Title

Naloxone Use During Pregnancy-Data From 26 US Jurisdictions, 2019-2020.

Journal

Journal of Addiction Medicine, 18(6)

Authors

Board, Amy
DAngelo, Denise
Miele, Kathryn
et al.

Publication Date

2024-11-01

DOI

10.1097/ADM.0000000000001337

Peer reviewed

HHS Public Access

Author manuscript

J Addict Med. Author manuscript; available in PMC 2024 November 06.

Published in final edited form as:

J Addict Med. 2024 ; 18(6): 711–714. doi:10.1097/ADM.0000000000001337.

Naloxone Use During Pregnancy – Data from 26 U.S. Jurisdictions, 2019-2020

Amy Board, DrPH[a,*], **Denise V. D'Angelo, MPH**[b], **Kathryn Miele, MD**[a], **Alice Asher, PhD**[c], **Beatriz Salvesen von Essen, MPH**[d], **Clark H Denny, PhD**[a], **Mishka Terplan, MD**[e], **Janae Dunkley, MPH**[a,f], **Shin Y. Kim, MPH**[a]

[a]Division of Birth Defects and Infant Disorders, National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention

[b]Division of Violence Prevention, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention

[c]Division of Overdose Prevention, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention

[d]Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention

[e]Friends Research Institute

[f]Oak Ridge Institute for Science and Education

Abstract

Objectives: We aimed to determine the prevalence of self-reported naloxone use during pregnancy among people in the U.S. with a recent live birth. A secondary objective was to characterize people at increased risk for overdose who did and did not use naloxone.

Methods: We analyzed data from the Pregnancy Risk Assessment Monitoring System from 26 U.S. jurisdictions that conducted an opioid supplement survey from 2019 through 2020. Respondents with increased risk of experiencing an opioid overdose were identified based on self-reported use of illicit amphetamines, heroin, cocaine, or receiving medication for opioid use disorder (MOUD) during pregnancy. Weighted prevalence estimates and 95% confidence intervals were calculated for reported naloxone use at any point during pregnancy among people with an increased risk of overdose.

Results: Naloxone use during pregnancy was reported by < 1% of the overall study population (unweighted N=88/34,528). Prevalence of naloxone use was 5.0% (95% CI: 0.0-10.6) among

[*]Corresponding author: Amy Board, Division of Birth Defects and Infant Disorders, National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention, 4770 Buford Highway MS106-3, Atlanta, GA 30341, ocg3@cdc.gov.

Conflicts of Interest: None.

The following text focuses on pregnancy-related or associated events. It makes use of concepts or descriptions that align with the traditional gender definitions by using concepts such as "maternal", "pregnant women", or "women". However, the concepts described are translatable to all persons who experience a pregnancy, regardless of their gender identity or intention to parent. Wherever possible, we have used the term "people who are pregnant" to describe the individuals in this study, unless citing research studies that were conducted exclusively among pregnant women.

respondents who reported illicit amphetamine use, 15.2% (1.8-28.6) among those who reported heroin use, and 17.6% (0.0-38.1) among those who reported cocaine use. Naloxone use was 14.5% (8.4-20.6) among those who reported taking MOUD. Among people with increased risk of overdose, no significant differences in naloxone use were observed by age, race/ethnicity, education level, residential metropolitan status, or insurance status.

Conclusions: Prevalence of naloxone use among people with an increased risk of overdose during pregnancy ranged from 5.0% to 17.6%. Access to naloxone, overdose prevention education, and treatment for substance use disorders may help reduce morbidity and mortality.

Keywords

PRAMS; naloxone; overdose; opioid; stimulant

Introduction

Overdose is a leading cause of pregnancy-associated death[1] and has risen in recent years.[2] Pregnancy-associated deaths due to drug overdose in the U.S. increasingly involve synthetic opioids (e.g., illegally made fentanyl) and psychostimulants (e.g., cocaine and methamphetamine).[2] Little is known about the frequency of use of naloxone, an opioid antagonist medication used to reverse overdose, among people who are pregnant. Two studies of pregnant people treated for opioid use disorder (OUD) found a sizeable proportion did not receive take-home naloxone (33% to 68.4%).[3,4] Another study found that among women with an opioid overdose-related emergency department visit, those who were pregnant had lower odds of naloxone administration compared with non-pregnant women of reproductive age.[5] These limited analyses suggest that naloxone may be underutilized during pregnancy, despite its safety profile and recommended use as the standard of care regardless of pregnancy status.[6]

We examined self-reported naloxone use during pregnancy among people in the U.S. with a recent live birth who took medications for opioid use disorder (MOUD) (a proxy for a current or previous diagnosis of OUD), or reported illicit amphetamine, cocaine, or heroin use during pregnancy. We also examined whether certain characteristics were associated with naloxone use. By estimating prevalence of naloxone use during pregnancy, future studies can identify potential gaps and strategies for ensuring access to this medication for people at increased risk for an opioid overdose during pregnancy.

Methods

We analyzed 2019 and 2020 data from the Pregnancy Risk Assessment Monitoring System (PRAMS), a population-based surveillance system that collects data on experiences and behaviors before, during, and shortly after pregnancy. This analysis included data from the 26 U.S. jurisdictions that participated in an optional PRAMS opioid supplement survey (https://www.cdc.gov/prams/pdf/questionnaire/Opioid-Supplement_508.pdf). Naloxone, illicit amphetamine, heroin, and cocaine use and MOUD (specifically methadone, buprenorphine, or buprenorphine/naloxone) during pregnancy were assessed using the following question: “During your most recent pregnancy, did you take

or use any of the following medications or drugs for any reason?" Use of any of these substances was not mutually exclusive. While naloxone is typically administered, the term "naloxone use" is used in this study to align with questionnaire wording.

Weighted prevalence estimates and 95% confidence intervals (CIs) of naloxone use during pregnancy overall and by specific substance reported were calculated using SAS software version 9.4 (SAS Institute, Cary, NC). We also examined whether select sociodemographic characteristics (i.e., age, race/ethnicity, education level, residential metropolitan status, health insurance status) varied by naloxone use among people with an increased risk of overdose (defined for this analysis as taking MOUD during pregnancy or use of illicit amphetamines, cocaine, or heroin).

Results

Naloxone use during pregnancy was reported by < 1% of the overall study population (unweighted N=88/34,528; Supplemental Table). Prevalence of naloxone use was 5.0% (unweighted N=9/209; 95% CI: 0.0-10.6) among respondents who reported illicit amphetamine use during pregnancy, 15.2% (unweighted N=12/99; 1.8-28.6) among those who reported heroin use, and 17.6% (unweighted N=9/72; 0.0-38.1) among respondents who reported cocaine use (Figure). Among those who reported MOUD, 14.5% (unweighted N=66/395; 8.4-20.6) reported naloxone use during pregnancy. Overall, this amounted to a naloxone use prevalence of 10.8% (6.2-15.3) among people at increased risk of overdose during pregnancy (Supplemental Table). Of the 88 (unweighted) individuals who reported naloxone use during pregnancy, 19 (30.3%, 11.5-49.0, data not shown) did not report taking MOUD or use of illicit amphetamines, cocaine, or heroin during pregnancy.

Among people at increased risk of overdose during pregnancy, no significant differences in naloxone use were observed based on age, race/ethnicity, education level, metropolitan status, or insurance status at delivery. Additionally, 9 out of 10 respondents reported a clinician asked them about substance use during pregnancy (Table 1).

Discussion

In this population-based survey of individuals with a recent live birth in 26 U.S. jurisdictions, approximately 1 in 6 people who reported cocaine use, 1 in 7 people who reported heroin use, 1 in 7 people taking MOUD, and 1 in 20 people who reported illicit amphetamine use self-reported use of naloxone during pregnancy. These results complement prior studies that have found a substantial prevalence of overdose during pregnancy among individuals with OUD;[7,8] a strength of this analysis compared to those involving administrative data is that data are self-reported and population-based and include nonfatal overdose events that occurred outside of the healthcare system. Among people at increased risk of overdose who did and did not report naloxone use, no significant differences in select sociodemographic factors were observed.

Notably, 1 in 6 people who reported any cocaine use in this sample reported use of naloxone during pregnancy. Co-occurring use of opioids and stimulants is rising,[9] with reports of illicitly manufactured fentanyl increasingly included as contaminants in cocaine

and methamphetamine drug seizures.[10] Recent data indicate that nearly one-fourth of people who reported cocaine use also reported heroin use during pregnancy, and over half of people who reported heroin use also reported illicit amphetamine use during pregnancy.[11] For both the general U.S. population and people who are pregnant, overdoses involving psychostimulants—often in combination with opioids—are also on the rise.[2,9] These trends highlight the importance of providing naloxone to people who are pregnant and use illicit stimulants in addition to those who use opioids.[12]

Approximately 9 out of 10 respondents at increased risk for overdose reported that a clinician asked about substance use during pregnancy, suggesting high levels of screening for those most at risk. Substance use screening provides an opportunity to educate about overdose prevention and provide access to naloxone. Pairing early universal screening for substance use during pregnancy in a clinical setting[13] with tools such as prompts in the electronic health record to offer naloxone for people who screen positive or who are prescribed opioids can increase access to naloxone and might prevent future overdoses.[14] In addition, over-the-counter naloxone formulations present an opportunity to increase naloxone access.

Importantly, approximately 30% of respondents who reported naloxone use during pregnancy did not report taking MOUD or use of illicit amphetamines, cocaine, or heroin. Given how the question about naloxone use was worded, respondents might have confused it with a different medication with a similar name (e.g., naproxen, naltrexone), might not have recognized it as the generic formulation of Narcan®, or might have responded based on an experience of using naloxone on someone else. Alternatively, respondents might have used other substances not asked about in the PRAMS survey, such as counterfeit prescription pain relievers or other substances that might be adulterated with fentanyl. This is particularly relevant since this study period includes the COVID-19 pandemic, when substantial changes in the illicit drug supply were reported, including an increase in counterfeit pills containing fentanyl.[15] Future analyses can examine the impact of other substances containing fentanyl and co-use of opioids and other central nervous system depressants such as alcohol and benzodiazepines on naloxone use, as well as postpartum naloxone use.

Conclusions

These findings highlight the importance of access to naloxone for people who are pregnant, particularly those with an OUD, those who use illicit opioids or stimulants, and those with an opioid prescription who may be at risk for overdose. Such strategies, combined with other harm reduction and overdose prevention services and treatment for substance use disorders before, during, and after pregnancy, might reduce morbidity and mortality.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments:

We would like to acknowledge Robert Baillieu, MD, for his invaluable insights and perspectives in preparing this paper as well as his tireless devotion to ensuring access to overdose prevention and substance use treatment for individuals who are pregnant. We would also like to acknowledge the PRAMS (Pregnancy Risk Assessment Monitoring System) Working Group Representatives: Tammie Yelldell, MPH, Kathy Perham-Hester, MS, MPH, Enid Quintana-Torres, MPH, Letitia de Graft-Johnson, DrPH, MHSA, Ashley Juhl, MSPH, Jennifer Morin, MPH, George Yocher, MS, Fern Johnson-Clarke, PhD, Tara Hylton, MPH, Fay Stephens, Matt Shim, PhD, MPH, Julie Doetsch, MA, Brittany Reynolds, MPH, Jennifer Pham, Lisa Williams, Tracey D. Jewell, MPH, Rosaria Trichilo, MPH, Virginia Buchanan, LMSW, Laurie Kettinger, MS, Hafsatou Diop, MD, MPH, Peterson Haak, Mira Grice Sheff, PhD, MS, Brenda Hughes, MPPA, Venkata Garikapaty, PhD, Miriam Naiman-Sessions, PhD, MPH, Jessica Seberger, Tami M. Conn, David J. Laflamme, PhD, MPH, Sharon Smith Cooley, MPH, Sarah Schrock, MPH, Anne Radigan, Lauren Birnie, MPH, Kathleen Jones-Vessey, MS, Grace Njau, MPH, Ayesha Lampkins, MPH, CHES, Cate Wilcox, MPH, Sara Thuma, MPH, Wanda Hernandez Virella, MPH, Karine Tolentino Monteiro, MPH, Harley T. Davis, PhD, MPSH, Maggie Minett, Tanya Guthrie, PhD, Ransom Wyse, MPH, CPH, Nicole Stone, MPH, Peggy Brozicevic, Kenesha Smith, PhD, MSPH, Linda Lohdefinck, Melissa Baker, MA, Fiona Weeks, MSPH, Lorie Chesnut, PhD

This project was supported in part by an appointment to the Research Participation Program at the Centers for Disease Control and Prevention administered by the Oak Ridge Institute for Science and Education through an interagency agreement between the U.S. Department of Energy and the Centers for Disease Control and Prevention.

Disclaimer:

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention or the Substance Abuse and Mental Health Services Administration.

References:

1. Campbell J, Matoff-Stepp S, Velez ML, Cox HH, Laughon K. Pregnancy-Associated Deaths from Homicide, Suicide, and Drug Overdose: Review of Research and the Intersection with Intimate Partner Violence. J Womens Health (Larchmt). 2021;30(2):236–244. doi:10.1089/jwh.2020.8875 [PubMed: 33295844]
2. Bruzelius E, Martins SS. US Trends in Drug Overdose Mortality Among Pregnant and Postpartum People, 2017–2020. JAMA. 2022;328(21):2159–2161. doi:10.1001/jama.2022.17045 [PubMed: 36472602]
3. Gonzalez AM, Arlandson ME, Patel A, Premkumar A. Predictive Factors Associated with Naloxone Prescription among Pregnant People Admitted for the Management of Opioid Use Disorder. Am J Perinatol. 2024;41(5):539–542. doi:10.1055/a-1975-4534 [PubMed: 36351448]
4. Bagley SM, Cabral H, Saia K, Brown A, Lloyd-Travaglini C, Walley AY, et al. Frequency and associated risk factors of non-fatal overdose reported by pregnant women with opioid use disorder. Addict Sci Clin Pract. 2018;13(1):26. Published 2018 Dec 14. doi:10.1186/s13722-018-0126-0 [PubMed: 30547833]
5. Forbes LA, Canner JK, Milio L, Halscott T, Vaught AJ. Association of Patient Sex and Pregnancy Status With Naloxone Administration During Emergency Department Visits. Obstet Gynecol. 2021;137(5):855–863. doi:10.1097/AOG.0000000000004357 [PubMed: 33831915]
6. Substance Abuse and Mental Health Services Administration. 2023. Naloxone. https://www.samhsa.gov/medications-substance-use-disorders/medications-counseling-related-conditions/naloxone. Accessed October 5, 2023.
7. Charles JE, Baylis J, Smid MC, Cochran G. Nonfatal Overdoses Among Pregnant Individuals With Opioid Use Disorder. Obstet Gynecol. 2023;141(5):961–963. doi:10.1097/AOG.0000000000005129 [PubMed: 37103536]
8. Schiff DM, Nielsen T, Terplan M, et al. Fatal and Nonfatal Overdose Among Pregnant and Postpartum Women in Massachusetts. Obstet Gynecol. 2018;132(2):466–474. doi:10.1097/AOG.0000000000002734 [PubMed: 29995730]
9. Fischer B, O'Keefe-Markman C, Lee AM, Daldegan-Bueno D. 'Resurgent', 'twin' or 'silent' epidemic? A select data overview and observations on increasing psycho-stimulant use and harms in

North America. Subst Abuse Treat Prev Policy. 2021;16(1):17. Published 2021 Feb 15. doi:10.1186/s13011-021-00350-5 [PubMed: 33588896]

10. Park JN, Rashidi E, Foti K, Zoorob M, Sherman S, Alexander GC. Fentanyl and fentanyl analogs in the illicit stimulant supply: Results from U.S. drug seizure data, 2011-2016. Drug Alcohol Depend. 2021;218:108416. doi:10.1016/j.drugalcdep.2020.108416 [PubMed: 33278761]
11. Board A, D'Angelo DV, Salvesen von Essen B, Denny CH, Miele K, Dunkley J, et al. Polysubstance use during pregnancy: The importance of screening, patient education, and integrating a harm reduction perspective. Drug Alcohol Depend. 2023;247:109872. doi:10.1016/j.drugalcdep.2023.109872 [PubMed: 37182339]
12. Centers for Disease Control and Prevention. 2023. Stimulant Guide. https://www.cdc.gov/drugoverdose/featured-topics/stimulant-guide.html#q6. Accessed October 5, 2023.
13. Committee Opinion No. 711: Opioid Use and Opioid Use Disorder in Pregnancy. Obstet Gynecol. 2017;130(2):e81–e94. doi:10.1097/AOG.0000000000002235 [PubMed: 28742676]
14. Duan L, Lee M, Adams JL, Sharp AL, Doctor JN. Opioid and Naloxone Prescribing Following Insertion of Prompts in the Electronic Health Record to Encourage Compliance With California State Opioid Law. JAMA Netw Open. 2022;5(5):e229723. doi:10.1001/jamanetworkopen.2022.9723 [PubMed: 35499826]
15. Palamar JJ, Ciccarone D, Rutherford C, Keyes KM, Carr TH, Cottler LB. Trends in seizures of powders and pills containing illicit fentanyl in the United States, 2018 through 2021. Drug Alcohol Depend. 2022;234:109398. doi:10.1016/j.drugalcdep.2022.109398 [PubMed: 35370014]

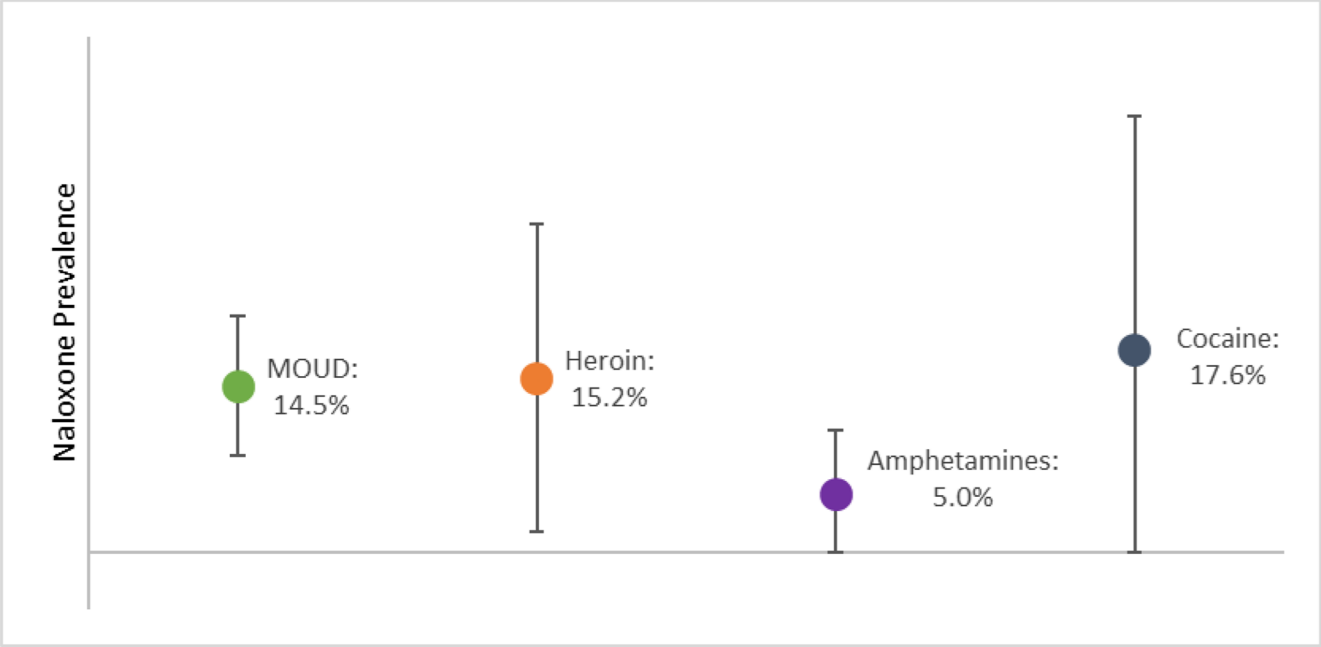

Figure: Prevalence estimates and 95% confidence intervals of naloxone use during pregnancy among individuals at increased risk of overdose – 26 U.S. jurisdictions[a], 2019-2020[b]

[a] U.S. jurisdictions included in 2019 only: Colorado, Connecticut, Florida, Georgia, Iowa, Illinois, Kentucky, Louisiana, Missouri, New Hampshire, Oregon, Pennsylvania, Puerto Rico, Rhode Island, Tennessee, Utah. U.S. jurisdictions included in both 2019 and 2020: Alabama, District of Columbia, Kansas, Massachusetts, Maryland, North Dakota, South Dakota, Vermont, Washington, Wyoming.

[b] Prevalence estimates were calculated based on the number of people reporting the use of naloxone out of all people in the sample who reported the use of each substance or medication (medications for opioid use disorder [MOUD], heroin, illicit amphetamines [including methamphetamine], or cocaine) during pregnancy. Use of any of these substances was not mutually exclusive.

Table 1:

Characteristics of people who reported naloxone use vs. those who reported no naloxone use among individuals with an increased risk for overdose during pregnancy[a] – 26 U.S. jurisdictions[b], 2019-2020

	Naloxone Use (Unweighted N = 69)[c]		No Reported Naloxone Use (Unweighted N = 514)[c]		
	Unweighted N	Weighted % (95% CI)	Unweighted N	Weighted % (95% CI)	P-value
Age					p=0.909
<25	14	23.2 (5.1-41.2)	85	22.4 (15.2-29.6)	
25-34	48	62.9 (41.7-84.1)	330	59.6 (51.8-67.5)	
35+	7	14.0 (0.0-29.6)	99	17.9 (12.1-23.8)	
Race/Ethnicity					p=0.664
Non-Hispanic White	44	87.5 (79.4-95.5)	293	82.1 (77.1-87.2)	
Non-Hispanic Black	4	3.2 (0.0-6.6)	28	4.6 (1.9-7.3)	
Hispanic/Latino	4	4.1 (0.0-9.2)	41	7.3 (3.5-11.1)	
Another Race[d]	16	5.3 (1.5-9.1)	144	6.0 (3.8-8.2)	
Education					p=0.862
Less than high school	11	26.6 (2.4-50.8)	106	22.5 (15.2-29.7)	
High school graduate	25	40.1 (18.9-61.3)	203	37.9 (30.1-45.7)	
More than high school	33	33.3 (15.0-51.6)	193	29.6 (32.1-47.2)	
Metropolitan Status					p=0.919
Urban	42	78.0 (62.2-93.8)	347	78.9 (72.7-85.0)	
Rural	27	22.0 (6.2-37.8)	167	21.1 (15.0-27.3)	
Health Insurance Status					p=0.842
Private	21	22.6 (5.2-39.9)	78	18.6 (12.5-24.8)	
Medicaid	43	76.7 (59.2-94.1)	375	80.5 (74.4-86.7)	
None	2	0.8 (0.0-1.8)	12	0.8 (0.1-1.6)	
Healthcare Provider Asked about Substance Use During Pregnancy					p=0.356
Yes	58	92.9 (86.4-99.4)	421	88.6 (83.5-93.7)	
No	8	7.1 (0.6-13.6)	48	11.4 (6.3-16.5)	

[a] Defined in this analysis as any respondent who reported the use of heroin, cocaine, or illicit amphetamines [including methamphetamine] during pregnancy, or who took medications for opioid use during pregnancy (as a proxy for opioid use disorder). Use of any of these substances was not mutually exclusive.

[b] U.S. jurisdictions included in 2019 only: Colorado, Connecticut, Florida, Georgia, Iowa, Illinois, Kentucky, Louisiana, Missouri, New Hampshire, Oregon, Pennsylvania, Puerto Rico, Rhode Island, Tennessee, Utah. U.S. jurisdictions included in both 2019 and 2020: Alabama, District of Columbia, Kansas, Massachusetts, Maryland, North Dakota, South Dakota, Vermont, Washington, Wyoming.

[c] Due to missing data, some row values may not sum to group totals.

[d] Due to small sample sizes, the following were grouped into the “another race” category: American Indian/Alaskan Native, Asian/Pacific Islander, multiracial, and another race not previously specified