

Patient pathway proposal for Connected Yorkshire

IMPROVING URGENT AND EMERGENCY CARE PATHWAYS FOR PATIENTS

1. Principal Organisations involved:

University of Sheffield
CLAHRC Yorkshire and Humber
Yorkshire Ambulance Service
Leeds Teaching Hospitals Trust
Sheffield Teaching Hospitals Trust
Sheffield Emergency Care Forum (PPI group)

2. Clinical Lead(s) (primary / secondary care):

- Dr Jonathan Thornley, Emergency Medicine Consultant, Leeds Teaching Hospitals
- Dr Susan Croft, Emergency Medicine Consultant, Sheffield Teaching Hospital

3. Research/Academic Lead(s) and roles:

- Professor Suzanne Mason, Professor of Emergency Medicine, Principal Investigator, School of Health and Related Research, University of Sheffield
- Jon Nicholl, Dean and Statistical Advisor, School of Health and Related Research, University of Sheffield
- Mr Colin O’Keeffe, Research Fellow and Project Manager, School of Health and Related Research, University of Sheffield

4. Technical/IT lead(s) and roles:

- Richard Jacques, Statistician, School of Health and Related Research, University of Sheffield
- Annabel Crum, Data Specialist, School of Health and Related Research, University of Sheffield
- Tony Stone, Data Specialist, School of Health and Related Research, University of Sheffield

5. Background & Need: (max 350 words)

Urgent and emergency care provide substantial health benefit across the world but increasing demand is leading to unsustainable pressure on services and need for health care funding. In the English NHS in 2012-13 there were 18.3 million attendances at major emergency departments, single specialty emergency departments, walk-in centres and minor injury units, at a cost of £2.1 billion; 5.3 million emergency hospital admissions, at a cost of £12.5 billion; 7 million ambulance service journeys; and approximately 24 million calls to NHS urgent and emergency care telephone services.

Failure of the urgent and emergency care system to manage increasing demand causes substantial public concern and political impact. Delays in ambulance response or emergency department assessment can lead to worse outcomes. Emergency department crowding is internationally recognised and may be associated with avoidable mortality. Failure to provide adequate emergency care is often central to scandals of poor hospital care. Over-burdening staff can lead to an unsustainable service. These issues make the delivery of urgent and emergency care an important priority for policy-makers and the public.

There is currently a lack of data to provide a detailed picture of the characteristics of demand in the UEC system. Individual provider data exists, such as ambulance 999 and emergency department (ED), but there has been no attempt to link data across different providers to show patient flow through the whole system, in order to understand how the system is used from the point of contact (such as a call to 999/NHS 111) through different parts of the system (into ED and into hospital). Understanding the system and how patients use it is key to developing appropriate patient-focussed interventions that can lead to a sustainable, safe and cost-effective system of care. This study will use data within cYorkshire from the Yorkshire Ambulance Service (incident details from calls to 999 and NHS 111) and link it with hospital data (ED/Inpatient) from a number of trusts and other healthcare providers such as primary care and 3rd part providers to analyse patient demand, flow and outcomes through these parts of the system.

6. Aim and objectives: (max 300 words)

This study will map the use of the urgent and emergency care system (UEC) in order to identify patterns of service use and outcome (such as mode of access, pathways of care) by different patient and demographic groups. This detailed mapping exercise will be used to identify groups of patients who currently utilise emergency and urgent care services in different ways and who may benefit from an alternative, more appropriate approach to care.

Objectives:

To link de-identified routine NHS data to describe a detailed profile of patient demand across both pre-hospital, primary care and hospital emergency and urgent care settings in cYorkshire, specifically to examine:

- A detailed picture of the pathways of care users of pre-hospital ambulance, urgent care services, ED and inpatient services utilise.
- A detailed case mix analysis of these users of pre-hospital ambulance and urgent care services and ED/inpatient services in order to understand patterns of service use by different patient groups or conditions (e.g. COPD, diabetes, mental health) and presentation based (e.g. frail elderly) in order to identify which patient groups present the greatest challenges to these services
- Identify explanatory factors affecting the use of these acute and emergency services including factors modifiable by services (such as availability of services e.g. community specialist nursing) and factors not modifiable by services such as population, geographical and health factors known to affect service use.
- Achieving these objectives will allow an accurate picture of challenges faced by a key part of the UEC systems in cYorkshire and will be the first step in identifying specific populations and geographical locations where particular issues exist with how services are used, which patient outcomes are measurable and important and where interventions may be best targeted.

7. Brief outline of implementation plan providing (i) overall key steps (ii) technical/IT activities to include linkage plan (500 words)

Data on individual acute patient episodes will be collected from participating services. We will therefore take an exploratory approach to the data in order to identify and understand the key groups of patients who are placing the greatest demand upon urgent and emergency care systems in cYorkshire. An initial descriptive case mix categorisation of the population and patient level datasets and key acute clinical conditions will form the first step in the analysis.

Data sources

Routine patient level data will be collected from electronic data sources e.g Ambulance Service Computer Aided Dispatch (CAD) Data and emergency department (ED)/inpatient Patient Administration Systems, GPRD/Research One data. This will be pseudonymised to allow linking. We will also explore obtaining data through the NHS Health and Social Care Information Centre.

Data items

Information will be extracted from the data to: 1) record information about the acute episode in order to link the pre-hospital episode with subsequent hospital attendance and; 2) provide clinical characteristics of the presentation, details of the pathway of care and disposition of the patient.

Data linkage

A proportion of ambulance service 999 (AS) and NHS 111 calls will be transported to EDs and other urgent healthcare providers. A process of pseudonymised data linkage of those pre-hospital emergency and acute care episodes conveyed will take place, in order to understand and detail the full pathway of care undergone by these patients. In these instances, the ambulance service CAD and NHS 111 data will be linked with data of participating healthcare provider in pseudonymised form. Based on our existing experience of data linkage through the CLAHRC study, we would anticipate linking 80-90% of AS and NHS111 data.

Analysis

Key emergency and urgent care indicators will be used to assess potential variation in system performance across cYorkshire which may be a result of patient case mix or due to locality based service factors. For this large time series analysis we will not have a specific sample size or power calculation. Sample sizes for time series are based on the number of data points (months) used in the model rather than the number of patients (or admissions). All the indicators of service use, performance and patient outcome will be analysed using a time series of monthly values. A simple AR1 time series regression will be fitted to the data to analyse a linear time trend.

8. Target population:

Populations and patients accessing urgent and emergency care

9. Data sources:

Routine patients level data from Yorkshire Ambulance Service, NHS111, acute hospital trusts, 3rd party providers of urgent care, primary care providers of urgent care, Health and Social Care Information centre.

10. Statement of likely intervention/care pathway improvement in lay terms

The aim of the project would be to:

Develop a whole system approach to detail the characteristics of local UEC demand in cYorkshire e.g demographics, case mix, demand for different services, deprivation and the associated factors (social isolation, proximity to services, health problems, lack of transport, living alone). Analysing these characteristics will allow interventions to be developed which are targeted at the right patients, based on best available and most up to date data. Specifically to:

- Focus on patients attending the emergency department unnecessarily and developing interventions for managing these patients more appropriately within the urgent and emergency care system
- Understand the pathways leading to short term avoidable hospital admissions and how these patients might be managed in a timely way but avoiding the need to come into hospital where this is appropriate
- Identify improved pathways of care for vulnerable patient groups such as the frail elderly and patients with acute mental health problems
- To examine urgent and emergency care systems throughout cYorkshire, and identify variation in performance, safety and pathways of care that could provide insight into best practice adoption.

11. Briefly describe how the project meets cYorkshire criteria: (max 500 words)

The project meets key criteria in the 5YFV around provision of urgent and emergency care services that are closer and more convenient for the needs of patients accessing it, and also leads to sustainable ways of delivering urgent and emergency care. There is a need for a whole system approach to detail the characteristics of local UEC demand in cYorkshire e.g demographics, case mix, demand for different services, deprivation and the associated factors (social isolation, proximity to services, health problems, lack of transport, living alone). Analysing these characteristics will allow interventions to be developed which are targeted at the right patients, based on best available and most up to date data.

The cYorkshire digital community will provide a unique opportunity to examine and evaluate the UEC system, giving insights into the current experiences and management of patients, and becoming a test-bed for the development and piloting of interventions that the data tell us would lead to benefits for patients, the community and services.

The project builds on feasibility work ongoing through the Y&H CLAHRC in using large datasets, linking them together and describing demand for urgent and emergency care, the patient journeys and their associated outcomes. This is useful in understanding both how populations currently navigate the complex urgent and emergency care system, but also is an opportunity for us to think 'outside the box' and develop strategies for managing our patients in the future. The dataset we currently hold, uses both identifiable and unidentifiable data for this purpose and is the only one in the UK to have achieved this at scale (14 acute NHS trusts and 17 emergency departments throughout Yorkshire and Humber). The CLAHRC theme has also led to the development of a robust network of NHS organisations who are collaborating to deliver data of this nature and are participating in a number of related studies in order to

inform the data being analysed. This gives us confidence that they will also support ongoing work of this nature.

We anticipate expanding this methodology to incorporate data spanning a longer period in order to examine trends in behaviours, but also to link in additional data from other providers such as out-of hours primary care, in-hours primary care, 3rd party providers and other relevant NHS providers that deliver urgent and emergency care services. This additional data linkage would provide us with a more comprehensive picture of the urgent and emergency care system allowing us to map patient flows within the system, and examine the management and outcomes of patients within it. We believe that achieving this using methodologies we have already established is feasible, but also deliverable on an ongoing basis and scalable to other sites throughout the UK.

12. Intervention resulting – key steps to successful intervention

Key factors of success will include:

- Obtaining comprehensive data from all relevant sources within the UEC system of cYorkshire
- Cleaning and coding the data for analysis
- Linking the data in order to provide a comprehensive analysis
- Producing analyses for consideration by experts and patient / public groups within services of cYorkshire to 1) feedback to services, ii) use to identify key areas for development of interventions
- Piloting and evaluating interventions within cYorkshire UEC system
- Developing the methodology for further roll-out of this technique of big data analysis
- Obtain funding for multi-centre studies to evaluate successful interventions

13. Main outcome measures:

Outcome measures will include:

Description of the characteristics of local UEC demand in cYorkshire e.g demographics, case mix, demand for different services, deprivation and the associated factors (social isolation, proximity to services, health problems, lack of transport, living alone). Analysing these characteristics will allow interventions to be developed which are targeted at the right patients, based on best available and most up to date data.

Specifically to:

- Focus on patients attending the emergency department unnecessarily and developing interventions for managing these patients more appropriately within the urgent and emergency care system
- Understand the pathways leading to short term avoidable hospital admissions and how these patients might be managed in a timely way but avoiding the need to come into hospital where this is appropriate
- Identify improved pathways of care for vulnerable patient groups such as the frail elderly and patients with acute mental health problems
- To examine urgent and emergency care systems throughout cYorkshire, and identify variation in performance, safety and pathways of care that could provide insight into best practice adoption.
- Pilot and evaluate interventions targeted at key areas identified within the UEC system as being likely to lead to direct patient benefit

14. Principal evaluation criteria (please see under item 12)

15. Opportunities for industry engagement: (partners in this project or potential partners after the outcome of the project)

The study presents opportunities for collaboration with 3rd party providers where this is possible. It is important that these providers are not excluded in analysing the UEC system. In parts of the UEC system in cYorkshire it is likely that some services are provided by 3rd parties – we will seek these out and discuss opportunities for including them as part of our analysis.