



Extended Research Article

Strategies to manage emergency ambulance telephone callers with sustained high needs: the STRETCHED mixed-methods evaluation with linked data

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

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Scientific summary

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Scientific summary

Background

Ambulance services, an integral part of the UK's NHS, are under sustained pressure, with emergency calls increasing annually by at least 6%. A small minority of people make high use of the emergency ambulance service. These callers often have complex needs and may be at high risk of mental health or other crises; providing an emergency ambulance response to them has operational implications for ambulance services and may not meet their needs. The standard response to these callers can be punitive and may shift unmet demand from one part of the health and social care system to another, with concomitant resource implications.

In some areas within ambulance services, multidisciplinary approaches provided with input from emergency, primary and social care – known as case management – have been introduced. However, evidence supporting the use of this approach for the care of patients who frequently call the emergency ambulance service is lacking. To address this gap, the STRETCHED study was designed as a mixed-methods evaluation using anonymised linked routine data outcomes to evaluate the effectiveness, safety and efficiency of case management for the care of this patient group.

Aim

To evaluate effectiveness, safety and efficiency of case management approaches to the care of people who frequently call the emergency ambulance service and gain an understanding of barriers and facilitators to implementation.

Objectives

The objectives of the STRETCHED study were to:

1. develop an understanding of predicted mechanism of change to underpin evaluation
2. evaluate case management approaches to the care of people who call the emergency ambulance services frequently in terms of:
 - a. further emergency contacts [emergency ambulance service calls, emergency department (ED) attendances, emergency hospital admissions] or death
 - b. effects on other services
 - c. adverse events (deaths; injuries; serious medical emergencies, police arrests)
 - d. costs of intervention and care
3. describe the epidemiology of sustained high users of emergency ambulance services
4. understand the views and experience of patients
5. identify challenges and opportunities using case management models, including features associated with success, and develop theories about how case management works in this population.

Design

STRETCHED was designed as a mixed-methods 'natural experiment' evaluation based on anonymised linked routine outcomes and qualitative data in four UK ambulance services: East of England Ambulance Service, London Ambulance Service, Welsh Ambulance Service and West Midlands Ambulance Service. These services each identified where case management and usual models of care were in place in different areas ('sites') within its catchment area. The natural experiment design established links between exposure to care model and outcomes.

Participants

Natural experiment

Involving adults meeting nationally agreed criteria for classification as 'frequent caller' by ambulance services during 2018. The study population comprised patients that had made 5 or more emergency ambulance service calls in 1 month or 12 or more calls in 3 months, were aged 18 years or older at the time of classification as 'frequent caller', and resident in a study site at that time.

Patients were included in the study cohort the first time they became eligible for classification as 'frequent caller'; two ambulance services included patients already so classified at the start of 2018.

Service providers

We interviewed ambulance service front-line staff (paramedics and call handlers), partner health and social care providers, commissioners and managers.

Service users

We sought to interview people in intervention sites of each service referred for case management and further explored the patient experience through recruitment via third-sector organisations and social media.

Interventions for people meeting criteria for classification as 'frequent caller'

Usual care comprised within-service management, typically involving: letters to patient and general practitioner (GP); call centre flags to invoke care plans, including 'no send' option; escalation to other services, including police action.

Intervention care comprised usual care with option of referral to cross-service multidisciplinary team (MDT) to review and plan care for selected patients in a case management approach.

Logic model

We held a face-to-face stakeholder event for patient representatives and a range of professional staff involved in commissioning, planning and delivering case management for people who call emergency ambulance services frequently. We developed the STRETCHED logic model from these discussions.

Outcomes

The primary outcome in STRETCHED is a composite hierarchical indicator of mortality, emergency hospital admissions, emergency department attendances and emergency ambulance service calls.

As per our published protocol, we sought data on:

1. further emergency contacts:
 - emergency ambulance calls
 - ED attendances
 - emergency admissions to hospital
 - declassification/reclassification as 'frequent caller'
2. effects on other health and social care services, as available
3. adverse events, as available:
 - deaths
 - injuries
 - serious medical emergencies
 - police arrests

4. costs of intervention and subsequent use of health and social care
5. patient experience of care at intervention sites.

Data collection and analysis

Natural experiment

STRETCHED was not a blinded study. Ambulance services provided NHS Digital and Digital and Health Care Wales with identifiable information on study patients, enabling matching to anonymised data from multiple sources. In parallel, ambulance services submitted clinical and operational data on study patients to the Secure Anonymised Information Linkage (SAIL) databank, for inclusion in an integrated study database.

Patients could request that their data were not used in the study by contacting the appropriate ambulance service. Data 'opt-out' requests to NHS Digital and the SAIL databank were upheld.

We expected to identify 158 eligible patients per site – equivalent to 316 per ambulance service, 632 per arm, and 1264 in total. Allowing for 5% attrition, we expected to include in analyses data on $n = 1200$ patients, yielding 90% power to detect a standardised statistical effect of 0.2 at the 5% significance level.

The primary outcome and its components were assessed using treatment allocated (the 'intention to treat' principle) via logistic regression analysis adjusted for patient characteristics (age, gender, ethnicity, deprivation quintile) and prior service use (number of emergency ambulance service calls, emergency admissions, ED attendances, elective admissions and outpatient appointments).

Health economics

Intervention implementation costs

We obtained information from ambulance service documentation and discussions with, and questionnaire surveys of, staff involved in case management. Staff time required was converted into staff costs using the mean annual basic pay per full-time equivalent (FTE) for staff.

Healthcare resource utilisation costs

Resource utilisation data and the resulting costs of health care were obtained from routinely collected healthcare data available from ambulance services, the Hospital Episode Statistics dataset for England and the SAIL databank for Wales. Data were available on emergency ambulance service calls, ambulance dispatches, ED attendances, emergency admissions, elective inpatient stays and outpatient visits.

Healthcare resource group codes were used for all healthcare components and data sets. Costs, taken from the NHS Reference Costs, were expressed in 2018–9 Great British pounds. No discounting was applied as the follow-up period did not exceed 1 year.

Qualitative elements

We collected qualitative data at the intervention site within each participating ambulance service to explore perceptions of how the intervention worked, what created its effect (if any), why it might function differently in different settings and for different groups of people, and any challenges to implementation and delivery of the intervention.

We sought to conduct up to eight interviews with a range of service providers in each ambulance service intervention site. Interview guides covered case management delivery processes, barriers and facilitators to changed working, perceived impact for patients, issues around diversity and terminology, strengths and weaknesses of the approach and wider organisational impact across health economies, such as information sharing, communication and continuity of care.

We conducted in-depth interviews with a range of service users who had been referred for case management within one ambulance service; we were unable to recruit in the other three services. In order to gather additional data on the user perspective, we added a supplementary qualitative study (STRETCH-UP); this recruited, via third-sector organisations and social media, people who identified as frequent callers. Interviews were conducted by members of the study team; with interviewees' consent, we audio-recorded and transcribed all individual interviews.

Results

Natural experiment

We included in analyses data on $n = 1183$ patients: 550 at intervention sites and 633 at control sites. There was considerable variation in numbers of patients by ambulance service and arm, particularly noticeable in the intervention arm, with over half the patients in one site. Overall, study patients were relatively elderly, with a median age of 65 years (lower quartile 45, upper quartile 81), with slightly more females (51.9%), and were predominantly white (81.7%). Just under two-thirds of patients (65.1%) lived in areas classified in the two most socioeconomically deprived quintiles, only 5.2% lived in areas classified in the least socioeconomically deprived quintile. Intervention site patients were generally younger than control site counterparts in three out of the four participating ambulance services (AS2, AS3 and AS4), and hence generally younger overall (median age: 60 years for the intervention arm; 69 years for the control arm). The proportion of female patients varied from 44.1% (AS2 intervention site) to 59.2% (AS1 intervention site), with no obvious pattern across study arms or ambulance services.

Emergency ambulance service use by patients for the 6 months before inclusion in STRECHED was similar between arms. Approximately two-thirds of patients recorded at least one emergency admission (753/1183; 63.7%), and/or outpatient appointment (804/1183; 68.0%). The proportions of patients recording emergency admissions, ED attendances, elective admissions and outpatient appointments were generally similar between arms; however, the overall mean number (per patient) of emergency admissions, elective admissions and outpatient appointments were all higher in intervention sites.

The proportion of patients recording at least one component of the composite primary outcome was very high and similar between study arms: 95.6% in the intervention arm; 94.9% in the control arm [odds ratio (OR) = 1.159; 95% confidence interval (CI) 0.595 to 2.256; $p = 0.665$]. The majority of patients made at least one further emergency ambulance service call in the 6-month follow-up; almost as many patients recorded an event in at least one other component of the composite measure.

The proportion of patients that died within the 6-month follow-up period was relatively high (10.5% intervention, 14.1% control). Although mortality did not differ significantly with study arm (OR = 0.713; 95% CI 0.465 to 1.093; $p = 0.121$), it was strongly associated with age ($p < 0.001$), which did differ between arms.

Available but incomplete data showed that approximately two-fifths of eligible patients (39/97) were referred for case management, with 27/39 (69.2%) known to receive it.

Just over half of emergency ambulance service calls resulted in attendance (53.8% intervention; 50.4% control); < 25% of calls resulted in conveyance to hospital (24.3% intervention; 22.3% control). The most common reasons for calling were 'fall' (6.5%), 'sick person' (5.2%) and acute coronary syndrome (4.7%).

Health economics

Estimates of intervention implementation costs of case management varied between different intervention sites, reflecting different staff mixes and case management regimes. We estimated that case management costs between £25 and £333 per patient per month. This does not include cost to other services and opportunity costs which remain unquantified.

When adjusted for baseline total number of healthcare service contacts and total baseline cost, together with age, gender, deprivation quintile and ethnicity (collapsed into white/non-white), patients in the case management

intervention sites had marginally lower mean per patient healthcare resource use and costs included in the primary outcome compared to patients in the usual care sites. Overall, patients in the intervention sites had -0.13 (95% confidence interval: -5.38 to 5.11 ; $p = 0.960$) more emergency healthcare contacts (including non-elective hospital admissions, ED attendances, emergency ambulance service calls) compared with control site patients over the 6-month follow-up period, at a slightly reduced mean cost of £243.57 (95% confidence interval: $-\text{£}1972.93$ to $\text{£}1485.79$; $p = 0.782$) per patient. There were no statistically significant differences between usual care and intervention groups at the 5% level for mean per patient healthcare service contacts or costs for any of the service use components included in the primary outcome.

Qualitative findings

Service providers

Thirty-one interviews with key service providers revealed a range of models of case management for people who called frequently, with some key components – such as MDTs – common to all ambulance services. Delivery of case management also varied, for instance, in terms of the role and seniority of those meeting with service users. Case management interventions were area-based, sometimes with changes over time, reflecting short-term funding allocations and changes in staffing or priorities.

Respondents recognised the complexities of needs among frequent callers and that medical presentations often resulted from long-term social needs. There was acknowledgement that emergency care was a default for those who – for whatever reason – had not received appropriate healthcare support through other routes. A minority of frequent callers seemed to be regarded as ‘nuisance’, but respondents were sympathetic to the unresolved needs of the majority.

Service users

Respondents ($n = 15$) generally called for emergency care because they had no other routes to access help; many seemed to use the emergency services as a gateway to accessing better care, and felt demoralised that repeated contacts with health professionals had not reduced or cured their symptoms.

Respondents prioritised receiving judgement-free reassurance when experiencing acute health needs; there was considerable dissatisfaction with the way they were treated.

Those who, according to service records, had been offered case management generally seemed not to be aware of this. None spoke of any resultant improvement in their lives or changes in their experience of making frequent emergency calls. Interventions for frequent callers, if considered at all, were generally regarded as caller management initiatives limiting contact with providers.

Public and patient involvement

We involved people with experience and healthcare backgrounds relevant to the STRETCHED study at all research stages, from project conception, through delivery and in dissemination of our findings. A layered approach enabled people to be involved at strategic and local levels in line with their interest, experience and health. We aimed to enable active and meaningful involvement throughout STRETCHED to enhance research quality, rigour and ethical standards.

Equality, diversity and inclusion

Participant recruitment to STRETCHED study did not proactively target specific groups other than on the grounds of clinical or self-reported healthcare need. Due to the nature of the study, participants were often marginalised and resident in relatively deprived socioeconomic areas.

Conclusions

We did not find any reductions in deaths, emergency ambulance calls or other emergency healthcare contacts associated with case management. The patients classified as frequent callers had high and varied needs. We do not believe that our findings mean that case management never works, or is not worth providing, but we found that expectations of its impact, based on advice and previous small-scale evaluations, were unrealistic.

Recommendations for further research include: the exploration of different forms of case management; feasibility of obtaining self-reported outcomes from this patient group; and the prospective evaluation of care options for this patient group.

Project management

STRETCHED was funded by the National Institute for Health Research (Health Services & Delivery Research programme), sponsored by Swansea University, and received approval from the Health Research Authority and R&D permissions at all participating NHS organisations. We obtained Swansea University Research Committee approval for the supplementary STRETCH-UP substudy.

Our independent Study Steering Committee drew its membership from: a non-participating ambulance service; the FreCaNN; a range of third-sector healthcare-related organisations; the police service; and academia. Two members offered a patient and public involvement (PPI) perspective; the chair had links with a carers' trust.

Study registration

This study is registered as research registry (www.researchregistry.com/) researchregistry7895.

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