Detecting First Order Operational Failures on a National Level Using the Improvement Science Research Network
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Background:
Experts point out an underutilized opportunity for improvement: leveraging front-line staff experience to identify and resolve operational failures (Tucker et al. 2008). Addressing microsystem problems from the frontline perspective holds promise for propelling quality enhancement. Several programs have urged frontline providers to apply QI tools (e.g., PDSA, TCAB); yet no systematic approach to problem detection has been tested.

Purpose:
We developed an innovative approach to assist frontline providers in systematically identifying operational failures in their clinical microsystem.

Methods:
This study was consisted two phases. The first phase was conducted at two local hospitals and involved the development of a pocket card to detect first order operational failures in nursing staff. The second phase moved the study to a national level using the Improvement Science Research Network (ISRN) in order to expand the generalizability of the results and generate more effective interventions. The population studied involved full time registered nurses at two local hospitals for Phase 1 and 15 national sites for Phase 2. The unit of analysis was a 'clinical unit' limited to medical-surgical units with an average length of stay of 2 to 4 days.

Results:
In the local sample (STAR-1), Hospital A reported small problems 5.8 times per 12-hour shift (most staff work a 12 hour shift), with the most common categories being equipment/supplies, facilities, and communication. At Hospital B, small problems were reported 3.6 times per 12 hour shift, with the most common categories being equipment/supplies and medications. This is roughly half the frequency reported by direct observation in Tucker’s study, but the distribution of problems is similar. There were no significant differences in operational failures between intervention and non-intervention units, likely due to the small sample size. The results of this first phase led to development of STAR-2 to capture a national sample in order to obtain a larger database of operational failures and interacting systems-level variables. Preliminary results from six clinical units show similar findings to STAR-1 with the most common categories being equipment/supplies and medications. Analysis of systems variables is currently in progress.

Conclusions and Implications:
Results from STAR-1 validated the use of the pocket as effective tool in detecting first order operational failures and indicated a need for a larger, national sample to develop effective interventions. Using

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ISRN’s unique infrastructure, STAR-2 is able to capture a large, national sample through multiple study sites that are associates in this virtual research network. Fidelity of the protocol is assured through the ISRN’s Coordinating Center. A total of 45 additional clinical units from a maximum of 15 ISRN hospitals were recruited for this study. Approximately 20 nurses (RNs) are nested in each clinical unit leveraging a minimum of 900 nurses and 6,300 shifts represented in operational failure detection. Data collection is currently in progress with, two sites competed, six sites in the data collection phase, and seven sites in the preparation/training phase.

The ISRN provides valuable resources in conducting multisite, quality improvement research. This infrastructure enabled the STAR study to capture a national sample to enhance the quality of research and raise scientific rigor. Moving improvement science research from small, local samples to larger, national units of analysis facilitates the development of interventions that are effective, generalizable, and sustainable in order to create health care that safe, timely, effective, efficient, equitable, and patient-centered.