Explaining variation in emergency admissions: a mixed-methods study of emergency and urgent care systems

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Scientific summary

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Background

The emergency admission rate in England has increased since 2004, causing concern among policy-makers and service providers about the ability of hospitals to sustain further increases. Some hospital admissions may be unnecessary, causing distress for patients and their families, and placing pressure on emergency services. There has been limited attention to the fact that emergency admissions occur in the context of a system of emergency and urgent care. This system consists of the range of services that could respond to an acute health problem including same day appointments in general practice, general practitioner (GP) out-of-hours (OOH) services, walk-in centres, telephone helplines such as NHS 111, community services such as district nursing, emergency departments (EDs), emergency ambulances and social services. For some health conditions, when a person has an exacerbation of an existing problem, it can be dealt with without resort to emergency admission. Research is needed on how characteristics of the emergency and urgent care system – its configuration, integration and accessibility – affect these *potentially avoidable* emergency admissions.

Objectives

We aimed to identify system-wide factors explaining variation in potentially avoidable emergency admissions in different emergency and urgent care systems in England. Our objectives were to:

1. calculate a standardised avoidable admission rate (SAAR) for 150 systems in England (an age- and sex-adjusted emergency admission rate for 14 conditions which an expert panel identified as amenable to management by the wider emergency and urgent care system, thereby potentially avoiding hospital admission)
2. explain variation in the SAAR between different systems using a regression model incorporating routine data on population, health, and emergency and urgent care system characteristics
3. undertake in-depth case studies to identify the more complex system factors influencing variation in six systems where regression failed to explain variation in the SAAR.

Methods

Design

The study design was a three-phase mixed-methods design known as 'qualitative residual analysis'.

Phase 1 was quantitative. We calculated the SAAR for each of 150 emergency and urgent care systems in England in 2008–11. These systems were geographically based populations defined by primary care trusts. Then we identified population, health and system characteristics using routine data. We undertook multiple regression to test if these factors explained variation between the 150 systems. We then identified systems with large residuals within the analysis, that is the systems with SAARs which could not be explained by the characteristics in our regression. To complement this, we repeated the process for 129 systems defined by the catchment populations of acute trusts.

Phase 2 was qualitative. We selected six systems with large residuals in the above regression and undertook a multiple case study approach to identify further system characteristics which might explain variation. Within each case study we undertook semistructured interviews with key stakeholders from commissioning, EDs, acute trusts, general practice, GP OOH services, ambulance services, community

health services, social services and Healthwatch. We did not interview patients and their families. We undertook 82 interviews in total, between 11 and 17 in each case study. We identified a range of issues affecting avoidable admission rates, some of which we had not included in our regression in phase 1.

Phase 3 was quantitative, involving identifying routine data on factors from phase 2 to try to explain further variation in the SAAR.

Results

We present the findings from the quantitative and qualitative phases for each explanatory factor in turn rather than present the findings of different phases of the project separately.

Amount of variation between systems

Twenty-two per cent (3,273,395 of 14,998,773) of all emergency admissions in England in 2008–11 were for conditions rich in avoidable admissions. The mean SAAR was 2258 per year per 100,000 population, with a 3.4-fold variation between the 150 geographically based systems (1268–4359).

Population-related factors explaining variation

Social deprivation

Employment deprivation, that is the proportion of the working age population seeking employment, explained 72% of the variation in the SAAR between geographically based systems: the higher the employment deprivation, the higher the SAAR. Interviewees also identified deprivation as a driver of avoidable admissions and highlighted the complexity of the relationship, explaining that people in socially deprived areas had high levels of morbidity, had transport difficulties that could lead to admission, and wanted immediate access to advice and treatment. Their discussions highlighted the extent to which deprivation encapsulates a whole range of social and cultural characteristics that determine health-care-seeking behaviour.

Culture and expectations

Interviewees perceived a growing culture of 24-hour access to services, leading to expectations of immediate access to health services. They associated this with people in urban areas, younger people and deprived communities. This contrasted with another subgroup of stoic older people or rural dwellers, who contacted services only when seriously ill.

Geography

The urban/rural status of a system explained 29% of variation in the SAAR by itself, and explained a further 3% of variation when social deprivation was considered. Interviewees described how long travel times and lack of transport, combined with the low expectations of socially deprived urban areas, and robust GP provision support, could explain lower SAARs in rural areas.

During the case studies it was apparent that the location of some acute trusts on the periphery of a number of systems could result in ED staff having to negotiate discharge with different sets of community and social services, acting as a barrier to discharge when patients lived in ‘other’ areas.

Service-related factors explaining variation

Acute trusts: coding of admissions

Interviewees in two of our case studies offered starkly different views on how admissions were coded within their hospitals. In one system, any patient moved from the ED to one of the 'holding areas' such as the clinical decision unit, in order to limit breaching of the 4-hour wait target for ED, was coded as an admission. In the other system, a number of 'holding units' were available and people were not coded as admissions even if they stayed overnight in a bed. This variation in coding practices between hospitals was probably measured by two factors in our regression: the conversion rate from ED attendance to admission, and short length of stay, which explained a further 5% and 2%, respectively, of variation in the SAAR once deprivation and geography were considered.

Acute trust bed provision

We tested the effect of the rate of acute beds per 1000 population on variation in the SAAR in 129 acute trusts. We found that it explained 16% of variation and continued to explain variation when deprivation was considered. The more beds a hospital had, the higher its SAAR. This raised the potential that 'supply-induced demand' might be at play, whereby admissions occur until beds are full rather than because admissions are necessary.

Emergency departments

Sixty-nine per cent of potentially avoidable admissions in our study were admitted through EDs, ranging from 44% to 92% in the 150 different systems. Use of EDs explained 15% of variation in the SAAR by itself and 3% when deprivation and geography were considered. Our interviewees described high demand for EDs nationally, as well as within their own departments. The 'conversion rate' from ED attendance to emergency admission explained variation in the SAAR. Interviewees described how junior doctors requested more diagnostic tests than senior colleagues. Waiting for diagnostic tests could cause the department to feel crowded and risk breaches of the 4-hour wait target. Admission could occur to free space and avoid breaches. Interviewees also alluded to a lack of consultants in two of our case studies, and a lack of physical space within departments, as factors contributing to avoidable admissions.

Community services

There were no routine data to measure the effect of variation in community services on the SAAR. Community beds, community matrons and multidisciplinary teams based in the community were described as helping to avoid admission within our case studies. Sometimes community beds were viewed as inaccessible because of stringent admission criteria or geographical location.

Primary care

Interviewees viewed GP OOH services as problematic, particularly in one case study, where the service was described as relying heavily on locums outside the area. Interviewees believed that poor perceived access to this service and daytime general practice led patients to use EDs and increase the likelihood of admission. Poor perceived access to general practice was associated with a high SAAR but, once use of EDs was considered, good perceived access to general practice was associated with high SAARs. Interviewees had mixed views about walk-in centres, minor injury units and urgent care centres; they were generally sceptical that these services reduced demand for EDs.

Social services

Acute trust and community service interviewees identified the importance of social services to avoiding admissions. They expressed concerns about responsiveness; social services interviewees expressed concerns about resources to meet demand.

Ambulance services

The ability of ambulance services to treat people at home or refer them to alternatives to the ED explained 35% of variation in the SAAR by itself and 2% when deprivation and geography were considered. Ambulance interviewees reported that the ability to keep people at home was dependent on the accessibility of social, community and GP services.

System-level factors possibly affecting variation

There were few routine data on system-level factors. However, interviewees in the case studies drew attention to system issues for admission avoidance.

Proactive admission avoidance schemes

One system in our case studies appeared to focus on early discharge whereas the other five had admission avoidance schemes in operation. Interviewees viewed these positively where they proactively sought patients in EDs or medical admission units to discharge. A key scheme was rapid assessment teams, which were multidisciplinary in nature, usually including physiotherapists, occupational therapists, nurses and (in some cases) social workers. Another scheme was use of senior review. Senior doctors, from the ED and other departments such as medicine and surgery, could offer early advice about patient management to GPs and junior doctors in EDs.

Integration

Our interviewees discussed how integration between services could benefit admission avoidance. This could mean colocation, joint posts or frequent communication between different services. Integration could occur between health and social care, between different health-care organisations in acute and community care or within the same organisation. A challenge of integration was the large number of services that needed to be integrated and the practice of breaking up established integration to create new integration; for example breaking community and social services joint working to establish acute and community joint working. Condition-specific pathways were identified by interviewees as avoiding admissions.

Availability of services out of hours

Interviewees described how support services that avoided admissions (primary care, social services, mental health services) were not always available outside weekday working hours, which meant that admissions occurred OOH that would have been avoided during working hours. However, when we tested this in our regression we could not find evidence to support it.

Resources available

During our case study interviews, interviewees referred to reductions in service provision due to financial constraints, including services directly supporting admission avoidance. We tested whether our 150 systems had been identified as in deficit or surplus financially and found that this explained 14% of variation in the SAAR but was no longer explanatory once deprivation was considered.

The easy option, the safe option

Interviewees used the terms ‘easy option’ and ‘safe option’ to describe emergency admission to a hospital bed. Services outside the hospital were described as not taking responsibility for the care of patients and taking the easy option of calling an ambulance or sending them to EDs. The ambulance service interviewees felt that transport to hospital could be the easy option because of the time taken to contact relevant services, but that it was also the safe option if they could not get hold of relevant support services. Within the hospitals, ED staff also discussed admission to a hospital bed as an easy and a safe option. Sometimes discharging from an ED required contact with numerous community and social care providers. It was described as quicker and easier to admit to a hospital bed, and this option inspired more confidence in ED staff worried about whether community services would be available if they sent a patient home.

Conclusions

Our conceptual framework was that some admissions are avoidable if services in the wider emergency and urgent care system operate well. Much of what we found supported this, but we also found that practice within the micro-system of an ED and acute trust was extremely important, for example variation in conversion rates from ED attendances to admissions. Social deprivation, associated with high levels of illness and possibly high expectations around service access, explained a large amount of variation in avoidable admissions. Some variation appeared to be related to different coding practices in acute trusts. Health-care staff perceived admission to be the easy or safe option when faced with time constraints. Some admission avoidance schemes, and integrated working, were well regarded by staff, for instance rapid assessment teams, but the research evidence base on the effectiveness of these schemes is limited. We did not interview patients and their families; further research on their views and experiences would be useful.

Implications for health care

All health and social services have a role to play in admission avoidance. Given the large impact of deprivation on variation in avoidable admissions, there is a need to develop admission avoidance initiatives tailored to deprived communities. There is a need to standardise coding practices so that hospital attendances staying a few hours in 'holding areas' are not coded as admissions. There is a need to evaluate schemes/initiatives that health-care staff perceive to offer easy and safe alternatives to a hospital bed, because the research evidence base is too limited to recommend that these approaches are adopted nationally.

Recommendations for research (in order of priority)

1. Better understand how deprivation affects admissions to facilitate the development of effective interventions to avoid admissions for deprived communities.
2. Robustly evaluate the different types of admission avoidance schemes used by some systems, in particular the use of multidisciplinary teams/rapid assessment teams.
3. Understand why ambulance services have such different percentages of calls not conveyed to an ED.
4. Understand avoidable emergency admissions from the viewpoint of patients and their families.
5. Understand the decision-making processes and the perceptions of decision-makers in terms of the risks and benefits of hospital admission (both to themselves and to the patients), with an emphasis on differences between junior and senior doctors.
6. Address evidence-light relevant issues such as the cost-effectiveness of 24/7 availability in the emergency and urgent care system and unintended consequences of the 4-hour target in EDs.

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