INSTITUTE FOR SAFE MEDICATION PRACTICES
A NONPROFIT ORGANIZATION

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ISMP Statement on Use of Metric Measurements to Prevent Errors with Oral Liquids

The Institute for Safe Medication Practices (ISMP) is asking prescribers, pharmacists, and other healthcare professionals, as well as pharmacy computer system and e-prescribing system vendors, to only use metric measurements in prescription directions. ISMP has taken this step after careful deliberation, in order to better protect patients from harmful errors and give providers a greater level of comfort and confidence when calculating and administering doses of medication.

ISMP first reported on the confusion of teaspoonfuls and mL in its newsletter in 2000, and in 2009 issued a call for practitioners to move to sole use of the metric system for measuring over-the-counter (OTC) and prescription oral liquid doses, but mix-ups have continued to result in the serious injury of children and adults. ISMP has received more than 50 reports of mL-teaspoonful errors alone, including cases where injuries required treatment or hospitalization.

Measurement of patients' weight in pounds rather than in the metric system also is problematic, as drugs are commonly dosed as weight in kilograms, especially in hospitals and emergency departments. Numerous mistakes have been reported when practitioners convert weights from one measurement to another or accidentally weigh a patient in pounds but enter kilogram amounts in the medical record. One pound equals 2.2 kilograms, which can cause a more than twofold dosing error.

Other organizations, such as the Food and Drug Administration, Consumer Healthcare Products Association, and Centers for Disease Control also have drawn attention to the need to move to sole use of the metric system or include both measurements with drug dosing instructions.

The healthcare industry needs to acknowledge the risk of confusion when using non-metric measurements, especially with oral liquid medications. Use of the metric system alone when prescribing, dispensing, and administering medications would prevent mix-ups because there would only be one method used to communicate and measure doses.

Several companies, including McNeil Consumer Healthcare, are already moving in this direction by standardizing their acetaminophen infant and children's oral liquid medications in a single concentration and developing dosing devices that measure in mL.

ISMP recommends the following actions to help prevent errors:

- Use only metric units, not teaspoon or other non-metric measurements, for all patient instructions, including those listed in prescribing and pharmacy computer systems. This should cover directions incorporated into computer system mnemonics, speed codes, or any defaults used to generate prescriptions and prescription labels.
- Express doses for oral liquids using only metric weight or volume (e.g., mg or mL)—not household measures such as teaspoonfuls or tablespoonfuls, which are not an accurate volume of measure. A transition period may be necessary during which the household measure can be listed in parentheses immediately following the metric measure—e.g., 5 mL (one teaspoonful). Authorities should set a date for full conversion.
- Take steps to ensure patients have an appropriate device to measure oral liquid volumes in milliliters.
- Coach patients on how to use and clean measuring devices; use the "teach back" approach, and ask patients or caregivers to demonstrate their understanding.
- Ensure that patient weights are measured and expressed in kilograms, not pounds, to ensure proper dosing and eliminate the use of pounds in medication labeling.

For more information and background on the issue of metric measurements for oral dosing, visit www.ismp.org.