

Preventing Pediatric Opioid Poisoning: Unusual Sources and Scenarios

Perry E. Rosen¹, Howard A. Greller, MD^{1,2}, Christine Ramdin, PhD², Bruce Ruck, PharmD^{1,2},
Lewis S. Nelson, MD^{1,2}, and Diane P. Calello, MD^{1,2}

This retrospective study analyzed 230 pediatric opioid exposures from a statewide poison control center over a 5-year period. Most exposures involved pharmaceutical opioids and children below 2-years-old. Narrative details were reviewed to identify uncommon sources of opioids involved in poisoning and highlight the need for tailored prevention strategies and guidance. (*J Pediatr* 2024;275:114236).

Analysis of national datasets has provided valuable insights regarding pediatric opioid poisoning. However, narrative details are often excluded and may contain meaningful information regarding the circumstances of exposure. We analyzed reports of pediatric opioid exposure at one statewide poison control center to characterize trends and inform strategies for poisoning prevention.

Methods

Data were manually extracted from the statewide poison center's ToxiCALL database. We included children aged 1-month through 6-years-old with a single opioid exposure as defined by the America's Poison Centers' generic code from January 2018 through December 2022. Data analyzed included age, sex, reason for exposure, site of exposure, management site, and narrative details on the reported original owner of the drug implicated. Analysis included descriptive statistics. A random selection of cases (5 per year, 25 total) were abstracted by a second reviewer; agreement was assessed using Cohen's kappa statistic (κ). This study was deemed exempt by the institutional review board. We used the STROBE cross sectional checklist when writing our report.¹

Results

There were 230 eligible exposures over a 5-year period. The mean age of exposure was 2.0 years (SD: 1.1) for the cohort, which was comprised of 56.1% males and 43.9% females. Those aged 2-years and under made up 80.0% of exposures ($n = 184$). Most exposures were unintentional (97.0%), occurred in the patient's own residence (91.3%), and resulted in admission to a healthcare facility (84.3%). Pharmaceutical opioids were implicated in most exposures (86.1%). The interrater reliability for abstraction of these coded field entries was excellent ($\kappa = 1.0$). From the narratives, we were able to deduce the origin of the opioid in 72.6% of exposures ($\kappa = 0.84$); while 40.0% of opioids implicated belonged to the parents of the patient, other intended recipients included grandparents (17.4%), friends or other family (7.8%), and pets (4.3%) (n of exposure characteristics can be seen in [Supplementary Appendix](#), online; available at www.jpeds.com). At least

8.7% described exposure to medication wrappers that were already opened, divided pills and films which were improperly stored, and exposure to opioid residue left on tissue paper, cotton balls, cellophane, and discarded analgesic patches. Five incidents involved pet medications accessed when mixed with food items like peanut butter and then left out. We were unable to identify any statistically significant trends over time, given the small annual sample size.

Discussion

While many cases in this review occurred in a typical scenario, such as an exploratory ingestion of a parent's intact opioid medication,² some unusual cases uncovered in the narratives revealed potentially overlooked opportunities for poison prevention. Our study highlighted how the child's home was often the location of exposure; however, there were still many instances where the opioids involved belonged to non-primary household members. This underscores the importance of incorporating education and counseling regarding these less common sources of opioids. For example, the presence of a grandparent in the home may increase the risk of poisoning as prescription drug use tends to increase with age,³ and rising drug prescriptions are associated with more pediatric exposures⁴; a past study showed grandparents' medications were involved in over 30% of pediatric medication exposures.⁵ Lack of proper prescription storage counseling may also occur less frequently with these older individuals, as they are assumed to have no dependents. Similar risks associated to veterinary pharmaceuticals have been reported in the past,⁶ and our study reiterates how such medications still may not be perceived as a hazard by parents and should be addressed in anticipatory safety.⁷ Given our findings, prescribers should consider co-prescribing naloxone to all patients receiving opioids, human or otherwise, which may be safely given to children after exposure.⁸

From the ¹New Jersey Poison Information and Education System, Newark, NJ; and ²Department of Emergency Medicine, Rutgers New Jersey Medical School, Newark, NJ

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The narrative details of this study unveiled incidents where children came across used fentanyl patches, illicit drug paraphernalia, dispensed liquid opioids, and divided opioid pills or films. These items were found in various locations, including trash receptacles, countertops, and handbags, often in opened film wrappers, resealable plastic bags, unsecured pillboxes, and open cups. Physicians and other health care providers should regularly discuss proper prescription storage and disposal, not only at the time of prescribing, but also during primary care check-up appointments. Safe storage counseling should specifically include discussion of partially used medication, in which the child resistant packaging may not be intact or utilized properly; these conversations can be an opportunity to reassess prescribed dosages to prevent the occurrence of such divided medications. Pharmacists also can address these important topics when dispensing medications. Where appropriate, discussion of the hazards of drug paraphernalia is critical as pediatric exposure to illicit drugs has a higher mortality than prescription exposures.⁸ It is important to note that this report was limited to the exposure data provided by individuals and health care facilities to the statewide poison control center; exposures are not regularly confirmed by analyte testing and implicit reporting bias may exist.

Pediatric opioid exposures are an ongoing cause of preventable injury, with significant morbidity and mortality. Understanding less typical scenarios can bolster preventative measures, particularly through anticipatory guidance on secure storage. Healthcare professionals should offer fundamental medication safety counsel during every patient interaction, and pediatricians may consider broaching the topics of substance use and household safety. In cases of reported poison exposure, callers should be directed to the America's Poison Centers' website (<https://www.poisoncenters.org/>) for additional prevention resources. ■

CRedit authorship contribution statement

Perry E. Rosen: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis. **Howard A. Greller:** Writing – review

& editing, Validation, Supervision, Investigation. **Christine Ramdin:** Writing – review & editing, Validation, Supervision, Formal analysis. **Bruce Ruck:** Writing – review & editing, Supervision, Resources, Investigation, Data curation. **Lewis S. Nelson:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Diane P. Calello:** Writing – review & editing, Supervision, Project administration, Methodology, Conceptualization.

Declaration of Competing Interest

No funding was secured for this study. The authors declare no conflicts of interest.

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Reprint requests: Perry E. Rosen, New Jersey Poison Information and Education System, 140 Bergen Street, Suite G1600, Newark, NJ 07103. E-mail: pr573@njms.rutgers.edu

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