Future of Emergency Care: Advancing Pediatric Emergency Care

Improving Pediatric Patient Safety

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A Medication Problem in the Pediatric Emergency Department

- 5 month old infant with complex congenital problem
- Sunday morning, 3AM
- Experienced pediatric ED nurse; new orientee
- Pediatric resident; cross coverage by general ED attending
- Hectic ED….

A Medication Problem in the Pediatric Emergency Department

- Fever + immuno-compromised = antibiotic
- 10mg/kg x 6kg = 600mg IV
- "This seems like a lot"
- Repeatedly interrupted; child in next room with a seizure; orienting new nurse; 3 other young children whose families had been waiting 3 hours
- 3:30AM
- At 7:00AM, medication orders reviewed…

Pediatric Patient Safety in the Emergency Care Setting

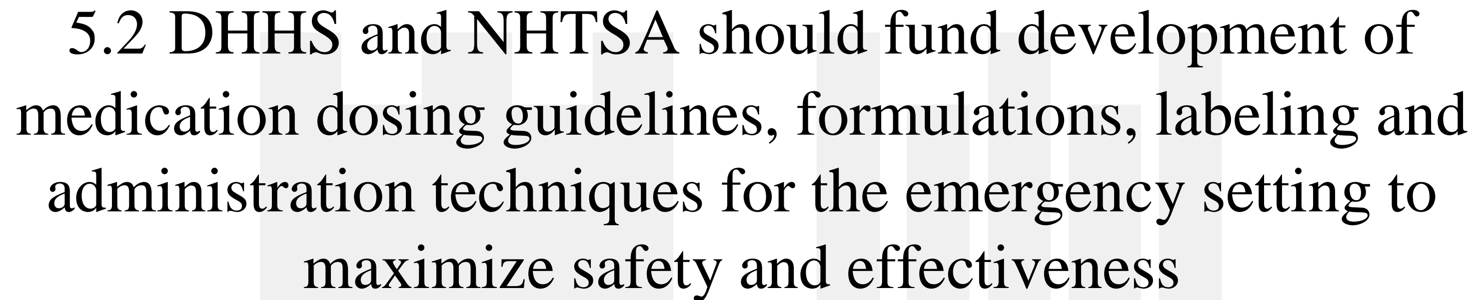
- Event occurred 3 months ago
- Emergency care is high risk, highly complex
- Providers are at risk of making errors, every day, because of this environment
- Other high risk industries have improved safety record: high reliability organizations (HRO)
  - Recognition of human limits; design system to account for human limitations: calculations
- We can reduce risk and prevent harm to patients

Recommendations related to pediatric patient safety

- 5.1 DHHS should fund studies on the efficacy, safety and health outcomes of medications used for infants, children and adolescents in emergency care settings (IOM Report on Medication Safety)
- **5.2 DHHS and NHTSA should fund development of medication dosing guidelines, formulations, labeling and administration techniques for the emergency setting to maximize safety and effectiveness for infants, children and adolescents**

Recommendations related to pediatric patient safety

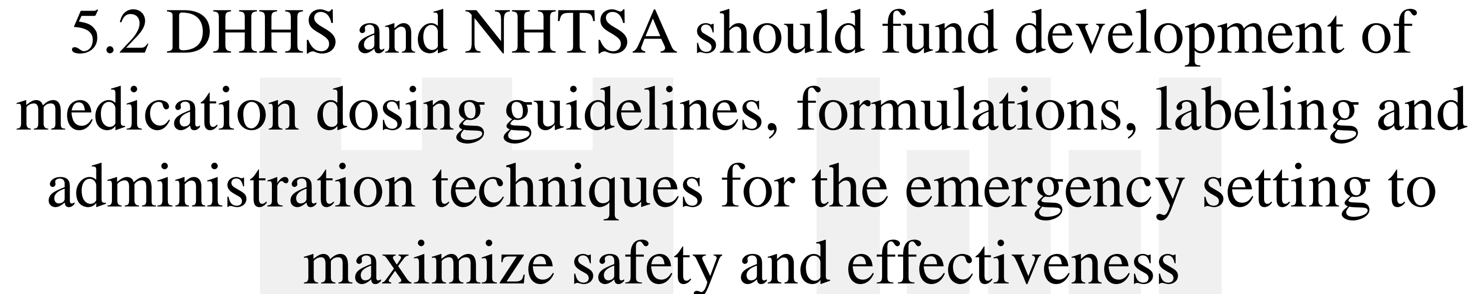
- **5.3 Hospitals and EMS agencies should implement evidence-based approaches to reduce errors in emergency and trauma care for children**
- **5.4 Federal agencies and private industry should fund research on pediatric-specific technologies and equipment used by emergency and trauma care personnel**
- 5.5 EMS agencies and hospitals should integrate family-centered care into emergency care practice



5.2 DHHS and NHTSA should fund development of medication dosing guidelines, formulations, labeling and administration techniques for the emergency setting to maximize safety and effectiveness

- Work collaboratively with agencies identified in IOM Report on Medication Safety (FDA, ISMP, AHRQ)
- Need for clinical tool to standardize and simplify dosing
  - provide pre-calculated medication dosages for physicians and nurses
  - 600 mg ordered; drug supplied as: 1gm/250mL
    - Correct dose = ?!
  - JCAHO: prohibit use of “rule of 6”; require use of “standard concentrations”…….there is no standard concentration

Duke University Health System



5.2 DHHS and NHTSA should fund development of medication dosing guidelines, formulations, labeling and administration techniques for the emergency setting to maximize safety and effectiveness

- Convene panel of experts
  - Emergency providers, pharmacists, pharmaceuticals, (IT vendors, equipment manufacturers)
- Define ideal, based on best evidence
  - Medication choice, dosing range, formulation
- Create user friendly clinical tool/system to provide this information to clinicians
  - Pilot and evaluate tool/system (computer and paper based)
  - Review regularly; revise based on feedback

5.3 Hospitals and EMS agencies should implement evidence-based approaches to reduce errors in emergency and trauma care for children

- Provider initiatives: Risk assessment and mitigation
  - Voluntary Reporting System (VRS)
    - » Patient/family portal (Rec 5.5)
  - Establish National Patient Safety Organization (PSO)
  - Active surveillance: multi-disciplinary safety teams, safety walkrounds; include families (Rec. 5.5)

5.3 Hospitals and EMS agencies should implement evidence-based approaches to reduce errors in emergency and trauma care for children

- Training: Teamwork training and communication
  - JCAHO - 60% of adverse events related to problem in communication
  - Teamwork training curriculum (DoD, AHRQ)
    - » Hospitals and Health Systems (Kaiser, Alina, Partners)
    - » State wide collaborative (NCHA), regional collaborative
    - » SON, SOM (DUMC, UNC)
  - Simulation
    - » Virtual training
  - Patients and families as team members (Rec 5.5)
    - » Transparency and Disclosure

5.4 Federal agencies and private industry should fund research on pediatric-specific technologies and equipment used by emergency and trauma care personnel

- IT systems and tools
  - IOM Report on Medication Safety
  - CPOE: Impact of implementing non-pediatric system
    - » Pediatric-specific order sets
    - » Standard weight-based dosing ranges
  - Automated surveillance
    - » Detect ADEs early in evolution; intervene to prevent harm
    - » Pediatric triggers
    - » Ambulatory setting, with EHR (Rec 5.5 Personal health record)
- Other technology
  - CT scans
    - » Pediatric "dosed" CT scans
  - Smart Pumps
    - » Guard rails and "standard concentrations"

Summary

- Thanks to IOM Committee
- Pediatric emergency care is high risk
- We *can* reduce risk and prevent harm…..now
- Further research and product development needed to continue to deliver safer care
- Collaborative efforts will get us there faster