



OL1EV: NHS111 online Evaluation

**An Evaluation of the impact of online NHS111 on the
NHS111 telephone service and potential effects on the
urgent care system**

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Abbreviations

CAG	Confidential Advisory Group
CCG	Clinical Commissioning Group
DoS	Directory of Services
ED	Emergency Department
EUCS	Emergency and Urgent Care System
HRA	Health Research Authority
IUC	Integrated Urgent Care
NHS	National Health Service
NIHR	National Institute of Health Research
OOH	Out of Hours
PPI	Patient & Public Involvement
REC	Research Ethics Committee
SchARR	School of Health & Related Research, University of Sheffield
SSC	Study Steering Committee
WP	Work Package

Definition of terms

NHS111	A free to use telephone service the public can use to get help for urgent health problems. Callers are asked a series of questions by a call advisor and directed to an appropriate service (e.g. ambulance, Emergency Department, GP) or passed to a nurse for further assessment and advice on what to do.
NHS111 online	A web based version of the NHS111 telephone service. People can access the service via a website or an “app” and answer a series of questions about their health problem. At the end of the assessment a user is provided with information on what to do next – either to attend or make an appointment with a specific service, request a call back from an NHS111 nurse or, where available, receive a call back from an out of hours GP or other service.
NHS Pathways	This is the triage or assessment system used by NHS111 to identify what the health problem is, how urgent it is and what service is needed.
Emergency and Urgent Care System	This is the collective term for all the different services within a geographical area that people can use to access care for an emergency or urgent health problem. It includes the 999 ambulance service, NHS111, Emergency Departments (A&E), Minor Injury Units, Urgent Care Centres, Walk in centres, GP services (daytime and out of hours).
Integrated Urgent Care	These are developing services that bring together the clinical assessment functions of NHS111 together with other services so that appointments or referrals can be made directly with, for example, urgent care centres, GP out of hours services, emergency dental services and pharmacists.
Clinical Commissioning Group	These organisations have responsibility for identifying what health services are needed for a local community and agreeing (commissioning) which local organisations (hospitals, ambulance services, community services) will provide these services.
Directory of Services	This is a list of all urgent care services available in a local area including when they are open. NHS111 use this directory to direct people to the right service for their problem.
NHS Digital	This is part of the NHS that has responsibility for the development and management of digital technology across the NHS. It also collects and keeps secure patient information and other information on use of services.

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Summary of Research

Background: The NHS in England, and in particular the emergency and urgent care system (EUCS), is under serious and sustained pressure. Demand for services continues to rise each year and the ability to service this demand is increasingly constrained by difficulties in recruiting and retaining a sustainable workforce. NHS England has a number of policy strategies to address this problem including continued development of the NHS111 urgent care telephone access service to provide integrated services and care pathways that support providing patients with the right care first time. To help better manage urgent care access there has been a commitment to provide a complementary online service for NHS111 that can provide a similar function – triage health care problems and provide either self care advice or direct people to an appropriate service, whilst at the same time relieving some of the pressure on the telephone service. This also fits with a wider policy commitment to embracing technological and digital solutions to health care provision. After initial pilot testing in 4 sites operating an NHS111 online service there has been a rapid expansion and the service became available across England by the end of 2018. There is a need to evaluate these services to assess the current and potential future impact of an NHS111 online service on the associated telephone service to support decisions about future service refinement and development.

Aim: The aim of this study is to evaluate the impact of an NHS111 online service on the existing NHS111 telephone service and the wider EUCS. The main questions we will address are – what impact does an online system have on the demand for the associated telephone service and other services both now and in the future?; are there differences in the people who use the online and telephone services?; what are the experiences of people who use the online service?; what are the workforce implications of two different access points in to the urgent care system?, and what are the cost implications for the NHS?

Design: We will address these questions using a number of discrete but also interrelated tasks using a mixed methods approach.

- 1) Review the current evidence about telephone and digital access services to urgent care.
- 2) Use routine activity data to measure if the introduction of an online service has diverted some activity in the telephone service across a range of sites reflecting different provider and geographical characteristics and use the trends from this analysis to predict potential future use.
- 3) Use detailed online and telephone service routine data and a survey of service users to explore the characteristics of people who use each type of service, whether this results in different types of advice or direction to other services, establish what services people actually use and look in more detail at whether people using the online service find it accessible, useable and valuable.
- 4) Interview a range of staff and other stakeholders to explore whether the online service has had any effect on the telephone service in terms of helping improve how quickly they can respond to telephone calls, change in the types of calls they receive, effect on clinical assessment services and staff recruitment and retention
- 5) Measure the cost consequences of the introduction of an online service on the telephone service and wider system.

Combining the results from the different research tasks will allow us report both the individual results of each activity in different types of operating environments but also to provide a broader picture of the overall impact on services and the people who use them, compare results between

online services and the telephone service and the 4 pilot and assess what the potential implications of this might be for the future provision of NHS111 in terms of activity, service use and costs.

Project timetable: 16 month funded research programme.

- Initial set up: Ethical and research governance permissions; Identification of routine data sources and data specifications; update of existing systematic review; development of surveys (4 months March – June 2019)
- Routine data acquisition; quantitative time series analysis of NHS111 telephone and online service activity and processes; user surveys; online service detailed pathway analysis; qualitative interviews (9 months July 2019 – March 2020)
- Economic analysis : (4 months – April 2020)
- Data triangulation and write-up (4 months March – June 2020).

Expertise: Highly experienced team with track record of successfully delivering challenging urgent care related studies and service evaluation. Specialists in EUC systems research, health services research, routine data management, systematic reviews, statistics, health economics, qualitative research and a strong PPI input. Oversight by an expert study steering group of service provider, commissioner, methodology, clinical and policy stakeholders.

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Lay Summary

The NHS 111 telephone service is being used increasingly by people who need help deciding which urgent care services to use when they need help quickly. Recently, an alternative online NHS 111 service has been introduced. This allows people to use either a website or an “app” to answer a series of questions about their health problem rather than the telephone. The online service can provide advice about what the patient needs to do next (for example self care, see a pharmacist, make a GP appointment, go to an emergency department) or, if needed link the person using the online service to a clinical advisor within the NHS111 telephone service for further assessment. It is hoped that this will help improve access to services, and help to reduce the impact of growing demand for the NHS 111 telephone services. This online service is now being offered across England.

As it is relatively new it is not clear at the moment how effective this service is. The University of Sheffield will look at how well the new service is working in about 8 sites and assess what impact the new online service has on the existing NHS 111 telephone service. We will see whether the new online service provides similar advice to the NHS 111 telephone service, how many people have their problem resolved and how many go on to use the telephone service as well. We will also look at how the new online service affects the workload and the people who work at the NHS 111 telephone service. We will explore whether users of the online service follow the advice they are given, and how the new service may affect use of other health services in future. Finally, we will estimate the costs of the new online service.

To achieve this we will conduct five separate research activities. 1) We will review what current evidence there is on telephone and online urgent care access services. 2) we will measure the number of calls to the 111 telephone service and contacts with the online service over a four year period in the 8 study areas. We will use statistical analysis to measure if there has been a shift from the telephone service to the online service. We will also estimate what the likely future numbers of users for each service will be. 3) In selected sites we will look in more detail at what happens to people who use both the online and telephone services to see if there are differences. We will also ask users about their experience of using the services and what they did after their contact using a survey and, if possible, more detailed interviews with people who have used the service. A particular interest will be the experiences of the people that use the online service and their views on whether it worked well or was difficult to navigate. We will enlist the help of patient and public involvement groups to help us design this survey so that we ask questions that are relevant to the people who use the service. 4) We will also talk to staff to see if the introduction of the online 111 service has had any impact on their work. 5) we will use the results of the statistical analysis and survey to assess whether the new service has had any effect on the costs of delivering the overall NHS111 service.

We hope that by looking at these different aspects of the new NHS111 service we will be able to identify where it works well and whether any changes are needed to improve the advice provided to people who use it and make it more accessible and easy to use.

1. Introduction

What is the problem being addressed?

Urgent care is provided by a range of services including emergency services (999 ambulance service, emergency departments), urgent care services (GP out of hours, minor injury units, walk-in centres, NHS 111) and in-hours general practice (requests for same day appointments and telephone advice). There is widespread concern about rising demand for urgent and emergency care services. In England, the use of emergency departments rose from 7 to 14 million first attendances between 1966 to 2006.¹ Consultation rates per person in general practice increased by 10% between 2007 and 2014², whilst demand for urgent care services in the UK rose by 46% between 2006 and 2013.³ Telephone based services have seen a large increase in demand. Between 2009-10 and 2015-16, ambulance calls and NHS 111 transfers rose by an average of 5.2% per year, increasing from 7.9 million to 10.7 million⁴ and calls to NHS 111 have also risen, with projected trends for this service showing that calls will rise by a further 1.5 million by 2020.⁵ These demand increases are not wholly explained by population increases or an aging population.¹

With demand rising year on year and increasing difficulties in recruiting and retaining a sustainable workforce⁶, it is questionable if emergency and urgent care services have capacity to deal with future demand increases. With concerns about service provision, as it is currently delivered, reaching saturation “one important focus for the NHS could be strategies to reduce patient health-seeking behaviours and increase self-management” (Hobbs, 2016).² There are also concerns that some of this demand is due to clinically unnecessary service use, for example, where people chose a higher acuity service level than is clinically necessary.^{7,8} In 2013 the NHS England Urgent and Emergency Care Review was published and this sets out to address ongoing concerns about the increasing and potentially unsustainable pressure faced by emergency and urgent care services. Underpinning the review is the premise that care should be provided ‘as close to home’ as possible.⁹ Three of the five key themes of the 2013 NHS England review relate to finding better ways of managing people with non-emergency problems, and attempt to relieve some of the pressure faced by emergency services. These were: (i) helping people with urgent care needs to get the right advice, in the right place, first time, (ii) providing better support for people to self-care and (iii) providing highly responsive urgent care services outside hospital so that people no longer choose to queue in accident and emergency departments.

What is currently known about this problem?

Over the last two decades a number of different organisational interventions have been implemented in England to attempt to manage demand for emergency and urgent care services. These include telephone advice and triage via NHS direct¹⁰ and also NHS 111, which is a telephone service to provide clinical assessment and direct people with non-urgent or low acuity non-emergency health problems to the most appropriate service for their clinical need.¹¹ Despite the apparent success of these services in terms of receiving large call volumes, they have had little impact on reducing demand for emergency services.¹¹ Current NHS England data shows that in April 2018 there were 1,338,253 calls to NHS111, an average of approximately 46,100 per day. Outcomes of these calls were that 21% had ambulances despatched or were recommended to attend an ED; 60.7% were recommended to attend primary care; 4.6% to attend another service; and 14% were given information or self care advice. The five year forward view policy¹² has prompted significant effort to further enhance the NHS 111 service by increasing the clinical assessment capacity and supporting more integration with other services. It has also highlighted the potential for some lower urgency calls to be handled through online services which may relieve some of the pressure on the

telephone service, make more efficient use of the workforce, support demand management and reduce costs. An online service also fits with the broader aspirations of exploiting technological innovations to improve healthcare delivery and offer alternative access systems in a world where digital solutions have transformed the way people live. Introduction of a similar online service in Australia resulted in a call decrease of 33%, after 3 years of the service being introduced.⁵

In response to this policy 4 pilot online NHS 111 services were introduced in 4 different geographical areas England in 2017. A useful description of these services is provided in a recent discussion¹³ but briefly they comprised online and app-based platforms that provide symptom checkers and advice on what users should do next, either self care advice or contacting another service. The services have with variable levels of interoperability to other services in the EUCS, for example some may simply advice people to contact another service and others have the ability to directly connect patients to the clinical advice service at the telephone NHS 111 service or book appointments with other services. Recent results from the pilot study reported that “NHS 111 Online uptake across all pilots varied between 2 – 15%, but on average was approximately 6%”,⁵ however it is hoped that uptake would increase over time to a similar level to that reached in the Australian service. During 2018 the service rapidly expanded to cover the whole of England. In addition a decision was taken to use only one of the original 4 platforms across the country. This is the online application developed from the NHS Pathways clinical assessment system used by the NHS111 telephone service and is now being used nationally.

In order to ensure uptake of a new service, the reasons why people chose to this service need to be taken into consideration during the design and implementation of new services. These reasons are many and varied and include influences such as access to primary care; perceived urgency, anxiety and the value of reassurance from emergency-based services; views of family, friends or healthcare professionals; convenience and perceived need for ambulance or hospital care, treatment or investigations.¹⁴

However, there is also a risk that this new system may increase overall demand, duplicate health care contacts, change the pattern of service use through differences in triage outcomes, remove some of the “gatekeeping” the telephone service provides or provide unsafe advice. Lack of consideration of the many and varied reasons why patients chose particular services¹⁴ may influence uptake of an online service. A recent systematic review of on digital and online symptom checkers for urgent health problems undertaken by the University of Sheffield found that there was little evidence to suggest that digital and online symptom checkers are harmful to patient safety, but this may be due to this outcome only being reported by small, short-term studies.¹⁵ Deficiencies have been reported in the diagnostic and triage capabilities of symptom checker algorithms that would potentially be used in a digital 111 platform.¹⁶ The systematic review identified that research is needed to investigate the pathways followed by patients using a digital 111 service and to identify whether the overall number and level of contacts with the health system can be reduced without affecting the quality and safety of patient care.¹⁵

Why is this research important?

This research has been designed to meet a clear need set out by NHS England to evaluate the current NHS111 service and establish the current and future potential impact of an online service on the existing NHS111 telephone service and wider urgent care system. There is a commitment to providing a national NHS111 online service but robust evidence is needed to inform future plans about what the online offering should look like, the likely impact on service use and associated costs and identify any potential unintended consequences that need to be addressed as the service continues to develop.

2. Aims and objectives

The primary aim of this study is to evaluate the impact of providing an NHS111 online service to access urgent health care advice and signposting to services on the telephone based NHS111 service. The secondary aim is to explore the potential effects on the wider urgent care system and the implications of providing a national NHS111 online service. The objectives are to:

1. Update and summarise the evidence on digital and telephone based services for accessing urgent care building on existing systematic and rapid evidence reviews.
2. Measure the impact of the NHS111 online system on contacts with the NHS111 telephone service, and estimate the effects on other services in the Emergency and Urgent Care System and NHS111 services in the future.
3. Explore and compare in detail the characteristics of users of the NHS111 online service and the NHS111 telephone service, service processes, patient care pathways and user experience and satisfaction
4. Assess the practical issues associated with implementation of the new service, the workforce implications of any changes to the overall NHS111 telephone service and specifically the impact on Clinical Assessment Teams
5. Estimate the cost consequences of implementing an NHS111 online service on the overall costs of the combined online and telephone 111 services and model the potential cost effects for the Emergency and Urgent Care System.

3. Study Design

Design and conceptual framework

The overall design is an observational mixed methods study using a sequential set of discrete but interrelated work packages. There is no established and agreed theoretical framework to underpin the delivery of urgent care but we will use three conceptual approaches to guide and interpret this research.

- Our recent extensive evidence review of models for delivering urgent care¹ found a clear consensus that evaluation research concerned with provision of urgent care services needs to take an emergency and urgent care system-wide perspective, rather than focus on a single service. This research uses a whole system model.
- Provision of an NHS111 online service is one element of the broader NHS England Emergency and Urgent Care strategy set out in the 2013 Keogh Review⁹ and is relevant to the principles set out in that review of providing access to care that is “right first time”; providing better support for people to self-care and providing more care closer to home in local communities. More specifically, enhancing the NHS111 service by improving integration with other services to provide efficient patient care pathways, increasing clinical assessment and adding an online access gateway are critical to the concepts set out in the NHS Five Year Forward View¹² to help manage demand for urgent care. More broadly the addition of an NHS111 online service fits with the NHS Digital Technology strategy to harness the potential of digital technology in ways that can empower and support people to take control of their health and care¹². The call for this research is embedded in a very clear policy need and these underlying urgent care policy principles have been used to frame the questions and design of this study and will be used to support interpretation of findings.
- NHS111, whether a telephone or online service, provides a point of access for people who have health problems they perceive to be urgent. Demand for and use of urgent care services is driven by the health seeking behaviours of a population but these have been poorly understood. This issue is being addressed by two current NIHR funded studies by Turnbull (on sense-making strategies and help-seeking behaviours associated with use of urgent care)¹⁷ and O’Cathain (a population study on drivers for demand for urgent care).¹⁸ The study by Turnbull is due to report this year and the results of the O’Cathain study in 2019 (three members of this research team are also co-applicants on this study) and so we expect that the findings of these studies will provide a conceptual model for urgent care health seeking strategies and behaviours that will be of value to the interpretation of the findings from this proposed study.

Service and Setting

The NHS111 online service is now available across England. Although a national service, NHS111 commissioned by Clinical Commissioning Groups (CCG’s) and is delivered by a range of providers to geographical areas that vary in size.

The NHS111 online service has been designed so people can get medical help or advice using a smartphone, laptop or other digital device. Users of the service can ask questions about their symptoms, get advice about what to do and where to go and, if needed, get further advice from a nurse, doctor or other health trained professional. The service can be accessed via a website

<https://111.nhs.uk/> or the NHS App <https://digital.nhs.uk/services/nhs-app> (for smartphones and tablet devices).

Implementation of the NHS111 online service has occurred in 3 phases;

Phase 1 – People accessing the service can answer questions about their health problem and the results direct them to the appropriate service using the local Directory of Services (DoS).

Phase 2 – In addition to advice on appropriate service users can also, where needed, book a clinical call back from the telephone NHS111 service or Integrated Urgent Care (IUC) provider

Phase 3 – In addition to 1 and 2 above users can also receive a call back from services such as out of hours GPs, dentists and other services where the technology links have been put in place to accept referrals from the online service.

In consultation with NHS Digital (who have responsibility for the NHS111 online service) we have identified a set of study sites that reflect a range of characteristics relevant to service delivery and which can therefore help identify any variation in service impact. The factors considered were;

- Length of time the NHS111 service has been in operation (early and late implementation)
- Provider type (ambulance service, social enterprise, private)
- Geographical area coverage (urban, rural, mixed urban & rural)
- Service implementation processes (phased steps, full service)

The 9 study sites are:

- Yorkshire & Humberside
- North West (Mersey; Greater Manchester; Lancashire & Cumbria)
- Cambridge & Peterborough
- Bedfordshire & Luton
- South West London
- Lincolnshire
- Staffordshire
- Hampshire
- Surrey

Early in the study a detailed description of each operating model will be produced. This will then help identify some of the possible detailed analyses we will undertake to assess user characteristics, service processes and care pathways and select a smaller cohort of sites (up to five) from the 9 main sites for some of the more detailed work in work packages 3 and 4.

4. Research Methods

We have designed a set of work packages (WP) to address the objectives of the study.

WP1 – Rapid update of the evidence base on telephone and online urgent care access services

This addresses objective 1. In recent years this research team have conducted a number of related systematic and rapid evidence reviews in the topic area. Most recently the NIHR Rapid Evidence Review Centre based in ScHARR has conducted a systematic review of digital and online symptom checkers and health assessment/triage services for urgent care.¹⁵ We have therefore already synthesised the related evidence in detail. In 2015 the Rapid Evidence Review Centre also published a review of models for urgent care (led by JT)¹ which included a comprehensive analysis of the evidence on telephone triage services. In 2012, as part of our earlier evaluation of NHS111 telephone service pilot sites, we published a systematic review of the evidence on appropriateness of and compliance with telephone triage advice.¹⁹ Given this is a time limited study we therefore propose to update both the 2015 and 2012 reviews. We will utilise the existing search and review strategies (for example inclusion and exclusion criteria) used for these reviews to identify relevant new evidence from the cut-off point of the earlier study up to the end of December 2018. The purpose will not be to re-write these reviews but to assess whether there is new evidence that changes the overall findings and conclusions of the earlier reviews and which might influence the conduct and interpretation of this study. If there is a substantial new body of important evidence then updated versions of the earlier reviews will be produced.

We are conscious that use of digital technologies is a fast moving environment and that new evidence may be published during the lifetime of this project that may be of relevance. We will therefore update the recently completed review of digital urgent care triage services in the last quarter of 2019 to establish if additional evidence has become available. In addition, the highlight notice for this call makes reference to the online symptom checker introduced as part of the Health Direct service in Australia, however we have been unable to identify any published evaluation of this service. There are obvious similarities with the UK system and so we will establish personal contact with the providers of this service to explore accessing any pending publications or sharing of data which may be of mutual benefit during the lifetime of this project.

WP2 – Estimating the impact of NHS111 online on the NHS111 telephone service and the Emergency and Urgent Care System (EUCS)

This addresses objective 2.

Users of NHS111 online may be advised how to care for themselves or to contact other services for care or advice. These other services include telephone 111, 999, GP out-of-hours, their own GP (in-hours), ED, urgent care walk-in services or pharmacists, for example. Ideally we would use linked data to provide a complete record of each caller encounter with the EUCS but, as described in more detail earlier, we do not think this is feasible. Because of this, we are not proposing to investigate the impact of the NHS111 online service on the whole EUCS using routine data. Instead we will:

1. Estimate the impact that the use of NHS111 online a) has had, and b) will have, on the use of the NHS111 telephone service using routine NHS 111 data.
2. Estimate the impact of the use of NHS111 online on the numbers of patients being advised by a) the online 111 service and b) the 111 telephone service to contact each of the other services in the EUCS using routine NHS111 data.

3. Estimate the impact on the actual use of these other services using a model based on primary survey data collected in this study (see WP3) and existing research data on the extent to which disposition advice is followed.

Methods

1. In order to look at the impact of online NHS 111 on use of the NHS 111 telephone service, we need to consider both users who have used the online service only, the telephone service only, and those who have used both. The impact cannot be measured purely in terms of NHS 111 telephone calls that originated through the online system as we need to consider new demand (i.e. people who would not have used the telephone service at all), substitution (those who use the online service instead of the telephone service) and duplication (those who use both).

We will obtain data on the number of contacts each month with the NHS 111 online service which reach a disposition (the 'dose') and the total number of calls each month to the 111 telephone service, from people giving addresses (postcodes) in each of the 9 areas we are studying (the 'effect'), for the 4 years spanning before and after the launch of the online service. The sites became "live" between February 2017 and July 2018 so we will use the period February 2015 – July 2019 to include at least one full year of NHS111 online operation in each site. The long "before" period is helpful in order to establish the underlying trend in usage of the NHS111 telephone service. We will model the effect as a function of the dose using a time series model (with Normal outcomes using the Prais-Winsten procedure in R or Stata). We plan to use a simple model, using only a 1month time lag, and assuming a linear functional form for the relationship between dose and effect. The model will be fitted separately for each site, and will include some systematic components: an underlying time trend (again assuming a simple linear form), and 'fixed' seasonal effects. Because it is possible that there were other changes affecting both the NHS111 service (e.g. increasing the clinical assessment capacity) or the whole EUCS at the time the online services started (such as new policies, media stories, flu epidemics, etc.) we will also fit a 'step' at the time the online service was launched. We will check all assumptions, and if necessary, adapt the model. We will then conduct two different analyses;

- i. Ideally the confounding effects of other changes affecting the EUCS would be accounted for by comparing sites introducing NHS111 online with a matched control site with no online service. The rapid expansion of the new service across England limits the availability of suitable control sites but we will conduct one analysis to estimate the impact of introducing NHS111 online by comparing change in two early ambulance service provider implementation sites with a "control" ambulance service site where the service was introduced 6 months later.
- ii. For all sites (including those in [i]) we will estimate changes in call activity after the introduction of NHS111 for each site. The study sites have been chosen to reflect a range of operating environments including different types of NHS111 service provider, geography (e.g. urban and rural areas) and NHS111 implementation processes. This will allow us to describe effects in individual sites and make comparisons between sites to provide a comprehensive picture of whether there are differences or consistencies between types of site in the impact of the new service on the existing telephone based service.

It is important to appreciate that, unlike in a conventional controlled interrupted time series model, it is NOT the size of the step at the time of the launch of NHS111 online that is of interest in our analyses, instead it is the size of the parameter representing the effect of the 'dose'. Indeed, in analysis i) the step, along with the time trend and seasonal effects, will be constrained to be the same in both the pilot site and the control area. In our models the step simply represents any

widespread effect at the time of the launch of NHS111 which otherwise might be interpreted by the model as an effect of the dose.

In analysis ii) we will compare the effect of the 'dose' from each of the sites by plotting the estimates and associated standard errors on a forest plot. We will then assess the estimates for heterogeneity. If heterogeneity is found, we will describe the differences in the estimates from different types of environments or providers using summary statistics. If the estimates are homogeneous then we may be able to combine them using standard meta-analysis methods.

2. Using the results of these models we will be able to estimate what the impact of NHS111 online has been on the NHS 111 telephone service, that is, if there is a detectable signal that the online service has resulted in any channel shift away from the telephone service or if there is duplication (for example if some users of the online service subsequently also separately make a call to the NHS111 telephone service to check the online advice is correct). We will also use estimates of future online use and using the model will estimate the likely impact the online service may have into the future.

It is of course possible that the impact of NHS111 online will be different further down-stream. Depending on the nature of the problems for which people use the online system, those who use the online system and are then contacted by the telephone advice service may be directed to different dispositions than other callers. The data we collect on NHS 111 telephone calls will be broken down by disposition to self-care, or other services, and the model described above will be fitted separately (and independently) to the counts of NHS 111 telephone calls resulting in each of the major categories of disposition (self- care, GP, 999, ED, other).

Data source – The data required for tasks 1 and 2 is the routine administrative data collected by all NHS111 services and is essentially the same variables used for reporting of the national NHS111 minimum dataset²⁰ (e.g. call volumes, triaged calls, dispositions, call backs, referrals).

Telephone service: For each study site we will request a dataset for each month of the 4 year analysis period that includes these variables split by important characteristics such as age groups, gender, in hours and out of hours, weekday and weekend and CCG area, **Online services:** We will request a basic dataset for each site with variables including contacts, contacts completed to a disposition, disposition types including transfers to the NHS111 telephone system or other services such as a GP Out of Hours (OOH) service and split by the same characteristics described for the telephone service data.

3. In (2) estimates of system effect are based on the advised dispositions. The actual impact on services depends on the extent to which people follow this advice or instead make their own, different, choice of which service to contact. As part of this study we will survey users of both the online and telephone NHS111 services and include questions about compliance with advice and what actual services users contacted. We also have data on the numbers of people who adhere to the advice they are given over the telephone and subsequent care for their health problems from our previous studies of NHS Direct¹⁰, NHS111¹¹ and a related systematic review¹⁹ which will be updated as described in WP1. Using the survey data, this historical evidence and any more recent work on compliance with NHS 111 held by NHS111 providers or NHSE we will use this best data to inform a model of the potential impact that changes in disposition advice resulting from the use of online services might have on actual use of downstream services.

WP3 – In depth assessment of the NHS111 online service

This addresses objective 3.

OL1EV

Protocol v1 07/03/19

A key aim of the NHS111 online service is to re-direct some of the demand for the NHS111 telephone service to this complementary service. It also aims to provide an alternative point of access that may be preferred by some sectors of the population. This will only be achieved if the online service: a) performs primarily as a substitute for, rather than addition to, the telephone service (that is, it doesn't simply add another step to the patient pathway or change demand for one part of the service) and b) functions in a way that allows users to complete the assessment process and provides them with advice that they trust and follow. WP1 will provide an indication of the overall traffic to the two NHS111 services and any channel shift from the telephone to the online service. In this work package we will undertake a more detailed exploration of the online service compared to the telephone service in selected study areas to;

- a) provide a better understanding of the characteristics of the users of each type of service
- b) assess the impact on service processes and care pathways within NHS111 and across the EUCS.
- c) assess user views about the online service including the accessibility and usability of the online services.

We will undertake 3 tasks within this work package;

1. Quantitative data mining of NHS111 online and telephone NHS111 contacts to look for important relationships that can explain differences between the online and telephone populations and the impact on processes and pathways.
2. A survey of users of both the online and telephone services to elicit common outcomes about service use and overall experience and satisfaction. For users of the online service this will also include specific questions about their views of and experience with this service.
3. More detailed interviews with a small number of users of the online service to look at these factors in more detail.

1. Quantitative data mining

This approach has the potential to provide a detailed and rich understanding of the NHS111 services by examining multiple combinations of factors that are more nuanced than simple activity analysis. However, the success of this approach will be dependent on the availability of individual call or contact level data. In order to simplify the data collection and associated permissions process so that this work can be completed within a relatively short timescale we have confined the data requirements to the NHS111 services only.

Methods

The original funding proposal for this work allocated resources to conduct this strand of work in 4 pilot sites. As the service is now national we have increased the number of sites for the quantitative analysis described in WP2, but the funded resources prohibits increasing this more detailed analysis at the same scale. We will select a maximum of 5 of the 9 study sites for this analysis which reflect operational differences such as service provider type and geographical differences.

We will request data for the full year July 2018 – June 2019 reflecting a full year of operation of NHS111 online in selected sites. Volume of activity varies with the geographical size of each site but current usage (February 2019) of the NHS111 online service indicates between 1000 and 11,000 completed triages per month. We will conduct a series of analyses which will include but is not limited to:

- 1) Process measures: we will assess whether simple process measures for the telephone service change following the introduction of the online service. Process measures include: rates of calls abandoned, proportions of calls answered within 60 seconds, calls triaged, calls sent for clinical assessment and calls waiting more than 10 minutes for a call back.
- 2) User characteristics: we will describe the characteristics of users of the online and telephone NHS111 services including age and gender profiles, times services are used (weekdays, weekend, in hours, out of hours), geographical locations types, reasons for contact (clinical problem)
- 3) Service effects: We will analyse the allocation of different dispositions as a proportion of all contacts for both NHS 111 online and NHS 111 telephone service. This will include proportion of clinical assessment calls originating from NHS111 online, total contacts and proportions triaged and abandoned, total clinical assessment workload, average call times for clinical assessment, waiting times for call backs, dispositions following clinical assessment, use of other clinical hub professionals. Where there is a function to book appointments via the online service we will measure if this differs to the telephone service.
- 4) For NHS111 online we will specifically look at completion rates and, if sufficiently detailed data is available, look for any peaks in specific 'locations' (page of the app or website) where a disposition is not reached and users abandon online 111 (e.g. closes the page/app). Peaks suggest a particular localised problem, whereas a generally distributed abandonment may suggest a broader dissatisfaction with e.g. speed of use.

For each of these groups we will use standard statistical analyses, descriptive and multivariate regression to describe characteristics and effects for each online and related telephone service. These can be compared for a) the selected different online services and b) between the online services and the telephone service to describe differences in the populations using each type of service.

There are also a large number of comparative analyses that can be made both within services and between services (for example relationships between age groups and call types, time of day and disposition type, call type and disposition, disposition types after clinical assessment for online and telephone contacts, abandonment rates and age profile). For these we can use specific data mining methods, called tree-based methods (recursive partitioning), including CART (Classification and Regression Tree)²¹ and CHAID (Chi-squared automatic interaction detection)²², to classify, for example, the different dispositions that are arrived at, and whether these are related to the demographics and the problems people call/go online for. We will also use the results of the user surveys (described below) to supplement this work.

These individual analyses will shed further light on differences between the NHS111 online populations in terms of characteristics and health seeking behaviours. They will also enable exploration of workload implications, for example if there are differences between the online and telephone based services in the volumes and length of call times for clinical assessment. To some extent the number and detail of these detailed analyses will depend on the granularity of the data we can obtain. The final analytical combinations explored will be determined by data availability, and agreement with the study steering committee, to ensure we include, where possible, the full range of factors that will be important to policy teams, commissioners and providers.

Data sources

- The routine administrative data described for WP1. If all the main variables currently included in the NHS111 minimum dataset are collected for this work package then we can assess whether there have been changes in some of the important telephone service process variables.

- Online services – for the detailed exploration we will require a larger number of variables and at an individual contact level. This would comprise the basic administrative data held by each site on contacts, timings, basic demographics (age, gender) completion rates to disposition AND the detailed triage process data recorded for each contact as they proceed through the online assessment to either exiting the service or arriving at a disposition. The Administrative data may be available centrally from NHS Digital or, if not, we will request this from participating sites. The triage data is collected centrally by NHS Pathways (which is part of NHS Digital) who will provide de-identified data.
- NHS111 telephone services – similarly, there will be more value in the detailed analysis if this can be replicated for the telephone service so we can assess what variation there is between the online and telephone user populations. This would require equivalent administrative individual contact level data either held centrally or from participating sites. As above, the only call assessment system used for the NHS111 telephone service is NHS Pathways so the individual call level data will be requested alongside the online service data from NHS Pathways.

2. User survey

We anticipate that a substantial proportion of the questions being addressed in this study can be answered using routine service based data. However, there are two specific issues we consider can only be explored by conducting a survey of NHS111 service users. These are: a) what actions were taken and services accessed by NHS111 users after their encounter with the service, and b) user views on the experience of and satisfaction with their encounter with a service. We propose to undertake a survey of users of both NHS111 Online and the NHS111 telephone service, although there will be some common questions and differences for each group, to collect this information.

Four or five geographical sites will be selected for the purpose of this work. Where possible we will select sites to ensure that the sites chosen represent both NHS and non-NHS providers, and cover differing geographies (i.e. urban and rural).

Recruitment and Methods

Recruitment poses some complexities as the method of approach for each service group will need to be different. We also know that response rates to this type of user survey are low – the earlier evaluation of NHS111 Online reported low numbers and a response rate of around 8-10%.

NHS 111 Online

NHS Digital have developed, and currently administer a survey to users of the service. All users have the option of completing this online survey, immediately following their assessment with NHS111 online. The survey includes items on user satisfaction, in addition to questions about whether the user *intended* to follow the advice given, and if they planned on contacting another health service. On completion of this survey, users can opt in to take part in further research. This takes the form of a ‘follow up’ survey (administered approximately two weeks after assessment). The follow up survey is a short instrument which addresses the user’s reported actions, and use of health services, in the seven days following assessment, how the health problem was seven days after assessment, satisfaction with the service, and likelihood of using NHS 111 in the future. The survey includes a number of free text questions allowing users to expand on their answers.

Participants are also asked if they give permission for their survey data to be linked to the data collected as part of the NHS 111 Online assessment.

We propose to utilise the information gathered as part of the NHS Digital follow up survey for the purpose of our study. NHS Digital have indicated that there is scope to add some additional questions if the existing questions do not cover all the areas of interest for this study. However, we would expect the number of additional questions to be small as the current survey is comprehensive. If we were to administer a further user survey, in addition to the two surveys currently administered by NHS Digital, this could compromise response rates (both for ourselves, and NHS Digital).

We will seek permission to obtain this data from NHS Digital. In order to access this data we will also need to comply with both ethical and data protection regulations to ensure any responses to a survey can be shared with the research team.

NHS111 telephone service

Providers of the NHS 111 telephone service are required to conduct a user experience and satisfaction survey and report this twice per year with a minimum of 200 responses for each 6 month period. Following discussion with providers, we are aware of the variation in terms of the how often they recruit to surveys (weekly, monthly) how they carry this out (postal, telephone, electronic), and the questions that are asked of users. We plan to utilise the existing survey processes during the study in our sites but will request some additional questions are asked as part of the routine survey.

We plan to use a small number of questions to ask service users what advice they were given, what subsequent course of action they took including which services they contacted, what happened to them, and overall satisfaction with the service. Some of these questions are currently asked of users of the NHS 111 telephone service, and were derived from the survey we used in our previous evaluation of the NHS111 telephone services²³. This survey is currently used as an example for NHS111 telephone services patient experience services and although not mandatory some of the questions included are. We will seek to adapt questions currently used as part of the NHS 111 Online survey, to use in this survey. The key point is that some of the questions will be worded exactly the same across both the surveys of online and telephone NHS111 users so that we can compare any differences. This information will also be used for the detailed analyses of care pathways described earlier for WP3 (data mining) and the estimates on whole service effects in WP2.

Similar to the free text options available to NHS 111 Online survey participants, a free text box will be provided for respondents to provide their own views of what features of the service worked well and which ones did not meet their expectations and might be improved.

Unlike the survey of online users, the survey of telephone users is not administered by a single organisation. Careful consideration will need to be given to ensuring the correct final permissions are in place to share data from the survey and we will work with each site to fit this around existing permissions processes.

Sample sizes

Our understanding, from NHS Digital, is that currently approximately 50% of users completing the initial survey, opt in to receive the follow up survey. In the Yorkshire region, approximately 50 NHS 111 Online users complete the initial survey, weekly. Therefore, we estimate that 25 users will receive the follow up survey each week (in Yorkshire). We are unclear of response rates to the follow up survey, but it is likely that it will take a minimum of 4 months to achieve

the target of 200 responses across four sites. We aim to collect a minimum of 800 responses from the follow up survey administered by NHS Digital.

For the telephone service survey, it is again difficult to be precise as each service may differ however services do appear to contact large numbers of patients for the purpose of the survey. Recent discussions with Yorkshire Ambulance Service indicate that they receive approximately 750 survey responses each quarter. As with the online users we will aim to collect a minimum of 800 responses from the telephone based service, across the same study sites identified for the survey of online users.

Survey Analyses

Responses to surveys will be entered in to SPSS. We will look at the survey data in three ways:

a) For online users, we will use descriptive statistics and frequencies to report responses to questions such as numbers of subsequent contacts, services used, overall levels of satisfaction and convergence and divergence with advice given. These will be compared between b) four NHS 111 Online sites, and c) online and telephone services.

Reported data on services used will also be used in WP2 for service use estimates and WP3 as additional variables for detailed quantitative data mining analyses.

The free text comments will be transcribed and analysed to identify themes using the same criteria frameworks for question construction.

NHS 111 Online user Interviews

Recruiting participant service users for more detailed interviews about their experience using the online service can be difficult but we will attempt to recruit and conduct semi-structured telephone interviews to explore in more detail factors that will be important to the design of future online services, and explore any potential channel shift between the telephony and online services provided by NHS 111.

At the end of the NHS 111 Online follow up survey, administered by NHS Digital, participants are invited to take part in a telephone interview to gain further insight about the service. We will liaise with NHS Digital regarding the recruitment of potential interview participants as part of the current process. Judging suitable sample size is difficult when interviewing users of a service that will be accessed potentially by thousands of people every month in terms of generalisability and ensuring a range of views are considered. We will aim to recruit up to 40 participants, across our study sites. We expect this to generate a large volume of detailed material sufficient to identify major themes.

Survey participants who indicate a willingness to participate in a follow up interview will be contacted within 2 weeks, the purpose of the interview explained and consent obtained. Telephone or face to face interviews will be offered, and will be undertaken by the research team. Interviews will be recorded and questions will include reasons for using online or telephone services, barriers/facilitators to use, differences between types of platform (app, web-based), exploration of whether online advice was followed. We will also explore the reassurance offered by online health assessment, and how this compares to face to face or telephone assessment. Technology Acceptance Model (TAM)²⁴ and Unified Theory of Acceptance and Use of Technology (UTAUT)^{25,26} criteria will be used to frame questions to elicit reasons why users find accessibility easy or difficult, their confidence in using technology based services. Particular consideration will be given to acceptable speed of use given the 'urgent' context and following the pathways through the assessment process.

Interviews will be transcribed verbatim and analysed using thematic analysis²⁷ to identify recurrent and common themes in responses and mapped to identify where there is convergence

and divergence of themes in relation to user characteristics. The themes identified from user interviews will be triangulated with the outputs of the free text comments from the larger sample included in the online survey.

WP4 – Impact of the NHS111 online service on service provision

This addresses objective 4.

The quantitative analyses in WP 2 and data mining and analyses in work package 3 will provide information of what effects the online service has had on NHS111 call activity and pathways of care. What they cannot necessarily tell us is how these arose from an operational perspective and the effects of change on service delivery from a provider perspective. This work package addresses the implications for the NHS and in particular service providers to explore the “real world” effects of the introduction of the new service and identify if there are any areas of operation where further refinement and development of the operational model are needed or consequences that need to be considered for future service commissioning.

Methods

We will conduct a qualitative interview study with NHS111 services and related stakeholders to explore these factors in 2 key areas:

- a) The practical implications for NHS111 in setting up, running and linking the online service with the telephone based service including the workforce implications. One of the drivers for a move to an online NHS 111 service is a need to maintain a sustainable workforce for the telephone service. Demand for this service creates real pressure in terms of providing a timely and responsive service. There is potential for the online service to improve the telephone service by diverting some calls away but also potential to increase activity if, for example, a substantial proportion of online assessments are diverted to the NHS111 clinical assessment teams.
- b) Changes in the pathways of call management or overall volumes of calls may have an impact of other services within the EUCS but how these manifest in terms of day to day service operation may not be clear. Qualitative research may help explain what effects occur.

Recruitment

For a) the focus is within NHS111 services as the practical effects of implementing an online service, including workforce effects, will be evident here. Within each of the 4 - 5 selected sites we will undertake qualitative semi-structured interviews with 5-8 stakeholders, including at least one commissioner, clinical advisers, call advisers, supervisors, performance managers and workforce planning. The focus will be to identify challenges and barriers to implementation of NHS 111 online (for example technical issues, any additional staff training, monitoring online activity, clinical governance) as well as the workforce implications of the introduction of NHS 111 online. An interview schedule will be constructed to explore a number of themes including: any demonstrated performance improvement, for example reducing the number of calls not answered or reducing queues for clinical assessment; any perceived change in the types of calls received by the telephone service; impact on recruitment/retention of both non-clinical call handler and clinical assessment staff; staff morale, workload and perceived sustainability of the NHS 111 telephone and online services.

For b) addressing the wider system implications is more complex. The NHS111 telephone service resolves or manages around 80% of calls within primary or community services or with self-care advice. Less than 20% are directed to the ambulance service (11%) or emergency departments (8%). It may therefore be difficult for individuals within the latter 2 acute services to discern any tangible effects from the introduction of NHS111 online. Effects may be more noticeable within primary care. We will conduct 4-6 interviews with stakeholders from the wider emergency care system in each selected site including primary care (in hours and out of hours services), ambulance services and commissioners but will take the advice of our steering group on the potential for value in including emergency departments. Question themes will include any change in activity, types of calls and appropriateness and impact on workload. We will also explore any early findings from work packages 2&3.

Potential interviewees will be identified in each site with help of the local site research lead and contacted to ask if they would be willing to take part. Participation will be voluntary and appropriate information provided and formal consent obtained from participants who agree. Interviews will be conducted face to face or by telephone depending on the preference of individual participants and will be recorded using an encrypted digital recorder.

Analysis

Recorded interviews will be transcribed verbatim. We will use framework analysis²⁸ to explore the main themes used to construct the interview schedule and identify any new emerging themes and subthemes including cross-cutting themes. These will then be mapped and compared for the different site characteristics (provider type, geographical area) to look for similarities and differences. Qualitative interviews can also provide useful practical information around “lessons learned” as the online service has embedded and matured which can be of value to the ongoing iterative process of development and refinement of the new service. We will identify any key lessons that emerge from the data in a summary format that highlights key findings using the broad categories used in our previous work on NHS111.²³ These include: technological issues; staff issues (including training); clinical governance and oversight; safety monitoring; criteria for choosing an online platform; marketing and publicity; implementation costs. We will also use a generic implementation framework to help identify important contextual factors which need to be considered in summarising the findings.²⁹

WP5. Economic evaluation

This will address objective 5.

The economic evaluation will estimate the costs of the two service models (Telephone and NHS111 online) and report these in tandem with the other service valuation data; this is termed a ‘cost-consequences analysis’. The evaluation will take the NHS perspective and will have a nominal time horizon of 7 days which will cover the initial NHS111 contact and up to two further contacts with NHS services. The evaluation is similar to that used successfully for the evaluation of NHS 111 pilot sites.²³

Methods

The cost analysis will comprise of two parts. First, the costs associated with the initial contact (either telephone or NHS111 online), and second, contact with subsequent NHS services. The two parts will be combined in the form of a simple decision tree, with events being characterised as chance nodes

and costs of each pathway calculated at each terminal node. The calculation of initial contact costs is simple, utilising the results of the interrupted time-series analysis in WP2, with changes in the number of calls being costed using unit costs from the individual services. Subsequent use of NHS services (capped at 2 further contacts) will be identified from multiple data sources. The key determinant for predicting subsequent service use will be the initial NHS 111 disposition. Sources will include WP2, WP3 (particularly the follow up user surveys), existing SchARR research and the wider literature.

The results will be presented for each of the eight sites separately and also scaled up to regional and national estimates based on socio-demographic and system factors identified in WP2 and 3.

Important factors that will be investigated in this regard will be deprivation, age (both being proxies for access to a smart phone), proximity to an emergency department and satisfaction with the local EUCS.

Whilst the site-specific analyses will capture any effects associated with the different disposition algorithms that exist within the sites, scenario analyses will be undertaken based on the data mining undertaken in WP3. For example, it may be possible to look at the potential effects of more or less cautious approaches to directing people away from the emergency care services.

A full set of one-way sensitivity analyses will be undertaken, with the results presented in the form of a tornado plot in order to highlight the most significant sources of uncertainty. The level of caller compliance to the proposed disposition is thought to be of particular importance. A probabilistic sensitivity analysis (PSA) is not considered to be appropriate as there are several sources of uncertainty that cannot be easily incorporated into probability distributions. Whilst methods to undertake a fully probabilistic analysis are possible, within a Bayesian framework, this is considered outside the remit of this call.

Integration of work packages

Integration of different work packages and methods is important in order to maximise the value of the data and ensure the "whole is greater than the sum of its parts".³⁰ Some elements of the research packages will be undertaken sequentially, as findings from individual components will feed into other components. For example, the routine data findings and survey results will inform the economic evaluation and quantitative analysis of services processes and effects will shed light on workforce implications, which will be explored within qualitative interviews. Other packages incorporate mixed methods which will be integrated in order to provide greater insight into, for example, the characteristics of people who use the different services and the impact of online NHS 111 on call response rates and types of calls received (e.g. WP3 routine data analysis, surveys and user interviews).

We will use a modified triangulation protocol to produce a convergence coding matrix to compare findings from different components of the research (e.g. routine data and qualitative interviews). We will consider whether there is agreement, silence or dissonance between the findings from the different components, and use these to guide overall interpretation of the results.^{31, 32} An evidence "map" will be produced to summarise the main findings for key criteria (for example call activity changes; call management pathways; user characteristics; workforce implications; future service activity; costs plotted against each of the work streams to highlight related qualitative and quantitative findings for each pilot service).

Study Steering Committee

A Study Steering Committee will be convened during study set up. This group will provide overall supervision of the OL1EV project in general on behalf of the trial sponsor (University of Sheffield) and funder (National Institute of Health Research, NIHR). The SSC will ensure that the study is conducted according to the planned research, with specific tasks including:

- Approval of the study protocol
- Review of study progress
- Monitoring adherence to study protocol
- Consideration of new information relevant to the research question
- Scrutiny of protocol amendments and extension requests
- Recommend appropriate actions such as changes to the protocol, additional patient information, practical solutions to potential problems (e.g. data acquisition).

The composition of the SSC is detailed in Table 1. The SSC will receive information from the Project Management Group and meetings will be convened by the CI approximately 6 monthly. The SSC chairperson will provide advice to the CI, sponsor (University of Sheffield), study sites, and funder (NIHR).

Table 1. Composition of Study Steering Committee

SSC Members:
Independent chair
Independent commissioner
Independent Provider
Independent GP
NHS Pathways Clinician
Public Health Representative
NHS England representative
NHS Digital representative
Lay representative
Chief Investigator
Project team members as needed

Project Management Group

A Project Management Group (PMG) will oversee day-to-day management of the project. Specific roles will include:

- Ensuring adherence with the study protocol
- Ensuring ethical and governance standards are met
- Monitoring data quality
- Developing and reviewing paperwork
- Responding to queries from the host institutions
- Developing the study protocol in response to operational challenges
- Review of results
- Dissemination of study findings

The PMG will comprise the CI, co-investigators, trial statistician, health economist, NHS provider representative and lay representatives. The PMG will meet monthly given the relatively short duration of the project.

Patient and Public Involvement (PPI)

There was a very short time period to consult the public about this research opportunity. However, we are fortunate that we have access to the Sheffield Emergency Care Forum (SECF), a PPI group with whom we have a well-established and excellent working relationship. They identified a co-applicant for us (Daniel Fall) who reviewed and commented on our proposal and helped construct the lay summary. He is a member of the project management group, will liaise with the wider group and will be the key point of contact throughout the research.

SECF is a well-established group of members of the public with significant experience of offering PPI to research studies in the field of emergency and urgent care. In particular, SECF will help to ensure that the research questions addressed are of interest to the wider general public, particularly around the accessibility and usability of the online platforms to a wider, non-specialist audience. We have also now established links to a separate PPI group based in Sheffield - The Deepend cluster- which is a PPI group supporting GP's within the most deprived areas of the city. This group will provide input from an import group of potential service users and help ensure we consider issues around digital access and inclusion. A member of the Deepend cluster PPI group is a member of the SSC.

The groups will help with writing the lay summary for the ethics application and help to develop topic guides for the qualitative research with service users. They will also help to develop questions to be added to existing user surveys. We will present regular updates to the wider SECF group and Deepend PPI group along with any relevant other organisations they link in with. Together they will be involved in operationalising the research and helping to interpret findings. We will work with the PPI groups to develop our dissemination strategy and to consider how to disseminate the work to the general population, as well as helping to develop lay summaries for dissemination. We have included costs for dissemination strategies (including a dissemination workshop), and for PPI involvement within the wider project.

5. Publication and dissemination

This research will help to understand the impact of NHS 111 online on the NHS 111 telephone advice service, as well as potential implications on the wider urgent care system. Findings will therefore be of interest to a wide range of stakeholders within the urgent care system, as well as academic audiences and the general public. We will seek to communicate findings to commissioners, service providers, front line staff and the general public.

The findings will be published in a HS&DR report, which will be published in the NIHR Libraries Journal. We will also publish our findings in academic journals and relevant conferences in the field of emergency and urgent care. These will include conferences such as International Conference for Emergency Care (ICEM), Royal College of Emergency Medicine (RCEM), 999 EMS Research Forum and health services conferences (Health Services Research UK). Conferences within other fields will also be considered, depending upon the findings of the study (e.g. Primary Care, community pharmacy, telehealth including the TSA International Technology Enabled Care Conference). Relevant journals include Emergency Medicine Journal, Journal of Medical Internet Research, British Journal of General Practice, Health Services Research & Policy.

We will also produce short plain language summaries and infographics to highlight the main messages from the research with an emphasis on the relevance to service providers and commissioners.

We will ask a commissioner from a local Clinical Commissioning Group to sit on our Project Advisory Group, alongside a member of the National Ambulance Commissioners Network and will seek their advice in disseminating findings to commissioners of urgent and emergency care. We will also liaise closely with NHS England to ensure the research is disseminated via appropriate channels to key national stakeholders within the field of urgent and emergency care service delivery and planning. The NHSE urgent care team will provide an essential conduit to this dissemination.

We will also disseminate findings via wider NHS focussed organisations including the NHS Confederation and NHS Providers and the NIHR Injuries and Emergencies speciality network. We will disseminate summaries of the report and any relevant publications to colleges and associations with an interest in urgent care systems and digital health technologies (e.g. Royal College of Emergency Medicine, the Royal College of General Practitioners, the College of Paramedics, and the British Medical Association, National Pharmacy Associations). Potentially relevant organisations will be discussed with the Project Advisory Group and the PPI group.

Our PPI group will help to explore how findings may best be disseminated to the general public, as well as helping to develop lay summaries for different audiences. SECF have previously developed leaflets for the general public, attended public dissemination events, and recently helped to produce an animation for the PhOEBe research programme funded by NIHR. We will explore which of these methods will be most appropriate for dissemination of findings, and will fund any PPI activity that supports this dissemination.

We have included costing for a dissemination workshop to present the findings to a wide stakeholder audience including patients and the public.

We will also disseminate via our website and via social media and our departmental Twitter account.

6. Finance

The study is funded by the NIHR Health Services & Delivery Research Programme (grant number NIHR 127655). Details have been drawn up in a separate agreement.

7. Ethics and regulatory approvals

NHS Ethics and NHS Permissions will be applied for in respect of obtaining routine NHS 111 data, recruitment of patients/service users for the surveys and online user interviews and interviews of staff for the qualitative study. Where possible we will only request de-identified and aggregated routine data. The individual patient level data for WP3 will be de-identified but we will seek CAG approval if required. The study will be conducted in compliance with a predefined protocol, HRA, CAG and REC approvals, and the NHS research framework. Local research governance approvals will be sought from all participating research sites.

Within the University and SchARR we have established and robust information governance policies for the management of data including compliance with all regulatory requirements.

8. Indemnity / Compensation / Insurance

The OL1EV project is sponsored by the University of Sheffield. The University holds insurance covering liabilities arising from negligent harm caused by poor protocol design by the Chief Investigator and researchers employed by the University.

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