Rising Stimulant Overdoses Among Young People in the United States

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Although commonly described as an opioid crisis, the drug overdose epidemic in the United States increasingly involves use of substances other than opioids.[1,2] In this issue of *Pediatrics*, Roehler et al[3] describe a concerning rise in overdoses among children, adolescents, and young adults related to stimulants such as cocaine, methamphetamine, and prescription drugs (including those commonly used to treat attention deficient/hyperactivity disorder).

Drawing on 2016–2019 surveillance data from a plurality of US emergency departments across 47 states, the authors found that whereas visits for drug overdoses rose only slightly among children <15 and remained unchanged in adolescents and young adults 15 to 24, visits for stimulant overdoses increased across all ages. Specifically, over each quarter between April 2016 and September 2019, stimulant overdose visits among young people aged 0 to 10, 11 to 14, and 15 to 24 years increased by 3%, 4%, and 2%, respectively.

These findings mirror other recent national drug overdose trends. Although the overall US overdose mortality rate plateaued in 2018 after climbing for 2 decades,[4] preliminary 2019 data suggest a return to increasing year-over-year rates.[1] Nationally, deaths involving cocaine and other stimulants increased sharply after 2016, including among youth ages 15 to 24.[1,5]

The overdose crisis is complex and evolving. Public health experts have described it as having occurred in waves.[5,6] The first wave, beginning in the early 2000s, was largely driven by increases in prescription opioid-related overdoses, likely fueled by aggressive industry marketing of opioid products.[7] Concomitant with a decrease in opioid prescribing, heroin began to supplant prescription opioids during the second wave of the early 2010s. From late 2013 onwards, highly potent fentanyl flooded drug markets and contributed to unprecedented mortality during the third wave. Now, in the fourth wave of the crisis, clinicians, public health experts, and policymakers are grappling with rising overdose fatalities involving stimulants, particularly cocaine and methamphetamine.

Pediatricians and other clinicians caring for youth should be concerned. Approximately 1 in 25 high school students has used cocaine, and 1 in 50 has used methamphetamine.[8] Racial inequities are pernicious; previous work has revealed that Black and Latinx youth are significantly less likely to receive timely evidence-based addiction treatment.[9] These inequities are critical not only because of the excess risk for overdose without recommended care, but also because youth of color are significantly more likely than white youth to be incarcerated for drug-related charges and to experience lifelong adverse health consequences stemming from criminal justice involvement.

What should also concern clinicians is the exceptional difficulty of treating stimulant use disorder. Whereas opioid use disorder is effectively treated with US Food and Drug

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Administration–approved medications,[10] there are no approved pharmacotherapies for stimulant use disorder, and most behavioral therapies are disappointingly ineffective.[11] Similarly, whereas widespread distribution of the opioid overdose reversal agent naloxone in the United States has averted innumerable deaths,[12] no comparable antidote exists for stimulants. Preventing stimulant use disorder from developing in the first place remains our best hope for averting downstream harms.

Roehler et al draw much-needed early attention to this worsening public health problem. Further studies are needed. The authors examine overdoses among 15- to 24-year-olds collectively; more granular age data would shed light on the precise times that overdoses are rising during adolescence and young adulthood. Data are also needed on how stimulant overdoses in youth are related to rising fentanyl overdose[6] and to polysubstance use more broadly, including use of benzodiazepines and alcohol.[13,14] Finally, researchers should take care to identify differences by race and ethnicity to ensure that our clinical and public health responses reduce inequities rather than exacerbate them.[15]

Researchers should also pursue a greater understanding of which stimulants are involved in the pathway to misuse, addiction, and overdose and whether they are illicit drugs like cocaine and methamphetamine, prescription pills, or both. Treating attention deficient/hyperactivity disorder is not associated with risk for substance-use disorder; clinicians should continue to prescribe stimulants when appropriate.[16] Nonetheless, there has been a simultaneous rise in stimulant prescribing,[17] misuse among young adults (particularly college students),[18] and pharmaceutical industry marketing to pediatricians.[19] Understanding whether the widespread availability of prescription stimulants is related to rising overdose rates, or if it is simply coincidental, could inform prescribing guidelines.

In the meantime, pediatricians and other clinicians can take immediate action. They can routinely screen for substance use using a validated tool (eg, Screening to Brief Intervention, https://www.drugabuse.gov/ast/s2bi/; Brief Screener for Tobacco, Alcohol, and other Drugs, https://www.drugabuse.gov/ast/bstad/; Car, Relax, Alone, Forget, Family/Friends, Trouble, https://crafft.org/), counsel on substance use, and refer to addiction treatment when needed.[20,21] As respected citizens in their communities, clinicians can advocate for evidence-based prevention programming in schools and other settings. When clinicians prescribe stimulants, they can counsel parents that they should ensure safe, locked storage of medications, which is especially critical given the rising rates of presumably unintentional stimulant overdoses observed in younger ages in the study by Roehler et al. Given that preliminary national 2019 data suggest that overdose rates have once again resumed their climb,[1] addressing stimulant misuse and overdose early in the life course is urgent.

REFERENCES

1. O'Donnell J, Gladden RM, Mattson CL, Hunter CT, Davis NL. Vital signs: characteristics of drug overdose deaths involving opioids and stimulants - 24 states and the District of Columbia, January–June 2019. *MMWR Morb Mortal Wkly Rep*. 2020;69(35):1189–1197
2. Liu S, Scholl L, Hoots B, Seth P. Nonfatal drug and polydrug overdoses treated in emergency departments - 29 states, 2018–2019. *MMWR Morb Mortal Wkly Rep*. 2020;69(34):1149–1155
3. Roehler DR, Olsen EO, Mustaquim D, Vivolo-Kantor AM. Suspected nonfatal opioid and other drug-related overdoses among youth in the US, 2016–2019. *Pediatrics*. 2020;147(1):2020003491e
4. Wilson N, Kariisa M, Seth P, Smith H IV, Davis NL. Drug and opioid-involved overdose deaths - United States, 2017–2018. *MMWR Morb Mortal Wkly Rep*. 2020;69(11):290–297
5. Kariisa M, Scholl L, Wilson N, Seth P, Hoots B. Drug overdose deaths involving cocaine and psychostimulants with abuse potential - United States, 2003–2017. *MMWR Morb Mortal Wkly Rep*. 2019;68(17):388–395
6. Gaither JR, Shabanova V, Leventhal JM. US national trends in pediatric deaths from prescription and illicit opioids, 1999–2016. *JAMA Netw Open*. 2018;1(8):e186558
7. Hadland SE, Cerdá M, Li Y, Krieger MS, Marshall BDL. Association of pharmaceutical industry marketing of opioid products to physicians with subsequent opioid prescribing. *JAMA Intern Med*. 2018;178(6):861–863
8. US Centers for Disease Control and Prevention. YRBSS results. 2020. Available at: https://www.cdc.gov/healthyyouth/data/yrbs/results.htm. Accessed September 11, 2020
9. Hadland SE, Wharam JF, Schuster MA, Zhang F, Samet JH, Larochelle MR. Trends in receipt of buprenorphine and naltrexone for opioid use disorder among adolescents and young adults, 2001–2014. *JAMA Pediatr*. 2017;171(8):747–755
10. Committee on Substance Use and Prevention. Medication-assisted treatment of adolescents with opioid use disorders. *Pediatrics*. 2016;138(3):e20161893
11. Ronsley C, Nolan S, Knight R, et al. Treatment of stimulant use disorder: a systematic review of reviews. *PLoS One*. 2020;15(6):e0234809
12. Pitt AL, Humphreys K, Brandeau ML. Modeling health benefits and harms of public policy responses to the US opioid epidemic. *Am J Public Health*. 2018;108(10):1394–1400
13. Lembke A, Papac J, Humphreys K. Our other prescription drug problem. *N Engl J Med*. 2018;378(8):693–695
14. White AM, Castle IP, Hingson RW, Powell PA. Using death certificates to explore

changes in alcohol-related mortality in the United States, 1999 to 2017. *Alcohol Clin Exp Res*. 2020;44(1):178–187

15. Jordan A, Mathis ML, Isom J. Achieving mental health equity: addictions. *Psychiatr Clin North Am*. 2020;43(3): 487–500
16. Humphreys KL, Eng T, Lee SS. Stimulant medication and substance use outcomes: a meta-analysis. *JAMA Psychiatry*. 2013;70(7):740–749
17. Piper BJ, Ogden CL, Simoyan OM, et al. Trends in use of prescription stimulants in the United States and Territories, 2006 to 2016. *PLoS One*. 2018;13(11):e0206100
18. Schulenberg JE, Johnston LD, O'Malley PM, Bachman JG, Miech RA, Patrick ME. Monitoring the Future National Survey Results on Drug Use 1975–2019: Volume 2, *College Students & Adults Ages 19–60*. Ann Arbor, MI: Institute for Social Research, The University of Michigan; 2020. Available at: www.monitoringthefuture.org/pubs/monographs/mtf-vol2_2019.pdf. Accessed September 15, 2020
19. Hadland SE, Cerdá M, Earlywine JJ, Krieger MS, Anderson TS, Marshall BDL. Analysis of pharmaceutical industry marketing of stimulants, 2014 through 2018. *JAMA Pediatr*. 2020;174(4): 385–387
20. Levy SJ, Williams JF; Committee on Substance Use and Prevention. Substance use screening, brief intervention, and referral to treatment. *Pediatrics*. 2016;138(1): e20161211
21. Steele DW, Becker SJ, Danko KJ, et al. Brief behavioral interventions for substance use in adolescents: a meta-analysis. *Pediatrics*. 2020;146(4): e20200351

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