

Pediatric Buprenorphine Ingestions

Buprenorphine, a partial mu opioid receptor agonist and kappa opioid receptor antagonist, is increasingly being prescribed for opioid dependence in the U.S. Consequently, buprenorphine products have become widely available to toddlers in homes and were the most common cause of hospitalization for medication ingestions by young children in 2010-2011.¹

Buprenorphine is available by prescription as sublingual tablets, sublingual film, and buccal film. Formulations may contain buprenorphine alone or in combination with naloxone to prevent diversion and misuse. The number of emergency department visits in 2013-2015 for pediatric buprenorphine/naloxone ingestions declined 65.3% compared to 2008-2010, presumably as a result of formulation changes (Suboxone® brand sublingual tablets to Suboxone® filmstrips) and packaging changes (multi-dose to unit-dose containers). However, as generic products have entered the market, the percentage of prescriptions dispensed in unit-dose packaging has declined, raising concerns that the incidence of pediatric ingestions will rise.²

Buprenorphine is almost completely absorbed sublingually within 2-4 minutes, thus children who suck or chew buprenorphine are at significant risk of toxicity. Its bioavailability once swallowed is <30% of sublingual. In adults, buprenorphine exhibits a "ceiling effect", limiting euphoria and respiratory depression. However, this "ceiling" effect does not appear to exist in children. Unintentional exposures in the pediatric population have resulted in significant morbidity including central nervous system depression, emesis, respiratory depression, miosis and death.^{3,4,5,6,7} In a recent retrospective study of 88 pediatric buprenorphine ingestions (ages 6 months to 7 years) at a single tertiary care center, 95% of the patients developed clinical signs of opioid intoxication. The majority of patients developed symptoms requiring reversal with naloxone within 8 hours, but two patients developed respiratory depression more than 8 hours after ingestion. While 83% experienced respiratory depression, hypoxia occurred in only 28%.⁵

Recommendations:

- Observe pediatric patients who have ingested buprenorphine for a minimum of 6 hours. This includes children who were found with the film or tablet still in the mouth. Children with symptoms should be admitted for at least 24 hours.⁷
- Give naloxone 0.1 mg/kg or 2 mg IV, IM, SC or IN for respiratory depression. A naloxone infusion may be required for recurrent respiratory depression.
- Contact the Maryland Poison Center for assistance with pediatric exposures to buprenorphine: 1-800-222-1222.

Elisabeth Losito MD
PGY3 Pediatrics Resident
University of Maryland Medical Center



Did you know?

Pediatric buprenorphine ingestions are primarily associated with unsafe medication storage.

Analysis of poison center data reported to the Researched Abuse, Diversion, and Addiction-Related Surveillance Program (RADARS) concluded that unsupervised ingestions by small children most commonly occur when the medication is stored within sight of the child, accessed from a purse or bag, and/or not stored in the original container. At least 15% of the ingestions involved prescriptions for someone other than a parent. The exposure rate with tablets was 8.8 times that of the film strips. No conclusion could be made, however, as to whether the difference in exposure rate was due to the formulation, packaging or something else.³

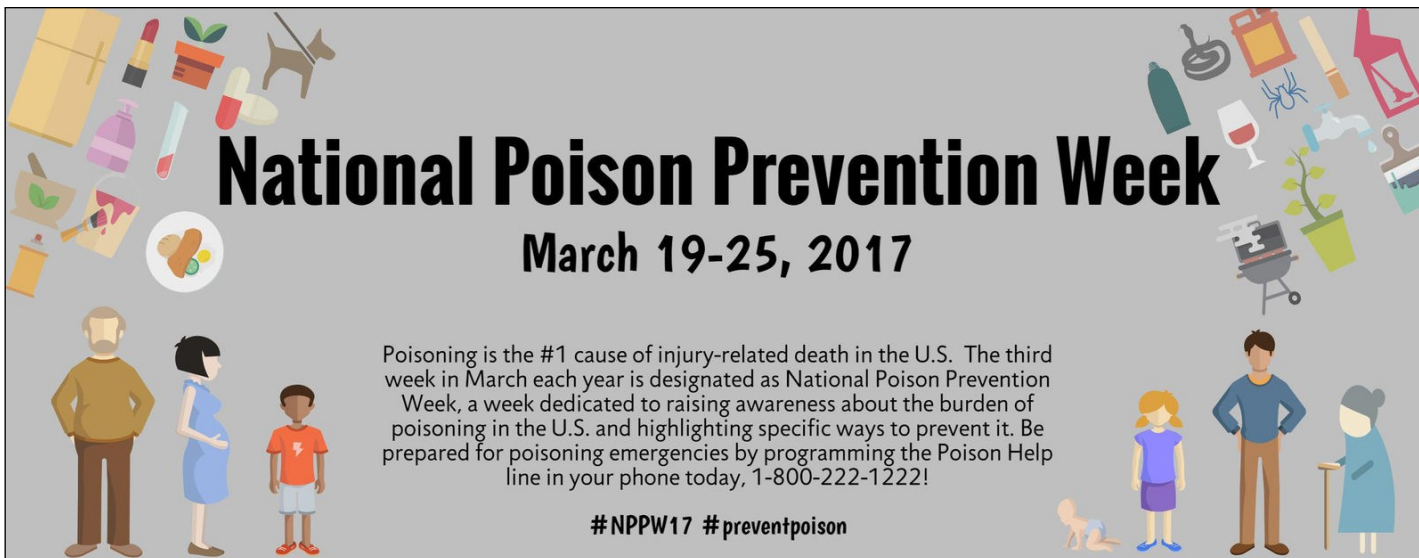


@MPCToxTidbits

Pediatric Buprenorphine Ingestions

References

1. CDC. Notes from the field: emergency department visits and hospitalizations for buprenorphine ingestion by children—United States, 2010–2011. *MMWR* 2013;62(3):56.
2. Budnitz DS, Lovegrove MC, Sapiano MRP, et al. Notes from the field: Pediatric emergency department visits for buprenorphine/naloxone ingestion - United States, 2008-2015. *MMWR* 2016;65(41):1148-9.
3. Lavonas EJ, Banner W, Bradt P, et al. Root causes, clinical effects and outcomes of unintentional exposures to buprenorphine by young children. *J Pediatr* 2013 Nov;163(5):1377-83.
4. Swartzentruber GS, Richardson WH, Mack EH. Buprenorphine ingestion in a 23-month-old boy. *Hosp Pediatr* 2015 Mar;5(3):164-6.
5. Toce, MS, Burns MM, O'Donnell KA. Clinical effects of unintentional pediatric buprenorphine exposures: experience at a single tertiary care center. *Clin Toxicol* 2017 Jan;55(1):12-17.
6. Kim HK, Smiddy M, Hoffman RS, et al. Buprenorphine may not be as safe as you think: A pediatric fatality from unintentional exposure. *Pediatrics* 2012;130(6):1700-3.
7. Hayes BD, Klein-Schwartz W, Doyon S. Toxicity of buprenorphine overdoses in children. *Pediatrics* 2008 (4);121;e782-6.



National Poison Prevention Week
March 19-25, 2017

Poisoning is the #1 cause of injury-related death in the U.S. The third week in March each year is designated as National Poison Prevention Week, a week dedicated to raising awareness about the burden of poisoning in the U.S. and highlighting specific ways to prevent it. Be prepared for poisoning emergencies by programming the Poison Help line in your phone today, 1-800-222-1222!

#NPPW17 #preventpoison

The banner features a central text area surrounded by various icons representing household hazards such as medicine bottles, cleaning products, and toys. Below the text are illustrations of diverse people: a man, a pregnant woman, a young boy, a young girl, a man, and an elderly woman with a cane, along with a dog.

Participating in *National Poison Prevention Week* is easy, and every activity—large or small—can make a difference. Download our poison prevention information sheets and order poison center phone stickers, magnets and brochures from our website: www.mdpoison.com/education/materials. Call us at 410-563-5584 for more information about National Poison Prevention Week and our public education materials.