Testing machine learning (ML) based patient deterioration alerts in a clinical setting

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Introduction: Hospital workflows commonly use clinical scoring and rule-based track-and-trigger systems to identify patient deterioration. Data captured in Electronic Medical Records creates opportunities to employ ML for proactive identification of patients at risk, potentially several hours before traditional alerts are activated. Sustained adoption of such techniques however needs rigorous testing within clinical settings.
Aims: Metro South Health and CSIRO have collaborated to develop PRoD (Predicting Risk of Deterioration); an ML-based tool to predict patient deterioration several hours before activation of the Queensland Adult Deterioration Detection System (QADDS). This project aims to tailor, pilot, test and evaluate PRoD at QEII Hospital. The objective is to evaluate its use to improve detection and intervention prior to deterioration.
Methods: The project has four phases. Phase 1 involves understanding clinical needs and workflows through staff engagement. Phase 2 undertakes usability testing of the prototype using retrospective data and simulated scenarios. Phase 3 produces a pre-implementation addressing integration issues and end-user training. Phase 4 delivers a six-month pilot trial using a hybrid-effectiveness design to evaluate clinician engagement, impact on decision-making and patient care outcomes.
Results: Phases 1 and 2 of the study are complete and phases 3 is underway. The PRoD algorithm is deployed within the Metro South digital environment, with a Power BI dashboard to support clinician use during the pilot.
Conclusions and Relevance: Ongoing learnings are informing the optimal use of PRoD and contributing to the development of a scalable system to support pre-emptive clinical decision-making and prevention of patient deterioration.

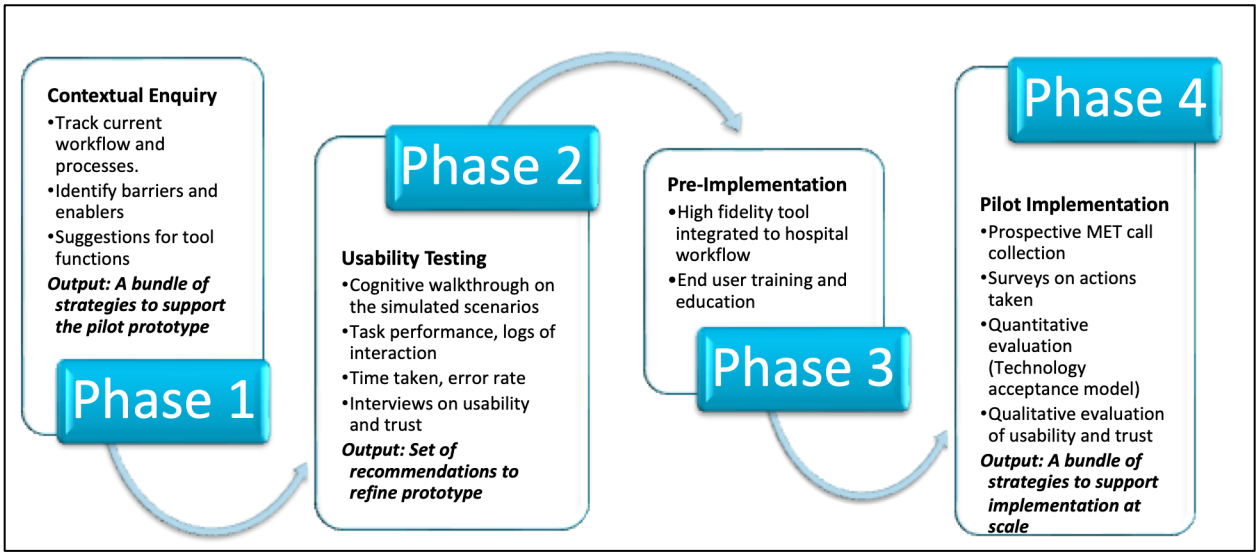

Fig: Study Design