

Factors that facilitate the implementation of interventions to reduce preventable hospital admissions with a focus on cardiovascular or respiratory conditions: protocol for an evidence map and realist synthesis

Review team: Andrew Booth, Duncan Chambers, Anna Cantrell, Janette Turner, Liddy Goyder

- The review will address identified gaps in the evidence regarding the implementation of interventions to reduce preventable hospital admissions.
- Our mapping approach will support the construction of the most appropriate sampling frame within which to explore and evaluate interventions to reduce preventable hospital admissions.
- Subsequently our realist-based approach will allow a more nuanced examination of the complexity surrounding implementation of interventions to reduce preventable hospital admissions within a UK NHS-based context.
- We will engage with stakeholders to ensure findings have relevance for patients, front-line clinicians, managers, and those commissioning services.
- We will employ a combination of systematic searches, cluster searching and structured forays into the literature to identify the most useful and relevant evidence to address the review objectives.

ABSTRACT

Introduction: Preventable hospital admissions (PHAs) divert valuable resources away from much needed areas of service provision and result in an unnecessary burden for patients and their families. Widespread geographic variations in admission rates for conditions where admission is potentially avoidable are a cause of concern for commissioners and could indicate inefficient care. Although several commentators have summarised the evidence base for interventions to reduce PHAs it is unclear why similar interventions have proved successful for some conditions, principally for cardiovascular and respiratory conditions, and yet not for others. Comparatively little attention has focused on how to support the implementation of interventions to reduce PHAs. Given this lack of understanding, this evidence synthesis is designed to address the research question: With regard to the implementation of interventions to reduce preventable hospital admissions for cardiovascular and respiratory conditions: what works, for whom, how and in what circumstances?

Methods and analysis: To identify interventions to reduce PHAs and to explore which interventions may work and in what contexts, we will conduct a mapping review and realist evidence synthesis. We will engage with multiple sources of evidence and consult with stakeholders about the differential effects of PHAs within the English NHS.

Following completion of the mapping review we will conduct the realist synthesis in 4 phases over 5 months.

Phase 1: we will construct an initial theoretical framework to explore plausible explanations of factors that explain under what circumstances implementation is successful.

Phase 2: evidence retrieval, review and synthesis guided by the theoretical framework;

Phase 3: testing and refining of programme theories, to determine their relevance;

Phase 4: formulating actionable recommendations about how interventions to reduce PHAs should be implemented within NHS service delivery.

INTRODUCTION

Admissions to hospital increasingly contribute to pressure on health system resources internationally. In the National Health Service (NHS), changes to commissioning arrangements have increased the focus and drive to reduce hospital admissions¹. In 2012-13, there were 5.3 million emergency admissions to hospitals, representing around 67% of hospital bed days in England, and costing approximately £12.5 billion². This situation poses a significant challenge to health services delivery as a potential source of unacceptable variation. Contributing factors to health service pressures include the high, rising unit costs of unplanned hospital admission compared to other forms of care, and because of the disruption emergency admissions cause to elective health care, most notably in-patient waiting lists, and to the individuals admitted¹.

Over more than a decade the NHS has explored community, population and policy level interventions aimed at reducing preventable hospital admissions but these have had little impact on admission rates¹. In 2012 Purdy et al summarised the evidence regarding interventions that had exhibited success in reducing unplanned hospital admissions³. In terms of services to reduce admissions Purdy and colleagues found evidence of effectiveness for education, self-management, exercise and rehabilitation, and telemedicine in certain patient populations, mainly respiratory and cardiovascular³. Specialist heart failure services and end-of-life care were also reported to reduce these admissions. However, case management, specialist clinics, care pathways and guidelines, medication reviews, vaccine programmes and hospital at home do not appear to reduce PHAs³. There is insufficient evidence on the role of combinations or coordinated system wide care services, emergency department interventions, continuity of care, home visits or pay-by-performance schemes³.

Thus, while the pattern of findings was mixed, Purdy's systematic review revealed a fairly consistent picture of reduction across different interventions targeting two particular types of condition, namely cardiovascular and respiratory conditions³. By way of comparison one of the quality measures for accountable care organisations under the US Affordable Care Act is to reduce preventable emergency admissions for three chronic medical conditions: chronic obstructive pulmonary disease (COPD), congestive heart failure, and asthma⁴. For this interpretative review we consider these as "proven interventions" and 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. This will include both (i) how the interventions work to reduce unplanned admissions and (ii) how they seek to ensure that admissions that are avoided are, in fact, unnecessary. The intention is also to identify some

potentially transferable lessons that might enlighten how to achieve comparable success in other conditions or, at least, help in understanding factors that potentially explain when comparable success is not realised outside these two focal conditions.

This review will fill a gap in the evidence base around successful implementation of admission reduction programmes by focusing on understanding what works for whom, why and in what contexts. We will investigate interventions that are currently used within the NHS to manage cardiovascular or respiratory conditions to identify and explain what particular features about them are more likely to (or not) promote a reduction in preventable admissions. We are interested in what local service providers and commissioners can do to optimise successful implementation of the so-called “proven interventions”. The findings from this evidence synthesis will equip commissioners and service providers to effectively implement interventions to reduce preventable admissions. We plan to use 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. To the best of our knowledge this is the first such example of a realist-based approach exploring these aspects of implementation.

BACKGROUND

Against a prevailing tide of short stay admissions, healthcare organisations in the UK and other countries including the USA, Canada and Australia are trying different service interventions to prevent and reduce preventable emergency admissions. Interventions include risk prediction tools, case management, hospital care at home, telemedicine and different ways of organising acute admissions in hospitals⁵.

How does one identify which admissions are avoidable? Researchers use the term “Ambulatory care sensitive conditions” (ACSCs) to collectively describe “conditions for which hospital admission could be prevented with care delivered in the primary care setting”⁵. Even if the ACSC episode itself is managed well, an emergency admission for an ACSC is often preventable by good quality primary and community care. Heart disease and respiratory conditions represent two important ACSCs. The NHS outcomes framework includes two indicators that measure the age-sex standardised rate of emergency admissions per 100,000 populations for people of all ages, one for acute and the other for chronic conditions. The focus of this review is on those chronic ambulatory care sensitive conditions that relate to cardiovascular and respiratory conditions. The relevant indicator is, therefore, “Unplanned hospitalisation for chronic ambulatory care sensitive conditions (all ages) (NHSOF 2.3.i)”⁶. This indicator indicates how successfully the NHS manages long term conditions such as diabetes, epilepsy and dementia, and specific to this review, (e.g. angina, asthma, COPD), where optimal management can be achieved without necessitating emergency admission. Understanding reasons for variation in emergency admissions for ACSCs at national level may facilitate review of local service provision and identify potential areas for improvement.

Table 1 - Conclusions on Intervention Effectiveness from: Purdy (2012)⁷

Intervention	Positive	No Effect	Negative
1. Case management	Heart Failure	Older People; COPD	
2. Specialist clinics	Heart Failure	Older People; Asthma	
3. Community interventions	Acutely at risk populations (e.g. Failure to Thrive Infants, Heart Failure).	Older People, mother and child health and heart disease	
4. Care pathways and guidelines		General conditions; specific diseases (e.g. gastrointestinal surgery, stroke and asthma).	
5. Medication review		Older People, Heart failure or Asthma	
Education and Self Management			
6a. Education	Heart Failure		
6b. Self-management	Adults with asthma; COPD.	Children with asthma	
7. Exercise and rehabilitation			
7a. Pulmonary rehabilitation	COPD		
7b. Exercise based cardiac rehabilitation	Coronary heart disease		
7c. Therapy based rehabilitation		Stroke	
7d. Fall prevention interventions		Older People	
8. Telemedicine	Heart disease, Diabetes, Hypertension, Older people.		

Intervention	⊖	⊕	⊖
9. Vaccine programs			
9a. Influenza Vaccinations		Asthma; Older people	
9b. Health Worker Influenza Vaccination		Older people	
10. Hospital at home			Older People
11. Finance schemes	Insufficient data		
12. Emergency department interventions	Insufficient data		
13. Continuity of care	Insufficient data		

Key: ⊖ - Evidence that intervention reduces admissions; ⊕ - Equivocal or contradictory evidence; ⊖ - Evidence that intervention does not reduce interventions

The phenomenon of unnecessary admission is complex - illustrated by the fact that proximity to an A&E department increases the risk of admission (for example Purdy reports a 12% higher rate of asthma admission for each kilometre that the patient is closer to the emergency department⁵). Chronic diseases are independently associated with higher rates of admissions⁸. Increased admission is also predicted by prior utilisation of health services, specifically the number of previous hospital admissions and length of stay by a patient in the previous year, and by less use of primary care⁹. Demographic factors, such as deprivation, may also explain possible variation in admissions¹⁰. Respiratory conditions have been reported to be particularly vulnerable to meteorological factors and pollution, again associated with an increase in admissions¹.

Provision of primary care services is a further factor associated with admission rates; larger practices have been found to have lower rates of emergency admissions, possibly because of access to a wider range of services including acute care services¹¹. A King's Fund report documented a five-fold variation in out-of-hours admission rates between GPs, suggesting that clinician factors must be taken into account when examining implementation strategies for interventions that target the reduction of admission rates¹.

Adopting a realist synthesis approach enables our review team to consider the widest variety of potential additional contextual influences on the successful implementation of proven interventions, including interactions within the complex adaptive healthcare system¹². For example, attitudes and behaviours of individual patients and clinicians, organisational policies, the availability of and access to primary care services are all appropriate aspects for exploration. In common with many other complex service interventions, interventions to reduce unplanned and unnecessary hospital admissions must be examined within the wider context of large-scale transformation¹³. Specifically, interventions to reduce preventable hospital admissions should be conceived as operating within a complex adaptive health system¹⁴. In unravelling such complexity a review team needs to extend their evaluative frame beyond the effectiveness evidence, particularly as this is well summarised elsewhere, to achieve a more nuanced consideration of contextual influences on implementation, the mechanisms underpinning interventions and their differential impact on reducing interventions¹⁵.

RESEARCH QUESTION AND AIMS

With regard to the implementation of interventions to reduce preventable hospital admissions for cardiovascular and respiratory conditions: what works, for whom, how and in what circumstances?

The main aims are:

1. To identify and map the different interventions that could be used to reduce preventable hospital admissions, with a particular focus on cardiovascular and respiratory conditions in the NHS (as identified by Purdy, 2012), including particularly close examination of underpinning mechanisms that explain how these work in practice.
2. To explore the diversity of types of impact of these interventions in different healthcare settings, including their interactions with other healthcare agencies and organisations, paying particular attention to contextual influences.
3. To investigate ways to help NHS managers and commissioners to select, implement and evaluate appropriate interventions likely to achieve most benefit in terms of reduced hospital admissions and other relevant outcomes.
4. To generate actionable recommendations to inform selection of appropriate interventions for reducing PHAs, specifically for cardiovascular and respiratory conditions but also, more broadly, for ambulatory care sensitive conditions.
5. To identify potential knowledge gaps within the research and practice agendas with a view to stimulating further development of the evidence base via future research and evaluation.

THEORETICAL CONSIDERATIONS

A realist synthesis has been designed as an appropriate approach to answer the review question and aims. Realist synthesis draws on a rich and diverse evidence base to establish whether interventions work or not, how, in what contexts and for whom¹⁶. In the specific context of implementation it offers the potential to identify and then provide practical solutions to, and/or explanations about, barriers that might result in suboptimal utilisation of interventions¹⁷.

Realist synthesis positions itself within a critical realist view of causality in the social world¹⁸. Within this realist synthesis, we seek to construct, test and refine a programme theory of causal explanations about how interventions to reduce hospital admissions actually work. Subsequently we plan to draw upon mid-range theories to explain how programmes work, or not, through examining patterns of admissions associated with different interventions and contexts¹⁶. We will engage with stakeholders in order to formulate and refine programme theories¹⁷ and thereby unpack complex, contextually contingent issues as the specific intent of this review.

Realist syntheses are theory-driven. We will use the synthesis to test a programme theory, capturing the complexity of interactions to offer an explanatory account of how interventions for reducing PHAs work. Our team will develop an initial theoretical framework, informed by the mapping review of the evidence and consultation with stakeholders. The framework will provide a provisional (hypothetical) explanation of what works and the impact of interventions for reducing PHAs. We will generate this explanation by investigating literature and evidence from separate but interlinked disciplines, around four theory areas: the factors that cause patients to seemingly require admission; factors that cause practitioners to

recommend admission, the characteristics of the intervention and their underlying mechanisms and the mechanisms associated with implementation. We will first unpick each of these four areas separately and then we will reconstitute the evidence base into a series of causal pathways linking the Motivations (of practitioner and patient) to their respective Capabilities (e.g. Suppressing Risk Averse Behaviour; Self Management), the Opportunities provided by the Intervention itself and the Behaviours required for successful Implementation¹⁹.

We are interested in identifying the full range of intended and unintended outcomes from interventions to reduce PHAs. Such impacts may relate to morale and motivation, patient satisfaction, financial operability through to less measurable outcomes such as improved knowledge and understanding, attitudes and insights, and changes in managerial and organisational behaviour.

METHODS

We will combine three different analytical approaches. First, we will undertake a mapping review to document all identifiable interventions with the intended outcome of reducing PHAs from the UK, as well as from the US, Canada, Australia and New Zealand. Our literature search will focus on studies published from 2010 onwards in recognition of the major King's Fund review which appeared in that year¹. However large, high quality and influential studies published prior to this publication date will be identified and accessed via reviews and reference lists of included studies.

Second we will use a best fit framework synthesis approach²⁰ to guide our analytical lens and thereby inform our data extraction, The exact source of this framework will be determined from a supplementary search for conceptual frameworks. However, it seems likely that it will derive from either a generic theory of behaviour change e.g. the COM-B framework¹⁹, from a generic implementation model²¹ or from a conceptual model/logic model specifically related to the problem of preventable hospital admissions²².

Finally, we will follow recognised methods for the conduct and reporting of realist synthesis. This synthesis will be conducted in four phases over 5 months

1. Programme theory development.
2. Evidence search, retrieval, review and extraction.
3. Programme theory testing and refinement through evidence synthesis.
4. Development of actionable recommendations.

While these phases are described sequentially, in practice there is considerable overlap between them.

However, stakeholder engagement is embedded throughout. The study advisory group will guide on policy and organisational engagement. Members of the group will include senior representatives from health, social care and public services with first-hand experience of service planning and delivery. Additionally, patient and public involvement (PPI) representatives will inform programme theory development, interpretation and dissemination of findings. Throughout the project we will mobilise knowledge, for example, through social media, engagement and dissemination activities.

Phase 1: programme theory development

We will construct the review's initial programme theory from evidence identified within our initial sampling frame in consultation with stakeholders. Stakeholders will be identified through consultation with the NIHR HS&DR Programme team and through local clinical networks. We will use logic modelling approaches^{23, 24} in seeking to understand the complex adaptive systems within which interventions to reduce preventable admissions operate. We will share nascent programme theory in telephone interviews with commissioners, managers and front-line practitioners to build upon our initial interpretations and to ensure that we have sufficiently captured variations in interventions across diverse organisational settings and health services. The resulting initial programme theory will provide an initial explanation of the complexity of seeking to achieve reductions in unplanned admissions using diverse interventions.

From an initial scoping search in the topic area of preventable admissions, with a particular focus on UK studies, we have identified potential key articles to inform our initial exploration of programme theory (Table 2).

Table 2 - Articles to Inform Initial Programme Theory Development

Author (Date)	Country	Study Design	Methodology
Fry et al (2016) ²⁵	UK	Qualitative Framework Analysis	Interviews with 11 patients who had participated in an ethnographic study of heart failure focusing on unplanned hospital admissions
Laue et al ²⁶	Seven countries (Norway, Germany, Wales, Poland, Russia, Netherlands, China (Hong Kong)).	Thematic analysis	Seven focus groups with 53 GPs from urban and rural areas
Laue et al 2017 ²⁷	Norway	Thematic analysis	Interviewed 19 patients with COPD using qualitative semi-structured interviews
O'Cathain et al (2014) ²⁸ ; O'Cathain et al (2016) ²⁹	UK	Sequential Mixed Methods	Routine data and in-depth case studies
Purdey & Huntley (2013) ³⁰	UK	Literature Review	Not Specified
Risor et al ³¹	Seven countries (Norway, Germany, Wales, Poland, Russia, Netherlands, China (Hong Kong)).	Grounded theory approach	142 urban and rural GPs and hospital-based and out-patient-clinic respiratory physicians in 21 focus group discussions (FGDs)
Romero et al (2009) ³²	USA	Comparative Study	Not Specified
Simmonds et	UK	Qualitative study	Semi-structured interviews with purposive

al (2012) ³³			sample of 19 health and social care professionals from three primary care trusts, two acute hospitals, social services and an ambulance service in the South West of England.
Simmonds et al (2015) ³⁴	UK	Multicentre, longitudinal, patient-led ethnography.	Ethnography of 31 patients with severe or difficult to manage heart failure followed for up to 11 months; 9 carers; 55 healthcare professionals.
Smeets et al (2016) ³⁵	Multiple	Qualitative evidence synthesis	18 qualitative studies
Walsh et al (2013) ³⁶	UK	Qualitative Framework Analysis	Semi-structured interviews with 20 health and social care professionals with experience of older people's admissions.
Wee et al (2017) ²²	Singapore	Conceptual paper	Describes framework of (1) conceptualization – with respect to intervention components and the population of interest; (2) manner and context of implementation; and (3) evaluation – how implementation processes impact health outcomes.

Phase 2: evidence retrieval, data extraction and evidence synthesis

In phase 2, we will build upon our initial evidence map to search for relevant evidence related to interventions for preventable hospital admissions in order to test and refine the programme theory. We will screen identified evidence for relevance and then undertake data extraction and charting (Table 3). The realist approach enables a test-retest approach to programme theories in order to determine the extent to which other literatures identify transferable mechanisms that operate across other contexts, cultures and organisations. We will target details of UK initiatives, building up a rich understanding of study context through identification of “clusters” of related reports. Where we identify links to the wider non-UK literature, through citations, shared terminology or theoretical connections we will drill down into the relevant evidence base. These “forays” into the literature will be documented and explored in a systematic manner. Additional supplementary searches will be undertaken as further information needs emerge.

Table 3- Theory Areas

Contributing Behaviours	Elements of Intervention	Elements of Implementation
GP Risk Averse Behaviour	Reassurance	Peer review, Mentorship

Search strategy

A realist approach will allow us to engage with the widest variety of evidence sources. To ensure relevance, our formal bibliographic search of MEDLINE, CINAHL, HMIC, EMBASE, Web of Science and the Cochrane Library. will cover the period from the seminal King’s Fund report, *Avoiding hospital admissions What does the research evidence say?*³⁷ (152 citations) to the current date (August 2017). We believe that this year range is justified

by the specific focus of this review on implementation; an implementation context is a continually mutable backdrop within which to evaluate the introduction of a complex intervention. Transferability of findings would be compromised by introducing too much variability within the evaluation framework. We will therefore privilege recent initiatives and, specifically, those that have been evaluated within a UK context. Nevertheless, the review methodology preserves the potential for engaging with the wider literature through coverage of reviews that extend the time and geographical limits beyond the formal sampling frame. The UK focus will also be strengthened by examination of the catalogues of the Health Service Management Centre at the University of Birmingham, the King's Fund Library and Health Management Online (NHS Scotland).

Search terms will be developed from previous systematic reviews^{38, 39 40} and adapted for each information source. The search terms for avoidable hospital admissions/preventable hospital admissions will be constructed from an exhaustive list of synonyms and variants from the titles of relevant documents and search strategies of previous reviews.

Population	Exposure	Interventions	Implementation	Outcomes
	Unscheduled	Case Management	(implementation or implementing).ti,ab.	Prevent(ion)/Reduced/Reducing hospital admissions
Ambulatory Care Sensitive Conditions	Avoidable		dissemination or disseminating).ti,ab.	Hospitalization/
Angina	Unplanned	Self Management	(research integration).ti,ab. adj2	Admission Avoidance
Asthma	Unnecessary			Avoidable Admission
Chronic obstructive pulmonary disease (COPD)	Preventable			
Congestive heart failure	Unnecessary Procedures/		(transfer* knowledge).ti,ab. adj2	
Hypertension			Barrier\$.ti.	
Primary Care Sensitive Conditions			Facilitator\$.ab.	
			sustainability.ti,ab	
			((change or changing) adj (behavior or practice)).ti,ab.	
			(research adj2 utilization).ti,ab.	

			"research into practice".ti,ab.	
			"knowledge to action".ti,ab.	

Additional search terms will focus on implementation issues and consequences. We will engage with the wider literature regarding implementation and large scale organisational change, including evidence reviewed by our two associated teams in relation to the New Models of Care Programme. We will also conduct internet searches for grey literature, such as project reports related to national and local initiatives, and will vigorously pursue associated evaluative data on these initiatives. In line with current realist search guidance⁴¹ we will use snowballing techniques⁴² and cluster searching⁴³ supplemented by the expertise of stakeholders to ensure that all relevant evidence is incorporated within our final analysis.

Inclusion and exclusion criteria

Our search strategy will follow the most recent guidance for a realist search in combining construction of a prescribed sampling frame with subsequent purposive searches to test the programme theory and inform further refinement of our explanations⁴¹. We will seek to optimise relevance and rigour¹⁶ by including items contributing to programme theory as well as reports from local and national initiatives, systematic reviews and key intervention studies. We will also search for evidence to help us to understand local settings and context, against the backdrop of widespread large-scale NHS transformation and emerging new models of care.

In a realist synthesis, evidence is only excluded if it does not relate to, or inform the development of the programme theory; however, the practical focus of this review requires that we exclude evidence with limited transferability to the NHS, such as avoidable admissions in low- and middle- income countries. In line with this decision we have pre-specified five countries from which we will admit direct evidence to the review, namely the UK, US, Australia, Canada and New Zealand. However, we will engage with the wider evidence base through systematic reviews, opinion pieces and direct reference to individual study reports, particularly where authors establish a connection to the UK context. We will use explicit inclusion criteria for our sampling frame to ensure consistent study selection by the review team.

Data extraction

We will develop purpose-designed data extraction forms using a systematically identified and appropriate best fit framework as the structure for interrogating the theories. We will extract data only if the evidence meets the test of relevance to the programme theory. A selection of included data will be validated by a second member of the team.

Synthesis

We will refine our initial logic model and organise extracted data into evidence tables to represent the different bodies of literature. By reconceptualising interventions for preventable

hospital admissions (PHAs) against different frameworks, relating to behavioural change and implementation, as lenses we will be able to identify underlying structures and emerging patterns to reduced and non-reduced admission, seeking confirming and disconfirming evidence. These patterns will be linked to develop programme theory which provides an explanation of factors critical to the implementation of interventions to reduce PHAs. The resultant hypotheses will function as synthesised statements of findings around which we will develop an explanatory narrative referenced to the underpinning evidence base. Our reference management database and accompanying data extraction spreadsheets will collectively offer a comprehensive evidence base relevant to interventions to reduce PHAs to support a set of hypotheses to be refined within phase 3.

Phase 3: testing and refining the programme theory

To refine the programme theory, and the accompanying evidence-based narrative, we will conduct telephone or face to face interviews with stakeholders including patient representatives, clinical staff, GPs and other managers. Informants will provide different perspectives relevant to the review question, including different local organisational and population contexts and service settings. We will follow recognised procedures for the realist interview⁴⁴ in order to elicit stakeholder views on the resonance and consequent trustworthiness of the resultant programme theory. PPI representatives will offer a complementary service user perspective and will be engaged at critical points throughout the project lifespan.

Phase 4: actionable recommendations

Within this phase, we will take our findings to potential stakeholders including patients, clinicians, service providers and those commissioning services. We will aim to develop a set of actionable recommendations and an evidence informed framework of what works for whom, and in what context in connection with the implementation of interventions to reduce UGAs. We will achieve this through meetings and teleconferences, and using existing fora to bring together interested parties.

ETHICAL ISSUES

Interviews will be undertaken with NHS staff and will not therefore require ethical review from the NHS. Other stakeholders, including public representatives will be engaged through involvement in existing Reference panels and their input will be in line with their current roles. University of Sheffield ethics and governance approval will be obtained subject to advice from the relevant institutional officers.

PATIENT AND PUBLIC INVOLVEMENT (PPI)

We will involve patients and members of the public through a newly formed Sheffield Evidence Synthesis Centre PPI group. The exact degree of involvement will be decided in conjunction with the group members but as a minimum we will ask the members to comment on plain language summaries and other relevant outputs and to give their perspective on relevant contextual factors and key messages for the NHS.

PROJECT OUTPUTS

Using our synthesis findings, we will compile a set of implementation resources, including:

- ☐ A final research report, using vignettes from identified case studies to illustrate findings, and a conceptual framework for managers around implementation of interventions to reduce PHAs.
- ☐ A briefing paper on implementation for managers and commissioners.
- ☐ A lay summary of the final report.

In addition, subject to other demands on the Evidence Synthesis team we will consider publishing an open-access peer reviewed publication and other approaches to more widespread publication as identified by the newly formed Sheffield Evidence Synthesis Centre Dissemination and Impact Working Group.

The Dissemination and Impact Working Group will develop an impact action plan and keep this under review throughout the duration of the Evidence Synthesis Centre programme. We will seek to capture uptake of project outputs through relevant metrics such as numbers of downloads (subject to availability of data) and citations. Use of project outputs in commissioning briefs and resulting funding bids can be taken as evidence of uptake to support development of the HS&DR research agenda. We will also seek advice from NHS stakeholders and the PPI group on methods of maximising uptake and use.

Specifically, the evidence map and realist synthesis will provide:

1. A map of current and recent UK initiatives for reducing PHAs, linked to heritage initiatives from the UK, US, Australia, Canada and New Zealand. This will document how interventions work and their intended and unintended outcomes, therefore, facilitating managers, commissioners and policymakers to understand critical factors for successful implementation locally, together with key assumptions on how they are supposed to work.
2. An explanatory account of the impact of contextual influences on the effectiveness of interventions to reduce PHAs. Context-sensitivity is known to be critical to the outcomes of complex health service delivery interventions. The synthesis will provide managers and policymakers with practical information to facilitate local adoption, contextualisation and adaptation.
3. An evidence-informed framework, extending beyond the specific context of cardiovascular and respiratory conditions, to suggest transferable findings that relate to other ambulatory sensitive chronic conditions, thereby facilitating appropriate and effective utilisation of admission services. Our stakeholder engagement means that managers will be able to co-produce these development strategies with the project team and with front-line staff and patient representatives.

DISCUSSION

Effective utilisation of acute hospital services has emerged as a key narrative in contemporary health services research. This synthesis is important for patients, families, clinicians, front-line managers and commissioners of health services as the health service contends with increasing demands, especially on emergency services. This review will address questions of practical relevance to service delivery managers, clinical staff and decision makers, including

identifying the critical success factors for successful implementation of interventions to reduce PHAs and how these might impact on organisational efficiency, quality of care and patient satisfaction.

Our findings also hold the potential to improve patient outcomes, although distally from the focus of our study. The link between preventable hospital admission and other aspects of care is intuitive but extremely challenging to demonstrate. Nevertheless, we believe that establishing a link between particular implementation strategies and successful impact of the chosen intervention(s) will hold the potential to contribute to wider quality improvement and to relieve some of the pressure on constrained NHS services. Our work will be of direct benefit to health and social care services in providing a resource to inform implementation in general, and specifically for ambulatory care sensitive conditions. Identification of factors (i.e. barriers and enablers) and associated contextual influences that impact on the success of interventions will subsequently enhance managers' professional judgements and decision-making processes.

Proposed Timescale

[illegible]

Draft Logic Model

Program Name: Avoidable Emergency Admissions

Program Vision: Reduction of emergency admissions for Ambulatory Care Sensitive Conditions

Population Served: People with cardiovascular or respiratory conditions for which hospitalisation is generally preventable

Population Needs to be Addressed by Services: Safe management of chronic cardiovascular and respiratory conditions without unnecessary stress or anxiety for patients or carers

**Services	Resources	Outcomes	Indicators	Measurement
Case Management Telemedicine Hospital at Home Intermediate Care Integrated primary and secondary care Acute Assessment Units	Training of GPs. algorithms or risk assessment systems, advice and support lines.	Avoidable Hospital Admissions Hospital Admissions Reassurance and Risk levels amongst Paramedics, GPs and other Health Staff Quality of Care	“Unplanned hospitalisation for chronic ambulatory care sensitive conditions (all ages) (NHSOF 2.3.i)”.	Routine Statistics Stress and Anxiety Measures
Self Management	Education of patients, advice and support lines	Self Management Patient Self Efficacy Health Literacy Patient Anxiety and Stress Carer Anxiety and Stress		Stress and Anxiety Measures

**** Service Assumptions:** If paramedics, GPs or other health care staff are confident that there is no additional risk to the patient and the patient and family are managed without stress and anxiety then the patient can be managed at home without requiring hospital admission

REFERENCES

1. Purdy S. *Avoiding hospital admissions*: kingsfund.org.uk; 2010.
2. National Audit Office DoH. *Emergency Admissions to Hospital: Managing the Demand*. October 2913, ; 2013.
3. Purdy S, Paranjothy S, Huntley A, Thomas R, Mann M, ... *Interventions to reduce unplanned hospital admission: a series of systematic reviews*; 2012.
4. Wallace E, Smith SM, Fahey T, Roland M. Reducing emergency admissions through community based interventions. *BMJ: British Medical Journal (Online)* 2016;**352**.
5. Purdy S, Huntley A. Predicting and preventing avoidable hospital admissions: A review. *Journal of the Royal College of Physicians of Edinburgh* 2013;**43**:340-4. <http://dx.doi.org/10.4997/JRCPE.2013.415>
6. NHIS. *Ambulatory care sensitive conditions*. . 2017. URL: <http://www.nhis.com/editorial/ambulatory-care-sensitive-conditions> (Accessed 03/08/2017).
7. Purdy S, Paranjothy S, Huntley A, Thomas R, Mann M, ... *Interventions to reduce unplanned hospital admission*: bris.ac.uk; 2012.
8. Longman JM, M IR, Passey MD, Heathcote KE, Ewald DP, Dunn T, *et al*. Frequent hospital admission of older people with chronic disease: a cross-sectional survey with telephone follow-up and data linkage. *BMC Health Services Research* 2012;**12**:373.
9. Rizza P, Bianco A, Pavia M, Angelillo IF. Preventable hospitalization and access to primary health care in an area of Southern Italy. *BMC Health Services Research* 2007;**7**:134.
10. O'Cathain A, Knowles E, Maheswaran R, Pearson T, Turner J, Hirst E, *et al*. A system-wide approach to explaining variation in potentially avoidable emergency admissions: National ecological study. *BMJ Quality and Safety* 2014;**23**:47-55. <http://dx.doi.org/10.1136/bmjqs-2013-002003>
11. Brettell R, Soljak M, Cecil E, Cowie MR, Tuppin P, Majeed A. Reducing heart failure admission rates in England 2004–2011 are not related to changes in primary care quality: national observational study. *Eur J Heart Fail* 2013;**15**:1335-42. <http://dx.doi.org/10.1093/eurjhf/hft107>
10.1093/eurjhf/hft107.
12. Lipsitz LA. Understanding Health Care as a Complex System: The Foundation for Unintended Consequences. *JAMA: the journal of the American Medical Association* 2012;**308**:243.
13. Best A, Greenhalgh T, Lewis S, Saul JE, Carroll S, Bitz J. Large-system transformation in health care: a realist review. *The Milbank Quarterly* 2012;**90**:421-56.
14. Lamont T, Barber N, De Pury J, Fulop N, Garfield-Birkbeck S, Lilford R, *et al*. New approaches to evaluating complex health and care systems. *BMJ (Online)* 2016;**352**. <http://dx.doi.org/10.1136/bmj.i154>
15. Pawson R, Greenhalgh T, Harvey G, Walshe K. Realist review--a new method of systematic review designed for complex policy interventions. *J Health Serv Res Policy* 2005;**10** Suppl 1:21-34. <http://dx.doi.org/10.1258/1355819054308530>
16. Pawson R. *Evidence-based policy: A realist perspective*: Sage publications; 2006.
17. Rycroft-Malone J, McCormack B, Hutchinson AM, DeCorby K, Bucknall TK, Kent B, *et al*. Realist synthesis: illustrating the method for implementation research. *Implement Sci* 2012;**7**:33. <http://dx.doi.org/10.1186/1748-5908-7-33>
18. Burton C, Rycroft-Malone J, Williams L, Davies S, McBride A, Hall B, *et al*. Managers' use of nursing workforce planning and deployment technologies: protocol for a realist synthesis of implementation and impact. *BMJ Open* 2016;**6**:e013645. <http://dx.doi.org/10.1136/bmjopen-2016-013645>
19. Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci* 2011;**6**:42. <http://dx.doi.org/10.1186/1748-5908-6-42>
20. Booth A, Carroll C. How to build up the actionable knowledge base: the role of 'best fit' framework synthesis for studies of improvement in healthcare. *BMJ Qual Saf* 2015;**24**:700-8. <http://dx.doi.org/10.1136/bmjqs-2014-003642>
21. Tabak R, Khoong E, Chambers D, Brownson R. Bridging research and practice: models for dissemination and implementation research. *American journal of preventive medicine* 2012;**43**:337-50. <http://dx.doi.org/citeulike-article-id:11076110>
doi: 10.1016/j.amepre.2012.05.024
22. Wee SL, Alexandra Health Geriatric E, Research Institute S, Duke-National University of Singapore Graduate Medical School S, Vrijhoef HJM, National University of Singapore Saw Swee Hock School of Public Health S, *et al*. A conceptual framework for evaluating the conceptualization, implementation and performance of transitional care programmes. *Journal of Evaluation in Clinical Practice* 2017;**21**:221-8. <http://dx.doi.org/10.1111/jep.12292>

23. Anderson LM, Petticrew M, Rehfuess E, Armstrong R, Ueffing E, Baker P, *et al.* Using logic models to capture complexity in systematic reviews. *Res Synth Methods* 2011;**2**:33-42. <http://dx.doi.org/10.1002/jrsm.32>
24. Baxter S, Killoran A, Kelly M, Goyder E. Synthesising diverse evidence: the use of primary qualitative data analysis methods and logic models in public health reviews. *Public Health* 2010;**124**. <http://dx.doi.org/10.1016/j.puhe.2010.01.002>
25. Fry M, McLachlan S, Purdy S, ... *The implications of living with heart failure; the impact on everyday life, family support, co-morbidities and access to healthcare: a secondary qualitative ...*: bmcfampract.biomedcentral.com; 2016.
26. Laue J, Melbye H, Halvorsen PA, Andreeva EA, Godycki-Cwirko M, Wollny A, *et al.* How do general practitioners implement decision-making regarding COPD patients with exacerbations? An international focus group study. *Int J Chron Obstruct Pulmon Dis* 2016;**11**:3109-19. <http://dx.doi.org/10.2147/copd.s118856>
27. Laue J, Melbye H, Risor MB. Self-treatment of acute exacerbations of chronic obstructive pulmonary disease requires more than symptom recognition - a qualitative study of COPD patients' perspectives on self-treatment. *BMC Family Practice* 2017;**18**:8.
28. O'Cathain A, Knowles E, Turner J, Maheswaran R, Goodacre S, Hirst E, *et al.* Health Services and Delivery Research. In: *Explaining variation in emergency admissions: a mixed-methods study of emergency and urgent care systems* Southampton (UK): NIHR Journals Library
- Copyright (c) Queen's Printer and Controller of HMSO 2014. This work was produced by O'Cathain *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health. This issue may be freely reproduced for the purposes of private research and study and extracts (or indeed, the full report) may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.; 2014. <http://dx.doi.org/10.3310/hsdr02480>
29. O'Cathain A, Knowles E, Turner J, Hirst E, Goodacre S, Nicholl J. Variation in avoidable emergency admissions: multiple case studies of emergency and urgent care systems. *J Health Serv Res Policy* 2016;**21**:5-14. <http://dx.doi.org/10.1177/1355819615596543>
30. Purdey S, Huntley A. Predicting and preventing avoidable hospital admissions: a review. *Journal of the Royal College of Physicians of Edinburgh* 2013;**43**:340-4.
31. Risor MB, Spigt M, Iversen R, Godycki-Cwirko M, Francis N, Altiner A, *et al.* The complexity of managing COPD exacerbations: a grounded theory study of European general practice. *BMJ Open* 2013;**3**:e003861. <http://dx.doi.org/10.1136/bmjopen-2013-003861>
32. Romero A, Brown C, Richards F, 3rd, Collier P, Jentz S, Michelman M, *et al.* Reducing unnecessary medicare admissions: a six-state project. *Prof Case Manag* 2009;**14**:143-50. <http://dx.doi.org/10.1097/NCM.0b013e3181a340c4>
33. Simmonds R, Shaw A, Purdy S. *Factors influencing professional decision making on unplanned hospital admission: a qualitative study*: bjgp.org; 2012.
34. Simmonds R, Glogowska M, McLachlan S, Cramer H, Sanders T, Johnson R, *et al.* Unplanned admissions and the organisational management of heart failure: a multicentre ethnographic, qualitative study. *BMJ Open* 2015;**5**:e007522.
35. Smeets M, Van Roy S, Aertgeerts B, Vermandere M, Vaes B. Improving care for heart failure patients in primary care, GPs' perceptions: a qualitative evidence synthesis. *BMJ Open* 2016;**6**:e013459. <http://dx.doi.org/10.1136/bmjopen-2016-013459>
36. Walsh B, Lattimer V, Wintrup J, Brailsford S. Professional perspectives on systemic barriers to admission avoidance: learning from a system dynamics study of older people's admission pathways. *Int J Older People Nurs* 2015;**10**:105-14. <http://dx.doi.org/10.1111/opn.12056>
37. Purdy S, Griffin T. *Reducing hospital admissions*: ncbi.nlm.nih.gov; 2008.
38. Thomas R, Huntley A, Mann M, Huws D, Paranjothy S, Elwyn G, *et al.* Specialist clinics for reducing emergency admissions in patients with heart failure: a systematic review and meta-analysis of randomised controlled trials. *Heart* 2013;**99**:233-9. <http://dx.doi.org/10.1136/heartjnl-2012-302313>
39. Huntley A, Lasserson D, Wye L, Morris R, Checkland K, England H, *et al.* Which features of primary care affect unscheduled secondary care use? A systematic review. *BMJ open* 2014;**4**:e004746.
40. Scott J, Strickland AP, Warner K, Dawson P. Frequent callers to and users of emergency medical systems: a systematic review. *Emerg Med J* 2014;**31**:684-91. <http://dx.doi.org/10.1136/emmermed-2013-202545>
41. Booth A, Wright J, Briscoe S. Scoping and Searching to Support Realist Approaches (Chapter 9). In: Emmel N, editor. *Doing Realist Research* London: Sage; 2018.

42. Wohlin C. Guidelines for snowballing in systematic literature studies and a replication in software engineering. Proceedings of the 18th international conference on evaluation and assessment in software engineering, abstract no. 24289, p. 38.
43. Booth A, Harris J, Croot E, Springett J, Campbell F, Wilkins E. Towards a methodology for cluster searching to provide conceptual and contextual “richness” for systematic reviews of complex interventions: case study (CLUSTER). *BMC medical research methodology* 2013;**13**:118.
44. Manzano A. The craft of interviewing in realist evaluation. *Evaluation* 2016;**22**:342-60.