



Creating a high-cost drug use policy that puts patients first

IV acetaminophen may be putting children at risk.

National attention on opioid use is putting pressure on children's hospitals to find pain management alternatives. Intravenous (IV) acetaminophen may be presented as a safer option for pediatric patients, which resonates with providers focused on safe care. However, it's been identified as a potential risk for children, and comes at a cost that's more than 676 times greater than the oral tablets.¹ Now children's hospitals are openly sharing policies to control usage.

Perspectives from a pharmacy director

Children's of Alabama is one of the lowest users of IV-administered acetaminophen among CHA's Pediatric Health Information System (PHIS) hospitals. That's attributed to an intense focus on patient safety, said Julie Lasseigne, PharmD, pharmacy director. Reviewing the risks of using IV acetaminophen and implementing steps to protect patients from potential harm have contributed to Children's of Alabama's successful drug use policy.

Risks to pediatric patients and hospitals

Vial size. Pediatric nurses are trained on smaller dose protocols for children, yet IV acetaminophen only comes in an adult-oriented 1000mg/100ml presentation. Vial size is an issue for other high-cost drugs as well, and remaining medication is typically wasted after a small dose has been given.

Overdose potential. A large vial increases the chances for overdosing a child or infant each time it is sent to the floor for administration.

Unknown toxicity. IV acetaminophen has different pharmacokinetic properties than the oral product. This includes a shorter time to peak concentration, and a bypass of the first pass effect. Studies on adult patients have shown IV acetaminophen works slightly faster compared with other routes, but no research has been done on children. A nomogram doesn't exist for IV acetaminophen, as it does for its oral counterpart, which leaves clinicians without clear guidance on how to treat a potential overdose.

High cost and waste. Children's hospitals currently spend more than \$25 million annually on IV acetaminophen. Because most pediatric doses are much smaller than the commercially available 1000mg single dose vial, children's hospitals only use approximately \$7 million—about 25 percent—of the product they purchase.

A safety-first approach

IV acetaminophen lacks sufficient clinical data and research to demonstrate reduction in opioid usage when compared with other methods of acetaminophen administration.² Taking a safety-first approach allows Children's of Alabama to limit IV acetaminophen use only to patients who meet very specific criteria.

3 steps to manage usage

1. Consider using analgesic alternatives for the pediatric patient population. Oral acetaminophen is comparable and as effective in pediatric pain management.^{3,4}
2. Consider strategies and implement protocols to restrict usage. The Children's of Alabama team
3. Advocate for the development of pediatric-sized vials to reduce patient safety risks and product waste.

maintained management through the pharmacy and eliminated availability in automated dispensing cabinets. Pharmacy management prevents it from being a convenient PRN product, as an oral or rectal form would produce pain relief by the time IV acetaminophen was received on the floor for administration.

- *Talk with julie.lasseigne@childrensal.org for insights that can support similar discussions in your hospital.*
- *Contact CHA's Supply Chain Services team to learn more about policies put in place by peer hospitals.*

Reasons to be concerned about drug vial sizes

child vs. adult

Doses are only available in 10 mg/ml vials. The same vials are used for adult and pediatric patients.

The large vial size increases the risk of overdose in children. Currently, there's no clinical protocol to rescue the patient if an overdose occurs.

On average, only 30% of an IV acetaminophen vial can be used for a safe child dose.

70% waste

1. Bourgeois F, Graham D, Kesselheim A, Randolph G. Cost Implications of Escalating Intravenous Acetaminophen Use in Children. *JAMA Pediatrics*. Published 2019 Mar 11. doi:10.1001/jamapediatrics.2019.0101.
2. Zhu A, Benzon HA, Anderson TA. Evidence for the efficacy of systemic opioid-sparing analgesics in pediatric surgical populations: a systematic review. *Anesth Analg*. 2017;125(5):1569-1587. doi:10.1213/ANE.0000000000002434.
3. Jibril F, Sharaby S, Mohamed A, Wilby KJ. Intravenous versus Oral Acetaminophen for Pain: Systematic Review of Current Evidence to Support Clinical Decision-Making. *Can J Hosp Pharm*. 2015; 68(3):238-47.
4. Yung A, Thung A, Tobias JD. Acetaminophen for analgesia following pyloromyotomy: does the route of administration make a difference? *J Pain Res*. 2016;9:123-7. Published 2016 Mar 8. doi:10.2147/JPR.S100607.