

Development, implementation and evaluation of an early warning system improvement programme for children in hospital: the PUMA mixed-methods study

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Disclaimer: This report contains transcripts of interviews conducted in the course of the research and contains language that may offend some readers.

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Plain English summary

The PUMA mixed-methods study

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Plain English summary

Children in hospital who become more unwell are not always recognised to be deteriorating. Track-and-trigger tools are a popular approach to this problem; they record key vital signs (e.g. heart rate, temperature) and prompt staff to act if these fall outside an acceptable range.

This study was funded to develop, implement and evaluate an evidence-based paediatric track-and-trigger tool for widespread adoption. Research reviews found little evidence to support track-and-trigger tool use in isolation, and revealed that failures to detect deterioration related to wider system issues, such as equipment, training and communication.

Considering these findings, the Paediatric early warning system Utilisation and Morbidity Avoidance (PUMA) programme was developed to improve systems for detecting and responding to children who deteriorate. It included a description of the core components of a paediatric early warning system (PUMA Standard), tools to support assessment of local systems and resources to support improvement teams.

The programme was implemented in two district general hospitals and two tertiary (specialist) hospitals. Quantitative impacts were evaluated by measuring trends in death and adverse events before, during and after implementation of the programme, and qualitative assessments of changes to the system and clinical practice in ward case studies were also evaluated.

All four hospitals made changes to their systems in line with the PUMA Standard. In some cases, these were associated with positive impacts on clinical outcomes. Using quantitative measures of inpatient deterioration was challenging, as these were infrequent. Alternative measures are needed to support research and improvement in this field.

All four hospitals experienced system changes arising from factors other than the PUMA programme, highlighting the variety of influences on paediatric early warning systems and the importance of regular assessment.

Users' experiences of the PUMA programme were explored. These insights informed revisions to the programme, which were evaluated positively in three additional hospitals.

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