

# Implementation of interventions to reduce preventable hospital admissions for cardiovascular or respiratory conditions: an evidence map and realist synthesis

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## Scientific summary

### Reducing cardiovascular and respiratory hospital admissions

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# Scientific summary

## Background

Admissions to hospital increasingly contribute to pressure on health system resources internationally. In the UK NHS, changes to commissioning arrangements have increased the focus on reducing hospital admissions. Despite this, overall emergency admissions continue to increase each year, increasing by 9.3% from 2013–14 to 2016–17. In 2016–17, there were 5.8 million emergency admissions, up by 2.1% from the previous year, and 24% of these were admissions that NHS England considers could have been avoided. The number of bed-days used by people admitted in an emergency admission increased from 32.41 million in 2013–14 to 33.59 million in 2016–17. This was a 3.6% increase, which is less than the 9.3% increase in emergency admissions during the same period. The National Audit Office calculated that the real-terms cost of emergency admissions have increased by 2.2% since 2013–14, from £13.4B in that year to £13.7B in 2015–16. This situation poses a significant challenge to health services delivery.

Unplanned hospital admission rates vary between geographical areas from 90 to 139 per 1000 people, and variation in emergency admission rates is even greater. The existence of such variation across the NHS indicates that there is potential to reduce hospital admission rates. The way in which emergency admissions are recorded also varies between institutions and this makes it more difficult to obtain an accurate picture of the current situation.

The interest in reducing admissions focuses in particular on a group of ambulatory care sensitive conditions, defined as those for which hospital admission could be prevented with care delivered in the primary care setting. These include asthma, chronic obstructive pulmonary disease, diabetes, epilepsy, hypertensive disease, dementia and heart failure.

In 2012, a series of systematic reviews (Purdy S, Paranjothy S, Huntley A, Thomas R, Mann M, Huws D, *et al.* *Interventions to Reduce Unplanned Hospital Admission: A Series of Systematic Reviews*. Bristol: University of Bristol; 2012) summarised the evidence regarding interventions that had exhibited success in reducing unplanned hospital admissions. In terms of services to reduce admissions, Purdy *et al.* in 2012 found evidence of effectiveness for education, self-management, exercise and rehabilitation, and for telehealth in certain patient populations, mainly respiratory and cardiovascular. Specialist heart failure services and end-of-life care were also reported to reduce these admissions. However, case management, specialist clinics (other than for heart failure), care pathways and guidelines, medication reviews, vaccine programmes and hospital at home did not appear to reduce preventable admissions. The reviews found insufficient evidence on the role of service combinations or co-ordinated system-wide care services, emergency department interventions, continuity of care, home visits or pay-by-performance schemes.

Thus, although the pattern of findings was mixed, Purdy *et al.*'s systematic reviews revealed a consistent picture of reduction across different interventions targeting two particular types of condition, namely cardiovascular and respiratory conditions. For this interpretative review, the National Institute for Health Research Health Services and Delivery Research programme asked us to consider these as 'proven interventions' and to seek to provide an in-depth understanding of how interventions that have been shown to reduce admissions for cardiovascular and respiratory conditions work in practice.

## Objectives

The aim of this research was to fill a gap in the evidence base around successful implementation of admission reduction programmes by focusing on understanding what works for who, why it works and in what contexts it works. We first investigated interventions that are currently used in the NHS to manage cardiovascular or respiratory conditions using a systematic mapping approach. We then used a realist approach to identify and explain factors that contribute to successful implementation of interventions to reduce preventable hospital admissions, looking at responses to interventions that involve different mechanisms and different contexts.

## Methods

The overall review comprised two main phases:

1. systematic mapping of cardiorespiratory intervention studies for reducing preventable admissions
2. realist review of implementation evidence.

The overall review commenced with the decision, agreed with the National Institute for Health Research Health Services and Delivery Research programme team, to focus exploration on those conditions revealed by the 2010 Purdy review (Purdy *S. Avoiding Hospital Admissions What Does the Research Evidence Say?* London: The King's Fund; 2010) to demonstrate effective interventions to prevent inappropriate hospital admissions. A positive effect or positive indication was consistently found for cardiorespiratory conditions and this was a focus for the systematic mapping of studies.

Based on these included studies, four complementary activities were conducted:

1. generation of if–then–leading to statements from a conceptually rich set of empirical studies and theoretical papers, and selection of candidate programme theories
2. analysis of implementation studies to identify intervention components using an abbreviated version of the Template for Intervention Description and Replication checklist
3. analysis of implementation studies using the Promoting Action on Research Implementation in Health Services framework
4. comparison of Promoting Action on Research Implementation in Health Services templates with shortlisted programme theories.

## Mapping review

For the mapping review, we searched six databases for studies published between 2010 and October 2017. Studies were included if they were conducted in the UK, the USA, Canada, Australia or New Zealand; recruited adults with a cardiovascular or respiratory condition; and evaluated or described an intervention that could reduce preventable admissions or re-admissions. We produced a descriptive summary of key characteristics of the included studies. Summary tables were developed using the search, cross-tabulation and reporting functions of EPPI-Reviewer 4 (Evidence for Policy and Practice Information and Co-ordinating Centre, University of London, London, UK).

## Realist synthesis

The studies included in the mapping review helped to inform the sampling frame for the subsequent realist synthesis. We also engaged with the wider evidence base (using supplementary searches) through systematic reviews, opinion pieces and direct reference to individual study reports, particularly when authors themselves established a connection to the UK context. We developed explicit inclusion criteria for our sampling frame to ensure consistent study selection by the review team across the different intervention types. Purpose-designed data extraction forms were designed using appropriate frameworks as structures by which to interrogate the theoretical literature and the empirical evidence.

In summary, data extraction comprised use of:

- an implementation framework, Promoting Action on Research Implementation in Health Services, as a structure for examining how interventions are delivered
- an intervention template, Template for Intervention Description and Replication – Lite, as a format for describing intervention components
- a realist logic template, if–then–leading to, to elicit programme theory on how interventions might work.

The initial programme theories were tested from the theoretical literature, empirical studies and insights from the patient and public involvement group. Programme theories were examined against the individual intervention types and collectively as a set. Following identification of the initial programme theories, the review team extracted data into evidence tables. The resultant hypotheses functioned as synthesised statements around which we developed an explanatory narrative referenced to the underpinning evidence base. Additional searches for mid-range and overarching theories were conducted using Google Scholar (Google Inc., Mountain View, CA, USA).

Our EPPI-Reviewer map, reference management database and accompanying data extraction spreadsheets collectively offer a comprehensive evidence base relevant to interventions to reduce unplanned hospital admissions.

## Results

### Mapping review

A total of 569 publications were included in the mapping review. Unsurprisingly, the interventions identified by Purdy *et al.* (Purdy S, Paranjothy S, Huntley A, Thomas R, Mann M, Huws D, *et al.* *Interventions to Reduce Unplanned Hospital Admission: A Series of Systematic Reviews*. Bristol: University of Bristol; 2012) as having the best evidence of effectiveness (or no effect) were well represented in the map. The largest group of studies originated from the USA and differences between health-care systems mean that care should be taken in extrapolating the results of such studies to the UK setting. The included studies from the UK showed a similar distribution of studies by intervention and population to that of the map as a whole, but there was evidence of some country-specific features, such as the prominence of studies of telehealth. The studies coded for the mapping review and stored in EPPI-Reviewer 4 represented a broad sampling frame for use in the accompanying realist synthesis.

### Realist synthesis

#### Implementation framework

Within the Promoting Action on Research Implementation in Health Services framework, successful implementation is represented as a function of the nature and type of evidence (examined from the mapping review), the qualities of the context in which the evidence is being introduced and the way the process is facilitated (extracted from included UK studies, both quantitative and qualitative). We found that interventions with strong evidence of effectiveness overall had not necessarily demonstrated effectiveness in UK settings; that the large majority of the evidence came from the USA, where the context for delivery of health care is very different from that of the UK; and that facilitation of the implementation of interventions was often not reported or inadequately reported in UK studies, which generally focused mainly on effectiveness or qualitative evidence of patient and health-care professional experiences of service delivery.

## Descriptive framework

The Template for Intervention Description and Replication – Lite framework provided a useful descriptive framework for recording key elements of the interventions and their delivery. Many of the included interventions were highly diverse in the ways in which they were delivered, the main exceptions being cardiac and pulmonary rehabilitation. There was also considerable overlap between interventions in terms of their key components. The role of specialist nurses in providing continuity of care and links between primary and secondary care were highlighted in multiple studies.

## Programme theories

We identified five programme theories to explain why interventions might work to reduce avoidable hospital admissions (*Box a*).

### BOX a Programme theory components

#### Programme theory 1

People with chronic conditions are frequently admitted to hospital when hospital is not the optimal destination for them. They may have symptoms that could be self-managed or anxieties that could be addressed by patient education or information.

#### Programme theory 2

People with chronic conditions lack knowledge about alternative health provision and therefore draw disproportionately on well-signposted channels, such as their general practitioner or the emergency department. Alternatively, patients perceive that presentation to an emergency department holds relative advantage (e.g. quality, ease of access, response) over general practitioner-based or other primary or community care services. Patients pressure health-care professionals to admit them to hospital.

#### Programme theory 3

Health-care professionals lack confidence in their own diagnoses or may lack confidence in, or knowledge of, alternative sources of health-care provision and so may refer people with chronic conditions, or admit them directly, to hospital. Health-care professionals feel under pressure to admit people with chronic conditions directly to hospital.

#### Programme theory 4

People with chronic conditions use health services inappropriately, delaying their presentation to health-care professionals or hospital because of perceptions of the service either anticipated or based on their own or others' past experiences.

#### Programme theory 5

General practitioners and other health-care professionals are influenced by the wider context of the health-care system, and the availability or otherwise of support and incentives may influence their adoption of interventions and pathways designed to avoid preventable referrals and admissions to hospital.

The programme theories, expressed as scenarios, were refined and endorsed by our patient and public involvement group. We found evidence to support programme theory 1, which suggests that hospital admissions could be reduced by optimal self-management. Considering programme theory 2, we did not find substantive evidence to suggest that patients may seek hospital admission primarily on the basis of relative advantage. It seems that concerns associated with anxiety and risk may constitute a more important driver, with hospitals being seen as safe places that can offer security and reassurance. However, the presence of perceived, implicit or indirect pressure cannot be ruled out. Programme theory 3 relates to clinicians' confidence in their own diagnoses and ability to refer appropriately to services that might avoid admission. In the context of cardiovascular and respiratory diseases, this is relevant to patients with symptoms, such as breathlessness, that could result from various underlying causes. Supporting evidence for programme theory 3 was found in studies of heart failure services.

Direct evidence for programme theory 4 (admissions resulting from patient delay in seeking treatment) was limited in our sample of studies. Finally, programme theory 5 (influence of the broader health system context) addressed the limitations on rational decision-making around hospital admissions. This was reflected in our studies. For example, heart failure care delivered across multiple services, confusion about eligibility for specialist care and relational/managerial discontinuity of care increased the likelihood of suboptimal management and unplanned admissions.

### Mid-range and overarching theories

In addition to the programme theories, we found numerous examples (both descriptive and empirical studies) of mid-range theories relevant to the interventions under review. The largest group focused on the patient, for example factors influencing adherence to recommended interventions, but theories related to health-care professionals' behaviour and the overall health system were also found. Some theories were cited in relation to several interventions (e.g. Bandura's self-efficacy theory) but it is unclear whether this reflects their greater utility or simply their higher profile and more pervasive influence in the literature. The overarching theories may be considered as more exploratory than the programme and mid-range theories.

## Conclusions

Avoidable hospital admissions for chronic cardiovascular and respiratory conditions are common and costly for both the health service and the patient/family involved. Systematic reviews have identified interventions that have strong evidence of effectiveness in reducing avoidable admissions. However, the synthesised evidence may not be supported by evidence of effectiveness in a specific setting or how best to implement the intervention in routine practice. Our mapping review and supplementary searching indicated that this was the case for some interventions widely recommended and employed in the UK health system. The subsequent realist data extraction and synthesis used diverse frameworks and levels of theory to examine how interventions might work and factors that support or hinder their implementation. The Template for Intervention Description and Replication – Lite framework proved useful in characterising interventions and indicated that interventions with different names often contain the same or overlapping components. The programme theories we developed from the literature were supported to varying degrees by empirical evidence, but all provided valuable insights.

Overall, the implementation of interventions to reduce avoidable admissions for cardiovascular and respiratory conditions appears to be favoured by:

- Support for self-management by patients and their families/carers, including the ability to recognise when they need to seek further help.
- Support for services that signpost patients to consider using less familiar services when appropriate, rather than treating general practitioner appointments/referral as the default option.
- Recognition of possible drivers leading patients to seek admission, for example the need for security and reassurance at a difficult time.

- Support for general practitioners and other health-care professionals to diagnose and refer patients appropriately and with confidence. This includes creation of a supportive background context and a set of incentives in the health system.
- Support for workforce roles, commonly filled by specialist nurses, that promote continuity of care and co-ordination between different services across primary, secondary and community care.

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