What factors affect pre-hospital pre-alert? Analysis of routine ambulance data

Fiona Sampson, Richard Pilbery, Esther Herbert, Fiona Bell, Andy Rosser, Rob Spaight, Steve Goodacre, Andy Pountney, Mark Millins

f.c.sampson@sheffield.ac.uk

Yorkshire Ambulance Service NHS Trust

Background

- Ambulance clinicians can use pre-alerts calls to advise emergency departments (EDs) of the imminent arrival of a patient who may require immediate senior clinical review or intervention.
- Consistency of pre-alert practice is important to ensure that EDs can respond to pre-alerts appropriately.
- As part of a wider mixed-methods study we analysed routine data from 3 ambulance services to understand what factors might affect variation in pre-alerting practice.

Methods

- We created a linked data set using electronic patient record data for all ambulance conveyances from three UK Ambulance Services (1/7/2020–30/6/2021) alongside staff information, Sequence of Event log data and shift information.
- We explored variation in pre-alert use by analysing ambulance clinician, hospital and patient variables (Figure 1).
- We undertook lasso regression in R to identify candidate variables for multivariate logistic regression to explain variation in terms of patient, ambulance service or hospital factors that are associated with the use of pre-alerts.

Figure 1: Variables explored in relation to pre-alert practice

Variation in pre-alert practice was not fully explained by patient factors

Other key factors affecting pre-alert practice included clinician role, receiving ED and anticipated handover delay

No evidence of higher rates of pre-alert in final hour of shift

Results

- Pre-alerts were recorded in 10.5% of conveyances (142,795/1,363,274) with significant variation in pre-alert rates between ambulance services (8.2%–14.7%) and between receiving ED.
- Paramedics pre-alerted 10.7% of their conveyances (107,309/1,002,733) with non-registered clinician staff pre-alerting 9.8% of their conveyances (35,486/360,541).
- Due to differences in data provided between ambulance services, we analysed data separately by ambulance service within the logistic regression. Odds ratios (OR) and confidence intervals (CI) presented here are for one ambulance service only but were significant for all ambulance services.
- Highest odds ratios associated with pre-alerts relating to clinical need/patient factors were working diagnosis (OR:4.16, CI: 4.04-4.26) and NEWS2 (OR: 1.41, CI: 1.40-1.41)
- Odds ratios varied considerably between receiving EDs, ranging from 1.40 (CI 1.29–1.51) to 5.67 (CI: 5.44–5.92) (Figure 2).
- Ambulance clinicians were more likely to pre-alert when there were longer turnaround times at ED (OR: 1.39, CI: 1.27–1.1.53)
- Despite being suggested as a potential factor for pre-alert decisions, there was no evidence of higher pre-alert rates during final hour of shift (OR: 0.96, CI: 0.93–0.99)

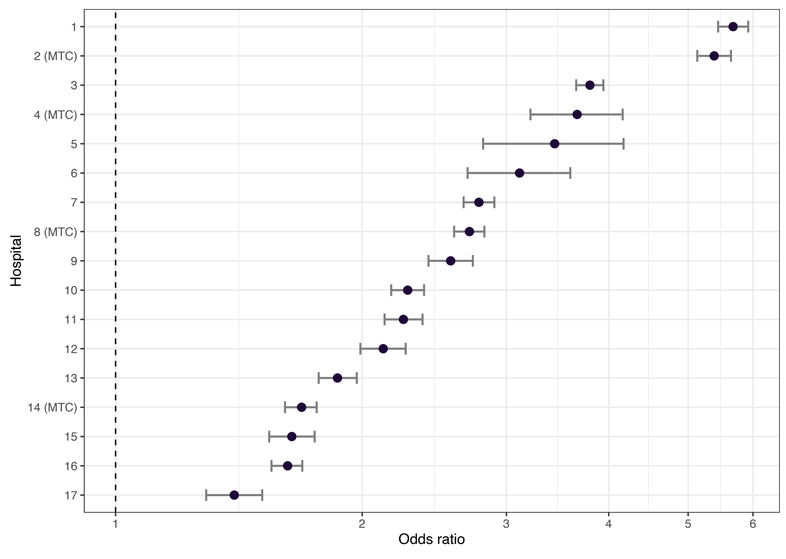

Figure 2: Odds ratios of pre-alert being made stratified by receiving hospital.

Conclusions

- **We identified variation in pre-alert practice that was not due to patient factors.**
- **Decisions about pre-alerts appear to be affected significantly by the ED that the patient is being conveyed to.**
- **Qualitative work will help to explore factors affecting pre-alert decisions in more depth.**

FUNDED BY NIHR | National Institute for Health and Care Research

This project is funded by the NIHR HS&DR Programme, award number 131293. The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care.

University of Sheffield