



COMMENT

Addressing drug overdose deaths in pediatrics: Where do we go from here?

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Drug overdose deaths continue to rise in the USA.^{1,2} The majority of drug overdose deaths are in adults,³ and therefore, studies investigating overdose mortality rates in young children are limited.⁴ Despite smaller numbers, these deaths must not be overlooked. In this issue of *Pediatric Research*, Kelly et al.⁵ start to address this important gap by describing trends and geographic variation in drug overdose deaths in young children, as well as the contexts and policies that may have an impact on these deaths.

Using Centers for Disease Control and Prevention (CDC) mortality files from 1999 to 2018, the authors report a rise in mortality rates due to psychoactive drugs among children <12 years old in the USA, with a peak in 2016 at 0.19 per 100,000 children, and with notable increases in mortality rates in recent years in 32 states. Opioids contributed to 65–75% of drug fatalities in the past 9 years of the study period, with prescription opioids as the leading substance implicated in overdose deaths. The study found that state expenditures on public welfare and hospitals and the presence of Good Samaritan laws were associated with lower pediatric overdose mortality rates. These findings provide new insights into emerging trends in pediatric drug overdose deaths and suggest potential policy levers to reduce pediatric overdose deaths.

This study by Kelly et al. makes several important contributions to our understanding of drug overdose deaths in young children. First, in addition to describing trends in mortality rates, the authors characterized drug overdose deaths by drug type and coded cause of death, important factors that must be considered when investigating and developing targeted interventions. Consistent with findings in adults,⁶ opioids were implicated in the majority of pediatric drug overdose deaths. While synthetic opioids are now the driver of overdose deaths in adults,⁶ this study demonstrates that prescription opioids, which remain readily prescribed and are commonly found in homes with children, are the predominant substance involved in pediatric drug fatalities.^{7–9} In the setting of the opioid epidemic, these findings are not surprising, but emphasize the importance of studying strategies aimed at decreasing the presence of opioids in the home, improving child-resistant packaging, and encouraging safe opioid storage and disposal.

Though opioids were the substance most often involved in pediatric drug overdose fatalities, many pediatric deaths involved other substances, including psychostimulants, cocaine, and benzodiazepines. Deaths involving multiple substances were also

common. Trends in substances other than opioids were not assessed, but future studies should examine if findings in other drug-related deaths in young children are consistent with recent studies demonstrating an increase in nonfatal drug overdoses from stimulants across all age groups, as well as polypharmacy in opioid overdose deaths in adolescents and young adults.^{6,10,11}

The coded cause of death in young children was found to be markedly different to that of adolescents and adults. Almost one-quarter of deaths in children were coded as homicide compared to <1% of deaths in the rest of the population. This is concerning, though consistent with other studies, which have found children <2 years old are at the highest risk for malicious poisoning or homicidal poisoning deaths.^{12–14} Healthcare providers must maintain a high level of suspicion for child abuse by poisoning in young children presenting with a drug overdose. Children of caregivers with substance use may be at increased risk for child abuse by poisoning and child maltreatment more broadly, as well as unintentional exposure to illicit substances in the home.¹⁵ Poison prevention efforts directed at packaging and caregiver education regarding home safety are unlikely to benefit children who are at risk for child abuse by poisoning or homicide, as well as those at risk for an illicit drug overdose. Further research into this challenging topic is necessary to better identify children at risk for malicious or illicit drug poisoning and determine targeted interventions for screening and prevention.

Second, understanding the factors associated with pediatric-specific drug overdose deaths is an essential component in the development of prevention strategies, and Kelly et al. take an important first step in this direction. Interestingly, the authors found no association between county-level socioeconomic factors and pediatric drug overdose deaths, though they found an association with state-level spending on public welfare and hospitals and pediatric overdose deaths. These findings are preliminary and are constrained by the cross-sectional study design. Indeed, the difference in overdose deaths by state-level spending could have served as a marker for other types of state characteristics associated with overdose risk. Despite this limitation, investigating the social and economic features of local areas that are associated with pediatric overdose risk is a critical priority. Future studies should investigate expanded county-level markers of economic and family distress, such as the Area Deprivation Index (ADI), which have been associated with drug-related mortality rates in the population at large.¹⁶ Additionally, there

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may be other pediatric-specific factors, such as adverse childhood experiences or caregiver access to childcare, that should be considered when studying predictors of overdose deaths in this population.

Third, the study's findings on the impact of state policies on drug overdose deaths in children is noteworthy. The association between Good Samaritan laws and decreased mortality rates is consistent with findings in the general population, adding evidence to support this harm reduction strategy.¹⁷ However, the lack of association of the other policies with decreased mortality rates may be due to several methodological concerns. The authors only evaluated the binary classifications of policies, and thus did not consider the sizable variation across states in the way these policies are defined and the types of provisions adopted. Prior research suggests that the impact of opioid policies on overdose risk depends on the type of policy model adopted.^{17–19} Also, the study only included policy implemented through 2016. Policies may need to be in effect for years before an impact is seen on overdose deaths and some policies assessed were newly in effect during the study period.^{17,18,20} Future studies need to examine the impact that specific policy provisions have on pediatric overdose risk, including more recent years. Finally, the study used county-level fixed effects, and while this is a useful approach to address unobserved and observed sources of confounding, fixed effects at this level may cause important concerns about statistical power, again leading to the lack of findings. Therefore, further study of these policies is necessary and no policies should be discounted as potential harm reduction strategies for children at risk for drug overdose deaths based on this study alone.

Drug overdose deaths nationally continue to increase,¹ but mortality rates in young children declined from 2016 to 2018. These findings are promising, though it will be important to examine trends by specific age groups and substances to determine the drivers of this decrease and if it is sustained. Future research must focus on investigating the specific circumstances surrounding pediatric drug overdose deaths at the patient level, identifying social determinants of health and caregiver characteristics that may contribute to these deaths, in addition to further evaluating associations with county-level characteristics and the impact of state-level policies in more recent years. The 1348 drug overdose deaths in young children reported by Kelly et al. over the 20-year study period are preventable deaths. Continued research and multifaceted poison prevention efforts targeting youth are necessary to protect this vulnerable subset of the population.

DISCLAIMER

The content is solely the responsibility of the authors and does not necessarily represent the official views of the Agency for Healthcare Research and Quality.

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COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

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