



# NRP

## Alert: Changes in Epinephrine Package Labeling

In September 2016, the Institute for Safe Medication Practices (ISMP) reminded the American Academy of Pediatrics that as of May 1, 2016, the USP and FDA no longer allow drug manufacturers to use ratio expressions on any epinephrine container labels except for local anesthetics with epinephrine. So, as inventory of the old epinephrine packaging is depleted, the former 1:1,000 and 1:10,000 ratio expressions won't be on the container label (<http://www.ismp.org/newsletters/nursing/issues/NurseAdviseERR201512.pdf>). Instead, the 1:10,000 epinephrine, used for newborn resuscitation will be labeled Epinephrine 1 mg/10 mL (0.1 mg/mL). The box of 1:1,000 epinephrine (ten times the strength of 1:10,000 epinephrine) will be labeled Epinephrine 1 mg/mL. **This stronger concentration is never used for newborn resuscitation.**

In the *Textbook of Neonatal Resuscitation, 7th Edition*, we describe the concentration of epinephrine using both the older ratio designation (1:10,000) and the current metric designation (0.1 mg/mL) because many units still have vials of epinephrine with the previous labeling and this nomenclature is well known by neonatal health care professionals. We anticipate that the next edition of the textbook will include only the metric description of the drug concentration, which means that we must begin now to reinforce the educational efforts to prevent epinephrine overdose.

- **DO NOT use the 1mg/mL concentration of epinephrine** for neonatal resuscitation. This stronger concentration of epinephrine would result in a ten-fold epinephrine overdose.
- **The correct epinephrine concentration for neonatal resuscitation is 1mg/10 mL (0.1 mg/mL).**
- Healthcare professionals who work outside the neonatal/perinatal unit may be accustomed to using the stronger (1 mg/mL) concentration and may not be aware that the 1 mg/10 mL solution is recommended for newborn resuscitation.
- The risk of an epinephrine drug error increases if both drug concentrations are stored in the same location. A clearly labeled newborn code cart, emergency box or medication drawer, clearly separating the neonatal concentration from the stronger concentration used for adults and pediatric patients, may help prevent an epinephrine drug overdose in the Emergency Department.
- **Use closed loop communication for medication orders.**
  - ◆ The medical provider and medication nurse first agree on an estimated weight; for example, *"The estimated weight is 3 kilograms."*
  - ◆ The medical provider orders the medication using closed-loop communication with confirmation of medication, concentration, dose, and route; for example, *"Susan, give epinephrine. Use the 1 mg in 10 mL concentration. Give 0.3 mL through the UVC."*
  - ◆ The person administering the epinephrine repeats the order, *"David, I have the 1mg in 10 mL concentration of epinephrine (show the box). I'm giving 0.3 mL (show the syringe) through the UVC."*



Examples of the former epinephrine package label (1:10,000) on the left and the revised epinephrine package label (1 mg/10 mL) on the right.

The ISMP also encouraged NRP to change our method (called volumetric dosing) from milliliters/kg to milligrams/kg.

- At the present time, the NRP Steering Committee believes that volumetric dosing (mL/kg) with a single specified epinephrine concentration results in the lowest risk of a dosing error.
- If the dose of epinephrine is ordered as milligrams/kg, the provider would be required to convert the requested dose to a volume for preparation and administration because syringes are marked in milliliters rather than milligrams.
- To limit the number of calculations and conversions, the dose is described primarily as mL/kg so that providers do not have to convert milligrams to milliliters during an emergency and risk making a decimal point error.

During this transition, it is important to practice ordering, preparing, and administering epinephrine with your resuscitation team during your NRP courses, simulations, and mock codes.

- Send an email reminder or create a poster to illustrate this change. Find a poster on the NRP website at [aap.org/nrp](http://aap.org/nrp).
- Include a photograph of the two epinephrine boxes to highlight the differences.
- You may want to meet with emergency department staff to identify how epinephrine is stored and labeled in the ED and to ensure that the correct concentration for newborn resuscitation is available and separated from the stronger concentration.

Dosing epinephrine in the newborn presents unique patient safety risks and effectively mitigating these risks remains a high priority for the NRP. As we plan future editions of the NRP educational materials, we will continue to consider alternate methods of describing the dosage of epinephrine and will evaluate patient safety evidence relevant to this important area.

