Evaluation of NHS 111 pilot sites

Final Report

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Contents

Declarations of interest

Professor Alicia O'Cathain and Professor Jon Nicholl are co-applicants on an NIHR Applied Research Programme led by Professor Chris Salisbury on behalf of NHS Direct: the Healthlines study. The focus of this project is the evaluation of NHS Direct delivering telehealth interventions for long term conditions. NHS Direct staff are part of this research team.

In June 2012 a family member of Professor Alicia O'Cathain won a contract to offer patient feedback for NHS 111 sites in London.

Dr Claire Ginn obtained the routine data for the impact analysis and analysed it according to instructions by Professor Jon Nicholl. Dr Ginn works for the Department of Health Commissioning Analysis and Intelligence Team.

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Glossary of terms

Abandoned Call (NHS 111)	A cal where the caller hangs up after 30 seconds from being queued for a call advisor to answer.
Ambulance call	A call to the ambulance service for an emergency response originating from the emergency number, requests from other health professionals (e.g GPs, NHS Direct) or NHS 111.
Ambulance incident	All cases where an ambulance response is sent to and arrives at an incident scene.
Auto-routed	Calls routed from another service to NHS 111 without the need for the caller to dial the number '111'.
Capacity Management System (CMS)	Operates in real time, taking account of what is available and current activity. This enables a call for urgent care to be automatically matched to a service with the right skills, location and within the required timeframe at the time of the call. Where adequate technical links can be set up, appointments or other contacts can be made by the call adviser at the time of the call.
Directory of Services (DoS)	Populated locally and jointly by service commissioners and provider services. The available skills of each provider are specified, as are service operation guidance such as location, referral protocols and opening times.
ED	Emergency Department
GP OOH	General practice out of hours service
Minimum Data Set (MDS)	Routinely collected information on the efficiency and effectiveness of the different NHS 111 service models
MIU	Minor Injury Unit
NHS Pathways	Delivers a single clinical assessment tool that can provide triage over the telephone in any setting taking calls from the public.
NHS 111 Programme Board	Set up by DH to oversee the strategic development and implementation of a new telephone based service for accessing urgent care.
Ofcom	The independent regulator and competition authority for the UK communications industries.
Public launch	Service became fully operational
Soft launch	Lasted for up to one month prior to the public launch and involved only taking calls that were routed from an existing number such as an out of hours service. During this time the service was not advertised to the public and so there were no direct dial 111 calls.
SPA	Single Point of Access – A telephone number that manages all requests for urgent health services
UCC	Urgent Care Centre
WIC	Walk in Centre
Warm transfer	A call transferred to a clinical advisor at the time of the call (without the need to call back)

Executive Summary

Introduction

This is the final report of the evaluation of NHS 111, a new telephone based service designed to help people access appropriate healthcare for urgent medical problems. NHS 111 was developed in response to a review of urgent care that highlighted problems the public encounter when trying to access urgent care. The objectives of the NHS 111 service were to simplify access to non-emergency health care by providing a memorable number – 111 – that was free to the caller, provide consistent clinical assessment at the first point of contact, and route customers to the right NHS service, first time. The service is available 24 hours a day, 365 days a year to respond to requests for healthcare where the situation is not life-threatening and callers are unsure about what service they need, or they need to access care out of hours. The expected benefits of the new service are that it should improve the user experience by providing a modern entry point to the NHS and easy access to more integrated services; and improve efficiency in the emergency and urgent care system by matching patient needs to the right service.

The purpose of the evaluation was to assess the extent to which this new service achieved its objectives and was a useful and cost effective addition to the emergency and urgent care system in England.

The NHS 111 service

We evaluated the first year of operation of NHS 111 in four pilot sites. The key features of the service are:

- Calls to NHS 111 are assessed by a trained, non-clinical call adviser using the NHS Pathways clinical assessment system to determine both the type of service needed and the timescale within which help is required.
- The call handling system is electronically linked to a skills based directory of local services so that callers can be advised about the appropriate services available at the time of their call.
- Where possible, appointments can be made with the correct service at the time of the call.
- Calls that require further clinical assessment can be transferred to a clinical nurse advisor within the same call.
- If a call requires an emergency ambulance response, a vehicle can be dispatched without the need for further triage.

Evaluation methods

We conducted a mixed methods study assessing processes, outcomes and costs to address a range of objectives. We used a controlled before and after design to measure the impact of NHS 111, comparing changes over time in the four pilot sites and three control sites which did not establish NHS 111. Seven main approaches were used:

1. A descriptive analysis of the first year of operation of the four pilot sites to assess service use, referral patterns and achievement of quality standards.

2. Two postal surveys of users of the NHS 111 service at three months and nine months post implementation to assess users' experiences and satisfaction.

3. A controlled before and after population telephone survey to assess changes in satisfaction with the emergency and urgent care system and awareness of NHS 111.

4. A controlled before and after study spanning two years before and one year after the introduction of NHS 111 using routine data to assess the impact of NHS 111 on use of services in the emergency and urgent care system.

5. A small exploratory expert panel review of NHS 111 cases to assess the accuracy of call dispositions and achievement of the "right place first time" objective.

6. A qualitative interview study with key stakeholders to assess the issues associated with implementation of NHS 111 in local health economies.

7. A cost-consequence analysis to assess the costs associated with providing NHS 111 and the impact on costs of the emergency and urgent care system.

Findings

NHS 111 operation

NHS 111 was established in four pilot sites - one ambulance service-provided site and three NHS Direct-provided sites. This was a considerable achievement by commissioners and service providers, particularly given that it occurred in the context of major reconfigurations of healthcare commissioning and demands for resource reduction in the NHS. We measured NHS 111 activity using routinely available data. Over 353,000 calls were answered by NHS 111 in the first year, and by the end of the year over 80% of these calls were being triaged. Numbers of calls triaged varied from 3,000 to 10,000 per month by site. All four pilot sites met and exceeded the national quality standards for abandoned calls and proportion of calls answered within 30 seconds. All of the pilot sites made some call backs for clinical advice but this accounted for less than 2% of answered calls. The proportion of calls transferred for further clinical advice within NHS 111 was a third higher in the three NHS Direct-provided sites than the ambulance service-provided site. Call episode times ranged from 6.5 to13 minutes, with the shortest time in the ambulance service-provided site. Where calls resulted in a patient being referred to a service, in all of the sites the largest proportion was directed to primary care and 9%-13% required an emergency ambulance response. NHS 111 operations are described in detail in Chapter 5 of the main report.

Users' views of NHS 111

The response rate to the nine month survey was 41% (872/1769). Overall satisfaction with NHS 111 was very good, with 73% (1255/1726) of respondents reporting that they were very satisfied and a further 19% that they were quite satisfied with the new service. Satisfaction levels were lower for some aspects of the service than others, in particular relevance of questions asked and advice given.

A large proportion of respondents (85%) indicated that NHS 111 had enabled them to contact the right place first time but this may not have occurred for at least 2% of users. The majority of respondents (86%) indicated that they complied with all of the advice given, and 65% indicated the advice given had been very helpful. Respondents were largely clear about when to use NHS 111 but there was evidence to suggest that respondents in two sites were less clear. There was no difference in findings between the three month and nine month surveys. Users' views are described in detail in Chapter 6 of the main report.

Impact on perceptions of the emergency and urgent care system

There was no evidence that NHS 111 changed perceptions of urgent care for recent users of emergency and urgent care (based on perceptions of 2237 recent users of emergency and urgent care). The population surveys showed no change in satisfaction with urgent care or the NHS following the introduction of NHS 111 (based on perceptions of 28,071 members of the general population). The population surveys showed a high level of awareness about the new service in two pilot sites (>70% of the population had heard of NHS 111) with much lower awareness in the other two sites (<50%). Impact on perceptions of the emergency and urgent care system is described in detail in Chapter 7 of the main report.

Impact on use of the emergency and urgent care system

Impact on the emergency and urgent care system was assessed by measuring monthly activity for five key services: emergency department attendances; urgent care services attendances/contacts (e.g. GP out of hours, walk in centres); calls to the NHS Direct 0845 telephone service; calls to the emergency ambulance service and ambulance service incidents for two years before and one year after implementation of NHS111 in each pilot site and a matched control site. A time series regression analysis was conducted to compare changes in activity in pilot sites with changes in control sites to identify changes associated with the introduction of NHS 111. This analysis took into account other factors that affect system activity such as seasonal fluctuations and changes made to other services in the system. This analysis was conducted for the five key services for all pilot sites combined (5 models) and also for the five key services for each of four pilot sites individually (20 models). We report here the statistically significant differences, that is, the differences which were unlikely to have occurred by chance.

For all sites combined, there was no statistically significant change in emergency ambulance calls, emergency department attendances or urgent care contacts/attendances. However there was a statistically significant reduction in calls to NHS Direct of 193 calls per 1000 NHS 111 triaged calls per month and an increase in emergency ambulance service incidents of 29 additional incidents per 1000 NHS 111 triaged calls per month. For individual sites, there was a statistically significant a) reduction in calls to NHS Direct in three sites, b) reduction in urgent care contacts/attendances in one site, c) reduction in ambulance calls in one site and increase in one site and d) increase in emergency ambulance service incidents in one site. This is described in detail in Chapter 8 of the main report.

Expert panel review

A panel of five clinicians examined a non random sample of 54 NHS 111 cases including those where there appeared to be a problem pathway based on responses to the user survey. In this highly selected group there was a high level of agreement that the call assessment processes were achieved and overall calls were judged to have received the right clinical disposition and achieved the objective of "right place, first time". The panel identified issues for further investigation including the number and relevance of questions asked in assessment, the accuracy of clinical advice, triage to emergency ambulance dispatch and referral pathways to clinical services. The expert panel review is described in detail in Chapter 9 of the main report.

Implementation in local health economies

Stakeholders involved in designing and implementing NHS 111 were generally enthusiastic about the service and believed that patient benefits could be achieved, but were less confident about the likely impact on the wider emergency and urgent care system. The national roll out was seen as key to delivering benefits, allowing better publicity and thus higher use of NHS 111. Key issues identified by these stakeholders for consideration by future commissioners and providers were the importance of: publicising the service, working hard to obtain clinical engagement, developing an accurate directory of local services, and integrating electronically with services in the urgent care system. The stakeholder interviews are described in detail in Chapter 10 of the main report.

Economic evaluation

A cost analysis was conducted comparing the costs of providing the NHS 111 service in the pilot sites with the costs of changes occurring in the emergency and urgent care system once NHS 111 was in operation. For this analysis, the changes in activity in the five emergency and urgent care services listed earlier were used to calculate monthly service and system costs for all sites combined and also for each individual pilot site. An 'implementation analysis' was also conducted to estimate the total economic impact of the national roll out of NHS 111 taking into account plans that NHS 111 would replace the NHS Direct 0845 service and provide all GP out of hours call handling.

The analysis for all sites combined estimated that NHS 111 would cost an extra £307,000 per month in these sites and that this might vary between saving £118,000 and costing £733,000. The likelihood that the service would be cost saving was 21%.The likelihood of the service being cost saving in individual pilot sites ranged from 7% to 81%. These costs were partly due to increased use of other services within the emergency and urgent care system following the introduction of NHS 111.

A simplistic economic analysis of the likely effects of national implementation of NHS 111, costing the impact of replacement of NHS Direct 0845 calls and GP out of hours call handling, and assuming similar effects on the emergency and urgent care system identified in the cost analysis above, identified that NHS 111 could potentially save the NHS money. Assuming 7.8 million NHS 111 calls per year, the estimated monthly cost impact to the NHS would be a saving of £2.5million, although

this could vary between a saving of £12million and an additional cost of £7million. These estimates are based on considerable assumptions and limited cost data and should be treated with caution. An important assumption is that the types of people calling NHS 111 will remain the same when the NHS Direct 0845 service is closed. The economic evaluation is described in detail in Chapter 12 of the main report.

Comparison of models

Although the four pilots in the evaluation operated differently to some extent, they seemed to produce the same lack of measurable benefit in terms of improving urgent system user satisfaction and reducing use of emergency care services. The NHS Direct-provided models utilised clinical advice more frequently and directed a larger proportion of callers away from a service contact, but this did not seem to result in any significant shift in wider urgent care system use or cost savings. Overall, we could not detect any clear evidence of the superiority of one type of model over another. This may be because the optimum model does not yet exist or that there is no single "best" model. This is discussed in more detail in Chapter 13 of the main report.

Conclusions

NHS 111 providers in four pilot sites successfully established new services. The key findings of the evaluation are:

- All pilot sites operated to national quality standards and were well used by their target population.
- Some integration between services was achieved, for example, the ability of NHS 111 call advisors to dispatch an ambulance without further triage and the links in some pilot sites that allowed appointments to be made with urgent care services during the initial call to NHS 111. There was scope for further development of integration between services.
- Users were satisfied with the new service and both an expert panel and user survey identified the need to review the relevance of questions asked by NHS 111 and the advice given for some types of calls. There is scope for further refinement of assessment and referral pathways.
- One year after launch, the pilots had not delivered the expected benefits in terms of improving satisfaction with urgent care or improving efficiency by directing patients to urgent rather than emergency care services. There was evidence of a reduction in calls to NHS Direct but an increase in emergency ambulance incidents.
- The primary economic analysis based on the pilot site activity identified a low probability of cost savings to the emergency and urgent care system. However, a simplistic analysis of the national implementation of NHS 111, with the service replacing the NHS Direct 0845 service and handling all GP out of hours calls, showed that NHS 111 may result in cost savings to the NHS. This is based on considerable assumptions and limited cost data.

- There was no clear evidence of the superiority of one type of model.

The lack of impact of NHS 111 in its first year in the pilot sites could be explained by the small 'dose' of NHS 111 within the emergency and urgent care system or the early stage of development at which it was evaluated (one year). It takes time for early problems to be identified and resolved, for a new service to become established with users, and for reflection on how the service can be improved. However, it cannot be assumed that increase in use, and time, will produce expected benefits. The evaluation has identified issues which could increase the likelihood of achieving expected benefits. These include:

- A review of the call assessment process to ensure that relevant questions are asked; pathways are improved, particularly those resulting in the need for an emergency ambulance; and attention is given to further integration with other services.
- Exploration of how the service will deal with increased and probably different demand when it replaces the NHS Direct 0845 number.

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1. Introduction

1.1 Policy background to the development of NHS 111

The provision of urgent care is a key function of the NHS. Care can be provided by a range of services including primary care, secondary hospital care (for example emergency departments) and the emergency ambulance service. Historically, patients needing urgent care have had to choose and then directly access the service they require. However, patients may be unsure of the type of care they need and therefore access a service which is inappropriate to their needs. Fifteen years ago, a review of developing emergency services in the community conducted focus groups with the general population who reported confusion about which service to attend when they had an urgent health problem (Calman,1997). One recommendation of this review was that telephone access using a simple three digit number should be introduced into the NHS. NHS Direct was established to meet this need in three pilot sites in 1998, expanding to a national service by 2000, although with the telephone number 08454647 rather than a simple three digit number.

Since that time a number of policy initiatives on emergency and urgent care have emphasised the potential for further development of a single telephone service to co-ordinate the assessment and referral of requests for urgent health care, including a review of Out of Hours GP Services (DH, Raising Standards for Patients, 2001), a strategy for developing emergency care (DH, Reforming Emergency Care, 2001), and a strategy for the development of ambulance services (DH, Taking Healthcare to the patient, 2005).

Over the last 10-15 years the range of urgent care services available to patients has increased to include, for example, walk in centres, urgent care centres and telephone based services such as NHS Direct. This has increased the complexity of decision making for patients requiring urgent care. In 2006 a consultation with the general public was conducted to explore future provision of urgent care (DH, Direction of Travel for urgent care, 2006) and identified the same problems of confusion about the most appropriate service to contact, and again highlighted the need for a service with a memorable telephone number to ease the access process for patients. Uncertainty about which service to contact means patients may access services not best placed to meet their needs. For example, the ambulance service in England receives 8.08 million emergency calls per year of which 2.73 million (33.8%) are classified as urgent rather than emergency (NHS Information Centre, 2011).

In response to the Direction of Travel for urgent care consultation the Department of Health (DH) commissioned three pieces of work to explore the public's views of a new telephone based service to access urgent care, including what the service should provide, the number and the cost of the call. The positive responses led to the DH approaching Ofcom to request a new three digit number. Ofcom conducted a consultation exercise which led to the number '111' being allocated to the DH for UK-wide use in 2009 (Ofcom, 2009) and it is this number that has been used to develop a new service to address the problems associated with access to urgent care services.

1.2 NHS 111 service development

The DH set up a programme board - initially termed the three digit number (3DN) programme and from 2010 the NHS 111 programme - in 2009 to oversee the strategic development and implementation of a new telephone based service for accessing urgent care. The strategic plan for the new service (NHS 111 Programme Board Service specification, 2010) defined the objective as:

> "The 3DN programme will improve and simplify access to non-emergency health care by providing a memorable three-digit number – 111 – that is free to the caller. The 111 service will provide consistent clinical assessment at the first point of contact and route customers to the right NHS service, first time, including emergency cases which will be transferred to emergency for an ambulance to be despatched without the need for the caller to repeat information."

The service was envisaged as one available 24 hours a day, 365 days a year, that could respond to requests for healthcare where the situation was not life-threatening (so less urgent than a emergency call); a GP was not an option (for example if the patient was away from home), a patient felt they could not wait but were unsure what service they needed, or a patient required reassurance about what to do. The perceived benefits of the new service included:

- improving the patient and carer experience by providing clear, easy access to more integrated services
- improving efficiency in the urgent and emergency health care system by connecting patients to the right place, first time
- increasing public confidence in the NHS
- providing a modern, efficient entry point to the NHS focussed on patient needs
- supporting the commissioning of more effective and productive health care services that better match needs.

The programme board invited Strategic Health Authorities (SHA) in England to submit plans for pilot NHS 111 services and four pilot areas were identified to take the plans forward. Following the change in government in 2010 a decision was taken to roll out the NHS 111 service across the country (DH, 111 - The New Number for the Future of Non-Emergency Health Services *press release*, 2010).

1.3 NHS 111 service evaluation

At the outset of NHS 111 development the plans included an independent evaluation of this new service to provide evidence on service implementation and use, impact on the wider emergency and urgent care system, and associated costs that could then be used to inform future policy decision making about NHS 111. In November 2009, the Medical Care Research Unit at the University of Sheffield was commissioned to carry out an evaluation of the first year of operation of four pilot services

2. Evaluation aims and design

2.1 Aims and objectives

The aim of the evaluation was to determine whether NHS 111 improves care by improving access to and direction within the emergency and urgent care system in England. The objectives were:

1) To synthesise evidence on telephone services directing people to appropriate healthcare.

2) To assess the processes of NHS 111 service provision by identifying

- Key aspects of the service and lessons learnt around early implementation
- Use of the service and how this changes over time
- Equity in access and use
- User experiences and satisfaction
- The extent to which the triage delivers 'right care first time'
- How it fits within the local health economy.

3) To evaluate the impact of the introduction of NHS 111 within it first year on

- Perceptions of the emergency and urgent care system
- Public satisfaction and confidence in non-emergency health services
- Demand for other urgent and emergency care services

4) To assess the costs and cost consequences of the service.

5) To compare and contrast different models of provision to identify the best ways of developing the service.

2.2 Evaluation design

To address the wide range of objectives of interest to policy makers and service providers, we conducted a mixed methods evaluation with a process evaluation, outcome evaluation and economic evaluation. Methods appropriate for addressing each objective were used and these methods are described in detail in later chapters. Here we provide an overview of the different components of the evaluation.

2.2.1 Evidence base for a telephone urgent care assessment service

The first evaluation objective was concerned with an assessment and synthesis of the evidence on telephone services directing people to appropriate healthcare. Rapid evidence reviews were conducted and are presented in Chapter 3.

2.2.2 Service provision and implementation

The service was established in four pilot sites using different models of service provision. A detailed description of the configuration of the service in each of the four pilot sites to identify key differences between different operational models is presented in Chapter 4.

2.2.3 Use, impact and costs of NHS 111

Process evaluation

Any new service is only likely to realise the expected benefits if it operates as planned. For NHS 111 this meant it must be used by people needing urgent care, it must operate to quality standards, users must like it enough to use it again, it must achieve the objective of 'right service first time', users must comply with the advice, and it must become established within its local health economy. We have used a range of methods to assess these issues and these are summarized in Table 2.1 together with the relevant chapter in which the detailed methods and results are reported.

Table 2.1: Process evaluation methods

Objectives	Methods	Chapter
Key aspects of the service and early lessons learnt around implementation	Documentary evidence about NHS 111 Focus groups and interviews with NHS 111 service developers	4
Service use, referral patterns, call abandonment rates, call times	Routine data from NHS 111	5
User experiences and satisfaction	Postal survey of NHS 111 users	6
The extent to which the triage delivers 'right care first time'	Expert panel assessing NHS 111 calls	9
How it fits within the local health economy	Qualitative interviews with local stakeholders	10
Inequalities in awareness and use	Telephone survey of general population	11

Outcome evaluation

Two important expected benefits of the NHS 111 are that it would improve perceptions of access to urgent care and also change how people use the emergency and urgent care system, in particular transfer some use of emergency services to urgent services. In a rapidly changing healthcare environment it is possible that factors other than the introduction of NHS 111 may influence perceptions and use of emergency and urgent care. Therefore it was important to compare changes in NHS 111 with changes in control sites to identify changes associated with NHS 111 only. We

conducted a **controlled before and after study** spanning two years before the introduction of NHS 111 and one year after to assess the impact of the new service on access to and use of urgent care services. Two different methods have been used for the outcome evaluation (Table 2.2).

Table 2.2: Outcome evaluation methods

Objectives	Methods	Chapter
Impact on perceptions of the emergency and urgent care system Impact on public satisfaction and confidence in non-emergency health services	'Before' and 'after' general population survey in pilot and control areas	7
Impact on demand for other urgent and emergency care services	Before and after routine data on use of different services in the emergency and urgent care system in pilot and control areas	8

Economic evaluation

An important factor for policy makers and service commissioners in considering changes to the way services are delivered is the associated costs and whether a new service is a good use of NHS resources. For NHS 111 there will be costs associated with setting up the service but any changes in costs for the wider emergency and urgent care system produced by changes in use of services within the system also need to be considered. The economic evaluation will be a cost consequence analysis of the costs of setting up NHS 111 and the impact on the costs of the emergency and urgent care system in each pilot site. We will also conduct a set of scenario analyses to investigate the impact of NHS 111 replacing the call handling component of GP OOH, and also replacing either part or all of NHS Direct. The economic evaluation is reported in Chapter 12.

2.2.4 Evaluation of four models or evaluation of a single service?

The four pilot NHS 111 services each use a different operating model, and therefore each pilot has been evaluated individually in recognition that some models may perform better than others. In addition to this we have described a limited number of key findings for the four pilots combined to address whether the core aspects of NHS 111 can deliver expected benefits.

2.3 Study sites

2.3.1 Pilot sites

Four pilot sites, within three Strategic Health Authorities, were chosen as the first NHS 111 services and are the subject of this evaluation. The four sites were:

- North East England SHA- County **Durham and Darlington** Primary Care Organisation
- East Midlands SHA - **Nottingham** City Primary Care Trust
- East Midlands SHA - . **Lincolnshire** Primary Care Trust
- East of England SHA - **Luton** Primary Care Trust

2.3.2 Control sites

The outcome evaluation used a controlled before and after design. We set out to identify a control Primary Care Trust (PCT) for each of the four pilot sites, matched for area, population characteristics and service use. The first step was selection by area type: county for Durham & Darlington and Lincolnshire, city for Nottingham and Luton); similar rural/urban classification; and within the same SHA as a pilot site or a closest neighbour health area. This identified 12 possible PCTs in which we then considered information on demographics, lifestyle, health and use of health services (Table 2.3).

Table 2.3: List of indicators used for selecting control sites

Indicator	Description	Data source
Demographics		
Population size	Target population (thousands)	PCT publications
Persons 65+	Proportion of people 65 and over (%)	Office of National Statistics (2008 estimates)
Ethnicity	Proportion of BME population (%)	Office of National Statistics (2007 data)
Life expectancy	Life expectancy at birth for males/females (years)	The NHS Information Centre, Compendium of Clinical and Health Indicators (2006-2008 data)
Deprivation value	Proportion of people living in 20% most deprived areas of England (%)	The Association of Public Health Observatories (2007 data)
Lifestyle		
Alcohol	Proportion of binge drinking adults (%)	The NHS Information Centre, Health surveys for England 2003-2005
Smoking	Proportion of smoking adults (%)	
Obesity (adults)	Proportion of obese adults (%)	
Obesity (children)	Proportion of obese year 6 children (%)	The NHS Information Centre, National Child Measurement Programme: England, 2008/09 school year
Health profile		
Mortality rate, all causes	Directly age-standardised rate per 100000 population under 75	The NHS Information Centre, Compendium of Clinical and Health Indicators (2006-2008

Mortality rate, all cancers	Directly age-standardised rate per 100000 population under 75	data)
Mortality rate, all circulatory diseases	Directly age-standardised rate per 100000 population under 75	
People with limiting long-term illness	Proportion of people with limiting long-term illness, 2001 Census	Office of National Statistics (2001 Census data)
People with long-term conditions	Proportion of respondents who reported a long-standing health problem in GP Patient Survey (%)	GP Patient Survey 2008/09
Use of health services		
A&E attendances	Attendance rate per 1000 population, includes A&E Departments, Walk in Centres and Minor Injury Units	Department of Health, QMAE data 2007/08
GP consultations	General Practices consultations combined rate per 1000 population (include GP and practice nurse consultations, estimates from national data)	The NHS Information Centre, QResearch report on trends in consultation rates in General Practices 1995-2008
GP out of hours contacts	Proportion of respondents of the GP Patient Survey who tried to contact OOH GP service in the last 6 months (%)	GP Patient Survey 2008/09
NHS Direct calls	Call rate per 1000 population	NHS Direct, 2008/09 data

Information provided by DH Commissioning and Intelligence Team

Candidate control sites with the highest number of matches across all criteria with a pilot site were selected as the final control sites. We asked emergency and urgent care leads in each potential control site if they had plans to introduce NHS 111 or make major changes to their emergency and urgent care systems in the lifetime of the evaluation. On the basis of responses indicating that no major changes were planned three controls were selected:

- **North of Tyne** PCO – matched to Durham and Darlington
- **Leicester** PCT – matched to both Nottingham City and Luton
- **Norfolk** PCT – matched to Lincolnshire

The control site for Luton is not in the same SHA but was the best match for all other criteria and is in the nearest neighbour SHA.

2.4 Ethics

We obtained approval from Leeds Central Research Ethics Committee.

3. Evidence base

3.1 Introduction

International research evidence about telephone services which direct people to appropriate healthcare may be relevant to NHS 111. We undertook evidence reviews of

- Appropriateness of triage recommendations
- Compliance with telephone triage recommendations
- Impact of telephone triage on use of other services

3.1.1 Reviews design

The reviews were conducted according to principles of rapid evidence assessment (REA, 2011). Rapid evidence assessment (REA) is suitable for reviews of evidence which are required for policy recommendations within a tight timescale. It provides a "balanced assessment of what is already known about a policy or practice issue, by using systematic review methods to search and critically appraise existing research". It is rigorous and explicit in method, and thus systematic, but makes concessions to the breadth or depth of the process by limiting particular aspects of the systematic review process such as searching for grey literature.

A systematic search was conducted in six electronic databases: CINAHL, Cochrane Clinical Trials Database, Medline, Embase, WOS, and Psyc Info for articles published between 1980 and June 2010. In line with REA methodology, grey literature was not searched, citation or key author searches were not undertaken, and authors were not contacted.

3.1.2 Appropriateness and compliance

We combined the reviews about appropriateness and compliance and published this in a peer-reviewed journal (Blank et al, 2012). Because this review will be available in a peer-reviewed journal, we only summarise the findings here. We identified 54 relevant papers: 26 papers reported appropriateness of triage decision, 26 papers reported compliance with triage decision and two papers reported both. Nurses triaged calls in most of the studies (n=49). Triage decisions rated as appropriate varied between 44% and 98% (median 75%); compliance ranged from 56% to 98% (median 77%). Variation could not be explained by type of triage service or method of assessing appropriateness. However, use of different definitions of appropriateness may explain some variation. Triage decisions to contact primary care (median 66%, range 25%-91%) may have lower compliance than decisions to contact emergency services (median 75%, range 29%-100%) or self care (median 77%, range 26%-100%). We concluded that telephone triage services can offer appropriate decisions, and decisions that callers comply with. We recommended that a definition of appropriateness incorporating both accuracy (the right service) and adequacy (at least the level of urgency required) of triage decision should be encouraged.

3.1.3 Impact on use of other health care services

We completed a review of impact of telephone triage on other health care services and report this in detail below.

3.2 Methods

3.2.1 Literature search

We searched six electronic databases: CINAHL, Cochrane Clinical Trials Database, Medline, Embase, WOS, and Psyc Info. We did not search grey literature or make contact with authors. We did however screen the reference lists of all included articles. The search was limited to articles published between 1980 and June 2010, in English and conducted with humans. The search terms included telephone, triage or consultation, NHS Direct, telephone triage, call centre triage, advanced nursing, appropriate, under referral, safe, decision making, technology transfer, general practice, teleconsultation, telepathology, video conferencing, virtual reality, video consultation and epidemiology. Search terms were also cross referenced (e.g. triage AND service use). All search results were downloaded into Reference Manager. Two reviewers independently screened titles and abstracts of papers, and excluded citations not matching the inclusion criteria. The full text of papers was considered where there was disagreement between the reviewers. In addition, one reviewer hand searched the reference lists of included papers.

3.2.2 Inclusion criteria

We selected studies measuring the effect of telephone triage on the use of healthcare services.

3.2.3 Data extraction

The following details were extracted: reference details (title, first author, journal year), country of research, primary research question, methods, triageur (nurse, doctor, other), outcomes measured (service use, intended service use), results. Data was extracted by one reviewer and checked by a second reviewer. Only data reporting on service use was extracted.

Many validated tools for assessing study quality in systematic reviews assess intervention studies. As most of the studies we included were observational studies, we assessed the quality of each study using factors commonly considered in the appraisal of observational studies (Sanderson et al. 2007). These were whether authors reported on: selecting study participants; the source population; appropriateness of measurement methods; methods employed to minimise bias; appropriateness of study design and/or analytical methods to answer the research questions, and appropriate use of statistics for analysis. We assessed whether each factor was considered and reported to an acceptable level and did not bring into question the study's conclusions. Studies were excluded if they failed to meet more than one of these requirements. The aim of the quality appraisal was to determine

whether any studies should be excluded due to high risk of bias, rather than to distinguish between the studies in terms of their quality.

A narrative synthesis of the identified literature is presented. Due to the amount of variation in the outcome measures reported and the context of the study settings, a meta-analysis was not appropriate. Papers were grouped by the service the triage impacted upon to allow for further analysis within the review.

3.3 Results

3.3.1 Description of studies

The searches generated 472 potentially relevant papers. Abstract and full paper appraisal resulted in the exclusion of 456 of these papers, leaving 16 relevant papers included. A further four papers were identified by searching the reference lists of included papers, giving a total of 20 papers. The main reason for exclusion at this stage was that service use had not been measured. No studies were excluded due to study design or quality.

The evidence base was published between 1998 and 2010, spanning a range of countries (Table 3.1): United Kingdom (8 papers), United States (5 papers), Australia and New Zealand (5 papers) and Denmark (2 papers). Triage was delivered by nurses in 15 studies and general practitioners in five. We identified two types of studies. One set of studies reported actual change in service use before and after the telephone triage system was initiated (12 papers). These were mostly prospective before and after studies, with one randomised controlled trial (reported in two papers). The second set of studies compared intended service use prior to triage with actual service use (8 papers). In addition four studies reported costs.

3.3.2 Measurement of actual service use before and after introduction of triage service

Twelve papers measured actual service use before and after the introduction of a triage service.

General practice

We focused on papers measuring the effect on general practice clinics and out of hours care. Eight 'before and after' studies (reported in nine papers) considered change in GP consultations as a result of telephone triage; seven of these focused on triage provided in general practice and one on the effect of general telephone triage call centres on GP consultations (Table 3.1).

Four studies considered telephone triage by a GP and three considered nurse-led telephone triage. GP triage in general practice reduced workload in terms of face to face consultations with GPs and home visits. Jiwa et al (2002) reported that demand for face to face GP appointments reduced by 39% (95% CI 29-51, $p<0.001$). Bondo et al (1998) reported that consultations in the GP surgery reduced, although the change was not statistically significant, and that out of hours home visits reduced from 46% to 18%. Richards et al (2002) reported that the triage system reduced appointments with general practitioners by 29%-44%; however, routine appointments and nursing

time increased. Dunt et al. (2007) reported reductions in emergency GP after hours service utilization (GP first call-out) in state-wide call centres in metropolitan and non-metropolitan areas: relative risk (RR) = 0.87 (95% Confidence interval: 0.86 - 0.88) and 0.60 (95% CI: 0.54 - 0.68) and for a Regional Call Centre in the non-Metropolitan area only (RR = 0.46 (95% CI: 0.35 - 0.61).

The same positive effect was found for nurse triage in general practice. Lattimer et al (1998) reported that nurse triage in an out of hours GP service managed 50% of calls without referral to a GP. There was a 69% reduction in telephone advice from GP, a 38% reduction in patient attendance at primary care centres, and a 23% reduction in home visits. Gallagher et al (1998) reported that GP consultations reduced as a result of nurse-led telephone triage. In addition, 26% of consultations were managed on the telephone without the patient visiting the surgery. The percentage of GPs working five hours or more out of hours per week also reduced, from 70% to 50%. Vedsted and Christensen (2001) reported that nurse-led triage resulted in a decrease in the total number of contacts with out-of-hours primary health care: the annual total number of out-of-hours contacts decreased by 31000, and out-of-hours face-to-face contacts decreased by 63500 (percentage change not given or calculable).

Two papers considered the effect of a general health helpline 'NHS Direct' on general practice (Munro et al. 2000, 2005). Munro et al (2000) reported early changes in the use of GP out of hours services from +2% a month before NHS Direct to -0.8% afterwards (relative change -2.9% 95% CI -4.2 to -1.5%). Control services showed no change (0.8% month before, and 0.9% after, relative change 0.1% (95% CI -0.9 to 1.1%). Munro et al (2005) showed longer term reductions in calls to GP out of hours services. In the context of long term rising demand for primary care, of 1% per year, NHS Direct was associated with a 3% fall in demand.

Emergency services

The effect on emergency services was measured in four papers. The telephone triage service was based in emergency care in two studies. Smith et al (2001) reported a reduction in basic life support ambulance responses as a result of telephone triage; this was not at the expense of adverse outcomes or patient satisfaction. In contrast, a second study reported a slight increase in paediatric service use as a result of a new telephone triage system, but reported no clearly identifiable change in use of ambulance services or emergency departments (Beaulieu et al, 2007). The other papers measured the effect of NHS Direct on emergency services. Munro et al (2000, 2005) found no significant change in trends of use of emergency departments or ambulance services as a result of NHS Direct.

3.3.3 Comparison of intention and subsequent service use

Eight studies measured individual patient intention prior to triage rather than service use data (Table 3.1). Three studies identified high rates of changed intentions: Bogdan et al (2004) reported that most patients claimed they had deviated from their original care plan (68%) as a result of telephone triage: 44% choosing lower intensity care and only 18% choosing higher intensity care. Cariello et al (2003) similarly reported that 61% changed disposition compared to their original intention: 48% overall decreased the level of care, and 13% increased it. St George et al (2001) reported that, in the

absence of the telephone triage service 1050 callers had intended to use emergency or urgent care services, but only 224 (21%) were triaged to that level of care.

Two studies reported specifically on intended and actual use of emergency departments. Delichatsios et al (1998) reported that 33% (53/160) of callers said they would have gone to an emergency department if they had not been able to speak to a doctor on the phone. Stewart et al (2010) reported that only 70% of callers to NHS Direct who were advised to attend an emergency department did so.

Three further studies, conducted in paediatric emergency care, considered primary care. Bunik et al (2010) reported that, in the absence of the telephone triage service, 12% of callers stated that they would have called a GP the next day. In two studies about the triage service Kidsnet, 28% of callers would have called their GP and 2% of callers would have called an out of hours GP (Keatinge et al 2005), and 9% of callers would have contacted their local doctor (Hanson et al 2004). However, St George et al (2001) reported that, of 2952 general call centre callers who did not intend to contact a doctor, 1486 (64%) were recommended to do so, suggesting a potential increase in primary care workload.

3.3.4 Cost

Four studies discussed cost implications of telephone triage. Lattimer et al (2000) undertook a bottom-up costing, both pre and post intervention. They estimated an annual saving for the NHS of £94k for a population of around 100,000. They reported that the savings were driven by reduced emergency admissions. Smith et al (2001) undertook a pre and post analysis, and reported that the reduction in emergency call-outs as a result of telephone triage in the US could result in national savings of between US$160k and $360k per annum. Richards et al (2002) also undertook a pre and post analysis when comparing standard management to triage. They found a mean increase in cost of £1.48 per patient for triage across three primary care sites in York; however this was not statistically significant (95% CI: -£0.19 - £3.15). Bunik et al (2010) undertook a cost analysis, comparing recommended to intended disposition after telephone triage for a US children's hospital. Their analysis found that, assuming all advice was taken, a saving per call of $42.61; this saving was robust to sensitivity analyses.

Table 3.1 Data extraction table

*Service: P= Paediatric, GP= General Practice, ED= Emergency Department, OOH= Out Of Hours.

Author Year	Country	Service *	OOH*	Study design	Study duration	Triage staff	Measure	Result
Outcome: service use before and after telephone triage intervention								
Beaulieu 2007	US	P		Before/after	One year before and one years after telephone triage	Nurse	Number of clinic visits	In the year prior to the advice nurse service, 5850 paediatric clinic visits occurred compared with 6003 in the year following implementation of the service (3% increase, z=12.53, p<0.001).
Bondo 1998	Denmark	GP	OOH	Before/after	5 years after service introduction	GP	Workload of GP. Cost of service.	Five years after the reform, the percentage of telephone consultations doubled to 48%. Consultations in the GP surgery were relatively unchanged (24% to 33%), but OOH home visits reduced from 46% to 18%. The percentage of GPs working 5 hours or more OOH per week dropped from 70% to 50%.
Dunt 2007	Australia	GP	OOH	Before/after	Monthly data collection over 3 years	GP	Reduction in emergency GP after hours service utilization (GP first call-out) as measured in Medicare Benefits Schedule claim data.	Significant reduction in first call out MBS claims in three of the four study areas where stand-alone call centre services existed: State wide Call Centre in both its Metropolitan and Non-metropolitan areas - Relative Risk (RR) = 0.87 (95% Confidence interval: 0.86 - 0.88) and 0.60 (95% CI: 0.54 - 0.68) and Regional Call Centre in the non-Metropolitan area (RR = 0.46 (95% CI: 0.35 - 0.61) Small increase in Regional call centre Metropolitan area (RR = 1.11 (95% CI: 1.06 - 1.17).
Gallagher 1998	UK	GP		Before/after	3 months	Nurse	Change in Dr/nurse workload. Repeat	1263 consultations were recorded. Doctor workload fell 54% from 1522 to 664 consultations. 325 (26%) consultations were managed on the phone without visiting the surgery.

							consultations for same problem.	Repeat consultations within a week were significantly higher for nurse consultations in the surgery than doctor consultations in the surgery 41/79 vs. 67/183 (52 vs. 37%) (95% CI 2 to 28% p=0.02).
Jiwa 2002	UK	GP		Before/after	Two years before and one year after introduction	GP	Demand for same day, face to face, GP appointments.	Demand for face to face appointments with a GP was reduced by 39% (95%CI 29 to 51% p<0.001).
Lattimer 2000	UK	GP	OOH	RCT	One year	Nurse	Costs and savings to NHS over trial year.	Intervention cost £81237 Other costs reduced by £94422 Conclude may reduce NHS costs in the longer term due to reducing demand for emergency admission to hospital.
Lattimer 1998	UK	GP	OOH	Block RCT: 156 matched pairs of days and weekends	One year	Nurse	Service use	Nurses managed 49.8% of call during the intervention periods without referral to a GP. During the intervention periods there was: 69% reduction in telephone advice from GP 38% reduction in patient attendance at primary care centres 23% reduction in home visits
Munro 2000	UK	NHS Direct		Before and after	24 months	Nurse	Service use	No significant change in trends of use of A+E or ambulance service. Changes in GP co-op services small, from +2% a month before NHS direct, to -0.8% afterwards (relative change -2.9% 95% CI -4.2 to -1.5%). Significant for both calls handled by telephone advice alone, and direct contact with GP co-op. Control co-ops showed no change (0.8% month before, and 0.9% after, relative change 0.1% (95% CI -0.9 to 1.1%).
Munro 2005	UK	NHS Direct	OOH	Before and after: Interrupted time series	3 years	Nurse	Service use	During its first 3 years of operation, NHS Direct was associated with a reduction in calls to out-of-hours general practice In the context of an underlying trend of demand rising by about 1% each year, the introduction of NHS Direct was associated with an immediate 3% fall in demand coupled with a reversal of the trend so that demand began to fall by almost 8% per year.

Richards 2002	UK	GP		Before and after: Interrupted time series	One year	Nurse	Use of services during the month after same day contact,	The triage system reduced appointments with general practitioner by 29-44%. Mean overall time in the triage system was 1.70 minutes longer, but mean general practitioner time was reduced by 2.45 minutes. Routine appointments and nursing time increased, as did out of hours and accident and emergency attendance. Costs did not differ significantly between standard management and triage: mean difference £1.48 more per patient for triage (95% confidence interval –0.19 to 3.15).
Smith 2001	US	Any		Before and after design : Two phase prospective study. 1. Basic life support unit (BLS) dispatched to all call. 2. No BLS for non urgent calls.	4 month intervention	Nurse	Number of call transferred to consulting nurse Adverse outcomes	Phase 1. 38 callers transferred to consulting nurse, with no nurse intervention. Phase 2. 133 callers transferred. No adverse outcomes detected. Patients were satisfied with the outcome in 96% of cases. Transferring 911 calls to a nurse line resulted in fewer BLS responses, no adverse effects, and maintained high patient satisfaction.
Vedsted 2001	Denmark	GP	OOH	Before and after	Ecological time trend from 1988-1997	GP	Mean number of annual contacts with casualty wards per inhabitant.	The decrease in the total number of contacts with the out-of-hours primary health care after the reform was not met by a corresponding increase in casualty ward contacts. A clear-cut significant increase in the use of casualty wards following the out-of-hours reform could not be demonstrated.

Author Year	Country	Service *	OOH	Study design	Data type	Triage staff	Measure	Result
Outcome: patient reported change from intended disposition as a result of telephone triage								
Bogdan 2004	US	Any		Cross sectional	Telephone survey	Nurse	Initial plans Nurse recommendation Subsequent health care action	Reported actions were classified as home care (46%), clinical visit (27%) or hospital visit (27%). Most patient actions differed from their original health care plan (68%), with 44% choosing lower intensity of care (n= 116) and only 18% choosing higher intensity care (n=49).
Bunik 2010	US	P ED		Cross sectional	Open ended question regarding alternative service use given before triage, compared to triage disposition	Nurse	Reported use of other services in absence of telephone triage compared to actual use.	Parents reported that in the absence of the call centre they would have: Gone to an emergency department or urgent care facility (46%) Treat the child at home (21%) Called a physician's office the next day (12%) Consulted a written source (2%) Other (7%) Of the 46% who would have sought emergency care, only 13.5% were given an urgent disposition by the call centre. 15% of cases in which parents would have stayed at home were given an urgent disposition. These results would translate in to a substantial cost saving for the health care system.
Cariello 2003	Australia	P ED		Cross sectional	Evaluation/user satisfaction with service data collected over the telephone	Nurse	Reported use of other services in absence of telephone triage compared to actual use.	39% (112) callers had the same disposition as their original intention. 61% (174) had a change in disposition compared to their original intention. Of these, 79% (137) decreased their level of health care intervention, and 21% (37) increased the level after discussion with the triage nurse X2 (49, n=300) = 263.015, p<0.001. Overall the level of care actually accessed was most often of a lesser level of intervention than they had originally intended.
Delichatsios 1998	US	GP		Cross sectional	Telephone survey	GP	Reported alternative	33% (53/160) reported they would have gone to ED if they were not able to speak to a doctor on the phone.

							service use.	
Hanson 2004	Australia	P ED		Cross sectional	Evaluation	Nurse	Reported use of other services in absence of Kidsnet	If Kidsnet was not available parents reported they would call: Local doctor (8.9%) Children's hospital (54.5%) Local emergency department (23.3%) Another advice line (12.2%) Do nothing (1.1%)
Keatinge 2005	Australia	P ED		Cross sectional	Telephone survey of parents	Nurse	Parental satisfaction. Resource utilization.	50% reported that they had not used another service or health practitioner for the same issues subsequent to their call to Kids Kare Line. In the absence of the phone line, most parents would have used an ED (53.68%), a GP (28.42%), another helpline (4.21%), OOH doctor (2.11%), OOH chemist (2.11%), telephoned children's ward (2.11%) or used the internet (2.11%).
Stewart 2010	UK	P ED		Cross sectional	Prospective data about calls matched to attendance	Nurse	Whether advice given was followed. Differences in disease severity and necessity of attendance at ED referred by NHS-D and GP.	70% of those advised to attend ED did so . A further 1% (176) advised against attendance, did attend. Patients referred by NHS-D represented 3.2% of attendees at ED. There was little difference in the triage categories of presenting groups, but there were significantly less admissions ($p<0.01$) in the NHS-D group.
St George 2001	New Zealand	Any	OOH	Observational	Reports on activity data	Nurse	Anticipated service use matched to actual triage disposition.	67% of calls were OOH 68% of calls were symptomatic (an algorithm was used for triage) . 1050 callers had intended to use ED or urgent care services, but only 224 (31%) received these triage dispositions. 434 (41%) were triaged to self care. 2952 callers did not intend to contact a doctor. 1486 (64%) were recommended to do so, 55 required 11 call outs, and 68 were recommend ED care. 94% intended to act in accordance with the triage disposition.

3.4 Discussion

3.3.1 Summary of findings

Appropriateness

There are two definitions of appropriateness used in the literature – accuracy and adequacy - and both are important for NHS 111. Accuracy is about triaging to the right service and this is the aim of NHS 111 with 'right place first time'. Adequacy is about triaging safely so that people get to a service which can deal with the level of urgency of the problem. Where there is a lack of accuracy, it is important that adequacy operates at a high level. Both issues must be considered in the context of triage services like NHS 111. We consider both in Chapter 9 when assessing triage decisions using an Expert Panel.

In the published literature the majority of telephone triage decisions were found to be appropriate in terms of accuracy and we would expect to see NHS 111 deliver around 75% accuracy (range between 44% and 98%) with only a small proportion of inadequate triage.

Compliance

In the published literature most callers complied with triage decisions. A minority of callers do not comply with advice and NHS 111 must recognise that non-compliance will occur and this may be more likely to occur when requesting people to contact their general practice. We show levels of reported compliance with NHS 111 advice in Chapter 6.

Impact on other services

There is some evidence that telephone triage can reduce the use of general practice in and out of hours but little is known about its effect on emergency services. Evidence on the early impact of NHS Direct on use of emergency department and ambulances services is the most relevant to NHS 111 and showed no significant impact (Munro et al, 2000).

Two previous systematic reviews have addressed the impact of telephone consultation and triage on the use of other healthcare services. Bunn et al (2005, 2009) included only studies with a longitudinal design and found six studies measuring healthcare use. Overall they suggested that telephone consultation services may have the potential to reduce GP workload by reducing the need for face to face consultation. Leibowitz et al (2003) studied the impact of different models of out of hours care on medical workload and concluded that telephone consultation services can reduce immediate medical workload. The focus of these reviews was on telephone consultation mainly. Our study complements these reviews by considering evidence of the effect of telephone triage on use of all healthcare services.

3.4.2 Relevance to NHS 111: non-clinical triageurs

Only two papers on appropriateness and compliance focused on non-clinical triageurs, that is, were directly relevant to NHS 111. Both were by the same author (Hildebrandt et al, 2003; Hildebrandt et al, 2006) and considered non-clinical triageurs who did not use software and took calls on behalf of general practice out of hours. Even this evidence has little relevance to NHS 111 where non-clinicians use software to triage. The evidence base on impact did not include literature on the impact of non-clinical triage. Therefore our evaluation offers a unique contribution to the evidence base on telephone triage services by considering appropriateness, compliance and impact of telephone triage by non-clinical triageurs with software.

3.4.3 Strengths and limitations

The review addressed three important aspects of telephone triage services: appropriateness, compliance and impact. There are limitations to rapid evidence reviews in that all evidence may not be found and included. This limitation is problematic when addressing effectiveness of services in a meta-analysis but less of an issue for our review where we have identified ranges within which telephone triage services have operated.

3.4.4 Implications for NHS 111 and the evaluation

The evidence base on telephone triage is mainly focused on doctor and nurse triage. NHS 111 uses trained non-clinical call takers to triage calls and therefore the evidence base is not directly relevant to this new service. Our evaluation of NHS 111 measures the appropriateness, compliance and impact of the new service on healthcare use and offers a new contribution to the international evidence base on telephone triage.

4. NHS 111 service models and implementation

4.1 Introduction and methods

In order to provide the context for the evaluation of the NHS 111 service it is necessary to describe the intended principles of the service, how the pilots operate and lessons about early implementation of the pilots. Two sources of information were used to provide this description:

- Documents provided by the national and local NHS 111 programme boards which set out principles, plans and processes for the introduction of NHS 111.
- A questionnaire completed by the local NHS programme lead in each pilot site at the end of the first year of operation summarising the service implemented, management arrangements for associated processes such as clinical governance and any relevant changes that were introduced in the surrounding emergency and urgent care system.

In addition, focus groups were conducted to capture early lessons learned in the pilot sites during the planning and implementation stage in order to provide information for others in the NHS who were planning NHS 111 services. This work is described in detail in the first interim report (Turner et al, 2011a).

4.2 Core service principles

The underlying principle of NHS 111 is that patients who request urgent medical care should be assessed and directed to the "right service first time". The main features of the service are that:

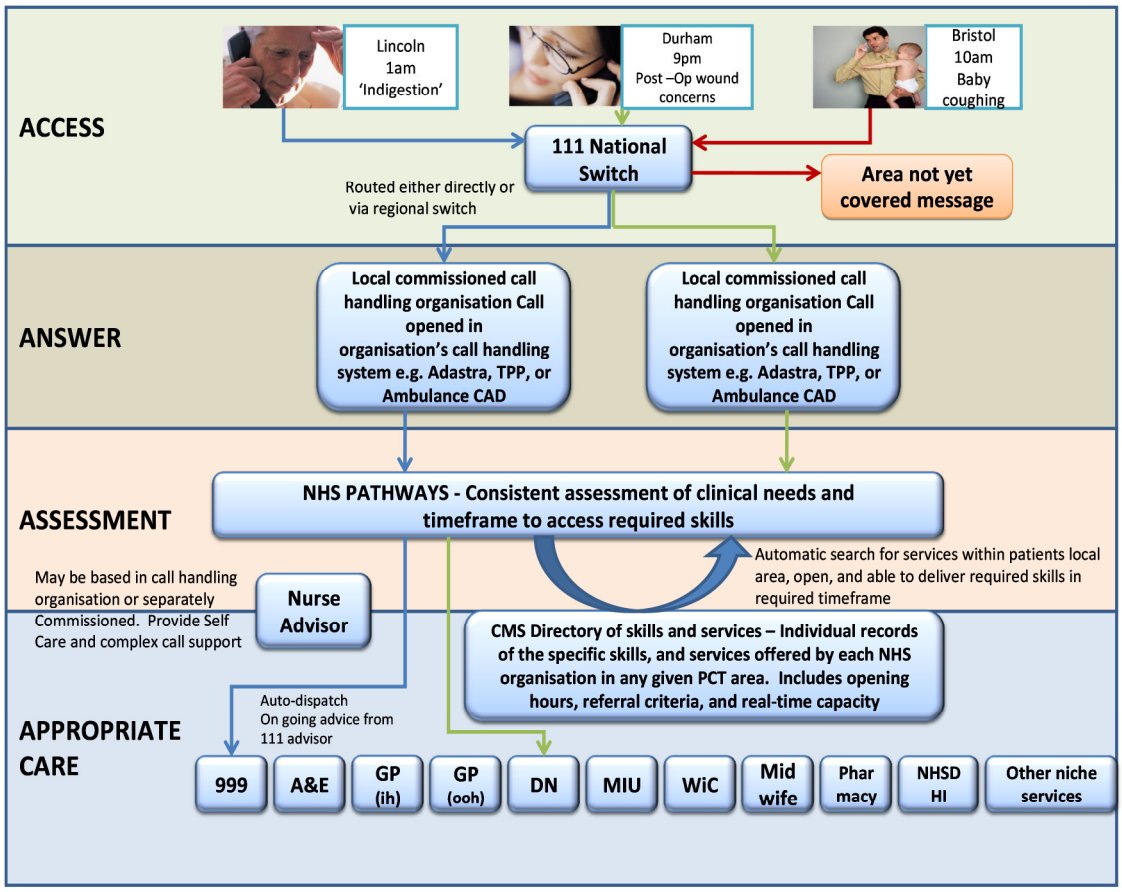
- The number is memorable and is free to use.
- Calls are assessed using an approved clinical assessment system to determine the most appropriate course of action for the patient at the first point of contact.
- Clinical assessment and provision of information, including clinician assessment, is completed on the first call without the need for a call back.
- Callers can be given health information, self care advice or directed to the most appropriate service available at the time of the call using an up to date skills based Directory of Services (DoS) for the patient's local area and without the need for re-triage.
- Where possible the NHS 111 service should develop real time links with urgent care providers so that information can be forwarded and appointments can be made for callers at the time of their call to NHS 111.
- Calls assessed as requiring an emergency ambulance response can be immediately directed to ambulance dispatch without the need for re-assessment.

NHS 111 therefore provides an integrated service that links clinical assessment with the services that are appropriate and available at the time of the call.

4.3 NHS 111 operational framework

Figure 4.1 illustrates the framework for the intended NHS 111 service during the initial pilot phase of the programme.

Figure 4.1 – Diagrammatic plan of the NHS 111 service



Source – NHS 111 Programme Board, 111 Service Specification version 1.2, May 2010

The operational framework consists of four linked steps:

1. *Access via the 111 telephone number* – Calls to NHS 111 can be routed in several ways and can be configured differently for different areas. The service can be accessed by callers only dialling 111, they may call another service such as a GP out of hours service and be asked to dial 111, or they may call another service and the call can be automatically switched to NHS 111 without the caller having to redial.
2. *Answer* – Calls are answered by a call handling service contracted to provide this service. The call handling service collects basic call details and then carries out the next step of clinical assessment.
3. *Clinical assessment* – In all four pilot sites a single clinical assessment system, NHS Pathways, is used as the clinical assessment system. NHS Pathways is a symptom based clinical assessment system used to triage calls from the public requesting emergency or

urgent healthcare and is used by ambulance services, GP out of hours services and other Single Point of Access telephone services for urgent care. The assessment is made by trained, non-clinical call advisors with clinician support available either on site. As call advisors ask symptom based questions, the answers to key indicator questions are flagged. The information from these answers is then used to match the clinical skills needed and the speed of response required for the clinical condition described to an appropriate service in step 4. In all sites most calls that may be suitable for self care advice or require referral to specialist services are transferred for clinical advice before a final disposition is reached.

4. *A web based Capacity Management System and Directory of Skills & Services (CMS/DoS)* is linked to the NHS Pathways clinical assessment system. This directory is populated locally and jointly by service commissioners and provider services. The available skills of each provider are specified, as are service operation guidance such as location, referral protocols and opening times. Services are matched to the clinical indicator flags in the clinical assessment system and appear to the call advisor in the order set by the service commissioner. The Capacity Management System operates in real time, taking account of what is available and current activity. This enables a call for urgent care to be automatically matched to a service with the right skills, location and within the required timeframe at the time of the call without having to manually search for an appropriate service. Where adequate technical links can be set up, appointments or other contacts can be made by the call adviser at the time of the call. Any provider service can be included in the CMS/DoS but, to ensure clinical safety, only some will be available for referral by an NHS Pathways call advisor. Other services, for example specialist nursing services, require additional clinician assessment before a referral can be made. The CMS/DoS system also provides activity and referral data for service monitoring and planning.

These four steps provide the overall framework for an NHS 111 service but within each step there are choices that can be made about how the service is delivered at a local level. These can be illustrated in more detail by describing the configuration of the NHS 111 service in the four pilot sites.

4.4 Pilot site service descriptions

4.4.1 Development of pilots

The development and implementation of the NHS 111 service in the four pilot sites was overseen by the national programme board and local programme boards comprising a range of stakeholders including SHAs, PCT commissioners and provider organisations. Each pilot site developed a plan within a service specification set by the DH and National NHS 111 Programme Board. In some sites these plans changed, for example the Lincolnshire site was initially envisaged as a service jointly provided by NHS Direct and East Midlands Ambulance Service NHS trust but this changed due to difficulties in getting all services ready within the desired timescales. There were also changes in the timetable for services to become operational. These issues are discussed more fully in the first interim report from the evaluation (Turner et al, 2011a). Here we discuss the final operational models implemented in each of the four pilot sites.

4.4.2 Final operational models implemented in the four pilot sites

The four pilot sites were:

- Durham & Darlington. An ambulance led service in County Durham and Darlington Primary Care Organisation
- Nottingham City. An NHS Direct led service in Nottingham City PCT
- Lincolnshire. An NHS Direct led service in Lincolnshire PCT
- Luton. An NHS Direct led service in Luton PCT

The characteristics of the NHS 111 operating models implemented are summarised in Table 4.1.

Call handling provider

The main difference between the models is in the call handling service provider, with one (Durham & Darlington) using an ambulance service provider and the remainder using NHS Direct. In the ambulance provider site all call handling is managed in a single location with flexible use of staff, as call advisors can work on NHS 111 or emergency ambulance calls, and facilities with NHS 111 call handling transferring to patient transport service control facilities during out of hours high demand periods. In this site clinical advisors (nurses or paramedics) are located within the call handling service. The NHS Direct sites manage calls within the national call handling infrastructure, for example, calls within Nottingham are not answered at a call centre in Nottingham, and also use NHS Direct nurse advisors for clinical advice. Using national infrastructure provides system flexibility at times of peak demand as there is a network of call handling centres.

Routes into NHS 111

Most of the sites use a mix of direct dial and call routing from other numbers to NHS111. The exception is the Lincolnshire site where only direct dial calls enter the NHS 111 system. All of the services have a partner ambulance service and out of hours primary care provider for direct referrals.

Direct transfer to other services

In one pilot site, Luton, the technical links to send calls directly to the ambulance service dispatch queue could not be achieved at the time the service went live and an alternative manual protocol was agreed locally. The Durham & Darlington pilot site has developed a direct technical link between the NHS 111 call handling service and the local urgent care centre network enabling the call advisors to make in hours and Out of Hours appointments for face to face or telephone contacts for callers while they remain on the line. In this site urgent transport can also be booked. In the Nottingham City and Lincolnshire pilot sites calls requiring an Out of Hours primary care contact, either face to face or telephone call, are warm transferred to the partner OOH service who will then make an appointment if required. In the Luton pilot calls are warm transferred to booking agents within the NHS Direct national system who can then make OOH appointments for the patient.

Directory of Service

All of the sites have populated at least two versions of the CMS DoS during the first year. The early directories did not have a standard framework for populating services and matching to the clinical assessment. A new version of NHS Pathways was introduced early in the pilot site operations which included national, quality assured templates to facilitate consistent linkage between the clinical information and indicators recorded in the assessment and demographic and service descriptions in the DoS. All of the sites re-populated their DoS using these templates. The Luton site will this year complete its fourth review and both Luton and Durham & Darlington have reported adding new services during the course of the first year of operation.

4.5 Implementation activities

All sites undertook a number of activities before services became live for use. The key activities were:

- *Development of a clinical governance framework* - All of the pilot sites set up NHS 111 clinical governance boards comprising a range of stakeholders to oversee governance and review performance, issues and risks on a regular basis by monitoring complaints, serious incidents, patient satisfaction and compliments. Feedback mechanisms have been put in place for providers to report clinical or operational issues that require review and action. Provider services have put in place call audit and monitoring processes to ensure consistent clinical assessment by call handlers. All pilot sites completed a rigorous clinical governance review before becoming a live service.
- *Readiness testing* – The National NHS 111 programme board set out a process for rigorous testing of a service before it becomes operational. This involves review of service design

including operational management arrangements, telephony arrangements, clinical governance process review and completion of DoS population. This is then followed by a period of end to end testing of test calls to check how calls are assessed and processed through the system. Only on satisfactory completion of the readiness testing are services allowed to become live.

- *Marketing* – Marketing a new service that is only available in a small number of geographically defined areas can be complex as any marketing or publicity needs to be confined to that area. All of the pilot sites employed a range of marketing, publicity and communication strategies prior to services going live. This included providing information for NHS staff and the public. It is outside the scope of this report to describe all of the activities undertaken but information was disseminated across the local NHS using clinical and professional groups and committees, personal visits by NHS 111 project staff and publicity material also used for the public. A range of different types of publicity materials were developed and distributed depending on the characteristics of local areas. For example, in Nottingham NHS 111 publicity was targeted at the large student population, in Lincolnshire NHS 111 fridge magnets were distributed in east coast holiday areas. The new service was advertised using local radio stations and newspapers, leaflets, posters (including street advertising) in a range of public and NHS premises and social media sites, and by events for example in supermarkets.

Having completed these processes each pilot site became an operational service in two stages. The first period of operation – the "soft launch" – lasted for up to one month and involved only taking calls that were routed from an existing number such as an out of hours service. This allowed a period for the service to slowly build up the call volume, make final tests of processes and give time for the service to bed in. During this time the service was not advertised to the public and so there were no direct dial 111 calls. The second stage was the "public launch" and at this stage assessment of direct dial 111 calls commenced and the service became fully operational.

Table 4.1: Description of four pilot site NHS 111 service models

	CDD	Nottingham	Lincolnshire	Luton
Call routing	Direct dial 111 Auto routed to 111 from Single Point of Access number	Direct dial 111 Auto routed to 111 from GP out of hours numbers	Direct dial 111 only (Nov 2010 – Mar 2011) All calls are 111 – no auto routed calls 1st April 2011 onwards all GP out of hours calls given message to call 111	Direct dial 111 Auto routed to 111 from some GP out of hours numbers Other GP out of hours numbers have a message telling caller to call 111
Call answering	Call handling provided by North East Ambulance Service Foundation Trust Service provided from ambulance emergency control centre in Newcastle on Tyne utilising emergency call control centre in hours and Patient Transport Service control centre at peak NHS 111 call times.	Call handling provided by NHS Direct national system Calls routed to NHS Direct using a separate number and identified within the system as Nottingham 111 or Nottingham OOH	Call handling provided by NHS Direct national system Calls routed to NHS Direct using a separate number and identified within the system as Lincolnshire 111	Call handling provided by NHS Direct national system Calls routed to NHS Direct using a separate number and identified within the system as Luton 111
Clinical Assessment	NHS Pathways using trained call advisors and on site nurse or paramedic clinical advice and supervision.	NHS Pathways using trained call advisors and NHS Direct nurse advisors for clinical advice and supervision.	NHS Pathways using trained call advisors and NHS Direct nurse advisors for clinical advice and supervision.	NHS Pathways using trained call advisors and NHS Direct nurse advisors for clinical advice and supervision.
CMS/DoS	Initial directory was existing directory and populated with services identified from commissioner led workshops and review meetings. Directory reflected urgent care reform and service remodelling that occurred prior to NHS 111. Current directory population built on this and led by	Two versions of directory have been populated. Initially populated by PCT leads who interacted with local providers. Second version using national clinical content templates was overseen by steering group with engagement with leads	Two versions of directory have been populated. Initially populated by PCT leads who interacted with local providers. Second version using national clinical content templates was overseen by steering group with engagement with leads from provider	Population of directory has been a stepped process. Early phase contained primary care, urgent care and Out of Hours providers. Two additional re-populations and re-profiling edits in 2011 using national templates with additional services e.g. mental health,

	PCT commissioner and a local provider capacity manager. Engagement events held with primary care providers to agree arrangements for in hours care. Over time additional services have been added allowing referrals to e.g. district nurses, nurse specialists. Transport can also be arranged for eligible patients to attend appointments made by 111.	from provider organisations.	organisations.	community services, social care added. Local engagement and involvement has increased with each review. Another re-population planned for 2012.
Technical links for warm transfer	Ambulance service emergency system for immediate ambulance dispatch Urgent Care Services so appointments can be made by the NHS 111 call advisor while the caller is still on the telephone	Ambulance service emergency system for immediate ambulance dispatch Calls can be warm transferred (i.e. no call back) to OOH provider for appointment booking	Ambulance service emergency system for immediate ambulance dispatch Calls can be warm transferred (i.e. no call back) to OOH provider for appointment booking	Manual dispatch of ambulances using agreed protocol Calls can be warm transferred (i.e. no call back) to booking agents within NHS Direct who book Out of Hours appointments with primary care services
Training	New staff recruited Standard NHS Pathways training. Additional training on safeguarding, negotiation skills, NHS 111 values, unscheduled care system. NHS 111 co-located with emergency ambulance control and both use NHS Pathways so call handlers can be used flexibly for either service when high demand.	Existing NHS Direct call handling staff re-trained Standard NHS Pathways training. Extension of role as now assessing patient on initial call. Additional training on transfer processes for OOH and ambulance dispatch. Safeguarding, record keeping and communication skills training already included in call handler training.	Existing NHS Direct call handling staff re-trained Standard NHS Pathways training. Extension of role as now assessing patient on initial call. Additional training on transfer processes for OOH and ambulance dispatch. Safeguarding, record keeping and communication skills training already included in call handler training.	Existing NHS Direct call handling staff re-trained Standard NHS Pathways training. Extension of role as now assessing patient on initial call.. Additional training on transfer processes for OOH and ambulance dispatch. Safeguarding, record keeping and communication skills training already included in call handler training.
Public Launch	August 2010	November 2010	November 2010	December 2010

4.6 Early implementation lessons learnt from the four pilot sites

In October 2010, the DH, following the decision to roll out NHS 111 nationally, initiated a rapid review of the implementation of NHS 111 in each of the four pilot sites. The purpose of this exercise was to enable an early exchange of views and ideas between those stakeholders at the 'vanguard' of designing, implementing and providing NHS 111 and to provide information that may be of value to the next wave of sites. As part of the independent evaluation we conducted a separate piece of work to identify these early lessons. Six focus groups were held with a wide range of stakeholders involved in the design, set up, implementation and provision of NHS111. We have reported the results of this exercise in more detail in our first interim report (Turner et al, 2011a). Here we present a summary of the main issues synthesised from the focus groups. The recurrent headline issues that the participants considered important for future NHS 111 developments and which need to be carefully considered are:

- The processes involved in delivering the service -strategic, management and operations-have been much more complex, difficult and time consuming than was expected.
- A clear and explicit service specification is needed to support planning and development.
- Success will be dependent on the committed engagement of all the relevant agencies and a dedicated project team to manage the process from start to implementation and subsequent maintenance.
- There are significant technical issues around licensing, adaptation and integration of the different telephone and IT systems that need to be linked to deliver seamless call handling.
- A robust period of testing to ensure consistency of assessment, alignment of dispositions to services and system resilience is critical before a service goes live.
- The development of the Directory of Services linked to dispositions is a crucial activity and the effort required to do this accurately and comprehensively cannot be underestimated.
- The capacity of NHS Pathways to provide system support and training needs to be increased if this is the preferred assessment system for national roll out.
- Aligned national and local marketing strategies that provide a consistent and explicit message about the purpose of NHS 111, and how it should be used, will be key to a national service.
- 111 is just a telephone number – it is what is behind it that is important and how it operates as part of an integrated 24/7 urgent care system.
- Greater clarity is required on the NHS 111 key performance indicators including National Quality Requirements for OOHs services

These findings were used by the National NHS 111 Programme as part of a wider "Lessons Learnt" exercise which provided practical information for commissioners and providers to inform planning and development of new services (NHS 111 Programme Board, NHS 111 Lessons Learnt, 2011). They

also resulted in a number of actions implemented by the National Programme Board to support further development including:

- Development of V2.0 of the national service specification setting out the mandatory core principles and quality standards, and removal of some detail which can be locally determined
- Introduction of the interoperability requirements and specification to address the systems integration challenges
- Issuing detailed guidance on how 111 can interface with OOH providers
- Enhancing the service readiness assurance process with a series of structured checkpoints and testing events during mobilisation
- Introduction of a DoS testing utility and national working group to support commissioners populating the DoS
- Introduction of a partnership working workshop at the start of mobilisation to engage delivery partners and establish good relations
- Introduction of a national procurement working group to collaborate and share good practice on procurement issues
- Enhancing the Clinical Governance requirements to cover arrangements at a local, regional and national level.

5. How NHS 111 was used

5.1 Introduction

In this chapter we consider how the new service has been used in terms of service activity, call handling performance as set out in the service specification and the outcomes of call assessment during the first full year of NHS 111 operation.

5.2 Methods

We have conducted a descriptive analysis of activity and processes during the first year of operation in the four NHS 111 pilot sites. The aspects of the service we have considered are:

- Numbers of calls to the service in each site including total numbers, source of call, and numbers and proportions of calls triaged
- Time taken to complete calls
- Compliance of NHS 111 call handling with National Quality Requirements and requirements set out in the service specification
- The outcomes of the clinical assessment process in terms of numbers and proportions of calls allocated to the available service dispositions

Results are presented as the total for the first full year of activity. However, with any new service it would be expected that activity will change over time and the associated processes may also change both as a consequence of an increase in activity but also as the service settles and matures. We have therefore also reported some key measures as trends over time. The four pilot sites became operational at different times and so the first year results cover different time periods.

We have considered the different operational models of the pilot sites and the possible impact on activity and processes. A more detailed comparison of operational models using combined data from other parts of the evaluation is presented in chapter 13.

The data source for this analysis is routinely collected data captured by the NHS 111 Minimum Data Set (MDS). The MDS has been designed to routinely collect and publish information on the efficiency and effectiveness of the different NHS 111 service models and provide information to Clinical Commissioning Groups to aid decision making. Service providers and commissioners provide monthly data on the coverage or population size of each service, the volume of calls received and answered, call timings and staffing information. The data set also includes information on which services patients are referred to and attendance figures to local services, outcomes of local surveys of patient experience and a set of service indicators. The MDS can be found at the following link: **http://www.dh.gov.uk/en/Publicationsandstatistics/Statistics/Performancedataandstatistics/NHS111MinimumDataSet/index.htm** . For this analysis we have used published MDS data and a bespoke dataset created from the MDS and including all call activity and triage dispositions for each

pilot site for each month during the first year of operation. This dataset was supplied by the DH Commissioning Analysis and Intelligence Team.

5.3 Results

5.3.1 Call volumes for NHS 111 and trends in use

Total numbers of calls received, answered and triaged for the first year of operation are presented in Table 5.1. Nottingham City and Lincolnshire became live services during November 2010 so we have used the year beginning December 2010 because this is the first reporting month for MDS data. All values given are for the operational period specified. Calls to NHS 111 have been separated into those connected by the telephony system and those that are 'answerable' by excluding calls where the caller hangs up within 30 seconds of the introductory message. These calls are excluded because they have not been on line long enough to allow an advisor to answer them. These types of calls occur more frequently in the Durham and Darlington pilot site where out of hours calls from some GP surgeries are switched to NHS 111 with no message. This results in a large number of calls being passed to NHS 111 at peak times such as surgery opening times when people begin calling surgeries for appointments before the call routing had been switched back from NHS 111 to local surgery telephone numbers.

Table 5.1: Total numbers of calls received, answered and triaged in one year

	Durham & Darlington	**Nottingham City**	**Lincolnshire**	**Luton**
Operational period included	August 2010 – July 2011	December 2010 – November 2011	December 2010 – November 2011	December 2010 – November 2011
Population covered	606,800	300,800	700,300	194,300
Total number of calls connected to 111	209,633	58,397	102,611	38,210
Direct dial 111 n (%)	106,961 (51)	18,354 (31.4)	102,611 (100)	23,264 (60.8)
Switched from other sources n (%)	102,672 (49)	40,043 (68.6)	0	14,946 (39.2)
Answerable calls n (%)	165,355 (78.9)	56,539 (96.8)	100,144 (97.6)	37,497 (98.1)
Answered calls n (% of answerable calls)	161,082 (97.4)	55,564 (98.2)	99,381 (99.2)	37,073 (98.8)
Triaged calls n (% of answered calls)	114,686 (71.2)	44,937 (80.9)	85,509 (86.0)	32,031 (86.4)
Connected calls per year per 1,000 people	345	195	147	196

The number calls per 1000 people is substantially higher in the Durham & Darlington site and this can in part be explained by the high number of calls ended within 30 seconds. However, if answerable

calls are considered the calls per 1000 people is still almost one third higher in this site. In Durham & Darlington NHS 111 was preceded by a single point of access telephone number for requests for urgent care and so local knowledge, awareness and familiarity with this service in the local population may also account for the higher number of calls per 1000 residents. It is also possible that familiarity with the SPA system means more people use this number than NHS Direct.

Numbers of calls

A total of 409,000 calls were made to the NHS 111 services during the first year of operation.

Route into NHS 111

The source of calls varied between the different sites reflecting the different ways in which call routing has been set up in each service. For example, only direct calls were accepted in Lincolnshire whilst other areas had a mix of direct dial and auto routed calls. In County Durham & Darlington and Luton around half of calls are direct dial and a third originate as direct dial in Nottingham City.

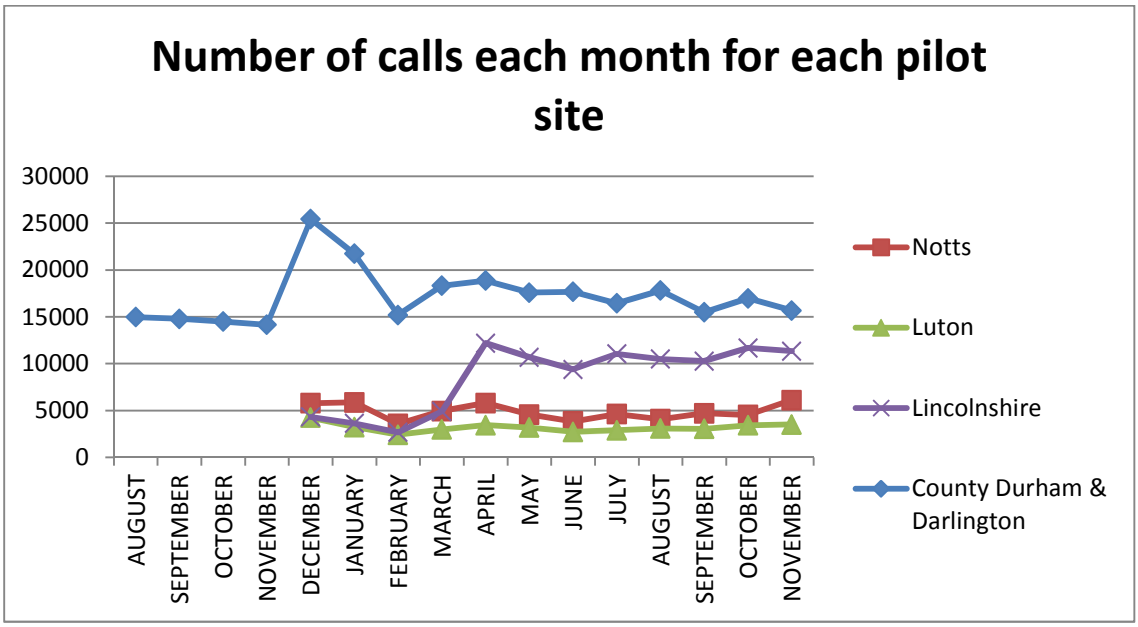
Triaged calls

Of calls available for answering, that is excluding those where the caller hung up within 30 seconds, on average 98% are answered, ranging from 97% to 99%. The proportion of answered calls triaged varied between sites during the first year of operation, with just over 70% being triaged in Durham & Darlington compared to almost 86% in Lincolnshire. This variation may be due to differences in types of calls reaching NHS 111, for example calls for information only, or a reflection of differences between the ambulance service and NHS Direct call handling provider services.

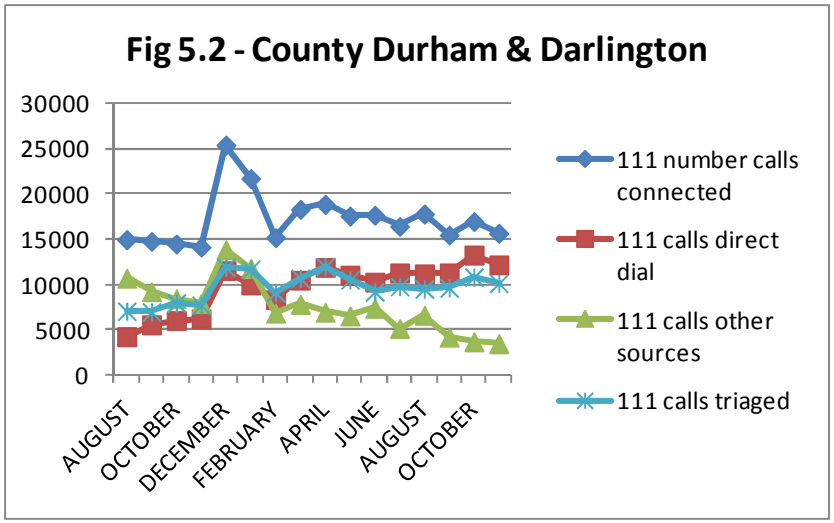
Trends over time

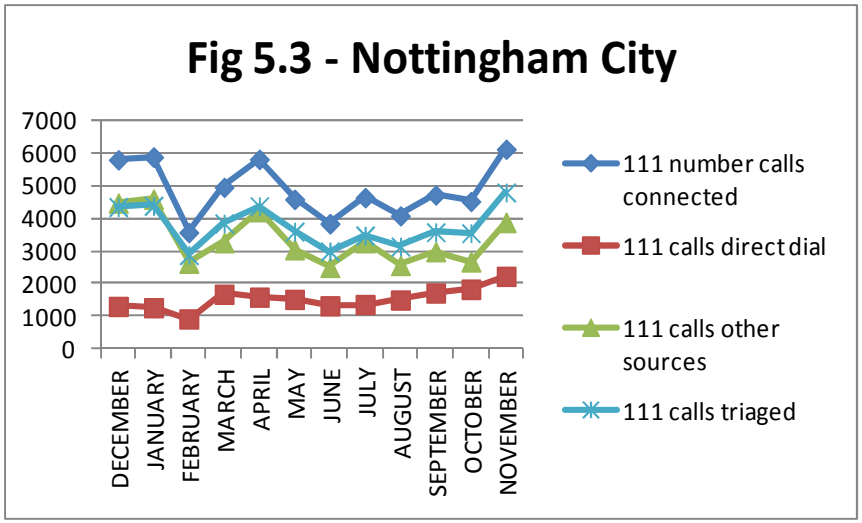
Differences as services mature are more clearly demonstrated by examining call activity over time. Figure 5.1 shows the number of calls connected to NHS111 in each site during the first year. Figures 5.2 – 5.5 show the trends for call sources, answered and triaged for each site over year one.

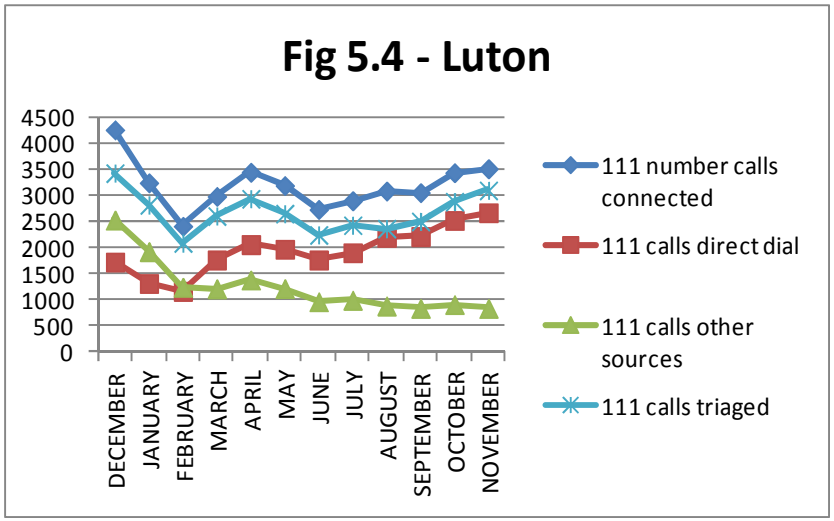
Figure 5.1: Number of connected calls per month over first year of operation

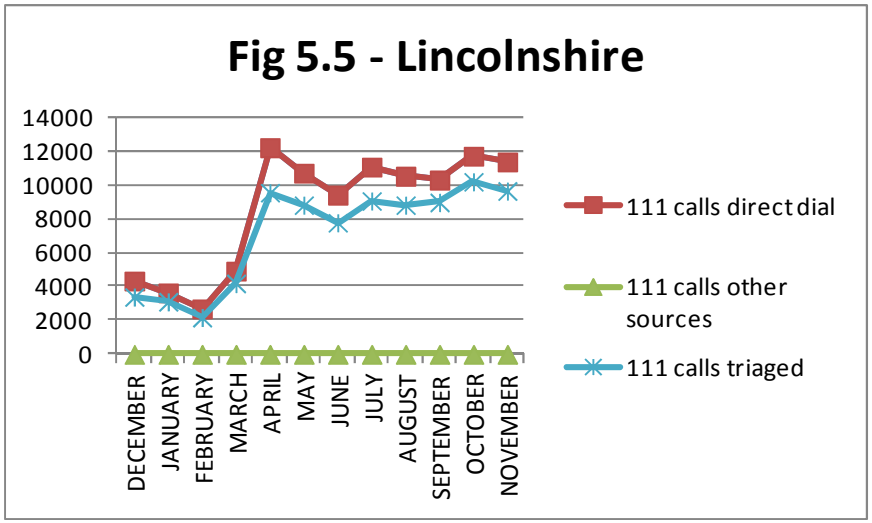


Figures 5.2 – 5.5 – Call activity in each pilot site for first year of operation









In Figure 5.5 the number of calls connected and direct dial calls is identical so only direct dial calls are visible. Figure 5.1 shows an early peak of demand in Durham & Darlington coinciding with the Christmas and New Year period. All sites demonstrate a steady state in demand over time. There is a sharp increase in call numbers in Lincolnshire (see Figure 5.5) explained by the switch of all out of hours calls to NHS 111 in April 2011. Figures 5.2 – 5.4 also demonstrate the gradual change over time in other areas towards a higher proportion of calls originating as direct dial 111 calls, particularly in Durham & Darlington and most markedly in the Luton pilot site.

5.3.2 Quality standards and call backs

Quality requirements

Calls to NHS 111 are expected to comply with National Quality Requirements (NQR) for out of hours call handling (Department of Health, DH4137271, 2006). The National Quality Requirements are NQR 8 - Initial Telephone Call:

Engaged and abandoned calls:

- No more than 0.1% of calls engaged
- No more than 5% calls abandoned.

Time taken for the call to be answered by a person:

- 95% of all calls must be answered within 60 seconds of the end of the introductory message which should normally be no more than 30 seconds long.
- Where there is no introductory message, all calls must be answered within 30 seconds.

An abandoned call is one where the caller hangs up after 30 seconds has elapsed after the call has been queued for an advisor. Calls where the caller hangs up within 30 seconds of being queued for an advisor are not counted as an abandoned call because there is insufficient time for the call to be answered. In addition to this quality requirement the NHS111 service design specifies that NHS111 should be delivered without call backs except in very exceptional circumstances, that is, if a call needs transferring to a clinical advisor this should be done at the time of the call (warm transfer). If no advisor is available the caller can be offered a call back and the call then queued and a call back made within 10 minutes.

Call abandonment, speed of answering and call backs

Table 5.2 shows details of numbers and rates of call abandonment, calls answered within 60 seconds and call backs in each pilot site. As performance may change over time as the service matures and develops, we have tabulated results for the first full year of operation and separately reported results for the first six months and second six months of operation.

The results show that the call abandonment rate was low across all sites. The highest value of 3.6% was in Durham & Darlington during the first half year operations but this can be explained by a high abandonment rate in one month (April 2011) when a telephony problem over a few days resulted in a

high number of calls being abandoned. Second half year results show the call abandonment rate was less than 1% across all sites and thus met the NQR for call abandonment rates.

All pilots also met the NQR for calls answered within 60 seconds and in second half year operation all services were well within the standard, with over 97% of calls answered within the required timeframe.

The service specification states that call backs should be exceptional. However all the pilots provided call backs for some calls where a clinical advisor assessment was needed. Call back rates ranged from 3% to less than 1%, with the higher values occurring during first half year operations. Across all services call back rates decreased over time and were 2% or less during 2nd half year operations. There was, however, a clear difference between sites in the proportion of call backs occurring within the required 10 minutes. In all three NHS Direct-led sites around 75% of call backs were achieved within 10 minutes compared to just over 50% in Durham & Darlington. The most likely explanation for this variation was differences in the operational models and how the time period for call back is measured. In Durham & Darlington the clinical advisors are located within the NHS 111 call handling service. Call advisors can therefore see if a clinical advisor is available and if one is not available will offer a call back. The time period for measuring call back time starts at this point. The NHS Direct-led pilots are working within a national infrastructure and any call requiring a clinical advisor is then put into a queue for the next available nurse. If the call is not picked up by a clinical advisor quickly (within about 50 seconds) the call reverts back to the call advisor who then offers a call back. The time period for measuring call back time starts at this point but the call may have already been in a queue for up to one minute. This means that the time period for measuring call back time (from the decision being made to transfer for clinical advice to the call back being made) in the NHS Direct sites can be up to the equivalent of 9 minutes rather than within 8 minutes and a proportionally higher number of call backs will be achieved within this longer timeframe.

Clinical advice

Table 5.3 summarises the numbers and proportions of NHS 111 triaged calls transferred for clinical advice and corresponding rates of warm transfer for clinical advice. The results show a clear difference between Durham & Darlington and the other three sites in the proportion of triaged calls referred for further clinical advice. In Durham & Darlington around 20% of calls were referred to clinicians compared to 30% in the other sites. Given that all four pilot sites use the same clinical assessment system (NHS Pathways) it would be expected that referrals for clinical advice will be similar. There are two possible explanations: 1) that there are differences in the case-mix of clinical problems experienced by people using the services, which will result in different clinical needs or, 2) that despite a common clinical assessment system, there is a difference in how the call advisors are managing calls. With respect to possible case-mix differences, we do not know whether this is the case for the pilot sites in this study although we would not expect Durham and Darlington to be exceptionally different to other pilot areas in terms of the types of calls being made to NHS 111. The second possibility is around differences in operation of the call advisor role. There are differences between the Durham & Darlington ambulance-led service and the NHS Direct-led sites. The former recruited a new cohort of staff and trained them as NHS 111 call advisors. In addition, NHS Pathways is the triage system used in this service to manage emergency ambulance calls so NHS Pathways

and assessment of calls by non-clinical call handlers is already firmly embedded in this environment. In contrast, NHS Direct retrained some of their existing call handling staff to provide call assessment in the three NHS 111 pilot sites. The NHS Direct call handling role is essentially one of gathering basic information and providing health information with clinical assessment being carried out by nurse advisors. In this environment the move to call assessment by call handlers was therefore a major shift in role, expectations and working practices for these staff. In the NHS Direct environment, assessment of calls by a nurse was normal practice whereas in the ambulance setting it is the exception. These fundamental differences seem a plausible explanation for the difference in transfer rates for clinical advice and may change over time as the services become established and mature and call handlers adjust to their new role. More recently a number of new NHS 111 services have become operational and begun submitting data to the MDS. The most recent publication in January 2012 shows that two of the new sites, Derbyshire and Lancashire & Cumbria, both of which have different call handling operating models than the pilot sites, have referral for clinical advice rates of 30% and 23% respectively (that is, the proportion of triaged calls referred for clinical advice) suggesting service model does have an impact on referral rates for clinical advice.

Table 5.2: National Quality Requirement measures in one year in four pilot sites

	Durham & Darlington			Nottingham City			Lincolnshire			Luton		
	Year	Months 1-6	Months 7-12	Year	Months 1-6	Months 7-12	Year	Months 1-6	Months 7-12	Year	Months 1-6	Months 7-12
Calls connected	209,633	105,543	104,090	58,397	30,529	27,868	102,611	38,396	64,215	38,210	19,510	18,700
Calls abandoned n (%)	4273 (2)	3808 (3.6)	465 9 (0.4)	980 (1.6)	689 (2.2)	291 (1)	771 (0.7)	370 (0.9)	401 (0.6)	430 (1.1)	313 (1.6)	117 (0.6)
Calls answered within 60 seconds n (% of answered calls)	154,928 (96.2)	74,495 (94.5)	80,433 (97.8)	53,644 (96.5)	27,591 (95.5)	26,053 (97.6)	96,929 (97.5)	35,779 (97)	61,150 (97.8)	35,783 (96.7)	17,956 (95.4)	17,827 (97.7)
Calls offered call back n (% of answered calls)	2774 (1.8)	1847 (2.5)	927 (1.2)	1005 (1.8)	581 (2.1)	424 (1.6)	1847 (1.9)	717 (2)	1130 (1.8)	932 (2.6)	560 (3.1)	372 (2.0)
Call backs within 10 minutes n (%)	1157 (41.7)	718 (38.9)	439 (47.3)	712 (70.8)	378 (65.0)	334 (78.8)	1348 (73.0)	500 (69.8)	848 (75.0)	615 (66.0)	336 (60.1)	279 (75.0)

Table 5.3: Number and proportions of NHS 111 calls transferred for clinical advice

	Durham & Darlington			Nottingham City			Lincolnshire			Luton		
	Year	Months 1-6	Months 7-12	Year	Months 1-6	Months 7-12	Year	Months 1-6	Months 7-12	Year	Months 1-6	Months 7-12
Triaged calls	114,686	53,356	61,341	44,937	23,413	21,524	85,509	31,159	54,350	32,031	16,521	15,510
Transferred for clinical advice n (% triaged calls)	24,488 (21.3)	10,936 (20.9)	13,552 (22.1)	13,261 (29.5)	7080 (30.2)	6181 (28.7)	28,871 (33.7)	11,018 (35.3)	17,853 (32.8)	10,779 (33.6)	5636 (34.0)	5143 (33.1)
Warm transferred (no call back) n (%)	21,714 (88.6)	9089 (83.1)	12,625 (93.1)	12,256 (92.4)	6499 (91.8)	5757 (93.1)	27,024 (93.6)	10,301 (93.4)	16,723 (93.6)	5076 (91.3)	4771 (90.0)	9847 (92.8)

5.3.3 Dispositions

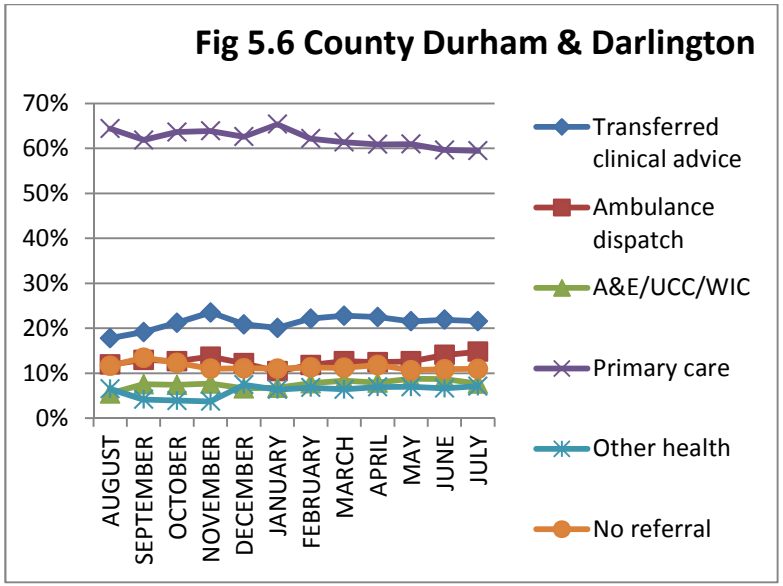
We have examined the final disposition, that is, the outcome of the call in terms of the service referred to or other action, of all triaged calls in each pilot site. The final disposition is that arrived at by the call advisor or, where the call is transferred for further clinical assessment, the clinical advisor. The numbers and proportions of triaged calls allocated to each disposition type are summarised in Table 5.4. Figures 5.6 – 5.9 show the proportions of calls allocated to different disposition types for each pilot service over the first year of operation and Figure 5.10 the proportions of calls allocated to each disposition type for all services.

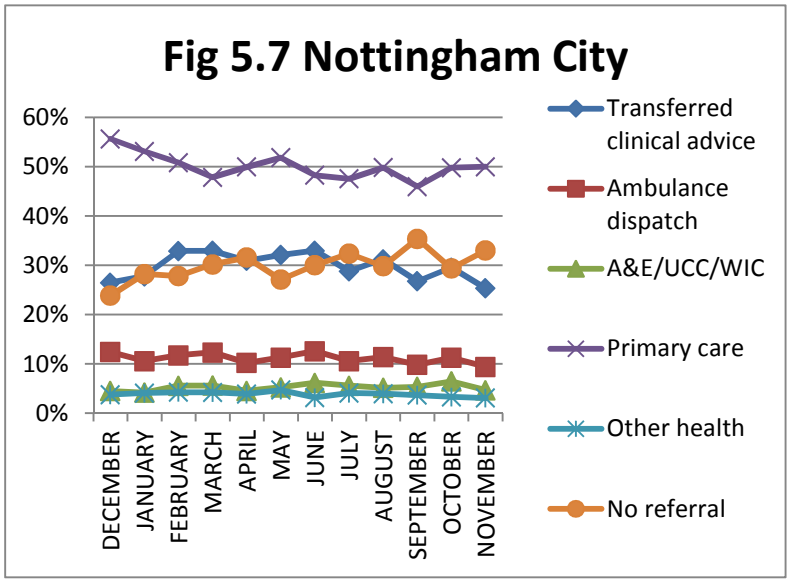
Table 5.4: Disposition of triaged calls and average episode time over one year

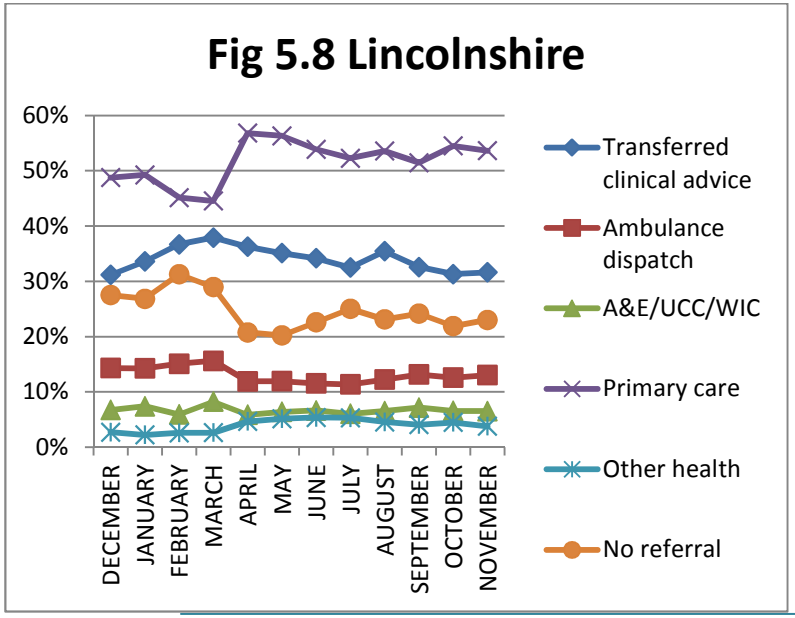
Disposition	Durham & Darlington	Nottingham City	Lincolnshire	Luton
Total number of triaged calls	114,686	44,937	85,509	32,031
Ambulance dispatch n (%)	14,487 (12.6)	4954 (11.0)	10,804 (12.6)	2814 (8.9)
A&E n (%)	8698 (7.6)	2307 (5.1)	5622 (6.6)	1637 (5.1)
Primary Care n(%)	71,271 (62.1)	22,548 (50.2)	45,314 (53)	18,161 (56.7)
Of these				
Contact PCP[1] n(%)	54,649 (47.7)	17139 (38.1)	32,979 (38.6)	14,339 (44.8)
Speak to PCP n(%)	12,872 (11.2)	4459 (9.9)	10,524 (12.3)	3246 (10.1)
Dental/pharmacy n(%)	3750 (3.3)	950 (2.1)	1811 (2.1)	576 (1.8)
Other service (e.g. midwife, district nurse) n(%)	7171 (6.3)	1704 (3.8)	3703 (4.3)	1551 (4.8)
No service n(%)	13,059 (11.4)	13,424 (29.9)	20,066 (23.5)	7841 (24.5)
Of these				
Health Information n(%)	1689 (1.5)	1742 (3.9)	2725 (3.2)	885 (2.8)
Home Care n(%)	8256 (7.2)	4232 (9.4)	8937 (10.5)	3642 (11.4)
Non Clinical n(%)	3114 (2.7)	7450 (16.6)	8404 (9.8)	3314 (10.3)
Average episode length (min:sec)[2]	06:34	12:38	13:00	11:02

[1] Primary Care Practitioner [2] at November 2011

Figures 5.6 – 5.9: Dispositions of triaged calls over one year







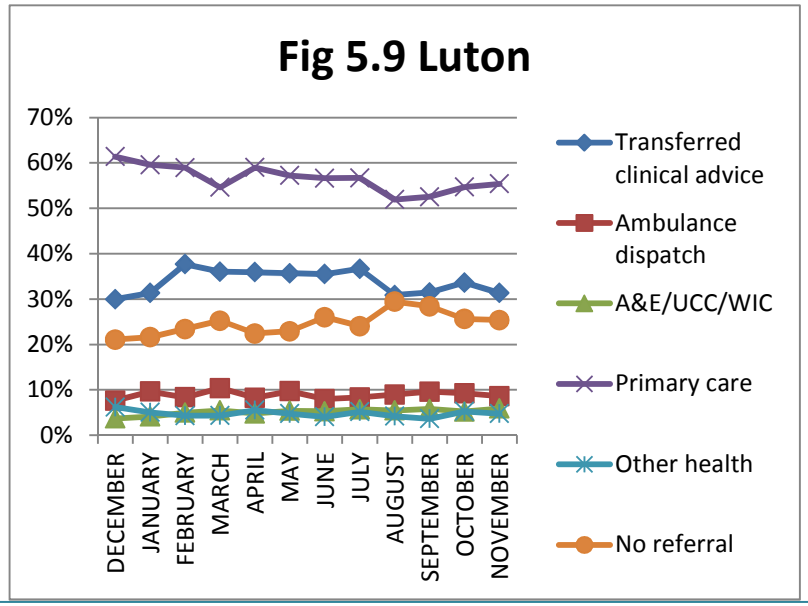
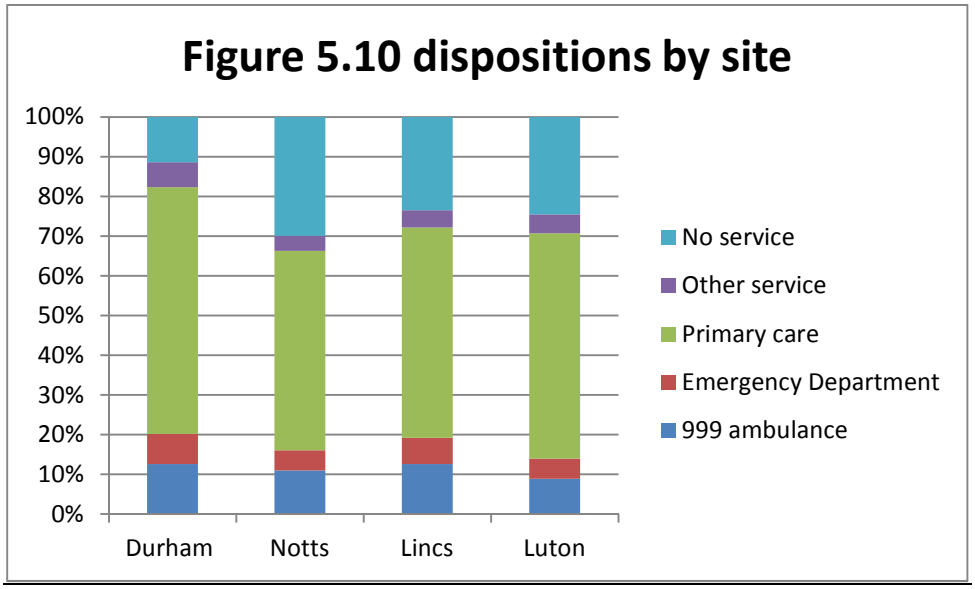


Figure 5.10: Proportions of triaged calls allocated to disposition types



Ambulance

9 – 12.9 % of dispositions were to emergency ambulance dispatch and this was similar across pilot sites although lowest in the Luton pilot site (Table 5.4). This site had a manual process for ambulance dispatch which may have influenced triage to ambulance dispatch.

A&E

The disposition type "A&E" includes calls referred to type 1 or 2 Emergency Departments, Between 5-7.6 % of triaged called were advised go to A&E. Durham & Darlington had the highest referral to the A&E disposition however this includes some referrals to urgent care centres (UCC) as some clinical pathways in the assessment system that would normally be configured as attend A&E have been configured to a disposition of UCC to reflect they level of care available in these centres in this area.

Primary care

The disposition type "Primary Care Provider" includes calls referred to or advised to contact GP practice, GP out of hours, walk in centres, minor injury units and urgent care centres, dental and pharmacy services. In all pilot sites the largest proportion of dispositions was to primary care services (50-62% overall) and this is more marked in Durham and Darlington (Figure 5.6). Referrals to primary care were 5-12% higher in this site than the other three pilot sites.

No service

11-30% of triaged calls have a disposition of 'no service' and this is mainly self care but also includes providing health information only and calls which were terminated before the assessment was complete or where the caller was requesting information such as test results. The most obvious

difference between sites was the smaller proportion of calls not referred to any service in Durham & Darlington than the other three sites. Figures 5.7- 5.9 show that that proportions of calls transferred for clinical advice is aligned with proportions of calls with dispositions other than service referral suggesting the two are linked. This would be a likely explanation as to ensure clinical safety there are few clinical scenarios within the NHS pathways system where the non-clinical call advisor would arrive at a disposition that requires no service and it would be expected that the enhanced clinical experience of the clinical advisors would allow more confident decisions about the need, or not, for a contact with a clinical service. However, there is a clear difference in the number of calls triaged as being non-clinical with this being only 2.7% in Durham & Darlington compared to 10-16% in the other sites. To explore this further we have examined the numbers and proportions of triaged calls assigned to each disposition type separately for call advisors and clinical advisors. The results are shown in Table 5.5. The proportion of calls triaged by clinicians as requiring an ambulance dispatch was lower in the three NHS Direct provided sites than the ambulance provided site but, as more calls are transferred for clinician assessment in the NHS Direct sites the case-mix may be different. A higher proportion of calls were assigned to other service dispositions by clinicians in the ambulance provided site. Of the “no service” dispositions the proportion assigned by clinicians to home care were very similar across all sites but a markedly higher proportion of call advisor calls were assigned to this category in the ambulance provided site compared to the NHS Direct sites where the majority of calls were assigned by call advisors to the non-clinical disposition. Proportions of calls assigned as “health information” were similar across all sites.

There is no clear explanation, using routine data, of why there are differences between sites in the number and proportion of calls assigned to the “no service” disposition. Overall, the proportion of all triaged calls assigned to “ home care” by call advisors and clinicians combined was lower in the Durham and Darlington site (7.2%) where fewer calls were passed to a clinician for further assessment, than the other sites (Nottingham City 9.4%, Luton 11.4%, Lincolnshire 10.5%) but clinicians triage calls to this disposition at a similar rate. The main difference between sites is the proportion of calls assigned as by call advisors as non-clinical and of these the majority (>95%) are recorded as “call closed-no further action required) which does not provide any description of the nature of the call but the most likely explanation is that there are differences between sites in the types of calls being made to NHS 111.

Table 5.5: Dispositions of triaged calls by call advisors and clinicians

	Durham & Darlington		Nottingham		Luton		Lincolnshire	
Disposition	Call Advisor	Clinician	Call Advisor	Clinician	Call Advisor	Clinician	Call Advisor	Clinician
Ambulance n(%)	11913 (13)	3113 (12.3)	3893 (12.3)	1061 (8)	2240 (10.5)	601 (5.6)	8284 (14.6)	2520 (8.8)
A&E n(%)	7453 (8.1)	1675 (6.6)	1514 (4.8)	793 (6)	1077 (5.1)	560 (5.2)	3613 (6.4)	2009 (7)
Primary Care n(%)	59753 (65)	12592 (49.9)	15541 (49)	7007 (53.1)	12296 (57.7)	5865 (54.7)	30424 (53.6)	14890 (51.7)
Other service n(%)	6055 (6.6)	1399 (5.5)	1478 (4.7)	226 (1.7)	1385 (6.5)	166 (1.5)	3298 (5.8)	405 (1.4)
No service n(%)	6720 (7.3)	6476 (25.6)	9308 (29.3)	4116 (31.2)	4308 (20.2)	3533 (32.9)	11094 (19.6)	8972 (31.2)
No service calls only								
Health information n(%)	1602 (23.9)	80 (1.2)	1697 (18.3)	45 (1.1)	862 (20.1)	23 (0.6)	2629 (23.7)	96 (1.1)
Home care n(%)	2361 (35.1)	5946 (91.8)	624 (6.7)	3608 (87.6)	472 (10.9)	3170 (89.8)	1071 (9.6)	7866 (87.6)
Non-clinical n(%)	2751 (41)	456 (7)	6989 (75)	461 (11.3)	2974 (69)	340 (9.6)	7393 (66.7)	1011 (11.3)

Call length

We have also examined the average episode time for NHS 111 calls. Episode time is calculated for all answered calls and is the interval from the time the call is connected until the caller hangs up either at the end of the initial call or after call back, that is, it will include any time spent waiting for a call back. The average episode time in Nottingham City, Luton and Lincolnshire sites of between 10-13 minutes was around double the 6.5 minute average episode time in Durham & Darlington (Table 5.3). Again this may reflect the different operating models and particularly the greater emphasis on clinical advice in the NHS Direct provided sites.

5.4 Discussion

5.4.1 Summary of findings

We have examined the first year of operation in four NHS 111 pilot sites in terms of call volumes, call handling performance and the outcomes of call assessment. During the first year the four sites managed just over 400,000 calls. Each site serves a different sized population and call volumes within each site varied to reflect this difference but in all sites call volumes have stabilised, taking in to account normal seasonal variation, as the service has matured. There is a higher call per 1000 people rate in the Durham & Darlington site some, but not all, of which can be explained by a higher proportion of calls that are terminated within 30 seconds.

The proportion of calls originating as direct dial calls to 111 varied from 38% to 100% across the 4 sites during the first year of operation. However this pattern changed as the pilot services refined their operational models by, for example, changing automatically routed call processes to one where messages ask callers to dial 111 directly. The most recent figures in the national MDS show that the proportion of direct dial calls has shifted substantially to 80% in County Durham & Darlington and 78% in Luton with a smaller increase recorded in Nottingham City where direct dial calls now account for almost 38% of 111 calls which probably reflects the different operating model in this site where 111 has been set up as two services, 111 and Out of Hours Primary care services but with common call handling. The proportion of calls triaged during year 1 of operation ranged from 70% - 86% , however again this trend has changed as services have matured and by January 2012 the most recent national MDS data shows that all four services are reporting triage rates of 80-84% of answerable calls.

All services have met the National Quality Requirements for call handling with a 2% or less call abandonment rate and over 95% of calls answered within 60 seconds. All services have reported having to make some call backs to callers when clinical advisors are not immediately available although the rate is similar in all sites. During the first year of operation there were 3729 call backs across all 4 sites equating to 1% of answered calls. There is a difference in the proportion of calls called back within 10 minutes with the County Durham and Darlington site reporting a smaller proportion then the other sites but this is likely to be a consequence of a difference in the way in which the call back time is measured in the different service models.

There is a marked difference between sites in the proportion of calls transferred to clinical advisors. In County Durham and Darlington 20% of calls are transferred for clinical advice compared to around 30% in the other 3 sites. In all sites around 90% of calls requiring clinical advice are warm transferred at the time of the call with 10% requiring a call back.

The difference in proportions of calls transferred to clinical advisors is reflected in the call assessment outcomes reported in the different sites. There is a clear difference in the proportion of calls assessed as not requiring a clinical service which is higher in the 3 NHS Direct provided sites which also have the higher proportion of calls assessed by clinical advisors. This difference is also reflected in average call episode times which are twice as long in these three sites compared to the ambulance service provided site. The most recent national MDS reports average episode times in the more recently operating sites of Derbyshire and Lancashire & Cumbria as 10 minutes and just under 9 minutes respectively which is between those reported in the 4 early pilot sites again suggesting that different operational models will result in different call processing times.

5.4.2 Strengths and limitations

All data presented here is collected as part of a national minimum data set, ensuring consistency of measurement over time and between pilot sites, and allowing comparison with later pilots. A limitation is that content is limited to the data collected within this MDA.

5.4.3 Implications for the evaluation and NHS 111

It is unclear why, given that all sites are using the same clinical assessment system, there should be such a marked but consistent pattern of higher clinician referral across all three NHS Direct provided sites compared to the ambulance service provided site but the most likely explanation is that this is a consequence of differences in the way the call handling operating environment has historically developed in these different types of service. Episode times and transfer rates to clinical advisors reported by services with different operating models that have been implemented more recently fall between those found in the 4 early pilots suggesting this is a consequence of service design.

6. Users' views of NHS 111

6.1 Introduction

It is important to understand users' experiences and views of new services. If users are not satisfied with a service, and they have access to alternative forms of care, they are less likely to use it again in the future. Two user surveys were undertaken in the NHS 111 pilot sites. The first survey was administered approximately three months after the launch of each NHS 111 pilot, and the second survey was administered approximately nine months after each launch. The first survey was to offer policymakers early feedback on a new service, and the second survey was undertaken to evaluate the service after it had 'bedded in' and had the opportunity to address any early teething problems. The findings from the first survey were reported in the second interim report from the evaluation (Turner et al, 2011b). Here we focus on the findings from the survey administered approximately nine months after the launch of each NHS 111 pilot.

6.2 Methods

6.2.1 Design

A cross sectional postal survey of people who had recently used NHS 111 was undertaken in each site. Surveys were undertaken approximately nine months after the start of the service in three of the four sites. The survey for Durham & Darlington was administered approximately 11 months after the start of the service because of a delay with the administration of the three month survey (Turner et al, 2011b).

6.2.2 Sampling

The intention was to send questionnaires to 1200 users in each site. Calls made in a single week were used as the sampling frame. A two week sampling period was used for sites with lower numbers of calls. When more than 1200 calls were identified in a week, systematic random sampling was used to select 1200 calls. After selection, a small number of calls were excluded by NHS 111 staff. As callers who were aged 15 years and under were sent a questionnaire addressed to their parent/guardian, we excluded this age group if the call related to a sexual health issue. We also excluded callers if they had not provided their home address details. In order to avoid 'repeat' users receiving more than one questionnaire, only one call received during the sampling period was included in the sample.

Personnel at each site sent a covering letter, information booklet, questionnaire and reply paid envelope to the *patient* within three weeks of the call. In most cases the caller and the patient were the same person. Where calls were made on behalf of children we addressed the questionnaire to 'care of the parent/guardian of'. We asked in the covering letter that both caller and patient attempt to complete the questionnaire together if relevant and possible. Responses were returned directly to our team and logged. Questionnaires had unique identifiers and sites were informed of which users

needed reminders. Up to two reminders were sent to non-responders approximately three weeks and six weeks after the initial mailing.

6.2.3 The questionnaire

The questionnaire addressed how people accessed the service, the usefulness of the advice received, compliance with that advice, positive and negative aspects of their contact with the service, overall satisfaction with the service, whether the problem was resolved to their satisfaction at seven days after the call, and caller demographics. In addition, we asked respondents an open question about the NHS 111 service, giving them a short section to describe in their own words anything they were particularly satisfied or dissatisfied with.

The questionnaire was developed based on our previous evaluations of NHS Direct and Ambulance Service call management (Munro et al, 2001; Turner et al, 2006). The questionnaire was piloted with three NHS 111 users in one site who discussed within a telephone interview the face and content validity of the questionnaire. We were aware before we embarked on this survey that NHS 111 users might not know that they had called the service because some users are auto-routed through from other services. We designed the covering letter and questionnaire to address this.

6.2.4 Analysis

Data were analysed in PASW Statistics version 19. We compared differences between sites using the chi-squared test for proportions. We were interested in whether the quality of service differed by site. Because levels of satisfaction may depend on case mix and on users' characteristics, we adjusted some site comparisons to take into consideration the fact that different sites had different types of callers. We adjusted for 'route into NHS 111' because the perceived urgency of the call was likely to be related to whether people were auto-routed in from calling a GP out of hours or called themselves. We also adjusted for age, sex and ethnicity of the caller because these demographics can affect people's satisfaction levels regardless of the quality of service given. In particular, older people are usually more satisfied with health care than younger people (Crow et al, 2002). We considered using ordinal logistic regression for categorical outcome variables. However, adjustment for demographic variables resulted in a large proportion of empty cells in these analyses and therefore we dichotomised categorical outcome variables and undertook binary logistic regression, testing the effect of 'site' adjusted for age group (16-44, 45-64, 65+), sex, ethnicity and 'route into NHS 111'.

We used the Friedman test to compare statements about eight aspects of the service. Due to the large number of pairs of statements available for post hoc testing, we used the Wilcoxon Signed-Rank test to compare the statement with the lowest rating with the seven other statements, using a Bonferroni adjustment to account for multiple testing.

We analysed the open question using a 'quantitative strategy' (O'Cathain & Thomas, 2004). Because of the large number of comments we randomly selected 50 comments from each site. One researcher read the comments and coded them into three categories: 'respondent provided positive comments only', 'respondent provided negative comments only', or 'respondent provided a combination of both

positive and negative comments'. Comments within each category were then re-read and coded into broad themes developed inductively from reading the comments.

6.3 Results

6.3.1 Response rates

The response rate was 41% overall and varied between 33% and 49% by site (Table 6.1). In total, 49% (872/1769) of respondents provided written comments.

6.3.2 Respondent demographics

We asked for the *caller* demographics (Table 6.2). Some of the questions on the questionnaire were related to the NHS 111 call itself, and therefore were designed to be answered by the caller. Demographics of respondents differed between sites for age (p=0.001), sex (p=0.021) and ethnicity (p=0.001). Luton had a higher proportion of younger callers and female callers than the other sites. Both Nottingham and Luton had higher proportions of callers from minority ethnic communities. The 2001 Census confirms that these areas have high proportions of minority ethnic populations (Nottingham 15%, Luton 28%) (ONS, 2003). We were unable to estimate non-response bias because we collected demographic information on callers and NHS 111 collects demographic information on patients.

Table 6.1: Sampling and response rates by site

	Durham & Darlington	Nottingham	Lincolnshire	Luton	All
Service start date	Aug 2010	Nov 2010	Nov 2010	Dec 2010	
Sampling period 2011	4th-10th July	29th Aug -11th September	12th -18th September	12th – 25th September	
Sampling method	Random	Random	Random	All calls	
Mailed	1117	1151	1161	884	4313
Completed questionnaires returned	522	371	564	312	1769
Adjusted response rate*	47% (522/1105)	33% (371/1133)	49% (564/1147)	35% (312/880)	41% (1769/4265)

**removed 'deceased' and 'return to senders'*

Table 6.2: Caller demographics by site

	Durham & Darlington % (n)	Nottingham % (n)	Lincolnshire % (n)	Luton % (n)	All
Age					
16-44	42 (217)	50 (180)	42 (233)	65 (202)	47 (832)
45-64	30 (158)	28 (103)	29 (160)	20 (62)	28 (483)
65+	28 (146)	22 (81)	30 (167)	15 (45)	25 (439)
Sex					
Male	27 (140)	33 (122)	32 (176)	24 (75)	29 (513)
Female	73 (376)	67 (243)	68 (381)	76 (237)	71 (1237)
Ethnicity					
White	98 (503)	73 (264)	98 (540)	56 (172)	85 (1479)
Other ethnic grp	2 (10)	27 (98)	2 (13)	44 (136)	15 (257)

6.3.3 Getting through to NHS 111

Given that there are different models of delivering NHS 111 (see Chapter 4), we would expect there to be differences between sites in how users reported accessing NHS 111. There were differences between sites (p=0.001) (Table 6.3). In Nottingham, the majority of callers reported being auto-routed to NHS 111 from another service. In the three remaining sites, the majority of respondents reported that they had accessed the service by dialling 111 directly. A small percentage of respondents (3%, 44/1712) were unsure how they had accessed NHS 111. There were some differences between this data and data from NHS 111 reported in Chapter 5. In particular, 100% of users direct dialled NHS 111 in the Lincolnshire site based on routine data from NHS 111, but only 87% of our respondents in Lincolnshire reported doing this. This may be due to people not interpreting the question as intended.

How users accessed the service may have affected their views in ways that are not related to the quality of the service they received. Remaining site comparisons are adjusted for 'reported route into NHS 111'.

Table 6.3: Getting through to NHS 111

	Durham & Darlington % (n)	Nottingham % (n)	Lincolnshire % (n)	Luton % (n)	All % (n)
Dialled NHS 111 directly	72 (352)	40 (139)	72 (393)	60 (175)	64 (1059)
Called another service and was put through to NHS 111 ('auto-routed')	17 (81)	53 (183)	13 (72)	28 (80)	25 (416)
Called another service and heard a message directing to call NHS 111	11 (54)	7 (24)	15 (80)	12 (35)	12 (193)

6.3.4 Advice given

Respondents were asked what they were told to do by NHS 111. Forty respondents (2%) did not provide an answer to this question. Of the 1729 respondents providing an answer, a further 39 respondents (2%) indicated that they could not remember or were unsure of the advice they had been given by NHS 111. The most common reported outcome of the call was having a primary care appointment arranged (34%) (Table 6.4). One in ten respondents reported that they had been advised to homecare/self care without the need to contact another health care provider. There were differences in the advice given in different sites (p=0.001). There was lower reported use of home care/self care in Durham & Darlington and higher reported use of primary care appointments made in Durham & Darlington and in Luton.

Table 6.4: Advice given by NHS 111

	Durham & Darlington % (n)	Nottingham % (n)	Lincolnshire % (n)	Luton % (n)	All % (n)
Transfer to emergency	3 (14)	3 (9)	3 (17)	2 (6)	3 (46)
Told that an ambulance was on the way	21 (107)	14 (48)	19 (105)	13 (40)	18 (300)
Primary care appointment arranged	42 (211)	28 (98)	29 (156)	38 (113)	34 (578)
Contact own general practice	3 (16)	13 (47)	12 (65)	9 (26)	9 (154)
Visit ED/WIC/UCC/MIU	12 (61)	18 (63)	16 (85)	16 (47)	15 (256)
Home care/Self care (inc pharmacy)	6 (30)	14 (48)	10 (52)	12 (37)	10 (167)
Other*	12 (60)	11 (39)	11 (61)	10 (29)	11 (189)

**'other' includes a variety of responses such as contact another health care professional – including home visits and telephone contacts, (and where respondents had ticked multiple services <2%).*

The options we gave on the questionnaire were based on dispositions in the NHS Pathways call assessment system. They differ from those reported in the NHS 111 minimum data set which was developed after our questionnaire (see Chapter 5). We grouped our categories to allow comparison between our survey dispositions and those in the minimum data set (Table 6.5). We used data from the minimum data set relating to the month that the survey calls were sampled to ensure we compared like with like. Note therefore that the minimum data set reported in Table 6.5 differs from the full year minimum data set reported in Chapter 5.

In our survey respondents we had more reports of contact with ambulance and emergency departments as advice given, and fewer reports of home care/self care/other care, than the minimum data set. This could be explained by non-response bias because people may be more likely to complete a questionnaire about an event which involves an emergency service than no service at all. It may also be the case that callers are given more complicated advice than our questionnaire allowed them to tick, for example 'self care but if the problem gets worse then go to a walk in centre'. This

would be categorised as self care on the minimum data set but survey respondents might have ticked 'walk in centre' on our questionnaire.

Table 6.5: A comparison of advice reported in the survey with the minimum data set (MDS)

	Durham & Darlington		Nottingham		Lincolnshire		Luton	
	Survey % (n)	MDS* % (n)	Survey % (n)	MDS** % (n)	Survey % (n)	MDS** % (n)	Survey % (n)	MDS** % (n)
Ambulance	25 (121)	15 (1432)	17 (57)	9 (324)	23 (122)	12 (1115)	16 (46)	9 (227)
ED/ WIC/UCC/MIU	12 (61)	12 (1134)	18 (63)	5 (191)	16 (85)	7 (646)	16 (47)	6 (147)
Primary care (includes appt with UCC, GP)	52 (268)	56 (5526)	48 (163)	46 (1658)	48 (256)	52 (4661)	53 (154)	53 (1336)
Home care/Self care (includes pharmacy)	5 (23)	10 (1008)	12 (42)	36 (1287)	8 (42)	24 (2189)	11 (33)	28 (719)
Other health care professional	6 (29)	7 (686)	5 (17)	4 (135)	6 (30)	4 (397)	4 (13)	4 (96)

**July 2011 only, **September 2011 only*

6.3.5 Helpfulness of advice

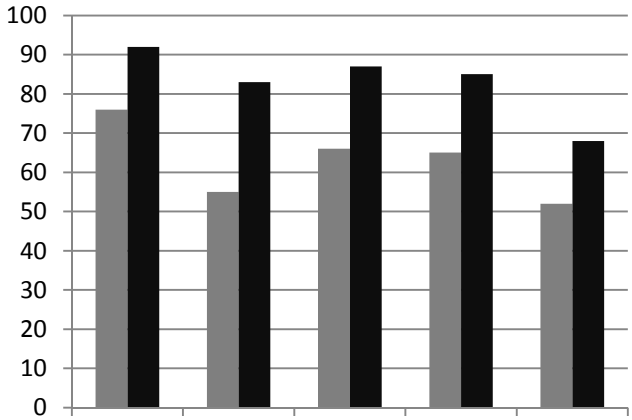
Respondents were asked how helpful they found the advice given by NHS 111 (Table 6.6). There were differences between sites (p=0.004). Overall, two thirds of respondents reported receiving 'very helpful' advice from NHS 111 (65% 1108/1695, 95% confidence interval: 63% to 68%). There were no differences between sites when comparing the dichotomised outcome of 'very helpful' with other categories (p=0.146, adjusted for route p=0.083).

Table 6.6: Helpfulness of the advice

	Durham & D % (n)	Nottingham % (n)	Lincolnshire % (n)	Luton % (n)	All % (n)
Very helpful	68 (342)	59 (209)	70 (378)	61 (179)	65 (1108)
Quite helpful	24 (122)	35 (125)	24 (133)	30 (88)	28 (468)
Not very helpful	5 (25)	5 (17)	4 (23)	7 (21)	5 (86)
Not helpful at all	2 (12)	1 (3)	2 (10)	3 (8)	2 (33)

Perceived helpfulness of advice differed by type of advice given (Figure 6.1). Respondents were less likely to feel that advice to go to the emergency department was 'very helpful' compared with other types of advice (p=0.001).

Figure 6.1: Helpfulness of, and compliance with, the advice given by NHS 111 disposition



6.3.6 Compliance with advice

The majority of respondents reported complying with all the advice given by NHS 111 (86%, 95% confidence interval: 84% to 88%) (Table 6.7). A small number of respondents reported that they had not followed any of the advice given. There were no statistically significant differences between sites when comparing 'complied with all advice' with 'not complied with all advice' (complied with some

advice and did not comply with advice) (adjusted for demographics p=0.574, adjusted also for route p=0.784).

Respondents who did not fully comply with the advice given by NHS 111 (n=235) were asked to indicate their main reason for not following the advice (Table 6.8). Most respondents provided a reason for not complying (70%, 165/235), reporting that they did not agree with the advice, felt unable to follow it or felt that it did not work. Numbers were too small to consider differences between sites in reasons for not following advice. A third of people ticked 'other reason' which consisted of a diverse range of responses including 'I forgot' or 'it was too late'.

Reported compliance differed by type of advice given (Figure 6.1 above). Respondents reported being less likely to fully comply with 'other' advice (p=0.001).

Table 6.7: Compliance with the advice given by NHS 111

	Durham & D % (n)	Nottingham % (n)	Lincolnshire % (n)	Luton % (n)	All % (n)
Complied with all advice	88 (430)	85 (296)	86 (465)	83 (244)	86 (1435)
Complied with some advice	9 (45)	12 (41)	10 (56)	13 (38)	11 (180)
Did not comply with advice	3 (13)	3 (12)	3 (18)	4 (12)	3 (55)

Table 6.8: Reasons for not complying with advice

	Durham & D % (n)	Nottingham % (n)	Lincolnshire % (n)	Luton % (n)	All % (n)
Did not agree	26 (11)	24 (10)	9 (4)	28 (10)	21 (35)
Unable to follow	19 (8)	29 (12)	17 (8)	14 (5)	20 (33)
The advice did not work	14 (6)	24 (10)	22 (10)	17 (6)	19 (32)
Health problem changed	2 (1)	7 (3)	13 (6)	3 (1)	7 (11)
Did not understand the advice	2 (1)	5 (2)	2 (1)	0 (0)	2 (4)
Other	36 (15)	10 (4)	37 (17)	39 (14)	30 (50)

6.3.7 Contact with health services after NHS 111: right service, first time?

Respondents were asked if they had any further contact with health services for the same problem in the five days after their NHS 111 call. We asked them to include services which NHS 111 had advised them to contact or contacted on their behalf. 52% (889/1721) of respondents reported being in contact with another health service, and there were no differences between sites (p=0.559). This was much lower than we expected to see given that 90% of respondents reported being given advice to use a service (see Table 6.4) and most people reported complying fully with advice (see Table 6.7). Earlier we noted that people may be advised by NHS 111 to contact a service if a condition gets worse and may have reported this advice as 'service contact' rather than 'home care' in Table 6.4. Thus Table 6.4 may show more service contact advice than occurred. Even taking this into consideration fails to account for the discrepancy between reports of advice given and reports of services contacted. Therefore caution is required when interpreting the findings on service contacts reported below.

Respondents were asked to list the types of service that they had been in contact with, and the order of contact. Only 93% (827/889) listed the services they had contacted following their NHS 111 call. Of these, 58% (479/827) reported contacting one service only following their call, 24% (195/827) reported contacting two services, and 19% (153/827) reported contacting three services. It would be easy to interpret this as 58% of NHS 111 users getting to the 'right service, first time'. However, some later service use may be expected even in a 'right service, first time' pathway e.g. going to a pharmacy to collect a prescription after seeing a GP, or ambulance dispatch followed by transfer to the emergency department and subsequent hospital admission. Respondents were asked to describe their care pathway following the call to NHS 111 (i.e. the order in which they contacted services). In total, 161 different pathways were described and the most frequently described ones are reported in Table 6.9. The most common pathway was contact with one care provider following the call: a GP. Most of the frequently reported pathways were single service.

Table 6.9: The most frequently reported care pathways after the NHS 111 call

First service	Second service	Third service	% (n)
GP	-	-	29 (237)
ED	-	-	8 (70)
GP OOH	-	-	6 (51)
Other*	-	-	4 (37)
GP OOH	GP	-	4 (30)
emergency	-	-	3 (22)
UCC	-	-	2 (19)
WIC	-	-	2 (19)
ED	GP	-	2 (18)
NHS 111	-	-	2 (14)
Total			827

**other includes: dentist (n=13), 'hospital' (n=10) and other services with single responses e.g. 'warfarin clinic', 'diabetes nurse' and 'physio'*

There are pathways which may indicate that a caller did not have contact with the 'right service, first time'. For example, if a caller contacted an emergency service later in a pathway, this may indicate that the first service contacted was not appropriate. To explore this further we identified respondents who reported using an emergency service (emergency ambulance or emergency department) as a second or third service on a pathway. We also considered whether they had complied with the advice given by NHS 111. Detailed pathways are reported in Appendix B. 48 respondents reported contact with a emergency ambulance service or emergency department as either the second or third service on their care pathway. After checking these pathways we found that six respondents indicated that NHS 111 was the first service contacted after their initial NHS 111 call. We could not be sure if these respondents had mis-read the question or had called NHS 111 twice so we removed them from the analysis. Of the remaining 42 respondents, two did not report if they had complied with the advice given by NHS 111. Of the remaining 40 respondents, 36 indicated that they had fully complied with the advice given by NHS 111. With the caution that there may be other pathways which indicate a lack of 'right service, first time', and that without detailed investigation it is difficult to allocate responsibility to NHS 111 for the problematic pathways identified here, we estimate that a minimum of 2% (36/1769) of NHS 111 callers may not have been directed to the 'right service, first time'.

6.3.8 Satisfaction overall

Respondents were asked about their overall satisfaction with NHS 111 (Figure 6.2) and there was some difference between sites (P=0.01). 73% (1255/1726, 95% confidence interval: 71% to 75%) were very satisfied with the way NHS 111 handled the whole process. There was no statistically significant difference between sites for the dichotomised outcome of 'very satisfied' v all other categories (age, sex, ethnicity adjusted p=0.301; age, sex, ethnicity and route into NHS 111 adjusted p=0.465) (Figure 6.3).

How a caller accesses a service may impact on their overall satisfaction. We found that satisfaction differed by the route into NHS 111 (p=0.001) (Figure 6.4). Respondents reporting that they had been auto-routed to NHS 111 from another health service were less satisfied than those who had dialled '111' or received a health service telephone message to dial 111. This difference might be explained by different types of callers accessing NHS 111 in different ways.

Figure 6.2: Satisfaction with NHS 111 (all sites)

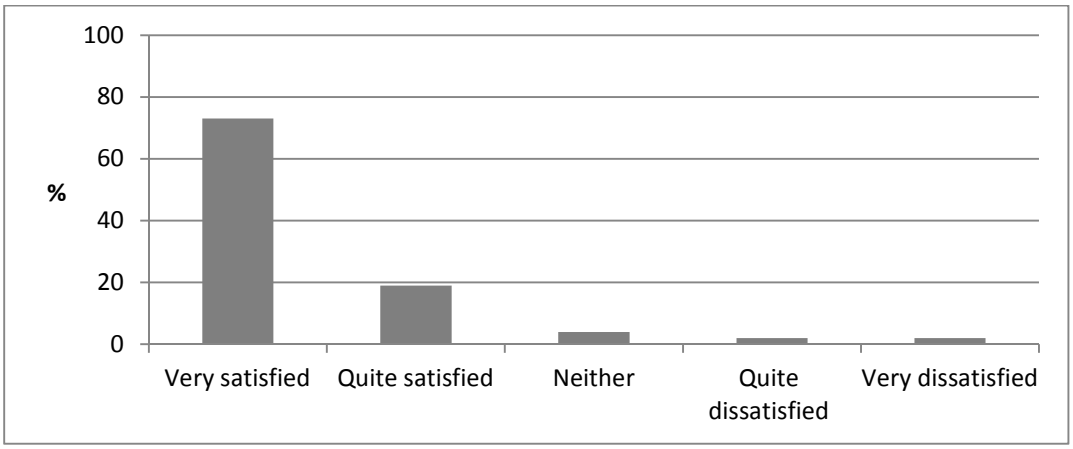


Figure 6.3: Overall satisfaction with NHS 111 by site (% very satisfied)

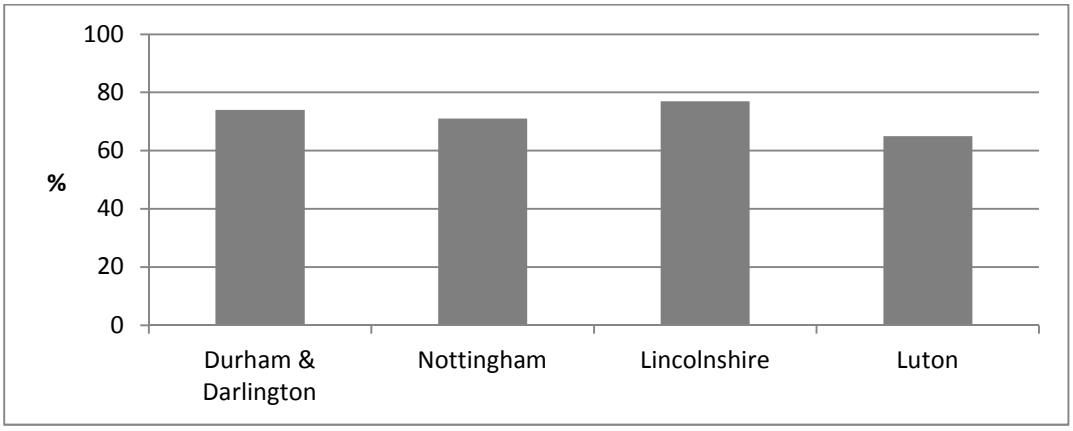
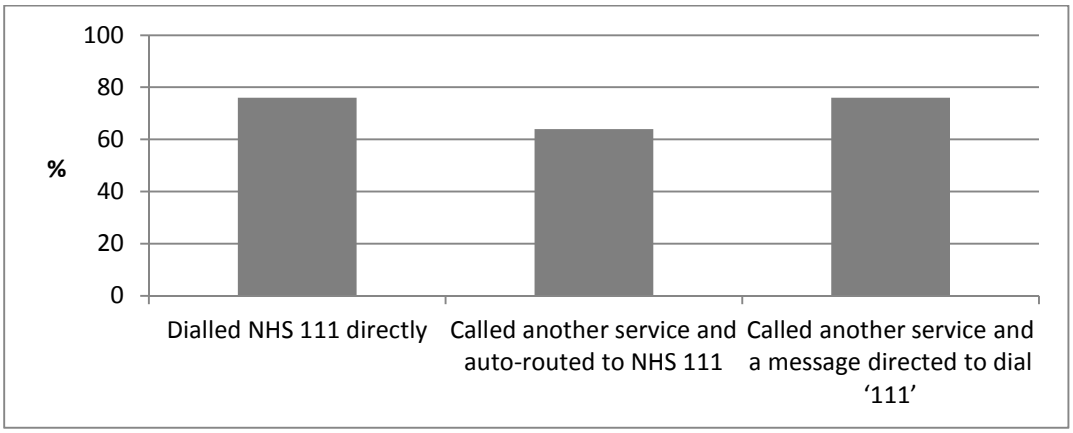


Figure 6.4: Overall satisfaction with NHS 111 by method of access (% very satisfied)



872 respondents made written comments and their distribution of overall satisfaction with NHS 111 was generally similar to the sample as a whole with the exception that people who wrote comments were more likely to be dissatisfied than those who did not (7% v 2%). Of the 200 open comments analysed, nearly three quarters were fully positive (Table 6.10).

Table 6.10: Types of comments in each site

	Durham & Darlington % (n)	**Nottingham** % (n)	**Lincolnshire** % (n)	**Luton** % (n)	**All** % (n)
Positive comments only	58 (29)	84 (42)	72 (36)	74 (37)	72 (144)
Negative comments only	36 (18)	8 (4)	22 (11)	20 (10)	21 (43)
Combination of positive and negative comments	4 (2)	4 (2)	2 (1)	2 (1)	3 (6)
Could not be identified as positive or negative	2 (1)	4 (2)	4 (2)	4 (2)	3 (7)
N=100%	50	50	50	50	200

6.3.9 Satisfaction with different aspects of the service

Respondents were asked to 'strongly agree' through to 'strongly disagree' on a five point Likert scale with a series of positive statements about NHS 111 (Table 6.11). Small percentages of respondents disagreed or strongly disagreed with these statements. There were differences between statements (p=0.001). Aspects of the service with lower ratings were: 'relevance of questions asked', 'how well the advice given worked in practice', 'making contact with the right health service' and 'reassurance'. The last three aspects of the service were related to the advice given.

We compared sites in terms of the proportion of respondents strongly agreeing with each statement (Table 6.12). We dichotomised at 'strongly agree' versus all other options because research has shown that people who state that they are 'satisfied' (equivalent to 'agree' with positive statements) can identify some areas for improvement with a service whereas those who state they are 'very satisfied' (equivalent to 'strongly agree') usually can see no room for improvement (Collins & O'Cathain 2003). We adjusted for age, sex, and ethnicity. Site differences were identified for one statement: helpfulness in terms of making contact with the right health service (adjusted p=0.035), with Nottingham and Luton respondents expressing less satisfaction with this statement even after adjustment for differences in the demographics of respondents by site. However, this statement was not significant when adjusted for route into NHS 111 (age, sex, ethnicity and route adjusted p=0.251).

Table 6.11 Satisfaction with different aspects of the NHS 111 service (all sites)

Statement	Strongly agree %	Agree %	Neither %	Disagree %	Strongly disagree %	N= 100%
The 111 staff were helpful	63	30	4	1	1	1725
The questions asked by the 111 service were relevant	50	36	8	5	2	1688
The 111 service dealt with my problem quickly	58	31	6	3	2	1702
The advice I was given by the 111 service worked well in practice	50	35	9	3	2	1651
The 111 service helped me to make contact with the right health service	53	32	9	3	2	1605
Using the 111 service reassured me	55	30	9	4	3	1679
I was completely happy with the 111 service	59	28	7	4	3	1706
The 111 service is a valuable addition to the NHS	65	24	6	2	3	1711

Table 6.12: Respondents 'strongly agreeing' with satisfaction statements by site

Statement	Durham & D % (n)	Nottingham % (n)	Lincolnshire % (n)	Luton % (n)
The 111 staff were helpful	66 (331)	57 (205)	68 (377)	59 (181)
The questions asked by the 111 service were relevant	50 (243)	52 (182)	54 (290)	45 (136)
The 111 service dealt with my problem quickly	61 (303)	52 (186)	63 (340)	52 (158)
The advice I was given by the 111 service worked well in practice	51 (243)	46 (160)	55 (291)	43 (128)
The 111 service helped me to make contact with the right health service	59 (276)	48 (163)	57 (290)	44 (127)
Using the 111 service reassured me	57 (279)	51 (181)	58 (312)	50 (149)
I was completely happy with the 111 service	60 (301)	56 (200)	63 (343)	51 (154)
The 111 service is a valuable addition to the NHS	64 (322)	64 (229)	69 (376)	62 (188)

We identified the following themes in the open comments made by respondents:

NHS 111 workforce

59 comments were made in relation to the NHS 111 workforce, the majority (n=54) of a positive nature:

> *"They were very caring, friendly and reassuring" (Lincolnshire)*
>
> *"The person...was very polite and was a credit to the service" (Luton)*
>
> *"Phone manner was excellent. Efficiently dealt with my problem" (Nottingham)*
>
> *"The way the gentleman on the phone spoke to me was very polite, friendly and very professional." (Durham & Darlington)*

A small number (n=5) of respondents made negative comments about NHS 111 staff. Respondents used terms such as 'rude' and 'inconsiderate' to describe the NHS 111 staff who had handled their call.

Speed with which NHS 111 handled the call

A quarter (n=47) of comments referred to the speed at which NHS 111 answered or handled the call. Almost all of these comments (n=45) were of a positive nature, indicating that the call was answered quickly or that the call itself was handled quickly or efficiently:

> *"They didn't take ages to help me, they assessed what my problem was and got through the emergency questions quickly efficiently to get on with what was wrong" (Durham & Darlington)*
>
> *"So helpful and I prefer 111 instead of NHS Direct. Speedy service from 111. I have to recommend this service to others" (Nottingham)*
>
> *"Got through to 111 in no time" (Luton)*
>
> *"The efficiency of all persons involved of my incident was excellent" (Lincolnshire)*

Two comments contained a negative reference to the speed at which NHS 111 handled the call. One respondent felt that it took too long to speak to a nurse or someone with medical training and another felt that the advisor spent too long listing the 'potential problems'.

Questions asked by NHS 111

In total, 28 comments were made in relation to the questions asked by NHS 111. There was an even distribution between negative (n=15) and positive (n=13) comments. Negative comments centred on the irrelevance of questions, and the amount of questions that were asked.

> *"The checklist the operator read was irrelevant and she apologised for this" (Lincolnshire)*

> *"Dissatisfied what [the questions] I was asked didn't cover a broken arm" (Durham & Darlington)*

> *"Had to go through hoops just to be able to tell the assessor my problem, felt like too many questions were about me, background etc. It's supposed to be non emergency granted but some urgency please" (Lincolnshire)*

Respondents providing positive comments described the questions as 'relevant' and alluded to the NHS 111 advisor (and the questions being asked) as 'thorough'. Some respondents recognised the need to ask more detailed questions because of the lack of visual assessment.

> *"My issue was difficult to diagnose over the phone. The staff asked what I believed were relevant questions not that I would know but it was clear that they were eliminating what would be most serious based on my call details." (Luton)*

> *"Satisfied: questions asked were relevant and in detail assuring me that I was talking to the right person." (Nottingham)*

> *"asked relevant questions regarding pain in areas and how long the pain had been there" (Nottingham)*

Advice given by NHS 111

40 comments referred to the advice given by NHS 111, of which 32 were positive and 8 were negative. Positive comments were mostly in relation to how 'satisfied' the respondent felt with the advice given:

> *"Always give sound health advice" (Luton)*

> *"I felt very reassured that I was being given good advice and steps to follow" (Nottingham)*

> *"Relevant questioning led to an ambulance being dispatched & advice to call emergency if it got worse. Symptoms got worse, called emergency and ambulance arrives swiftly. Fantastic advice, action and outcome" (Lincolnshire)*

Respondents providing negative comments thought that the advice they were given was inappropriate or incorrect:

"Was advised the walk-in-centre could deal with my issue, only to then be told by the walk-in-centre they couldn't help" (Nottingham)

Reassurance provided by NHS 111

Some respondents (n=32) indicated that NHS 111 had 'reassured' them or provided 'peace of mind'. The use of the term reassurance was used in relation both to NHS 111 staff, and the service itself:

"My call was taken very seriously, promptly and professionally. As I was calling on behalf of my son (4 yrs old) I was very concerned and slightly panicking, the lady on the phone's help and advice kept me calm and reassured me. I am very grateful." (Luton)

"The service that 111 give is exceptional. He [NHS 111 advisor] calmed me down and reassured me everything was going to be ok." (Durham & Darlington)

"Very reassuring about what actions I was already taking, and practical advice given was useful" (Nottingham)

Just one respondent indicated that NHS 111 had not provided reassurance and they were later admitted to hospital as an emergency.

Impact on access to care

47 respondents indicated that NHS 111 had impacted on their access to further care. 35 respondents felt that NHS 111 had improved their access to care, indicating that they would have not received help so quickly had it not been for NHS 111. Other respondents were happy that they were able to book appointments with services via the NHS 111 service:

"The doctor would not have seen us within 1 hour had it not been for the 111 advice" (Luton)

"It is very hard to get an appointment with my GP. You have to phone in the morning and after half an hour you get through and they say sorry full or try at 11 o clock, you do and it is the same. I phoned and got through at 8:30am and was told sorry no appointments, I dialled 111 I phoned back and told my GP I got an appointment straight away for 9:30am." (Lincolnshire)

"I had the help I needed in a matter of minutes, an ambulance came so very quick and a paramedic came in a car before that" (Durham & Darlington)

"It allows me to contact healthcare professionals for advice and assistance when my own GP is unavailable" (Nottingham)

12 respondents indicated that NHS 111 had hampered their access to care or felt that NHS 111 had not dealt with their problem in a timely way which led to a delay in care. Again, this fits with Table 6.11

where a lower proportion of respondents indicated they strongly agreed that the advice had worked well in practice.

> *"After waiting 3 hours for a doctor to return my call we went back to the walk in centre where we were told 111 had gotten the wrong phone number despite being given it 3 times" (Durham & Darlington)*

> *"Being passed from one person to another on the phone for about 40 minutes was dissatisfying" (Nottingham)*

General comments

Some comments were about services other than NHS 111 or were general comments about NHS 111. General comments were either extremely positive or extremely negative:

> *"Brilliant service, start to finish" (Lincolnshire)*

> *"I think it [NHS 111] is a complete waste of NHS resources and yet another hair brained scheme by the government" (Durham & Darlington)*

6.3.10 Health improvement

We asked respondents how they perceived their health problem to be seven days after their call to NHS 111. The majority of respondents reported an improvement in their health problem (Table 6.13). A small proportion (4%) indicated that they felt 'worse' seven days after making the call. NHS 111 cannot be identified as a causal factor in health improvement using this simple cross sectional survey. There were no differences in reported health improvement between sites (p=0.449, adjusted for route p=0.400).

Table 6.13: Perceived improvement in health problem at seven days

	Durham & D % (n)	Nottingham % (n)	Lincolnshire % (n)	Luton % (n)	All % (n)
Completely better	29 (138)	33 (118)	32 (166)	30 (89)	31 (511)
Improved	57 (275)	50 (178)	51 (269)	55 (161)	53 (883)
The same	10 (47)	12 (43)	12 (63)	12 (36)	11 (189)
Worse	4 (19)	5 (16)	5 (28)	3 (8)	4 (71)

6.3.11 Finding out about NHS 111

Respondents were asked how they had heard about NHS 111. Most respondents had heard about NHS 111 through leaflets and health care providers (Table 6.14). Note the high proportion of users in Lincolnshire reporting that they had heard about NHS 111 from a leaflet.

Table 6.14: How respondents heard about NHS 111 (respondents were asked to tick all options that applied, therefore % not equal to 100)

	Durham & D	Nottingham	Lincolnshire	Luton	All
	% (n)	% (n)	% (n)	% (n)	% (n)
Media	22 (116)	13 (48)	24 (137)	14 (43)	19 (344)
Leaflet	26 (134)	25 (94)	40 (224)	26 (82)	30 (534)
Friend/relative	19 (98)	12 (46)	15 (82)	13 (40)	15 (266)
Online	3 (18)	3 (10)	3 (15)	3 (10)	3 (53)
Health service telephone message	14 (73)	18 (66)	16 (91)	20 (61)	16 (291)
Other healthcare provider	31 (163)	28 (105)	23 (129)	33 (103)	28 (500)

6.3.12 Clarity around when to use NHS 111

Respondents were asked if they were clear about when to use the new service instead of another service, and whether they would consider calling NHS 111 in the future (Table 6.15). 86% (95% confidence interval: 85% to 88%) reported being 'definitely clear' about when to call the service. This differed by site, with higher rates of clarity in Durham & Darlington and Lincolnshire than other sites (adjusted p=0.001, adjusted for route p=0.014).

86% (95% confidence interval: 84% to 88%) said they would call the service again for a similar problem (Table 6.15). Again this differed by site (adjusted p=0.029), with slightly more respondents in Durham & Darlington and Lincolnshire reporting that they would use the service again. However, this was not statistically significant after adjustment for route (adjusted for route p=0.209).

Table 6.15: Using NHS 111 in the future

	Durh'm & D % (n)	Nottingham % (n)	Lincolnshire % (n)	Luton % (n)	All % (n)
Clear about when to call					
Yes, definitely	90 (456)	77 (277)	91 (506)	83 (256)	86 (1495)
No/ Not sure	10 (51)	24 (85)	9 (49)	17 (51)	14 (236)
Call service again?					
Yes	87 (443)	84 (303)	89 (494)	82 (250)	86 (1490)
No/ Not sure	13 (66)	16 (57)	11 (61)	18 (55)	14 (239)

6.3.13 Perceptions of intended behaviour by advice given

Policy makers and service providers are often interested in what people say they intended to do had a new service not been available. We asked this question of NHS 111 users and then compared it with the advice they reported being given by NHS 111 (Table 6.16). Around half of respondents intending to use emergency ambulance or primary care reported that they had been given advice that matched their intended behaviour. The other half were given different advice, for example those intending to call emergency reported being advised to attend an emergency department or primary care. This could be interpreted as NHS 111 changing people's minds and therefore changing which services are used in the urgent and emergency care system. However, we urge extreme caution when interpreting this data because people's perception of intention and may not reflect what they would actually have done.

Table 6.16: Perceptions of intended behaviour compared with advice given by NHS 111

	Intended action						
Reported NHS 111 advice	**emergency ambulance Service % (n)**	**Emergency Department % (n)**	**General practice % (n)**	**Urgent Care Centre % (n)**	**Walk-in centre % (n)**	**NHS Direct % (n)**	**Self care % (n)**
Ambulance	54 (166)	14 (47)	15 (60)	20 (38)	7 (15)	13 (53)	12 (4)
Emergency Department	10 (32)	24 (81)	14 (58)	10 (19)	20 (41)	16 (64)	6 (2)
Primary care	25 (78)	52 (177)	57 (237)	58 (109)	58 (118)	54 (214)	58 (19)
Other service	6 (17)	12 (4)	5 (21)	4 (7)	5 (10)	4 (17)	6 (2)
Home/Self care	5 (14)	7 (23)	9 (37)	8 (15)	9 (18)	12 (48)	18 (6)
N=1846+	307	340	413	188	202	396	33

+ respondents were asked to tick one option only but many ticked multiple services, therefore 'n=' is more than 1769

6.3.14 Comparison with the first survey

Users' experiences and views can change over time as new services get busier and become more embedded in the health care system. We compared the results between the three month and nine month surveys. We found no differences. For example, the proportion of respondents reporting that they were 'very satisfied' with NHS 111 remained identical over time at 73% (first survey 1497/2060, second survey 1255/1726; p=0.977).

6.4 Discussion

6.4.1 Summary of key findings

Overall satisfaction with NHS 111 was good, with 91% of respondents reporting that they were very or quite satisfied. This compares well with satisfaction with telephone consultations in general practice settings (98%: Jiwa, 2002, 88%: Gallagher, 1998, 62%: Payne, 2001) and international evidence on general population telephone triage (Bogdan, 2004; Wetta Hall, 2005) and paediatric telephone triage (Kempe, 2001; Keatinge, 2005; Beaulieu, 2008). Satisfaction with NHS 111 also appears to compare favourably with that of other new urgent care services, such as NHS Direct (O'Cathain, 2000) and walk-in centres (Salisbury, 2002), shortly after they were introduced in the UK. Two aspects of the service received lower satisfaction ratings than other aspects: relevance of questions asked and advice given. Analysis of the free text comments supported this in that the most frequent negative comments were about these aspects of the service. A key aim of NHS 111 is to help users make contact with the 'right service first time'. A large proportion of respondents (85%) indicated that NHS 111 had enabled them to do so but this may not have occurred for a minimum of 2% of users. The majority of respondents (86%) indicated that they complied with all of the advice given. The evidence synthesis (reported in Chapter 3) regarding compliance with telephone triage showed that compliance ranged from 56% to 98% (median 77%), indicating that compliance with NHS 111 was at the higher end of this range. Respondents were largely clear about when to use NHS 111 but there was evidence to suggest that respondents in Nottingham and Luton were less clear even after adjusting for different routes into the new service.

6.4.2 Strengths and limitations

This is a large survey of users of NHS 111 and provides the first evidence of satisfaction with this new service. The response rate of 41% was low but comparable with large postal surveys of access to general practice in England which obtained response rates of 41% in 2008 and 38% in 2009 (Department of Health, 2011). Response rates were lower in Nottingham and Luton. This might have been related to the large proportion of people from minority ethnic communities in these sites because we did not translate the questionnaire into different languages. We were unable to assess formally the size of any non-response bias but noted the possibility that people with more emergency service use might have responded more than people offered self care advice.

6.4.3 Implications

Users were generally satisfied with NHS 111 and complied with the advice given at levels similar to other telephone triage services. NHS 111 appeared to be operating well from a user perspective and there was no evidence that quality of service, assessed through user views, differed by site. There were indications that some aspects of the service could be improved, in particular relevance of questions asked and advice given.

7. Impact on perceptions of the urgent care system

7.1 Introduction

When introducing a new service such as NHS 111, it is important to assess the impact it has on users of the whole emergency and urgent care system. A primary aim of the new service was to improve system users' experiences by offering them easy access to a single service which directs them to the right service immediately. Therefore it should improve system users' perceptions of ease of entry into the urgent care system, progress through the urgent care system and possibly patient convenience. A secondary aim of the new service was to increase confidence in the NHS when seeking urgent care and generally.

7.2 Methods

7.2.1 Design

We undertook a controlled before and after population survey in each pilot site prior to the launch of NHS 111 and 12 months later (see Chapter 2 for selection and description of control areas). The population survey identified recent users of the emergency and urgent care system and sought their views about their most recent episode of care. We also asked *all* respondents about confidence in the NHS and urgent care.

7.2.2 Sampling

We used a survey methodology which we had previously tested and validated (O'Cathain et al, 2008). A market research company was engaged to undertake a telephone survey of the general population in each NHS 111 site and its control. The PCT boundaries were used to identify the site population. We identified the relevant postal districts within each PCT and the proportion of the population residing within each postal district. This, together with the age/sex demographic of the population, formed the frame for quota sampling. The market research company undertook random digit dialling with one attempt to contact a landline telephone number, aiming to identify 2000 respondents who were representative of the age/sex profile of the PCT population. Standard market research procedures were followed to identify an adult to speak to within a household who was aged 16 and over. An adult or a child in the household was selected as the focus of the interview in line with meeting the quota sample.

The surveys were undertaken in 2010, approximately one month prior to the launch of NHS 111 in each site, and exactly twelve months later in 2011 (Table 7.1). They were undertaken at exactly the same time in an NHS 111 site and its control.

Table 7.1: Population survey dates

	Durham & Darlington	Nottingham	Lincolnshire	Luton
Planned NHS 111 launch date	August 2010	September 2010	October 2010	October 2010
Actual NHS 111 launch date	August 2010	November 2010	November 2010	December 2010
Survey month (2010/2011)	June	August	September	August
Three month re-call period (2010/2011)	April-June	June-August	July-September	June-August

7.2.3 Questionnaire

The questionnaire was developed based on qualitative research with users of the emergency and urgent care system (O'Cathain et al, 2010). The validated Urgent Care System Questionnaire measures how people access the emergency and urgent care system, the length of any pathway, the services used on the pathway and satisfaction with entry, progress and patient convenience (O'Cathain et al, 2011). All participants were asked a screening question about whether they had sought help for an urgent health problem in the previous three months, some socio demographic questions, awareness and use of NHS 111, and confidence in urgent care and the NHS. If they had sought help urgently from health services in the last three months they were asked to complete the remainder of the questionnaire in relation to their most recent urgent health problem. They were asked to describe their care pathway and their satisfaction with different aspects of the emergency and urgent care system.

7.2.4 Analysis

Data were analysed using PASW version 19. For each NHS 111 site we compared changes in system users' views before and after the introduction of NHS 111 with changes occurring in their control site. For continuous variables we undertook analysis of covariance. We adjusted for age group (16-44, 45-64, 65+), sex and ethnicity and then tested the interaction between type of site (control and intervention) and time of study (pre and post NHS 111 launch). We dichotomised categorical variables and undertook logistic regression adjusting for age group, sex and ethnicity.

7.3 Results

7.3.1 Response rates

The overall response rate was 28% (28,071/100,408). Response rates were similar between sites, ranging between 27% and 30% (Appendix Table 7a). The response rate was calculated by including all calls resulting in a completed questionnaire in the numerator, and removing from the denominator all calls where there was no one in the household who matched the remaining quota, or where the telephone number was unobtainable or engaged. These rates were similar to those of previous use of this survey methodology and questionnaire (MCRU, 2011).

7.3.2 Respondent profiles

The demographic profiles of respondents were similar in 2010 and 2011 for each site. This was expected given the use of quota sampling (Appendix Table 7b).

7.3.3 Overall rate of system use by population

The proportion of the population seeking help for an urgent health problem in the previous three months was 8% (2,237/28,071), varying between 6% and 11% in the different NHS 111 and control sites, identifying approximately 150 recent system users in each site (Appendix Table 7c). System use can vary depending on the time of year in which the survey is undertaken (MCRU, 2011). Most of the surveys asked about system use over the summer months, with the exception of Durham & Darlington and its control which covered some spring months (Table 7.1). The higher system use in Durham & Darlington and its control (around 10% compared with around 7% in other NHS 111 sites and their controls) is likely to be explained by the difference in survey timing.

We expected system use in each NHS 111 site and its control to be similar before the new service was launched and indeed it was (Appendix Table 7c). It is possible that a service like NHS 111 can increase overall demand for the emergency and urgent care system by facilitating access to healthcare. There was no evidence of a change in the proportion of the population reporting use of emergency and urgent care in the previous three months in each pilot site compared with its control (Appendix Table 7c). Overall, use of the system was 8% before and after NHS 111 in the NHS 111 sites combined and in the controls combined. The odds ratio for change in system use compared with controls was 1.15 (95% CI 0.96,1.34 adjusted for age group, sex and ethnicity). Respondents were also asked how many times they had used the system in the previous three months and there was no evidence of change in overall number of contacts (p=0.265, adjusted).

We hoped that the demographics of system users would be similar for the NHS 111 and control sites. Whilst the demographic profile of system users in two NHS 111 sites, Durham & Darlington and Lincolnshire, were similar to their respective control sites, there appeared to be some differences in the remaining sites (Appendix Table 7d). Therefore we adjusted any comparisons for age, sex and ethnicity.

7.3.4 Services contacted by system users

System users were asked to identify all of the services that they made contact with during their most recent use of the system. We identified in our earlier research the problems with system users distinguishing between the different types of services available in the system (MCRU, 2011): the general population may not understand the labels used by service providers for particular services e.g. knowing they had visited a walk-in centre, urgent care centre or primary care centre. We also used a survey instrument which offered generic options e.g. 'accident and emergency department' and 'out of hours GP' rather than options related to local service names e.g. urgent care centres. This limited our ability to measure changes in use of different services over time in different localities. We report here the services which users reported that they had contacted (Appendix Table 7e), recognising that routine data on utilisation of services in the NHS 111 and control sites is the more robust source of evidence of change in service use over time (see Chapter 8 of this report). There were considerable differences over time in reported use of some services in both NHS 111 sites and in controls, although numbers were small.

We selected the service 'GP in hours' for separate analysis for two reasons: routine data is not available for this service, and we felt that users were able to distinguish this well established service from other services in the emergency and urgent care system. The majority of system users made use of a 'GP in hours' in their most recent urgent care episode (between 40% and 55% in the different NHS 111 and control sites). There was some evidence of a reduction in use of GP in hours in three of four NHS 111 sites, and an increase in the other site, but differences were not statistically significant when comparing change over time in individual NHS 111 sites with change over time in their control sites (Appendix Table 7e). Overall, the odds ratio for change in use of GP in hours in NHS 111 sites combined compared with control sites combined was 0.88 (95% CI: 0.63, 1.23).

System users were asked to identify the first service on their care pathway during their most recent use of the system (Appendix Table 7f). Again, we report this data but it should be treated with caution for the reasons given above.

7.3.5 NHS 111 as a first contact service

We were interested in the *potential* influence that NHS 111 could have on use of the emergency and urgent care system. This depends on the proportion of contacts with the system that NHS 111 influences, particularly where it is the first service contacted. As expected, no one reported using NHS 111 as their first contact service in their most recent use of the emergency and urgent care system prior to its availability or in control sites (Appendix Table 7f). The proportion of recent system users reporting that they had used NHS 111 in the pilot sites during their most recent health episode varied between sites (Table 7.2). This was higher in Lincolnshire (15%) and Durham & Darlington (13%) than in Nottingham (2%) and Luton (6%). This site difference is likely to be related to the different models in use because some models auto-routed calls from GP out of hours to NHS 111 and users were not necessarily aware that they had used NHS 111.

The majority of system users who knew that they had made contact with NHS 111 did so prior to contacting another health service (Table 7.2). That is, NHS 111 was the entry into the system for the majority of system users who knew they had made any contact with NHS 111. The 'dose' of NHS 111

as a first contact service, visible in this survey of system users' perceptions, differed by site (p=0.003), with the dose being one in ten system users in Durham & Darlington and in Lincolnshire. Some system users in this survey will have used NHS 111 but not been aware of it. Thus any 'dose' reported here is a minimum dose and Table 7.2 will not reflect actual dose differences by site.

Table 7.2: Use of NHS 111 in 2011

	Durham & D **% (n)**	**Nottingham** **% (n)**	**Lincolnshire** **% (n)**	**Luton** **% (n)**
Any contact with NHS 111	13 (27)	2 (3)	15 (21)	6 (9)
First service contacted was NHS 111	11 (22) 95%CI: 7.1, 15.8	2 (3) 95%CI: 0.4, 5.8	11 (16) 95%CI: 7.0, 17.7	5 (8) 95%CI: 2.5, 10.3
N=100%	205	155	141	151

7.3.6 Length of pathway

The key aim of NHS 111 is to direct people to the right service first time. Therefore we would expect to see a reduction in the length of pathway through the emergency and urgent care system, that is, the numbers of services contacted during a single episode of care. However, it is not quite as straightforward as this when we attempt to measure the change in pathway length associated with having NHS 111 in the system. For an episode starting with NHS 111, the length of the pathway should be either one service (NHS 111) or two services (NHS 111 followed by the right service). NHS 111 may reduce length of pathway for some people but increases it for most people by being itself an extra service on a pathway. Any positive effect of NHS 111 would only be seen in this survey for long pathways. All of this must be borne in mind when interpreting the data on length of pathways below.

System users were asked about the number of contacts that had been made with services during their most recent urgent care health episode. System users reported between 1 and 8 contacts per episode (Appendix Table 7g). The numbers of long pathways were small (four or more services contacted) and there was no evidence that these reduced when NHS 111 was part of the system. We compared the change in mean pathway length in each NHS 111 site with their control and found little evidence of change. Lincolnshire showed a potential increase compared with its control Norfolk (p=0.056) but this finding relied on a reduction in pathway length in the control Norfolk.

7.3.7 System user satisfaction

We measured three discrete domains of system satisfaction: entry into the system, patient convenience of the system, and progress through the system (O'Cathain et al, 2011). Each domain has a maximum score of 5; changes of 0.3 or more are associated with a step change in satisfaction

(O'Cathain et al, 2011). There was no evidence of increased satisfaction in any of the NHS 111 sites when compared with their control site for entry (Figure 7.1), convenience (Figure 7.2), or progress through the system (Figure 7.3). Domain scores are available in Appendix Table 7h.

Figure 7.1: Entry into the system

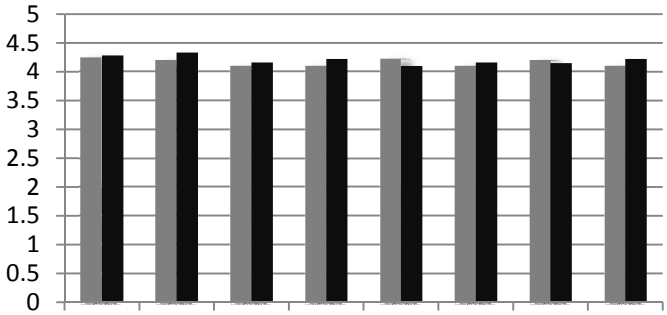


Figure 7.2: Convenience of the system

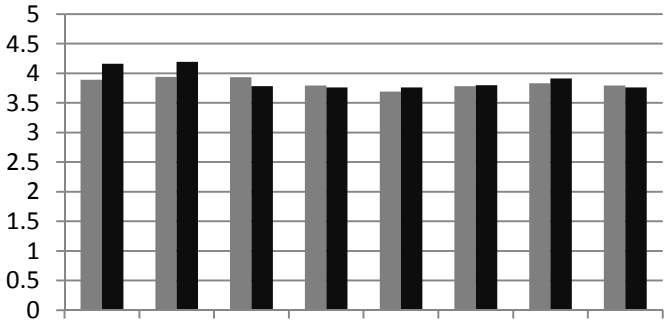
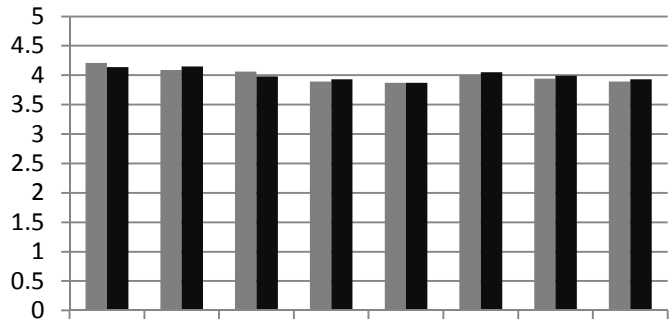


Figure 7.3: Progress through the system



System users were asked to rate their overall care for their most recent use of the urgent care system (Appendix Table 7i). There was no evidence of a change in the percentage of system users reporting that they received 'excellent' care overall in any of the NHS 111 sites when compared with their controls.

We compared satisfaction levels for people who *reported* entering the emergency and urgent care system via NHS 111 and those who *reported* entering through another health service (using data from the pilot sites 2011 surveys only). This comparison is compromised because we are not comparing like with like, and because of the problems discussed earlier in the chapter about people knowing whether they had used NHS 111. There was no evidence to suggest that users entering the system through NHS 111 were more satisfied than those entering the system through another service (Table 7.3).

Table 7.3: Satisfaction by entry point into the system

	First contact was NHS 111 N=49	**First contact was <u>not</u> NHS 111 N=603**	**P value - unadjusted**
Entry into the system (mean)	4.20	4.18	0.83
Convenience of the system (mean)	3.98	3.92	0.57
Progress (mean)	4.09	4.00	0.41
Overall care 'excellent' % (n)	41 (20)	43 (256)	0.82

7.3.8 Population satisfaction with urgent care and the NHS

An objective of NHS 111 was to improve population satisfaction with the NHS when seeking urgent care and in general. We asked questions about this of all 2000 respondents in each pilot and control site, totalling 28,071 respondents. There was evidence that satisfaction with urgent care increased in one of the NHS 111 sites, Luton, when compared with its control (p=0.004), increasing from 25% of the population reporting being 'very satisfied' to 30% (Appendix Table 7j). It is highly unlikely that this reported increase is attributable to NHS 111 given the small proportion of users of NHS 111. There was a reconfiguration of walk in centres and urgent care centres in this area from April 2011 which may explain this finding. There was no evidence of a change in the other three NHS 111 sites when compared with their controls. There was no evidence of a change in population views of the NHS in general in the NHS 111 sites when compared with their controls (Appendix Table 7j).

7.4 Discussion

7.4.1 Key findings

There was no evidence that NHS 111 changed perceptions of urgent care for recent users of emergency and urgent care. There was no evidence to suggest that the number of services contacted during an urgent care episode had changed following the introduction of NHS 111, recognising that NHS 111 itself is an extra service on some pathways.

The lack of change seen here may be due to the insensitivity of the questionnaire to identify change, although it was developed and validated for measuring change in user perceptions of emergency and urgent care systems. It may also be due to the small dose of NHS 111 in the system in that only one in ten of first contacts were dealt with by NHS 111, or it may be due to a lack of impact of NHS 111.

7.4.2 Strengths and limitations

Obtaining the experiences and views of urgent care system users is a challenge. A major strength of this part of the evaluation was the use of a validated methodology and questionnaire to identify recent system users and seek their views. Limitations include the large numbers of survey respondents required to identify recent system users and the relatively small numbers of system users identified because surveys were undertaken about recall periods over summer months. However the lack of change reported here was unlikely to be due to a lack of statistical power because of the lack of change observed in key variables.

7.4.3 Implications

A key objective of NHS 111 was to improve levels of user satisfaction with the emergency and urgent care system by reducing confusion about how to enter the system and direct people quickly to the right service. Overall, one year after the launch there was no evidence that NHS 111 had improved user satisfaction with the urgent care system. This could be because NHS 111 has not had this impact, or because the dose of NHS 111 is so small that any effect is not visible.

8. Impact of NHS 111 on the emergency and urgent care system

8.1 Introduction

One of the main aims of NHS 111 is to direct people with urgent healthcare problems to the right place, first time. An expected benefit is that efficiency in the urgent and emergency health care system will be improved by directing people to the right level of care, for example, directing people with urgent problems away from emergency services such as the emergency ambulance service and emergency departments to urgent care services that are more appropriate to clinical needs. A key objective of the evaluation was to assess the impact of NHS 111 on the emergency and urgent care system by examining demand for other urgent and emergency care services to detect if there was any change in how services were used.

8.2 Methods

8.2.1 Design

We conducted a controlled before and after study, spanning the two years before the introduction of NHS 111 and one year after, to assess the impact of the new service on use of emergency and urgent care services. We used routine data to assess service use in each pilot area and a matched control area. The NHS 111 sites, their respective control sites and the study periods are given in Table 8.1. The method for selecting the control areas is described in Chapter 2. As the Nottingham City and Lincolnshire sites became live late in November we have used December as the first full month starting point for data.

Table 8.1: NHS 111 and matched control sites and time periods studied

Pilot Site	Control Site	Study period
Durham & Darlington	North of Tyne	August 2008 – July 2011
Nottingham City	Leicester	December 2008 – Nov 2011
Lincolnshire	Norfolk	December 2008 – Nov 2011
Luton	Leicester	December 2008 – Nov 2011

8.2.2 Services included and data sources

We identified emergency and urgent care services which NHS 111 might be expected to affect and then sought routine data for these services. Routine data were not available for urgent day time

general practice but were available for other key services: emergency departments, urgent care services, NHS Direct and the emergency ambulance service (Table 8.2). For emergency departments, Type 1 & 2 attendances were combined. Due to a lack of data availability for separate urgent care services, we had to combine data for out of hours primary care contacts, walk in centre attendances and urgent care centre attendances. We identified two aspects of the emergency ambulance service that NHS 111 might affect: the numbers of emergency calls and the numbers of incidents resulting in an ambulance response. This resulted in **five** sets of routine data labelled as A, B, C, D (i) and (ii) in Table 8.2. For each of these five 'services' we analysed monthly activity counts in the pilot and control sites for two years prior to the launch of the NHS 111 pilot and one year after.

Table 8.2: Services included and data sources

Service included	Data sources
A. Emergency Department (ED) attendances Type 1 & 2 Type 1 ED is a consultant led 24 hour service with full resuscitation facilities and designated accommodation for the reception of accident and emergency patients. Type 2 ED is a consultant led single specialty accident and emergency service (e.g. ophthalmology, dental) with designated accommodation for the reception of patients	A&E Secondary Uses Service (SUS) data by PCT of residence. Where this was unavailable Weekly Situation Report data collected by the Department of Health
B. Urgent care (three services combined) Out of Hours primary care contacts Walk in Centre attendances Urgent Care Centre attendances	Local reports or management information A mixture of local management information and Weekly Situation Report data Local management information
C. NHS Direct calls	Nationally produced report CIT2558, calls answered from patients calling 0845 46 47 by PCT of location where valid postcode is available
D. Ambulance service (i) Number of emergency calls answered (this includes all calls for an emergency ambulance derived from emergency, urgent calls by health professionals and NHS 111) (ii) Number of emergency incidents resulting in an ambulance service response arriving at the incident scene	Reports produced by ambulance services to KA34 definitions used by NHS Information Centre

8.2.3 Changes (other than NHS 111) occurring in pilot and control sites

We needed to account for changes to services in the emergency and urgent care system other than NHS 111. We took two approaches to identifying these changes. First, the questionnaire sent to NHS 111 Programme leads and control site evaluation contacts (see Chapter 2) asked about changes occurring in pilot and control sites in the time period under study for this analysis. Second, we searched PCT websites for annual reports for 2009/10 and 2010/11 for each pilot and control site. We read annual reports to identify any reported major changes to the emergency and urgent care system.

8.2.4 Analysis

For each of the five 'services' (ED attendances, urgent care contacts/attendances, NHS Direct calls, ambulance calls and ambulance incidents):

1. We plotted monthly activity (indexed so that activity in month 1 = 100) for each pilot and control pair so that any change over time could be seen graphically.

2. We then fitted a time series regression model to the pilot site counts, using the Prais-Winsten procedure in Stata, to test for preliminary evidence that service use had changed in the pilot site. This model consisted of a month effect, an overall trend, a before and after step term for any other potentially significant changes introduced into the pilot site, and a term for before and after the time when NHS 111 was launched. The month effect was included to help explain some of the variation in the data due to seasonal fluctuations.

3. We then tested for changes in a pilot site compared to their control site using time series regression to test for the impact of NHS 111 and obtain estimates (and confidence intervals) of its impact to feed into the economic models in Chapter 12. We used a simple model with four main elements:

i. The basic model, consisting of a linear trend in activity over the 36 months constrained to be the same in the pilot and control sites, plus the seasonal effect and a site effect.

ii. Site specific effects for any potentially significant effects other than NHS 111 introduced during the 36 months. For example, in one of our pilot sites, a Single Point of Access for all calls to out of hours services was introduced prior to NHS 111 which changed the way urgent calls were handled. To allow for any impact of this change, and other similar changes in either the pilot or control sites, we included site specific before and after terms in the models.

iii. For controlling for the possible effect of any other external changes affecting both the pilot and control sites equally, e.g. in regional services such as the ambulance service or in circumstances such as environmental conditions or flu epidemics, which occurred at about the time NHS 111 was introduced, terms for before and after the time when NHS 111 was launched and for any change in the general trend at that time were included.

iv. Finally, we included a term for the regression of the monthly activity counts on the volume of NHS 111 calls that were triaged that month (which we call the 'dose'). By definition the dose is zero for all months in the control site and up until the launch of NHS 111 in the pilot site.

This regression allowed us to directly estimate the impact of different levels of NHS 111 activity.

4. We undertook a confirmatory analysis by fitting a 'step model' as well as fitting the 'dose model' described above. In this model, instead of regressing the activity counts on the number of NHS 111 calls in step iv, we simply fitted a term for the interaction of site and before and after the introduction of NHS 111. This term measures the differential change in the average monthly activity count in the pilot and control sites before and after the time when NHS 111 was launched in the pilot site.

5. The tests based on these models assume that there is constant variance (i.e. whatever the size of the activity count, the variance of the count is the same). Usually this is not true with counts, with big counts having bigger variance. Therefore if a statistically significant NHS 111 effect was found when we modelled the raw monthly activity counts, we also tested the coefficients by fitting the models to the square root of the counts (which tends to stabilise the variance).

Finally, for each of the five types of activity we repeated the analysis for all sites combined. We used a time series regression dose model, including a site effect for each of the 7 sites in the study, trend and month effects which were the same across all sites, before and after terms for site specific changes other than NHS 111, and regressing activity on the number of NHS 111 triaged calls.

8.3 Results

The results are presented separately for each pilot site for changes in each of the five emergency and urgent care services described in Table 8.2, following the four steps described in the analysis:

1. A plot of the indexed activity for the service under consideration for pilot and control sites using the raw activity data for that service.

2. The results of the time series regression model for the pilot site counts.

3. The results of the time series regression 'dose' model comparing activity in the pilot and control sites.

4. The results for the 'step' model.

Readers without a statistical background may wish to 'bypass' the statistics reported below and look at two things: the graphs (to see any change over time), and Table 8.3 and Figure 8.25 at the end of the chapter (for a summary of findings).

8.3.1 Durham & Darlington

In the analysis of the impact of the introduction of NHS 111 in the Durham & Darlington site there were two known system changes that were accounted for in the analysis in addition to the introduction of NHS 111:

Pilot site:

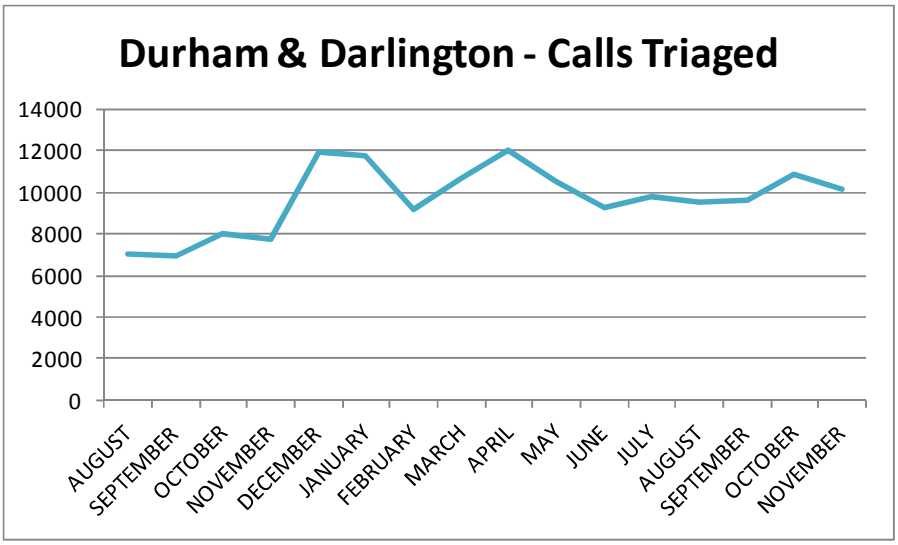
- Introduction of the Single Point of Access in Durham and Darlington in October 2009, which was largely co-terminus with their urgent care reconfiguration.

Control Site:

- Reconfiguration of Emergency Department services in Newcastle PCT, which is within the North of Tyne PCO control site, in December 2010, which saw relocation of the department to a city centre location.

The NHS 111 service was introduced in August 2010 and the number of calls triaged by the service during the first year of operation is shown in Figure 8.1. Calls initially were around 7,000 per month and peaked at 12,000 before stabilising at around 10,000 per month.

Figure 8.1: Number of NHS 111 calls triaged in Durham & Darlington pilot site from August 2010 to November 2011



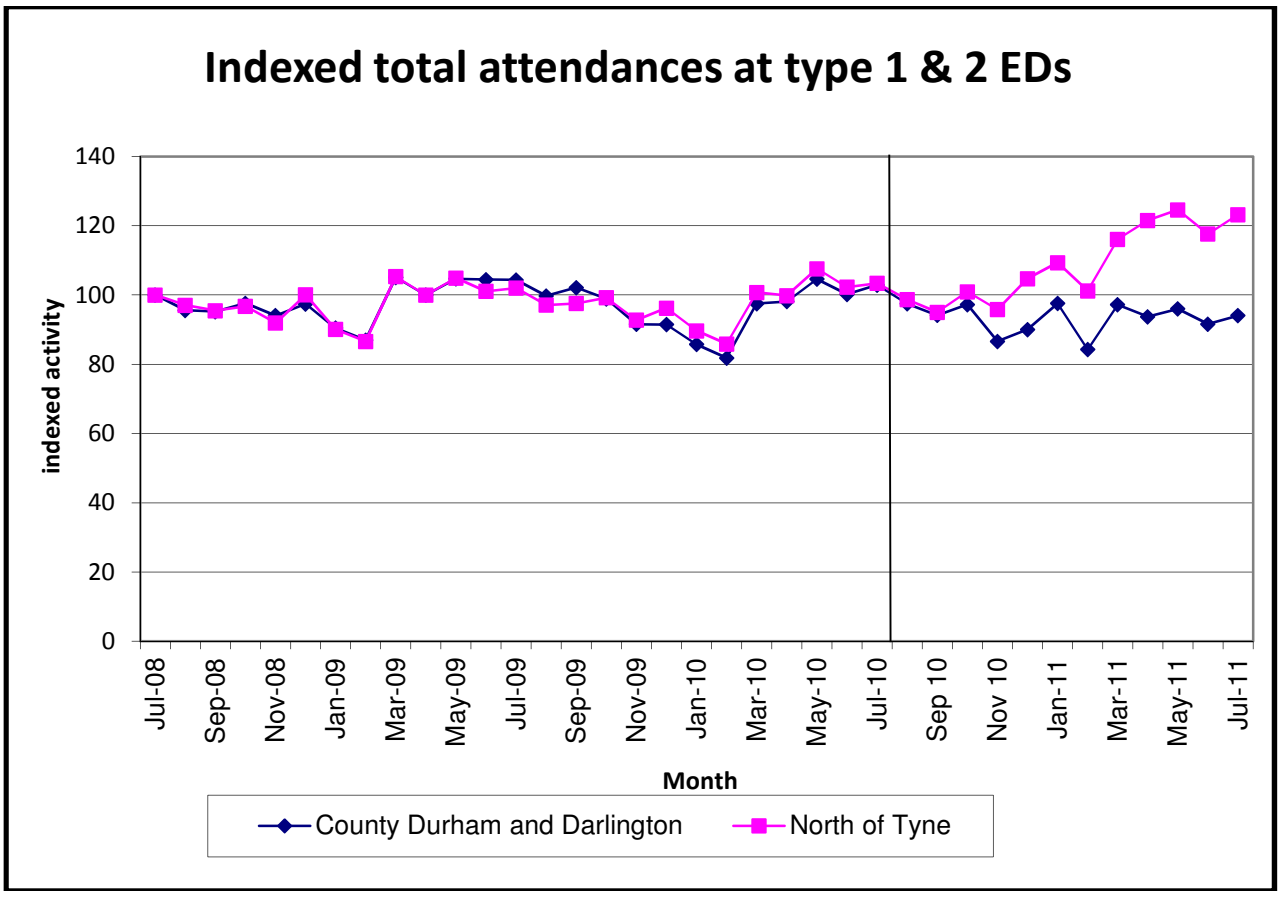
A. Emergency Department attendances

1. Trends in emergency department attendance

Figure 8.2 shows the indexed monthly attendances at emergency departments in the pilot and control sites over the three year study period. The indexed activity shows a clear increase in attendances in the control area coinciding with the reconfiguration of the emergency department in Newcastle PCT. This change, happening so close in time to the introduction of the NHS 111 service, makes the

comparison between the pilot site and the control site particularly difficult to interpret. In the pilot site the number of ED attendances fell by 3.9% from an average of 13,675 attendances per month before the introduction of NHS 111 to an average of 13,142 per month afterwards. In the control site the number of attendances increased by an average of 2,195 (+11.7%) per month over the same period.

Figure 8.2: Indexed monthly ED attendances in DURHAM & DARLINGTON pilot and North of Tyne control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated attendance in the pilot site in the months following the introduction of NHS 111 changed by an average of -351 (-1470, +768) attendances per month, which is a 2.6% reduction compared to the months before.

3. Pilot and control site model

Allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on emergency department attendances was not statistically significant. The model estimated that there

were 29 (-131, 73) fewer emergency department attendances per 1000 NHS 111 triaged calls or about 277 (2.0%) fewer emergency department attendances per month in Durham & Darlington.

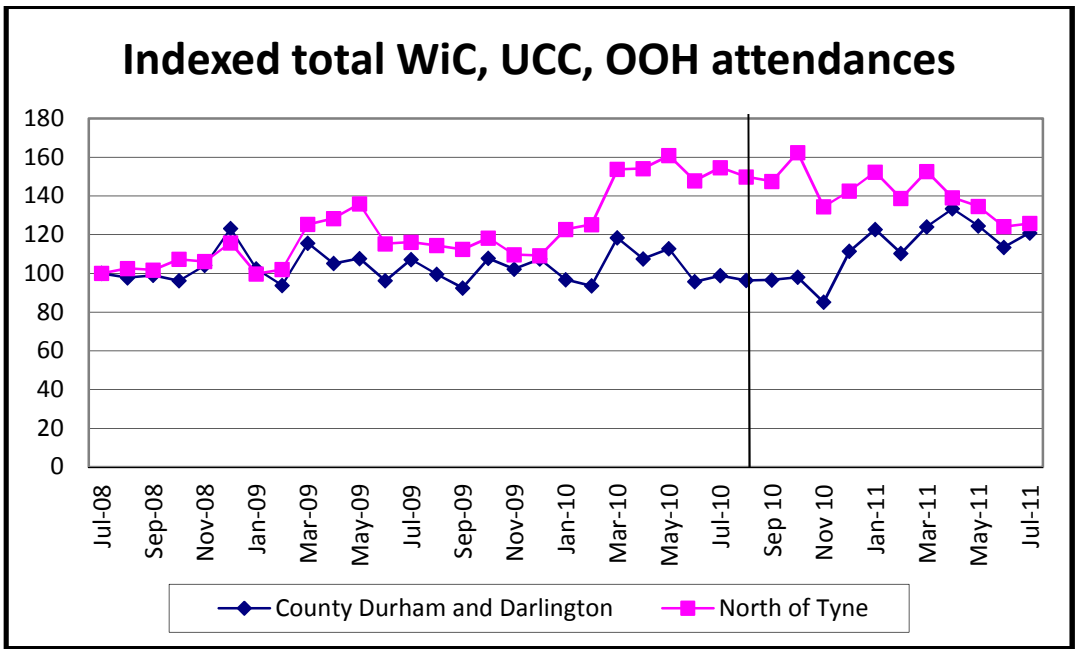
Using a simple "step" model for comparing the changes before and after in average monthly attendances between pilot and control sites, a similar decrease in attendances was estimated. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 311 (-1261, +640) fewer attendances per month in the pilot site compared to the control site following the opening of NHS 111, a decrease of 2.3% per month.

B. Urgent care services: GP Out of Hours contacts, Walk in Centre and Urgent Care Centre Attendances

1. Trends in GP Out of Hours, Walk in Centre and Urgent Care Centre attendance

Figure 8.3 shows the indexed monthly contacts/attendances at GP Out of Hours, Walk in Centres and Urgent Care centres in the pilot and control sites over the three year study period. The indexed activity shows an increase in attendances in the control area relative to the pilot area coinciding with the introduction of the Single Point of Access service in Durham & Darlington in October/November 2009. There was a small reduction in attendances at these combined urgent care services in the pilot site prior to the introduction of NHS 111 and this continued until November 2010 after which there has been a gradual increase in attendances. Overall, GPOOH/WiC/UCC attendances in the pilot site increased by 7.7% from an average of 13,667 attendances per month before the introduction of NHS 111 to 14,729 attendances per month afterwards. In the control site, GPOOH/WiC/UCC attendances show an overall increase although this started to decrease from late 2010 showing an opposite trend to ED attendances following the reconfiguration of emergency departments in the control area. GPOOH/WiC/UCC attendances in the control site increased by an average 1721 (16%) attendances per month before and after the time of the introduction of the NHS 111 service in the pilot site.

Figure 8.3: Indexed monthly contacts/attendances in GP Out of Hours, Walk in Centres and Urgent Care Centres in the DURHAM AND DARLINGTON pilot and North of Tyne control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated attendance in the pilot site in the months following the introduction of NHS 111 changed by an average of +817 (-1540, +3180)attendances per month, which is a 6.0% increase compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on GP OOH, WiC and UCC attendances was not statistically significant. The model estimated that there were an additional 127 (-98, +353)OOH/WIC/UCC attendances per 1000 NHS 111 triaged calls or about 1215 (8.9%)extra attendances per month in Durham & Darlington.

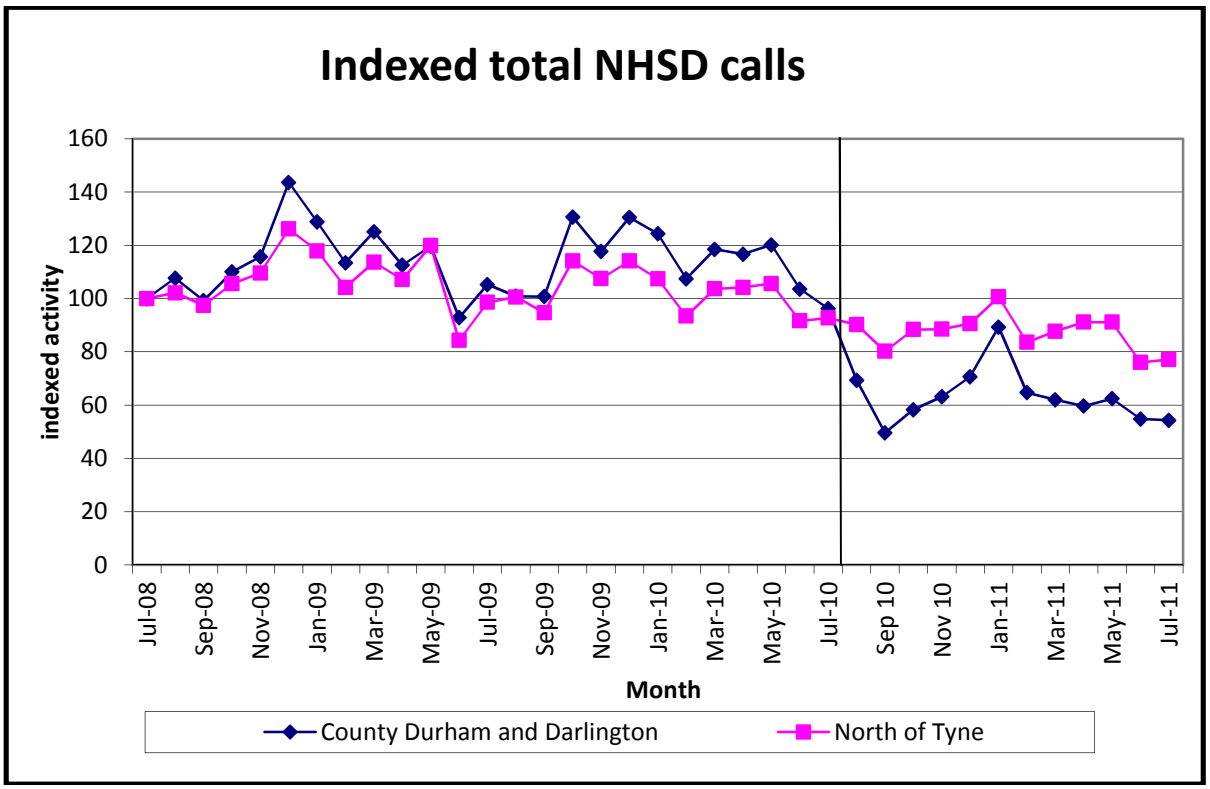
A different effect was estimated if the simple "step" model comparing the changes before and after in average monthly attendances between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 608 (-2717, +1500)fewer attendances per month in the pilot site compared to the control site following the opening of NHS 111, a decrease of 4.4%.

C. Calls to NHS Direct

1. Trends in calls to NHS Direct

Figure 8.4 shows the indexed monthly calls to NHS Direct in the pilot and control sites over the three year study period. The graph shows a reduction in calls to NHS Direct in both areas but this is more marked in the pilot area following the introduction of NHS 111. In the pilot site the number of calls to NHS Direct fell by 44.7% from an average of 3978 calls per month in the two years before the introduction of NHS 111 to an average of 2201 calls per month in the year afterwards. During the same period calls to NHS Direct fell by an average 962 calls per month (16.9%) in the control site.

Figure 8.4: Indexed monthly Calls to NHS Direct in the DURHAM AND DARLINGTON pilot and North of Tyne control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of NHS Direct calls in the pilot site in the months following the introduction of NHS 111 changed by an average of -1850 (-2250, -1440) calls per month, which is a 46.5% reduction compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on calls to NHS Direct was statistically significant ($p< 0.001$). The model estimated that there was a reduction of 110 (-154, -66) NHS Direct calls per 1000 NHS 111 triaged calls or about 1050 (26.5%)fewer calls to NHS Direct per month in Durham & Darlington. The effect was also statistically significant when the square root of the monthly activity counts was modelled ($p<0.001$).

A similar effect was seen if the simple "step" model comparing the changes before and after in average monthly calls to NHS Direct between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 991 (-1383, -599)fewer calls to NHS Direct per month in the pilot site compared to the control site following the opening of NHS 111, a decrease of 24.9%.

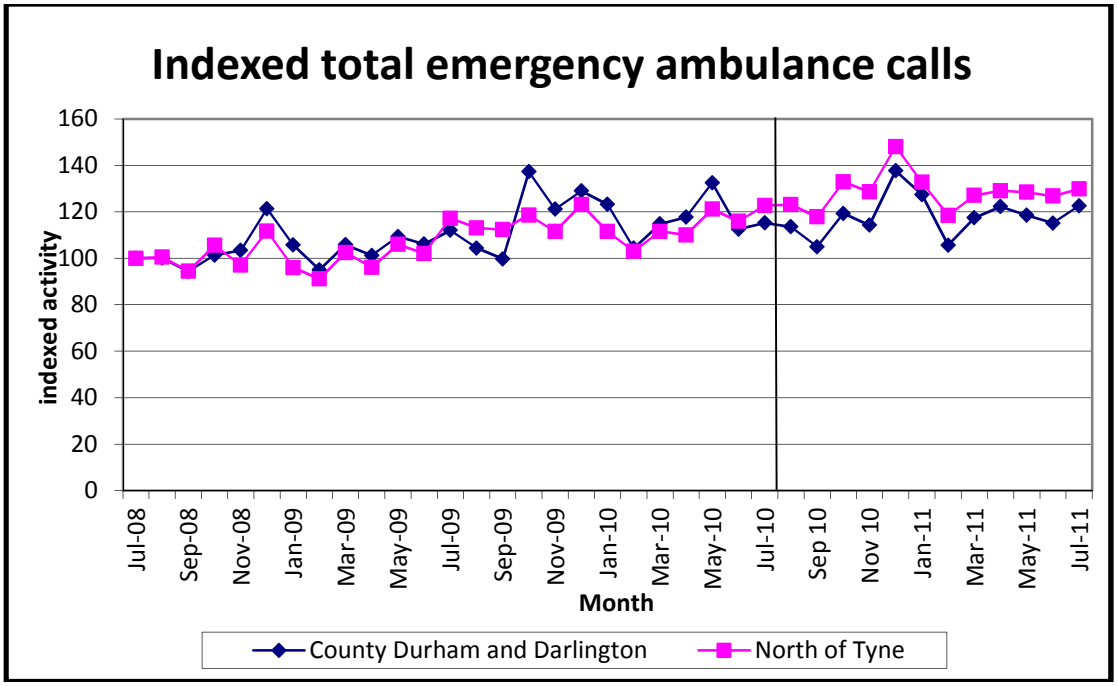
D. Calls to the emergency ambulance service

(i) Calls to ambulance service

1. Trends in calls to the ambulance service

Figure 8.5 shows the indexed monthly ambulance service calls in the pilot and control sites over the three year study period. The graph shows a steady increase in calls to the ambulance service during the 36 month study period for both pilot and control sites but the rate of increase is less in the pilot site and indexed activity in the pilot site is consistently lower than in the control site after the introduction of NHS 111. In the pilot site calls to the emergency ambulance service increased by 6.4% from an average 6479 calls per month before the introduction of NHS 111 to an average 6895 calls per month afterwards. In the control site calls to the emergency ambulance service increased by an average of 1476 calls per month (18.9%) over the same period.

Figure 8.5: Indexed monthly calls to the ambulance service in the DURHAM AND DARLINGTON pilot and North of Tyne control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of ambulance service calls in the pilot site in the months following the introduction of NHS 111 changed by an average of -572 (-1060, -81)calls per month, which is a decrease of 8.8% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on calls to the emergency ambulance service was statistically significant (p=0.017). The model estimated that there was a reduction of 77 (-140, -15) emergency calls per 1000 NHS 111 triaged calls or about 737 (11.4%)fewer emergency calls to the ambulance service per month in Durham & Darlington. The effect was also statistically significant when the square root of the monthly activity counts was modelled (p=0.016).

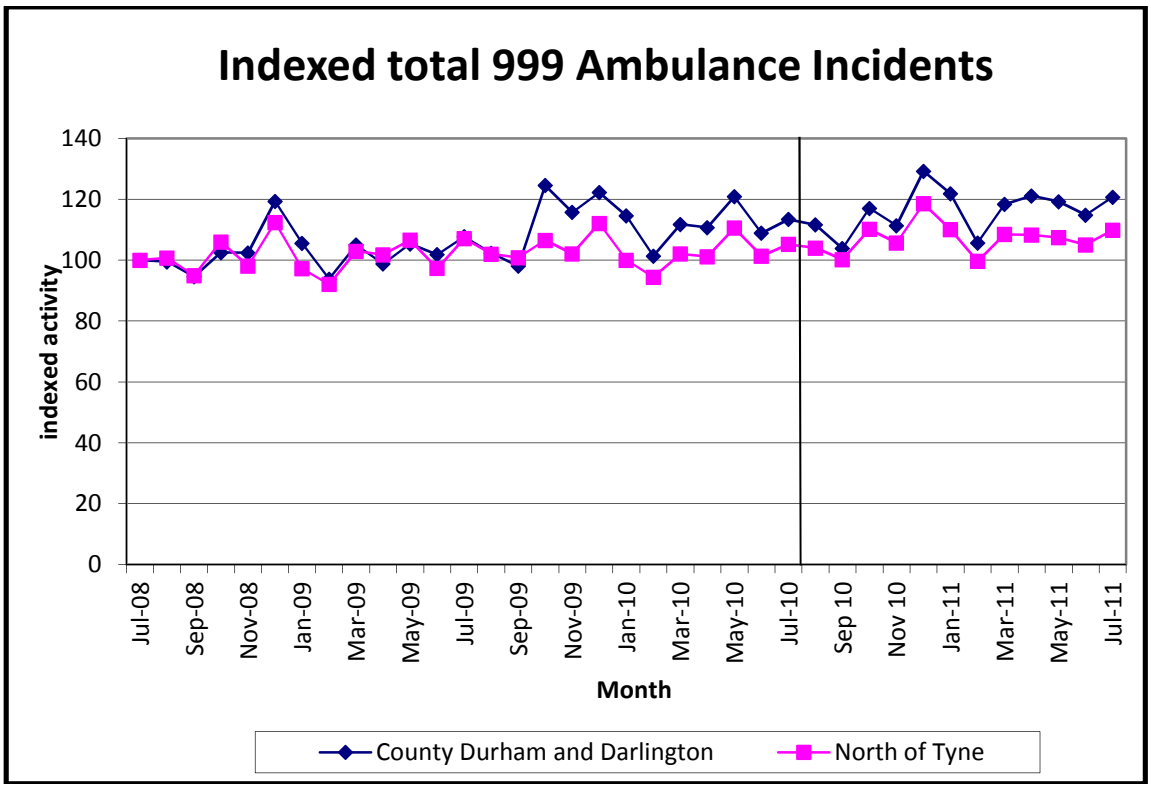
A similar effect was seen if the simple "step" model comparing the changes before and after in average monthly attendances between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 943 (-1468, -418) fewer ambulance calls per month in the pilot site compared to the control site following the opening of NHS 111, a decrease of 14.6%.

(ii) Ambulance incidents

1. Trends in ambulance service incidents

Figure 8.6 shows the indexed monthly ambulance service incidents in the pilot and control sites over the three year study period. The graph shows an increase in ambulance service incidents following the introduction of the SPA in Durham & Darlington and this has been maintained following the introduction of NHS 111. In the pilot site, ambulance service incidents increased by 8.1% from an average of 5304 incidents per month before the introduction of NHS 111 to 5734 incidents per month afterwards. In the control site, ambulance incidents increased by 344 incidents per month (4.9%) over the same time period.

Figure 8.6: Indexed monthly ambulance service incidents in the DURHAM AND DARLINGTON pilot and North of Tyne control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of ambulance incidents in the pilot site in the months following the introduction of NHS 111 changed by an average of -268 (-582, +45)incidents per month, which is a decrease of 5.1% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on ambulance service incidents was not statistically significant. The model estimated that there were an additional 9 (-22, +40) ambulance incidents per 1000 NHS 111 triaged calls or about 86 (1.6%) extra ambulance service incidents per month in Durham & Darlington.

A small negative effect was seen if the simple "step" model comparing the changes before and after in average monthly incidents between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 54 (-342, +234) fewer ambulance incidents per month in the pilot site compared to the control site following the opening of the 111 service, a decrease 1.0%.

8.3.2 Nottingham City

In the Nottingham City / Leicester analysis there were six known system changes that were accounted for in the analysis:

Pilot site:

- A new walk in centre opened in Nottingham in January 2010.
- The Choose Well publicity campaign ran in Nottingham during September & October 2010 to improve public awareness of how to use different urgent care services.

Control Site:

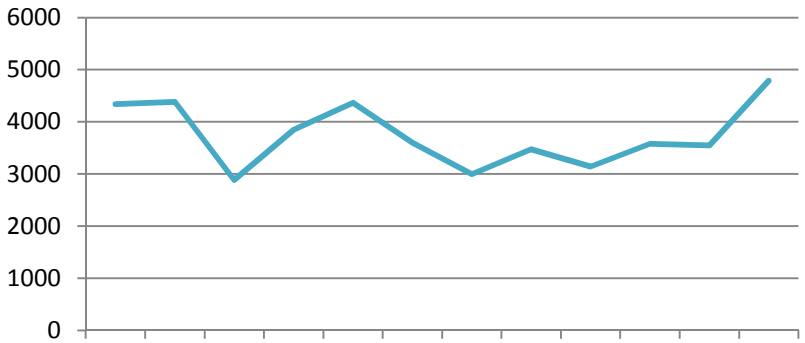
- An emergency department attendance reduction scheme ran in Leicester from 2010 onwards.
- An Urgent Care Centre patient streaming service to reduce emergency department attendances ran in Leicester from June 2010 onwards.
- A scheme to refer Walk in Centre patients back to GPs ran in Leicester from August 2011 onwards.
- East Midlands Ambulance Service began conveying patients directly to Walk in Centres and Minor Injury Units in Leicester from March 2011 onwards.

As with the other sites, walk-in centre and out-of-hours GP data have been combined. This data was not available for the first four months of the study period and so the analysis runs from April 2009 to November 2011. For all other types of activity the analysis covers the full 36 months from December 2008 to November 2011.

The NHS 111 service was introduced in November 2010 and the number of calls triaged by the service during the first year of operation is shown in Figure 8.7. Calls initially were around 4,000 per

month although the service started close to the peak demand winter period and subsequently settled at an average of around 3,500 calls per month.

Figure 8.7: Number of NHS 111 calls triaged in Nottingham City pilot site between December 2010 and November 2011

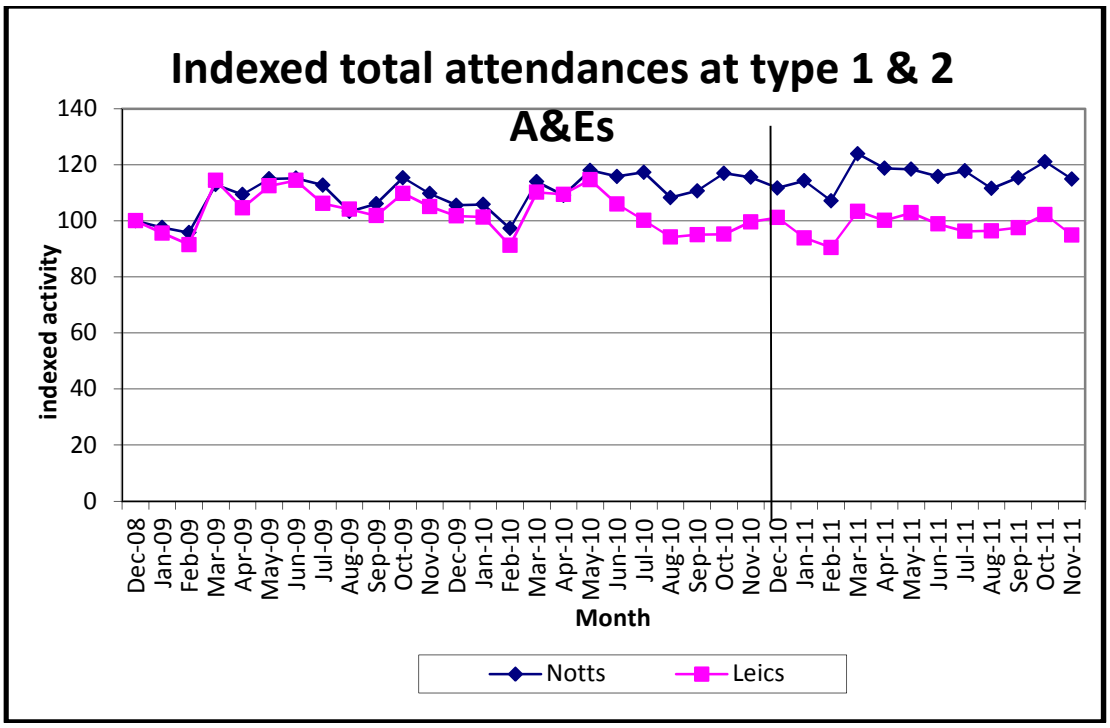


A. Emergency Department attendances

1. Trends in emergency department (ED) attendance

Figure 8.8 shows the indexed monthly attendances at emergency departments in the pilot and control sites over the three year study period. The indexed attendances show a reduction in ED attendances in the control site coinciding with the ED attendance reduction schemes. In the pilot site the number of ED attendances increased by 5.8% from an average of 7505 attendances per month before the introduction of NHS 111 to an average of 7945 per month afterwards. In the control site, the average monthly number of attendances decreased 352 (-5.2%) over the same period.

Figure 8.8: Indexed monthly emergency department attendances in NOTTINGHAM CITY Pilot and Leicester PCT control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and the other known changes in the pilot site, the estimated attendance in the pilot site in the months following the introduction of NHS 111 changed by an average of +43 (-402, +488)attendances per month, which is an increase of 0.6% compared to the months before. This is much smaller than the change in the raw numbers, because the long term trend is picking up all the effect.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on emergency department attendances was not statistically significant. The model estimated that there were an additional 12 (-53, +76)emergency department attendances per 1000 NHS 111 triaged calls or about an extra 44 (0.6%)emergency department attendances per month in Nottingham City.

A similar effect was seen if the simple “step” model comparing the changes before and after in average monthly attendances between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated +70 (-196, +335)more ED attendances per month in the pilot site compared to the control site following the opening of the 111 service, an increase of 0.9%.

B. Urgent care services: GP Out of Hours and Walk in Centre Attendances

1. Trends in GP Out of Hours and Walk in Centre attendance

Figure 8.9 shows the indexed monthly attendances at GP Out of Hours and Walk in Centres in the pilot and control sites over the three year study period. The indexed data shows attendances have fluctuated in both pilot and control areas during the study period but the overall trend is one of increased attendances and this is more marked in the control site coinciding with the introduction of direct transport to WiC and Minor Injury Units by the ambulance service in March 2011. Overall, GPOOH/WiC attendances in the pilot site have increased by 11% from an average of 8561 attendances per month before the introduction of NHS 111 to 9424 attendances per month afterwards. Average monthly GPOOH/WiC attendances in the control site increased by 1114 (15.6%) over the same period.

2. Pilot Site model

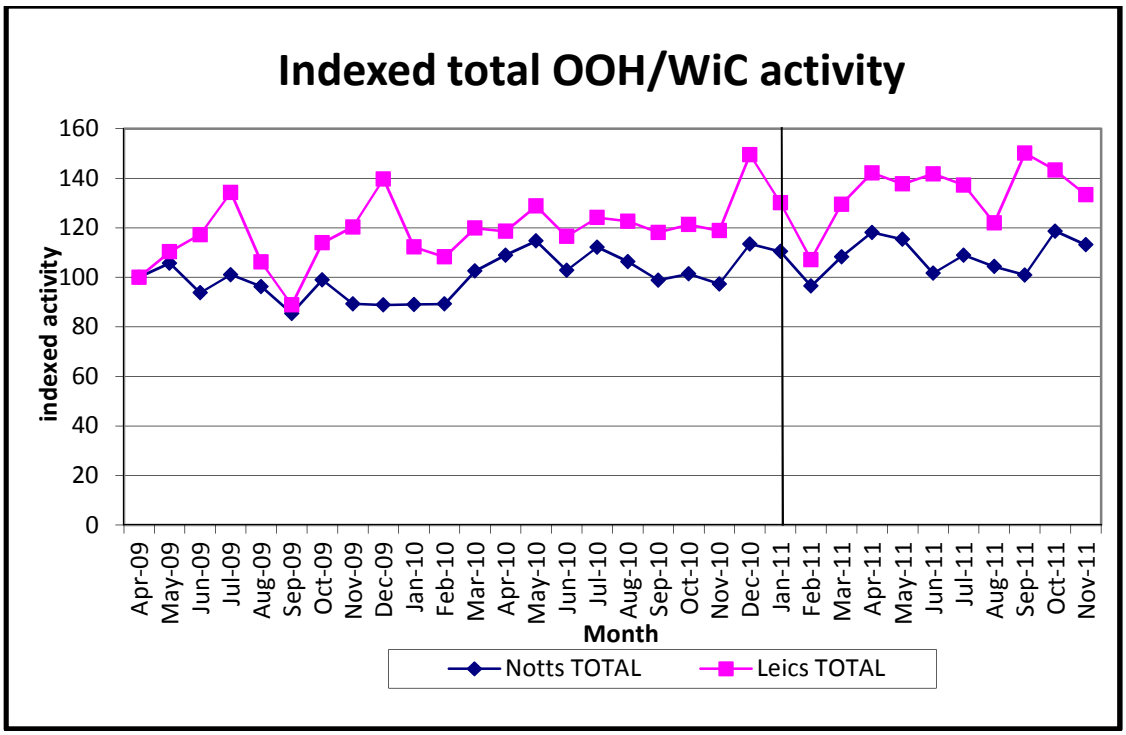
After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated attendance at urgent care services in the pilot site in the months following the introduction of NHS 111 changed by an average of +1030 (-50, +2110)attendances per month, which is an increase of 12.0% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on GP OOH/ WiC attendances was not statistically significant. The model estimated that there were 11 (-285, +263) fewer OOH/WIC attendances per 1000 NHS 111 triaged calls or about 41 (0.5%) fewer attendances per month in Nottingham City.

A larger effect was found if the simple “step” model comparing the changes before and after in average monthly attendances between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 321 (-1474, +833)fewer urgent care attendances per month in the pilot site compared to the control site following the opening of the 111 service, a decrease of 3.7%.

Figure 8.9: Indexed monthly attendances in GP Out of Hours and Walk in Centres in NOTTINGHAM CITY Pilot and Leicester PCT control sites



C. Calls to NHS Direct

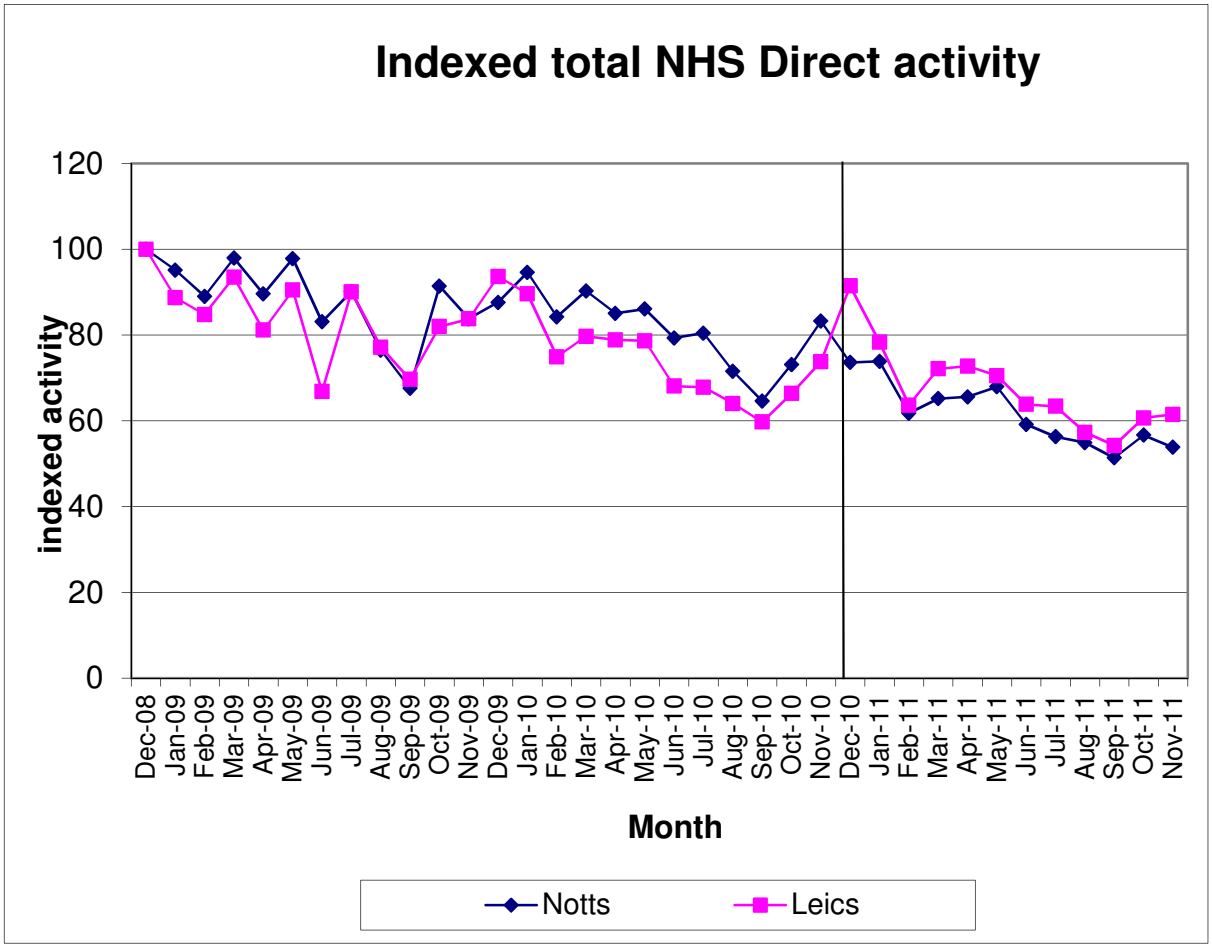
1.Trends in calls to NHS Direct

Figure 8.10 shows the indexed monthly calls to NHS Direct in the pilot and control sites over the three year study period. The graph shows a decrease in NHS Direct activity in the pilot and control sites with a greater reduction in the pilot site after the introduction of NHS 111. In the pilot site the number of calls to NHS Direct fell by 27.5% from an average of 3016 calls per month before the introduction of NHS 111 to an average of 2186 calls per month afterwards. During the same period calls to NHS Direct fell by an average 380 calls per month (17.5%) in the control site.

2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of calls in the pilot site in the months following the introduction of NHS 111 changed by an average of -273 (-599, +52)calls per month, which is a decrease of 9.1% compared to the months before.

Figure 8.10: Indexed monthly Calls to NHS Direct in NOTTINGHAM CITY Pilot and Leicester PCT control sites



3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on calls to NHS Direct was statistically significant ($p<0.001$). The model estimated that there was a reduction of 139 (-193, -84)NHS Direct calls per 1000 NHS 111 triaged calls or about 515 (17.1%)fewer calls to NHS Direct per month in Nottingham City. The effect of starting the NHS 111 service was also significant when the square root of the monthly call counts was modelled ($p<0.001$).

A similar and statistically significant effect was found if the simple "step" model comparing the changes before and after in average monthly calls to NHS Direct between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 563 (-791, -335) fewer NHS Direct calls per month in the pilot site compared to the control site following the opening of the 111 service, a decrease of 18.7%.

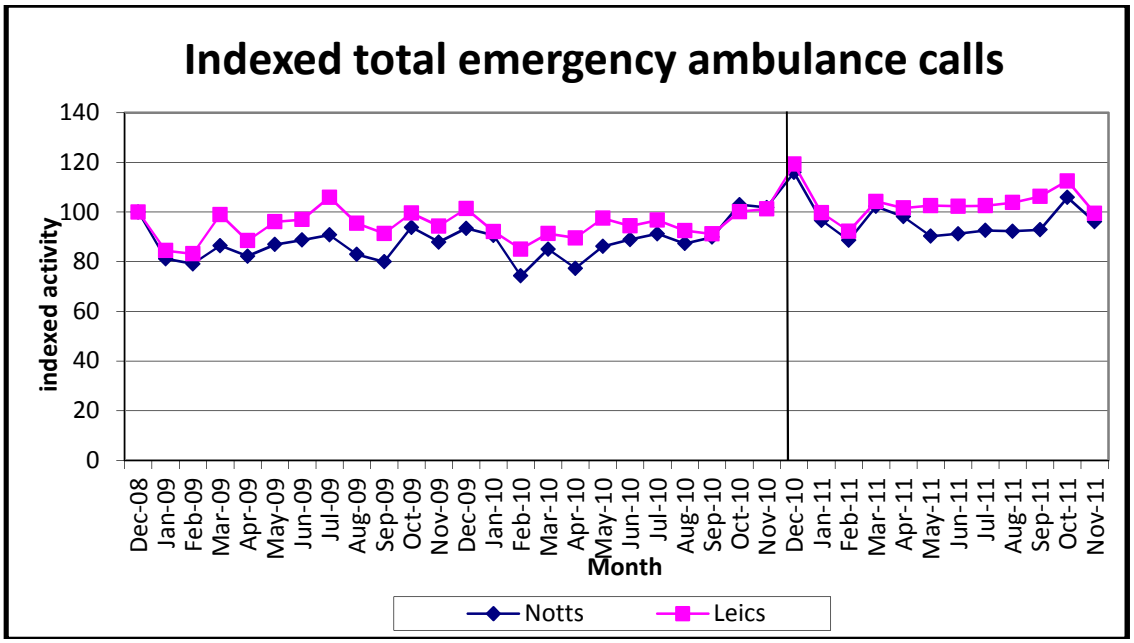
D. Calls to the emergency ambulance service

i) Ambulance calls

1. Trends in calls to the ambulance service

Figure 8.11 shows the indexed monthly ambulance service calls in the pilot and control sites over the three year study period. There was an increase in calls in both sites during the study period. In the pilot site calls to the emergency ambulance service increased by 10.3% from an average 4824 calls per month before the introduction of NHS 111 to an average 5319 calls per month afterwards. In the control site calls to the emergency ambulance service increased by an average of 442 calls per month (9.9%) over the same period.

Figure 8.11: Indexed monthly Calls to the ambulance service in NOTTINGHAM CITY Pilot and Leicester PCT control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of calls in the pilot site in the months following the introduction of NHS 111 changed by an average of +686 (+66, +1310) calls per month, an increase of 14.2% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on calls to the emergency ambulance service was not statistically significant. The model estimated that

there was an increase of 34 (-64, +131) emergency calls per 1000 NHS 111 triaged calls or about 126 (2.6%) more emergency calls to the ambulance service per month in Nottingham City.

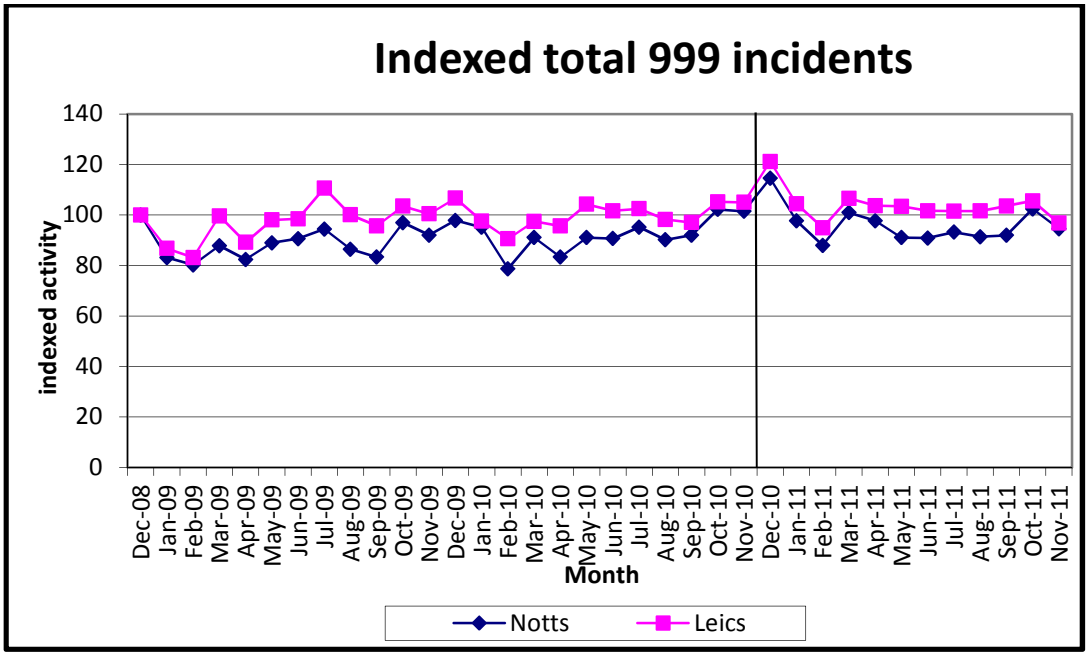
A similar effect was found if the simple "step" model comparing the changes before and after in average monthly ambulance service calls between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 78 (-348, +504) more ambulance service calls per month in the pilot site compared to the control site following the opening of the NHS 111 service, an increase of 1.6%.

ii) Ambulance incidents

1. Trends in calls ambulance service incidents

Figure 8.12 shows the indexed monthly ambulance service incidents in the pilot and control sites over the three year study period. There is no obvious change in ambulance incidents during the study period. In the pilot site ambulance service incidents increased by 6.1% from an average of 4276 incidents per month before the introduction of NHS 111 to 4538 incidents per month afterwards. In the control site, ambulance incidents increased by 205 incidents per month (5.2%) over the same time period.

Figure 8.12: Indexed monthly ambulance service incidents NOTTINGHAM CITY Pilot and Leicester PCT control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of ambulance incidents in the pilot site in the months following the introduction of NHS 111 changed by an average of +435 (-23, +893) incidents per month, an increase of 10.2% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on ambulance service incidents was not statistically significant. The model estimated that there was an additional 27 (-38, +93) ambulance incidents per 1000 NHS 111 triaged calls or about 100 (2.3%) extra ambulance service incidents per month in Nottingham City.

A similar effect was found if the simple "step" model comparing the changes before and after in average monthly ambulance incidents between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 69 (-207, +344) more ambulance service incidents per month in the pilot site compared to the control site following the opening of the NHS 111 service, an increase of 1.6%.

8.3.3 Luton

In the Luton pilot site and Leicester control site there were five known system changes that were accounted for in the analysis:

Pilot site:

- Luton began re-configuring Walk in Centres and Urgent Care Centres in April 2011

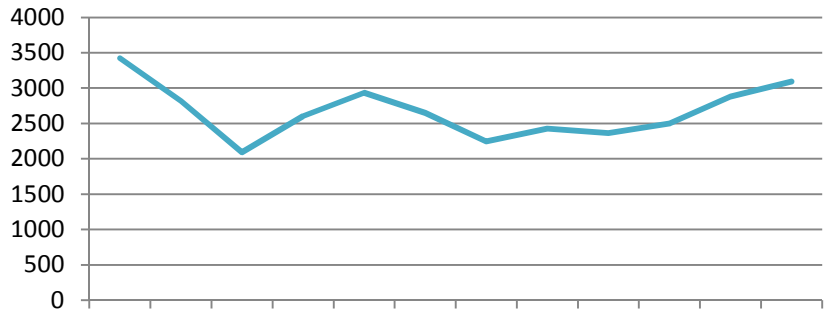
Control site:

- An emergency department attendance reduction scheme ran in Leicester from 2010 onwards
- An Urgent Care Centre patient streaming service to reduce emergency department attendances ran in Leicester from June 2010 onwards
- A scheme to refer Walk in Centre patients back to GPs ran in Leicester from August 2011 onwards
- East Midlands Ambulance Service began conveying patients directly to Walk in Centres and Minor Injury Units began in Leicester from March 2011 onwards.

Luton PCT was not able to provide a continuous time series for ED data from December 2008 to March 2009, so the analysis of ED activity starts in April 2009. Similarly Leicester PCT could not provide out-of-hours data for the first four months, so the analysis of the WIC/OOH/UCC activity also starts in April 2009.

The NHS 111 service was introduced in December 2010 and the number of calls triaged by the service during the first year of operation is shown in Figure 8.13. Calls initially were around 3,500 per month although the service started close to the peak demand winter period and subsequently call volumes reduced and settled at an average of around 3,000 calls per month by the end of the first year of operation.

Figure 8.13: Number of NHS 111 calls triaged in the LUTON pilot site between December 2010 and November 2011

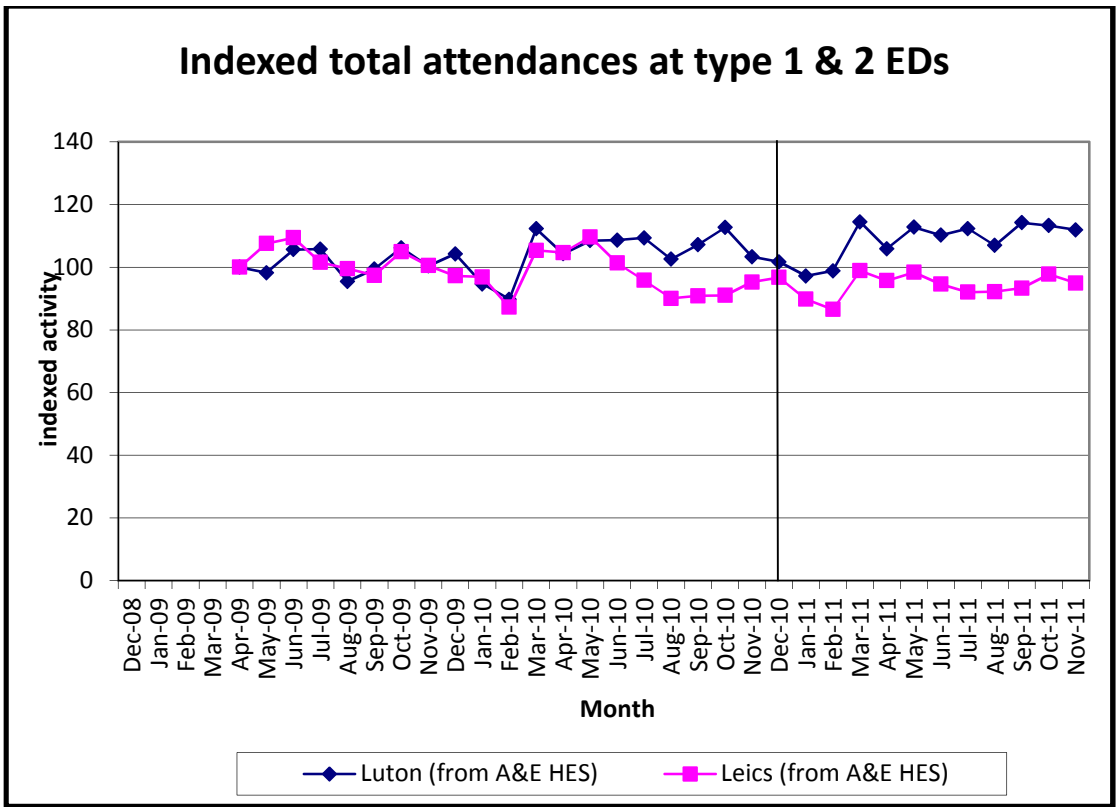


A. Emergency Department attendances

1. Trends in emergency department attendance

Figure 8.14 shows the indexed monthly attendances at emergency departments in the pilot and control sites over the three year study period. The indexed data shows a decrease in emergency department attendances in the control site coinciding with the introduction of ED reduction schemes and a steady increase in attendances in the pilot site. In the pilot site the number of ED attendances increased by 4.7% from an average of 3474 attendances per month before the introduction of NHS 111 to an average of 3638 per month afterwards. In the control site, the number of attendances decreased by an average of 391 (-5.5%) attendances per month over the same period.

Figure 8.14: Indexed monthly emergency department attendances in LUTON pilot & Leicester control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated attendance in the pilot site in the months following the introduction of NHS 111 changed by an average of -95 (-224, +34)attendances per month, a decrease of 2.7% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on emergency department attendances was not statistically significant. The model estimated that there was a reduction of 46 (-183, +91) emergency department attendances per 1000 NHS 111 triaged calls or about 122 (3.5%) fewer emergency department attendances per month in the Luton pilot site.

A similar effect was seen if the simple “step” model comparing the changes before and after in average monthly attendances between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 72 (-484, +340) fewer ED

attendances per month in the pilot site compared to the control site following the opening of the NHS 111 service, a decrease of 2.1%.

B. Urgent care services: GP Out of Hours, Walk in Centre and Urgent Care Centre Attendances

1. Trends in GP Out of Hours, Walk in Centre and Urgent Care Centre attendance

Figure 8.15 shows the indexed monthly attendances at GP Out of Hours, Walk in Centres and Urgent Care centres in the pilot and control sites over the 3 year study period. The graph shows a reduction in attendance following the reconfiguration of these services and again following the implementation of NHS 111 in the Luton pilot site. In contrast attendances have increased in the control site over the same time period as ED attendances have reduced suggesting a shift between urgent care services. Overall, GPOOH/WiC/UCC attendances in the pilot site have reduced by 19.0% from an average of 7573 attendances per month before the introduction of NHS 111 to 6135 attendances per month afterwards. GPOOH/WiC/UCC attendances in the control site have increased by an average of 1114 (15.6%) attendances per month over the same period.

2. Pilot Site model

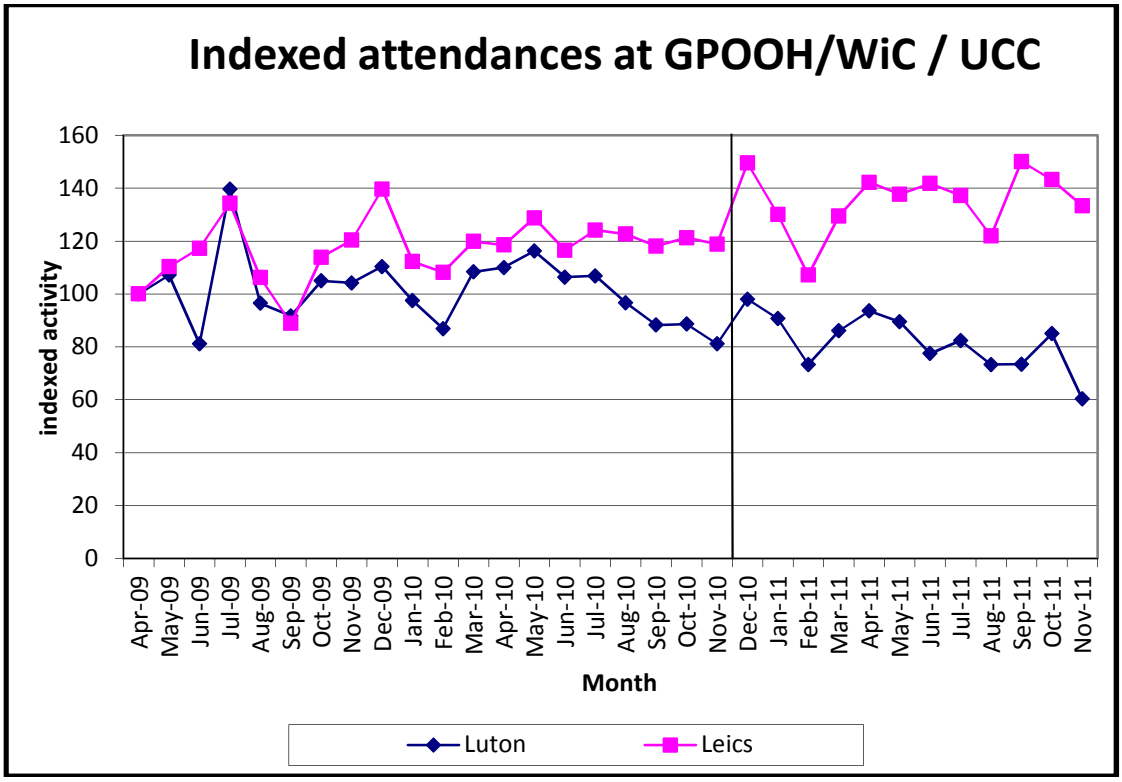
After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated attendance in the pilot site in the months following the introduction of NHS 111 changed by an average of -762 (-2060, +536) attendances per month, a decrease of 10.1% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on GP OOH, WiC and UCC attendances was statistically significant (p=0.043). The model estimated that there was a reduction of 457 (-898, -16)OOH/WIC/UCC attendances per 1000 NHS 111 triaged calls or about 1216 (16.1%) fewer attendances per month in the Luton pilot site. The effect was also statistically significant when the square root of the monthly activity counts was modelled (p=0.047).

A similar effect was seen if the simple “step” model comparing the changes before and after in average monthly attendances between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 1362 (-2640, -84) fewer urgent care centre attendances per month in the pilot site compared to the control site following the opening of the 111 service, a decrease of 18.0%.

Figure 8.15: Indexed monthly attendances in GP Out of Hours, Walk in Centres and Urgent Care Centres in LUTON pilot & Leicester control sites

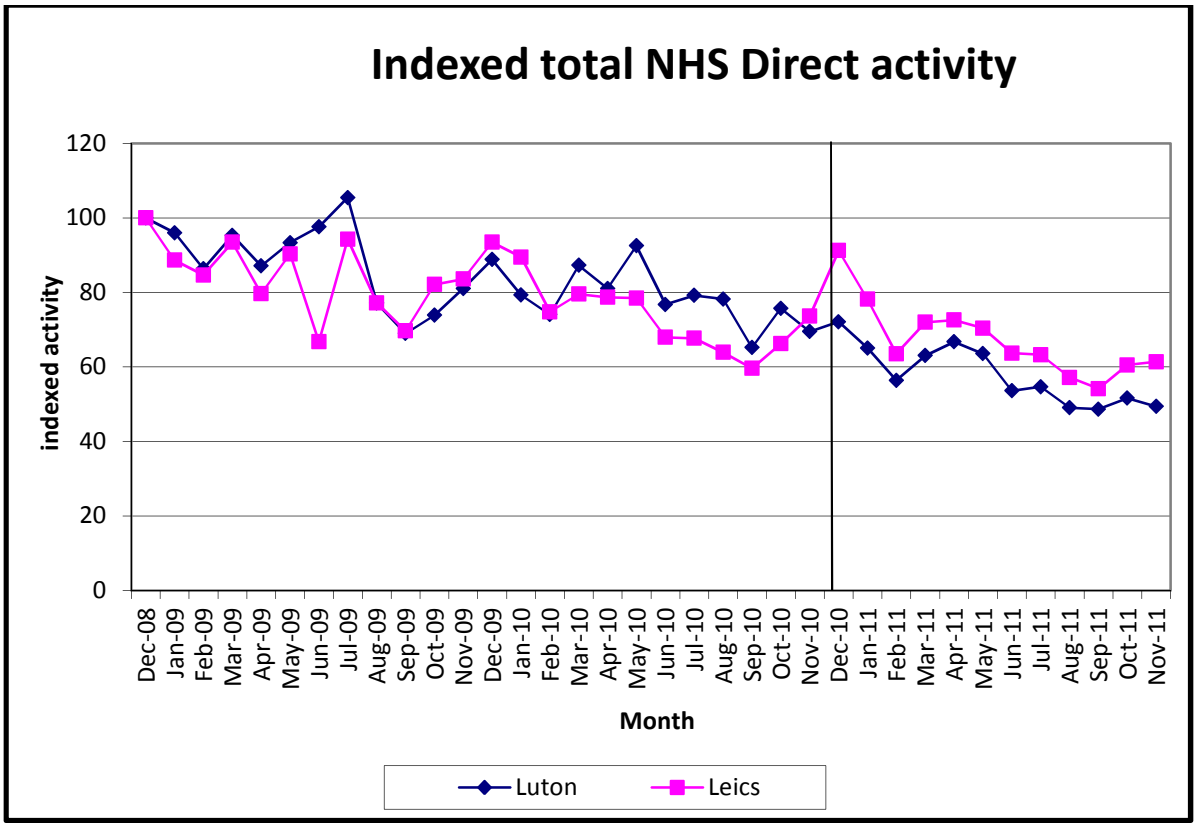


C. Calls to NHS Direct

1. Trends in calls to NHS Direct

Figure 8.16 shows the indexed monthly calls to NHS Direct in the pilot and control sites over the three year study period. The graph shows a reduction in NHS Direct calls in the pilot and control sites during the study period with this reduction being more marked in the pilot site. In the pilot site the number of calls to NHS Direct fell by 31.0% from an average of 1547 calls per month before the introduction of NHS 111 to an average of 1068 calls per month afterwards. During the same period the average monthly number of calls to NHS Direct fell by 386 (15.1%) in the control site.

Figure 8.16: Indexed monthly Calls to NHS Direct in LUTON pilot & Leicester control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of calls in the pilot site in the months following the introduction of NHS 111 changed by an average of -187 (-393, +18)calls per month, a decrease of 12.1% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on calls to NHS Direct was statistically significant (p=0.0005). The model estimated that there was a reduction of 175 (-270, -81)NHS Direct calls per 1000 NHS 111 triaged calls or about 466 (30.1%) fewer calls to NHS Direct per month in the Luton pilot site. The effect of starting the 111 service was also significant when the square root of the monthly call counts was modelled (p=0.0006).

A similar and statistically significant effect was found if the simple “step” model comparing the changes before and after in average monthly calls to NHS Direct between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 508 (-782, -234) fewer NHS Direct calls per month in the pilot site compared to the control site following the opening of the NHS 111 service, a decrease of 32.8%.

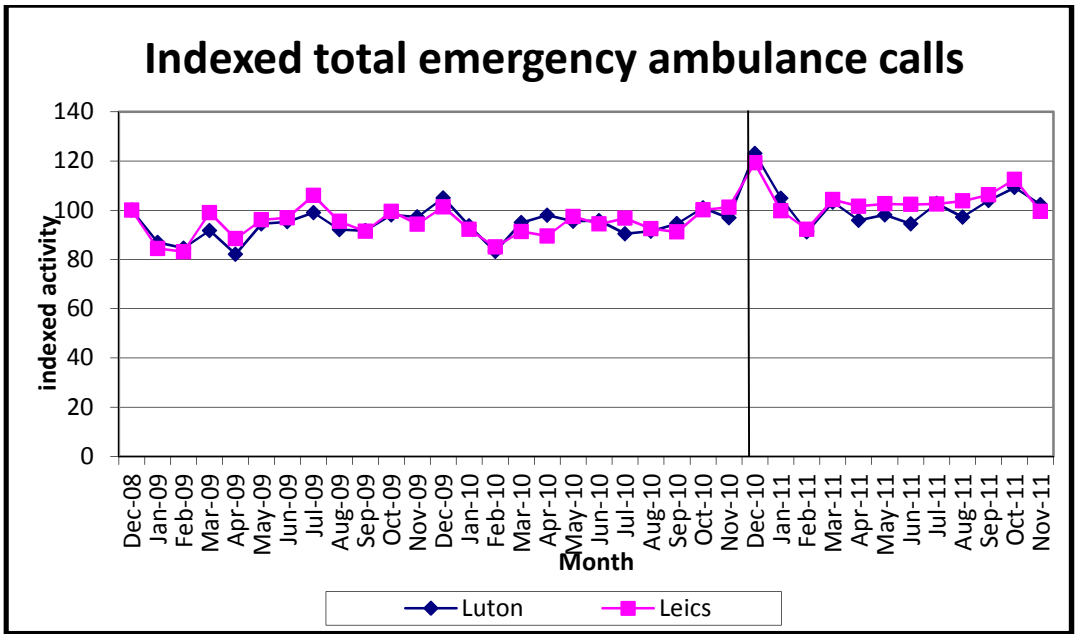
D. Calls to the emergency ambulance service

i) Ambulance calls

1. Trends in calls to the ambulance service

Figure 8.17 shows the indexed monthly ambulance service calls in the pilot and control sites over the 3 year study period. The indexed data shows a small increase in ambulance calls in the pilot and control areas during the study period. In the pilot site ambulance service emergency calls increased by 8.8% from an average of 2626 calls per month before the introduction of NHS 111 to 2857 calls per month afterwards. In the control site, ambulance service emergency calls increased by 442 calls per month (9.9%) over the same time period.

Figure 8.17: Indexed monthly calls to the ambulance service in LUTON pilot & Leicester control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of calls in the pilot site in the months following the introduction of NHS 111 changed by an average of +283 (+69, +497) calls per month, an increase of 10.8% compared to the months before.

3. Pilot and control model

However, after allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on calls to the emergency ambulance service was not statistically significant. In fact the model

estimated that there was a small decrease of 21 (-128, +87) emergency calls per 1000 NHS 111 triaged calls or about 56 (-2.1%) fewer emergency calls to the ambulance service per month in the Luton pilot site.

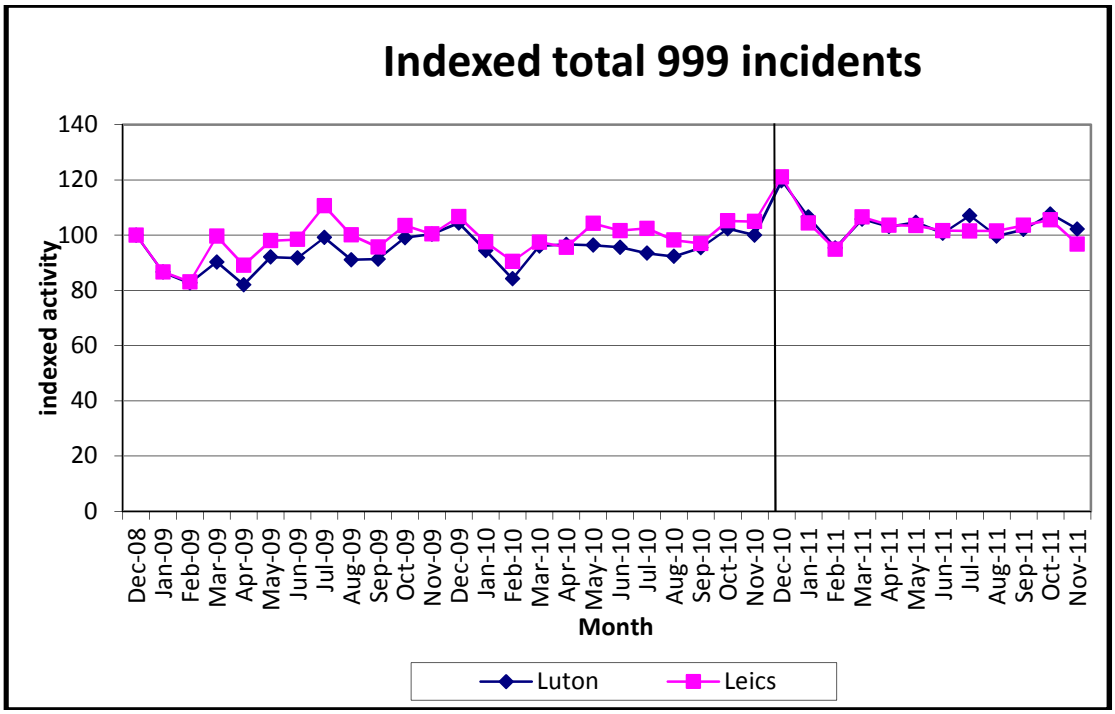
A similar, non-significant effect was found if the simple "step" model comparing the changes before and after in average monthly ambulance service calls between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 131 (-449, +187) fewer ambulance service calls per month in the pilot site compared to the control site following the opening of the NHS 111 service, a decrease of 5.0%.

ii) Ambulance incidents

1. Trends in calls ambulance service incidents

Figure 8.18 shows the indexed monthly ambulance service calls in the pilot and control sites over the 3 year study period. There is no obvious change in ambulance incidents during the study period. In the pilot site ambulance service incidents increased by 11.1% from an average of 2239 incidents per month before the introduction of NHS 111 to 2488 incidents per month afterwards. In the control site, ambulance incidents increased by 205 incidents per month (5.2%) over the same time period.

Figure 8.18: Indexed monthly ambulance service incidents in LUTON pilot & Leicester control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of ambulance incidents in the pilot site in the months following the introduction of NHS 111 changed by an average of +215 (+69, +361)incidents per month, an increase of 9.6% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on ambulance service incidents was not statistically significant. The model estimated that there was a small reduction of 17 (-103, +70) incidents per 1000 NHS 111 triaged calls, or about 45 (2.0%) fewer incidents per month in the Luton pilot site.

Similarly, a very small effect was found if the simple "step" model comparing the changes before and after in average monthly ambulance service incidents between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 44 (-306, +218)fewer ambulance service incidents per month in the pilot site compared to the control site following the opening of the 111 service, a change of just -2.0%.

8.3.4 Lincolnshire

In the Lincolnshire pilot site there were four known system changes that were accounted for in the analysis:

Pilot site:

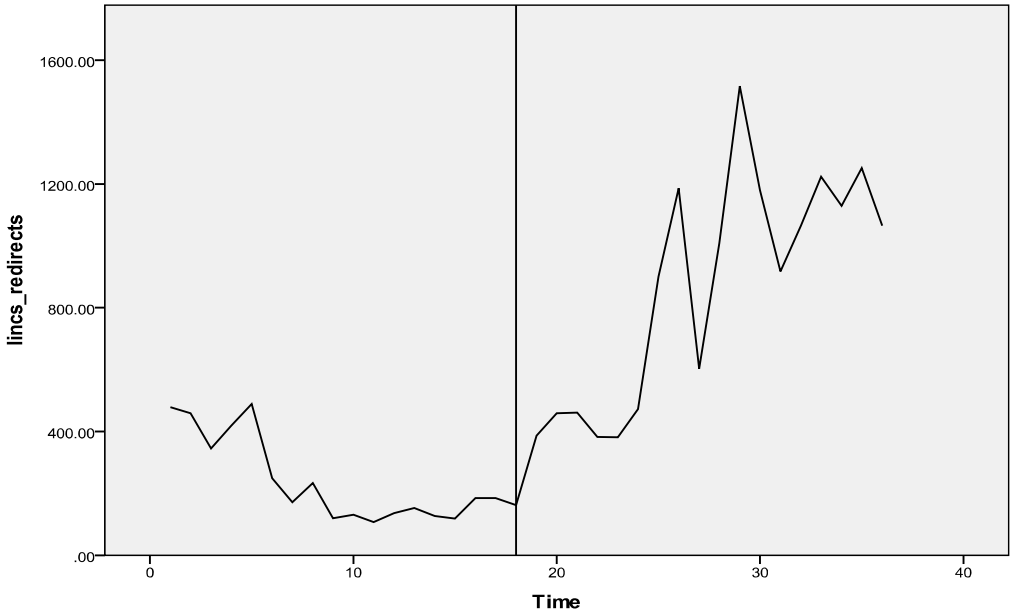
- Opening of a new Walk in Centre in July 2009 in Lincolnshire
- Reconfiguration of emergency department services in Lincolnshire in April 2010 comprising a re-designation of Louth from type 1 to type 3 and University of Lincoln Teaching Hospital from a type 1 and 3 to type 1 only
- An emergency department diversion policy which triaged patients coming to the ED to OOH services was operating in Lincolnshire throughout the study period (before and after implementation of NHS 111). However, there was a steep increase in the number of patients redirected to OOH services beginning in month 19 of our 36 month time series, which was just a few months before NHS 111 was launched in December 2010 (month 24 in our graphs, see Figure 8.19a), making it difficult to judge the effect of NHS 111 on emergency department and urgent care activity. Estimates have been made for the effect of NHS 111 on emergency department and urgent care activity by including a site specific step variable at the time of this change, but these estimates should be treated with

particular caution because we do not know what change was introduced to cause this steep rise in the number of diverts.

Control site:

- Opening of a new Walk in Centre in July 2009 in Norfolk

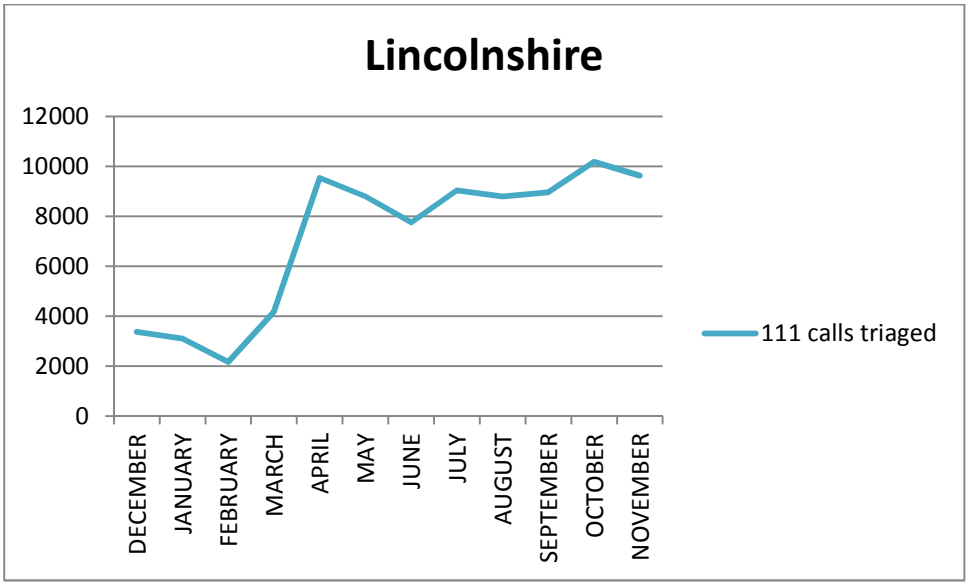
Figure 8.19a Numbers of Emergency Department diverts in Lincolnshire



The reconfiguration of ED services in Linconshire led to varying completion of SUS data, so SitRep data has been used to provide a consistent time series. Lincolnshire out-of-hours data was not available for September and October 2010 due to a change in provider, and data for these months has been imputed using the average of the activity in the three months before and three months after. Ambulance data for October 2010 appears to be about 40% below what would be expected. We approached the AS about this, but the data could not be explained and no other data were available. So in this case we have omitted the ambulance data for October 2010 and in order to avoid any possible bias in the estimates have also omitted the recorded ambulance data for Octobers 2009 and 2011 as well.

The NHS 111 service was introduced in December 2010 and the number of calls triaged by the service during the first year of operation is shown in Figure 8.19b. In this pilot site only direct dial calls are received with no diverted calls from other sources. Calls were initially around 4000 per month until April 2011 when all OOH GP access telephone numbers were replaced with a message asking callers to dial 111 instead. Since then calls have remained steady at just under 10,000 per month.

Figure 8.19b: Number of calls triaged in the LINCOLNSHIRE pilot site between December 2010 and November 2011

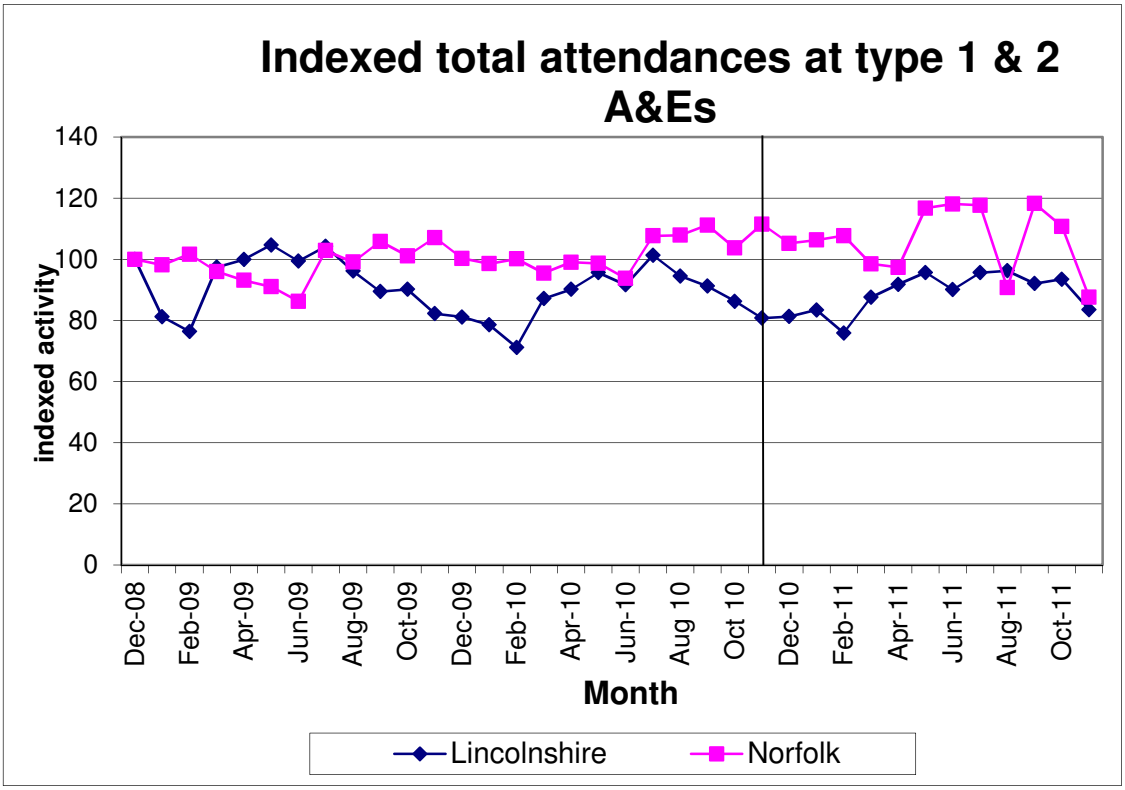


A Emergency Department attendances

1. Trends in emergency department attendance

Figure 8.20 shows the indexed monthly attendances at emergency departments in the pilot and control sites over the three year study period. The indexed data shows variability in emergency department attendances in the Lincolnshire pilot site before the introduction of NHS 111 and a rise in attendances after the introduction of NHS 111. In the pilot site the number of ED attendances decreased by 1.2% from an average 14,293 attendances per month before the introduction of NHS 111 to an average 14,117 attendances per month after. In the control site, attendances per month increased by an average of 641 (5.8%) over the same period.

Figure 8.20: Indexed emergency department attendances in the LINCOLNSHIRE pilot and Norfolk PCT control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated attendance in the pilot site in the months following the introduction of NHS 111 changed by an average of +486 (-464, +1440)attendances per month, an increase of 3.4% compared to the months before.

3. Pilot and control site model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on emergency department attendances was not statistically significant. The model estimated that there were an additional 67 (-131, +265) emergency department attendances per 1000 NHS 111 triaged calls or about an extra 477 (3.3%) emergency department attendances per month in Lincolnshire.

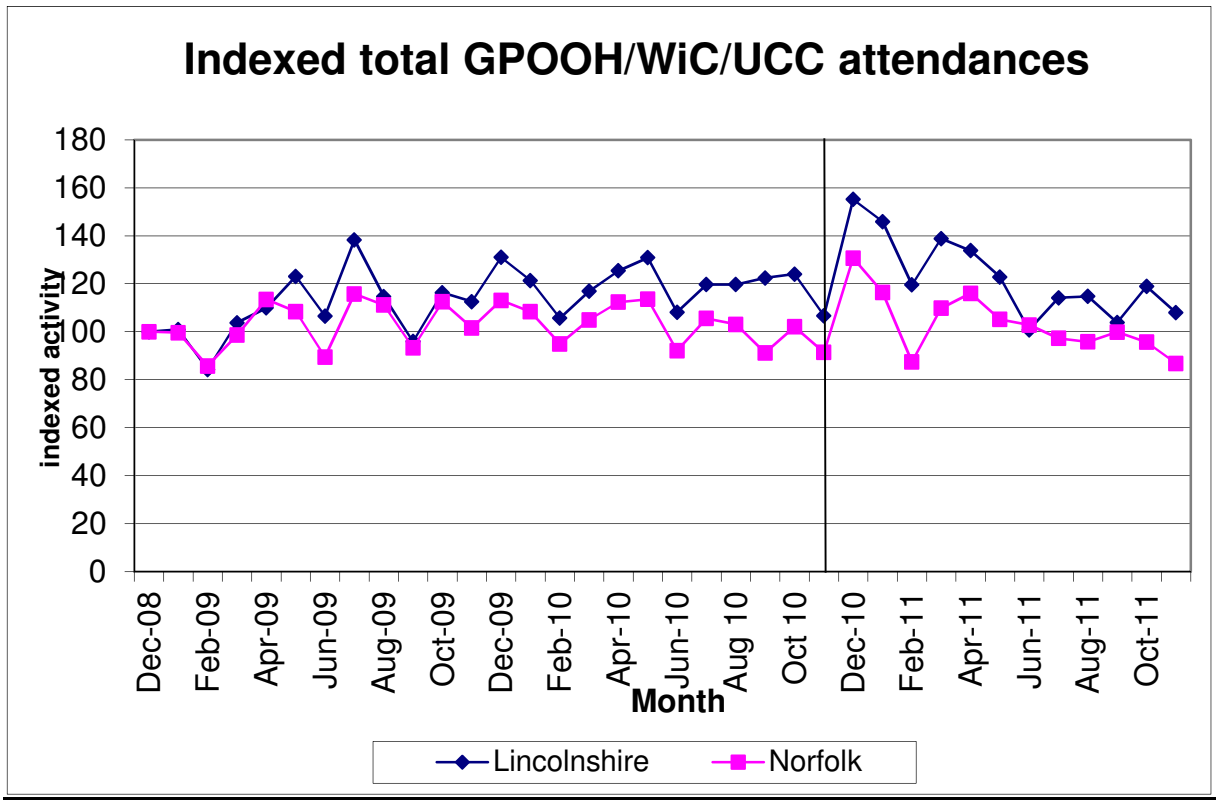
A different effect was seen if the simple "step" model comparing the changes before and after in average monthly attendances between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 269 (-1998, +1459) *fewer* ED attendances per month in the pilot site compared to the control site following the opening of the NHS 111 service, a decrease of 1.9%.

B. Urgent care: GP Out of Hours, Walk in Centre and Urgent Care Centre Attendances

1. Trends in GP Out of Hours, Walk in Centre and Urgent Care Centre attendance

Figure 8.21 shows the indexed monthly attendances at GP Out of Hours, Walk in Centres and Urgent Care centres in the pilot and control sites over the three year study period. The graph shows an initial rise in attendances in the pilot site after the introduction of NHS 111 but a steady decline over the rest of the first year of operation. In the pilot site the number of GPOOH/WiC/UCC attendances increased by 6.8% from an average 12,374 attendances per month before the introduction of NHS 111 to an average 13,222 attendances per month after. In the control site, average monthly attendances increased by 94 (0.6%) over the same period.

Figure 8.21: Indexed attendances at GP Out of Hours, Walk in centres and Urgent Care Centres in the LINCOLNSHIRE pilot and Norfolk PCT control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated attendance in the pilot site in the months following the introduction of NHS 111 changed by an average of +2310 (-214, +4820) attendances per month, an increase of 18.7% compared to the months before.

3. Pilot and control site model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on GPOOH/WiC/UCC attendances was not statistically significant. The model estimated that there were 64 (-200, +72) fewer attendances per 1000 NHS 111 triaged calls or about 448 (-3.6%) fewer GPOOH/WiC/UCC attendances per month in Lincolnshire.

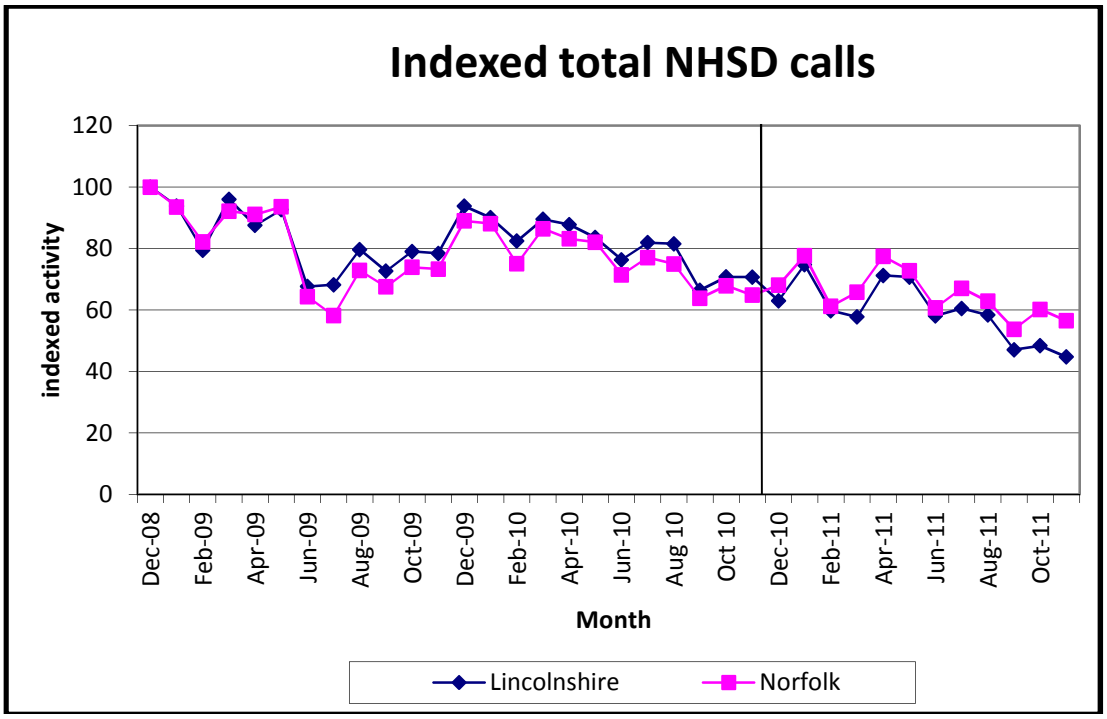
A different effect was seen if the simple "step" model comparing the changes before and after in average monthly attendances between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 46 (-1183, +1275) more urgent care centre attendances per month in the pilot site compared to the control site following the opening of the NHS 111 service, an increase of 0.4%.

C. Calls to NHS Direct

1. Trends in calls to NHS Direct

Figure 8.22 shows the indexed monthly calls to NHS Direct in the pilot and control sites over the 3 year study period. The graph shows a reduction in calls to NHS Direct in the pilot and control sites during the study period. In the pilot site the number of calls to NHS Direct fell by 27.2% from an average of 3660 calls per month before the introduction of NHS 111 to an average of 2655 calls per month afterwards. During the same period calls to NHS Direct fell by an average 791 calls per month (16.9%) in the control site.

Figure 8.22: Indexed monthly Calls to NHS Direct in LINCOLNSHIRE pilot & Norfolk PCT control sites



2. Pilot site model

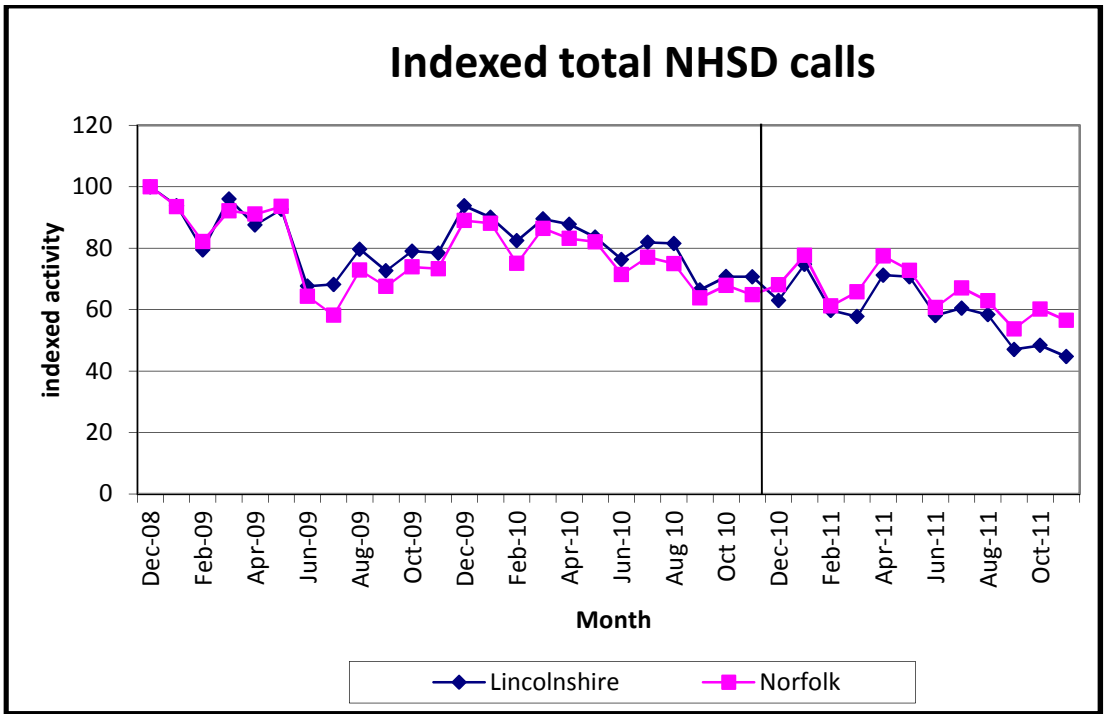
After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of calls in the pilot site in the months following the introduction of NHS 111 changed by an average of -940 (-1490, -390) calls per month, a decrease of 25.7% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on calls to NHS Direct was not statistically significant. The model estimated that there was a reduction of 22 (-71, +28) NHS Direct calls per 1000 NHS 111 triaged calls or about 156 (4.3%) fewer calls to NHS Direct per month in Lincolnshire

A slightly bigger effect was found if the simple "step" model comparing the changes before and after in average monthly calls to NHS Direct between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 331 (-755, +92) fewer NHS Direct calls per month in the pilot site compared to the control site following the opening of the NHS 111 service, a decrease of 9.0%.

Figure 8.22: Indexed monthly Calls to NHS Direct in LINCOLNSHIRE pilot & Norfolk PCT control sites



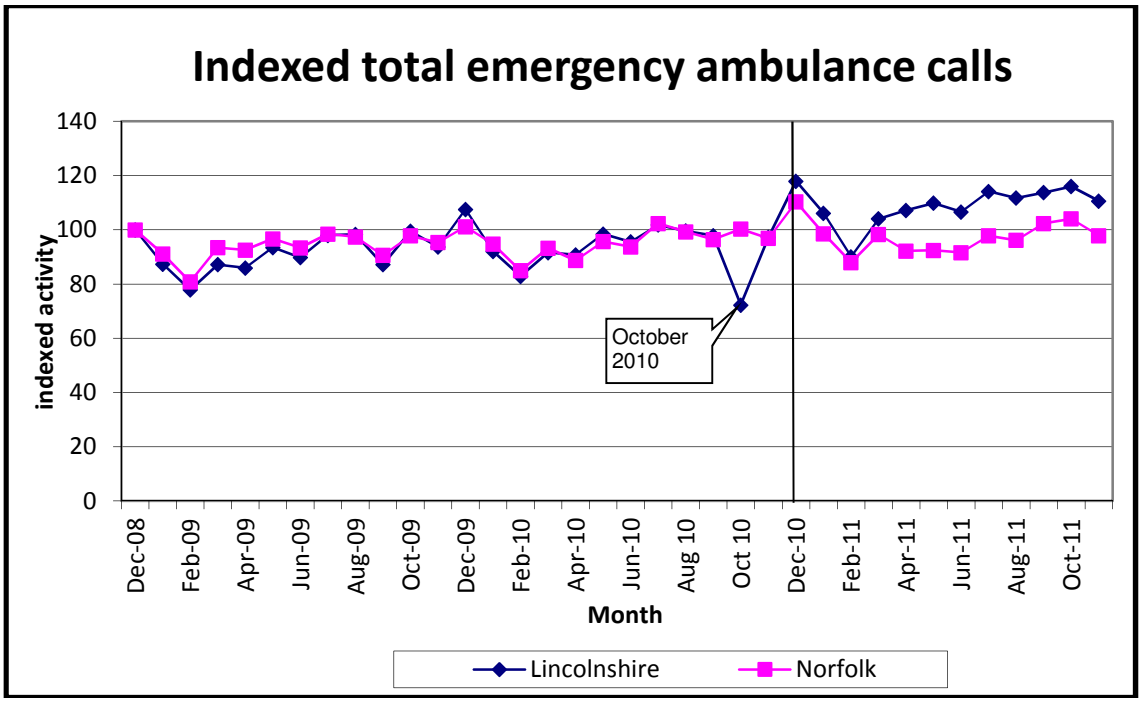
D. Calls to the emergency ambulance service

i) Ambulance calls

1. Trends in calls to the ambulance service

Figure 8.23 shows the indexed monthly ambulance service calls in the pilot and control sites over the three year study period. Ambulance data for October 2010 is an outlier and seems very low. We have approached the ambulance service to rectify this or offer an explanation. No other data is available and no explanation has been given so data for Octobers (09,10,11) have been excluded from the analysis both in the year on year comparisons and the modelling. The indexed data shows an increase in ambulance calls in the pilot area relative to the control area after the introduction of NHS 111. In the pilot site calls to the emergency ambulance service increased by 16.1% from an average 7307 calls per month before the introduction of NHS 111 to an average 8480 calls per month afterwards. In the control site calls to the emergency ambulance service increased by an average of 227 calls per month (2.6%) over the same period.

Figure 8.23: Indexed monthly Calls to the ambulance service in LINCOLNSHIRE pilot & Norfolk PCT control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of calls in the pilot site in the months following the introduction of NHS 111

changed by an average of +437 (+179, +695) calls per month, an increase of 6.0% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on calls to the emergency ambulance service was statistically significant ($p<0.001$). The model estimated that there was an increase of 107 (+71, +143) emergency calls per 1000 NHS 111 triaged calls or about 761 (10.4%) extra emergency calls to the ambulance service per month in Lincolnshire. The effect was also statistically significant when the square root of the monthly activity counts was modelled ($p<0.001$).

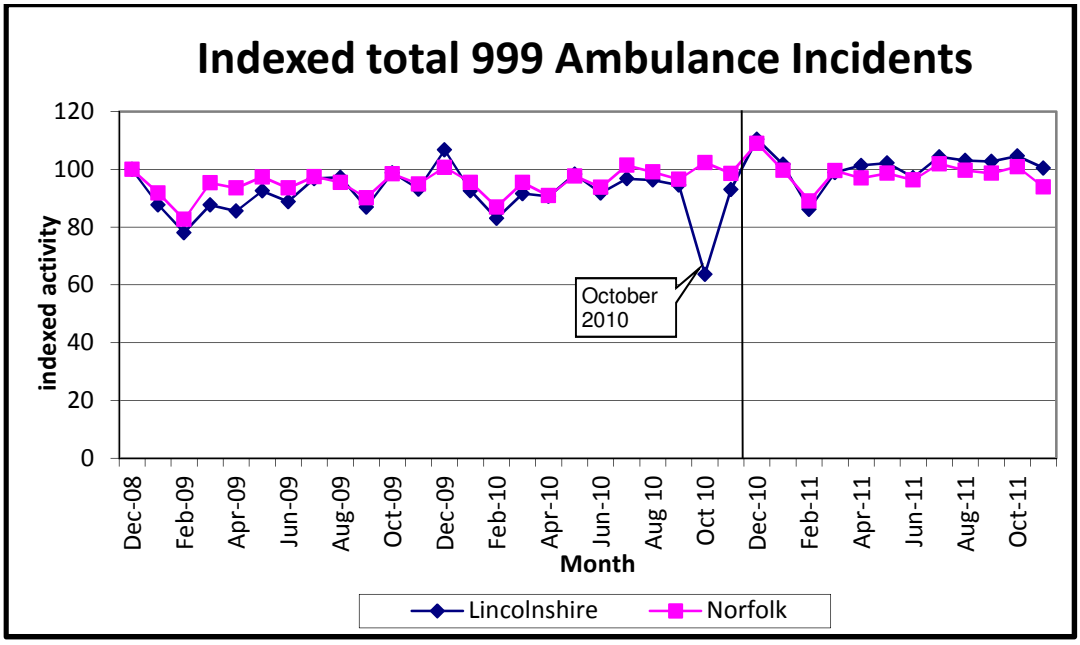
A similar significant effect was found if the simple "step" model comparing the changes before and after in average monthly ambulance service calls between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated +784 (+421, +1147) more ambulance service calls per month in the pilot site compared to the control site following the opening of the NHS 111 service, an increase of 10.7%.

ii) Ambulance incidents

Trends in calls ambulance service incidents

Figure 8.24 shows the indexed monthly ambulance service incidents in the pilot and control sites over the three year study period. Data on incident numbers for Octobers have again been excluded from the analysis and modelling because of the anomalous numbers. The indexed data shows an increase in ambulance incidents in the pilot site relative to the control site during the study period. In the pilot site ambulance service incidents increased by 9.6% from an average of 6989 incidents per month before the introduction of NHS 111 to 7657 incidents per month afterwards. In the control site, ambulance incidents increased by 302 incidents per month (4.0%) over the same time period.

Figure 8.24: Indexed monthly ambulance service incidents in LINCOLNSHIRE pilot and Norfolk control sites



2. Pilot site model

After allowing for seasonal effects, any long term trend and other known changes in the pilot site, the estimated number of ambulance incidents in the pilot site in the months following the introduction of NHS 111 changed by an average of +282 (-22, +585) incidents per month, an increase of 4.0% compared to the months before.

3. Pilot and control model

After allowing for other changes at around the time of the introduction of the NHS 111 service which may have affected both the pilot and control sites, the estimated impact of NHS 111 call activity on ambulance service incidents was statistically significant ($p<0.001$). The model estimated that there was an additional 47 (+26, +69) ambulance incidents per 1000 NHS 111 triaged calls or about 334 (4.8%) extra ambulance service incidents per month in Lincolnshire. The estimated effect remained significant if the square roots of the raw counts of ambulance service incidents were analysed ($p<0.001$).

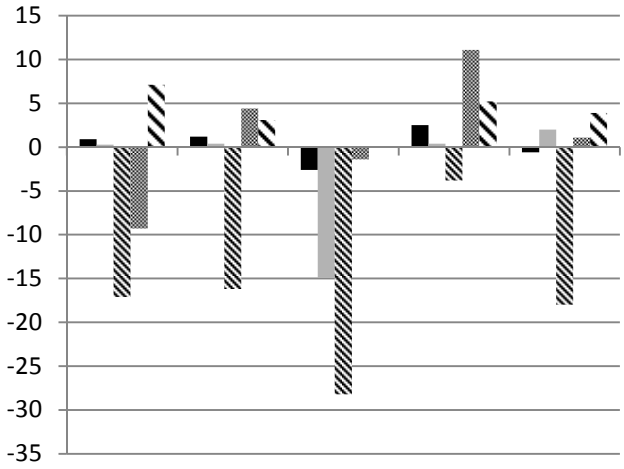
A very similar effect was found if the simple "step" model comparing the changes before and after in average monthly ambulance service incidents between pilot and control sites was used. Allowing for long term trends, seasonal effects and other site specific changes there were an estimated 368 (+172, +562) more ambulance service incidents per month in the pilot site compared to the control site following the opening of the 111 service, an increase of 5.3%.

8.3.5 Summary of findings for individual sites

All the findings for the five 'services' for each of the four pilot sites are summarised in Table 8.3 and Figure 8.25. There was a statistically significant (that is, unlikely to have occurred by chance)

- reduction in urgent care attendances in one site (Luton).
- reduction in calls to NHS Direct in three of the four pilot sites associated with the introduction of NHS 111 (Durham & Darlington, Nottingham and Luton).
- reduction in emergency calls in one site (Durham & Darlington) and increase in one site (Lincolnshire).
- increase in ambulance incidents in one site (Lincolnshire).

Figure 8.25 Percentage change in service use for each pilot site compared with control



8.3.6 Consideration of overall demand for the emergency and urgent care system

Based on data from the population survey of emergency and urgent care system users, we reported that there was no evidence of a change in overall use of the emergency and urgent care system in terms of numbers of people reporting that they had had at least one contact with a service for an urgent problem in the previous three weeks (Section 7.3.3). There was also no evidence of a change in the numbers of services contacted in any one episode of care (Section 7.3.6). We made the point in Section 7.3.6 that NHS 111 adds an extra service to a pathway as well as potentially reducing the subsequent number of services contacted. Therefore NHS 111 is potentially an extra contact in the emergency and urgent care system if it does not reduce use of other services in the system. Another way of considering the overall demand for the system is to measure changes in contacts with all services in the system using routine data presented here in Chapter 8. We need to make the point that routine data was only available for some services in the emergency and urgent care system - the most significant gap was urgent day time general practice.

Routine data used in this chapter is summarised in Table 8.4, showing monthly use of the different services before and after NHS 111. The row 'all services' shows that monthly use of the established services in the system slightly increased or slightly decreased, depending on the site. However, when NHS 111 use was added in, there was an increase in activity overall in every site. Even assuming that NHS 111 would eventually take all NHS Direct calls this still resulted in increased activity in each site. GP out of hours can be divided into calls and responses in the way that the emergency ambulance service has been divided in our above analyses. NHS 111 takes the GP out of hours calls in some of the sites and we have estimated the level of this activity using Table 5.1. Even accounting for this, activity increased overall in each site. The cost of each type of activity is important and this is considered in Chapter 12.

Table 8.3 Summary of estimated effects of NHS 111 on other emergency and urgent care services: % change in monthly activity counts

Service activity	Durham & D'ington % change	Nottingham City % change	Luton % change	Lincolnshire % change	All sites Change in activity per month per '000 triaged NHS 111 calls % change
ED attendances					
Raw activity change (%)	-3.9	+5.8	+4.7	-1.2	-1 (-66, +64) fewer ED attendances
Pilot model - estimated % change in monthly activity	-2.6	+0.6	-2.7	+3.4	
Pilot v Control model – estimated % change in monthly activity (95%CI):					
Dose model	**-2.0 (-9.1, +5.1**)	**+0.6 (-2.6, +3.8)**	**-3.5 (-14.0, +7.0)**	**+3.3 (-6.5, +13.2)**	**-0.1% (-3.8%, +3.7%)***
Step model (confirmatory)	-2.2 (-9.2, +4.7)	+0.9 (-2.6, +4.5)	-2.1 (-13.9, +9.8)	-1.9 (-14.0, +10.2)	
GPOOH, WiC, UCC. MIU attendances					
Raw activity change (%)	+7.7	+11.0	-19.0	+6.8	+47 (-66, +159) extra attendances
Pilot model - estimated % change in monthly activity	+6.0	+12.0	-10.1	+18.7	
Pilot v Control model – estimated % change in monthly activity (95%CI):					
Dose model	**+8.9 (-6.8, +24.7)**	**-0.5 (-12.5, +11.4)**	**-16.1 (-31.5, -0.6)**	**-3.6 (-11.5, +4.1)**	**+2.5% (-3.5%, +8.5%)**
Step model (confirmatory)	-4.4 (-19.9, +11.0	-3.7 (-17.2, +9.7))	-18.0 (-34.9, -1.1)	+0.4 (-9.6, +10.3)	
Calls to NHS Direct					
Raw activity change (%)	-44.7	-27.5	-31.0	-27.2	-102 (-130, -74) fewer calls to NHS Direct
Pilot model - estimated % change in monthly activity	-46.5	-9.1	-12.1	-25.7	

Pilot v Control model – estimated % change in monthly activity (95%CI):					
Dose model	**-26.5 (-37.0, -15.8)**	**-17.1 (--23.7, -10.3)**	**-30.1 (-46.4, -13.9)**	**-4.3 (-13.8, +5.4)**	**-19.3% (-24.6%, -14.0%)**
Step model (confirmatory)	-24.9 (-34.8, -15.1)	-18.7 (-26.2, -11.1)	-32.8 (-50.5, -15.1)	-9.0 (-20.6, +2.5)	
Calls to emergency ambulance service					
Raw activity change (%)	+6.4	+10.3	+8.8	+16.1	+3 (-31, +37) more calls to the ambulance service
Pilot model - estimated % change in monthly activity	-8.8	+14.2	+10.8	+6.0	
Pilot v Control model – estimated % change in monthly activity (95%CI):					
Dose model	**-11.4 (-20.6, -2.2)**	**+2.6 (-4.9, +10.1)**	**-2.1 (-13.0, +8.8)**	**+10.4 (+6.9, +13.9)**	**+0.3% (-3.1%, +3.7%)**
Step model (confirmatory)	-14.6 (-22.9, -6.5)	+1.6 (-7.2, +10.4)	-5.0 (-17.1, +7.1)	+10.7 (+5.8, +15.7)	
Ambulance emergency incidents					
Raw activity change (%)	+8.1	+6.1	+11.1	+9.6	+24 (+8, +39) more ambulance incidents
Pilot model - estimated % change in monthly activity	-5.1	+10.2	+9.6	+4.0	
Pilot v Control model – estimated % change in monthly activity (95%CI):					
Dose model	**+1.6 (-4.0, +7.2)**	**+2.3 (-3.3, +8.1)**	**-2.0 (-12.2, +8.3)**	**+4.8 (+2.6, +7.0)**	**+2.9% (+1.0%, +4.8%)**
Step model (confirmatory)	-1.0 (-6.4, +4.4)	+1.6 (-4.8, +8.0)	-2.0 (-13.7, +9.7)	+5.3 (+2.5, +8.0)	

*all figures in brackets are 95% confidence intervals. If both figures within a bracket are positive then there is likely to have been an increase. If one figure is negative and the other is positive then it is likely that there was no change. If both figures are negative then it is likely that there was a reduction.

Table 8.4: Average monthly contacts (000s) with services in the emergency and urgent care system before and after the launch of NHS 111 (based on routine data)

	D&D		Nottingham		Luton		Lincolnshire	
	Before	After	Before	After	Before	After	Before	After
Ambulance calls	6479	6895	4824	5319	2626	2857	7307	8480
Ambulance incidents	5304	5734	4276	4538	2239	2488	6989	7657
EDs	13675	13142	7505	7945	3474	3638	14293	14117
Urgent	13667	14729	8561	9424	7573	6135	12374	13222
NHS Direct	3978	2201	3016	2186	1547	1068	3660	2655
All services*	43103	42701	28182	29412	17459	16186	44623	46131
NHS 111	0	10000	0	3500	0	3000	0	10000
Total with NHS 111	43103	52701	28182	32914	17459	19186	44623	56131
Total assuming all NHS Direct calls taken by NHS 111	43103	50924	28182	32084	17459	18707	44623	55126
Total assuming all NHS Direct calls taken by NHS 111 and estimated GP OOH calls (prior to NHS 111 inc in before period)**	48003	50924	30582	32084	17459	18707	48523	55126

**taken from Table 5.1 % calls switched from other sources

8.3.7 Combined analysis for all pilots

We undertook an analysis for each of the five 'services' which combined data for all four pilot sites (see final set of bars above in Figure 8.25 and final column of Table 8.3). The decrease in NHS Direct, and increase in urgent care use, fits with original expectations of the new service. However, the increase in ambulance calls and incidents is the opposite of expectations. Only two of the five services had statistically significant changes associated with the introduction of NHS 111: a reduction in use of NHS Direct and an increase in ambulance incidents.

8.3.8 'Dose' of NHS 111 in the emergency and urgent care system

Based on data from the population survey of emergency and urgent care system users, we reported that the minimum 'dose' of NHS 111 as a first contact service in the emergency and urgent care system was one in ten system users in two pilot sites and less than one in 20 in two pilot sites (see Section 7.3.5). The system included urgent day time general practice which made up half of reported system contacts. However, this 'dose' relied on people knowing they had contacted NHS 111 by direct dialling the service and therefore underestimated dose because some people had been auto-routed through to the service. It is useful to consider the dose of NHS 111 using the routine data reported here in Chapter 8. Routine data was only available for some services in the emergency and urgent care system. The most significant gap was urgent day time general practice. NHS 111 triaged calls accounted for one in five of the contacts with the system defined as emergency ambulances, emergency departments, urgent care services (GP OOHs, MIUs, WICs), NHS Direct and NHS 111 (Table 8.5). It is interesting to note that NHS 111 was a significant player in the system in terms of utilisation: use was slightly higher than use of emergency ambulances (19% versus 16% of monthly contacts) and twice as high as use of NHS Direct prior to the launch of NHS 111 (19% versus 8%).

Table 8.5: Numbers of contacts per month (000s) with services in the emergency and urgent care system based on routine data

	Durham & D	Nottingham	Luton	Lincs	All
	% (n)	% (n)	% (n)	% (n)	% (n)
Ambulance calls	15 (7)	18 (5)	14 (2.5)	16 (8)	16 (22.5)
ED attendances	27 (13)	28 (8)	20 (3.5)	29 (14)	27 (38.5)
Urgent care	29 (14)	32 (9)	40 (7)	27 (13)	30 (43)
NHS Direct calls*	8 (4)	11 (3)	9 (1.5)	7 (3.5)	8 (12)
NHS 111 triaged calls	21 (10)	12 (3.5)	17 (3)	21 (10)	19 (26.5)
Total	48	28.5	17.5	48.5	142.5

*Before NHS 111

8.4 Discussion

8.4.1 Summary of findings

We expected to see a reduction in use of emergency ambulance services and emergency departments, and an increase in urgent care services as NHS 111 shifted people from emergency care services to urgent care services. Our combined analysis for all sites showed a statistically significant reduction in use of NHS Direct and a small increase in emergency ambulance incidents. Statistically significant changes were also found for individual sites: a reduction in calls to NHS Direct was found in the Durham & Darlington, Nottingham City and Luton pilot sites and an increase in ambulance service incidents in the Lincolnshire pilot site which could be associated with the introduction of NHS 111. We found no effect on emergency departments and urgent care services overall.

The reduction in use of NHS Direct occurred in three of the four sites and makes sense in terms of the similarity in the services offered by NHS Direct and NHS 111. It occurred in the context of a national reduction in calls to NHS Direct. The lack of reduction in Lincolnshire was due to a similar sized decrease in the control site. The increase in ambulance incidents was evident in three of the four sites even though it was only statistically significant in Lincolnshire. This is an unexpected finding in the context of expectations that NHS 111 would offer an alternative to callers using 999 for urgent problems. There were some statistically significant changes which only occurred in one site and not overall in all sites combined.

As shown in Chapter 3, there is a dearth of evidence of the effect of telephone triage services on emergency services, with the NHS Direct evaluation offering the best available evidence (Munro et al, 2000). This showed that NHS Direct appeared to have no affect on use of emergency departments and ambulance services. Our findings are different in that we have shown that NHS 111 appears to have had no effect on emergency departments but may have increased use of the ambulance service. The evidence base does show that telephone triage can reduce the use of general practice and general practice out of hours (see Chapter 3). It is important to note that there was no routine data available for us to assess the impact of NHS 111 on use of general practice. However, the population survey reported in Chapter 7 (Section 7.3.4) did indicate some evidence of a reduction in use of GP in hours in three of four NHS 111 sites, and an increase in the other site, but differences were not statistically significant when comparing change over time in NHS 111 sites with change over time in their control sites (see Appendix Table 7e). Finally, it would have been extremely helpful to analyse GP out of hours separately from the other two urgent care services given the evidence base that telephone triage can reduce use of GP out of hours services (Munro et al, 2000) but data availability in some sites meant we had to combine the three urgent care services.

8.4.2 Strengths and limitations

The strength of this analysis is the comparison of pilot sites with controls, and taking into consideration the effect of service reconfiguration other than NHS 111 to ensure that changes associated with NHS 111 could be identified. However a severe limitation was the extent of noise in the analysis due to multiple changes to the emergency and urgent care system, especially in some control sites. We selected control sites where PCTs indicated that they had no intention of making changes to their emergency and urgent care systems in our evaluation time frame. This proved not to be the case in practice and significant reconfigurations occurred. We modelled the various changes in the pilot and control sites but this sometimes produced findings which were not obvious from looking at the graphs of service use over time. For example, in the Luton pilot site, the graph (Figure 8.16) clearly shows that there was a larger reduction in calls to NHS Direct in Luton than in its control site but the estimate produced by the model seems rather large for a best estimate of size of effect when viewed alongside the graph. Our analysis was limited by the availability of routine data and did not include urgent day time general practice use or a separate analysis of GP out of hours use which are important services to consider. Our combined analysis for all sites was potentially more challenging because of the large number of system changes accounted for. However the estimates produced looked reasonable in the context of the estimates for the four sites.

8.4.3 Implications

There is evidence that NHS 111 is handling calls which would have been handled by NHS Direct. There is evidence of an increase in emergency ambulance incidents which requires investigation by NHS 111. Otherwise the expectations that NHS 111 would shift use from emergency to urgent care when appropriate appears not to have been achieved in the first year of operation.

Future evaluation could consider the impact of NHS 111 on demand for urgent day time general practice and on demand for GP out of hours services.

9. Preliminary exploration of achievement of 'right place first time'

9.1 Introduction

A key principle of NHS 111 is that patients receive "right care, first time". This means that the outcome of the NHS 111 call should be either resolution at the time of the call or a single referral to another healthcare provider who can deal with the presenting problem. The analysis of the care pathways reported by NHS 111 users in the user surveys (see Chapter 6) makes two assumptions:

1. Any call where the problem was resolved at the time of the call or by the first service referred to has achieved definitive clinical assessment – that is the advice given was correct or the service referred to was the right service, and

2. Any call where the patient/caller chose to seek help from a service other than the one recommended or, where the first service referred to makes subsequent referrals to other providers has not achieved definitive clinical assessment and the original disposition was therefore incorrect.

However, there may be circumstances where these assumptions are not true:

- Where a single service referral is the reported pathway this may have resolved the problem but the service referred to may have been a higher level than that needed.
- The advice given or service referred to may have been clinically appropriate but not practical (or acceptable) within the context of individual patient circumstances and so the patient may make their own choice of where to go.
- A clinically appropriate decision may be made but the urgent care system cannot adequately respond, at that time, and therefore onward referrals are made.

The aim of this exploratory study was to examine in more detail the questions about whether NHS 111 achieves definitive clinical assessment for callers to the service and, where this appears not to be the case, to identify the possible factors which can explain this.

The objectives were to:

- Review a sample calls to NHS 111 using a standardised scoring system
- Assess for each call if the service objective of "right place, first time" had been achieved
- Identify process and factors which impede the achievement of definitive clinical assessment

9.2 Methods

9.2.1 Design

We used an expert panel peer review design to assess a sample of calls to NHS 111. We have used this method successfully in previous research studies to evaluate emergency ambulance call prioritisation decisions and trauma outcomes (Nicholl 1996, Nicholl 1995). Peer review using a broad range of relevant professionals allows judgements to be made and synthesised to answer complex questions, such as the appropriateness of interventions that cannot be measured using other

methods. Call review using a structured assessment tool is a standard method used for quality assurance of telephone based health services including GP Out of Hours services, NHS Direct and ambulance service emergency medical dispatch.

9.2.2 Case Selection

Respondents to the user surveys described in Chapter 6 were asked to consent to the records of their call being used for further research. Only cases where consent was given were eligible for this study. Ideally calls would be reviewed from all four pilot sites but the capacity to only examine a small number of cases within the evaluation timescale limited selection to one pilot site. In order to maximise the potential for identifying factors which may impede the achievement of "right place first time" we selected some calls where the questionnaire responses indicated that this objective was not achieved. In addition a random sample of all other calls was also selected. From the pool of consented cases four types of call were purposively selected for further review:

1. Calls where respondents reported they had not agreed with or followed the advice given at the time of the call.

2. Calls where respondents reported contact with at least 3 services after their call to NHS 111.

3. Calls where respondents recorded they were dissatisfied or very dissatisfied with the NHS 111 service.

4. Random selection of calls.

For all selected cases audio recordings of the NHS 111 call were retrieved by the NHS 111 service. Identifying information at the beginning of each call (name, address) was removed and the call recordings copied in an encrypted format to password protected CDs.

9.2.3 Expert panel and assessment process

An expert panel of 5 members was recruited to represent different services within the emergency and urgent care system. The 5 members were:

- A General Practitioner with commissioning expertise
- A General Practitioner with expertise in OOH call handling quality assessment
- A telephone triage nurse
- A hospital consultant in emergency medicine
- An advanced paramedic practitioner

For each call the expert panel members were provided with the audio recording of the call, a summary of the clinical pathway reported by the user in their survey response and any relevant free text comments made by the user on the questionnaire. A simple score sheet with a series of questions was developed to reflect the objectives of the review including the expert's opinion on the

accuracy of the call assessment and disposition arrived at. The score sheet comprised the following items:

1. Four questions related to the call handling process comprising, if the reason for the call had been identified; whether there was early recognition of an emergency situation; an adequate history obtained and an adequate assessment completed. These questions were rated on a 3 point scale of yes, partly or no.

2. A question asking if the clinical disposition was correct. This required a yes or no answer

3. If a reviewer answered no they were asked to indicate the reason from a list of options, for example disposition service too high or too low and, also from a list of options, the service they thought to be correct (e.g. emergency ambulance, ED, GP appointment) and the timescale (e.g. immediately, within 4 hours, within 24 hours).

These questions were answered using the call information only so that their assessment was based on the same information as that available to the call handler managing the call.

After reviewing the additional information from the survey responses reviewers were then asked 3 further questions

4. If they considered the original disposition to still be correct. This required a yes or no answer.

5. If no they were again asked to indicate the type and timescale of service that, in their opinion, was required

6. If the management of the call had achieved the objective of "right place first time". The options for this question were yes, no or unsure.

Reviewers could also write comments to explain the reasons for their decisions and any views on aspects of the service that could be improved.

9.2.4 Analysis

For each case the answer to each question requiring a yes, no or partly or unsure response was tabulated for each reviewer and the total number of responses in each category calculated to determine the level of agreement for each question, i.e. the combined number of yes or no responses to each question for all 5 reviewers.

Calls were classified in two ways:

> Where the majority (at least 3 of the 5) reviewers answered "yes" to the call process question, disposition question or "right place first time" question then the objective related to that question was considered to have been achieved. If the majority (at least 3 of the 5) reviewers answered "no, partly or unsure" to a question then the objective of that question was considered to have not been achieved. For each question the number of cases achieving or not achieving the question objective was calculated.

For cases where there was a majority agreement that the disposition was not correct the responses of each reviewer to the questions about the reason the disposition was not correct and what they

considered to be the correct disposition were tabulated for each case and used with the reviewer comments from the assessment score sheet and the patient comments from the associated survey response in the descriptive analysis for these cases to identify issues that may have contributed to the service objectives not being achieved.

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It is important to bear in mind when reading the results below that the sample was not random and purposely identified calls where potential problems could be present. The calls reviewed are not representative of the NHS 111 population and therefore it is not appropriate to interpret that a problem identified in of our sample would be found in 10% of NHS 111 assessments in general. This analysis does not estimate the size of problems but rather highlights potential problems which require further investigation.

9.3 Results

9.3.1 Calls assessed

There were 259 eligible calls for assessment from respondents to the 9 month user survey who had consented to the information from their call being used for further research. Of these calls 11 (4.2%) recorded that they did not agree with or follow the advice given at the end of their call, 9 (3.5%) recorded that they were dissatisfied or very dissatisfied with the NHS 111 service and 21 (8.1%) recorded at least 3 services contacted following their call. Six calls met two of these criteria and one call met three criteria giving a total of 34 calls (13.1%) of eligible calls identified for further assessment. In addition, 21 calls were randomly selected providing a total of 55 (21.2%) calls included in the assessment. The reviewers found one call had missing information so this was excluded, giving 54 calls for analysis.

9.3.2 Call management processes

The expert panel reviewers were asked to rate if four key processes were achieved using a 3 point scale of yes, partly or no. The four processes were:

- Reason for call clearly identified
- Early recognition of a serious/emergency situation
- Adequate history obtained
- Adequate assessment performed

There were 8 cases out of the 54 (14.8%) assessed where at least 3 of the 5 reviewers agreed that a call management process had not been achieved and in 5 of these 8 cases more than one process was considered not to have been achieved. There was complete agreement that the reason for the call was clearly identified for all cases, with all 5 reviewers rating this as ‘achieved’ in 48 (88.9%) of calls and just 6 (10.1%) of calls where one reviewer rated the reason for the call as ‘partly achieved’. Similarly there were 5 (9.2%) cases where the majority of reviewers rated recognition of an emergency situation was not or only partly met although no cases where a majority rated this process

as not met. There were 4 (7.4%) cases where a majority of reviewers considered an adequate history had not been obtained and 3 cases (5.5%) where the consensus was that an adequate assessment had only partly or not been performed. Six of the 8 cases where a key process had only been partly or not achieved were cases derived from the purposive sample (i.e. the cases that had been identified as potentially problematic on the user survey) with only 2 cases from the random sample being assessed as not or only partly achieving one of the key processes.

9.3.3 Accuracy of clinical disposition and achievement of "right place first time"

Table 9.1 gives the results of the reviewers assessment relating to the clinical disposition arrived at for each call using just the audio call information and the reviewers' opinion of whether the objective of "right place first time" was achieved after reviewing the additional information from the user surveys. The results have been displayed as the number and proportions of cases where all 5 reviewers agreed that the disposition or "right place first time" had or had not been achieved, 4/5 agreed and 3/2 agreed to give an indication of the strength of agreement. One reviewer felt there was incomplete information and did not complete this part of the assessment for one case so 53 cases are included.

Table 9.1: Expert panel assessment of clinical disposition and "right place first time"

Decision from 5 reviewers	Appropriate disposition n= 53 cases		right place first time n =53 cases	
	Yes	No	Yes	No
5/5 n(%)	17 (32)	0	18 (34)	0
4/5 n(%)	17 (32)	6 (11.3)	14 (26.4)	2 (3.8)
3/5 n(%)	11 (20.8)	2 (3.8)	16 (30.2)	3 (5.6)
Total with majority agreement n(%)	45 (84.8)	8 (15.2)	48 (90.6)	5 (9.4)

Almost 85% (45/53) of cases were judged to have had an appropriate disposition, with 64% having at least 4 out of 5 reviewers agreeing that the disposition was correct. There were 8 cases where the majority of reviewers considered the disposition was not correct.

Around 90% (48/53) of cases were judged to have achieved the objective of "right place, first time" although a higher proportion were at the lower level of a majority of 3 out of 5 reviewers in agreement suggesting less agreement. There were differences in interpretation of this question, with some reviewers considering this objective to have been achieved if, within the episode, the patient received the right level of care whereas others interpreted this more literally and considered this to have been achieved if a single referral was made. This was primarily a feature of transferring calls for further telephone assessment. For example, if a call assessment arrived at a disposition of referral to the NHS 111 clinical nurse advisor who then subsequently referred for an out of hours primary care appointment, some reviewers considered the out of hours appointment should have been the first

disposition. Less than 10% of cases were judged to have not met the "right place first time" objective and these were in the same group of 8 cases judged to have not had the correct clinical disposition.

We have looked in more detail at these 8 cases to examine the features of the calls identified by the reviewers and the survey respondents which may explain why the service did not work as expected. All 8 cases were derived from the purposive sample of calls identified from survey responses that indicated not agreeing or following advice, 3+ service contacts and dissatisfaction with the service. Of these 8 calls, 5 were judged by the expert panel to have been assigned a disposition that was too high and 3 a disposition that was too low.

Dispositions identified as too high

Of the five calls where the disposition was **too high** the following features were identified:

- Two calls were for adult patients who were 1-2 weeks post operative after surgery (1 hysterectomy, 1 gall bladder surgery) calling because of abdominal pain. Both calls were given a disposition of a emergency ambulance response. The majority view of the reviewers was that an ambulance and resultant ED attendance was unnecessary and a more appropriate disposition would have been assessment by a primary care service within 4 hours. One reviewer commented that the assessment algorithm could be improved for management of post surgery patients.
- Two calls were for children. One call was for a child with headache and vomiting who had already been diagnosed at a recent GP consultation as having migraine. This call had a disposition of emergency ambulance and the reviewers considered a better option would have been to give self care advice including analgesia and further review if symptoms did not improve. The other call was a child with vomiting, high temperature and headache who had already been seen at a walk in centre. The disposition was for a call back by a GP but after 3 hours waiting for the call back the parent took the child to a walk in centre. The comments on the survey response were that the urgent care service had been unhelpful and the reviewers agreed that this was a system problem in that the call back had not been made in a timely manner .They felt that a better disposition would have been self care advice with instructions to call back if symptoms worsened or for the GP call to have been made at the time of the initial call.
- One call was for an elderly patient who had fallen and hurt her ribs. The initial disposition was to go to an emergency department but the patient did not want to do this. The call was transferred for clinical advice and the nurse assessment resulted in a disposition of call back by an urgent care centre. The patient eventually went to the urgent care centre. The reviewers agreed that the initial ED disposition was too high, the clinical advice had added nothing and that the correct disposition was a referral for an assessment at an urgent care centre, walk in centre or minor injury unit. The comments from the survey concur with this view and the patients' relative felt that the same questions kept being asked each time a telephone assessment was undertaken.

Dispositions identified as too low

Of the 3 calls where the disposition was considered **too low** the following features were identified:

- One call was for a child with a head injury. The NHS 111 call disposition was for referral to an out of hours GP service for a GP to call back the patient.. A GP did call back and advised the child be taken to an emergency department. The reviewers agreed that ED immediately should have been the initial disposition.
- A patient who called with facial weakness and numbness had a disposition of GP within 3 days. This patient did not agree and went to a GP themselves as soon as they were open. The GP sent the patient to a stroke unit where Bells Palsy was diagnosed. There were divided opinions amongst the reviewers but all agreed the 3 day disposition was too low. Some reviewers also felt questions had not been asked correctly to rule out a stroke (although this was not the final diagnosis) and that if this had been the case an early primary care assessment would have made the correct diagnosis and avoided an admission to a stroke unit.
- A patient who called with a low pulse rate, previous cardiac history, nausea and sweating was given an initial disposition of 'advised to see GP same day'. The patient saw the GP and was admitted to a coronary care unit. The reviewers agreed that the correct disposition should have been ED immediately. The patient agreed and felt that the symptoms he described had not been identified as serious.

General issues identified

Some general themes emerged from analysis of these calls and comments made by users on their questionnaire and the reviewers in their assessment of the other cases:

- One comment made by all the reviewers was that too many irrelevant questions are asked during the call assessment, particularly where the purpose of the call was very clear and specific, for example where someone is calling because they have run out of medicines or where they are requesting a specific service, for example a dentist or district nurse. Comments from service users also identified the number and type of questions as causing dissatisfaction. Reviewers identified parts of the assessment as irrelevant, particularly for the assessment of children where questions were asked about warfarin, stroke or a possible fractured neck of femur.
- Assessment of children was particularly identified by three of the reviewers as a problem area as many childhood illnesses are self limiting and they felt there was more scope to give better self care advice with instructions to call back if symptoms persisted or got worse. One reviewer thought some of the advice given for self management of children was particularly poor, for example advising not to give ibuprofen for analgesia or not to give paracetamol

when standard treatment by clinicians is to give both. This reviewer also considered advice to keep waking a child with a head injury as not evidence based.

- Advice about analgesia was an area picked up in several cases both in children (as above) but also advising the elderly to take ibuprofen which is not recommended by clinicians. In one case a patient (with renal colic) who had been told to take ibuprofen by an urgent care centre was given advice not to take it when he/she called NHS 111 There appears to be inconsistency in the advice given about analgesia within the NHS Pathways system to different groups of patients and evidence based practice by clinicians. One reviewer thought that GP or primary care call backs would be of more value if they were provided immediately within the same call. Where there has to be a wait it would be of benefit if callers could have timeframe of when the call back will be. A comment from patients is that they are told they will get a call back but they have no information on what the timeframe for this is.
- Another issue identified by the reviewers is whether access to some services, particularly district nursing, could be improved. Two calls were for blocked catheters where the reviewers considered an ability to directly refer for a district nurse visit would be better management. One call reviewed was included because of dissatisfaction where the family of a terminally ill person had been told to contact NHS 111 if they needed a district nurse. Despite being very specific about what they needed the call was assessed using NHS Pathways, transferred for clinical advice and the NHS 111 nurse then had to contact district nurses. The caller found the process very frustrating and the reviewers agreed, suggesting that either these cases should be flagged or, better, families of patients with terminal illness should be able to access these services directly. This issue was also raised in the stakeholder interviews described in chapter 10.
- Reviewers felt that self care advice was too standardised and was at times irrelevant when a patient had been given an appointment to be seen within a short timeframe and commented that advice needs to be proportion to the disposition.
- There were a number of cases where repeat calls were made within a short time frame but the same assessment was carried out again each time. Patients questioned why the information wasn't available from their previous calls and the reviewers agreed that some flexibility is needed to only re-assess if there has been a change (for example as in a case directed to pharmacy and the pharmacist directed the patient back to NHS 111).
- There were questions raised by two reviewers in some calls about the value of further assessment by a nurse which appeared to just add a step to the process. Comments from service users also sometimes questioned the purpose of this assessment, particularly when the same questions were asked again.
- Two reviewers identified the issue of matching patient expectations to the "correct" clinical disposition. For example there were 2 cases where a reviewer considered an ambulance dispatch to be too high a response but the patient commented on how satisfied with a service that provided this response and 2 other cases where patients commented on how well the service had worked by arranging an immediate primary care appointment but a reviewer

considered the patient could, with some advice, have waited and made an appointment themselves.

9.4 Discussion

9.4.1 Summary of findings

We conducted a small exploratory study using an expert panel peer review process to assess the adequacy of the call assessment process, clinical dispositions and achievement of the "right place, first time" objectives. Overall, there was a high level of agreement amongst the reviewers that the call assessment processes relating to problem identification, recognition of emergencies, problem history and clinical assessment were achieved. Similarly, overall, the majority of calls were judged to have received the right clinical disposition and to have achieved the objective of "right place, first time" . As the sample we have used in this study is small and not random, and weighted towards calls where the service may not have worked as intended we cannot view these findings in the context of the findings on accuracy and adequacy discussed in chapter 3. However the results of this study suggest that, in the opinion of the 5 expert reviewers, the call handling process is acceptable.

Of 8 calls where a potential problem was identified,5 were judged to have had a clinical disposition that was too high, with 3/5 of these calls receiving what was judged to be an unnecessary emergency ambulance dispatch. Although not a majority decision, there were other cases within the assessment where 2 out of 5 members of the expert panel considered an emergency ambulance dispatch to be too high a response, particularly where people could be asked to make their own way to an emergency department. This is reflected in the impact assessment reported in Chapter 8 where an increase in ambulance service incidents following the introduction of NHS 111 was identified. Three calls were judged to have been assigned a clinical disposition that was too low.

The sample of calls was not representative of the NHS 111 call population as we selected over half of the cases based on user survey responses that indicated the service had not worked well. The comments made by service users were generally supported by the reviewers who identified the same problems. In terms of identifying areas for service improvement, the expert panel comments proved to be a valuable source of explanation where the service had not achieved its objectives and why patients had chosen not to follow advice or been directed to several services. The use of multiple services as reported in the responses to the user survey was, in general, associated with additional telephone assessment. This can be at the time of the call where there is a transfer to an NHS 111 clinical adviser, or a separate call where a call back by a GP is arranged. Either of these additional telephone assessments can then direct a patient to another service. Two reviewers questioned whether the additional telephone assessment added any value to the process by adding in an additional step before a caller reaches the right service. It is also the case that direction to one service may be necessary before arriving at the final service, for example three contacts, a call to NHS 111, an ambulance and an ED attendance may be needed to get to the "right place" Our reviewers demonstrated that there are differences in how "right place, first time" is interpreted with some considering this achieved if there is a single step from call to "right" service and others interpreting this as achieved if the final service is the right service even if more than one contact is needed to arrive there.

9.4.2 Strengths and limitations

This small scale study has provided an initial exploration of the relationship between call assessment, achievement of service objectives and patient views of the NHS 111 service by allowing an overview of a sample of calls to be assessed within the context of subsequent patient action. Further research using this approach could provide a better understanding of where service changes are needed to optimise not just the NHS 111 service but how it integrates with the wider emergency and urgent care system. It could also allow exploration of the relationship between patient expectations and service objectives as this study revealed, in a small number of calls, a discrepancy where users commented on how good they thought the service was and the judgement of some expert reviewers who thought the clinical disposition was too high. There is an important distinction between what patients think is a good service and what clinicians think is the "right" service that we have not yet begun to explore.

The limitations to this study are the small number of cases reviewed and the use of only one pilot site. Ideally a consensus meeting would have been held with the expert panel to re-examine the cases where agreement was lowest (those where decisions were split 3:2) to try and achieve a higher level of consensus. A larger study examining more cases, from different models of NHS 111 service provision, and allowing a more detailed assessment of peer reviewers' opinions together with a detailed analysis of service quality assurance data on complaints and risk or adverse incident records would provide a more robust assessment of the achievement of service objectives, safety and the relationship to patient experience.

9.4.3 Implications for NHS 111

The assessment process identified a number of factors which can begin to explain why the service may not always achieve its objectives and where possible improvements can be made. These centre around:

- The questioning in the assessment process – particularly where a)someone calls with a clear and specific problem (run out of medicine) or service request (dentist) that does not require a full assessment or b) the questions are not relevant to a particular age group. The questions used to assess problems in babies and children seemed to be particularly problematic
- The need to re-assess in full calls that have recently already been assessed
- The availability of information from previous recent assessments to prevent duplication and what callers perceive as repetitive and unnecessary questioning
- The value of different types of telephone assessment within the same calls and if definitive service referral could be achieved earlier
- Direct referral to some specialist services such as district nursing
- The quality of advice given as part of the call assessment process with a particular emphasis on advice given for analgesia in different age groups and also some alignment of type of advice in relation to the timescale of any response, for example self care advice for someone who will be seen at an emergency department in an hour is not the same as that needed by someone who has been advised to see a service the next day

10. The implementation of NHS 111 within local health economies

10.1 Introduction

The new service was an addition to an established local health economy - the local emergency and urgent care system. It was important to identify lessons learnt about implementation of this new service within its local health economy by exploring the views of key people involved in designing, developing and delivering the new service locally and representatives of key services likely to be affected by the new service.

10.2 Methods

10.2.1 Design

A qualitative semi-structured telephone interview study was undertaken.

10.2.2 Selection of stakeholders

Purposive sampling was used to select the same range of stakeholders in each of the four pilot sites. Two groups of stakeholders were targeted: 'NHS 111 related', that is, those involved in the design, development or delivery of NHS 111 who could reflect on implementation and identify lessons for future health economies establishing NHS 111; and 'non-NHS 111', that is, representatives of groups/services likely to be affected by NHS 111 who could offer views of the potential and impact of the new service on other services in the emergency and urgent care system. The first group included the SHA manager with responsibility for initiating the new service; the PCT manager responsible for urgent care; services delivering NHS 111 such as NHS Direct or the emergency ambulance service; and services auto-routing into NHS 111 such as GP out of hours services. The second group included the emergency department, urgent care centres, walk-in centres, general practice, and representatives of local patients. There were different NHS 111 models in operation and therefore some services were in the 'NHS 111 related' group in some sites and the 'non-NHS 111' group in other sites.

Stakeholders were identified by contacting the SHA lead for NHS 111 in each site and asking for names and contact details of the different types of stakeholders. A list was received for two sites. In the remaining two sites local health related websites (e.g. PCT website) were searched to identify relevant names and contact details. Where names could not be identified the local Research and Development team was contacted for help. Two potential interviewees were interviewed in March 2011 as a pilot. All potential interviewees were sent an email inviting them to take part in a half hour telephone interview in July 2011; this was between nine months and a year after the launch of NHS 111. Non-respondents were sent up to two email reminders and asked to suggest alternative contacts if they felt they were not the right person to interview. Respondents were asked to complete a consent form and telephone interviews were arranged on receipt of the consent form.

10.2.3 The interviews

Telephone interviews were undertaken with a range of local stakeholders in each of the four NHS 111 sites. A topic guide was constructed based on issues of interest for this part of the study. This was amended after the two pilot interviews. The topic guide addressed expectations of benefit of the new service and the possibility of attaining these benefits, perceived impact, integration with other services in the system, and the value of NHS 111 as an addition to the urgent care system. Pilot interviews were undertaken by one researcher (PC) and the main interviews by one researcher (FS). Interviews took an average of 24 minutes, ranging from 8 to 37 minutes. Interviews were audio recorded and transcribed verbatim.

10.2.4 Analysis

The 'framework' approach was used for the analysis (Ritchie & Spencer, 1994). This approach was suitable because it was developed for use in applied policy research, allowing researchers to explore both *a priori* and emerging themes. FS checked transcripts for completion and accuracy by listening to the recordings. FS then read eight transcripts for familiarisation and AOC read two of these transcripts. FS developed a thematic framework based on discussions with AOC. FS applied the thematic framework by coding all parts of all transcripts using NVivo version 8. The charting stage of framework was not used; instead codes within individual themes were read with attention paid to types of stakeholders. FS and AOC undertook the mapping stage of the framework approach together by discussing the content of themes and the relationships between them.

The analysis was undertaken on all the transcripts first, describing themes for all sites and stakeholders. Then attention was paid to interviews undertaken within each site. Attention was always paid to the role of each stakeholder, particularly whether they were 'NHS 111 related' or 'non-NHS 111'. Verbatim quotes are used and labels are deliberately general to preserve confidentiality of individual interviewees.

10.3 Results

10.3.1 Interviewees

We tried to identify 38 stakeholders in the main study but were unable to obtain contact details for five of them. We approached 33 people for interview in the main study. 24 people responded but one person did not want to take part and one emergency department manager withdrew because they felt that they did not know enough about NHS 111 to contribute. Two interviews were impossible to arrange due to multiple cancellations. In addition to the two pilot interviews, a further 20 interviews were undertaken between August and October 2011, totalling 22 interviews. The pilot interviews were included because of the considerable amount of relevant data within them.

A general description of the sample is given by pilot site; details are not given in order to preserve confidentiality (Table 10.1). Some interviewees spanned sites, e.g. NHS 111 provider or ambulance service, and are counted in one site only. Some interviewees had dual roles and are identified by one role only: NHS 111 implementation managers (n=2), SHA (n=2), PCTs (n=4), NHS Direct (n=3), ambulance service (n=3), GP (n=1), GP ooh (n=2), urgent care centre/walk-in centre (n=3), and patient group (n=2). We struggled to recruit ordinary GPs and emergency department managers despite a number of attempts to do so. Those who responded to our request and were not interviewed expressed concern that they did not know about NHS 111 or have anything to contribute. Most of the interviewees were 'NHS 111 related' and our ability to interview 'non-NHS 111' stakeholders differed by site (Table 10.1). This may have been related to the model in use in different sites, in that Durham & Darlington had operated a Single Point of Access prior to NHS 111, resulting in the integration of some services which were external to NHS 111 in other sites.

Table 10.1 Interviewees by site

	Durham & Darlington	**Nottingham**	**Lincs**	**Luton**	**Total**
NHS 111 related	4	4	4	2	14
Non-NHS 111	1	2	3	2	8
All	5	6	7	4	22

10.3.2 Expected benefits of NHS 111: improved access to care for patients and possibly demand management

When asked about the expected benefits of NHS 111, stakeholders described improvements for patients as the main expected benefit before then going on to describe expected benefits to the wider health economy, describing NHS 111 as an immediate demand management tool and a future opportunity to transform urgent care by offering a single gateway to care. Stakeholders described NHS 111 as an opportunity to improve patient care by improving access to health services via a free easy-to-remember number that would inform them of the most appropriate service for their needs. They described the complexity of the current urgent and emergency care system and felt that NHS 111 offered an opportunity to simplify system access, reduce the public's confusion around where to access care, reduce the patient's need to repeat the same information to different services, ensure contact with services when necessary by directly transferring patients to a service, and offer a consistent and thus safer approach to decision making within the urgent and emergency care system through NHS Pathways.

> *If, you know, a patient needs to be referred into a service, they make sure that they have actually been referred into that service and the patient is fully aware of that outcome, rather than them just going 'well you need to go to so-and-so, so thanks very much, bye', and we don't know if they ever got there (NHS 111 related)*

It allows all providers that have telephone access to provide the same assessment process, which provides patients with a consistent approach to assessment, so a consistent end point should be achieved (NHS 111 related)

Stakeholders could also see a role for NHS 111 in managing demand for urgent care. The 'phone before you go' aspect of the service, and the use of a Directory of Services (DoS) with details of local services, were identified as important for referring patients to the lowest acuity of service appropriate for their condition, with financial benefits potentially realised from reduced numbers of inappropriate ambulance journeys and unnecessary attendances at GP out of hours services or emergency departments. There was some evidence that stakeholders were not as convinced about improvements to the wider health economy as they were about direct patient benefits.

If you believe the hype then every, all services benefit because they only get patients that are appropriate walking through the doors. (NHS 111 related)

But from a commissioning perspective I think there is a strong and growing view that it needs to perform a quite tricky and quite complex demand management function (NHS 111 related)

Stakeholders with strategic roles within the NHS also regarded NHS 111 as a future gateway into urgent care services which would provide an opportunity to shape the way services worked in the future. The disposition data provided by the service would enable commissioners to identify gaps and duplication of services so that services could meet demand more effectively.

111, as I said before, apart from the obvious benefits, it does provide the platform to help come up with a coordinated design about how urgent care should work. (NHS 111 related)

10.3.3 The extent to which the pilots were operating to plan: appropriate users and appropriate referral (mainly)

Stakeholders felt that patients generally understood how to use NHS 111 and that it was being used mainly by people requiring urgent care. They discussed some movement into the extremes of emergency and urgent care: emergency ambulances and day time general practice. They felt that some people called NHS 111 when they were unsure whether or not they needed an emergency ambulance, particularly older people. They did not consider this to be problematic because an emergency ambulance was dispatched directly if needed. They also felt that some people called NHS 111 when they could not access their own GP in hours, and could then end up accessing GP out of hours services because NHS 111 had no facility to book patients in with their GP in hours.

I don't think there is a great volume of issues that aren't worthy of the title 'urgent'. (NHS 111 related)

it's being used in the way that it's intended. The interesting aspect is that we are finding that patients who are unsure whether it's an emergency or not are using the service to a greater extent than we thought. (NHS 111 related)

So many of our dispositions end in 'primary care disposition' and during the day, you know, I sort of struggle a bit with, well a lot of these people, I sometimes feel are calling because they can't get into their own primary care service. (NHS 111 related).

Stakeholders felt that most patients were being signposted to the correct service, although they felt that the evidence they based this upon was limited. They gave examples of over-triage and under-triage, particularly when the pilots first started. There was no consistent view about which services were affected by inappropriate referrals but a number of stakeholders suggested that NHS 111 may not offer enough self-care options. They felt that some patients were directed to primary care due to a lack of self-care advice or pharmacy dispositions. They also felt there was also a lack of adequate provision for patients with 'special notes' who had individualised care plans.

I think, well my feeling is that it's getting patients to the appropriate place. (non-NHS 111)

There is a feeling out there that Pathways is too risk adverse and presents a higher level of care that could be, perhaps, that it could be managed at a lower level. (NHS 111 related)

The only burning issue for me is the special notes stuff aspect of 111 because we haven't got a very good solution to how we share information that's pertinent to the patient's care. (NHS 111 related)

10.3.4 Perceived benefits of NHS 111 to date: streamlined care for patients, improved GP out of hours care, and integration within the urgent care system.

Participants felt that there had already been clear benefits for patients, GP out of hours care and working relationships within the urgent care system, but that impact on the wider health system was either just beginning or not yet happening. They described NHS 111 as delivering many of the expected patient benefits including offering them more streamlined care, with patients not having to wait for 'call backs' from services and having appointments booked for them within a single call.

It's one process, so they're not hanging around waiting for call backs, you know, even if they're, if the patients want a visit to the PCC they're warm data transferred. How good is that, that's absolutely brilliant. 'Hold on the line' and then they're not waiting for call backs, which was the process we had before (non-NHS 111)

Stakeholders reported benefits for GP out of hours services as a consequence of NHS 111 undertaking triage and ensuring that appropriate patients only were booked to see a doctor. They reported a shift of a reduction in numbers of referrals but an increase in the acuity of cases seen, and

a shift from walk-in appointments to booked appointments which resulted in an improved ability to manage demand.

> *From our point of view, the 111 system allows us to plan our services a little better, in that we can look at capacity and demand of the service and can staff appropriately, you know what patients are coming, you know the expectations of patients, that kind of thing (non-NHS 111).*

Stakeholders reported that NHS 111 had brought about improved integration of services and encouraged joined-up working within the urgent care system. This was due to the process of services working together to set up NHS 111, the use of electronic transfer of patient data, and the engagement of different providers in the provision of a single, consistent clinical assessment.

> *It's bought the [service 1] and [service 2] closer together. We always did have a fairly close working relationship, but with the 111 project coming on board we have regular meetings, conference calls, governance meetings, where we get together and it really has brought the two organisations together, it's been quite refreshing (non-NHS 111)*

> *The whole approach behind 111 requires all providers, actually, from primary care through to acute care trust etc to be behind 111, and really what the 111 system does is it creates a more cohesive and coherent urgent care system (NHS 111 related).*

….but impact on the wider system is difficult to determine

Stakeholders generally found it difficult to offer a view on whether NHS 111 had had a measurable impact on use of services in the wider emergency and urgent care system. Rather they described the difficulties in measuring such impact due to the lack of appropriate data, difficulty in attributing changes to NHS 111, and the sense that it would take a long time to achieve these benefits.

> *There are the general thoughts of 'oh it's increased A&E' but A&E increases every year anyway. So actually attributing a change in urgent care to one service is very, very difficult and should be treated with great caution (NHS 111 related)*

> *I absolutely think that they can [deliver the anticipated benefits], and I think that the timescales around delivering those benefits is something that we really haven't gotten our heads round yet. And so I think, you know, an expectation that bringing in 111 will change our health economies, you know, whole make-up and economies and efficiencies in a year is pie in the sky. (NHS 111 related)*

10.3.5 Issues important to the success of NHS 111

Stakeholders described a number of issues they felt were key to the success of NHS 111. Some issues were external - engagement with the public and clinicians, and the need to integrate NHS 111

with more services, and others were internal – maintaining an accurate and up-to-date DoS, and giving the new service the management time required.

Public awareness and behaviour

Stakeholders felt that public awareness of NHS 111 was critical to the success of NHS 111. Even where there was good local campaigning, respondents felt that NHS 111 was in its infancy and would not become part of people's mindset until it was nationally advertised. This appeared to be about more than simply raising awareness of the service; it was about changing traditional approaches to service use. Participants described the need to change the behaviour of the public from a 'face-to-face' expectation to a 'phone before you go' approach.

> *And thinking about it, and this has been a bit of a disappointment for me to realise this, but thinking about it, we probably are unlikely to make an in-road until we've got a full blown national campaign: it starts appearing on things like Eastenders, because it's not lodged in those people's psyche. (NHS 111 related)*

> *I think we've just got a lot of work to do in terms of changing people's behaviour in how they access services. (NHS 111 related)*

Stakeholders noted that although changing people's mindset was important, it was also important to understand that some sub-groups of the population, such as those with mental health problems or communication problems, might always be reluctant to engage with NHS 111 because they preferred face-to-face consultations or had difficulties using the telephone.

> *But there will be elements of the population that maybe will not be able to manage this service, the elderly and vulnerable adults, vulnerable children, people whose first language isn't English, that kind. (non-NHS 111)*

Clinicians' trust in the new model of care

Stakeholders highlighted a lack of clinical engagement as a current problem faced by the new service, with GPs resistant to the new service due to a lack of trust in it and fear that it might increase workload in primary care. Stakeholders in strategic positions at PCTs or SHAs highlighted the need for communication with service managers and clinicians to improve understanding of the service and allay fears.

> *We tried to involve medical staff, we asked our GPs to be represented in the early days. We didn't get much support and feedback, and I think really in hindsight that would have been a really, really essential part of developing the service. (Non-NHS 111)*

> *I think we've got a way to go actually in terms of making sure we've got our entire kind of clinical community on board and working behind the 111 system. I think there is, you know,*

rightly I think people are suspicious of, you know, generally I think quite suspicious of change, I think round 111. (NHS 111 related)

Clinical trust in the service was considered to be essential because NHS 111 was making decisions about the most appropriate place and urgency of treatment. This decision was being made by non-clinical call handlers using NHS Pathways and some stakeholders from NHS Direct and GP out of hours services expressed concerns that the non-clinical call handlers could not provide the sensitivity and quality of care that NHS Direct nurses could provide, potentially leading to patients being inappropriately triaged.

Because an algorithm cannot ever have the same sensitivity of a trained nurse. (NHS 111 related)

I think the bottom line is, you've got non-clinical staff doing call handling, and using a fairly rigid computer system that says 'yes' or 'no'. (non-NHS 111)

Further integration with services

Stakeholders felt that the success of NHS 111 depended on integration with more services, with direct links between NHS 111 and services such as community nursing, dental care and primary care in hours to ensure that callers to NHS 111 were dealt with within a single call. Stakeholders also felt that electronic transfer of patient information to services such as A&E and primary care was essential to meet the goal of 'one patient, one call', particularly in the absence of a single electronic patient record.

I think yes [it could work], once you've got to the point of it being integrated over the whole of all of the services.[...] Because I think, until you get to that point you're going to get a patient who rings and then they're told to ring somewhere else. And so they could think, well what is the benefit? (NHS 111 related)

Well it very much depends whether the technology is there to integrate I think. So while the two, from my experience, two major chunks are well [integrated], which is ambulance and out of hours, and poorly with anything that isn't electronically linked. (NHS 111 related)

Monitoring and updating the Directory of Services

Stakeholders described problems caused by inaccurate or missing data in the DoS, with patients being directed inappropriately as a consequence. They emphasised the need for all providers to be fully committed to keeping the DoS fully up-to-date in order for NHS 111 to function properly.

I think 111 at the moment is only as good as the information that is being put into the CMS DoS (NHS 111 related)

Management time

Participants spoke of difficulties setting up the NHS 111 service within the context of the current NHS reforms, particularly during the resource-intensive set up phase where staff needed to deal with technical difficulties at a time when cutbacks in budgets had left services with no spare staffing capacity.

> *I think what people are struggling with at the moment is the capacity of providers to get together regularly, just because there's a lot of changes going on outside of that and, you know, people are very stretched so, you know, very resource intensive when we went live, I don't think we could go live again. (NHS 111 related)*

10.3.6 The future of NHS 111: it's only the start...

Mixed views of the value of the new service

We asked participants whether they felt that NHS 111 was a valuable addition to the health service. The response was largely positive, with a spectrum of views from extreme enthusiasm, a measured approach of the *potential* of the service once it was integrated, through to concerns from some stakeholders who were unsure whether NHS 111 offered something new and improved, or whether it simply duplicated services that already existed.

> *In my opinion I think it's, I do feel that it's worked particularly well, and working particularly well, evolving and developing all the time. (non-NHS 111)*

> *I think in time it will prove invaluable because it's simple. (non-NHS 111)*

> *Oh gosh [sighs]. Erm, hmm, I think it's valuable in terms of a 24/7 service, but I sometimes wonder whether it's a luxury. (NHS 111 related)*

> *I think working in a service that was already nationally delivering a very similar service, then I don't think it's necessarily 'yes', I think there are things that could have been done to what's already there to improve it, but I think you've sort of, taken away one service and replaced it with another. (NHS 111 related)*

The national rollout

Stakeholders saw NHS 111 as an evolving service that was in its infancy during the pilots and spoke of their vision of how NHS 111 could expand in the future. They felt that the model of NHS 111 that exists at the moment is not a finished product, but the basis of a future integrated model. Some stakeholders welcomed the proposed national rollout of NHS 111 because they felt this would help to develop the service and deliver the promised benefits of the new service in terms of impact on other services.

Certainly the way it's going at the moment it can only, it can only improve as more and more counties, districts, cities or whatever it is come in on that system, it will just get better. (non-NHS 111)

I think when we go to a regional level and regional scale, that's when I think we'll really reap the maximum benefits. (NHS 111 related)

However, other stakeholders expressed disquiet at the decision to roll out the service nationally before the evaluation of the pilots had been completed because they felt that people needed to learn lessons from the pilot sites, and that evidence of benefit from the pilots would facilitate roll out. Concern was also expressed at the short timescale set for the national rollout, particularly given the significant amount of work required before the service could 'go live' and their personal experience that their pilots would have worked better had they been given more time to plan. There was also some uncertainty about the decommissioning of NHS Direct as NHS 111 was rolled out, particularly given that NHS 111 requires fewer clinical staff than NHS Direct.

I think where we were when we started the pilot [...], if we'd had the full 12 months to assess it, you know, before rolling on to the next set of pilots then we'd been able to make more informed decisions about what we needed to do to make those benefits happen. (NHS 111 related)

Transforming the NHS

The potential of NHS 111 to transform health services was seen as more than merely adding new services to the DoS; it was seen within the context of widening remotely delivered health services and as an opportunity to take over entry into the urgent care system and change the culture of service use from one based on a face to face model to one based on entry via remote triage. However, while some stakeholders welcomed the thought of NHS 111 becoming a gateway to all services, others were concerned that the strategic direction had not been clearly thought out.

I think it will grow and grow and in a few years down the line it may actually assist people getting doctors' appointments and allocating them maybe. So you could allocate the nearest GPs for people who haven't got their own GP[...]. And we also could make[…] day appointments at the hospital etc etc. (NHS 111 related)

I think that the bit that is particularly concerning is the bit about, it's not been explicitly said that the sort of implication that 111 will be the sort of telephone front end for the out of hours service and I think we have a concern that the whole approach of 111 is to get people sorted out as promptly as possible , while the whole ethos of an out hours service is by and large, is to see the things that definitely can't wait until the morning but everything else can wait (NHS 111 related)

One additional integrated service was the subject of much discussion during the interviews. The integration of GP in-hours care was seen as a key part of NHS 111 transforming urgent care but was not universally welcomed.

> *…what I would like to see is the actual vision of that coming to fruition. I would love it that they can actually book GP appointments. Getting the patient to the right place is what it's all about. (non-NHS 111)*

> *One thing I was a little bit worried about, there was talk that the 111 system was going to take over the surgery appointment system, and I thought, no, that's a bridge, that's a step too far. I don't think that it could possibly work, that would, you know, create all sorts of hassle. (non-NHS 111)*

Working within major changes in the NHS: new models of commissioning and 'any willing provider'

Stakeholders expressed concerns about the service under future commissioning structures at a primary care cluster level rather than PCT or SHA level. They wanted to understand how clinical governance arrangements would work, given that existing clinical governance arrangements were already considered to be time consuming and complex. They felt that a considerable amount of work would be required to take on a potentially high number of providers because any small provider could bid to be listed on the DoS. This concern was also associated with the provision of services by private and non-NHS providers which might have different clinical governance arrangements or standards.

> *….the other thing that concerns me is this: the opening it up to any willing provider using any, you know, I just think that is potentially, is going to be a contractual, very difficult thing in the future when we've got lots of people bidding for this and doing parts of it, here, there and everywhere, I think it's going to make it far more complex. (non-NHS 111)*

> *If you've got private companies working to their own clinical governance when it was once all NHS and perhaps I'm biased, but when it was all NHS, it was all, you followed the letter of that clinical governance. (non-NHS 111)*

10.3.7 Differences between sites: more engagement in some sites than others

We noted differences between sites in terms of the levels of enthusiasm expressed for NHS 111, the belief that the service could deliver expected benefits, and integration within the health economy. We took care to consider whether these differences were due to the types of stakeholders interviewed in each site, for example it might be expected that people not involved in developing or delivering NHS 111 would be less enthusiastic about the service. This was complicated by the fact that different sites had different models which were more or less inclusive of services in the health economy. With this in mind, we still considered that both Durham & Darlington and Lincolnshire stakeholders were more positive on the whole than Nottingham City and Luton.

When they come to understand the system they will realise it is a seamless service, it is there to assist the patients and really, how could you go wrong by ringing 111? (Durham &Darlington)

I'm very pro 111, I think it's absolutely fantastic. (Lincolnshire)

I'm yet to be convinced at this point to be quite honest (Luton)

Whereas participants from Durham & Darlington and Lincolnshire seemed to believe that NHS 111 had made some impact on other services that was difficult to demonstrate, participants from Nottingham City and Luton did not appear to be convinced that the benefits were there at all.

We know that we have already reduced the calls that would go through to normally to an out of hours service by a third, so we've dealt with them by an alternative mechanism. (NHS 111 related)

I really want to understand. Is it actually doing what it's supposed to, even though I'm this close to it, I don't know if it is. (Non-NHS 111)

Stakeholders in both Durham & Darlington and Lincolnshire had had commitment to telephone health services prior to NHS 111, with the Single Point of Access and Hub for Health respectively. These services later migrated into NHS 111 and were seen as key facilitators for the integration of NHS 111 within the local health economy, and the level of engagement with the new service. Thus there had been previous 'buy-in' to the concept of an urgent telephone service and preparation in terms of rethinking of the whole emergency and urgent care system which had facilitated the delivery of NHS 111. In contrast, stakeholders at Nottingham City and Luton saw NHS 111 as a new and developing service, and appeared to have a lower level of commitment to the single assessment service.

We had a massive degree of consensus that 111 was the way to go. (Durham & Darlington)

And, I think it's been a really well phased integrated approach. (Lincolnshire)

Well in theory yes [it can deliver], now whether it will work in practice I don't know, I just think it's an extra, you know, an extra arm on to it [the health service]. (Nottingham City)

Other than that there's not a great deal of integration. It seems to be a separate thing that's still in a pilot stage, and, not fully integrated, I suppose. (Luton)

Durham & Darlington and Lincolnshire stakeholders associated the perceived effectiveness of their NHS 111 services with public awareness levels whereas the level of public awareness was described as poor by Nottingham City and Luton participants, in part due to the lack of public awareness campaigns by the time of the interviews.

Interviewer: So do you think it worked for the patients?

Lincolnshire stakeholder: Erm, yeah, I think there was a good communication strategy around it.

Interviewer: Do you think the service, this service, actually can deliver those expected benefits?

Nottingham City stakeholder: I think if it was more known about it could. I don't think it's been publicised enough.

10.4 Discussion

10.4.1Summary of key findings

According to stakeholders, the NHS 111 pilots were generally working as planned, with room for improvement and visions for expansion in the future. There was a sense that many benefits to patient care were being delivered already in terms of improving patient access to emergency and urgent care but that expected benefits in terms of reduction in use of emergency services were more difficult to deliver. The national roll out was seen as key to delivering further benefits, allowing better publicity, and thus higher use, of NHS 111. Stakeholders identified a number of key aspects of the service which future NHS 111 commissioners and providers should pay attention to: publicising the service, working hard to obtain clinical engagement, developing an accurate directory of local services, and integrating electronically with services in the urgent care system.

Researchers sometimes undertake interview studies of new practices to understand perceptions of key stakeholders and facilitators and barriers to implementation (Cooper et al, 2008). Comparing our findings with other stakeholder studies of new practices or services is only helpful if the service is similar to NHS 111. In 1emergency we undertook similar stakeholder interviews for an evaluation of NHS Direct pilots at a time when the national roll-out had been announced prior to completion of the evaluation of the pilots (Munro et al, 2001). The threat of the principle of the new telephone triage service NHS Direct was a strong theme of the interviews and this did not appear to be present in our interviews about NHS 111. This may be due to NHS 111 joining a health system which has accommodated and accepted a national telephone triage service, the way in which NHS 111 has been introduced in local health economies, or the lack of GPs and emergency department staff in our NHS 111 interviews. We believe that it is more likely to be related to the former reasons because our attempts to obtain the views of these stakeholders indicated a lack of engagement rather than hostility or fear of NHS 111. It is striking how similar the two sets of interviews are when looking to the future of the new service. For NHS Direct, views of the future included integration with more services, NHS Direct as a gateway to the whole health service and the need to slow down the pace of change. This was exactly the same for NHS 111 ten years later.

10.4.2 Strengths and limitations

This is a study of the perceptions of key stakeholders involved in, or working in health economies, with pilots of a new service. There were two major gaps in the sample: ordinary GPs and emergency department staff. We approached these groups in each of the four sites and only managed to interview one of the eight approached. We had some communication with one of the emergency departments who said they knew little about the service and did not want to be interviewed or return emails to arrange an interview. We believe that the lack of engagement in this stakeholder interview study reflected the lack of engagement of these groups with NHS 111. This also occurred within one of sites where we were less successful in obtaining interviews; it seemed harder to convince people we approached to participate than within the other three sites. Therefore it is important to remember voices that are not represented here when drawing overall conclusions from these interviews and consider how this affects the themes identified. Many of our interviewed stakeholders were active within NHS 111 because they were providing the service, had helped to establish the service, or worked in a service which had been integrated with NHS 111 and therefore might be considered to have had a vested interest in NHS 111. The missing voices were from those whose services might be affected by NHS 111 within the wider NHS.

10.4.3 Implications

For NHS 111

Pilots are by nature pioneers that identify problems and solutions for others to learn from. Pilots can face fundamental problems that lead to the failure of the service to get off the ground, or they can face so many problems that they fail to operate as planned, or they can encounter 'teething problems' where they operate generally as planned with room for improvement. Based on the stakeholder interviews, these pilots appeared to be the third type, with each pilot operating as planned and able to consider ways of improving in the future. They show that it is possible to establish this service, and to do so within a relatively quick timescale, although the fast pace is not something they necessarily recommend others to follow.

Stakeholders identified improvements they would like to see, in particular consideration of the use of more self care options, provision for patients with special notes, improving awareness, engaging more with service managers and clinicians to instil trust in the service, putting electronic transfer of data in place and keeping the Directory of Services up to date. Some of these issues can be dealt with centrally e.g. NHS Pathways could revisit the system to consider whether some endpoints might more appropriately be self care rather than referral to a service. Other issues require local action e.g. putting resources into communicating with stakeholders to ensure that they understand the service and have opportunities to discuss concerns, and putting efforts into keeping the Directory of Services up to date.

For the evaluation

Given that the pilots operated as planned, we would expect to be able to detect some of the expected benefits within our impact evaluation. However there was no indication of improvements in patient experience of the urgent care system in our population survey (Chapter 7) and no evidence of reductions in use in emergency services in our analysis of routine data (Chapter 8). Indeed there was evidence of increased use of an emergency service. We note the point made by the stakeholders that NHS 111 is in its infancy and may need to become a national service with national publicity to provide a large enough 'dose' to impact visibly on the wider emergency and urgent care system. Indeed there was room for increasing awareness levels of NHS 111 within the general population in all four sites (see Chapter 11). There is sense in this viewpoint but this may also result in increased emergency ambulance use and it must also be considered that problems associated with high usage may then come into play e.g. higher levels of demand may result in longer waiting times for NHS 111.

11. Awareness, use and equity

11.1 Introduction

The general population must be aware of this new service, and make use of it, for it to have an impact on how the emergency and urgent care system is used (see Chapter 8). It is important to consider whether those in equal need have equal access to NHS 111 regardless of gender, age, ethnicity, and socio economic background. Here we present population awareness and use of the new service overall and within different groups of the population.

11.2 Methods

We used data from the population surveys to measure awareness and use amongst the general population and to explore equity in awareness and use of NHS 111. The questionnaire included questions about awareness and use of NHS 111 and socio demographic characteristics of the person who was the focus of the questionnaire (see Chapter 7 for a detailed description of the methods).

11.2.1 Analysis

Data were analysed using PASW 19. For overall awareness and use of NHS 111, we analysed the data from the population surveys undertaken before and after NHS 111 was launched, in both NHS 111 and control sites. The chi-squared test was used to compare differences between NHS 111 sites. To assess equity in awareness and use of NHS 111 we analysed the data from the 'after' population surveys undertaken in the NHS 111 sites in 2011 approximately one year post NHS 111 launch. We combined the data from all the sites and used logistic regression to test for differences in awareness and use between different socio-demographic groups. We adjusted for site because population characteristics, and awareness and use, differed by site. We further adjusted some variables by age and sex to ensure that any differences were not simply explained by different age and sex distributions of different ethnic groups for example.

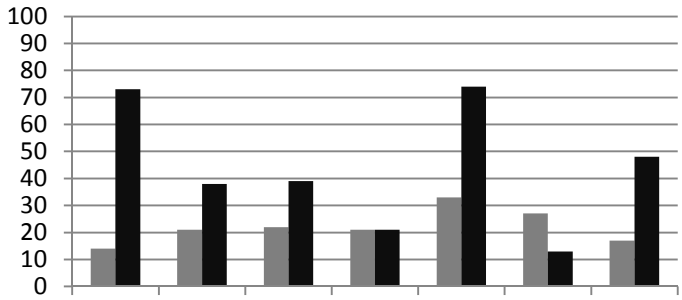
11.3 Results

11.3.1 Overall awareness of NHS 111

The full population sample, regardless of whether or not they had recently used the emergency and urgent care system, was asked if they had heard of NHS 111. Although NHS 111 was not 'live' at the time of the 2010 surveys, there had been national media stories about the new service and there was some awareness of NHS 111 in both the NHS 111 and control sites prior to the service starting. Awareness increased in all of the NHS 111 sites. Twelve months later, that is, approximately 10 months after the launch of NHS 111, awareness levels differed by NHS 111 site (p=0.001). Almost three quarters of respondents in two of the NHS 111 sites (Durham & Darlington: 73%, 1463/2003

and Lincolnshire: 74%, 1471/2000) reported that they had heard of the service (Figure 11.1) whereas awareness levels were lower in Luton (48%, 965/2001) and Nottingham (39%, 788/2006). Some increases in awareness had also occurred in the control sites. Indeed a control site, North of Tyne, had a similar awareness level (38%, 761/2006) to that of the NHS 111 site Nottingham. Awareness decreased amongst the population in the control site Norfolk. Awareness levels may have been inflated in this area in 2010 due to the media interest surrounding the official launch of NHS 111 which occurred immediately prior to the survey being undertaken.

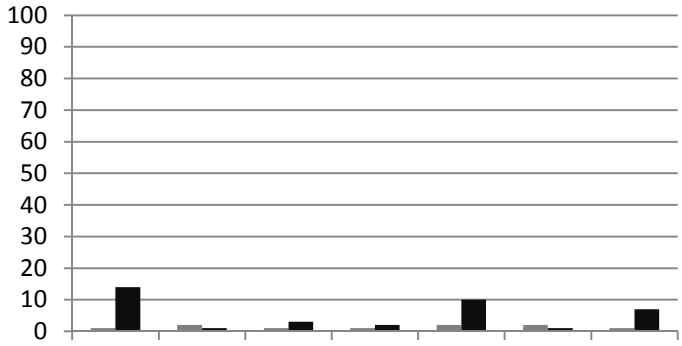
Figure 11.1: Ever heard of NHS 111



11.3.2 Overall use of NHS 111

All survey participants were asked if they had ever used NHS 111. Population use varied between the NHS 111 sites in 2011 when the service had been available for approximately a year (p=0.001). Reported use was highest in Durham & Darlington (14%, 272/2003) and Lincolnshire (10%, 208/2000) and lowest in Nottingham (3%, 62/2006). A small number of people thought they had used NHS 111 in 2010 prior to the launch of the service and in the control sites (1%, 208/14049); any survey of service use usually identifies these confusions. Indeed, the proportion of the population reporting that they had used NHS 111 in Nottingham was similar to that of the population in their respective control site, Leicester (2%, 32/2002).

Figure 11.2: Ever used NHS 111



11.3.3 Equity of awareness of NHS 111

Overall, 59% (4687/8010, 95% CI: 57% to 60%) of respondents in the NHS 111 sites had heard of the service (Table 11.1). On the questionnaire we asked for socio-demographic details about the person who was the subject of the telephone interview (e.g. a child) rather than the person answering the questions (e.g., parent of a child). Therefore exploring equity of awareness by age and sex is not sensible because the age and sex of the subject of the interview and the respondent are likely to differ. However because it is likely that ethnicity, and socio-economic status measured through home ownership, are the same for the subject and respondent, we report this. There were slightly lower levels of awareness for people in black and ethnic minority groups and without home ownership, although these were not statistically significant (site adjusted p=0.447 and site/age/sex adjusted p=0.190 respectively).

Table 11.1: Equity of awareness of NHS 111

	n	%	Site adjusted OR (95% CI)*	Adjusted OR (95% CI)**
Ethnicity				
White	4214	60	1	1
Other	443	46	0.92 (0.79 to 1.06)	0.94 (0.81 to 1.10)
Housing tenure				
Owner	3543	60	1	1
Not owner	1021	55	0.92 (0.82 to 1.03)	0.93 (0.83 to 1.04)

**adjusted for site only, **adjusted for site, sex and age group*

11.3.4 Equity of use of NHS 111

9% (691/8010, 95% CI: 8% to 9%) of respondents reported ever using NHS 111 (Table 11.2). There were differences in reported use for different groups of the population. Respondents were *less likely* to have used NHS 111 if they were male (site adjusted p=0.001), were older (site adjusted p=0.001), did not have a disability or limiting long term illness (adjusted p=0.001), or owned their home (adjusted p=0.039). Reported use was lower for black and ethnic minority groups; a statistically significant difference was found when adjusting for site only (p=0.05) but not when adjustment was made for site, age group, and sex (p=0.354).

Table 11.2: Ever used NHS 111

	n	%	Site adjusted OR (95% CI)*	Adjusted OR (95% CI)**
Sex				
Male	292	7	1	
Female	399	10	1.36 (1.16 to 1.59)	
Age				
0-4	67	15	1	
5-19	150	10	0.60 (0.44 to 0.82)	
20-44	247	9	0.57 (0.42 to 0.76)	
45-64	150	7	0.42 (0.31 to 0.58)	
65+	77	6	0.33 (0.23 to 0.47)	
Ethnicity				
White	613	9	1	1
Other	75	8	0.76 (0.57 to 1.00)	0.87 (0.68 to 1.16)
Disability/limiting long term illness				
Yes	163	10	1	1
No	528	8	0.81 (0.67 to 0.97)	0.61 (0.50 to 0.75)
Housing tenure				
Owner	504	9	1	1
Not owner	178	10	1.26 (1.05 to 1.52)	1.21 (1.01 to 1.46)

**adjusted for site only, **adjusted for site, sex and age group*

11.4 Discussion

11.4.1 Summary of key findings

Given that NHS 111 had been available for only one year in these four sites, awareness levels were good in all sites, and very good in two of the sites. A study assessing awareness levels of NHS Direct amongst an outpatient population (and therefore users of healthcare) reported NHS Direct awareness levels at 60% in 2008, ten years after the introduction of NHS Direct (Larner, 2009). Given that awareness levels in Durham & Darlington and Lincolnshire were higher than this just one year after the launch of NHS 111, it appears that local publicity has been effective.

There was evidence of site differences in awareness and use of NHS 111: respondents in Durham & Darlington and Lincolnshire were more likely to report that they were aware of NHS 111 and had made use of the service than respondents in Nottingham and Luton. However, it is important to bear in mind that some NHS 111 users may not have realised that they had used the service if they had contacted another service, such as GP out of hours, and been auto-routed to NHS 111. Therefore differences in reported use should be, and indeed is, similar to differences in the rates of *direct dial* calls per year per 100,000 people reported in Chapter 5 where both Durham & Darlington and Lincolnshire had the highest direct dial use rates.

There was evidence of age, sex, health status, and socio-economic (using housing tenure as a proxy) differences in reported use of NHS 111. Some of these findings are supported by evidence from elsewhere: men were less likely to report using NHS Direct (Knowles et al, 2006; Larner, 2009) as were older people (Knowles et al, 2006). It has been suggested that older people are reluctant to use the telephone to access out-of-hours care and prefer contact with their own GP (Foster et al, 2001). Some findings differed from other evidence on telephone accessed healthcare. Respondents identifying themselves as having a disability or limiting long term illness were more likely to have reported using NHS 111 than those in better health; evidence on NHS Direct indicated that those with greater health needs were not accessing the service as frequently as others (Ring & Jones, 2004). People who did not own their home were *more* likely to report using NHS 111 whereas usage of NHS Direct was lower in groups who did not own their own home (Knowles et al, 2006), or had a low income (Shah & Cook, 2008). Finally there was uncertainty about differences in use of NHS 111 by ethnic group. This is in contrast to studies looking at NHS Direct which found lower usage amongst minority ethnic groups (Ring & Jones, 2004; Knowles et al, 2006; Shah & Cook, 2008).

11.4.2 Strengths and limitations

A strength of this component of the evaluation is that it is based on large numbers of the general population. A limitation is that reported usage may be lower than actual usage due to auto-routing into NHS 111. Finally, the analysis on equity assumes that all groups have equal need and that any differences in use indicate inequitable use.

11.4.3 Implications

Future NHS 111 providers should be able to attain the high levels of awareness seen for some of these pilots. Higher levels of awareness may be easier to attain as the service becomes national and nationwide publicity becomes possible. Older people were less likely to report using NHS 111 and policy makers and future service providers will need to consider the extent to which this is inherent in telephone accessed health care and therefore consider the availability of other ways of accessing care for some subgroups of the population. It was reassuring to find that those identifying themselves as disabled or having a limiting long term illness were more likely to use NHS 111 than groups in better health, indicating that NHS 111 is reaching some groups of the population with greater needs.

We regard these findings as early indications of awareness and use of NHS 111 that are likely to change over time. It is important to consider the advent of nationwide publicity in the national roll out of NHS 111 and the impact this may have on overall awareness and use and differences between groups in the general population.

12. Economic evaluation

12.1 Introduction

The introduction of NHS 111 has potential cost implications. There are costs attributable to NHS 111 which may potentially be offset by a reduction in the use of other services in the urgent and emergency care system.

12.2 Methods

We assessed the economic impact of NHS 111 using a cost-analysis (Drummond & McGuire 1996). A cost-analysis is a form of economic evaluation where net costs of a new programme are considered. Health benefits are not included in the analysis and so a comparative evaluation of the costs and benefits (such as a cost-effectiveness of cost-benefit analysis) was not performed. We compared the costs of providing NHS 111 in the pilot sites with the costs of changes occurring in the urgent and emergency care system once NHS 111 was in operation, including changes to emergency ambulance calls and incidents, emergency departments (EDs), GP Out-of-Hours (GP OOHs) services, Walk in Centres (WICs), Urgent Care Centres (UCCs), Minor Injury Units (MIUs) and NHS Direct (NHSD). The economic evaluation follows the methods guide for the National Institute for Health and Clinical Excellence technology appraisals programme (NICE 2008). In particular it takes an NHS and Personal Social Services perspective. Costs are at 2011 levels, and historic costs are uprated using the 2011 Personal Social Services Research Unit (PSSRU) inflation indices (PSSRU 2011).To reflect the uncertainty in the impact evaluation parameters, parametric sampling (with replacement) was undertaken by generating 10,000 samples of the cost impact and determining the probability that NHS 111 was a cost saving policy.

12.2.1 Costs of establishing NHS 111

The four NHS 111 pilots established the new service using existing telecommunication services, requiring adaptation and possibly extra staff and resources, but not the full capital expenditure expected of a new service. The cost of establishing NHS 111 included both a start-up cost and a running cost for maintaining the service. We had aimed to identify these costs but this was not possible due to the commercial sensitivity of the data at a time of procurement for services in different parts of England. We therefore used an estimate of cost per call provided by the Department of Health, with the caveat that this may not be an accurate reflection of the cost of establishing the service.

12.2.2 Costs of impact on the NHS

The impact of NHS 111 on use of different services in the urgent and emergency care system has been measured in the impact evaluation using an interrupted time series (see Chapter 8). Changes in use of different services in NHS 111 sites over and above changes in control sites which can be associated with NHS 111 have been taken from Chapter 8. These changes have been monetised

using 2011 unit cost data (PSSRU 2011).Table 12.1 presents the service activities costed in this analysis, including sources for the cost data.

Table 12.1: Costs of NHS services included in economic evaluation

Service	Value	Details	Source
Total ED activity	£115.51	A weighted average of admitted (£147) and not admitted (£106) ED attendances Type 1 (consultant led full 24hr A&E) and Type 2 (specialist A&E)	PSSRU. Stratified by admitted (23%) and not-admitted (77%) and weighted by activity observed in Durham and Darlington pilot site
Total WIC / UCC / OOH activity	£41	Walk in centres unit cost	PSSRU
Total NHS Direct activity	£24.32	The number of calls to the NHS Direct 0845 service	NHS Direct Core Contract
Total emergency Ambulance Calls	£32.90	Total calls to the ambulance service	NHS Reference Cost 2009/10 uprated
Total emergency ambulance incidents	£201.10	Total calls to emergency which are categorised as A, B or C and result in an ambulance dispatch. The £32.90 cost of the ambulance call is subtracted.	PSSRU. Average of all paramedic services (Cat A, B and C combined) net of £32.90 for ambulance call
NHS 111	£8	Cost per call of NHS 111	Specified by the Department of Health

12.2.3 Analysis

The analysis was undertaken with two separate objectives. The primary objective was to report the economic impact of NHS 111 as observed from the pilot sites (the 'observational analysis'), and a secondary objective was to estimate the potential economic impact of introducing NHS 111 as a national service (the 'implementation analysis'). These two analyses are reported separately in the results section.

Observational analysis

(i) Service impact

We compared the cost of NHS 111 and the cost of changes occurring in the system for each pilot site separately. The monthly impact of NHS 111 on each service was estimated in the models in Chapter 8. The estimate from each model was multiplied by a steady state estimate of monthly NHS 111 triaged calls (estimated as the average, with the first three months omitted to allow for a gradual uptake). The analysis provides a total monthly service cost impact of NHS 111 in that locality by

summing the impact on each service, as well as a cost per NHS 111 call. This estimate is described as the *total service impact cost* in the tables below.

(ii) System impact

This analysis was also run for each site with the unit costs for each service incorporated into the regression analysis, which provides a modelled total cost of the urgent and emergency care system for each pilot site. The total system cost for each month in each site was calculated as the sum of the costs of the monthly activity in each of the five services studied (i.e. ED, urgent care services, NHSD, 999 ambulance calls and incidents) plus the NHS 111 activity, using the unit costs shown in Table 12.1. The time series regression 'dose' models described in Chapter 8 were then estimated with the total monthly *system* cost as the dependent variable. The models provide an estimate of the system cost per NHS 111 call. This provides an alternative estimate of the cost per NHS 111 call which incorporates the correlations between the various services within the urgent and emergency care system. This is described as *the total system impact cost* in the tables below. Graphs of the total monthly system impact cost are shown.

An economic analysis of the total cost impact of NHS 111 across all four sites together was also undertaken. This used the model for estimating impact on a service across all sites together described in Chapter 8, with the total monthly system cost as the dependent variable.

Implementation analysis

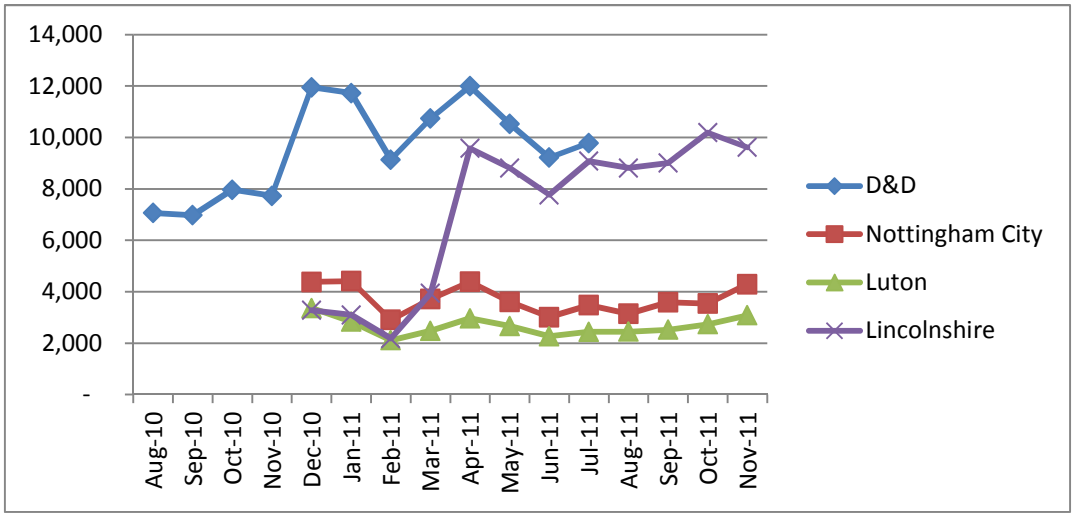
NHS 111 is being rolled out nationally. An implementation analysis has been undertaken which incorporates other system changes anticipated by the Department of Health. In particular, these include the decommissioning of the NHS Direct 0845 advice line, and the scenario whereby NHS 111 provides all GP OOH call handling. The analysis is presented with various assumptions to estimate the total economic impact of NHS 111 nationally.

12.3 Results – observational analysis

12.3.1 Use of NHS 111 in pilot sites

The results of the analysis are presented for each pilot site (and matched control site) separately. Figure 12.1 shows that, in Durham & Darlington (D&D) and Lincolnshire, there was a gradual increase in the numbers of calls triaged by NHS 111, before reaching a relatively stable number of monthly calls after approximately three months. Nottingham City and Luton were both stable for the whole 12 months.

Figure 12.1: Numbers of NHS 111 calls triaged per month in each site in the first year of operation



12.3.2 Durham & Darlington observational analysis

The numbers of NHS 111 triaged calls included in the economic model for Durham & Darlington are presented in Table 12.2.

Table 12.2: Durham & Darlington parameter values

Parameter	Value
Minimum monthly NHS 111 calls	6,976
Maximum monthly NHS 111 calls	11,995
Average (across 12 months)	9,568
Average (dropped first 3 months)	10,312

The modelled estimates of the impact of NHS 111 in Durham & Darlington indicated a reduction in ED activity and ambulance calls (Chapter 8), although these changes were not statistically significant. There was an increase in ambulance incidents and WIC/UCC/OHH activity, although these changes were not statistically significant. There was a reduction in NHS Direct calls which was statistically significant. The costs of these changes are shown in Table 12.3. The economic analysis provides an estimated cost of NHS 111 of £82k per month, with a total impact for the NHS of £66k per month (a cost for the NHS of £6.46 per NHS 111 call). There was considerable uncertainty around this estimate. Lower and higher bounds of the estimate of monthly impact were between -£241k and +£374k, that is, a large cost saving or a large additional cost. The estimates were sampled 10,000 times to quantify the uncertainty, and produced a probability of NHS 111 being cost saving of 34%.

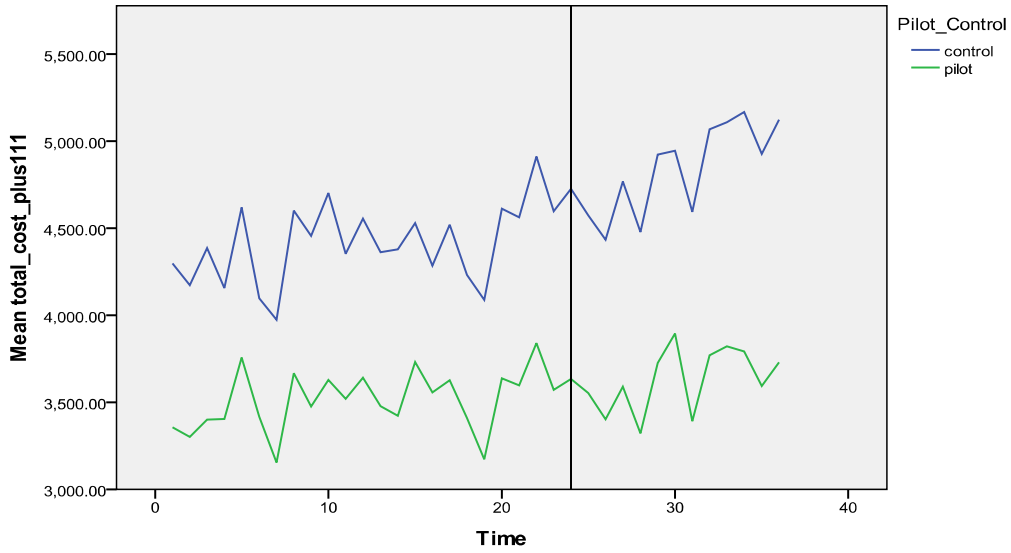
When estimating the system cost for a single NHS 111 call from the impact regression model, the total cost was £1. Figure 12.2 shows the monthly cost of the urgent and emergency care system in the pilot and control sites, both before and during the NHS 111 intervention period.

Table 12.3: Durham & Darlington economic analysis

	Parameter	SE	Monthly change in activity	Monthly cost Impact	Lower bound	Higher bound
ED Activity	-0.029	0.051	-299.05	-£34,542	-£153,607	£84,522
Ambulance Calls	-0.077	0.031	-794.04	-£26,124	-£46,738	-£5,510
Ambulance Incidents	0.009	0.016	92.81	£18,664	-£46,370	£83,698
NHS Direct	-0.110	*0.022	-1134.34	-£27,587	-£38,401	-£16,773
WIC/UCC/OOH	0.127	0.112	1309.65	£53,696	-£39,118	£146,509
NHS 111				£82,498		
Total monthly service impact				£66,604	-£241,736	£374,944
Total monthly service impact (per NHS 111 call)				£6.46	-£23.44	£36.36
Probability of being cost-saving				34%		
Total system impact cost per call from impact regression model				£1	-£18	£19

*= p<0.05

Figure 12.2: Durham & Darlington total system cost



12.3.3 Nottingham City observational analysis

The NHS 111 triaged call volume for Nottingham City is presented below in Table 12.4.

Table 12.4: Nottingham City parameter values

Parameter	Value
Minimum monthly NHS 111 calls	2,907
Maximum monthly NHS 111 calls	4,413
Average (across 12 months)	3,707
Average (dropped first 3 months)	3,643

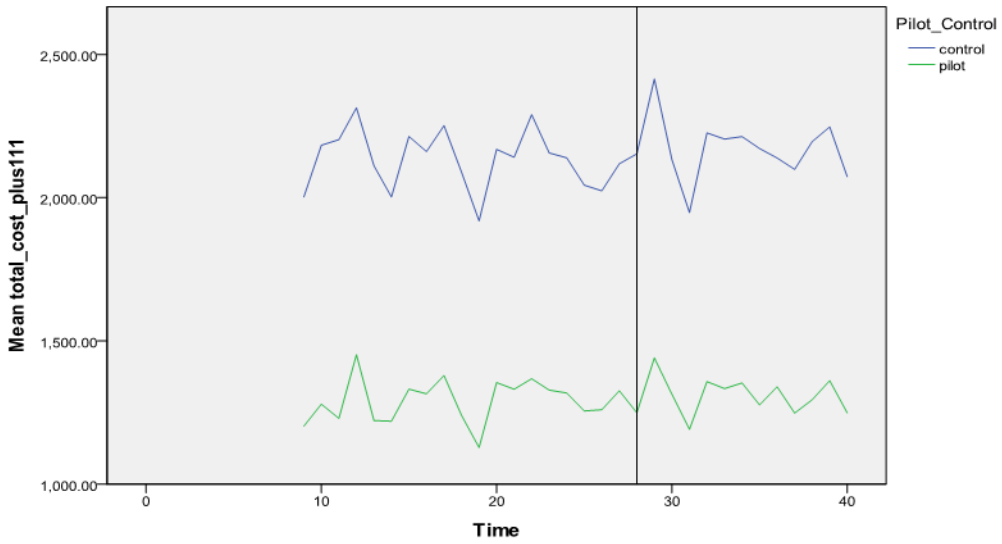
The estimates from the impact evaluation in Chapter 8 indicated an increase in ED attendances, ambulance calls and ambulance incidents, which were not statistically significant. A non-statistically significant reduction in WIC/UCC/OOH's was identified, along with a statistically significant reduction in NHS Direct calls. The costs of these changes are shown in Table 12.5. The cost of NHS 111 was estimated as £29k per month, with a total impact for the NHS of £44k per month (a cost for the NHS of £12.10 per NHS 111 call). Lower and higher bounds of the estimate of monthly impact were between -£84k and +£172k, that is, a large cost saving or a large additional cost. The estimates were sampled 10,000 times to quantify the uncertainty, and produced a probability of NHS 111 being cost saving of 25%.The system cost per call, including the cost of NHS 111, was £14. The total system costs for the pilot and control sites are provided graphically in Figure 12.3.

Table 12.5: Nottingham City economic analysis

	Parameter	se	Monthly change in activity	Monthly cost Impact	Lower bound	Higher bound
ED Activity	0.012	0.032	43.71	£5,049	-£21,341	£31,439
Ambulance Calls	0.034	0.049	123.85	£4,075	-£7,435	£15,585
Ambulance Incidents	0.027	0.032	98.36	£19,779	-£26,167	£65,726
NHS Direct	-0.139	*0.027	-506.35	-£12,314	-£17,003	-£7,626
WIC/UCC/OOH	-0.011	0.136	-40.07	-£1,643	-£41,455	£38,169
NHS 111				£29,142		
Total monthly service impact				£44,088	-£84,259	£172,435
Total monthly service impact (per NHS 111 call)				£12.10	-£23.13	£47.34
Probability of being cost-saving				25%		
Total system impact cost per call from impact regression model				£14	-£7	£35

* = p<0.05

Figure 12.3: Nottingham City total system cost



12.3.4 Luton observational analysis

The NHS 111 triaged call volume for Luton is presented below in Table 12.6.

Table 12.6: Luton parameter values

Parameter	Value
Minimum monthly NHS 111 calls	2,109
Maximum monthly NHS 111 calls	3,361
Average (across 12 months)	2,660
Average (dropped first 3 months)	2,624

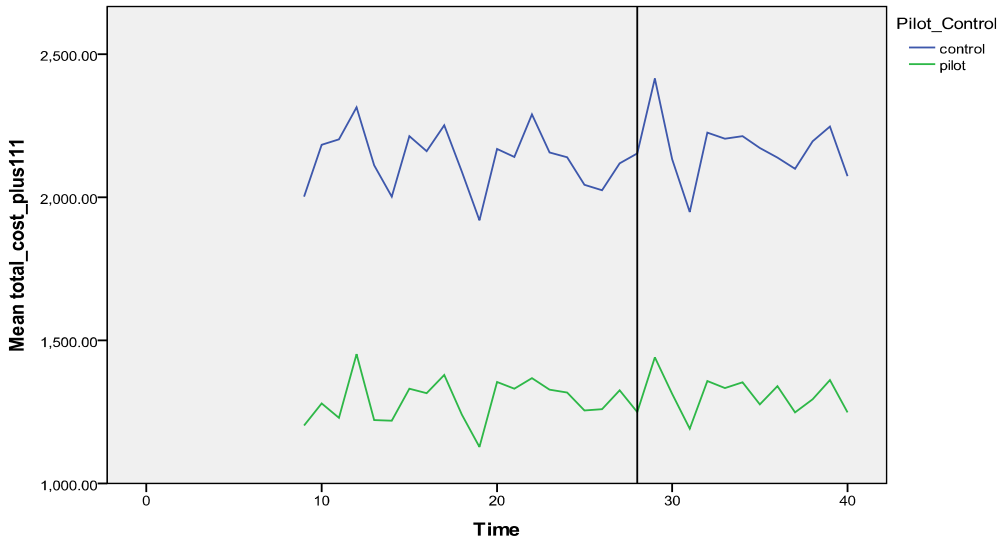
Across all services, there was a reduction in activity; however these were only statistically significant for NHS Direct and for WIC/UCC/OOHs. The costs of these changes are shown in Table 12.7. The cost of NHS 111 in Luton was estimated as £20k per month, with a total impact for the NHS of -£64k per month (a saving for the NHS of £24.42 per NHS 111 call). Lower and higher bounds of the estimate of monthly impact were between -£210k and +£81k, that is, a large cost saving or a large additional cost. The estimates were sampled 10,000 times to quantify the uncertainty, and produced a probability of NHS 111 being cost saving of 81%.The system cost per call, including the cost of NHS 111, was -£21. The total system cost for the pilot and control sites are provided graphically in Figure 12.4.

Table 12.7: Luton economic analysis

	Parameter	Se	Monthly change in activity	Monthly cost Impact	Lower bound	Higher bound
ED Activity	-0.046	0.068	-120.68	-£13,940	-£54,328	£26,449
Ambulance Calls	-0.021	0.054	-55.09	-£1,813	-£10,948	£7,323
Ambulance Incidents	-0.017	0.043	-44.60	-£8,969	-£53,435	£35,497
NHS Direct	-0.175	*0.047	-459.12	-£11,166	-£17,044	-£5,288
WIC/UCC/OOH	-0.457	*0.219	-1198.96	-£49,158	-£95,329	-£2,986
NHS 111				£20,988		
Total monthly service impact				-£64,056	-£210,096	£81,983
Total monthly service impact (per NHS 111 call)				-£24.42	-£80.08	£31.25
Probability of being cost-saving				81%		
Total system impact cost per call from impact regression model				-£21	-£61	£18

*= p<0.05

Figure 12.4: Luton total system cost



12.3.5 Lincolnshire observational analysis

The NHS 111 triaged call volume for Lincolnshire is presented below in Table 12.8.

Table 12.8: Lincolnshire parameter values

Parameter	Value
Minimum monthly NHS 111 calls	2,183
Maximum monthly NHS 111 calls	10,187
Average (across 12 months)	7,115
Average (dropped first 3 months)	8,534

The estimates from the impact evaluation in Chapter 8 indicated a non-statistically significant increase in ED activity, along with statistically significant increases in ambulance calls and ambulance incidents. Reductions in NHS Direct and WIC/UCC/OOH activity were observed, however these were not statistically significant.

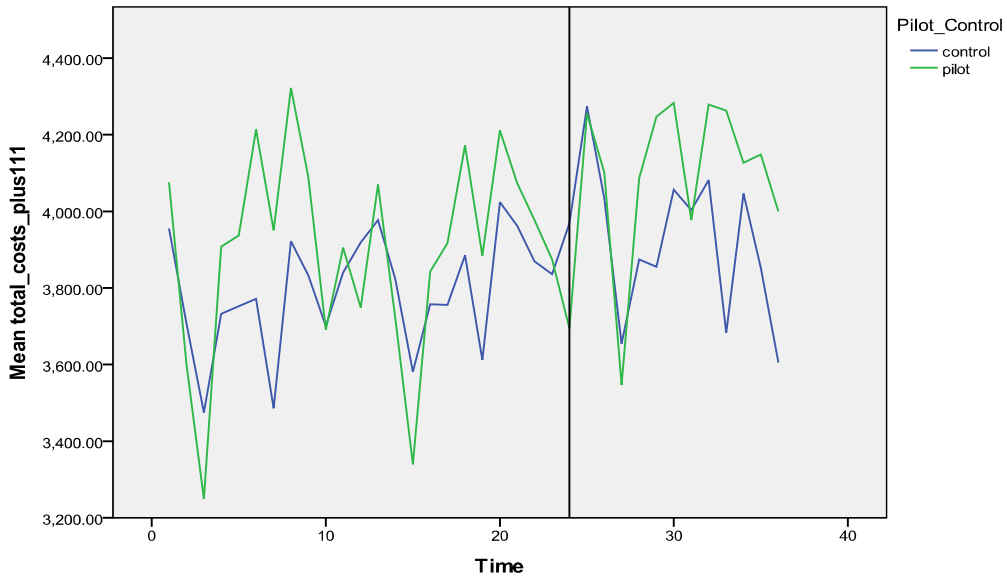
The costs of these changes are shown in Table 12.9. The cost of NHS 111 was estimated as £68k per month, with a total impact for the NHS of £218k per month (a cost for the NHS of £25.55 per NHS 111 call). Lower and higher bounds of the estimate of monthly impact were between -£76k and +£513k, that is, a large cost saving or a large additional cost. The estimates were sampled 10,000 times to quantify the uncertainty, and produced a probability of NHS 111 being cost saving of 7%. The system cost per call, including the cost of NHS 111, was £23. The total system cost for the pilot and control sites are provided graphically in Figure 12.5.

Table 12.9: Lincolnshire economic analysis

	Parameter	Se	Monthly change in activity	Monthly cost Impact	Lower bound	Higher bound
ED Activity	0.067	0.099	571.80	£66,046	-£125,231	£257,323
Ambulance Calls	0.107	*0.018	913.17	£30,043	£20,138	£39,949
Ambulance Incidents	0.047	*0.011	401.11	£80,664	£43,662	£117,666
NHS Direct	-0.022	0.025	-187.76	-£4,566	-£14,736	£5,604
WIC/UCC/OOH	-0.064	0.068	-546.20	-£22,394	-£69,030	£24,242
NHS 111				£68,275		
Total monthly service impact				£218,068	-£76,924	£513,059
Total monthly service impact (per NHS 111 call)				£25.55	-£9.01	£60.12
Probability of being cost-saving				7%		
Total system impact cost per call from impact regression model				£23	£1	£45

*= p<0.05

Figure 12.5: Lincolnshire total system cost



12.3.6 All sites

A combined economic analysis was undertaken, using the 'all sites impact analysis' from Chapter 8. The average number of triaged calls to NHS 111 across all four pilot sites was used (25,113, average with first 3 months dropped). The estimates from the impact evaluation in Chapter 8 indicated a non-statistically significant reduction in ED activity, and a statistically significant reduction in NHS Direct activity. Ambulance calls and WIC/UCC/OOH's had a non-statistically significant increase in activity, and ambulance incidents had a statistically significant increase.

The costs of these changes are shown in Table 12.10. The cost of NHS 111 across all four sites was estimated as £200k per month, with a total impact for the NHS of £307k per month (a cost for the NHS of £12.26 per NHS 111 call). Lower and higher bounds of the estimate of monthly impact were between -£118k and £733k, that is, a large cost saving or a large additional cost. The estimates were sampled 10,000 times to quantify the uncertainty, and produced a probability of NHS 111 being cost saving of 21%. The estimate of the impact of NHS 111 on total monthly system costs also found an increase in cost of £10.00 (95%CI: £0.00, £20.00) per NHS 111 call, or £50k per month if the monthly NHS 111 call volume is 5,000 calls. These results should be treated with caution because of differences in urgent and emergency care services and NHS 111 across the four sites.

Table 12.10: All sites analysis

	Parameter	Se	Monthly change in activity	Monthly cost Impact	Lower bound	Higher bound
ED Activity	-0.001	0.033	-25.11	-£2,901	-£190,516	£184,715
Ambulance Calls	0.003	0.017	75.34	£2,479	-£25,051	£30,008
Ambulance Incidents	0.024	*0.008	602.71	£121,205	£42,018	£200,392
NHS Direct	-0.102	*0.014	-2561.51	-£62,296	-£79,055	-£45,537
WIC/UCC/OOH	0.047	0.057	1180.31	£48,393	-£66,638	£163,423
NHS 111				£200,903		
Total monthly service impact				£307,782	-£118,339	£733,904
Total monthly service impact (per NHS 111 call)				£12.26	-£4.71	£29.22
Probability of being cost-saving				21%		
Total system impact cost per NHS 111 call				£10.00	£0.00	£20.00

*= p<0.05

12.4 Results – implementation analysis

To help inform the roll out of NHS 111 nationally, an implementation analysis was undertaken which incorporates other system changes anticipated by the Department of Health. Each of these system changes are described, along with the assumptions utilised for the economic evaluation, before results are presented. The analysis uses the combined estimates of impact (see Table 12.10) from Chapter 8, to calculate national estimates of impact on the NHS due to the implementation of NHS 111.

12.4.1 No NHS Direct 0845 service

It is anticipated by the Department of Health that the introduction of NHS 111 will see the partial replacement of the services offered by NHS Direct. NHS Direct and NHS 111 are not identical services: they are likely to have different case mix because NHS 111 is directed at urgent care and NHS Direct is directed at non-urgent as well as urgent care; NHS 111 provides telephone advice while NHS Direct provides telephone advice, internet advice and health information. The 2010/11 NHS Direct annual report shows that 4.3m people used the 0845 number, with a further 5.6m using the internet services. Given that NHS 111 does not provide internet services a realistic scenario would be a partial replacement of NHS Direct by NHS 111, with NHS Direct continuing to provide the internet services and the NHS Direct 0845 number being replaced by NHS 111.

Consideration of the effect of replacing the NHS Direct 0845 service is difficult because the availability of NHS Direct during the NHS 111 pilot site evaluation would have affected who called NHS 111. Without NHS Direct 0845 in the urgent and emergency care system, callers to NHS 111 may have a

very different acuity mix from those using the service with NHS Direct in the system. The NHS Direct website provides current data on the advice offered by NHS Direct: of all callers, 50% are directed to self-care, 30% to urgent and emergency care, and a remaining 20% to routine care. This is very different from NHS 111 (see Chapter 5).

If it was possible to separate the costs of services that NHS Direct provides, then an estimation of the cost impact of NHS 111 + partial NHS Direct (the internet advice and information) could be provided. However the financing of NHS Direct is complex, with multiple providers contributing to their income for patient care activities (Table 12.11). Also, the expenditure by NHS Direct cannot be grouped into "0845" and "other services" easily, using the information available to us. In addition, decommissioning a service would result in substantial costs. These decommissioning costs would reduce if NHS Direct provided some of the new NHS 111 services in the future.

Table 12.11: NHS Direct income (by provider)

	2010/11 (£)	**2009/10 (£)**	**Annual income per capita (England and Wales 2010) (£)**
SHAs	125,884,000	132,433,000	2.40
NHS Trusts	165,000	277,000	0.01
PCTs	9,950,000	12,249,000	0.22
NHS Foundation Trusts	193,000	232,000	0.00
Local authorities	0	0	0.00
DH	4,315,000	40,082,000	0.73
NHS Other	0	1000	0.00
Non-NHS	4,806,000	3,782,000	0.07
TOTAL	145,313,000	189,056,000	3.42

Source: NHS Direct annual reports

On the assumption that the Department of Health pays for central aspects of NHS Direct, and all local and regional commissioners pay for the 0845 number, and that there are no decommissioning costs associated with stopping the 0845 service, Table 12.11 suggests that only providing the internet component of NHS Direct could reduce the income (and therefore cost) of NHS Direct from £145m to £4.3m. The saving of £141m per year by decommissioning the NHS Direct 0845 is converted into a monthly estimate and included in the implementation analysis.

12.4.2 NHS 111 replaces GP Out-of-Hours call handling

The £41 used for the cost of a GP OOH/WIC/UCC contact/attendance includes the cost of any call handling of the GP OOH service as well as attendance. If NHS 111 replaces GP OOH call handling, the economic analysis of the impact of NHS 111 will need to only cost the other parts of GP OOH. We had limited cost data available to us to help with disaggregation of costs. Data were provided by one l

site. Table 12.13 shows the GP OOH activity for one site during the NHS 111 one year intervention period.

Table 12.13: GP OOH activity in one site

Total OOH cases			95,395
Total calls answered			119,068
Case Mix	**Number of cases**	**Proportion (of total OOH cases)**	**Activity type**
Emergency cases	1,721	2%	Call and referral
Telephone advice	42,746	45%	Call
Centre Visits	27,953	29%	Visit
A&E Referral	9,630	10%	Call and referral
Home Visits	1,345	14%	Visit
Total	95,395	100%	

GP OOH was composed of calls which lead to referrals or visits, with 43 visits per 100 calls. To net the unit cost of GP OOH activity of the cost of call handling, the following calculations were undertaken:

$$Total\ OOH\ Cost = OOH\ Cases\ \times GP\ OOH\ Unit\ Cost$$

$$£3{,}911{,}195 = 95{,}395\ \times £41$$

$$Unit\ cost\ OOH\ (net\ call\ handling) = \frac{Total\ OOH\ cost - Call\ handling\ cost}{Activity}$$

$$£28.42 = \frac{£3{,}911{,}196 - £1{,}200{,}000}{95{,}395}$$

Therefore an approximation of the GP OOH unit cost without call handling was £28.42. (This value is not generalisable and is based on the original choice of £41 as a unit cost for GP OOH, WIC and MIU combined).

12.4.3 Implementation results

At present NHS Direct manages 4.3m callers annually to the 0845 telephone service which would transfer to NHS 111 (http://www.nhsdirect.nhs.uk/news/factsandfigures). Using the all site impact analysis in Chapter 8, the revised GP OOH cost of £28.42, and removing NHS Direct 0845 services allows an estimate of the total annual cost to the NHS of introducing NHS 111 which includes future predicted service changes. The number of triaged calls to the four pilot sites during the observation period was 277k. This can be extrapolated into an estimated number of 7.8m calls to NHS 111 in England per annum. The implementation analysis has also been conducted using this estimate of NHS 111 triaged call volume.

Table 12.14 provides the implementation analysis results based on 4.3m annual calls to NHS 111. With the decommissioning of NHS Direct 0845, the impact on this service is removed to avoid double counting. The results show that removing the annual NHS Direct 0845 cost of £141m has a large impact on the economic analysis, with NHS 111 certain to have a cost saving impact on the urgent and emergency care system (based on a simplistic analysis with limited cost data). These results should be considered alongside the limitations detailed in the methods section, and will be explored further in the chapter discussion section.

Table 12.14: Total implementation analysis (for 4.3m annual NHS 111 calls)

	Parameter	se	Monthly change in activity	Monthly cost impact	Lower bound	Higher bound
ED Activity	-0.001	0.033	-358	-£41,389	-£2,718,460	£2,635,681
Ambulance Calls	0.003	0.017	1075	£35,368	-£357,448	£428,183
Ambulance Incidents	0.024	*0.008	8600	£1,729,460	£599,546	£2,859,374
NHS Direct	-	-	-	-	-	-
WIC/UCC/OOH	0.047	0.057	16841	£478,640	-£659,098	£1,616,378
NHS 111				£2,866,667		
Total monthly Impact - 0845 service				-£6,681,088	-£12,018,626	-£1,343,551
Probability of being cost-saving (with no 0845)				100%		

*= p<0.05

Table 12.15 shows the implementation analysis results based on 7.8m annual calls to NHS 111. As before, including the saving of £141m annually from decommissioning the NHS Direct 0845 service has a significant impact on the cost of the NHS 111 service. NHS 111 costs £5m per month to triage 7.8m calls annually. However the impact on the urgent and emergency care services, and the £141m saving from decommissioning NHS Direct 0845, results in a net saving of £2.5m per month (based on a simplistic analysis with limited cost data). The probability of being a cost saving service is 94%

when the uncertainty in the parameter estimates is sampled 10,000 times. However, these results are all dependent on how much money is saved by decommissioning the NHS Direct 0845 service.

Table 12.15: Total implementation analysis (for 7.8m annual NHS 111 calls)

	Parameter	se	Monthly change in activity	Monthly cost impact	Lower bound	Higher bound
ED Activity	-0.001	0.033	-654	-£75,496	-£4,958,580	£4,807,587
Ambulance Calls	0.003	0.017	1961	£64,512	-£651,emergency	£781,022
Ambulance Incidents	0.024	0.008	15687	£3,154,604	£1,093,596	£5,215,612
NHS Direct	0.000	0.000	0	£-	£-	£-
WIC/UCC/OOH	0.047	0.057	30720	£873,059	-£1,202,221	£2,948,338
NHS 111				£5,228,915		
Total monthly Impact - 0845 service				-£2,504,240	-£12,240,121	£7,231,641
Probability of being cost-saving (with no 0845)				94%		

*= p<0.05

12.5 Discussion

12.5.1 Summary of findings

An economic analysis was conducted for each of the four pilot sites relative to the three matched control sites to assess the economic impact of NHS 111 on the urgent and emergency care system. For each of the four pilots, it was not clear whether NHS 111 would increase or decrease the cost of the urgent and emergency care system. The uncertainty around the estimates of impact on each service resulted in cost estimates which spanned cost-positive and cost-saving probabilities for all four sites. For three of the four pilots, NHS 111 was likely (based on point estimates and sampled estimates) to have a positive cost impact for the NHS, that is, cost the NHS money. A statistically significant cost saving was observed in three of four pilot sites via reduction in NHS Direct activity; however this was offset by the cost of NHS 111 and the increased impact on other urgent and emergency care services.

Estimates of the cost impact per NHS 111 call were derived, both from the economic analysis, and also from including the total monthly system costs (i.e. the sum of the monthly costs of each service) in the impact analysis to account for the correlations between services. The estimates derived from both analyses showed consistency and highlighted that correlations between services do exist. In

three of the four sites, both analyses reported that NHS 111 would cost money. In one site both analyses were consistent in estimating a cost saving. For all sites combined the conclusion was that NHS 111 was unlikely to be cost saving.

An economic analysis was then performed making assumptions about the national implementation of NHS 111. This was a simplistic analysis using limited cost data and was not the primary objective of the economic evaluation. This analysis incorporated potential service changes anticipated by the Department of Health. The analysis included a revision to the cost of providing GP out of hours services if NHS 111 replaces the telephone call handling aspect of this service. The analysis also attempted to account for the replacement of the NHS Direct 0845 telephone service. Disaggregating the various activities of NHS Direct to estimate the cost attributable to the 0845 service was challenging; however a saving annually of £141m was estimated in the analysis, and included as a saving to the monthly impact of NHS 111 on urgent and emergency care services. The effect of these changes on the economic impact of NHS 111 was large. Two estimates of the annual call volume to NHS 111 were used in the analysis, and with both it was likely that NHS 111 would save the NHS money (based on a simplistic analysis with limited cost data).

12.5.2 Strengths and limitations

The strength of this analysis was the attention paid to uncertainty of estimates used, with display of lower and upper estimates as well as best estimates. The analysis was undertaken in two parts to allow consideration of the economic impact of the observed pilots and of the implementation of NHS 111 nationally.

Attention needs to be paid to the limitations of the analysis. First, detailed costs were not available to us, and the services included may reflect a narrow view of the total impact that NHS 111 may have across the NHS. Second, health benefits were not included. It is possible that increased use of some services was appropriate and improved people's health and this has not been considered. Benefits such as improvements in people's perceptions of urgent care have not been included here, but there was no evidence that they occurred (Chapter 7). Third, the use of a steady state estimate of NHS 111 calls may be a potential limitation due to the dynamic nature of the NHS, and gradual behaviour change as NHS 111 becomes established. The use of this economic analysis for long term predictions is not recommended. Fourthly, the analysis may include some double counting of the emergency call triage component. This is because NHS 111 undertakes the triage of calls and any calls requiring an emergency ambulance response are directed straight to the ambulance service dispatch queue with no further triage by the ambulance service. However, the dispatch of an ambulance will be recorded by the ambulance service as an ambulance incident and the cost of call triage is included in the unit cost of an ambulance incident. This means that the cost of triage is included twice – once for NHS 111 and again for the ambulance service although no ambulance service triage actually takes place. In practice, the triage component is likely to be a small proportion of the total unit cost of an ambulance incident, and NHS 111 undertaking the triage before ambulance dispatch is unlikely to significantly alter the staffing of ambulance service emergency telephone call handling. Fifthly, the estimates for the costs associated with a national service have been calculated

using the number of triaged calls only and any further analysis will need to account for non-triaged calls.

the assumption is made that it is feasible for NHS 111 to take over call handing for GP OOH services e.g. GP OOH contractors may not be willing to release money from current contractual arrangements.

Trying to account for NHS 111 replacing GP OOH call handling and NHS Direct 0845 has required considerable assumptions over the size of the savings made to the urgent and emergency care system. The results of this analysis should be considered with caution, and further research should be undertaken to fully establish the economic impact of NHS 111 replacing existing services.

12.5.3 Implications

From the pilot studies, there was no evidence that NHS 111 saved money. It appeared to cost money and policy makers must consider whether consequences/benefits other than changes in service use have been realised from this extra cost. When considering the implementation of NHS 111 nationally, future service changes must also be accounted for. It appears that money may be saved if NHS 111 replaces NHS Direct 0845 and the call handling component of GP OOH services (based on a simplistic analysis and limited cost data). We highly recommend that more accurate cost data are used to explore this further.

13. Comparison of models

13.1 introduction

In each of the previous chapters we presented findings for each of the four pilot sites. Here we present a summary of key issues and findings about each site to facilitate model comparison. We also present combined findings for all sites.

13.2 Results

Comparison of the different operating models shows some consistencies and differences in the operation of services, the views of users of the service, the impact on access to and use of the emergency and urgent care system and the costs associated with delivering NHS 111 (Table 13.1).

In terms of **consistencies** across all models we found the following features:

- All services were compliant with national quality requirements for call answering times and abandonment rates.
- There was no evidence of impact on satisfaction with the urgent care system
- Satisfaction of users of the new service was comparable across all four sites, as was compliance with the advice given
- There was little impact on the use of other emergency and urgent care services within the emergency and urgent care system. The exception was calls to NHS Direct where a statistically significant reduction was found overall.

The clear **differences** between the ambulance service provider model and the NHS Direct provider models were:

- The NHS Direct model had higher triage rates, higher 'transfers for clinical advice' rates, higher 'no service dispositions' rates and longer average episode times.
- The ambulance service model had higher call rates per 1000 population and shorter average call episode times.

Features where there was **variability** between service models were:

- Call origin was variable across sites and a higher direct call rate was associated with higher awareness of NHS 111 and a higher proportion of people reporting using NHS 111 as the first point of contact in the population survey.
- The two services (Durham & Darlington and Lincolnshire) with highest awareness were also the two services where preparedness and integration with other services were perceived to be highest in the stakeholder interviews.
- Only one pilot site has shown the potential for cost savings to the NHS

- Emergency ambulance incidents where there was a trend towards an increase in activity in all sites but this was only statistically significant in one site.

Table 13.1 Summary of findings by site

	Durham & Darlington	Nottingham	Lincolnshire	Luton	Overall (95% CI)
Model					
Lead	Ambulance	NHS Direct	NHS Direct	NHS Direct	
% calls direct dial 111	51%	31%	100%	61%	61%
% calls triaged	71%	81%	86%	86%	81%
% triaged calls clinical advice	21%	29%	34%	34%	29%
% triaged calls =no service	11%	30%	23%	24%	22%
Mean length of call (min)	6	12	13	11	10
Compliance with call abandonment and answering standards	Yes	Yes	Yes	Yes	
Dose					
Triaged calls per year per 1000 population (routine)	189	149	122	165	154
%system users use NHS 111 as first contact (pop survey)	11%	2%	11%	5%	7.5%
Population awareness					
% population aware of NHS 111 (pop survey)	73%	39%	74%	48%	59%
% users clear about when to use (user survey)	90%	77%	91%	83%	86%
Publicity (stakeholders)	Good		Good		

	Durham & Darlington	Nottingham	Lincolnshire	Luton	Overall (95% CI)
User satisfaction					
% advice 'very helpful'	68%	59%	70%	61%	65% (63,68)
% 'very satisfied' overall	74%	71%	77%	65%	73% (71,75)
Compliance with advice					
% full compliance	88%	85%	86%	83%	86% (84,88)
Impact on perceptions of urgent care					
Change in entry to urgent care system satisfaction (system users)	-0.08	+0.06	-0.12	-0.05	
% change in population satisfaction with urgent care	-2%	1%	3%	5%	
Impact on service use					
ED	No	No	No	No	No
UCC/WIC/MIU/GPOOH	No	No	No	No	No
NHS Direct	-991 cpm	-563 cpm	No	-508 cpm	-193 cpm
Ambulance calls	No	No	No	No	No
Ambulance incidents	No	No	+368cpm	No	+29 cpm
Local health economy					
Preparedness (stakeholder perceptions)	Prepared		Prepared		
Integration (stakeholder perceptions)	Integrated		Integration		
Monthly cost impact (£)	+64,604	+44,088	+218,068	-64,056	+307,782

Cpm=calls per month

13.3 Discussion

The evaluation has shown that there are strengths and weaknesses between sites rather than specific models of delivery that perform better than others. There was no clear best or optimal model.

The NHS Direct provider models made more use of clinical advice as part of the call handling process and a larger proportion of calls were directed to "no service". Closer inspection of these statistics reveals that the proportion of calls receiving self care advice, although larger in these sites than the ambulance service model, was less disparate and the real difference was in the calls classified as non clinical. This may be a feature of the history of a service as the ambulance service model was also a site that moved from a Single Point of Access service to NHS 111 so the change, in terms of public use of telephone services to access care, may have been less confusing for local populations. One of the more recent NHS 111 sites implemented in Derbyshire has also developed from a SPA service and the dispositions for "no service" recorded in the most recent NHS 111 minimum data set show a profile similar to that recorded in this evaluation for Durham & Darlington, that is, a lower total proportion of calls assigned to no service and a small (2%) number assigned as non clinical compared to the 10-16% recorded in the NHS Direct-led sites. Further investigation is required to identify why this difference between sites is present.

The higher levels of service awareness found in two services (one ambulance provider, one NHS Direct provider) compared to the other two sites suggests that success of a service is less to do with the actual provider and more dependent on the wider issues around how the service has been developed and implemented within a health economy. The perceptions from the stakeholder interviews was that the Durham & Darlington and Lincolnshire sites had high levels of clinical engagement with other services, preparedness for implementing NHS 111 and had active marketing campaigns to inform both the public and other health services about the service changes. This fits with the key features of successful implementation identified in the early "lessons learned" work reported in our first interim report (Turner et al 2011a) and summarised in Chapter 4 of this report. The economic evaluation also showed little advantage of one type of service provider over another in terms of cost savings to the NHS.

Finally, it is important to recognise that this evaluation has measured processes and outcomes of the four pilot sites during the first year of operation and that these four sites were the first to implement a completely new service. Introducing a new service is always challenging and early adopters will identify what works well and also what does not work well as the service matures. Over the course of the first year the four pilot sites have reviewed and refined their operations and as a result will have changed. For example, the proportion of calls triaged has increased in Durham & Darlington from the 71% reported during the first year to over 80% as it enters its second year of operation. The number of direct dial calls has increased in both Durham & Darlington and Luton and all four sites have reviewed and modified their Directories of Service. All four pilot sites will have changed in some way and it is therefore probably unrealistic to identify an "optimal" model after one year of operation but rather that during this time some of the salient features that appear to be working well, as described above, can be identified and a longer period of operation during which services adapt and change with experience is needed to further refine delivery of NHS 111.

14. Discussion and conclusions

14.1 Summary of main findings

We have evaluated the operation and impact of four NHS 111 pilot sites during the first year of operation. The main findings of the evaluation are:

- There was a high level of awareness about the new service in two pilot sites and low levels of awareness in two sites.
- 353,000 calls were answered by NHS 111 in the first year and over 80% of these calls received a clinical assessment. Call volumes increased during the first few months of operation and then stabilised to a steady state in all four pilot sites. All pilot sites met and exceeded the national quality standards for abandoned calls and proportion of calls answered within 30 seconds. All of the pilot sites made some call backs for calls that required clinical advice but this accounted for less than 2% of answered calls. The major clear operating difference between the sites was the proportion of calls transferred for further clinical advice, with this being a third higher in the three NHS Direct-provided sites than the one ambulance service-provided site. There were shorter average episode times in the ambulance service provided site but a higher proportion of patients not referred to a service in the NHS Direct provided sites, including provision of self care advice. In all of the sites the highest proportion of calls was directed to primary care and 9-13% received an emergency ambulance response.
- Users were satisfied with the new service, with over 90% of respondents saying they were very or quite satisfied with NHS 111. Users complied with advice at a level expected for telephone triage. There was some indication that NHS 111 needs to review the relevance of questions asked and the advice given for some types of calls. A small expert panel assessment of NHS 111 cases in one site showed that most of a purposively sampled set of cases were judged to have received care that was “right place, first time”. Areas identified for improvement included relevance of questions asked, advice given (particularly about children), possible over triage to emergency ambulance dispatch and the ability to refer to specialist services.
- Stakeholders who had been involved in developing and delivering NHS 111 were generally enthusiastic about the service and believed that patient benefits could be achieved. They were less convinced about the likely impact on the wider emergency and urgent care system, particularly in the short term.
- There was no evidence that NHS 111 improved satisfaction with urgent care generally. Neither has it had the expected effect of reducing use of emergency care services by shifting care to urgent care or other services. There was a reduction in calls to NHS Direct and an increase in the number of ambulance service incidents associated with the introduction of NHS 111.

The economic evaluation has concluded that NHS 111 pilot sites are unlikely to have produced cost savings. The estimated economic impact of NHS 111 on the emergency and urgent care system varied from +£218,000 to -£64,000 per month across the four sites. These costs were related to

increased use of other services within the emergency and urgent care system following the introduction of NHS 111. Consideration of replacement of NHS Direct 0845 calls and GP out of hours call handling, identified that NHS 111 could potentially save the NHS money but this analysis is based on considerable assumptions and limited cost data.

14.2 Has NHS 111 achieved the expected benefits?

In Chapter 1 we described the expected benefits of NHS 111 which centred on two principle objectives: providing an efficient, easy access entry point to integrated services to improve the patient and carer experience, and improving efficiency in the emergency and urgent healthcare system. We discuss here the extent to which these objectives have been realised after one year of operation.

A quality service in operation

NHS 111 was established successfully in all four pilot sites and met its required quality standards. This is an excellent achievement by commissioners and service providers, particularly given that it occurred at such a difficult time for the NHS which faced major reconfigurations of commissioning and demands for resource reduction. The stakeholders involved in establishing the pilots deserve recognition for the tremendous efforts this required. The high levels of awareness achieved in two of the sites during the first year of operation was exceptional for a new service and all the pilots were well used from an early stage, with the two busiest pilot sites each triaging about 10,000 calls per month. Some integration between services was achieved, for example, the ability of NHS 111 call advisors to dispatch an ambulance without further triage and the links in some pilot sites that allowed appointments to be made with urgent care services during the initial call to NHS 111. However, stakeholders felt there was more opportunity for integration. User satisfaction was very good, operating at a level reported for other telephone based services. This was also the case for compliance with the advice given. There was evidence from both the user survey and the expert panel that the service needed to review the relevance of questions asked for some symptoms and age groups, and the reasons for some users experiencing long pathways to get to the right service, for example, by being referred to a GP out of hours service and then on to an emergency department. The need for some emergency ambulance dispatches was also questioned suggesting that there is scope for further refinement of assessment and referral pathways.

Satisfaction with urgent care

The population surveys did not show any increase in satisfaction with the urgent care system. This was disappointing given that the main push for a three digit number came from concerns about the general public's confusion and frustration with access to urgent care. This lack of impact could be explained by the small 'dose' of NHS 111 in the system, in terms of accounting for only one in ten first contacts with the emergency and urgent care system, but may also be due to aspects of NHS 111 not working as planned (relevance of questions and advice for some users) and the need to offer more integration with other services.

Shift in demand from emergency to urgent care

The improvements in efficiency in the emergency and urgent care system were not realised in the pilot sites. We have conducted a rigorous analysis assessing the impact of NHS 111 on use of key services in the emergency and urgent care system. The main impact has been on calls to NHS Direct where a statistically significant reduction in calls to this service following the introduction of NHS 111 has been found. This change is to be expected as people become aware of the availability of the 111 number. There was no strong evidence of a shift from ambulance service and emergency department use to urgent care services. We did not measure the use of urgent day time general practice but there is some possibility (evidenced from our population survey) that NHS 111 may have affected this. There was a statistically significant increase in ambulance incidents associated with the introduction of NHS 111 in one pilot area and in the combined data for all four pilot sites. It is difficult to explain why service use has not changed in the ways expected. One expectation of NHS 111 is that, with the availability of clinical advice at the time of the call, more calls might be directed to self care alone or self care until a routine appointment can be made. The results of the first year of operation shows that a relatively small proportion of 7%-11% of all triaged calls are given self care advice suggesting the scope for self care alone is small. However it is possible that the integration of services and ability to make appointments might encourage more use of out of hours care rather than providing self care advice and directing callers to make routine appointments with in-hours services. Additional analysis of any change in activity between in hours and out of hours primary care activity may help answer this question.

An unexpected finding was the statistically significant increase in ambulance service incidents following the introduction of NHS 111. An expected advantage of NHS 111 was that it would reduce demand for the emergency ambulance service in the longer term, particularly less urgent category C calls, by directing the public to use 111 instead. However, the opposite seems to have happened. Again it is difficult to explain this finding but there are some possibilities that would be worth further investigation. Firstly, calls to NHS 111 that are assessed as needing a emergency ambulance are transferred directly to the ambulance dispatch queue for an ambulance response. What we do not know is, if the same call had been triaged by the ambulance service would a response have been sent? In the Durham & Darlington site where the same clinical assessment system is used to triage emergency and NHS 111 calls it would be expected that the answer would be yes; however, ambulance incidents increased in this pilot site relative to the control site although this was not statistically significant. The relationship between triage outcomes for the same calls assessed as a emergency call or a 111 call needs further investigation. It is also possible that calls are being over triaged to emergency, a factor identified in a small number of cases by our expert panel, and, as ambulance dispatch is an integrated process, calls assessed as requiring an immediate emergency department visit are being directed to the ambulance service even if the patient could safely be asked to make their own way there. The ability to directly dispatch may be encouraging rather than reducing demand for emergency ambulances. In our four pilot sites the service with the lowest impact on emergency ambulance incidents was the one that did not have the necessary technical links to directly dispatch ambulances and used a more complex manual system. The ability to directly refer for appointments or dispatch ambulances may be influencing call advisor behaviour and is worth more

detailed exploration. A complementary study currently being conducted by the University of Southampton on workforce and NHS 111 may shed some light on this issue.

It would also be useful to examine in more detail the outcomes of ambulance responses generated by NHS 111 in terms of whether or not a patient is subsequently transported to hospital. An alternative view could be that if, by providing a face to face assessment and treatment in the home and therefore avoiding a hospital attendance then an increase in ambulance incidents might be acceptable. This would fit with the aspirations of ambulance services to become a mobile health service but the resources and associated costs of providing an increased primary "treat and leave" service, rather than just a transport service, would need to be properly integrated in to NHS 111 service plans and care pathways.

Although not explicitly stated in the expected benefits of NHS 111, it can be assumed that any improvement in efficiency in the emergency and urgent care system should also bring cost savings. The economic evaluation has shown that NHS 111 as currently delivered in the pilot sites cannot be expected to produce cost savings and the impact of increased utilisation of the emergency and urgent care system is likely to increase the costs of providing urgent care. A national service with NHS Direct 0845 calls and GP out of hours call handling moving to NHS 111 could potentially save the NHS money but the estimates are based on considerable assumptions and limited cost data . Additional cost savings are only likely to be realised if either demand in the system is reduced or there is a measurable shift of service utilisation from high level to lest costly lower level care.

14.3. Wider considerations

14.3.1 What would happen if the dose of NHS 111 in the system was bigger or had operated for longer?

We have examined the operation of four pilot sites during the first full year of operation and not detected any significant impact in terms of improved perception of urgent care, reduced use of emergency care or realisation of cost savings. These findings need to be considered alongside some important issues:

- Are these findings a consequence of the fact that, in four pilot sites serving a total population of around two million people, current NHS 111 provision is a small dose in a large emergency and urgent care system and that to realise the full benefits, NHS 111 may need to be operating on a larger scale as part of a national network where use of 111 for urgent care has become as familiar to the public as the emergency service? In particular that population awareness of the service increases from between 39% and 74% to close to 100%. NHS 111 is a significant service provider, dealing with numbers of a similar order to emergency departments and the emergency ambulance service in the pilot sites. However, it is also the case that the service has been able to influence only one in ten episodes of use of the wider emergency and urgent care system including urgent day time general practice. So there is some support for the argument that the lack of impact may be explained by the small dose of the new service. However, as experienced evaluators of these types of services, we consider that simple expansion over time is unlikely to deliver benefits. There is a need to review the

assessment process within NHS 111, and there is scope to further integrate NHS 111 within a comprehensive urgent care strategy for health economies. To some extent this has been achieved with the co-operative working demonstrated in the pilot sites to develop the Directories of Service but the stakeholder opinions support the view that there is scope to develop this much further.

- A year may be too short a time to realise the full benefits of a new service. This must be considered when evaluating the first services providing a change in healthcare provision. The 'lessons learnt' from the four pilot sites revealed the complexities in developing and planning the implementation of the new service. It takes time for early problems to be identified and resolved, for the service to become established with users, and for reflection on how the service has operated to date and how it can be further improved. The stakeholder interviews supported the view that NHS 111 is very much a developing and evolving service which requires further refinement and a national campaign to establish its role with the public. The results of the impact evaluation, expert panel and user surveys provide valuable information for the pilot sites and future providers to refine the clinical assessment. This will be an ongoing process and it may take several years before an "optimum" service is attained.
- The impact assessment was particularly challenging because there were so many other changes occurring within the emergency and urgent care systems of the pilot and control sites, making it difficult to detect the contribution of a single service. To do this, stability is required in both pilot and control sites but this is rarely true in health care systems where there is constant change. The "noise" created by these changes made evaluating changes in use of health services difficult but not impossible. It also provides a useful illustration of the importance of the "system" in emergency and urgent care. Alongside NHS 111 there were various re-organisations of services, such as opening walk in centres and urgent care centres and demand management schemes such as emergency department diversion schemes where the effect on service utilisation could be seen in the impact analysis graphs. This highlights an important point which is, in looking to improve efficiency in an emergency and urgent care system, there are many strategies that can be employed. It is probably unrealistic to expect any one service, such as NHS 111, to do everything and the real improvements may only be gained when a series of co-ordinated measures designed to increase efficiency across all services are implemented.

14.3.2 Is the model good in theory?

The provision of a telephone service which quickly guides people needing urgent care advice to the most appropriate service is sensible given repeatedly expressed concerns by the general public about confusion around which service to access when needing urgent care. Key aspects of the service such as an easy-to-remember number, emphasis on fast triage and smooth transfer to the 'right service, first time' are desired by the general public. However, NHS Direct is a current part of the established emergency and urgent care system, offering telephone triage to direct people to the most appropriate care. This begs the question of why a new telephone triage service is required and why it can be expected to perform differently from NHS Direct. One argument is that people need an easy to remember number so they can call without having to hunt down the longer number of NHS Direct.

This makes sense in terms of offering immediate easy access for people in times of stress. One solution could have been to change the NHS Direct telephone number. However, the type of situations at which NHS 111 is aimed at currently is different from NHS Direct. The bulk of calls to NHS 111 are from callers who would previously (or indeed still do and are re-routed) have contacted an Out of Hours urgent care provider or possibly the emergency ambulance service, although some would have called NHS Direct as evidenced by the significant decrease in calls to this service detected in our impact analysis. So, callers to NHS 111 have already, for the most part, made a decision that their health problem is sufficiently urgent that they need to directly contact a service. Callers to NHS Direct, in contrast, are probably more likely to contact this service because they are uncertain that their problem is sufficiently urgent and need further guidance on which service, if any, they need to contact. There is therefore likely to be a difference in the clinical needs of people calling NHS 111 and NHS Direct and indeed the way the services operate reflects this difference in two key areas:

Firstly, NHS 111 has been specified and set up to deliver clinical assessment and referral within a single call and minimal call backs which should be within 10 minutes. This not only improves the patient experience but also minimises clinical risk in a population more likely to have an urgent problem that needs contact with a service. In contrast, call backs are a common feature within NHS Direct and the timeframe can in some cases be measured in hours rather than minutes. The lower acuity of calls to NHS Direct may also be reflected in the larger proportion of patients who can be managed with home care advice.

Secondly, a key feature of the NHS 111 service is the requirement to be able to 'warm transfer' calls to the ambulance service, clinical advisors and, where possible, provider services. The current NHS Direct service cannot 'warm transfer' to ambulance services and, whilst not absent, there has been less emphasis on the development of technical links that enable completion of an episode, including referral to an appropriate service, within a single call. Changing NHS Direct to NHS 111 could not therefore be achieved by simply changing the telephone number. Significant service development and resourcing would still have been required in order to provide a service with minimal call backs, the necessary technical links and the Directory of Services development that links assessment to service. It is not, therefore, axiomatic that the existing NHS Direct service could simply be switched to the NHS 111 service. The level of development needed means there is scope for a range of other current providers of urgent care call handling and assessment services, including the ambulance service and GP Out of Hours services, to deliver NHS 111. This is reflected in the pilot sites with an ambulance service provider site and in the emerging NHS 111 services where existing Single Point of Access services (Derbyshire) or combinations of providers (Lancashire & Cumbria) are providing alternative service models.

14.3.3 Replacing NHS Direct

The policy plan is that NHS 111 will replace NHS Direct. There are significant implications to this strategy.NHS Direct was established to direct people to the right place but also in practice offers advice to people who do not need contact with a service. As discussed above, the emphasis of NHS 111 is on direction to right place rather than reassurance and self care advice and the service has

been designed to wherever possible complete an episode within a single call at the time of the call. If current callers to NHS Direct are shifted to NHS 111 the call volumes will increase substantially, the characteristics of the population using the service will change and consideration will need to be given to how the principles of NHS 111 in terms of minimal call back and warm transfers, particularly for clinical advice, can be sustained.

We have shown that it is possible that NHS 111 replacing NHS Direct makes economic sense (in combination with other changes) because the cost of an NHS 111 call is lower than the cost of an NHS Direct call. However, consideration needs to be given to the fact that the case mix of both services is likely to be very different, that NHS Direct offers more services than their 0845 number, that NHS 111 increases the use of emergency ambulance incidents in its current format, and that decommissioning costs need to be considered in the economic equation.

14.3.4 Are some models better than others?

Although the four pilots in the evaluation operated differently to some extent, they seemed to produce the same lack of measurable benefit in terms of improving urgent system user satisfaction and reducing use of emergency care services. The NHS Direct-provided models utilised clinical advice more frequently and directed a larger proportion of callers away from a service contact, but this did not seem to result in any significant shift in wider urgent care system use or cost savings. The technical links between NHS 111 and the urgent care providers in Durham & Darlington that enabled appointments to be made at the time of the 111 call without having to transfer the caller to another service was viewed as a significant improvement by stakeholders and was valued by some service users. Further development of this strategy may be a key feature of future NHS 111 development. Overall, we could not detect any clear evidence of the superiority of one type of model over another. This may be because the optimum model does not yet exist or that there is no single “best” model. It may be that the fit of any NHS 111 service with the wider urgent care strategy for any given locality is the important factor and that rather than a whole model it is elements of models which appear to be working well or not. During the course of the evaluation three other NHS 111 services have been introduced and each one is of a different design than the four pilot sites we have considered. The key findings of this evaluation are transferable in that it can provide useful information about factors that need to be considered when developing an NHS 111 service but further research examining the impact of alternative service models will be needed to better understand the relationship between service model and the achievement of benefits.

14.3.5 Changing demand

Another important question to consider is whether NHS 111 increases demand because more people use it than would use the current urgent care system. We could see no evidence of this in our population surveys but some evidence of it in the impact analysis. It is possible that, once NHS 111 is a national service with a higher profile, then demand for the service could change. In addition, the impact analysis has shown trends of increased utilisation of some services in some areas following the introduction of NHS 111 and a significant increase in ambulance service incidents. Although some

of these increases were not significant there is the potential that, without further development work on the process of matching calls to services, there may be an overall increase in demand for some services across the urgent care system.

14.3.6 Non-clinical call handlers

NHS111 has non-clinical call handlers using NHS Pathways software to triage calls at the frontline of the service, with later clinical input from nurses for a minority of calls. There have been some concerns expressed about the safety of callers not having immediate contact with a doctor or a nurse (http://www.bma.org.uk/images/nhs111_gpcguidance_tcm41-211819.pdf). It is worth noting that there are other services in the emergency and urgent care system with non-clinical call handlers formally or informally triaging calls: the emergency ambulance service has non-clinical call handlers triaging emergency calls using either AMPDS or NHS Pathways, with 10% of calls not being sent a response in the form of an ambulance or first responder; access to urgent care in general practice is through receptionists who do not use software and callers can be asked to try again the next day when appointment slots run out; and NHS Direct call handlers undertake triage by contacting a emergency ambulance for some callers and prioritising call backs for nurses during busy times. It is also the case that similar concerns were expressed about nurses rather than doctors triaging when NHS Direct was launched. Nonetheless the use of non-clinical call handlers is an important issue to consider. In our user survey, less than 10% of respondents expressed a view that they were dissatisfied with the call handling process and most callers were referred to a service to receive immediate clinical contact, although some people did not comply with this advice.

14.3.7 NHS Pathways

Of triaged calls to NHS 111, 70-80% were referred to another service at the time of the call. As illustrated by the variation between sites in the proportion of calls managed without referral to a service, and comments made by our expert panel members who reviewed a sample of NHS 111 calls, there may be some scope to further examine the profile of calls referred for clinical advice and consider the balance of NHS Pathways dispositions directed to non-service solutions by non-clinical call handlers, particularly if the call profile changes as NHS Direct calls are routed to NHS 111.

14.4 Strengths and limitations

14.4.1 Strengths

There are four key strengths of this evaluation. First, the central design of a controlled before and after comparison of routine and survey data is the strongest available in the hierarchy of evidence when a randomised controlled trial cannot be used. Second, the aim of NHS 111 was to improve perceptions of urgent care and we were able to use a recently developed and validated methodology to measure this. Third, we addressed a wide range of important research questions on economics,

impact and processes using a range of approaches that have included use of routine data, incorporating the views and experiences of people using the service and taking account of the views and experiences of key stakeholders who were involved in service development and implementation. Finally, the evaluation has been timely: the first pilot began in July 2010 and the evaluation has reported within two years of this.

14.4.2 Limitations

There are a number of limitations to the evaluation. The decision to roll out the NHS 111 programme nationally meant that the economic evaluation coincided with service procurement processes. This meant cost information became a sensitive issue and as a result there was a lack of detailed information to inform the costings for economic analysis. For the impact analysis we used routine data but in some areas this was difficult to retrieve in the planned format (e.g. separately for GP OOH and other urgent care services such as WIC/UCC/MIU). There was considerable noise in the emergency and urgent care system as we attempted to measure the impact of a single service. We conducted two surveys to assess users' views and experiences but the response rates were lower than we had expected at 41%; findings of these surveys may be subject to non-response bias and the views of some groups of service users may not have been fully represented. Our intention to include a broad range of stakeholders in the stakeholder interviews was not achieved due to a lack of access to some important stakeholders. The implementation analysis of national service costs was simplistic, relying on a large number of assumptions and limited cost data. Finally, we evaluated the four pilot services, as originally intended, during the first full year of operation. However, the experiences of the pilot sites in terms of the delays and problems they had to overcome to ensure the service was robust indicate the complexity of this new service. These services are continuing to evolve and develop and it is entirely possible that one year is too short a time in which to be able to assess the real impact of NHS 111.

14.5 Key Messages

We have evaluated four pilot NHS 111 services during the first year of operation. The key messages from this evaluation are:

- NHS 111 providers in four pilot sites successfully established new services which operated to expected quality standards in a challenging NHS environment.
- There was a high level of awareness of the new service within the first year in the general population in two pilot sites.
- The service was well used with almost 300,000 calls triaged during the first year and was liked by users who reported a high level of satisfaction and compliance in line with evidence from other telephone triage services
- There was no change in satisfaction with the urgent care system.
- NHS 111 did not appear to improve efficiency within the emergency and urgent care system and there was evidence that it increased emergency ambulance incidents.

- The detailed economic analysis of each pilot site identified a low probability of cost savings to the emergency and urgent care system. A simplistic analysis identified the potential for cost savings when considering the implementation of NHS 111 nationally, which would include NHS 111 replacing NHS Direct 0845 services and GO out of hours call handling, but additional analysis using more detailed cost and activity data is needed to explore this further.
- If all current callers to NHS Direct shift to NHS 111, call volumes will increase substantially, the characteristics of the population using the service will change and consideration will need to be given to how the principles of NHS 111 in terms of minimal call back and warm transfers, particularly for clinical advice, can be sustained.
- An expert panel and user survey identified a well performing service, as well as ways of improving the assessment process within the new service for some types of calls.
- The lack of impact of NHS 111 on improving satisfaction with urgent care and reducing use of emergency services in its first year could be explained by the small 'dose' of NHS 111 within the emergency and urgent care system or the early stage of development at which it was evaluated (one year). Interviews with stakeholders showed that NHS 111 is still very much regarded as a work in progress with potential for further development. However, it cannot be assumed that increase in use, and time, will produce expected benefits.
- A reassessment of NHS 111 is needed to increase the likelihood of obtaining expected benefits and transforming urgent care as originally envisaged.

14.6 Future Research

We have identified a number of key areas of additional research which are needed if NHS 111 is to be refined and improved:

- A more detailed appraisal of the reasons for the increase in ambulance incidents. This could include a review of the appropriateness of emergency ambulance dispositions by comparing the disposition outcomes of calls using NHS 111 and ambulance triage.
- More detailed analysis of the outcomes of calls where an ambulance is dispatched in terms of the numbers and proportions of patients who are subsequently transported to hospital or left at home.
- Further work to follow up the preliminary expert panel review, to provide a more robust assessment of where improvements in the call management and referral pathways of NHS 111 can be made. This could incorporate an appraisal of safety by including information on, for example, complaints or critical incident reports.
- Exploration of the reasons for differences between sites using the same assessment system in the proportion of calls referred for clinical advice and non-clinical service dispositions. This should be extended to include the more recently implemented NHS 111 services using different operational models to assess whether differences in triage dispositions are a consequence of the effect the operational model or other factors such as differences in call advisor behaviour.
- Additional economic evaluation to identify the cost consequences of a national roll out of NHS 111.

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Appendix A Pathways reported by NHS 111 users (Chapter 6)

Pathways with emergency service as a second or third service

First service	Second service	Third service	N=42	Compliance
GP	GP OOH	ED	2	Full compliance (n=2)
GP	GP OOH	emergency ambulance	1	Full compliance
GP	ED	emergency ambulance	1	Full compliance
GP	ED	pharmacy	1	Full compliance
GP	ED	Admitted to coronary care unit	1	Full compliance
GP	ED	-	4	Full compliance (n=3) Partial compliance (n=1)
GP	emergency ambulance	GP OOH	1	Full compliance
GP	emergency ambulance	ED	2	Full compliance (n=2)
GP	emergency ambulance	-	2	Full compliance (n=1) No compliance (n=1)
GP	NHS 111	ED	1	Partial compliance
GP OOH	GP	ED	3	Full compliance (n=3)
GP OOH	GP	emergency ambulance	1	Full compliance
GP OOH	ED	Admitted to hospital	2	Full compliance (n=2)
GP OOH	ED	-	5	Full compliance

				(n=5)
GP OOH	emergency ambulance	ED	3	Full compliance (n=2) Unknown (n=1)
GP OOH	emergency ambulance	-	2	Full compliance (n=1) Unknown (n=1)
UCC	ED	GP	1	Full compliance
UCC	ED	ED	1	Full compliance
UCC	ED	-	1	No compliance
UCC	emergency ambulance	ED	1	Full compliance
UCC	emergency ambulance	'Hospital admission'	1	Full compliance
WIC	ED	GP	1	Full compliance
WIC	ED	-	2	Full compliance (n=2)
WIC	emergency ambulance	ED	1	Full compliance
Hospital	GP OOH	ED	1	Full compliance

Appendix B – Population survey findings (Chapter 7)

Please note that Leicester is a control for Nottingham *and* Luton NHS 111 sites; data for this control is repeated in the tables below for ease reading the tables

Table 7a Response rates* to population surveys

	Durham & Darlington % (n/N)	North of Tyne % (n/N)	Nottingham % (n/N)	Leicester % (n/N)	Lincolnshire % (n/N)	Norfolk % (n/N)	Luton % (n/N)	Leicester % (n/N)
Before: 2010	28 (2001/7088)	30 (2027/6841)	27 (2008/7516)	28 (2013/7201)	28 (2000/7203)	28 (2000/7234)	28 (2000/7057)	28 (2013/7201)
After: 2011	28 (2003/7111)	28 (2006/7142)	29 (2006/6989)	28 (2002/7076)	27 (2000/7304)	27 (2004/7386)	28 (2001/7260)	28 (2002/7076)

*response rate calculation (numerator: questionnaires completed, denominator: all calls made which could have been answered and a questionnaire could have been completed. Calls were removed from the denominator if there was no one in the household who matched the remaining quota, the telephone number was unobtainable, or the number was engaged)

Table 7b Respondent demographic profiles to population surveys

	Durham & Darlington % (n)		North of Tyne % (n)		Nottingham % (n)		Leicester % (n)		Lincolnshire % (n)		Norfolk % (n)		Luton % (n)		Leicester % (n)	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Age																
0-4	6 (110)	5 (105)	5 (110)	6 (111)	7 (139)	6 (118)	6 (117)	6 (114)	5 (102)	5 (99)	5 (96)	5 (100)	7 (130)	7 (130)	6 (117)	6 (114)
5-19	17 (347)	18 (354)	18 (371)	19 (373)	18 (359)	17 (346)	23 (471)	22 (436)	19 (371)	18 (367)	17 (345)	17 (338)	27 (529)	23 (460)	23 (471)	22 (436)
20-44	32 (639)	33 (669)	29 (590)	29 (587)	40 (802)	39 (780)	35 (702)	35 (709)	29 (574)	28 (568)	29 (578)	30 (595)	33 (658)	36 (716)	35 (702)	35 (709)
45-64	28 (557)	27 (533)	29 (586)	28 (565)	23 (460)	25 (500)	23 (455)	24 (471)	28 (554)	28 (564)	28 (558)	28 (555)	21 (422)	22 (432)	23 (455)	24 (471)
65+	17 (348)	17 (342)	18 (370)	18 (370)	12 (248)	13 (262)	13 (268)	14 (272)	20 (399)	20 (402)	21 (423)	21 (416)	13 (261)	13 (263)	13 (268)	14 (272)
Sex																
Male	48 (960)	49 (978)	47 (955)	48 (967)	48 (967)	49 (974)	46 (923)	48 (969)	49 (986)	49 (984)	48(954)	49 (975)	47 (933)	49 (989)	46 (923)	48 (969)
Ethnicity																
White	98 (1956)	98 (1962)	96 (1937)	95 (1903)	81 (1609)	85 (1698)	66 (1314)	66 (1321)	99 (1962)	98 (1954)	98 (1956)	97 (1936)	70 (1388)	70 (1379)	66 (1314)	66 (1321)

Table 7c Proportion of population seeking health care urgently

	Durham & Darlington % (n)		North of Tyne % (n)		Nottingham % (n)		Leicester % (n)		Lincolnshire % (n)		Norfolk % (n)		Luton % (n)		Leicester % (n)	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Sought care urgently	11 (226/2001)	10 (205/2003)	11 (223/2027)	9 (188/2006)	6 (114/2008)	8 (155/2006)	7 (142/2013)	7 (142/2002)	8 (161/2000)	7 (141/2000)	7 (140/2000)	6 (129/2004)	6 (120/2000)	8 (151/2001)	7 (142/2013)	7 (142/2002)
*P value**	*0.641*				*0.067*				*0.758*				*0.174*			

**p value relates to test of change in NHS 111 site v change in control site*

Table 7d System user demographic profiles

	Durham & Darlington % (n)		North of Tyne % (n)		Nottingham % (n)		Leicester % (n)		Lincolnshire % (n)		Norfolk % (n)		Luton % (n)		Leicester % (n)	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Age																
0-4	8 (19)	11 (22)	7 (16)	12 (23)	12 (14)	7 (11)	9 (13)	8 (11)	5 (8)	9 (13)	9 (12)	6 (8)	10 (12)	11 (17)	9 (13)	8 (11)
5-19	20 (44)	20 (40)	22 (50)	21 (40)	16 (18)	16 (25)	25 (36)	11 (16)	19 (30)	12 (17)	19 (27)	14 (18)	28 (33)	25 (38)	25 (36)	11 (16)
20-44	26 (59)	31 (63)	29 (64)	29 (54)	33 (37)	34 (53)	33 (47)	33 (47)	22 (36)	26 (37)	21 (30)	26 (34)	28 (33)	31 (46)	33 (47)	33 (47)
45-64	27 (62)	28 (57)	29 (64)	26 (49)	24 (27)	32 (49)	20 (28)	30 (43)	30 (49)	28 (40)	29 (40)	32 (41)	23 (27)	15 (23)	20 (28)	30 (43)
65+	19 (42)	11 (23)	13 (29)	12 (22)	16 (18)	11 (17)	13 (18)	18 (25)	24 (38)	24 (34)	22 (31)	22 (28)	13 (15)	18 (27)	13 (18)	18 (25)
Sex																
Male	47 (107)	48 (98)	44 (99)	41 (77)	47 (54)	44 (68)	37 (52)	44 (62)	36 (58)	39 (55)	46 (64)	47 (60)	38 (46)	39 (59)	37 (52)	44 (62)
Ethnicity																
White	99 (224)	98 (200)	97 (215)	95 (178)	91 (103)	84 (129)	73 (104)	74 (105)	98 (157)	99 (136)	99 (138)	98 (126)	77 (92)	74 (111)	73 (104)	74 (105)

Table 7e Services contacted during most recent use of the system*

	Durham & Darlington % (n)		North of Tyne % (n)		Nottingham % (n)		Leicester % (n)		Lincolnshire % (n)		Norfolk % (n)		Luton % (n)		Leicester % (n)	
	2010	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**
GP in hours	53 (119)	41 (83)	48 (108)	48 (91)	40 (46)	47 (72)	52 (74)	51 (72)	53 (86)	43 (61)	55 (77)	54 (69)	54 (65)	46 (69)	52 (74)	51 (72)
*P value***	*0.090*				*0.297*				*0.308*				*0.504*			
GP OOH	9 (21)	5 (11)	10 (23)	8 (15)	5 (6)	8 (13)	8 (11)	10 (14)	9 (14)	11 (15)	9 (13)	9 (11)	8 (9)	7 (11)	8 (11)	10 (14)
Emergency Dept	19 (43)	27 (55)	30 (66)	26 (49)	24 (27)	25 (39)	23 (33)	18 (26)	26 (42)	33 (47)	20 (28)	26 (34)	28 (34)	23 (34)	23 (33)	18 (26)
Ambulance	9 (21)	8 (17)	9 (19)	13 (24)	13 (15)	11 (17)	6 (9)	16 (22)	10 (16)	9 (13)	14 (20)	14 (18)	5 (6)	11 (17)	6 (9)	16 (22)
Walk in centre	17 (38)	19 (39)	13 (29)	12 (23)	17 (19)	11 (17)	18 (25)	10 (14)	3 (5)	4 (5)	6 (8)	4 (5)	12 (14)	13 (19)	18 (25)	10 (14)
NHS Direct	5 (12)	6 (13)	9 (20)	7 (13)	16 (18)	10 (16)	9 (12)	11 (15)	11 (17)	6 (8)	9 (12)	7 (9)	10 (12)	5 (8)	9 (12)	11 (15)
NHS 111	1 (3)*	13 (27)	0 (1)*	1 (1)*	0 (0)	2 (3)	0 (0)	0 (0)	0 (0)	15 (21)	0 (0)	0 (0)	0 (0)	6 (9)	0 (0)	0 (0)

*may have used it or simply thought they had used it

** p value relates to comparison of change in use of GP in hours in each NHS 111 site compared with its control

Table 7f FIRST service contacted during most recent use of the system*

	Durham & Darlington % (n)		North of Tyne % (n)		Nottingham % (n)		Leicester % (n)		Lincolnshire % (n)		Norfolk % (n)		Luton % (n)		Leicester % (n)	
	2010	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**
GP in hours	47 (106)	34 (70)	44 (99)	39 (74)	40 (45)	43 (66)	47 (67)	46 (65)	38 (54)	49 (68)	50 (65)	44 (67)	44 (67)	47 (67)	46 (65)	45 (73)
*P value***	*0.263*				*0.411*				*0.297*				*0.574*			
GP OOH	7 (15)	2 (5)	8 (17)	6 (12)	4 (4)	5 (7)	6 (8)	6 (9)	7 (11)	9 (12)	8 (11)	6 (12)	6 (7)	5 (7)	6 (8)	6 (9)
Emergency Dept	12 (26)	19 (39)	16 (36)	18 (33)	10 (11)	15 (23)	13 (18)	16 (22)	19 (30)	23 (32)	12 (17)	16 (21)	20 (24)	16 (24)	13 (18)	16 (22)
Ambulance	5 (12)	5 (10)	5 (12)	9 (16)	11 (13)	9 (14)	6 (8)	10 (14)	8 (12)	4 (6)	11 (15)	11 (14)	4 (5)	7 (11)	6 (8)	10 (14)
Walk in centre	13 (29)	12 (24)	8 (17)	10 (19)	10 (11)	8 (12)	11 (16)	6 (9)	3 (4)	3 (4)	3 (4)	3 (4)	7 (8)	12 (18)	11 (16)	6 (9)
NHS Direct	4 (10)	6 (13)	6 (14)	6 (11)	16 (18)	8 (13)	9 (12)	9 (13)	10 (16)	4 (6)	8 (11)	5 (7)	9 (11)	3 (5)	9 (12)	9 (13)
NHS 111	0 (0)	11 (22)	0 (0)	0 (0)	0 (0)	2 (3)	0 (0)	0 (0)	0 (0)	11 (16)	0 (0)	0 (0)	0 (0)	5 (8)	0 (0)	0 (0)

** p value relates to comparison of change in use of GP in hours in each NHS 111 site compared with its control

Table 7g Length of pathway of recent system users

Number of services	Durham & Darlington % (n)		North of Tyne % (n)		Nottingham % (n)		Leicester % (n)		Lincolnshire % (n)		Norfolk % (n)		Luton % (n)		Leicester % (n)	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
One	56 (127)	56 (115)	56 (125)	63 (118)	56 (64)	70 (109)	57 (81)	68 (96)	63 (101)	57 (81)	61 (85)	65 (84)	67.5 (81)	67 (101)	57 (81)	68 (96)
Two	35 (78)	34 (69)	33 (74)	30 (56)	35 (40)	23 (35)	31 (44)	25 (35)	30 (49)	31 (44)	30 (42)	27 (35)	24 (29)	26 (39)	31 (44)	25 (35)
Three	8 (18)	5 (10)	8 (17)	5 (10)	7 (8)	3 (5)	9 (13)	6 (8)	5 (8)	7 (10)	6 (8)	7 (9)	6 (7)	7 (10)	9 (13)	6 (8)
Four or more	1 (3)	5 (11)	3 (7)	2 (4)	2 (3)	4 (6)	3 (4)	2 (3)	2 (3)	4 (6)	4 (5)	1 (1)	2.5 (3)	1 (1)	3 (4)	2 (3)
Mean (range)	1.56 (1-7)	1.64 (1-8)	1.59 (1-5)	1.49 (1-7)	1.56 (1-6)	1.41 (1-5)	1.58 (1-5)	1.43 (1-5)	1.47 (1-6)	1.60 (1-5)	1.52 (1-4)	1.44 (1-5)	1.43 (1-4)	1.41 (1-4)	1.58 (1-5)	1.43 (1-5)
*P value***	*0.111*				*0.862*				*0.056*				*0.104*			

** p value relates to comparison of change in mean length of pathway in each NHS 111 site compared with its control

Table 7h Domain satisfaction scores for recent system use

	Durham & Darlington % (n)		North of Tyne % (n)		Nottingham % (n)		Leicester % (n)		Lincolnshire % (n)		Norfolk % (n)		Luton % (n)		Leicester % (n)	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Entry	4.25	4.17	4.20	4.18	4.10	4.16	4.10	4.22	4.22	4.10	4.10	4.16	4.20	4.15	4.10	4.22
P value	*0.493*				*0.630*				*0.112*				*0.121*			
Convenience	3.89	3.78	3.94	3.82	3.93	3.78	3.79	3.76	3.69	3.76	3.78	3.80	3.83	3.91	3.79	3.76
P value	*0.816*				*0.190*				*0.734*				*0.282*			
Progress	4.21	4.03	4.09	4.06	4.06	3.98	3.89	3.93	3.87	3.87	4.00	4.05	3.94	3.99	3.89	3.93
P value	*0.220*				*0.305*				*0.728*				*0.954*			

** p value relates to comparison of change in mean satisfaction domain score in each NHS 111 site compared with its control

Table 7i Overall rating of most recent urgent care episode

	Durham & Darlington % (n)		North of Tyne % (n)		Nottingham % (n)		Leicester % (n)		Lincolnshire % (n)		Norfolk % (n)		Luton % (n)		Leicester % (n)	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Excellent	47 (106)	43 (88)	49 (110)	49 (92)	47 (54)	47 (73)	35 (49)	35 (50)	41 (66)	43 (60)	43 (60)	44 (57)	37 (44)	36 (55)	35 (49)	35 (50)
Very good	28 (63)	32 (66)	25 (56)	24 (45)	25 (28)	27 (42)	27 (38)	36 (51)	25 (40)	28 (39)	31 (43)	35 (45)	33 (40)	34 (51)	27 (38)	36 (51)
Good	16 (35)	12 (25)	14 (30)	15 (28)	17 (19)	14 (21)	23 (32)	16 (23)	19 (31)	14 (20)	14 (20)	10 (13)	18 (22)	19 (29)	23 (32)	16 (23)
Fair	6 (13)	7 (14)	7 (15)	5 (9)	4 (5)	8 (12)	9 (12)	8 (11)	7 (11)	9 (12)	3 (4)	8 (10)	6 (7)	6 (9)	9 (12)	8 (11)
Poor or very poor	4 (9)	6 (12)	5 (12)	7 (14)	7 (8)	5 (7)	8 (11)	5 (7)	8 (13)	7 (10)	9 (13)	3 (4)	6 (7)	5 (7)	8 (11)	5 (7)
*P value***	*0.621*				*0.935*				*0.959*				*0.886*			

** p value relates to comparison of change in %excellent in each NHS 111 site compared with its control, using logistic regression

Table 7j Satisfaction with urgent care and the wider NHS

Respondents reporting 'very satisfied'	Durham & Darlington % (n)		North of Tyne % (n)		Nottingham % (n)		Leicester % (n)		Lincolnshire % (n)		Norfolk % (n)		Luton % (n)		Leicester % (n)	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
The way in which the NHS runs when you need to seek help URGENTLY	34 (687)	32 (633)	37 (754)	36 (715)	34 (681)	35 (709)	28 (559)	26 (529)	27 (547)	30 (597)	34 (680)	37 (745)	25 (508)	30 (590)	28 (559)	26 (529)
*P value***	*0.422*				*0.211*				*0.819*				*0.004*			
The way in which the NHS runs in GENERAL	33 (666)	28 (552)	37 (747)	34 (678)	33 (656)	34 (674)	26 (514)	24 (487)	26 (516)	26 (515)	32 (636)	36 (715)	25 (499)	26 (510)	26 (514)	24 (487)
*P value***	*0.286*				*0.394*				*0.052*				*0.269*			

** p value relates to comparison of change in %very satisfied with statement in each NHS 111 site compared with its control, using logistic regression

The University Of Sheffield.

Reviewer Number:	Case Number:

Evaluation of NHS111 – Call Review

Please give your response to the following questions using only the information available from the call recording

		Yes	Partly	No	Comments
1	Was the reason for the call clearly identified?				
2	Was there early recognition of a serious/emergency situation?				
3	Was an adequate history obtained?				
4	Was an adequate assessment performed				
5	In your opinion, was the final clinical disposition decision appropriate based on the information available at the time of the call		X		

6	If no, what is the reason for your decision (tick all that apply)	The level of service was too high	
		The level of service was too low	
		The timeframe of referral was to long	
		The timeframe of referral was too short	
		The decision was clinically unsafe	

7	In your opinion, what was the correct decision for this call	**Service**		**Timeframe**	
		emergency ambulance			
		Emergency Department		Immediately	
		UCC/WIC/MIC			
		GP		Within 4 hours	
		Other health professional (e.g. midwife, dentist)			
		Pharmacist		Within 24 hours	
		Further clinical assessment			
		Self Care		More than 24 hours	
		Other			

Now consider the responses provided in the follow up questionnaire relating to this call. After review:

<table>
<tr><td></td><td></td><td colspan="2">Yes</td><td>No</td><td>Unsure</td></tr>
<tr><td>8</td><td>Do you consider the original disposition decision to still be correct</td><td colspan="2"></td><td></td><td></td></tr>
<tr><td rowspan="10">9</td><td rowspan="10">If no, what, in your opinion, was the correct disposition decision</td><td colspan="2">Service</td><td colspan="2">Timeframe</td></tr>
<tr><td>emergency ambulance</td><td></td><td colspan="2" rowspan="2"></td></tr>
<tr><td>Emergency Department</td><td></td></tr>
<tr><td>UCC/WIC/MIU</td><td></td><td colspan="2" rowspan="2">Immediately</td></tr>
<tr><td>GP</td><td></td></tr>
<tr><td>Other health professional (e.g. midwife, dentist)</td><td></td><td colspan="2" rowspan="2">Within 4 hours</td></tr>
<tr><td>Pharmacist</td><td></td></tr>
<tr><td>Further clinical assessment</td><td></td><td colspan="2" rowspan="2">Within 24 hours</td></tr>
<tr><td>Self care</td><td></td></tr>
<tr><td>Other</td><td></td><td colspan="2">More than 24 hours</td></tr>
<tr><td>10</td><td>Please state briefly your reasons for this</td><td colspan="4"></td></tr>
<tr><td>11</td><td>What, in your opinion, would have improved the management of this call</td><td colspan="4"></td></tr>
<tr><td></td><td></td><td colspan="2">Yes</td><td>No</td><td>Unsure</td></tr>
<tr><td>12</td><td>In your opinion, did this call fulfil the NHS111 objective of right place first time</td><td colspan="2"></td><td></td><td></td></tr>
</table>

Any other comments: