Abstract:

Background: Processes for delivery of high-risk infusions in pediatric intensive care units (PICUs) are complex. Standard concentration infusions (SCIs), smart-pumps, and electronic prescribing are recommended medication error reduction strategies. Implementation rates in Europe lag behind those in the United States. Since 2012, the PICU of an Irish tertiary pediatric hospital has been using a smart-pump SCI library, interfaced with electronic infusion orders (Philips ICCA). The incidence of infusion errors is unknown.

Objectives: To determine the frequency, severity, and distribution of smart-pump infusion errors in PICUs.

Methods: Programmed infusions were directly observed at the bedside. Parameters were compared against medication orders and autodocumented infusion data. Identified deviations were categorized as medication errors or discrepancies. Error rates (%) were calculated as infusions with errors and errors per opportunities for error (OEs). Predefined definitions, multidisciplinary consensus and grading processes were employed.

Results: A total of 1,023 infusions for 175 patients were directly observed over 27 days between February and September 2017. The drug library accommodated 96.5% of infusions. Compliance with the drug library was 98.9%. A total of 133 infusions had ≥1 error (13.0%); a further 58 (5.7%) had ≥1 discrepancy. From a total of 4,997 OEs, 153 errors (3.1%) and 107 discrepancies (2.1%) were observed. Undocumented bolus doses were most commonly identified (n = 81); this was the only deviation in 36.1% (n = 69) of infusions. Programming errors were rare (0.32% OE). Errors were minor, with just one requiring minimal intervention to prevent harm.

Conclusion: The error rates identified are low compared with similar studies, highlighting the benefits of smart-pumps and autodocumented infusion data in PICUs. A range of quality improvement opportunities has been identified.

Reference:

Howlett MM, Breatnach CV, Brereton E, Cleary BJ. Direct Observational Study of Interfaced Smart-Pumps in Pediatric Intensive Care. Appl Clin Inform. 2020 Aug;11(4):659-670. doi: 10.1055/s-0040-1716527. Epub 2020 Oct 7. PMID: 33027835.