



Little People, Big Drugs: Pediatric Medication Safety in Adult Settings

Pediatric Hospital Medicine Conference
July 23, 2017

Francisco Alvarez, MD, FAAP
Lana Ismail, MD, FAAP
Allison Markowsky, MD, FAAP
Wendy Hoffner, MD, FAAP

Disclosure

We have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this presentation.



Objectives

1. Examine ways to assess pediatric medication safety infrastructure within adult care settings.
2. Recognize challenges and strategies in implementing pediatric medication safety practices within adult care settings.
3. Identify approaches to designing and developing pediatric centric medication safety structures in adult care settings.

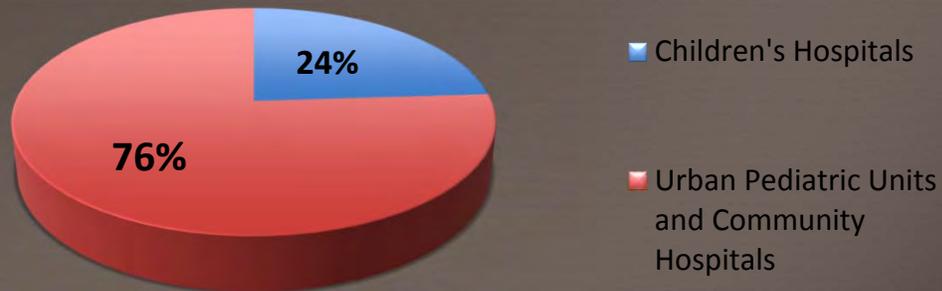


Audience Response System



Background

Higher percentage of pediatric care takes place in adult settings



-AAP Clinical Report: Facilities and Equipment for the Care of Pediatric Patients in a Community Hospital, 2003.



“Medical errors- the third leading cause of death in the US”

-Makary MA, Daniel M., BMJ. 2016 May 3;353:i2139



The Joint Commission. Sentinel Event Alert, Issue 39: Preventing pediatric medication errors (April 11, 2008)

“Errors associated with medications are believed to be the most common type of medical error and...have the potential to cause harm within the pediatric population at a higher rate than in the adult population...”



Case Examples

Use of non-standard weight measuring

9 year old patient receiving 3,000mg ceftriaxone for pneumonia based on patient weight transcribed as 60kg. (Patient actual weight: 60 lbs)



Case Examples

Contraindicated medications

11 month old with bronchiolitis receiving acetaminophen with codeine for cough.



Case Examples

Use of standard adult dosing

11 year old receiving initial dose of 1,000mg Vancomycin for cellulitis. (Recommended dose was 500-750 mg for the patient's weight of 50kg)



"Dennis Quaid's Newborns Given Accidental Overdose"

- While not mentioning the Quaid's specifically by name, the hospital released a statement that confirmed that three of its patients had received 1,000 times the prescribed Heparin. Instead of 10 units, the patients received 10,000 units.
- A pharmacy technician mistakenly stocked the 10 unit vials and 10,000 unit vials in the same drawer.
- In that case, the nurses grabbed vials of Heparin for **adults** instead of Hep-lock for children.

-ABC News November 21, 2007



Key Questions to Ask

What do you have?



What do you need?



How do you get it?



Determining what you have?

Peds Med Safety Survey

(Sample Questions)

Does your hospital require the specific mg/kg/dose to be documented in the order for pediatric medications?

Does your hospital have a pharmacist specifically trained in pediatrics?

Does your hospital have maximum doses clearly defined and/or documented on orders for hospitalized pediatric patients?

Does your hospital have a designated committee that addresses pediatric medication safety events or concerns?

Does your emergency department utilize order sets or computerized provider order entry (CPOE) with pediatric weight-based dosing?

Does someone routinely review pediatric medication safety events or concerns within your hospital?

Direct Observation

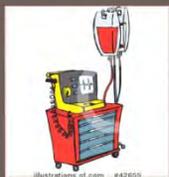
- Ask nurses and pharmacists process of how medications go from order to administration
- What concerns do they have?
- Are they aware of some of the pediatric medication safety practices mentioned on survey?



Determining what you have?

Code Carts

- Peds Specific, Adult, Hybrid?
 - Equipment
 - Medication (concentrations)
 - IV lines
 - Defibrillator (Peds option)



Order Sets

- Common diagnosis
- Surgical/Pain
- Visible or "hard stop" mg/kg/dose and max doses



Findings from our sites

Limited Pediatric Awareness

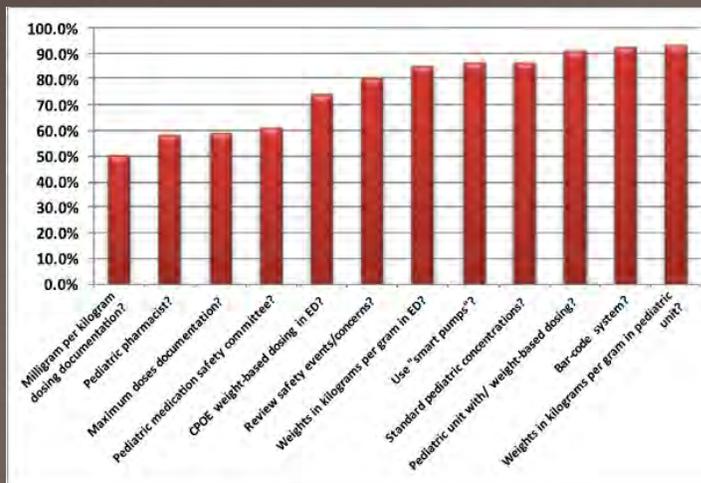
- Weight measured in pounds (even though dosing based on kg)
- Adult standard doses used for certain medications (e.g. Vancomycin, Hydromorphone)
- Lack of education or awareness of pediatric specific vital signs

Lack of Standards

- Lack of standard medication review process
- Lack of weight based dose verification by nursing staff
- Multiple systems used to check medication dosing



National Survey Findings



Alvarez, F., Ismail, L., Markowsky, A. "Pediatric Medication Safety in Adult Community Hospital Settings: A Glimpse Into Nationwide Practice" *Hospital Pediatrics*. 2016 Dec; 6(12):744-749



What you need?

- Base on survey/needs assessment gaps
- Use Failure Mode and Effects Analysis (FMEA) model
 - High Volume or High Risk
- Recent event?
 - Opportunity to develop model of addressing pediatric med safety
- Areas of concern to staff?
 - Develop buy-in and members that will collaborate with you (and possibly become part of local pediatric safety team)



What meds to start with?

High volume

- Acetaminophen
- Ibuprofen
- Ondansetron
- Ceftriaxone
- Prednisolone/Prednisone
- Diphenhydramine
- Dexamethasone
- Amoxicillin
- Ketorolac
- Cefazolin
- Co-trimoxazole
- Azithromycin
- Amoxicillin and Clavulanate



High risk

- Acetaminophen/Codeine
- Acetaminophen/Oxycodone
- Promethazine
- Acetaminophen/Hydrocodone
- Acetaminophen/Propoxyphene
- Hydromorphone
- “GI cocktail” -
(Atropine/Phenobarbital,
Mylanta, Lidocaine)
- Lorazepam
- Atropine
- Morphine
- Ketamine



How to get it?

Individual/Group "Stages of Grief"



How to get it?

- Find others with similar concerns and interests
- Develop a pediatric medication safety team/committee
 - Legitimizes concerns and action plans
 - Helps in solidifying administrative support
- "Borrow" from other sites or providers
 - Order Sets from affiliated or local tertiary centers
 - Colleagues who work in similar settings
- Build a sense of urgency
 - Cases
 - Objective data (ex. dosage errors or contraindicated meds)
 - Helps in making a case for pediatric trained pharmacist
- Find quick, tangible "wins"
 - Build easy and accessible medication orders and/or sets for physician staff
 - Standard dosage guides for nursing (using hospital formulary concentrations)



Building a Sense of Urgency



Sample Medication Review

- Failure Modes and Effects Analysis (FMEA) approach
- High Volume/Low Risk vs Low Volume/High Risk
- *Multidisciplinary* action plan based on **agreed upon** findings



Make it Easy to do the Right Thing

Medication	Recommended Dosage	10-12kg	13-15kg	16-18kg	19-21kg	22-24kg	25+ kg
Hydromorphone injection	0.015mg/kg/dose IV (initial dose)	0.15mg	0.2mg	0.25mg	0.3mg	0.35mg	0.4mg
Preferred Pediatric Concentration	0.1mg/1mg/ml concentration	0.15ml	0.2ml	0.25ml	0.3ml	0.35ml	0.4ml
Alternative Concentration	1.0mg/2mg/ml concentration	0.008ml (rounded)	0.1ml	0.12ml (rounded)	0.15ml	0.18ml (rounded)	0.2ml

Medication	Recommended Dosage	5yr (5-7kg)	7-11yr (7-17kg)	12-14yr (18-24kg)	15-17yr (25-34kg)	18-19yr (35-44kg)	20-24yr (45-59kg)	25-29yr (60-79kg)	
Prednisolone (Orped) 10mg/5ml liquid	2mg/kg/dose	6mg (2mL)	12mg (4mL)	18mg (6mL)	24mg (8mL)	30mg (10mL)	45mg (14mL)	60mg (18mL)	
Prednisone tablets	2mg/kg/dose	Use liquid Prednisolone (see dosing above)					40mg	60mg	90mg

Dosage Standardization

- Based on review findings?
- Based on high volume use?
- **Emergency Department:** Improves workflow and minimizes errors (win-win)



Audience Response System



Breakout Session



The do's and don'ts

Do's

Ask nursing and providers what they feel they need

Look at med safety data together and come up with a "joint" conclusion

Jointly determine what should be done based on findings

Present improvements as a *TEAM* effort (even if some people were not involved in team)

Don'ts

Don't tell nursing or providers they are wrong or harming patients

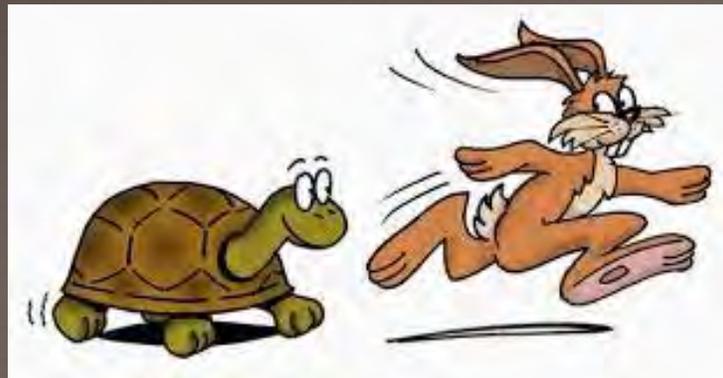
Say what was done wrong based on *YOUR* findings

Tell what needs to be done based on findings and "*academic evidence*"

Do not present as improvement done by "safety team" *WITHOUT* area staff's help (*even if they impeded it*)



Marathon, not a Sprint



Keeping it Going

- Develop Standing Themes
 - Monthly/Quarterly Review of Hospital-wide Pediatric Safety Events
 - Provider and/or area specific peds med safety concerns
 - Recent ISMP, FDA, or AAP pediatric med safety alerts
- Expand to issues within populations
 - NICU (ex. TPN)
 - PACU (ex. Pain Meds, IVF)
 - Neonatal Abstinence (ex. Methadone/Morphine dosage weans)



Take Home Points

- **Identify primary stakeholders**
 - Acquire administration support
 - Establish a system of checks and balances
- **Empower stakeholders to critically appraise the system**
 - If no urgent issues, then start with “low hanging fruit”
 - Feeling of collaboration versus intrusion
- **Research established processes that can be built upon**
 - Utilize order sets from affiliated children’s hospitals or review other online hospital standards
- **Educate key players**
 - Identify primary educator to disseminate changes in the system
- **Reinforce**
 - Demonstrate effectiveness of process
 - Continue clear channels of communication
 - Accountability



Questions?



Contact Information

Francisco Alvarez: fvarez@childrensnational.org

Wendy Hoffner: whoffner@childrensnational.org

Lana Ismail: lismail@childrensnational.org

