Medication Errors in Pediatric Patients After Implementation of a Field Guide With Volume Based Dosing

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WHAT WE LEARNED
Implementation of a prehospital field guide with volume-based dosing for pediatric patients led to significantly fewer medication dosing errors.

BACKGROUND
- Pediatric medication error rates by paramedics > 30%
  - Epinephrine error rate 56%
  - Diphenhydramine error rate 61%
- Handtevy™ Field Guide System
  - Precalculated mL doses by age/length
  - Superior to Broselow LBT in simulation
  - Customized to each EMS system

HYPOTHESIS
- Implementation of a field guide would reduce pediatric medication errors to less than 15%.

METHODS
- Introduced Field Guide system – 2015
- Baseline data – 2014 (weight/age-based)
- Single center retrospective cohort study
  - EMS records July 2017 – June 2019
  - Medications administered ≤ 13 years old
- Primary outcome – medication error rate
- Error: A dose that differed from the predetermined dose by age by > 20%
- Reviewed by 2 investigators
- Excluded online medical direction cases

RESULTS
- Baseline error rate 48.9% (134/274 doses)
  - 483 drug administrations to 375 patients
  - Overall appropriate administration - 89.4%
  - 10.6% error rate
    - 4.3% overdoses
    - 6.2% underdoses
- Largest overdose
  - Solumedrol – 3x accepted dose
- Largest underdose
  - Epinephrine 1:1 – 10-fold underdose
- Perfect dosing (0 errors)
  - Adenosine
  - Dextrose 10%
  - Glucagon
  - Ondansetron ODT
- Most frequent errors: Midazolam IN > Fentanyl IN > Fentanyl IV

LIMITATIONS
- Retrospective cohort study
- Baseline error rate determined based on provider-documentated weight (or age)

DISCLOSURES
- NONE

OPTION 1: ESTIMATE AGE USING LENGTH (PREFERRED)
- USE PROVIDED TAPE MEASURE (HEAD TO HEEL)

OPTION 2: USE ACTUAL AGE (IF STANDARD SIZED CHILD)

NEWBORN  4 MO  6 MO  1 YR  2 YR  3 YR  4 YR  5 YR  6 YR  7 YR  8 YR  9 YR  10 YR  11 YR

CONCLUSIONS
- Implementation of a field guide resulted in a significantly lower medication error rate for pediatric patients compared to system baseline
- Strategies to reduce pediatric medication errors by EMS providers are essential to improving the care of critically ill and injured children.