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HS&DR Evidence Synthesis Centre Topic Report

Interventions to manage use of the emergency and urgent care system by people from vulnerable groups: a mapping review

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Declared competing interests of authors: Andrew Booth is a member of the NIHR CRRSU Funding Board, other authors have no competing interests declared.

Published June 2019
DOI: https://doi.org/10.3310/hsdr07330

This report should be referenced as follows:

Booth A, Preston L, Baxter S, Wong R, Chambers D & Turner J. *Interventions to manage use of the emergency and urgent care system by people from vulnerable groups: a mapping review.* Health Serv Deliv Res 2019;7(33)

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The research reported in this web report was commissioned and funded by the HS&DR programme as part of a series of evidence syntheses under project number 16/47/17. For more information visit https://www.journalslibrary.nihr.ac.uk/programmes/hsdr/164717/#/

The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HS&DR editors have tried to ensure the accuracy of the authors' work and would like to thank the reviewers for their constructive comments, however; they do not accept liability for damages or losses arising from material published in this web report.

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ABSTRACT

Background: The NHS currently faces increasing demand on accident and emergency departments. Concern has been expressed as to whether the needs of vulnerable groups are being handled appropriately or whether alternative methods of service delivery may provide more appropriate emergency and urgent care (EUC) services for particular groups.

Aims and objectives: Our objective was to identify what interventions exist to manage use of the emergency and urgent care system by people from a pre-specified list of vulnerable groups. We aimed to describe the characteristics of these interventions, and examine service delivery outcomes (for patients and the health service) resulting from these interventions.

Review methods: We conducted an initial mapping review to assess the quantity and nature of the published research evidence relating to seven vulnerable groups (socioeconomically deprived people and families, Migrants, Ethnic minority groups, the long term unemployed/inactive, people with unstable housing situations, people living in rural/isolated areas and people with substance abuse disorders). Databases and other sources were searched between 2008 and 2018. Quantitative and qualitative systematic reviews and primary studies of any design were eligible for inclusion. In addition, we searched for UK interventions and initiatives via examining press reports, commissioning plans and casebooks of "good practice". We carried out a detailed intervention analysis using an adapted version of the TIDieR framework for describing interventions; and an analysis of current NHS practice initiatives.

Results: We identified nine different types of interventions; care navigators (3 studies – GRADE = moderate), care planning (3 studies - high), case finding (5 studies - moderate), case management (4 studies - high), front of A&E general practice/front door streaming model (1 study - low), migrant support programme (1 study - low), outreach services and teams (2 studies - moderate), and rapid access doctor/paramedic/urgent visiting services (1 study - low). Few interventions had been targeted at vulnerable populations, instead they represented general population interventions, or were targeted at frequent attenders (who may or may not be from vulnerable groups). Interventions supported by robust evidence (care navigators, care planning, case finding, case management, care planning, outreach services and teams, and urgent care clinics) demonstrated an effect on the general population, rather than specific population effects. Many programmes mixed intervention components (e.g. case finding, case management and care navigators) making it difficult to isolate the effect of any single component. Promising UK initiatives (front of A&E general practice/front door streaming

model, migrant support programme, and rapid access doctor/paramedic/urgent visiting services) lacked rigorous evaluation. Evaluation should therefore, focus on the effectiveness and cost-effectiveness of these initiatives.

Conclusions: The review identified a limited number of intervention types that may be useful in addressing the needs of specific vulnerable populations with little evidence specifically relating to these groups. The evidence highlights that vulnerable populations encompass different sub-groups with potentially differing needs, and also that interventions seem particularly context-sensitive. This indicates a need for a greater understanding of potential drivers for varying groups in specific localities.

Limitations: Resources did not allow exhaustive identification of all UK initiatives; the examples cited are indicative.

Future work: Research is required to examine how specific vulnerable populations differentially benefit from specific types of alternate service provision. Further exploration, using primary mixed-methods data, and potentially realist evaluation, is required to explore what works for whom under what circumstances. Rigorous evaluation of UK initiatives is required including a specific need for economic evaluations and for studies that incorporate effects on the wider EUC system.

Funding details: This work was funded by the National Institute for Health Research, within the Health Services and Delivery Research Programme.

LIST OF ABBREVIATIONS

ED	Emergency department
EUC	Emergency and urgent care
GRADE	Grading of Recommendations, Assessment, Development and Evaluations
HS&DR	Health Services and Delivery Research
NIHR	National Institute for Health Research
TIDieR	Template for intervention description and replication
UK	United Kingdom

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SCIENTIFIC SUMMARY

Background

The increasing demand for urgent and emergency care is not well understood and diverse reasons for this rapidly increasing demand have been proposed. Hypothesised reasons have included: the ageing population and the increased number of people living with frailty; the challenges faced in accessing primary care; and a population which encompasses an increasing number of vulnerable groups, who may have poorer health combined with difficulty in accessing routine primary care (and may therefore seek care from the emergency and urgent care services when their health needs might actually be better met elsewhere). Vulnerable people may be frequent users of the emergency department and the wider urgent and emergency care system, either due to poorer health or due to a perceived need to access healthcare urgently with a low acuity health problem.

Our review aimed to identify any interventions and initiatives that had been specifically designed for use with vulnerable people to manage their use of the ED (which may be seen as inappropriate or excessive), and to assess whether there is any evidence of their effectiveness in terms of health service utilisation.

Research questions

The review aimed to answer the following research questions:

- What interventions exist to manage use of the emergency and urgent care system by people from vulnerable groups?
- What are the characteristics of these interventions?
- Is there evidence regarding what service delivery outcomes (for patients and the health service) may result from these interventions?

Definition

Our preferred definition of vulnerability is that proposed by the EU VulnerABLE project as “a social phenomenon, affected by multiple processes of exclusion that can lead to or result from health problems”. This definition encompasses the wider social determinants of health and the inextricable link between exclusion and ill health. The vulnerable groups specified by the NIHR

Health Services & Delivery Research Programme team were socioeconomically deprived people, people living in rural or isolated areas, new migrants, existing minority ethnic groups, the long-term unemployed, people who are homeless/at risk of homelessness and people with substance misuse problems.

Our definition of emergency and urgent care was limited to emergency departments and urgent community-based care. We considered looking at services offered such as same day/out of hours GP access, walk-in centres, district nursing, telephone helplines but felt that limiting to the ED and ambulance/paramedic services would allow interventions to be better compared.

Methods

The review was undertaken in three phases:

1) An initial **systematic mapping review** of interventions delivered to seven pre specified vulnerable groups within the Emergency and Urgent Care setting.
2) A detailed **intervention analysis**, using an evidence-based framework.
3) A **search and review of initiatives** delivered within the UK setting to these vulnerable groups to manage their use of the urgent care system.

Inclusion and Exclusion Criteria

In the first instance (systematic mapping review) we sought interventions specifically tailored for and targeted at the seven pre-specified vulnerable groups. We therefore excluded interventions targeted at a general population or where the inclusion of vulnerable groups could not be determined. Following this mapping review process, and in view of the identified shortage of available evidence, we expanded our search and review to initiatives where there was reason to believe that vulnerable populations would benefit from the intervention. Typically, this latter conceptualisation was articulated within the discourse of “frequent users”. All health service outcomes, quantitative or qualitative (e.g. increase/reduction in admissions, referrals, patient satisfaction) were eligible for inclusion. We excluded specific clinical measures related to particular conditions.

Data sources

The initial mapping review and interventions review searched for evidence published in the last 10 years, which was indexed in the following databases: MEDLINE, Web of Science (Science and Social Science Citation Indices, Conference Proceedings Citation Index-Science and Conference Proceedings Citation Index – Social Science 1990) and CINAHL. A structured search was developed and undertaken by an experienced information specialist.

The third phase initiatives search supplemented the systematic mapping review search using search engines (Google) and the nhs.uk domain. In addition to screening for peer-reviewed literature, we also included evidence from press reports, commissioning plans and evidence of good practice. Iterative search processes ensured that the full breadth of evidence available was captured.

Evidence for the systematic mapping review and intervention review was restricted to USA, UK, Canada, Australia, New Zealand or Europe for health system and societal comparability. We only included evidence from 2008 onwards. Evidence for the initiatives review was limited to the UK only.

Data extraction and assessment of validity

Data relating to interventions reported in the mapping review were entered into a data extraction table in a Microsoft Word document. A GRADE approach was used to evaluate risk of bias, imprecision, inconsistency, indirectness, publication bias and overall grade for each group of studies.

Data synthesis

As the evidence from the three stages of the review was diverse and diffuse, the method of synthesis was primarily narrative. Intervention content was analysed using an abbreviated version of the Template for Intervention Description and Replication (TIDieR), a template specifying the content of interventions, with each intervention type being the unit of analysis. A composite TIDieR template was populated for each intervention type from data cumulated from multiple study reports; the Intervention purpose (Why), intervention materials and procedures (What), Who provided the Intervention, How and Where the intervention was delivered, to what frequency (When) and intensity (How much) together with any Tailoring or

Modifications. Each template concluded with details on How well (planned) and the extent to which these plans were realised - How well (actual).

Public Involvement

Members of a public advisory group provided input during all stages of the review. They had a particular role in helping to refine our definitions of vulnerability and assisted with interpretation and understanding of the evidence identified.

Results

The systematic mapping review of interventions and initiative review found a paucity of evidence relating to interventions specifically targeted at vulnerable groups and delivered within an emergency and urgent care setting. We identified only sixteen studies for the mapping review, four studies for the intervention analysis and fifteen UK initiatives.

Interventions/initiatives tended to either be targeted at managing demand from general populations of EUC users or at a specific group of EUC users who used the EUC more than other 'frequent attenders'. However, it was unclear the extent to which the group of frequent attenders also comprised people who were vulnerable.

Evidence from the mapping review demonstrated limited effectiveness of specific interventions, which tended to be targeted at frequent users of the ED, who may or may not have been vulnerable (e.g. people with substance misuse problems). A number of systematic reviews were included which brought together evidence of interventions targeted at managing demand, but many of these did not fit into the inclusion criteria of this review as they were delivered outside of the emergency and urgent care system.

Combining evidence from the three reviews identified a typology of nine different intervention types delivered across the EUC system: namely care navigators, care planning, case finding, case management, care planning, front of A&E general practice/front door streaming model, migrant support programme, outreach services and teams, and rapid access doctor/paramedic/urgent visiting services. Supporting information for these interventions was then scrutinised for evidence of delivery and improved outcomes for our population groups and the likely benefit to them.

The emergent evidence from the mapping review, intervention review and initiatives review allowed the review team to develop other ways to conceptualise vulnerability including: vulnerability due to lack of ability to navigate the health system (e.g. new migrants or those familiar with other health systems); vulnerability due to lack of ability to physically access health care (e.g. rural/coastal communities); vulnerability due to lack of ability to prove eligibility for healthcare (e.g. homeless people or migrants); vulnerability due to unmet need for multi-agency health and social care (e.g. the homeless, long term unemployed); or vulnerability due to requiring both healthcare and social support/interaction.

Conclusions

The paucity of evidence identified during all three stages of the review limits the extent to which generalisable conclusions can be made. This lack of evidence underpinned our decision to take a three-phase approach, which was broader than carrying out an effectiveness review. The challenge of defining vulnerability, and its varied understanding in the wider literature, meant that evidence has been drawn from interventions delivered to populations who are more representative of the general population or who represent frequent users of the ED.

In addition to examining a broad range of evidence types, we widened the intervention and initiative review to consider those interventions delivered only partially within the EUC system. Evidence relates to users who use the EUC frequently due to ill health, or who use it frequently for low acuity problems – either due to preference or difficulties in access. The limited evidence base for interventions suggests that there needs to be further examination of how alternate service provision can be tailored to meet the needs of these populations of vulnerable people. This may be by using primary mixed methods approaches and including realist elements, to understand more about what works for whom and in what circumstances.

Implications for healthcare

1. The evidence highlights that reasons for increased patterns of use for vulnerable groups are complicated and encompass a wide variety of drivers for use of the ED including burden of disease, access to primary care, and patient preference.
2. The evidence indicated that specific needs and barriers of each sub-population within those categorised as vulnerable may differ, requiring nuanced understanding of these diverse populations.

3. The review found a notable shortage of interventions designed specifically to reduce demand for ED services from vulnerable groups, and existing interventions are mostly delivered within the community setting.
4. The review found that the majority of interventions aim to tackle the problem of increased patterns of ED use by vulnerable groups at a general population level (such as front of A&E general practice or urgent care clinic approaches), or target frequent attenders as a discrete sub-group.

Recommendations for research

1. The review found that interventions specifically targeting the vulnerable groups identified in this report need to be designed, developed, trialled and rigorously evaluated.
2. The evidence indicates that it is likely that evaluations of these types of interventions will require mixed-methods approaches, such as that currently being undertaken for GP involvement within an emergency department.
3. The review suggests that interventions may also require an explicit and conceptually sound theoretical basis, particularly in understanding vulnerability and how it impacts upon emergency department use.
4. The findings of the review indicate potential for realist evaluation approaches, especially since several interventions identified seem to be heavily-context dependent.

Funding details: This work was funded by the National Institute for Health Research, within the Health Services and Delivery Research Programme.

PLAIN ENGLISH SUMMARY

Emergency and urgent care services (such as accident and emergency departments) face great pressure from increasing numbers of patients. People who are labelled as “vulnerable” sometimes use emergency services more than other people. Vulnerable people include *those who are socioeconomically deprived, are unemployed, homeless or have substance misuse problems*. It is not completely understood why vulnerable people use emergency services instead of other parts of the health service.

The National Institute for Health Research asked us to summarise research that has already been carried out. We wanted to find out how the NHS might reduce the number of vulnerable people using emergency services, if they could be seen elsewhere. Help could be offered in different ways or in different places.

Few researchers had tested out approaches targeting vulnerable people. Instead, most research had looked at people who frequently attend emergency departments. Many reasons might explain why some people go more often than expected to emergency departments. They could be from a vulnerable group with particular health conditions requiring emergency attention, or they may struggle to use other health and social services, such as their local GP. Research on frequent attenders therefore may not tell us much about people in vulnerable groups, and different types of people can be described as ‘vulnerable’.

Currently, little research is available to help us understand how best to meet the health needs of people from vulnerable groups and to reduce demands on emergency care. Reasons why vulnerable groups use emergency departments are complicated and may include the burden of disease, how easy it is to access primary care, and what patients prefer. It is more helpful to target the specific needs and barriers of each vulnerable group in turn, rather than treating them as a single user group, and then to evaluate their effects carefully. With a limited number of suggested approaches, particularly outside a community setting, it becomes even more important to evaluate their effects using different types of data. Future research would benefit from basing interventions on a good understanding of vulnerability and how it impacts on emergency department use and from understanding how interventions work either better or worse based on their context.

CHAPTER ONE INTRODUCTION AND BACKGROUND

Good health and access to healthcare are not always equitable. There is clear evidence to link vulnerability with poorer health and poorer access to health services. People from vulnerable groups have generally worse health for diverse complex reasons and they are also known to access healthcare, particularly routine healthcare, less than people from non-vulnerable groups.[1] A notable pattern of health service use can be observed across people from vulnerable groups and without simplifying, or conflating the needs of individual members of these groups, one of these patterns involves disproportionate use of the EUC system.

People from specific groups may use the EUC more as they are engaged in behaviours which are likely to cause them harm (e.g. substance users) or they may be unable to access primary healthcare so use the EUC as a proxy for routine care (e.g. homeless people, people who are geographically isolated). There is also evidence that people who are 'low acuity' users of EUC (people who have medical problems that would be better addressed outside of EUC) are more likely to come from a vulnerable group.

These reasons have stimulated interest in candidate interventions that attempt to manage demand for the EUC by these vulnerable population groups. Clearly there is potential for interventions, delivered to vulnerable population groups and individuals to address wider determinants of health (and delivered outside the EUC), however the focus of this review is on the management of demand for EUC by the EUC system.

It is unclear whether this demand is concentrated in Emergency Departments (EDs) or whether it presents elsewhere within the EUC system. Rising demand is acknowledged by the NHS[2] as placing pressure on front line staff and systems. One of the 2017/2018 national service improvement priorities for the NHS is *improving A&E performance….upgrading the wider urgent and emergency care system so as to manage demand* (p.12).[2]

Vulnerability, in a healthcare context can be conceptualised in a variety of ways. In this study we have chosen to use the definition from the EU VulnerABLE[3] project which states that "*Vulnerability is a social phenomenon, affected by multiple processes of exclusion that can lead to or result from health problems*". Vulnerability is a complex phenomenon – for the purpose of the project we are conceptualising this population as being more likely to have poor health and more likely to face problems accessing healthcare appropriately. The brief for the review from HS&DR was to focus on a set of seven priority groups as follows:

- Socioeconomically deprived individuals and families (socioeconomically deprived)

- People living in rural/isolated areas (including coastal communities) (geographically isolated)
- Migrants (new migrants)
- Ethnic minority groups (minorities)
- The long term unemployed/inactive (unemployed)
- People with unstable housing situations who are homeless or at risk of homelessness (homeless)
- People with substance misuse problems (substance misuse)

Two further groups may receive interventions to manage their demand and use of Emergency and Urgent Care. *Low acuity* users of the ED tend to use the ED when their clinical problem could be more appropriately dealt with elsewhere. Diverse reasons may explain why they seek EUC rather than routine care.[4 5] Such reasons may be linked closely to population characteristics shared by our vulnerable groups. Whilst this low acuity group is not a priority for this review, their inclusion in the review will aid commissioners and decision makers to identify potential possible interventions and areas for further research

One particular group of ED users are referred to as *frequent attenders*. These users visit the ED 'often' – defined as five or more visits a year. This population are seen as vulnerable because they "are more at risk of having poor social, physical and psychological health" for a variety of reasons, which cause and result from their use of the ED.[6] There may well be overlap between frequent attenders, low acuity users and the specific population groups identified above, however it is important to be aware that the literature may describe groups in terms of their patterns of use, rather than the needs that drive this use.

Objectives

The aim of this three stage review was to identify and map, using predefined population groups, interventions that have been developed and delivered to individuals or groups to manage their use of EUC services. These interventions may either reduce demand or ensure that populations use the appropriate EUC as needed. An additional aim was to classify these interventions, where the evidence permitted, in terms of intervention characteristics and to report headline messages of the outcomes of these interventions. Further detail on the content and delivery of these interventions was to be extracted using a Template for Intervention Description and Replication (the TIDieR[7] template). It was anticipated that the review, which

also aimed to look at current UK initiatives, would help us to understand what can be learnt about delivering interventions to vulnerable service users, and also to identify potential gaps within the research and practice agendas, with a view to stimulating future research and evaluation.

Research questions

The research questions for this review were as follows:

- What interventions exist to manage use of the emergency and urgent care by people from vulnerable groups?
- What are the characteristics of these interventions?
- Is there evidence of service delivery outcomes (for patients and the health service) resulting from these interventions?

An initial model to illustrate the complexity of associations and outcomes in this research area was developed by the team from the review of reviews by Coster[4]. The original review of reviews had identified six themes that accounted for most factors related to ED attendance and urgent care usage; Access to and confidence in primary care, Perceived urgency and anxiety and the value of reassurance from emergency based services; Views of family, friends, or healthcare professionals; Convenience (in terms of location, not having to make appointments, and opening hours, Individual patient factors and Perceived need for EMS or hospital care, treatment, or investigations. This initial model, which helped us to conceptualise the review, is illustrated below in Figure 1. Vulnerable patients had been identified as one factor within Individual patient factors, linked but not invariably associated with Deprivation. The team took these factors at a disaggregated level transforming them from the original linear framework into a conceptual model.

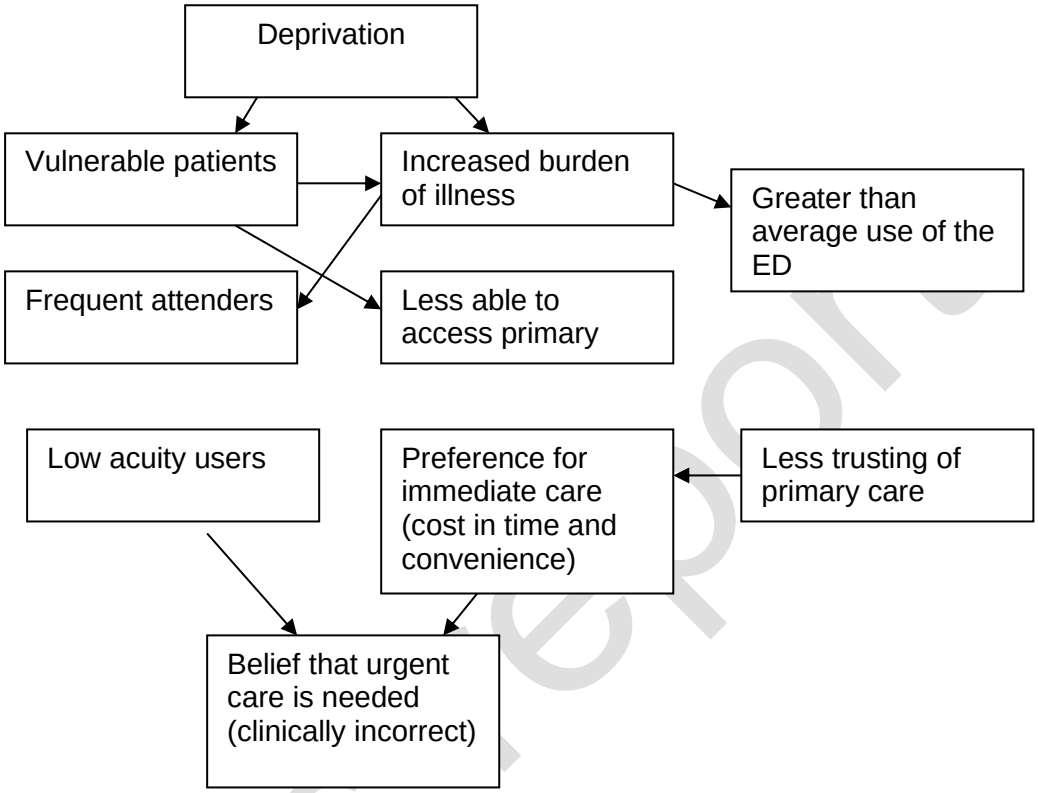

Figure 1- Diagram illustrating complex relationships underpinning use of emergency care

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The overall aims of the project were as follows:

- Identify and map, using predefined population groups, interventions that have been developed and delivered to individuals or groups to manage their use of EUC services. These interventions may either reduce demand or ensure that populations use the appropriate EUC as needed.
- To classify these interventions, where the evidence permits, in terms of intervention characteristics.
- To report headline messages of the outcomes of these interventions, where the evidence permits.
- Where interventions include outcomes data (evaluative), to assess how the content and delivery of these interventions had been reported, using the TIDieR template. [7]

- Where interventions do not report outcomes data (descriptive), to report the content and delivery of the intervention, using an abbreviated version of the TIDieR template. [7]
- To understand what can be learnt about delivering interventions to vulnerable service users.
- To identify potential gaps within the research and practice agendas with a view to stimulating future research and evaluation.

CHAPTER TWO REVIEW METHODS

Overview

The initial phase of the project entailed carrying out a systematic mapping review, conducted according to published methods.[8] This phase was followed by an intervention analysis examining the content and delivery of each intervention using the Template for Intervention Description and Replication (TIDieR).[7] The intervention analysis aimed to offer a broad overview of intervention content in order to facilitate further knowledge synthesis or primary research whilst summarising the current state of the evidence base through analysing the interventions reported. During the third and final phase of the work we undertook a review of current UK initiatives (whether or not they have been evaluated) which had the aim of managing demand. The three phases of the project are summarised in Figure 2.

Figure 2 - Overview of the phases of the review

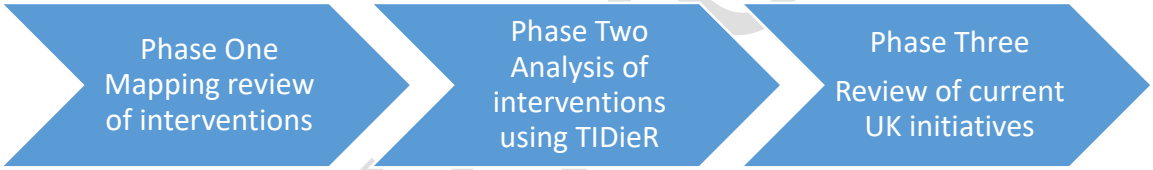

Table 1 summarises how the evidence was funnelled through the review, outlining the actions taken during each phase, the main outcomes of the work, and comments on issues and challenges encountered during each phase.

Table 1 - Summary of processes during the project

Action	Outcome	Comments
Looked for all reported interventions for vulnerable groups with service delivery outcomes	Vulnerable groups tended to only be reported in terms of their 'frequent attendance"	In those studies where managing use of ED was reported this was only in terms of clinical outcomes for the patient group. Interventions were reported for these patient groups that were delivered outside of the ED but had ED service use outcomes but again this was

Action	Outcome	Comments
		outside the scope of the initial mapping review.
Identified evidence on interventions for frequent attenders	A cumulative TIDieR template[7] for case management and for other interventions for frequent attenders	Users defined by use of ED rather than population characteristics; they tend to be from a vulnerable group but are not described as this
Looked for all reported but not evaluated interventions for vulnerable groups in the ED	Review of initiatives	Limited evidence on these initiatives.

Phase one mapping review methods

Identification of literature

A database search was undertaken in January 2018 by an experienced information specialist who developed the search strategy using published terms for specific vulnerable groups in an iterative process, using retrieved citations to inform terms for further searching.

Sources Searched

A full line by line search strategy is presented in Appendix 1. Searches were limited to the last 10 years and to English Language studies. We limited to studies published in the last ten years in order to capture the changing nature of EUC as documented across Emergency Care research and also to capture the demographic changes that impact on society generally and more specifically on who is vulnerable and how they are vulnerable. The search was run in MEDLINE, Web of Science (Science Citation Index Expanded, Social Sciences Citation Index, Conference Proceedings Citation Index – Science, Conference Proceedings Citation Index - Social Science & Humanities (1990-)) and CINAHL. Retrieved references were de-duplicated and saved in Endnote. The search process was recorded with lists of databases searched, date of search, limits applied, number of hits and duplication as per PRISMA guidelines.

Study selection

Study selection was undertaken using the EPPI Reviewer software. Three reviewers screened the identified references with a fourth reviewer screening 10% of the records from each of the three reviewers. A Cohens Kappa to measure agreement between reviewers was calculated.

Inclusion criteria

Study selection was undertaken according to the inclusion criteria outlined in Table 2.

Table 2 - Mapping review study selection criteria

Population	Socioeconomically deprived people and families Migrants Ethnic minority groups The long term unemployed/inactive People with unstable housing situations People living in rural/isolated areas People with substance abuse disorders Where articles relate to more than one population group, these should be included. Where an intervention relates to a group who are using the EUC frequently and/or for low acuity reasons, these are included.
Setting	Delivered within the EUC system (limited to the ED and ambulance/paramedic care) Evidence from any of the following settings: USA, UK, Canada, Australia, New Zealand or Europe.
Outcomes	Health service outcomes (for patients and the health service)
Study design	All types of study design, where an intervention is reported (descriptive or evaluative). We will not include surveys of patient experience of interventions. We will use reviews as a source of primary evidence
Types of data	Evidence from conference abstracts for interventions/populations where there is not already a published evaluation study.

	Given the evidence generally available in conference abstracts, these are more likely to be included at the mapping stage rather than for intervention analysis. Grey literature in the form of reports of interventions delivered in the UK.
Other criteria	English language only Evidence published since 2008.

Screening process

Following screening at title and abstract stage, the references that were selected were scrutinised at full text for inclusion in the review, and if they did not meet the inclusion criteria, were excluded. The screening process was divided between three reviewers with a fourth screening a percentage of each of the three reviewers' references (10%).

Data collection process and data items

Data extraction was undertaken in Microsoft Word, using a data extraction template designed for the mapping review. The extraction form was piloted on a small sample of papers prior to use, and included: paper identifying code; author; setting; study type; population; intervention; and outcomes and headline messages. In addition, during the data extraction process, references were categorised into 'bundles' according to the vulnerable population group(s) that they addressed.

Methods for phase two and phase three

Phases two and three of the project were iterative, and involved two value-added synthesis processes: firstly, an intervention analysis to examine the components of each intervention; and secondly, an initiative analysis to identify interventions in practice within a UK NHS setting. As candidate interventions from the initiative analysis were identified, the team retraced their steps to the evidence base, as captured in the Endnote database for the project and through targeted searches of the PubMed MEDLINE database to augment the list of candidate interventions.

The intervention analysis and initiative analysis sought to add both intervention detail and UK context-sensitive breadth to the mapping review of published literature. They aimed to extend the field of inquiry to include the wider whole system (e.g. not just the ED and ambulance care

but also including, but not limited to, walk-in centres, urgent GP access, same day community-based nursing, telephone helplines e.g. NHS111) of urgent and emergency care beyond the limited lens offered by the inclusion criteria of the mapping review.

Eligibility criteria for phase two and three of the project

Table 3 outlines the eligibility criteria for the intervention analysis and initiative analysis phases of the project.

Table 3- Study selection criteria for intervention analysis and UK initiative analysis

Population		Socioeconomically deprived people and families Migrants Ethnic minority groups The long term unemployed/inactive People with unstable housing situations People living in rural/isolated areas People with substance abuse disorders Where articles relate to more than one population group, these were included.	
Intervention		Only interventions that fulfil a dedicated Urgent & Emergency Care function or where Urgent and Emergency Care is the superordinate function were included (i.e. interventions or services that attract a small proportion of	

		urgent or emergency cases are excluded) Where an intervention relates to a group who are using the Urgent & Emergency Care system frequently and/or for low acuity reasons, these were included.	
Setting		Delivered within the wider whole system of Urgent & Emergency Care (NB. extending beyond the narrower definition from the mapping review). Evidence from any of the following settings: USA, UK, Canada, Australia, New Zealand or Europe.	
Outcomes		Health service outcomes (for patients and the health service) e.g. •Reduction of presentations at emergency department. • Reduction of emergency admissions made via the emergency department.	
Study design		All types of study design, where an intervention is reported (descriptive or evaluative)	
Data types		Evidence on intervention components from published studies of interventions or from less formal (grey literature)	

		descriptions of current practice (e.g. from 'good practice casebooks', general practice and health service newspapers and magazines etcetera). Evaluation data from the latter were reported but not considered as authoritative evidence.	
Other criteria		English language only Evidence published since 2008.	

Identification process for phases two and three

Given the comprehensive nature of the search for the mapping review where the search strategy was designed to be comprehensive (and only the synthesis and analysis was conducted at a more superficial level) it was decided that there was no need to extend the bibliographic search process: a decision verified by confirming the presence of references, tracked through additional search methods, within the original Endnote database.

Coverage of the relevant literature for the intervention analysis and initiative analysis was therefore provided in three main ways:

(i) By using Google and Google Scholar to find unpublished and published descriptions of interventions designed to address frequent users of emergency services, including but not exclusive to the identified list of vulnerable groups.

(ii) By revisiting the extensive Endnote database (of more than 18,000 references) for occurrences of specific named interventions, from (i) above, supplemented by targeted searches for these named interventions in PubMed MEDLINE to retrieve sub-optimally indexed or recent occurrences of these interventions.

(iii) By examining relevant reviews and systematic reviews for single instances of eligible interventions.

To supplement information retrieved, an additional search was undertaken for UK grey literature for the initiatives review. A Google search using key terms from each focal population together with “emergency department”, “accident and emergency” or “A&E” focusing on sites within the nhs.uk domain, was undertaken. In addition, the websites for the Royal College of Emergency Medicine, and Care Quality Commission were searched for interventions delivered to frequent attenders/vulnerable groups.

As each new candidate intervention was identified, e.g. ‘front of A&E general practice”, ‘care navigators’ or ‘rapid access doctor”, these phrases were entered into Google and Google Scholar to retrieve extra supporting detail. Where the phrase alone was not sufficiently distinct e.g. ‘care navigator’ the phrase was combined with “emergency department”, “accident and emergency” or “A&E”. Individual initiatives were examined to establish whether they were, in fact, homogeneous or whether they contained essential differences (e.g. an acute visiting service being delivered by a GP as opposed to a paramedic). For this reason, more than one entry may be present in the list of initiatives, although present as a single entry within the intervention descriptions. Finally, we returned to the published literature using the specific phrase for the intervention to establish the existence of systematic review or quantitative research evidence supporting the intervention.

Study selection

Candidate interventions identified from the initiative analysis were selected according to the above eligibility criteria by a single reviewer. Heterogeneity of interventions and of outcome data meant that meta-analysis was neither feasible nor appropriate.

Data collection process

The team used an abbreviated version of the Template for Intervention Description and Replication (TIDieR) framework to analyse intervention content.[7] A template was created for each type of intervention; therefore, the intervention was the unit of analysis, not the individual study report. A single reviewer extracted data against the TIDieR template, using multiple data sources to triangulate intervention descriptions across study reports and resolve any inconsistencies. The abbreviated TIDieR templates were typically populated from key studies

describing the intervention, descriptions of initiatives from news articles or grey literature on good practice or, most frequently, by a combination from multiple sources.

Data items

Each Intervention (modified TIDieR) template included the Author and Date, a Brief name for the Intervention, the Intervention purpose (Why), intervention materials and procedures (What), Who provided the Intervention, How and Where the intervention was delivered, to what frequency (When) and intensity (How much) together with details of any Tailoring or Modifications. The template concluded with evaluative details on How well (planned) and the degree to which these plans were realised - How well (actual).

For the initiatives we extracted the following: name, setting (location), setting (geographical), aim of initiative, initiative details, reported outcomes, evaluation of initiative, where next and headline message.

Risk of bias

The mapping review aimed to provide an overview of the volume and characteristics of the literature, and therefore in line with normal mapping review methods we did not include quality appraisal of individual studies. Given the inclusive nature of the literature on interventions and initiatives we provided an overview of the included study designs, including reporting where evidence was from higher quality empirical work, rather than completing individual quality appraisals for each study. The likely risk of bias was however, considered during our evaluation of each study using the GRADE approach as outlined below.

Methods of analysis

Few accepted ways exist for summarising findings from a mixed body of evidence. Outcomes from quantitative studies may be summarised using the GRADE[9] system while qualitative findings can be summarised using the related GRADE-CERQual approach.[10] The focus of both tools is on the outcomes/findings and they are not designed for use at an intervention level. However preliminary attempts in other reviews carried out by the team (e.g. Sworn K & Booth A (2019) *Scoping review: patient safety outcomes and nursing skill mix interventions.* Sheffield, University of Sheffield: School of Health and Related Research (ScHARR) for the RCN Strategic Research Alliance.) suggest that the domains/constructs from these grading systems may offer a useful overarching structure for analysis. We therefore decided to use

the five domains of the GRADE[9] approach to summarise the diverse and diffuse evidence underpinning each intervention, across the published literature and yet including unpublished initiatives. We summarised the collective evidence for each intervention according to the likely risk of bias, the degree of imprecision, the inconsistency surrounding the estimate of effect, the likely indirectness and the potential for publication bias. While not designed to provide a definitive assessment of the evidence base this overarching system can indicate the need for further research (to reduce uncertainties around the risk of bias and imprecision), the need for further synthesis (to reconcile uncertainties around inconsistency and contextual variation), the need for more rigorous evaluation (to address publication bias) and the need for UK specific initiatives (to address indirectness i.e. lack of direct relevance for a UK context).

Protocol and registration

Given the iterative nature of the work, and that the initial element was a mapping review which is not eligible for PROSPERO registration, the study was not formally registered as a systematic review. A study protocol was drafted in advance of the work, and was available via the NIHR HS&DR programme website.

Involvement of stakeholders

A public involvement group provides ongoing advice to projects that are being carried out at the Sheffield HS&DR Evidence Synthesis Centre. The group has eight members, with national representation. The second meeting of the group, held in February 2018, included discussion of this project, with public members reporting that research on urgent and emergency services is of particular interest to them, particularly given the high profile nature of these services in the media. Input from the public advisors highlighted the need to avoid conveying a negative perception of vulnerable people during the review, as vulnerability could result from circumstances over which people have no control. They perceived that vulnerable groups were generally under-researched, and reported how public understanding may be unclear regarding how vulnerability may lead to discrimination and poorer health outcomes.

The group cautioned that it would be important to think about the impact of austerity on these populations during the review, both in terms of a general decrease in wealth in society and the differential impact that this might have on these groups but also in terms of the cuts to services, particularly those upstream that might impact on increased use of the healthcare system. Input from the group highlighted the need to look for examples of interventions that had failed as well as those that had been successful. They also mentioned that the criminal justice system, in particular the police, were often having to take a role in health and social services so it might be worth looking at interventions delivered to these groups in emergency settings by the police. Notes from this meeting are available (See Report Supplementary Material File 1)

In addition to our discussions with our PPI panel, we also sought advice from clinical academics within ScHARR who are involved in the delivery of care within the ED to ensure that our understanding of vulnerability made sense and that we were conceptualising the scope of the EUC in an understandable manner.

CHAPTER THREE RESULTS

Overview

The results from the three phases of the work are outlined separately in sequence in the following sections. The main findings and recommendations are combined in the discussion section.

Studies included in the mapping review

The database search identified 18381 records (Epub Ahead of Print, In-Process & Other Non-Indexed Citations, MEDLINE(R) Daily and MEDLINE(R) – 6210, CINAHL - 3647 and Web of Science & Conference Proceedings Citation Indexes – 8524). Following deduplication, there were a total of 11890 records for screening. Figure 3 provides a summary of the process of study selection. A total of 169 references were initially screened as 'include'. Upon further scrutiny, 141 of these were excluded. The most common reason for exclusion related to study outcomes reported as clinical outcomes for patients with no health service/demand related outcomes reported. Any paper that included an outcome that could be related to the use of, or demand for UEC were included. A total of 28 papers were screened at full text, and a total of 16 have been included in the mapping review.[11-26] Full details of these papers are included in Report Supplementary Material File 1.

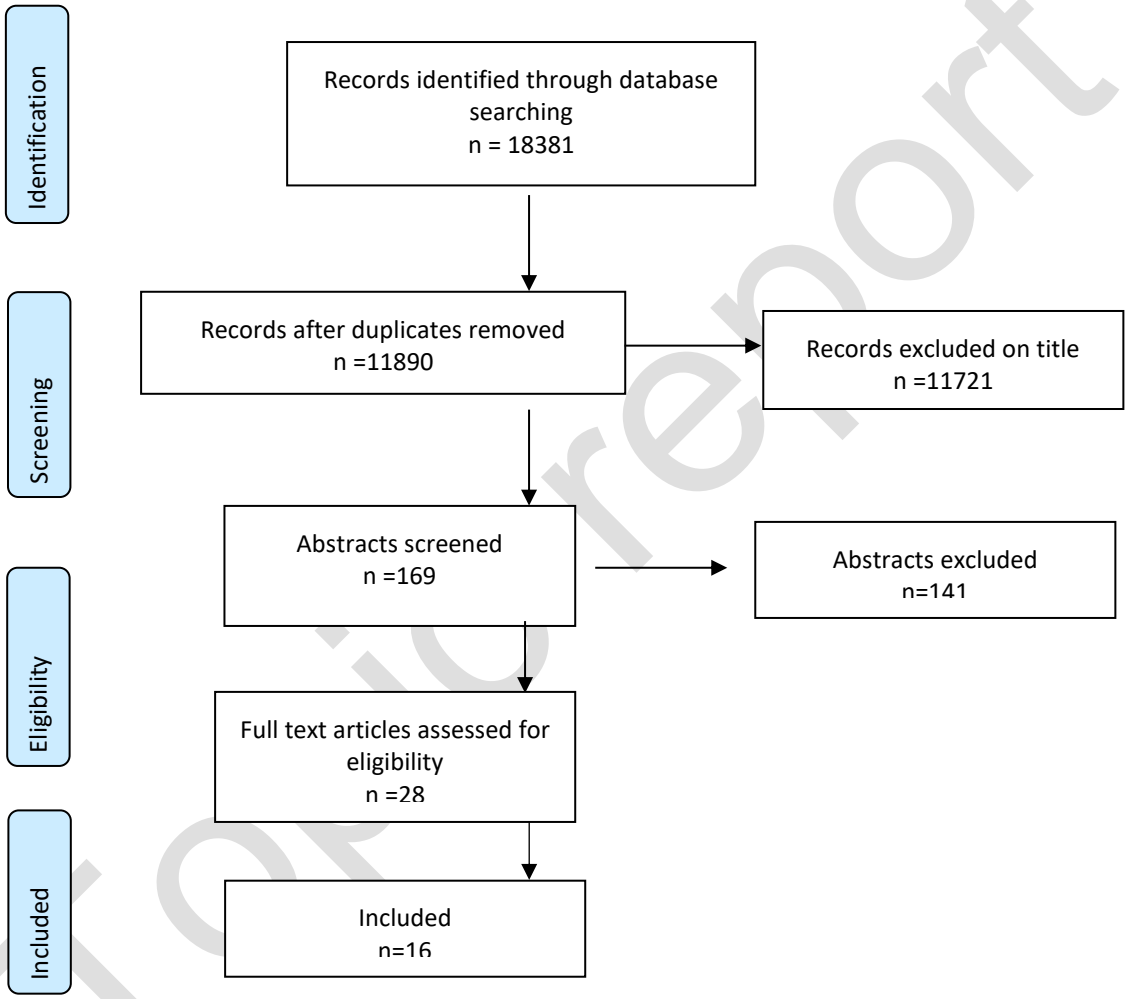

Figure 3- PRISMA diagram illustrating the process of mapping review study selection

Characteristics of studies included in the mapping review

The primary study papers which met the inclusion criteria all used evaluative designs, including three randomised controlled trials,[12, 24, 26] four non-randomised trials[17,20,21,22] and three cohort studies.[13,19] [15] The majority of the literature was from North America, with three studies from the UK,[11,13,19] a single study from Australia,[26] and Switzerland.[12]

Table 4- Data extractions for the mapping review

Paper ID and Author	Setting		Study Type	Population		Intervention		Outcomes (headline message)
	Country	UEC setting		Description of population	Intervention group size (control group size)	Description or evaluation?	Describe the intervention	
Baker et al (2013)[11]	UK	ED	Cohort	"people in an acute phase of representations"	20	Evaluation	Care plans including cognitive behavioural therapy to address reported mental health and physical health problems	Reduction in attendances for all 20 patients enrolled in study (estimated as 245 attendances displaced).
Bodenmann et al (2016)[12]	Switzerland	ED	RCT 12 month FU	Frequent users (5 or more visits in previous 12 month period) over 18 years of age	125 (125)	Evaluation	Case management in addition to emergency care at 1, 3 and 5 months. Interdisciplinary mobile team.	Intervention group made 19% fewer visits - not statistically significant (ratio 0.81 CI 0.63-1.02 p=0.08)
Edwards et al (2015)[13]	UK	Ambulance	Pilot study	Frequent ambulance callers, mostly with multiple and complex reasons for calling and who required multiple interventional strategies.	110	Evaluation	Case management intervention	Significant reduction in median call volume observed as a result of an individualised case management programme. Programme found that these callers had complex unmet medical, mental health, social and personal care needs.

Paper ID and Author	Setting		Study Type	Population		Intervention		Outcomes (headline message)
	Country	UEC setting		Description of population	Intervention group size (control group size)	Description or evaluation?	Describe the intervention	
Fiesseler et al, (2015)[14]	USA	ED	Retrospective cohort	"Patients at high risk for drug seeking behavior"	53	Evaluation	Care plan initiated by ED staff member. Primary care physician contacted and if agreed an ED care plan was put in place. The plan directed the patient to visit the ED for new or recurring symptoms but outlined that they would be screened on arrival, and if there was no new disease there would be no opioid administration or limited.	Prior to intervention - mean annual visits 7.6 (95% confidence interval, 6.3-9.1). One year post intervention - , mean visits decreased to 2.3 (95% CI, 1.5-3.1) (P ≤ .0001). Two years post intervention, mean visits declined to 1.5 (95% CI, 0.9-2.1) (P ≤ .0001)
Garbers et al (2016)[15]	USA	ED	Pre/post design	Patients without a primary care provider, without insurance, or who visited the ED more than 1 time in the preceding 12 months	75,765 patients who did not receive PN services	Evaluation	PN program aimed to work with providers, nurses, social workers, and care managers, to support patients to best understand,	"Findings demonstrate that patients who had frequent ED T&R visits before navigation had significantly fewer

Paper ID and Author	Setting		Study Type	Population		Intervention		Outcomes (headline message)
	Country	UEC setting		Description of population	Intervention group size (control group size)	Description or evaluation?	Describe the intervention	
							access, and utilize the health care system, along with family members	visits in year after navigation. Among 535 navigated patients who had 3-5 ED visits in the year pre-navigation, on average, number of visits decreased by 1.68 visits in the year after navigation – a difference of 898 visits within this subset alone

Kim et al (2015)[16]	USA	ED	Unclear/cross sectional	Low income/ uninsured	10,761	Evaluation	Hospital EDs linked to local primary care providers. ED staff referred patients to clinics. Describes number of sites which implemented similar models. "Navigators" in hospitals and clinics.	71% of patients did not have subsequent ED visit during study period. Much of analysis considers variance in visits between study population. Authors report no reduction in ED visits overall, but a reduction for those with chronic or behavioural conditions or more frequent users, although data not present in paper.
McCormack et al (2013)[17]	USA	ED	Prospective, nonequivalent control group trial	Patients with at least 5 ED visits annually for 2 consecutive years and 1 within 6 months, alcohol dependence, and undomiciled without shelter use for 9 of 24 months.	20 participants with highest baseline ED visits compared with 20 patients who received standard care and 20 patients from previous year	Evaluation	Social worker and outreach team met with participants, guided by previous care plans to offer shelter on discharge. Caseworkers relocated participants into increasingly supportive settings, coordinated multidisciplinary care, and updated plans during biweekly	Differences in differences between intervention and prospective patients and retrospective controls were −12.1 (95% CI = −22.1, −2.0) and −12.8 (95% CI = −26.1, 0.6) for ED visits and −8.5 (95% CI = −22.8, 5.8) and −19.0 (95% CI = −34.3, −3.6) for inpatient days, respectively. 18 participants accepted shelter; no

							interagency meetings about participants' medical, psychosocial, and housing needs	controls were housed. ED use decreased and housing was achieved.
Michelen et al (2006)[18]	USA	ED	Unclear – retrospective cohort	ED frequent fliers – patients using the ED three or more times in the past six months (age range 0-95 years)	539 baseline, 537 at 3 months 177 at 6 months	Evaluation	Health priority specialist (HPS) working in ED diversion programme. On visit to ED the HPS is flagged that a patient has attended ED and makes contact to attempt to identify reasons for and manage frequent use of ED.	Including patients seen at all three assessment points there was significant decrease in ED use and referral to primary care provider and provision of health education and counselling were linked to reduced use.
Ng et al (2015)[19]	UK	ED	Cohort	Seven of the 20 most frequent ED attenders over the last 12 months who were causing the greatest challenges for the team.	7 patients (no control group)	Evaluation	Comprehensive medical assessment of patient by ED clinician followed by a bio-psycho-social assessment – then a patient centred plan was drawn up (working with patients and carers) for any contact with health and social services, including future ED visits.	As a result of Frequent Attendances programme - significant decrease in presentations to ED. Authors propose that this may relate to adding a liaison psychiatry clinician (who works at interface between physical and mental health) to intensive

								case management team.
Rathlev et al (2016)[20]	USA	ED	Randomised non blinded two group parallel design	Patients with opioid use disorder and high frequency ED use. Three affiliated hospitals with identical electronic health records.	20 assigned to the care plan group and 20 assigned to the usual care group.	Evaluation	Care plan instituted and added to electronic health record.	Primary outcome was opioid use (not relevant for this study). Also collected information on secondary outcomes including number of ED visits. Care plans did not alter number of ED visits.
Seaberg et al (2017)[21]	USA	ED	Prospective RCT	Superutilizers (sic) of the ED (5 or more visits to the ED in the last 12 months)	148 treatment group (134 control group)	Evaluation	Patient Navigator who works with ED patients to review diagnosis, prescriptions and arrange follow up appointments etc. Delivered in the ED at the time of initial appointments, at follow up appointments and via telephone calls (2 weeks-12 months following initial visit)	All reported results statistically significant – overall ED visits decreased for both groups but greater decrease for intervention group. Same pattern observed for decrease in costs and increase in primary care physician use. No difference in patient satisfaction pre and post intervention for either group.
Shnowske et al (2018)[22]	USA	ED	Retrospective cohort analysis of	Over 18 years, assigned care guide as identified as	287	Evaluation	Case management via a Care Guide who assists patient in barriers to	Care Guide initiation does reduce ED use by at least 40% for non emergent and

			electronic care records	patients with recurrent visits for non emergent complaints			finding non emergent care such as identifying primary care, scheduling appointments, patient education and help with financial management of medical care	chronic complaints, however these patients were not being directed back to primary care instead.
Shumway et al (2008)[23]	US	ED	24-month randomized trial with interviews and service usage and cost data from administrative records.	Two-hundred fifty-two frequent users randomized	(167 to case management, 85 to usual care)	Evaluation	Long-term clinical case management including assessment, crisis intervention, individual and group supportive therapy, assistance in obtaining stable housing and income entitlements, linkage to medical care providers, referral to substance abuse services as needed, and ongoing assertive community outreach.	Case management (CM) associated with statistically significant reductions in psychosocial problems common among ED frequent users (homelessness, alcohol use, lack of health insurance and social security income, and financial need). CM associated with statistically significant reductions in ED use and cost. No differences in use or cost of other hospital services.
Stergiopoulous et al (2017)[24]	Canada	ED	RCT	Adults (over 18) with five or more visits in past 12	Brief case management (n=83) and	Evaluation	Brief intensive case management offering wide range	Primary outcome was frequency of ED visits in 12 months

				months with at least one visit for mental health or addiction.	usual care (n=83)		of services to participants including medical and social support.	following intervention. Compared to usual care, intervention groups saw 14% reduction in frequency of ED visits during post randomisation process, however this did not reduce statistical significance.
Tadros et al (2012)[25]	USA	EMS transports	Pilot study	Adults with greater than or equal to 10 EMS transports in 12 months or patients with significant recent increases in transports	51 (sequentially recruited)	Evaluation	Resource Access Program (RAP) – surveillance, case management and referral to identify and modify medical and social factors leading to increased calls to EMS	Evidence of decrease in EMS transports but limited impact on use of hospital services (authors suggest care may have been displaced)
Tait et al (2016)[26]	Australia	ED	RCT (cost effectiveness data)	12-19 year olds with alcohol related presentation	60 (67)	Evaluation	Link worker, brief intervention and referral. Link worker carried out follow up contact, made appointment with services and attended appointment if required.	No difference at 10 year follow up in cost of ED presentations intervention versus control group ($4266 versus $4150 p=0.916). No significant difference in number of ED events between groups (p=0.849). ED attendances and rates of presentation

								specifically with an alcohol or other dependency mental health diagnosis were significantly reduced in intervention group (0.03 versus 0.25 p=0.010; and 0.03 versus 0.25 p=0.010)

Synthesis of mapping review findings

Table 4 summarises the data extraction from the mapping review. None of the study populations were described in terms of being "vulnerable". Included studies referred to participants as being frequent users or frequent callers,[12, 13, 15, 18, 19, 20-25] young people with alcohol-related presentations,[26] people having high opioid use,[20] being at high risk of drug seeking behaviour,[14] or being on a low income.[16]

The interventions evaluated in the primary studies included: provision of a link worker for young people with alcohol-related presentation, combined with a brief intervention and referral[26] and introduction of a system for people on low incomes or who were uninsured whereby hospital EDs were linked to local primary care providers and ED staff referred patients to these clinics[16] (both subsequently classified under Outreach Services and Teams). Interventions also included a care plan initiated by ED staff for patients at high risk of drug seeking behaviour.[14] Case management which could include offering additional social support to patients was described in four included studies.[12 13 22 24] The difference between interventions described as case management and those referred to as care plans were not always clearly distinguishable as establishing a plan was often a main component of management.

A care plan intervention was reported to have resulted in a significant reduction in mean annual visits amongst the 53 patients in the study group from 7.6 (95% confidence interval, 6.3-9.1), to 2.3 (95% CI, 1.5-3.1) (P ≤ .0001) at one year, and 1.5 (95% CI, 0.9-2.1) (P ≤ .0001) at two year follow up.[14]

The link worker intervention was evaluated via a randomized controlled trial,[26] and the authors reported no difference at 10 year follow up in cost of ED presentations intervention versus the control group ($4266 versus $4150 p=0.916). There was also no significant difference in the number of ED events between groups (p=0.849). However, ED attendances and rates of presentation specifically with an alcohol or other dependency mental health diagnosis, were significantly reduced in the intervention group (0.03 versus 0.25 p=0.010).

The linking system intervention[16] similarly appeared to have resulted in no reduction in ED visits overall, although the authors reported that there was a reduction for those with chronic or behavioural conditions or more frequent users (however, data for this finding are not provided in the paper).

A randomised controlled trial evaluating case management for frequent attenders who had mental health or addiction difficulties was found to have achieved a 14% reduction in frequency of ED visits during the post randomisation process however, in line with the studies above, this reduction did not reach statistical significance.[24] A pilot study of frequent ambulance callers suggested that case management was promising as a method to reduce median call volume, although the authors highlighted the complex range of needs required by patients.[13]

Of the 16 included studies, there was overall uncertainty regarding the effectiveness of interventions aiming to reduce UEC, with five indicating a reduction in service use,[14 15 18 19 21] and six suggesting no significant reduction.[16 20 22 24-26] There appeared to be no clear pattern regarding which types of interventions reported positive outcomes, although the group of studies indicating effectiveness tended to be of non-comparative design.

The mapping review identified the extremely limited evidence regarding interventions and outcomes for people who might be classified as being "vulnerable. In view of the paucity of empirical evidence, it suggested that a further full systematic review of interventions for vulnerable patients was not indicated. The review identified the lack of clarity regarding intervention types and components, with a potentially useful direction for further work being to unravel elements of the interventions evaluated. It was anticipated that further exploration of the detail of interventions aimed at reducing UEC usage in patients more generally, might assist in understanding which interventions may be promising for vulnerable groups. Given the limited available evidence in academic journals, it was also anticipated that grey literature and other sources of reporting may be a worthwhile avenue of exploration.

Developing a typology: the intervention and initiative analyses

The phase two intervention search focused on further exploring the characteristics of existing interventions aiming to reduce use of UEC services. Following the iterative process described in the Methods section the review team developed a typology of nine different intervention types (See Table 5). In addition to the literature found during the mapping review, the phase two intervention analysis identified four additional articles; three related to multi-component packages including case management, case finding, care planning and outreach for the homeless and those with substance use problems,[27-29] and the other was a programme to divert less serious, and therefore, potentially inappropriate cases from presenting at an ED.[30]

To supplement the evidence from the initial mapping review and phase intervention search, in phase three of the study, we sought further evidence from grey literature and other sources beyond academic journals. In phase three we identified 22 further documents[33-43, 46-55] relating to fifteen UK initiatives. Data from these documents were extracted against an abbreviated version of the Template for Intervention Description and Replication (TIDieR) and examined to further develop and refine our understanding of intervention characteristics and components.

Primary sources of these initiatives were good practice case books and rapid reviews, commissioning plans and news articles, either in the GP press (e.g. Pulse) or in local newspapers. It was not always possible to determine the extent to which initiatives were truly innovative and the extent to which they had been developed elsewhere and then implemented in a new location. The method by which each type of intervention was identified is indicated in Table 5.

Table 5 - Types of intervention and method by which identified

	Mapping Review	Intervention Analysis	Initiative Analysis
1. Care Navigators	√		√
2. Care Planning	√		
3. Case Finding	√		√
4. Case Management	√	√	
5. Front of A&E General Practice/ Front Door Streaming Model			√
6. Migrant Support Programme			√
7. Outreach Services and Teams			√
8. Rapid Access Doctor/Paramedic/Urgent Visiting Service			√
9. Urgent Care Clinics		√	√

The following section provides a summary description of each intervention in our typology, drawing on information from the three phases of the review. Completed TIDieR templates for the interventions are available in Report Supplementary Material File 1. For illustrative purposes only a sample abbreviated TIDieR template for Targeted Case Management is provided in Table 6.

Table 6 - Sample abbreviated TIDieR template for Targeted Case Management

Author and Date	Hudon et al (2016); Hudon et al (2017); Grover et al (2018)
Item 1. Brief name	Case Management
Item 2. Why	Intensive personalised management (through a care plan) enables coordination of services and appropriate targeting of care.
Item 3. What (materials)	Care plan.
Item 4. What (procedures)	Composite package of interventions which may include: • case-finding • assessment

	• care planning • care co-ordination, including but not limited to: o medication management o self-care support o advocacy and negotiation o psychosocial support o monitoring and review. o case closure (in time-limited interventions). May also include self-management, patient education and disease management programmes.
Item 5. Who provided	Health care professionals, typically specialist nurses with medical support
Item 6. How	In an ED context, initial contact is within ED and then follow up may occur following discharge and may involve multiple health and social care agencies.
Item 7. Where	May be delivered face-to-face in a patient's home or in an ED setting or via the telephone
Item 8. When and how much	Frequency and duration of contacts varies according to need
Item 9. Tailoring	At intervals determined by case manager, may also be patient initiated.
Item 10. Modifications	Components from above list vary according to setting, skill mix and target population

Further details of the sources by which the initiatives were identified are available in Appendix 2 - Search results for initiatives and intervention analysis. Table 7 summarises key details of each intervention.

Table 7 - Key details of current practice interventions

Intervention	What (procedures)	What (materials)	Who provided	Where
Acute Visiting Service/Rapid Access Doctor	Responds to clinically appropriate Green category triaged calls from 999, uniquely dispatched from Ambulance Service clinical decision-making hub. Supports locally based Ambulance Crews; assesses, diagnoses, prescribes and treats in home, without requiring paramedic response, conveyance to hospital or subsequent admission.	Mobile directory of services	Dedicated GP with a driver in a non-Ambulance Service vehicle	Community
Alcohol Intoxication Management Services (AIMS)	Alternative care pathway to divert acute alcohol related attendances from ED	Care Pathway	Not stated	Emergency Department and diverted from ED

Case Management	Composite package including:
	• case-finding
	• assessment
	• care planning
	• care co-ordination, including but not limited to:
	  • medication management
	  • self-care support
	  • advocacy and negotiation
	  • psychosocial support
	  • monitoring and review.
	  • case closure.
	May include self-management, patient education and disease management.
		Care Plan	Health care professionals, typically specialist nurses with medical support	Face-to-face in a patient's home or in an ED setting or via the telephone

Frequent Attenders' Programme	Biopsychosocial Assessment; Frequent attenders' clinic for brief interventions and monitoring of subsequent attendances	Care Plans	Doctor & Senior Nurse Clinical leads	Emergency Department
Front of A&E General Practice/ "Front-door streaming model"	To provide alternative primary care-based	Hospital has co-located urgent GP centre, open	Two and three GPs work in centre daily,	Emergency Department

	services to patients not requiring ED admission	from 8am-midnight, every day of the year.	with a minimum of two GPs working there at any one time.	
Health Diversity Initiative	To address confusion over GP out-of-hours services and poor rates of registration from migrant groups.	Includes community education sessions, six-week courses, and bilingual advocacy and interpretation services.	Multidisciplinary team of nurses, health coaches, paramedics, pharmacists, midwives, nutritionists and falls specialists.	Multiple settings
High Impact User Team	Management of top 100 most frequent attending patients	Support plans, behavioural contracts, signposting	Multidisciplinary group of ED and other medical staff alongside police, ambulance and other staff	Emergency Department
High Intensity User programme	Tackles problems of patients with complex psychosocial problems as alternative to A&E presentation. Uses personal mentoring and one-to-one coaching			Emergency Department
Homeless Hospital Discharge Programme [Care Navigators]	Works as part of hospital discharge team to proactively identify homeless patients and establish their ongoing care needs.	No Details	Works with a community-based 'broker' to find out help available and barriers to be addressed	ED & Hospital
@home (Guy's and St Thomas's NHS Foundation Trust @home service: GSTT@home service)	Service for prevention of admission and early discharge: provides intensive care for short episode through multi-disciplinary team work with aim to return patient to prior health status following acute episode of ill-health.	Care pathways	Senior nurses with acute hospital ED nursing experience skilled at managing complex acutely unwell patients. Nurses usually of Masters Level with advanced differential diagnostic skills and non-medical prescribers.	Community
Multidisciplinary Integrated Care	Integrated care	Integrated Care Plans	Not stated	Emergency Department
Non-Clinical Care Navigator	Screens and offers signposting to services outside of hospital as appropriate:	Signposting	Team including doctors, nurses, and physiotherapists,	ED and Medical Assessment Unit (MAU)

	• Liaises with triage nurse team once people are medically cleared • Liaises with A&E rapid response team to identify patients readmitted multiple times, and offer information to help reduce further readmission		triage nurse and A&E rapid response team	within hospital setting
Positive Lives	Focuses on individuals who present at A&E with a non-medical need, e.g. anxiety, unemployment, homelessness or depression and aims to change way they are supported. Individuals offered access to appropriate support to address their issues and improve well-being. Ongoing support provided if needed.	No Details	Positive Lives lead works one-to-one with individuals to uncover underlying cause of their crisis.	Emergency Department
The Sociolance	On the spot care or transport to a care provider. Referrals to other services	Emergency Medical Dispatch Centre	Sociolance	Community
Urgent Care Clinics	Service that primarily treats injuries or illnesses requiring immediate care, but not serious enough to require visit to an Emergency Department.	Treatment facility – may also include diagnostic services	General Practice teams	Often located near Accident and Emergency departments. *See Front of A&E General Practice for collocated services.*
Urgent Visiting Service	GP-led, rapid assessment service for patients unwell at home who might otherwise call an ambulance.	Utilised mobile SystemOne application to enable access to records.	Deployed locums to back-fill sessions to free-up GPs to lead the service.	Community
Working Together to Connect Care	Case review and referral to community services	Case management	ED Staff	Emergency Department

Care Navigators (Non-clinical)

Care navigators are increasingly seen across a wide diversity of health care settings and their existence attests to the increasing complexity of co-morbidities, and interacting health and social problems and the bewildering complexity of how health services are organised and how inter-agency relationships present themselves to a service user.[37] Within the specific context of the Emergency Department the care navigator can fulfil a two-fold function referring the service user to other services that may be useful, together with information on access and eligibility (a casebook describes how a long-term visitor to London was advised on temporary registration with a GP and on which GPs accepted temporary registrants), and acting as a liaison point with members of the ED team.[36] The care navigator role is formally recognised by a task specification and associated competencies. This role can be of particular value to those with limited familiarity with the organisation of health services, whatever the reason, together with those with languages other than English, those with learning difficulties and those with poor health literacy.

Care Planning

Frequently a component of wider case management initiatives, care planning is an approach of choice where the complex needs of a particular type of patient are semi-predictable.[28] Groups of patients that have shared needs for example those with substance use disorders or those who are homeless benefit from a standardised approach.[43] Pascal et al (2013) invoke knowledge management by identifying a shared care plan as a "knowledge object"; that is "information solidified into a pure and objective form [that]…takes the form of text or can be embedded in physical artefacts such as machinery or tools" (Hislop 2002, p. 167). As a standalone knowledge object, a shared care plan serves to structure and contextualise the patient/practice relationship through creation of an actual document, prompting referral to other agencies and proceduralising less familiar areas of care (Pascal et al, 2013).

Case Finding

Frequent attenders typically fall into recognisable groups, some of these correspond to the categories of vulnerable populations identified for this report. Case finding may be of benefit where populations have complex non-medical, psychological or social needs that cannot be met or resolved by repeated presentation at an ED, e.g. in the unemployed, those with substance use disorders or those who are homeless.[28 29] By 'breaking' a vicious cycle of presentation and re-presentation the intervention may help to reduce inappropriate re-attendance.

Case Management (Targeted)

Case management may include elements of care planning and case finding. It represents another form of personalised care by which needs that are not resolved through inappropriate presentation to an ED are channelled to more appropriate outlets. Thus, there is an element of care navigation included in the role.

Front of A&E General Practice

Front of A&E general practice represents a generic approach to inappropriate presentation at an ED for minor conditions and injuries. As such it is not yet clear whether the vulnerable groups targeted by this review are particularly likely to benefit from such provision. In theory, provision of single site services should be valuable for those who have difficulty navigating primary care or more general health service provision, such as migrants or those whose first language is not English.[46] However, this approach would be of limited value to other vulnerable groups, for whom access to emergency departments located in a major population area is already problematic, such as those living in rural areas or those without transportation (e.g. the homeless). As some commentators have observed, notwithstanding the rhetoric of "Front of A&E services", permanent provision of GP services alongside an ED becomes a *de facto* extended ED – the main attraction of which lies in provision of a small percentage of appropriate primary care services from a primary care (i.e. commissioning), not acute hospital budget.

@home

The service receives referrals from GPs and two major hospitals. A clinical lead nurse with experience of establishing new services, leads and develops the team strategically and operationally, with consultant geriatrician support within a multidisciplinary team (MDT) (senior nurses led by matrons together with GPs, rehabilitation support workers, physiotherapists, occupational therapist, social workers and a pharmacist. The MDT assesses, initiates and implements treatment, and meets daily to discuss the progress of the patient. Due to the acuity of the patients, most nurses are bands 6 and 7 (supported by a few band 5 nurses and placements from student nurses.[12 Lee G, Sakone P, Mulhall H, et al. Using hospital-at-home to reduce admissions. Nurs. Times 2015;111:12–15.

[Google Scholar]

The GSTT@home service pursues three specific aims:

(1) Identifying people at risk of a hospital admission and providing care that prevents their condition from worsening;
(2) allowing people to be given a high level of care in their own homes instead of being admitted unnecessarily to hospital and;
(3) allowing for advanced discharge from hospital so that patients can recuperate in the comfort of their home while receiving high quality care.

The service is designed for 260–280 referrals each month and operates 24/7 with the overnight service mainly focused on palliative and end-of-life care or an acute medical emergency such as blocked urinary catheter. The main referral criteria are: adults aged 18 years and over, living with an acute onset of illness (including acute exacerbations of chronic conditions). Most patients are either: early discharge (following a medical procedure in hospital and requiring further nursing care or therapy) or admission avoidance (the patient has been identified as being at high risk of requiring a hospital admission). All referrals are triaged by the GSTT@home duty clinician (matron or GP) or, if they are inpatients, they are reviewed and assessed by a GSTT@home in-reach nurse. The in-reach nurses review patients in the emergency departments, acute assessment wards and on post-take rounds identify suitable patients as quickly as possible. The GSTT@home duty clinician or in-reach nurse determine if the referral is appropriate and fits the acceptance criteria (i.e. requires short-term care in their own home that can be provided by the team). The patient is then transferred to the appropriate team where they are assessed by a senior nurse/GP. Patients' GPs are informed that the patient has been seen by the GSTT@home team and are sent an intervention summary on discharge from the service.

Migrant Support Programme

Migrants and those from ethnic minorities with first languages other than English are likely to benefit from a support programme that fulfils a dual role of literacy and health literacy, as typically provided by a diversity inclusion programme.[47]

Outreach Services and Teams

Outreach services are potentially useful for those for whom presentation at an ED represents an acute phase of more pervasive underlying chronic issues, such as those relating to psychological health and social challenges. Outreach to the homeless, to those with substance abuse problems, to the long term unemployed and to other targeted groups of the population such as ethnic minorities and migrants can offer both ongoing monitoring and coordination of health and social care services.[26] However, outreach services are considered potentially very intensive and expensive and so must be targeted judiciously.

Rapid Access Doctor/ Paramedic/Urgent Visiting Service

Physical access barriers to emergency and urgent care are manifest in multiple ways; they may result in either inappropriate calls to ambulance services or to non-use of services at an acute setting. Services that can visit patients in the community, in their own home if appropriate, can provide an early assessment of clinical need and reduce presentation at EDs where not required. Patients who are vulnerable because of access difficulties may benefit from such services.[41] In addition, rapid access services may be perceived as being more accessible or more locally sensitive. However, such services do not necessarily address difficulties around care navigation as patients have to be familiar with the available service and know how to access it. Furthermore, our review of initiatives found variation in whether rapid access services were initiated by general practices or ambulance services. This could have a differential effect on perceived eligibility for those who are homeless or who are not registered with a general practice.

Urgent Care Clinics

Limited evidence from the United States suggests that urgent care centres (walk-in clinics outside of a traditional emergency department) may be disproportionately used by the homeless.[30] However, it is unclear whether this simply reflects the same patterns of frequent use encountered by EDs or whether this captures some added relative advantage that such clinics might offer. A high percentage (69%) of users of an Urgent Care Clinic in the U.S. were not registered with a doctor, making them potentially attractive to a homeless or migrant population. However, it is unclear to what extent this would be equally true in the U.K. In theory, the local positioning of these centres offers a more accessible point of contact than an acute hospital and such services may be perceived as more context-sensitive.

Vulnerable sub-populations

Table 8 summarises the vulnerable population sub-groups included in studies relating to each type of initiative, indicating either reports of positive outcomes or where uncertainty was reported.

Table 8 - Summary of likely benefit from current initiatives

	S/E deprived	Migrants	Ethnic Minority Groups	Long Term Unemployed	Unstable Housing Situations	Rural/ isolated areas	Substance Abuse Disorders
1. Care Navigators (Non-clinical)	?	√	√		√		
2. Care Planning	?			√	√		√
3. Case Finding	√			√	√		√
4. Case management (targeted)	?			√	√		√
5. Front of A&E General Practice		?	?			√	
6. Migrant Support Programme		√	√				
7. Outreach services and teams	√	√			√		√
8. Rapid Access Doctor/ Paramedic/Urgent Visiting Service					?	√	
9. Urgent care clinics	√	√	√	√	√	√	√

√ =beneficial outcomes reported; ?=uncertainty in outcomes

Evaluation of strength of evidence

Table 8 illustrates how some interventions, such as case management and care planning, have been demonstrated to be effective across diverse contexts. These contexts include some that are specific to the vulnerable populations covered by this review. In contrast, locally-driven NHS solutions such as the Rapid Access Doctor and the Diversity Action Service for Migrants have demonstrated good locally relevant results but are lacking in rigorous evaluations. Furthermore, such initiatives may reveal a systematic publication bias in celebrating 'local success stories'. Similarly, we can observe extensive roll-out of the Blackpool model of case finding and the Luton & Dunstable model of Front of A&E General Practice, stimulated by local enthusiasm for adoption or by government endorsement and mandate. Table 9 seeks to consolidate and evaluate the disparate evidence from multiple sources by using a "light" version of the GRADE domains. Risk of bias relates to the methodological quality of the supporting studies whereas imprecision is determined by the uncertainty around the likely overall strength of effect. Inconsistency conveys the degree to which different studies demonstrate a consistent pattern of effect while indirectness relates to the relevance of the included studies to a UK context. Finally, publication bias examines the likelihood of selective reporting of results; a particular concern when alleged "good practice" initiatives are being reported in professional journals (e.g. Health Services Journal or Nursing Times) or via websites or casebooks. Collectively these five components contribute to an overall assessment that is rated as: Very low (The true effect is probably markedly different from the reported effect), Low (The true effect might be markedly different from the reported effect), Moderate (The authors believe that the true effect is probably close to the reported effect) and High (The authors have a lot of confidence that the true effect is similar to the reported effect). *NB. We use the phrase "reported effect" in preference to "estimated effect" to convey that the evidence base includes both quantitative and qualitative data. Similarly, the assessment is considered GRADE-light because the quality, strength, consistency, relevance and selectivity of the evidence base are explored at the level of the intervention, not the individual study finding as the originators of GRADE intended.*

Table 9 - Summary of evidence characteristics for different interventions (using GRADE domains)

	No. of Studies	No. of Participants	Risk of bias	Imprecision	Inconsistency	Indirectness	Publication bias	Overall assessment	Notes
Care Navigators	3	76,334	*	*	**	**	*	Moderate	Generic care navigator role is common. Limited evidence of specific ED application.
Care Planning	3	113	**	**	***	**	**	High	Supported by Systematic Review evidence, generically. More evidence required for specific groups. Component of case management.
Case Finding	5	1045	*	*	**	***	*	Moderate	Effective in some circumstances. Component of case management. Interpreted locally (Blackpool model) with strong social support element.
Case Management	4	688	**	**	**	***	***	High	Supported by Systematic Review evidence, generically. More evidence required for specific groups
Front of A&E General Practice/ Front Door Streaming Model	1	N/A	*	*	*	*	*	Low	Limited evidence. Differential success across hospitals. Partially covered by Cochrane Review. Likely to be context specific.
Migrant Support Programme	1	N/A	*	*	**	***	*	Low	Single case study with limited evaluation. Context sensitive solution.

	No. of Studies	No. of Participants	Risk of bias	Imprecision	Inconsistency	Indirectness	Publication bias	Overall assessment	Notes
Outreach Services and Teams	2	10,888	*	*	*	***	**	Moderate	Some evidence for outreach teams. Unclear extent to which they are effective for specific populations within this review.

	No. of Studies	No. of Participants	Risk of bias	Imprecision	Inconsistency	Indirectness	Publication bias	Overall assessment	Notes
Rapid Access Doctor/ Paramedic/ Urgent Visiting Service	1	N/A	*	*	*	*	*	Low	Limited examples of initiatives. Not exclusively for rural areas. Different mechanisms apply for different contexts.
Urgent Care Clinics	SRs	N/A	*	**	**	**	**	Moderate	Substantive US evidence. Large numbers of UK sites. Unclear whether theoretical benefits to specific vulnerable populations are realised in practice.

SRs = Systematic Review evidence; N/A = Non Applicable

While the meaning of the results presented in Table 9 will be explored in detail in Chapter 4 - Discussion it is nevertheless worth observing a polarisation between interventions that are supported at a systematic review level through multiple consistent studies derived mainly from non-UK settings and initiatives, largely at pilot or non-evaluated stages, that show promise within a UK context. This trade-off between likely rigour and likely relevance makes it particularly challenging to interpret the evidence base, compounded by the fact that even UK studies describing promising initiatives tend to frame the discourse in the language of "frequent attenders" rather than as interventions targeting vulnerable populations.

CHAPTER FOUR DISCUSSION

This discussion section looks at the overall take home messages from the three phases of the review and seeks to draw together some general observations and conclusion.

What interventions were identified

As previously mentioned for the mapping review it is extremely challenging to identify interventions that are targeted specifically at the vulnerable groups nominated for this review. Interventions may not specifically identify the vulnerability as the feature to be addressed by their programme theory. Alternatively, interventions may target the population generally with the implication that vulnerable populations may benefit equally or even may benefit more than the general population. In some cases, we had to work backwards from interventions employed by initiatives introduced by specific health communities to target vulnerable populations (e.g. urgent care clinics) to look at the associated evidence for that intervention.

The short list of nine intervention types identified from the multiple routes used for this review; namely, the mapping review, the intervention analysis and the survey of initiatives, comprises:

1. Care Navigators,
2. Care Planning,
3. Case Finding,
4. Case Management,
5. Care Planning,
6. Front Of A&E General Practice/Front Door Streaming Model
7. Migrant Support Programme,
8. Outreach Services and Teams
9. Rapid Access Doctor/Paramedic/Urgent Visiting Services.

A previous narrative review of reviews categorised interventions to reduce frequent attendance at emergency departments within six types.[56]

(1) Cost sharing;

(2) Strengthening primary care;

(3) Pre-hospital diversion (including telephone triage);

(4) Co-ordination;

(5) Education and self-management support;

(6) Barriers to access emergency departments.

The intervention typology developed during our review adds to this previous work by providing discrete types of interventions outlined in the literature, rather than categorising general approaches. The diversity of intervention types we identified indicates different conceptualisations of the exact nature of the problem of frequent attendance and, consequently, a differential ability for these interventions to benefit vulnerable groups. Interventions relating to cost sharing or co-ordination may result in more efficient and more appropriate utilisation of care but are unlikely to benefit vulnerable populations directly unless specifically targeted at these groups (e.g. case management of the homeless).

More promising, particularly for vulnerable populations where physical access is an issue, are those interventions that challenge difficulties relating to the proximity of services, such as strengthening primary care (e.g. urgent care clinics) or prehospital diversion (e.g. telephone services including triage). It should be noted that stereotypical representations of vulnerable populations may impede identification of potential interventions; for example, a systematic review of homeless persons' access to health services via technology found high rates of mobile phone and technology ownership.[57] Education and self-management support can prove challenging to several of the identified vulnerable groups e.g. those with low levels of health literacy, those with languages other than English and those with itinerant lifestyles. The final category of interventions that address barriers to access overlaps partially with those that address physical access or navigation barriers as mentioned above but, more widely, may address systemic difficulties such as the requirement to provide proof of residence or the unsympathetic or unwelcoming attitudes of emergency department staff.[58]

Why are these groups vulnerable/at higher risk?

The heterogeneous grouping of vulnerable patients specified for this review recognises that vulnerability presents in many forms. Indeed, one common form of vulnerability i.e. frailty among older and chronically unwell patients, was specifically excluded from this review having previously been separately targeted by the Evidence Synthesis Programme. In trying to conceptualise vulnerability at a level superordinate to the list of included groups we identify the following 'vulnerabilities':

1. Vulnerability in terms of a *limited ability to navigate the health system* (either through language challenges or through limited health literacy).
2. Vulnerability in terms of *constrained physical access to current health provision* (e.g. rural communities, those likely to encounter transportation difficulties).
3. Vulnerability in terms of difficulties in *demonstrating eligibility for current health services* (e.g. migrants and the homeless).
4. Vulnerability in terms of requiring *a higher likelihood of complex psychological and social issues, not adequately or appropriately addressed by health services and requiring multi-agency involvement* (e.g. long term unemployed, those in non-stable housing situations, those experiencing substance use disorders).
5. Vulnerability in terms of requiring *a higher degree of social or emotional support* (a proportion of those from among long term employed, those experiencing substance use disorders, those from ethnic minorities and migrants).

These different vulnerabilities are addressed by different mechanisms present within the different interventions e.g. issues around physical access may be addressed by provision of 'more local' urgent care centres or an urgent visiting service. Conversely, an intervention may activate multiple mechanisms – so, for example, the particular type of case finding activated by the paramedic from Blackpool[42] offers elements of navigation, outreach and social and emotional support. Finally, how an initiative is set up may differentially address different vulnerabilities e.g. a rapid access doctor that is accessed via participating general practices may result in persistence and extension of existing barriers of limited eligibility (based on practice registration and having a permanent address) whereas the same service accessed as an extension of the ambulance service would be equally available to the homeless and to migrants.

In a twist on the perspective presented in this report, Couture and colleagues argue that frequent use of health services is itself a marker of vulnerability.[59] Such frequent users, they maintain, deserve attention due to high costs and negative outcomes such as lower quality of life and higher mortality. For this reason, they contend that healthcare systems should offer interventions tailored to their needs and to their level of health literacy, including strategies to promote activation. Such an approach is best evidenced in the health diversity initiative for migrants[38] but, it could be argued, has wider application for populations where health literacy, not language proficiency, remains a key issue.

A further paradox relates to the fact that provision of multiple channels for accessing services may maximise the chances of certain vulnerable populations being able to access an appropriate service while, at the same time, adding to the complexity facing those vulnerable populations for whom being able to navigate the health care system is the more significant problem. So, for example, one of the experiences of the pilot Front of A&E services was poor uptake related to poor awareness of the role of the new service when compared to the existing ED. Other services and initiatives specifically exclude specific vulnerable groups; so, for example, the Guy's & St Thomas' and King's Hospitals Rapid Response service[35] excludes patients where the primary diagnosis is a mental health or substance disorder problem.

Strengths and limitations of this review

This three-stage review has optimised use of resources by first undertaking a mapping phase, before undertaking more intensive analytical phases, ensuring that the final review approach is meaningful and potentially useful. As anticipated by the review team and HS&DR commissioners, there is a limited body of evidence on interventions for vulnerable people that have service delivery outcomes. Findings from papers included in the mapping review, confirmed the existence of evidence for the interventions used having a positive effect on ED attendances, although as noted, many of these interventions did include an 'outside of the ED' element. This finding, in turn, justified our widened scope for the subsequent phases of the review.

The mapping review only looked at interventions for vulnerable groups that are delivered within the EUC. We were aware that interventions that are being delivered outside of the EUC, within acute or primary care offer potential to reduce ED use by these groups. For our

intervention analysis we imposed a more forgiving requirement in recognition that (i) interventions may be triggered within the ED but followed up in primary care (ii) that representation and/or readmission of frequent users made such a distinction somewhat arbitrary and (iii) that the emergency and urgent care system could conceivably include extensions offered in primary care that are conceived as operating seamlessly as part of an extended EUC system (e.g. Rapid Access Doctors, Urgent Care Clinics and Front of A&E General Practice).

Although, as reported in the introduction, it is acknowledged that patients in these vulnerable groups are frequent and heavy users of the EUC system, there is limited evidence to show that interventions specifically target use of services from these groups. The screening process for this review indicated that interventions are often reported in terms of patient outcomes, rather than health system or service delivery outcomes, thus limiting the number of papers included in this review.

The intervention analysis has ensured that details of the interventions can be identified and explored and differences manifest at a local level can be identified and clearly flagged. A major contribution of this overall review (particularly given the dearth of specifically-targeted interventions identified from the literature) is the review of current practice (like many researchers we resist the label of "good practice" for promising and yet superficially evaluated or unevaluated initiatives). This has expanded our pool of candidate interventions although once again evidence of specific targeting is limited and the vulnerable populations from our target list benefit, if at all, only collaterally from initiatives and, within these initiatives, differentially according to the specific nature of their vulnerabilities. This additional searching (citation and reference list checking) highlighted additional interventions to include in the review and the full intervention analysis has highlighted germane aspects of the interventions of interest. By combining the publication and practice evidence bases we have been able to offer a potentially valuable perspective on the current landscape, where work is being done and where future work is required.

Weaknesses relate to the diverse nature of the evidence, ranging from published studies to brief mentions in news stories or "good practice" casebooks. This poses particular challenges for synthesis, particularly because this tends to polarise the twin considerations of rigour and relevance which, ideally, should be complementary when characterising the evidence base;

so, the trialled interventions typically originate from the United States while the locally-sensitive initiatives from the UK are likely to be vulnerable to risk of bias, particularly selective reporting bias. Furthermore, initiatives that are evaluated in the short term are vulnerable to several implementation biases when compared to routine roll out and adoption – for example, the disproportionate influence of the "hero innovator" and the enthusiasms of early adopters. This narrative may partly, although not entirely (see below), explain the differential success of the Front of A&E streaming initiatives at Luton and Dunstable and Frimley Park.[48-51]

Initiatives of alleged good practice carry known limitations in frequently displaying the presence of reporting bias, in the use of relative measures of performance (e.g. percentages) with inadequate measures of baseline performance and in limited evaluation objectives and timeframes. As a consequence, they do not necessarily depict an accurate picture of real world implementation. In particular, they typically invoke cost savings without costing the actual cost of designing, planning and introducing the intervention. Nevertheless, they do indicate potential candidate interventions that might benefit from more rigorous evaluation. An illustrative example in this review is the front of A&E general practice initiative which yielded vastly different results in Luton & Dunstable and Frimley Park, leading at least one commentator to highlight the likely context-sensitivity of such interventions.[52] Indeed Edwards (2018) reminds us that "Complex problems are not very amenable to simple solutions or one-size-fits-all policies". Notwithstanding a letter in 2017 from the chief executives of NHS England and NHS Improvement, instructing trusts to ensure that every hospital in England should use hospital-based GPs to triage and redirect patients as they are first seen in A&E,[49] commentators could point to a differential effect between well-suited hospitals serving populations that use A&E extensively for primary care concerns[50] and areas where GPs see a high proportion of emergency cases on the same day.[48] This context-sensitivity provides a strong indicator for further realist evaluation[60-61] and realist synthesis approaches[62] within an ED context.

CHAPTER FIVE CONCLUSIONS

This review was conducted against a backdrop of the emergency system experiencing higher demand. Reasons include more patients, ageing population (more older people and they are more complex) more complex patients (across the general population) and a decrease in the availability of other services. However, despite conclusive evidence of disproportionate use of the ED by certain groups of people the majority of interventions appear either to tackle the problem at a general population level e.g. front of A&E general practice or urgent care clinic approaches or to target frequent attenders as a discrete group.

While one would expect a proportion of the vulnerable populations identified in this report to benefit from population-based solutions and, indeed, these vulnerable populations to figure in frequent attender case finding approaches, neither of these approaches tackle the specific needs and barriers of each specific population. Such an approach requires a more sophisticated and nuanced understanding of how vulnerability is to be interpreted in these diverse populations. Our public involvement group further identified that vulnerability may hold a temporal dimension. While they expressed this in terms of population characteristics this is likely to be equally true with regard to patterns of emergency department utilization (i.e. a frequent attender during one measurement period will not necessarily figure during a previous or subsequent measurement period. Frequent attendance is not necessarily inappropriate attendance and several vulnerable groups are known to have more complex or more serious physical problems. Nevertheless, a substantive part of the problems facing certain vulnerable groups is social and non-medical and can benefit from coordination with, and navigating to, other non-health agencies.

Reasons for increased patterns of use for vulnerable groups are complicated and encompass a wide variety of drivers for use of the ED (burden of disease, access to primary care, patient preference). Indeed, our public involvement group identified additional types of vulnerability which potentially would invoke an even wider diversity of drivers of ED use. A wider understanding of what exactly is meant by “vulnerability” could potentially lead to inclusion of other sub-population groups, such as people with dementia, and thus broaden the richness of potential solutions to address these vulnerabilities. This, in turn, would acknowledge that “vulnerable populations” is an even more heterogeneous grouping than implemented in this review and that nuanced understandings, and tailored interventions, are strongly indicated.

As a consequence of a research agenda articulated around the phenomenon of frequent attendance, we have identified a distinct shortage of interventions designed specifically to reduce demand for ED services from the identified list of vulnerable groups. Interventions that do exist are mostly delivered within the community setting. This justifies our decision to interpret an extended conception of emergency and urgent services for the intervention and initiative analysis, while preserving the focus on health service outcomes, particularly relating to presentation at an ED or admission via an ED.

Interventions and initiatives offering alternatives to presentation at an ED or admission via an ED currently trade between rigour and relevance. In particular, front of A&E services have received ministerial endorsement in advance of a detailed examination of their implications, particularly with regard to their context-sensitivity. Further research is needed to challenge the "one-size-fits-all" models implied by blanket endorsement, particularly to explore variation by setting and variation according to different conceptions of vulnerability.

Of particular interest are initiatives identified as "bottom-up" locally-generated solutions that offer a response to frequent attendance. Such initiatives as that generated in Blackpool[42] for frequent attenders draw from an established menu of intervention components to compile a locally-sensitive package of actions. Many of these intervention components are comparatively well-tested but little knowledge is available on which component to select under which circumstances. This is particularly important given that multi-component interventions invariably contribute to increased cost in the absence of data on which components are essential or desirable and, indeed, which components are "active". Complex systems thinking emphasises that a model of cumulation may be inappropriate when it is interaction (e.g. synergy or antagonism) that may be most relevant. Resource implications should also be examined through rigorous economic evaluation.

Practicable steps shared by local initiatives include: (1) an analysis of frequent attenders; (2) formation of a multi-disciplinary, indeed multi-sector team, to ensure that social needs are addressed alongside healthcare needs; (3) a case management approach with nominated coordination and responsibility; (4) shared documentation allowing a holistic picture of patient contacts to be accessed by all relevant professionals. Once these prerequisites have been put in place then service response and improved access can be targeted; looking, in particular,

at improved access to services, alternatives to ambulance conveyance and emergency admission, and delivering non-urgent responses through primary or community care.

Some of the uncertainties identified by this report are being addressed by current research in progress.

Implications for healthcare

1. The evidence highlights that reasons for increased patterns of use for vulnerable groups are complicated and encompass a wide variety of drivers for use of the ED including burden of disease, access to primary care, and patient preference.

2. The evidence indicates that specific needs and barriers of each sub-population within those categorised as vulnerable may differ, requiring nuanced understanding of these diverse populations. Decision makers need to gain an accurate picture of the distribution of specific vulnerable populations in order to target service responses appropriately.

3. The review found a notable shortage of interventions designed specifically to reduce demand for ED services from vulnerable groups with existing interventions being mostly delivered within the community setting. Front of A&E services are being strongly promoted but there is little evidence that they are particularly addressing the needs of vulnerable populations. Indeed, they may share some of the physical and geographical barriers to access typically encountered in connection with EDs.

4. The review found that the majority of interventions aim to tackle the problem of increased patterns of ED use by vulnerable groups at a general population level (such as front of A&E general practice or urgent care clinic approaches) or target frequent attenders as a discrete group. Healthcare decision-makers could seek to monitor the prevalence of identified vulnerable groups presenting at EDs and primary care alternatives and seek to avoid local barriers to appropriate use.

5. The review identifies common components of interventions targeting frequent users: (1) analysis of frequent attenders; (2) multi-sectoral teams; (3) case management approaches and (4) shared documentation. Healthcare providers can select from these core components to construct a locally-sensitive package of responses and submit these to ongoing evaluation.

Recommendations for research

1. The review found that interventions specifically targeting the vulnerable groups identified in this report need to be co-designed[63], developed, trialled and rigorously evaluated. A particular need was identified for further research on the effectiveness and cost-effectiveness of promising UK initiatives.
2. The evidence indicates that evaluations of these types of interventions will likely require mixed-methods approaches, with an important contribution to be made by qualitative inquiry.
3. The review suggests that interventions may also require an explicit and conceptually sound theoretical basis, particularly in understanding vulnerability and how it impacts upon emergency department use.
4. The role of technology and health informatics, briefly touched on by this report, requires further examination; particularly relating to identification and co-ordination of frequent users[63].
5. The findings of the review further indicate potential for realist evaluation approaches[62,64,65], especially since several interventions identified seem to be heavily-context dependent.

ACKNOWLEDGEMENTS

Contributions of authors

Louise Preston (Research Fellow) co-led the study including contributing to data analysis and report writing

Andrew Booth (Reader) co-led the study including contributing to data analysis and report writing

Susan Baxter (Senior Research Fellow) contributed to the mapping review and report writing.

Ruth Wong (Information Specialist) contributed to the electronic database searching

Duncan Chambers (Research Fellow) contributed to the review processes including sifting and data extracting

Janette Turner (Reader in Emergency & Urgent Care Research) provided topic expertise.

Data sharing

All available data can be obtained from the corresponding author.

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APPENDICES

Appendix 1. Search strategy (Mapping Review)

1 *Emergency Service, Hospital/

2 *Emergency Medical Services/

3 *Emergency Medicine/

4 (emergenc* adj2 service*).ti,ab.

5 emergenc* care.ti,ab.

6 ((urgent or unscheduled) adj care).ti,ab.

7 emergenc* department*.ti,ab.

8 *Ambulances/

9 ambulance*.ti,ab.

10 or/1-9

11 *Vulnerable populations/

12 *Poverty/

13 *Socioeconomic Factors/

14 (vulnerable or socioeconomic* or disadvantaged or depriv* or poverty or poor or low-income* or low

15 ((vulnerable or socioeconomic* or disadvantaged or depriv* or poverty or poor or low-income* or lo
or people or person* or famil* or population* or communit* or neighbourhood* or group*)).ab.

16 ((financ* or economic* or money) adj2 (hardship* or difficult* or problem* or worries or worry)).ti,ab.

17 *Social Isolation/

18 (social* adj1 (exclu* or inequalit* or isolat*)).ti,ab.

19 or/11-18

20 Rural Population/

21 (rural or remote or coast* or geographical* isolat*).ti.

22 ((rural or remote or coast* or geographical* isolat*) adj3 (people or patient* or population* or c
area*)).ab.

23 ((hard* or difficult) adj2 (reach or locate or find)).ti,ab.

24 or/20-23

25 refugee*.ti,ab.

26 asylum seeker*.ti,ab.

27 (migrant* or immigrant* or emigrant*).ti,ab.

28 Refugees/

29 "Emigrants and Immigrants"/
30 "transients and migrants"/
31 ((human or child or people or person) adj traffick*).ti,ab.
32 ("first generation" or "second generation" or "third generation").ti,ab.
33 ("new arrival*" or settler* or newcomer*).ti,ab.
34 ((multi or trans or cross) adj cultural*).ti,ab.
35 (multi adj (ethnic or racial or lingual)).ti,ab.
36 diaspora.ti,ab.
37 ethnic groups/
38 (traveller* or gypsies or gypsy or gipsy or gipsies or romany or romanies or romani or romanis or rromani or rromanis or roma).ti,ab.
39 (african american or african americans or asian or asians or black or blacks or hispanic or hispanics or indian or indians or latino or latina or latinos or latinas or native american or native americans).ti.
40 (bme or black ethnic minorit* or black minorit* ethnic* or south asian* or bangladeshi* or pakistani* or indian* or sri lankan* or asian* or east asian* or chinese or taiwanese or vietnamese or korean* or japanese or afro-caribbean* or african-caribbean* or caribbean or african* or black* or afro* or islam* or hindu* or sikh* or buddhis* or muslim* or moslem* or christian* or catholic* or jew*).ti.
41 or/25-40
42 *Unemployment/
43 (unemploy* or jobless or workless).mp.
44 ((job* or work or employment) adj3 (redundan* or insecur* or loss* or lose or lost
45 or search* or seek* or find*)).ti,ab.
46 (economic* adj3 inactive).ti,ab.
47 or/42-45
48 exp *Homeless Persons/
49 (homeless* or rough sleep*).mp.
50 ((unstabl* or emergency or temporary or inadequate or poor or overcrowd*
51 or over crowd*) adj3 (hous* or accommodation or shelter* or hostel* or dwelling*)).ti,ab.
52 runaway*.mp.
53 (street adj3 (individual* or person* or people or group* or population*)).ti,ab.
54 or/47-51
55 (addict* or ((substance* or alcohol* or drug* or cocaine or heroin or amphetamine*

56 or marijuana or cannabis) adj2 (misus* or abus* or depend* or use* or using))).ti,ab.

57 (legal high* or (psychoactive adj (substance* or product*))).ti,ab.

58 *Substance-Related Disorders/
59 *Drug Users/
60 *Alcoholics/
61 or/53-57
62 10 and (19 or 24 or 41 or 46 or 52 or 58)
63 Case report.tw.
64 Letter/
65 Historical article/
66 60 or 61 or 62
67 exp Animals/
68 Humans/
69 64 not (64 and 65)
70 63 or 66
71 59 not 67
72 limit 68 to (english language and yr="2008 -Current")

Appendix 2. Search results for initiatives and intervention analysis

Interventions Delivered in EUC Context	**Endnote Database**	**PubMed MEDLINE**	**Google (nhs only)**	**Google Scholar**
Care Navigators	2	3	2570	312
Care Planning	80	249	31	44
Case Finding	4	151	16	9
Case Management	167	1071	57	70
Front of A&E General Practice	0	0	2460	2
Front door streaming	0	0	731	10
Migrant Support Programme	495 (migrant*)	423 (migrant)	11	125
Outreach Services	103 (outreach)	799 (outreach)	4	7
Outreach Teams			8030	3180
Rapid Access Doctor	8 (rapid access)	0	22	2
Acute Visiting Service	1	0	1550	21
Rapid Access Paramedic	8 (rapid access)	0	0	0
Urgent Visiting Service	0	0	28	1
Urgent Care Clinics	14	101	2280	1630