weiner, S. G.(2021). Linkage of public health and all payer claims data for population-level opioid research. Pharmacoepidemiology and drug safety, 30(7), 927–933.

Funding: This study was funded by the National Institute on Drug Abuse, award 5-R01-DA044167

Disclosures: Outside of this work, Dr. Weiner serves on a scientific advisory board of Vertex Pharmaceuticals. The other authors have no relevant disclosures.

Brigham and Women's Hospital
Founding Member, Mass General Brigham

Comagine Health

Oregon Health Authority

Funded by: NIH National Institute on Drug Abuse
Advancing Addiction Science