

Weighing All Patients in Kilograms

Description

Dose-related medication errors remain a persistent threat to patient safety, as identified by organizations including the Joint Commission [TJC], the National Coordinating Council for Medication Error Reporting and Prevention [NCCMERP], and the World Health Organization (WHO) (TJC, 2008; NCCMERP, 2018; WHO, 2025). Documentation of an accurate patient weight is essential to safe medication dosing. Certain populations such as older adults, children, and patients with oncologic, renal, or liver disorders are at even greater risk for adverse drug events and are more vulnerable to the effects of any errors that result from incorrect weights being documented or communicated (Flentje et al., 2018; NCCMERP, 2018). However, patients of all ages are at risk for potentially fatal medication errors due to incorrect weight documentation in the ED (Wichmann & Larios, 2020).

Despite decades of global standardization, the United States is one of only two industrialized nations that has not fully converted to the metric system (CIA, 2024). However, international product labeling for medications with weight-based dosing utilizes the metric system (e.g., mg/kg, units/kg) (Institute for Safe Medication Practices [ISMP], 2020; NCCMERP, 2018; Wichmann & Larios, 2020). Accurate metric weights are also essential because formulas used to estimate creatinine clearance for medication dosing and to calculate basal metabolic rate depend on them (NCCMERP, 2018).

The WHO's *Medication Without Harm* initiative identifies metric standardization, including the exclusive use of kilograms for weight measurement, as a foundational global safety goal. The Joint Commission established this priority in its Sentinel Event Alert #39 which recommended that pediatric patients be weighed in kilograms upon admission and that only metric weights be used on prescriptions, health records, and in staff communication (TJC, 2008). However, The Joint Commission stopped short of making metric conversion a requirement for their verification. Implementation of metric weights in the U.S. remains inconsistent. A 2022 ISMP survey found fewer than 60% of hospitals use kilogram-only documentation for adults (ISMP, 2022).

Communicating a patient's weight in pounds can lead to wrong-weight documentation when kilograms are required, and contribute to serious dosing errors (ISMP, 2024). The Institute for Safe Medication Practices (ISMP) and National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) both recommend posting conversion charts near scales to reduce wrong weight documentation errors, especially when patients or families ask for their weight in pounds (ISMP, 2024; NCCMERP, 2018). Empowering the patient or family to find this information on the conversion chart themselves reduces the need for the nurse to verbally report the weight in pounds.

As the portal of entry for many patients who require healthcare services, the emergency department (ED) is one of the top three areas for medical errors with serious consequences (Bailey et al., 2018). ED characteristics including a high stress environment, frequent

interruptions, and numerous transitions in care are contributing to the high risk of medication errors occurring in the ED setting. The varied processes of obtaining, documenting, and communicating patient weights in the ED create discrete opportunities for incorrect data entry, leading to medication errors that can perpetuate throughout a patient's hospital encounter. Recording an accurate patient weight in kilograms has implications for a variety of clinical tasks both in and beyond the ED including accurate medication and fluid prescribing, fluid volume assessment, and nutritional and obesity screenings (Flentje et al., 2018).

Key Barriers and Systemic Challenges

There are numerous consumer, commercial and system level barriers to metric weights adoption in the U.S. Weighing in pounds is a cultural default rooted in tradition, daily use and healthcare communication norms. Newborn weights are universally announced in pounds and ounces. Parents continue to track their child's growth in these units, comparing current to birth weight and using pound/ounces for feeding calculations. Weight tracking in pounds is also important to many adult patients when monitoring fluid retention or daily weight trends in chronic conditions such as heart failure. Providing visible conversion charts near scales in healthcare settings is recommended by major patient safety organizations such as Institute for Safe Medication Practices (ISMP) (2024) and the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) (2018). Conversion charts facilitate patient and family understanding, tracking at home, and patient safety at home.

One of the primary obstacles to kilogram-only adoption in the U.S. is the lack of a national regulatory mandate, making implementation voluntary and inconsistent. Smaller or under-resourced facilities often face prohibitive costs associated with converting equipment, updating EHR systems, and training staff. Balancing safety with limited budgets and high clinical demands—often without technical assistance or incentives, are also barriers to implementation of new initiatives (AHRQ, 2020).

Weight-based medication errors are often preventable but difficult to detect due to limitations in error tracking systems and the diffuse nature of medication workflows. Current U.S. medical error reporting systems often fail to capture weight documentation as the root cause of medication errors. Instead, errors are reported under general categories such as "wrong dose," masking the role of incorrect weight data (Bailey et al., 2016). Few studies available in the current literature include analyses that drill down to wrong-weight documentation as the root cause of specific medical errors. The Pennsylvania Patient Safety Authority (Bailey, 2016; Bailey et al, 2018; Hoffman & Levine, 2018) was one of the first U.S. organizations to explore the root causes of a state's wrong-dose medical errors. They published two studies between 2009 and 2016 that demonstrated that confusion between pounds and kilograms caused approximately 25% of their wrong-dose medical errors (PA Patient Safety Authority, 2009; Bailey et al., 2016). The Pennsylvania Patient Safety Authority was also one of the first safety organizations to acknowledge that simply having the option to weigh a patient in either pounds or kilograms contributes to wrong weight entries (PA Patient Safety Authority, 2009).

Weight assessment and documentation practices vary widely. Units of measure are frequently omitted, auto-converted, or estimated. Historical weights may be copied forward without

verification. When the weight value appears numerically plausible—even if in pounds—many systems do not trigger alerts, leading to significant dosing errors without detection (ISMP, 2022).

ENA Position

It is the position of the Emergency Nurses Association (ENA) that:

1. In all healthcare settings, including prehospital care and telehealth, patient weights are measured and recorded in kilograms.
2. All weighing equipment is configured to display kilograms only (e.g., stretchers with integrated built-in scales, floor scales, chair scales, portable standing scales, infant scales).
3. Conversion charts for kilograms to pounds are available near ED scales for patient or caregiver reference.
4. Electronic Health Record (EHR) systems:
 - Trigger alerts for missing or implausible values based on growth chart, age or prior documented weight.
 - Integrate with /digital scales via wireless technology to eliminate manual entry.
5. Validated length-based tools (e.g., tools for estimating weights in pediatric patients such as Broselow, Pediatric Age-Weight PERcentage (PAWPER) tapes) are used to estimate when direct weighing is not feasible.
6. Clinical communication (verbal, written, electronic) includes weights in kilograms only.
7. Prescriptions and order sets prompt for weight in kilograms.
8. Handoff reports include the patient's weight in kilograms.
9. Policies require measurement of actual weight except when clinically unsafe or not feasible.
10. Error reporting systems include fields to:
 - Record weight in kilograms.
 - Identify role of incorrect weight in dose-based errors.
11. Emergency nurses lead efforts in quality improvement and education related to weight-based safety, including tracking and reporting of errors resulting from the documentation of an incorrect weight.

Background and Justification

Underreporting of medication errors is common when no immediate harm occurs, and stress or cognitive overload during emergencies can exacerbate risks (Cicero et al., 2021). Pediatric patients, particularly those in emergency and critical care settings, are at heightened risk. D'Errico et al. (2022) found that PICUs experience seven times more weight-related medication errors than other units. Cicero et al. (2021) report pediatric EMS dosing errors in up to 37% of encounters, often due to manual conversions, cognitive overload, and inconsistent weight estimation. The report supports pre-calculated kilogram-based dosing tools and complete elimination of pounds across frontline care.

While older adults, children, and patients with oncologic, hepatic, or renal conditions face the greatest risks, all populations are vulnerable. Weight-based errors disproportionately affect those

with low health literacy, language barriers, or complex care needs. A BMJ Open Quality study (Bassi et al., 2025) revealed disparities in error reporting by age, ethnicity, and gender. In a study of two Australian tertiary pediatric care centers, Badgery-Parker et al. (2024) identified adolescents as having the highest rates of medication errors in their pediatric populations — challenging assumptions that these risks are limited to the younger pediatric patients.

The absence of national mandates and standardized infrastructure has perpetuated variation in practice. A national safety certification initiative or incentive program—modeled on the National Pediatric Readiness Project (NPRP)—could address gaps in adoption. The NPRP, led by Emergency Medical Services for Children (EMSC), American Academy of Pediatrics (AAP), American College of Emergency Physicians (ACEP), and ENA, includes kilogram-only weighing in its benchmark assessment without imposing mandates. It provides evidence that national quality frameworks can advance safety standards through education and evaluation (Gausche-Hill et al., 2015; EIIC, 2023).

Conclusion

Kilogram-only weight documentation is an evidence-based, equity-enhancing safety standard. Its adoption is critical to reducing preventable medication errors across all settings. Emergency nurses lead this transition through advocacy, implementation, and continuous quality improvement, including conducting root cause analyses of dosing-based medication errors if this data is not already captured by the reporting system. It is essential that institutional leaders prioritize the removal of systemic barriers—cost, policy gaps, and technology limitations—and advocate for national support to accelerate widespread adoption of metric weights in healthcare.

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