Targeted Medication Safety Best Practices
for Hospitals:
Frequently Asked Questions

Best Practice #5: Purchase oral liquid dosing devices (oral syringes/cups/droppers) that only display the metric scale.

1. **Question:** Are there any commercially-available oral syringes and other liquid dose measuring devices that display only the metric scale?

   **ANSWER:** Yes, commercially available dosing cups, oral syringes, and oral dispensers that display measurements only in the metric scale are available. Device manufacturers Baxter, BD, Comar, Medtronic (formerly Covidien), and NeoMed have metric only oral syringes or dispensers. Comar also has metric only medication cups. In addition, at least two healthcare product companies, Health Care Logistics and Medi-Dose/EPV sell a variety of metric only dosing cups, oral syringes, and oral dispensers. ISMP recommends dosage cups that have a printed scale as they are more readable and thus less prone to error than those with an embossed scale.

   As an example, Health Care Logistics offers the following products:

   - **Description:** Narrow Graduated Medication Cup available in Clear, Red, and Yellow. Cups are graduated at each mL, with embossed numbers at every 5 mL. Cups have a 30 mL capacity.

   - **Description:** mL Only Printed Medication Dosage Cup. Clear cups are marked in black ink at 10, 15, 20, 25, and 30 mL graduations. Cups have a 30 mL capacity.

   - **Description:** Baxter ExactaMed® Plastic Oral Dispenser with Tip Cap. Sizes for order include: 0.5 mL, 1 mL, 3 mL, 10 mL, 20 mL, 35 mL, and 60 mL, in both amber and clear plastic, and 5 mL in amber plastic only. Note: Baxter has communicated that it is in the process of converting the 5 mL clear plastic oral dispenser to metric only.

   - **Description:** Comar Plastic Oral Dispenser with Tip Cap. Sizes for order include: 0.5 mL and 1 mL in both amber and clear plastic.

   - **Description:** NeoMed Plastic Oral Dispenser. Sizes for order include: 0.5 mL, 1 mL, 3 mL, 6 mL, 12 mL, 20 mL, 35 mL, and 60 mL in clear plastic with orange or blue print and amber plastic with white print.

   The above products are listed as examples of product availability and should not be mistaken as an ISMP endorsement for these particular products or representation of an all-inclusive list. There may be similar products from other manufacturers and distributors.

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2. **Question:** Why did you select mL for the only markings on the oral liquid dosage containers—aren’t there concerns from patients regarding their understanding of mL only measurement?

**ANSWER:** When patients or caregivers administer liquid medications, the dosing designations on the medication container labels and accompanying dosing devices should be consistent. The use of multiple volumetric units (e.g., teaspoons, tablespoons, dropperfuls) and multiple abbreviations for the same volumetric unit (e.g., mL, cc; tsp, TSP) increase the risk of dosing errors by healthcare professionals, patients, and caregivers. For example, patients and caregivers have confused teaspoons and tablespoons, resulting in three-fold dosing errors. In addition, the use of teaspoons and tablespoons as units of measure on container and prescription labels may encourage the public to believe they can use non-calibrated household spoons for dosing medications.

Although prescribers and pharmacists may assume that parents and other caregivers cannot administer liquid medications accurately using mL, a recent study indicates this is a false assumption. The study showed that parents who reported their dose in mL were not only more likely to use a standardized dosing device, but also were half as likely to make a dosing error.\(^1\)

Organizations such as the American Academy of Pediatrics, Consumer Healthcare Products Association,\(^5\) and US Pharmacopeial Convention\(^6\) recommend the use of metric units and/or metrically marked dosing devices for the measurement and administration of oral liquid medications. Also, a key focus of the PROTECT Initiative, a public-private partnership, has been to encourage the adoption of an mL-based dosing standard. Efforts have targeted provider prescribing behaviors, the use of information technology systems to support mL dosing, as well as pharmacy dispensing.

Healthcare practitioners, including prescribers, should:\(^7\)

- Write/order doses for oral liquids using only metric weight or volume (e.g., mg or mL)—never household measures, which also measure volume inaccurately.
- Cease use of prescription orders and patient instructions that use “teaspoonful” and other non-metric measurements, including any listed in pharmacy and e-prescribing computer systems. This should include mnemonics, speed codes, or any defaults used to generate prescriptions and labels.
- Establish policies and procedures that standardize measurement systems to the metric system and eliminate the use of English and apothecary measurements (e.g., on order forms, patient education material).
- Take steps to ensure patients have an appropriate device to measure oral liquid volumes in mL.
- Coach patients on how to use and clean measuring devices; use the “teach back” approach, and ask patients or caregivers to demonstrate their understanding.
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**References:****


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