



Advisory 23-03: Medication Dosing Safety for Pediatric Patients

To: All EMS Agencies and Providers

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The attached regional policy “Medication Dosing Safety for Pediatric Patients” establishes a clinical guideline intended for use with all pediatric patients with the intent of addressing dosing errors in pediatric patients which regrettably is a common occurrence nationally, and in our own region.

As ALS agencies in this region are aware, MLREMS is excited to be collaborating with the NYS Bureau of EMS and Trauma to pilot the Handtevy System, which when implemented will meet all expectations of this clinical guideline for those ALS agencies wishing to participate.

With any questions, please do not hesitate to contact this office.

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MEDICATION DOSING SAFETY FOR PEDIATRIC PATIENTS

BACKGROUND/PURPOSE

Prehospital medication dosing errors in pediatric patients are a common occurrence, including in our own region. Dosing errors are the result of multiple causes that include infrequent exposure to pediatric patients and complex calculations for weight-based dosing performed in a stressful environment. Evidence-based best practices for pediatric medication dosing have been developed in order to reduce the incidence of pediatric medication errors in the prehospital environment that include the following:

1. **Confirm patient weight at the time care is delivered** (should be done for all pediatric patients). Methods to confirm patient weight include asking the parent, using a length-based tape, or by age (least accurate).
2. **Use kilograms as the standard of weight used.** Precalculated tools should be used to convert from pounds (lbs) to kilograms (kgs).
3. **Use tools that provide pre-calculated weight-based dosing with reported doses in mL** that can be modified quickly when drug shortages force substitutions.
4. **Increase opportunities for EMS clinicians to practice performing weight based dosing,** utilizing the tools and equipment that they would actually use in the field.

The purpose of this policy is to reduce medication dosing errors in our region by implementing these best-practices. While they are focused on pediatric medication dosing errors, the same principles apply to all patients. This clinical guideline is intended to be used in conjunction with the Medication Cross check process outlined in Advisory 21-04.

CLINICAL GUIDELINE

Indications: This clinical guideline is intended to be used for all pediatric patients, regardless of whether a medication is administered.

Weight estimation: As part of initial patient assessment, pediatric patient weight should be determined and recorded in kilograms for all patients. Patient weight may be obtained preferably by asking parents or determining through the use of a length-based tape. Less preferably, it may be estimated by the age. A reference tool should be available to convert lbs to kg without need for calculation, especially in circumstances where patient weight is determined by asking parents who are most likely to give this information in lbs. We recommend storing the Length-based tape in a location where it will be available as part of the initial assessment of all pediatric patients.

Volume-based dosing reference: A volume-based dosing reference, which provides the appropriate dose in ml to be administered based on drug concentration, should be used for medication-dosing to avoid calculation errors that otherwise inevitably occur during the course of patient care. Such a volume-based dosing tool should be rapidly changeable in context of change in medication concentration due to drug shortages. We encourage the use of such a tool for all patients, including adults, to help clinicians become more facile and familiar with the tool through more frequent use as well as reducing the chance of a medication dosing error across all age groups.

Medication Cross-Check: We strongly encourage the use of a medication cross-check process with each medication administration for all patients, including pediatrics. The volume-based dosing reference can be used as an adjunct during this process.



Hands-on simulation and competency assessment: All EMS clinicians responsible for the administration of pediatric medications should undergo training and competency assessment in determining patient weight (including the use of length-based tape), use of volume-based dosing reference and medication cross-check performance.

REFERENCES

1. Hoyle Jr, J. D., Davis, A. T., Putman, K. K., Trytko, J. A., & Fales, W. D. (2012). Medication dosing errors in pediatric patients treated by emergency medical services. *Prehospital Emergency Care*, 16(1), 59-66.
2. Cicero, M. X., Adalgais, K., Hoyle, J. D., Lyng, J. W., Harris, M., Moore, B., ... & Pediatric Committee of NAEMSP Adopted by NAEMSP Board of Directors. (2020). Medication dosing safety for pediatric patients: recognizing gaps, safety threats, and best practices in the emergency medical services setting. A position statement and resource document from NAEMSP. *Prehospital Emergency Care*, 25(2), 294-306.
3. Hoyle Jr, J. D., Ekblad, G., Woodwyk, A., Brandt, R., Fales, B., & Lammers, R. L. (2022). Methods Used to Obtain Pediatric Patient Weights, Their Accuracy and Associated Drug Dosing Errors in 142 Simulated Prehospital Pediatric Patient Encounters. *Prehospital Emergency Care*, 26(4), 511-518.
4. Rappaport, L. D., Markowitz, G., Hulac, S., & Roosevelt, G. (2022). Medication Errors in Pediatric Patients after Implementation of a Field Guide with Volume-Based Dosing. *Prehospital Emergency Care*, 1-8.