

Abstract:

BACKGROUND: Increased use of health information technology (HIT) has been advocated as a medication error reduction strategy. Evidence of its benefits in the pediatric setting remains limited. In 2012, electronic prescribing (ICCA, Philips, United Kingdom) and standard concentration infusions (SCIs)-facilitated by smart-pump technology-were introduced into the pediatric intensive care unit (PICU) of an Irish tertiary-care pediatric hospital.

OBJECTIVE: The aim of this study is to assess the impact of the new technology on the rate and severity of PICU prescribing errors and identify technology-generated errors.

METHODS: A retrospective, before and after study design, was employed. Medication orders were reviewed over 24 weeks distributed across four time periods: preimplementation (Epoch 1); postimplementation of SCIs (Epoch 2); immediate postimplementation of electronic prescribing (Epoch 3); and 1 year postimplementation (Epoch 4). Only orders reviewed by a clinical pharmacist were included. Prespecified definitions, multidisciplinary consensus and validated grading methods were utilized.

RESULTS: A total of 3,356 medication orders for 288 patients were included. Overall error rates were similar in Epoch 1 and 4 (10.2 vs. 9.8%; $p = 0.8$), but error types differed ($p < 0.001$). Incomplete and wrong unit errors were eradicated; duplicate orders increased. Dosing errors remained most common. A total of 27% of postimplementation errors were technology-generated. Implementation of SCIs alone was associated with significant reductions in infusion-related prescribing errors (29.0% to 14.6% ; $p < 0.001$). Further reductions (8.4%) were identified after implementation of electronically generated infusion orders. Non-infusion error severity was unchanged ($p = 0.13$); fewer infusion errors reached the patient ($p < 0.01$). No errors causing harm were identified.

CONCLUSION: The limitations of electronic prescribing in reducing overall prescribing errors in PICU have been demonstrated. The replacement of weight-based infusions with SCIs was associated with significant reductions in infusion prescribing errors. Technology-generated errors were common, highlighting the need for on-going research on HIT implementation in pediatric settings.

Reference:

Howlett, M.M., Butler, E., Lavelle, K.M., Cleary, B.J. and Breatnach, C.V. (2020) The Impact of Technology on Prescribing Errors in Pediatric Intensive Care: A Before and After Study.



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