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Getting It Right Before Implementation: Using Simulation to Optimize Recommendations and Interventions After Adverse Event Review

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Abstract : Description: Root Cause Analysis (RCA) is used by health care teams to examine adverse events (AEs) to identify causes which then leads to recommendations for prevention Despite widespread use, RCA has limitations. Best practices have not been established for implementing recommendations or tracking the impact of interventions after AEs. During phase 1 of this study, we used simulation to analyze two fictionalized AEs that occurred in hospitalized paediatric patients to identify and understand how the errors occurred and generated recommendations to mitigate and prevent recurrences. Scenario A involved an error of commission (inpatient drug error), and Scenario B involved detecting an error that already occurred (critical care drug infusion error). Recommendations generated were: improved drug labeling, specialized drug kids, alert signs and clinical checklists. Aim: Use simulation to optimize interventions recommended post critical event analysis prior to implementation in the clinical environment. Methods: Suggested interventions from Phase 1 were designed and tested through scenario simulation in the clinical environment (medicine ward or pediatric intensive care unit). Each scenario was simulated 8 times. Recommendations were tested using different, voluntary teams and each scenario was debriefed to understand why the error was repeated despite interventions and how interventions could be improved. Interventions were modified with subsequent simulations until recommendations were felt to have an optimal effect and data saturation was achieved. Along with concrete suggestions for design and process change, qualitative data pertaining to employee communication and hospital standard work was collected and analyzed. Results: Each scenario had a total of three interventions to test. In, scenario 1, the error was reproduced in the initial two iterations and mitigated following key intervention changes. In scenario 2, the error was identified immediately in all cases where the intervention checklist was utilized properly. Independently of intervention changes and improvements, the simulation was beneficial to identify which of these should be prioritized for implementation and highlighted that even the potential solutions most frequently suggested by participants did not always translate into error prevention in the clinical environment. Conclusion: We conclude that interventions that help to change process (epinephrine kit or mandatory checklist) were more successful at preventing errors than passive interventions (signage, change in memory aids). Given that even the most successful interventions needed modifications and subsequent re-testing, simulation is key to optimizing suggested changes. Simulation is a safe, practice changing modality for institutions to use prior to implementing recommendations from RCA following AE reviews.

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