Methods to evaluate the implementation of a computerized physician order entry (CPOE) system

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Background Whenever strategies to improve medication safety are implemented in routine care, a thorough evaluation of the impact on processes and clinical outcomes is suggested. The more complex these strategies are and the more they change the existing processes, the broader the evaluation must be. One of such key interventions is the introduction of electronic prescribing systems in hospital care, which is currently taking place in our tertiary care university hospital on all normal wards.
Purpose The goal of this work is to identify and assess existing methods or methods sets for evaluation of the impact of electronic prescribing in all potential relevant dimensions and thereupon deduce a final strategy that is robust, easy-to-apply and transferable to different settings.
Method An extensive, non-systematic literature search on methods for CPOE evaluation was conducted. This included the review of key literature from the NHS e-prescribing toolkit, the Institute for Healthcare Improvement resource site, the AHRQ Health IT Evaluation Toolkit, and MEDLINE. Methods were collected and those that both had high information value and could be carried out with low threshold were selected for pilot trials on practicability, suitability to assess the desired object of measurement, and transferability to different hospital wards.
Findings There were eight refined methods selected for the evaluation, which aim to measure ten different outcomes. The outcomes were grouped in four dimensions, i.e. time and resource efficiency, quality of care, patient safety, and user opinion. Within the dimension efficiency, the chosen outcomes were the time to complete certain tasks (evaluated by time-and-motion study), process changes (evaluated by focus group interviews and spaghetti diagram) and the utilization of clinical documentation systems (evaluated by focus group interviews). Within the dimension quality of care, the defined outcomes were medication documentation quality (evaluated by qualitative chart analysis) and documentation comprehensiveness (evaluated by quantitative chart analysis). The dimension patient safety was covered by the outcome patient safety culture (evaluated by a qualitative written questionnaire). Finally, the dimension user opinion summarized the outcomes organizational readiness for implementing change, interprofessional collaboration, workplace satisfaction and expectations and opinions of staff regarding the implemented CPOE system, all evaluated by a qualitative written questionnaire.
Conclusion We herewith suggest a methodology that (i) is supposed to be able to comprehensively and precisely evaluate the impact of a CPOE implementation and (ii) might establish standards on how to collect data during such an evaluation for future projects.