

3.4 Percentage of paediatric medication orders that include the correct dose per kilogram (or body surface area) AND an effective and safe total dose

Purpose

This indicator addresses the effectiveness of processes that encourage effective and safe medication ordering for paediatric patients.

Background and evidence

Incorrect dosing is the most common medication error reported in paediatric patients.^{1,2} Some reasons why paediatric patients are particularly predisposed to risk of medication error and subsequently of morbidity and mortality from medication error include:³

- the different and changing pharmacokinetic parameters of paediatric patients
- the need for calculation of individualised doses based on a weight or body surface area (BSA)
- lack of ready access to high quality information regarding safety and efficacy of medicines in paediatric patients.

Therefore, the intended dose per kilogram (or dose per BSA) and the total dose calculated using an accurate weight (or BSA) should appear on all orders for paediatric patients.³

Key definitions

Paediatric refers to all patients aged up to 18 years.

Medication orders refers to all medicines that require weight-based or BSA-based dose calculations. Creams, drops and other medicines that do not require such dosing are not included. In older paediatric patients, weight-based dosing may not be needed. See following information.

The correct dose per kilogram (or body surface area)

is the intended dose, usually expressed as mg/kg or mg/m², and should be determined with reference to the paediatric prescribing information resource(s) endorsed for local use by the drug and therapeutics committee (DTC). It should be recorded in the dedicated area of the Paediatric National Inpatient Medication Chart (PNIMC) or other chart approved for paediatric use by the DTC.

An effective and safe total dose means within the effective and safe dose range based on patient age and weight (or BSA) as recommended by the paediatric prescribing information resource(s) endorsed for local use by the DTC. It should be recorded in the main order box of the PNIMC or other chart approved for use by the DTC.

Note:

- In obese children, use of ideal weight may be more appropriate for some medicines (check paediatric prescribing information resource(s) for specific guidance).
- In older paediatric patients (or those over 40–50 kg) care should be taken to ensure that the upper dose limit for adults is not exceeded.

Data collection for local use

Please refer to the section *Using the National Quality Use of Medicines Indicators for Australian Hospitals* for guidance on sample selection, sample size, measurement frequency and other considerations.

Inclusion criteria: Medication orders for paediatric inpatients. For the patients selected for audit, all current medication orders on all current medication charts should be audited.

Exclusion criteria: Medication orders that do not require weight or BSA dose calculations.

Recommended data sources: Medication charts.

The data collection tool for QUM Indicator 3.4 assists data collection and indicator calculation.

Data collection for inter-hospital comparison

This indicator may be suitable for inter-hospital comparison. In this case, definitions, sampling methods and guidelines for audit and reporting need to be agreed in advance in consultation with the coordinating agency.

Indicator calculation:

$$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$$

Numerator = Number of paediatric medication orders that include the correct dose per kilogram (or body surface area) AND an effective and safe total dose

Denominator = Number of medication orders in sample

Limitations and interpretation

Calculating doses based on weight or BSA can be problematic in overweight or older paediatric patients with resultant doses exceeding the safe adult dose range. Caution needs to be applied in these situations.

Further information

Training on safe prescribing for paediatrics is included in a designated module of the NPS MedicineWise National Inpatient Medication Chart online training course, available at <http://learn.nps.org.au>

Medication Safety Self Assessment for Australian Hospitals⁴ (MSSA) can help identify potential strategies for improvement with this and other indicators. The MSSA encourages development of robust systems for safe prescribing, dispensing, administration and monitoring of medicines. The MSSA is available at www.cec.health.nsw.gov.au

This indicator can be used to assist hospitals in meeting the National Safety and Quality Health Service Standard 1 [items 1.2.1, 1.2.2, 1.5.2, 1.6.1, 1.6.2] and Standard 4 [items 4.2.1, 4.2.2, 4.4.2, 4.5.1, 4.5.2].⁵

References

1. American Academy of Pediatrics Committee on Drugs and Committee on Hospital Care. Prevention of medication errors in the pediatric inpatient setting. *Pediatr* 2003; 112(2): 431-436.
2. Miller MR, Robinson KA, Lubomski LH, et al. Medication errors in paediatric care: a systematic review of epidemiology and an evaluation of evidence supporting reduction strategy recommendations. *Qual Saf Health Care* 2007; 16: 116-126.
3. Levine S, Cohen M, Blanchard N, et al. Guidelines for preventing medication errors in pediatrics. *J Pediatr Pharmacol Therapeut* 2001; 6: 427-443.
4. Medication Safety Self Assessment for Australian Hospitals: Institute for Safe Medication Practices USA (Adapted for Australian use by NSW Therapeutic Advisory Group and the Clinical Excellence Commission), 2007.
5. Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards. Sydney, ACSQHC, 2012.