



A service evaluation of the pathways of care for children <5 years through the NHS following contact with NHS 111: a pilot evaluation with a focus on children with fever

Imperial College Healthcare 
NHS Trust


England


**Sandwell and West Birmingham
Clinical Commissioning Group**

RCPCH

Royal College of
Paediatrics and Child Health

Leading the way in Children's Health

A service evaluation of the pathways of care for children <5 years through the NHS following contact with NHS 111: a pilot evaluation with a focus on children with fever

A report by:

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Introduction

In 2012-13 in England alone there were 21.7 million emergency department (ED) attendances, an increase of 50% in ten years (Department of Health, 2012), of which a quarter were children. Many paediatric cases presenting to EDs have low acuity conditions that could be managed in a primary care setting (College of Emergency Medicine 2013, Gill et al 2013). The majority of this group comprises of young children (under 5 years) with an age peak of 1-2 years (Mann, Tempest 2014, McCale et al 2013). There is national variation in the numbers of under 5s that present to EDs (CHIMAT, 2012); the reasons for this are multi-faceted but include differences in access to local services, the quality of care that can be delivered, and population factors, such as deprivation and urban versus rural location (Mooney, 2014, Hendry, 2005). Large numbers of children are therefore attending EDs for a range of problems, including ones where self-care is the optimal treatment regime. NHS 111 should, in its role of telephone triage, more accurately direct patient flow according to the patient's needs.

The use of telephone consultation on a national basis commenced in 1998, when NHS Direct was established in England to provide health advice and direct patients to the most appropriate health care provider with the service offering the initial consultation pathway for patients into the local healthcare system (Foster, 2003). The goal of the service was to provide clear direction and support for patients who may require clinical attention, alleviate some of the strain on the NHS and reduce unnecessary trips to EDs. NHS Direct provided support in determining urgent care needs for patients, with the highest service users being pre-school children (Cook, 2013).

In 2010 NHS 111 was introduced to replace GP out-of-hours call-handling services and some of the functions of NHS Direct. As well as assessing and determining the clinical need of individual patients, NHS 111 aims to better integrate urgent care through access to a local directory of services allowing callers to be referred on to the most appropriate care provider. Unlike NHS Direct, which was largely nurse-led, NHS 111 uses non-clinical call handling staff (health advisors) supported by nurses and paramedics to triage calls using computerised clinical decision support software: NHS Pathways. After the details of the patient are obtained (basic demographic information, including date of birth and name), questions are asked regarding the patient's condition. From the information provided by the caller the health advisor selects and follows one of the clinical algorithms provided to give advice on the best course of action for the patient. A number of outcomes may arise that range from the health advisor providing advice on self-care, to recommending attendance at a walk-in centre, use of the GP out-of-hours service or attendance at an ED in a hospital (there is also the option for the health advisor to request a 999 ambulance). The date and time of the call is also recorded, as is the NHS number for that patient. For most calls to NHS 111 information about the call is also sent to the patient's GP.

As with any telephone triage system, NHS 111's success and acceptability from the perspectives of patients and/or carers is important, but what is also important is its impact on the overall urgent care system and other providers of acute services both 'in' and 'out' of hours.

The under-5s age group is particularly known to present to EDs with conditions that are often easily treatable in primary care. They may, therefore, be a group that could benefit significantly from the triage and advice service that NHS 111 provides. However, previous initiatives and policies to improve the quality and co-ordination of NHS care for this age group have been limited by lack

of baseline information on patient flow between different care settings and on the quality and value of care provided in each setting. An overview of the usage patterns of NHS 111 is available but there is relatively little detail about the specific needs of children and infants. Although NHS 111 may direct service users toward a particular course of action, including referring to other services, patients may independently choose to follow a different course of action and seek care elsewhere. Determining the reasons for this behaviour and its impact on the provision of urgent care in this country requires exploration of the complete patient pathway, from the point at which patients access the healthcare system. This is required to inform commissioners and clinicians alike, and to assist in the production of integrated care pathways. There is also inconclusive evidence comparing the outcomes of initial NHS 111 assessment to subsequent consultations in the ED, specifically in children under 5 years. It is clear that greater data linkage and analyses are key to rolling out successful quality improvement measures and thus enhancing the healthcare journey of under-5s through urgent and emergency care services.

Aims

The aims of this study are:

- to quantify the contribution of fever to the workload of NHS 111 in the under 5s population
- to ascertain the most frequent recommended actions by NHS 111 in response to calls regarding febrile under-5s
- to determine whether data linkage between primary (NHS 111) and secondary (a paediatric ED) care sources is feasible and can provide insights into patient journeys through urgent care services
- to review the diagnosis and management in the ED of under-5s with fever who had contact with NHS 111, comparing those who had been recommended to attend the ED with those who had not
- to obtain feedback from experts in the field of paediatric emergency medicine on the influence of NHS 111 and telephone triage on children's acute care

It is intended that the findings will illustrate the impact of NHS 111 on the care pathways of children under 5 years with fever. Future studies will consider the conditions diarrhoea and vomiting, constipation and breathlessness as entry points into the urgent care system and examine patient flow, quality of care and patient satisfaction. These four conditions have been highlighted as common presentations to primary and secondary care, and have nationally accepted guidelines for their management.

Methods

This study has been conducted in three separate sections: Section 1 describes the general trends and referral patterns for febrile under-5s to NHS 111; Section 2 examines the results of data linkage of the patient's journeys from NHS 111 to the ED; and Section 3 reveals professional opinion by leaders in Paediatric Emergency Medicine on the role of NHS 111. Methods for all the three sections are described below.

Section 1

Data were provided by the North East London Commissioning Support Unit (NELCSU) on all calls from 12 North East London boroughs for children under 5 years over a 13 month period (July 2013 - July 2014). These data were analysed with regard to the 'symptom discriminator' for the call (i.e. the symptoms identified from NHS Pathways algorithm) as well as the recommended action where the fever algorithm was followed.

Section 2

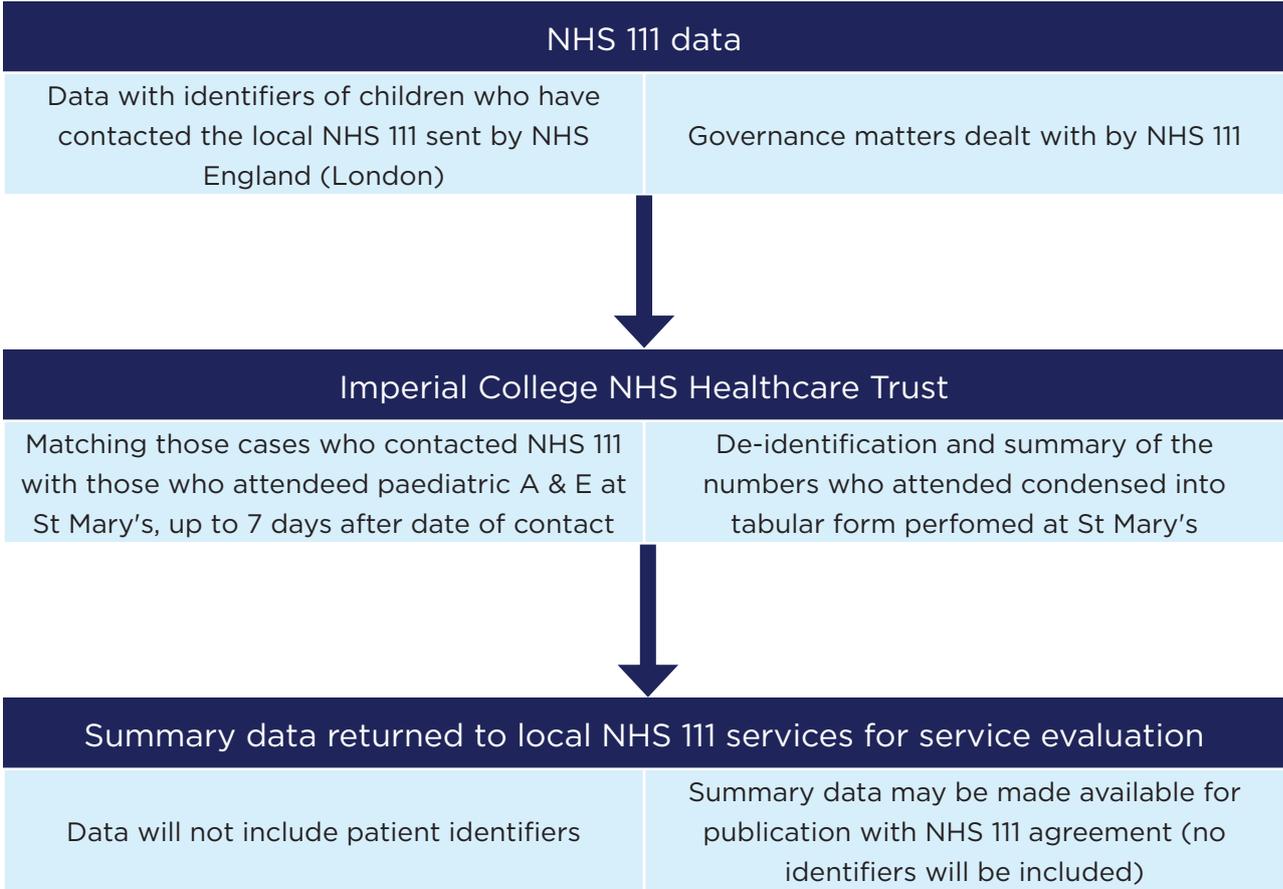
Data were provided by NHS England on all calls from the North West London (NWL) area from July 2013 to June 2014 made in respect of children under 5 years where the fever algorithm was followed. These data were then correlated with data on children who had attended St Mary's Hospital Emergency Department during the same period. Using the NHS number, researchers at Imperial College NHS Healthcare Trust matched NHS 111 calls against data held in the Symphony System (the electronic tracking system used in the ED) to identify children who attended the ED within 7 days of a call to NHS 111 (i.e. 7 days before and 7 days after the contact with the telephone service). NHS 111 data were transferred under the terms of the data sharing agreement with the RCPCH for compilation and final reporting.

In this section calls were analysed in 3 groups. The first group comprised those children who were advised by NHS 111 to attend St Mary's Hospital ED. The second group was those children who were advised to attend a different ED. The third group was those children who were advised to use services other than an ED. In all groups, the subset of children who actually attended St Mary's ED within 7 days of their NHS 111 call were investigated in more detail in regard to the diagnosis and management outcomes.

Section 3

The RCPCH Emergency Standards Committee was invited to provide their professional opinions on themes including safety and efficiency of the NHS 111 system and outcomes for the pathways of care for children aged under-5 years. This was undertaken using a questionnaire with open questions.

Figure 1: Data flow diagram for the service improvement program of this work



Results

Section 1

There were 76,193 calls made to NHS 111 from the North London area from July 2013 to July 2014 inclusive (13 months) regarding children under 5yrs. Fever accounted for 4,455 of these calls (5.8% of the total) making it the 5th most common cause of call recorded and the 3rd most common specific symptom recorded:-

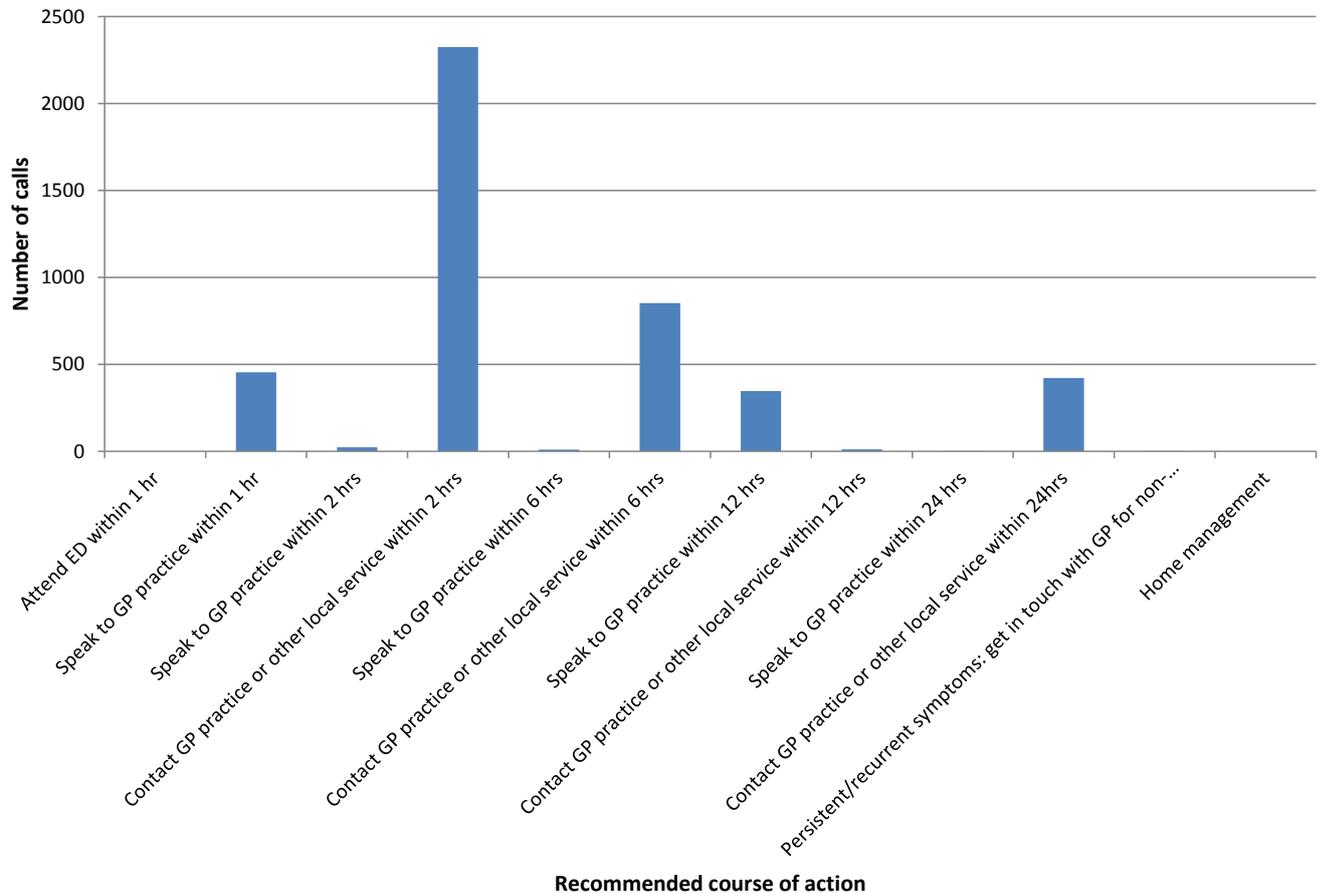
Table 1: 10 most frequent reasons for calling NHS 111 recorded for under 5s (North London area July 2013-July 2014)

1. Not Applicable to pathways	19.1%
2. Unwell	15.5%
3. Skin	7.0%
4. Cough	6.1%
5. Fever	5.8%
6. Breathing problems	4.8%
7. Vomiting	4.4%
8. Head injury	3.7%
9. Diarrhoea and vomiting	3.7%
10. Predetermined management plan	2.0%

Table 2: The course of action recommended by NHS 111 for the 4,455 calls

NHS111 Recommended action	Number of calls
Attend ED within 1 hr	2
Speak to GP practice within 1 hr	454
Speak to GP practice within 2 hrs	24
Contact GP practice or other local service within 2 hrs	2,324
Speak to GP practice within 6 hrs	11
Contact GP practice or other local service within 6 hrs	853
Speak to GP practice within 12 hrs	346
Contact GP practice or other local service within 12 hrs	12
Speak to GP practice within 24 hrs	3
Contact GP practice or other local service within 24 hrs	422
Persistent/recurrent symptoms: get in touch with GP for non-urgent appointment	3
Home management	1

Figure 2: Recommended course of action for NHS 111 calls for febrile under-5s in North London July 2013-July 2014



Comment 1

The majority of callers were recommended to contact their GP or other local services (this includes GP Out of Hours), with a time scale ranging from 1 to 24 hours. One caller was advised to manage the child at home and only 2 callers were advised to attend the ED. Considering fever accounts for approximately 1 in 3 children who attend the ED, this result was lower than expected.

Section 2

There were 3,484 calls managed by the North West London NHS 111 service over a 1 year period (July 2013- June 2014) in respect of 3078 children < 5 years with fever. The triage outcomes of these 3,484 calls were:

- 72 callers were advised to attend an emergency department (ED)
 - 15 to attend St Mary’s Hospital ED
 - 57 to attend a different ED
- 3,412 callers were advised to use other healthcare services, not ED. These callers included those who were advised about self-care

For 254 of the calls (7.3%) there was no documented NHS number on the NHS 111 record and therefore matching for these calls with the Symphony database was by name and age alone.

Callers advised to attend St Mary's Hospital ED (n=15)

Eleven of these 15 patients actually attended St Mary's Hospital ED within 7 days following the call (73%), of whom 2 were admitted (13% of the total number of calls and 18% of the actual attendees).

- Time to attendance from the time of the call to NHS 111:
 - o 7 patients attended within 1 hour (2 within 30 minutes)
 - o 2 patients attended between 1-2 hours
 - o 1 patient attended between 2-4 hours
 - o 1 patient attended 2 days later

The two admitted patients were:

- 20 month male who attended 1 hour after their NHS 111 call with fever and a petechial rash. He was admitted for intravenous antibiotics
- 9 month male who attended 2 hours after their NHS 111 call with fever and rash. He was admitted for further investigations and observation (suspected measles)

Neither patient required high-dependency treatment nor intensive care admission.

The diagnoses made for the 9 discharged patients were: gastroenteritis (3), viral upper respiratory tract infection (URTI) (1), tonsillitis (1), chickenpox (1), hand, foot and mouth disease (1), non-specific viral rash (1) and fever post-MMR vaccination (1).

None of these discharged patients required investigations or treatment that could not have been made available in a non-ED healthcare setting.

Comment 2

The national average rate of admissions per year from paediatric EDs is about 12%. This comprises medical conditions as well as ones due to acute surgical need and from trauma. The admission rate amongst patients(18%) who have already been triaged by NHS Pathways as needing to attend the ED could be expected to be higher than this. In this study, this does not appear to be the case.

Callers advised to attend a different ED

None of these 57 calls attended St Mary's Hospital ED in the 7 days following their call to NHS 111. However, 1 patient had attended St Mary's Hospital ED in the 24 hours prior to their call to NHS 111.

Callers advised to use other healthcare services including self-care

Of the 3,412 calls 218 children attended St Mary's Hospital ED within the 7 days following the call (6.4%), 26 of whom were admitted (0.8% of the calls and 11.9% of the actual attendees).

Sixteen of the attendees were directed to the co-located Urgent Care Centre (UCC) at triage and not seen in the ED.

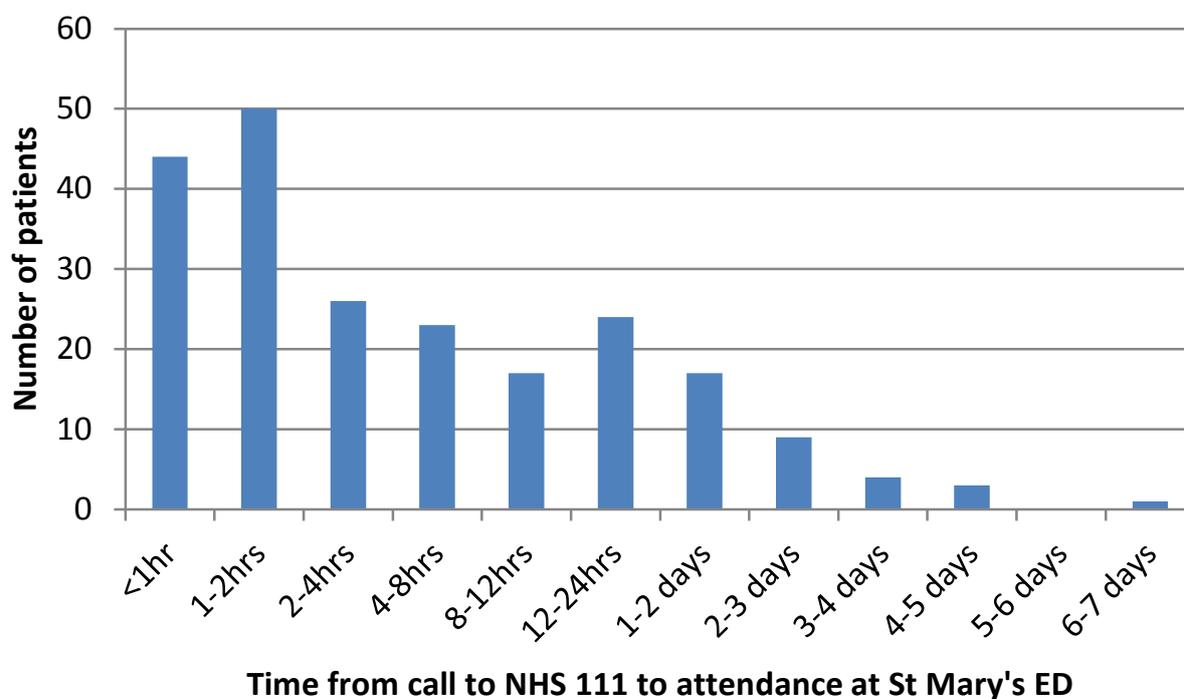
Comment 3

The rate of admission amongst these patients(11.9%) is similar to the national figure for admission from the ED. Note that there is a range of times between the call to NHS 111 and when the child attended the ED. This could mean that patients had attended other providers prior to attending the ED.

Time to attendance

The majority of patients attended within 4 hours of their call to NHS 111, the shortest interval being 14 minutes.

Figure 3: Time to St Mary's ED attendance for patients advised to use other services



Comment 4

It is unlikely that the children about whom a call had been made to NHS 111 within 1 hour had sourced another health provider, but quite likely that those who had attended 4-5 days later had. However, this is speculative as the patient flow through the local primary and secondary care services is currently unknown, but warrants further investigation, particularly to secure integrated pathways of care, so that all clinicians who come into contact with these patients can deliver a safe and effective service.

Outcome and diagnosis

Twenty six patients were admitted following their ED attendance. Their diagnoses were: possible/suspected sepsis (10), pneumonia (3), viral induced wheeze (3), croup (2), fever without source (2), seizure (2), bronchiolitis (1), gastroenteritis (1), Kawasaki's disease (1) and perforated appendix (1).

Three of these patients required high-dependency/intensive care admission following their attendance. These were:

- A 15 month child who attended 3 hours after their call to NHS 111 with a prolonged seizure that required intubation and ventilation and subsequent Paediatric Intensive Care Unit (PICU) admission (not fitting at the time of the NHS 111 call)
- A 10 month child who attended 13 hours after their call to NHS 111 with sepsis and shock and who required intraosseous access for significant fluid resuscitation followed by PICU admission (in this case, it is not known if the child had seen other services prior to attending St Mary's ED; the condition could have evolved over that time frame so that the child was much sicker prior to attendance at the ED rather than at the time of the call)
- A 5 week child who attended 90 minutes after their call to NHS 111 with fever, abdominal distension and vomiting and who had a seizure in the department (following a lumbar puncture) who underwent a high-dependency transfer to a paediatric surgical unit for a suspected surgical abdomen (the child may have evolved more symptoms and signs following the call to NHS 111; it is not known if a clinician at NHS 111 would have picked up the symptoms that would have led to direct referral to the hospital)

In addition to the 26 patients who were admitted, a further 3 patients commenced ambulatory care from the ED (receiving intravenous antibiotics as they had fever with petechiae). A further 8 patients received investigations and/or treatments that may not have been readily available in a non-ED healthcare setting (including dexamethasone for croup, prolonged observation post-febrile convulsion, and chest x-ray/blood tests in prolonged fever).

In total, therefore, 37 patients received treatment that was not available in the out of hospital setting, representing 1.1% of the total number of calls who received advice other than attend an ED.

Amongst the discharged patients the most common diagnoses were: viral URTI (37), tonsillitis (29), non-specific viral illness (25), gastroenteritis (12), urinary tract infection (UTI) (8), croup (6), otitis media (6) and 'well child' (6).

In addition, 11 of the patients who chose to attend the ED 'did not wait' to be seen (2 of whom had attended the ED within 30 minutes of their call to NHS 111).

Comment 5

The common conditions echo those seen in previous work examining the presentations to ED with medical disorders, meaning that clinical pathways of care could have a unifying impact on patient care and flow. The use of ambulatory care meant that patients were not admitted but their on-going care was maintained with parents being told the indications of when to return. This is a good example of keeping children appropriately out of hospital with clear instructions to assist parents in looking after them.

‘Did not wait’ or ‘left without being seen’ generally means a child is triaged by a nurse in the paediatric ED (comprising a brief history and recording of physiological observations) but leaves the department before a full medical assessment is undertaken and a management plan formulated by a doctor. There are a variety of reasons why parents may choose to take their children away from the ED before they have seen a doctor, these include: an improvement in the child’s condition, dissatisfaction with the length of the wait in the ED, and sufficient reassurance about the child’s condition gained from the triage process itself. In this group of patients, whose parents were concerned enough about their condition to attend the ED despite advice from NHS 111 that this was not necessary, the parental thought processes behind their change of heart merit exploration. The RCPCH has an existing emergency PREM that has been successfully piloted and that could be rolled out for use in the next phase of work. It may be that the triage assessment in the ED is offering a higher level of reassurance or is more trusted than that provided by NHS 111 and the reasons for this may reveal potential areas for improvement in the NHS 111 system. The use of Patient Recorded Experience Measures to determine the satisfaction of care that is delivered to the children is being developed for use in future studies of patient care in the under 5s population.

Use of 999 Ambulance

Amongst the 218 attendees to St Mary’s Hospital ED who had been advised to use other healthcare services, 13 had called a 999 Ambulance to attend of whom 3 were admitted and 10 discharged (1 of whom attended within an hour of the call and then did not actually wait to be seen):

Table 3: Patients advised to attend other services by NHS 111, attending St Mary’s ED by 999 Ambulance

Time from call to NHS 111 to arrival at ED	Diagnosis	Outcome
<1 hour	?sepsis	Admitted
<1 hour	Chickenpox	Discharged
<1 hour	Did not wait to be seen	Did not wait to be seen
<1 hour	Fever without source (neonate)	Admitted
1-2 hours	Fever post-immunisation	Discharged
1-2 hours	UTI	Discharged
1-2 hours	Viral URTI	Discharged

Time from call to NHS 111 to arrival at ED	Diagnosis	Outcome
1-2 hours	Viral URTI	Discharged
1-2 hours	Tonsillitis	Discharged
1-2 hours	Tonsillitis	Discharged
3 hours	Tonsillitis	Discharged
3 hours	Seizure	Admitted (PICU)
6 hours	Viral URTI	Discharged

Ten of these children were under 2 years of age.

Comment 6

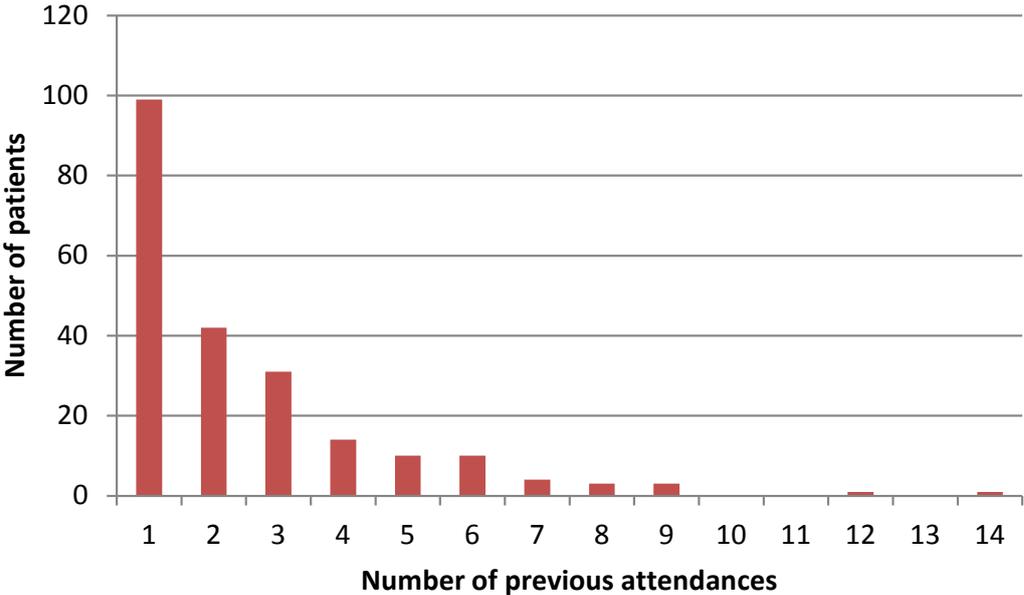
The majority of these cases were self-limiting conditions, with only three being admitted for suspected sepsis or prolonged seizures, and one that did not wait to be seen. The cost of an ambulance call-out and transfer to ED is between £176 and £251, according to the National Audit figures of 2011. (www.nao.org.uk/wp-content/uploads/2011/06/n10121086.pdf). London ambulance figure for a non-contracted journey is an estimated £552 for a call-out.

Current practice in the London Ambulance Service is that all children under the age of 2 must be taken to hospital, regardless of the assessment of the paramedic. It could be helpful to review this policy and develop a more focussed approach by establishing the necessary symptoms or signs that mandate transfer to hospital, allowing some (with safety netting) to be left at home, or an appointment arranged at another healthcare provider via NHS 111. This could include the development of a clinical decision support tool for use in such circumstances to assist paramedics.

Previous use of St Mary's ED

Amongst the 218 patients who chose to attend St Mary's Hospital ED having been advised by NHS 111 to use other services, 119 (55%) had attended the department previously. The number of previous attendances ranged up to 13.

Figure 4: Number of previous St Mary's ED attendances amongst those who came to St Mary's ED from reference NHS 111 call



In addition to the 218 patients who attended St Mary’s Hospital ED in the 7 days following their call to NHS 111, a further 47 patients (from the 3412 calls advised to use other healthcare services) had attended St Mary’s Hospital ED in the 7 days prior to their call; 27 had done so in the previous 24 hours; 12 between 24-48 hours prior to the call, 3 between 48-72 hours prior to the call and 5 between 3-7 days prior to the call. It is not known if these patients sought the assistance of other healthcare services that were recommended by NHS 111 or if they went to different providers. Six patients attended the ED both prior to, and after their call to NHS 111.

Comment 7

Patients who contacted NHS 111 after attending St Mary’s ED may have done so because they were not confident in the advice given in the ED, because the condition had evolved out of expectation or to re-affirm that the condition was running its natural course (hopefully to resolution). Alternative explanations are that the parent simply wanted to allay their own concerns or had not understood the information given to them in the ED. Other parents may have sought information from other healthcare providers (where they may have obtained different or contrary advice). To understand the behaviour of concerned parents/carers it is essential to assess, for example by means of PREM, how they view the system of healthcare working for them.

Use of NHS 111 by frequent callers

The total number of 3,484 calls to NHS 111 over the 1 year period were regarding 3,078 individual children less than 5 years of age with fever, owing to multiple calls for some children (either during the same or separate illnesses):

- One call in the case of 2,754 children
- 261 children had 2 calls made

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- 49 children had 3 calls made
 - 11 children had 4 calls made
 - 1 child had 5 calls made
 - 2 children had 6 calls made

Children who attended the ED and for whom repeat calls had been made included:

In the 6 calls group

- 2 year girl for whom 6 calls were made over the 1 year period all of which resulted in advice to use other healthcare services. Three calls were made during one 24 hour period and she attended ED 2 hours after the 3rd call- following which she 'did not wait' to be seen.
- 2 year girl for whom 6 calls were made over the 1 year period. She was advised to attend ED on one occasion and did so but was re-triaged to the Urgent Care Centre from the ED.

In the 5 calls group

- 14 month girl for whom 5 calls were made over the 1 year period, 2 of these calls were made in a 24 hour period after an ED attendance at which 'teething' had been diagnosed and child discharged.

In the 4 calls group

- 18 month girl for whom 4 calls were made over the 1 year period, all of which resulted in advice to use other healthcare services. She attended ED on 3 occasions after 3 of the calls, 2 of which were in a 48 hour period. She was diagnosed with gastroenteritis on each occasion and discharged.
- 23 month boy for whom 4 calls were made over the 1 year period, 2 of which were made in a 24 hour period and other healthcare services advised on each occasion. He attended ED 5 hours after the 2nd call and was sent to the Urgent Care Centre.

In the 3 calls group

- 22 month boy for whom 3 calls were made during a 24 hour period and other healthcare services advised on each occasion. He attended the ED 1 hour after the 3rd call, was diagnosed with chickenpox and was discharged.
- 18 month boy for whom 3 calls were made over the 1 year period, 2 of which were made in a 4 hour period and other healthcare services advised on each occasion. He attended ED 1 hour after the 2nd call and was diagnosed with a viral URTI and discharged.
- 10 month girl for whom 3 calls were made in a 24 hour period and other healthcare services advised on each occasion. She attended ED 5 hours after the 3rd call, was diagnosed with a viral URTI and discharged.

In the 2 calls group

- 12 month boy for whom 2 calls were made in a 24 hour period and other healthcare services advised on each occasion. He attended ED 4 hours after the 2nd call, was diagnosed with a viral URTI and discharged.

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- 13 month girl for whom 2 calls were made in a 24 hour period and other healthcare services advised on each occasion. She attended ED 7 hours after the 2nd call, was diagnosed with a UTI and discharged.
 - 2 year boy for whom 2 calls were made in a 48 hour period and other healthcare services advised on each occasion. He attended ED 1 hour after the 2nd call to NHS 111 and was diagnosed with a viral URTI and discharged.
 - 2 year girl for whom 2 calls were made in a 12 hour period and other healthcare services advised on each occasion. She attended ED 2 hours after the 2nd call and was diagnosed with tonsillitis and discharged.
 - 2 year boy for whom 2 calls were made in a 24 hour period and other healthcare services advised on each occasion. He attended ED 2 hours after the 2nd call and was diagnosed with viral URTI and discharged.
 - 2 year boy for whom 2 calls were made in a 2 hour period. He was advised to attend ED after the 2nd call- attended and was diagnosed with gastroenteritis and discharged.
 - 18 month girl for whom 2 calls were made in a 24 hour period and other healthcare services advised on each occasion. She attended ED 3 hours after the 2nd call, was diagnosed with possible sepsis and admitted for intravenous fluids and antibiotics.

Comment 8

The level of detail that can be derived is impressive and should be useful in building models of care across primary care (here seen as NHS 111) and hospitals in the shape of the ED. This data linkage provides a better understanding of the use of primary and secondary settings in a practical and real way and fulfils the proof of concept that this level of data linkage is feasible and will be helpful for clinicians and commissioners.

This data is retrospective and does not influence the care delivered to those patients and so has been registered as a service improvement project. Future work will require linkage of more points within the healthcare environment, and permit interventions to improve the clinical pathways of care, PREM and the quality of care that can be delivered. This will form the base of a research application as there is a need to extend the scope of this work to linking primary and secondary care data.

Section 3

Professional feedback

As part of this service evaluation, the RCPCH Emergency Standards Committee discussed the pathway of children under 5 years through the NHS 111 system. They agreed that, currently, their opinions regarding the appropriateness of referral of children by NHS 111 to EDs, are based on anecdotal evidence and thus key measures to capture the whole patient journey are needed for objective analysis of the performance of the NHS 111 service.

Incidentally, during the analysis of patient ED medical clerkings in SECTION 2, on at least 2 occasions it was noted that those parents of children who had been advised by NHS 111 to use services other than the ED but chose to attend the ED, incorrectly told the ED clinician they were attending on the advice of NHS 111. This inaccurate relaying of information could be unintentional

if they had misunderstood the advice of NHS 111 but may have been intentional if they were trying to justify their ED attendance. This illustrates the fact that ED clinicians are highly susceptible to being misled by parents in forming their impression of NHS 111 and factual evidence is required.

The committee also hypothesised that the triage process of NHS 111 could benefit from utilising child healthcare professionals at each stage of the patients journey from the initial answered call. The decision by the London Ambulance Service (LAS) in 2009 that all patients under the age of two must be conveyed to an ED regardless of their presenting complaint was identified by the group as an important factor altering the flow of patients through the healthcare system within London. It was a suggestion by the group that the LAS should have a greater involvement throughout the triage process and participates in understanding patient flow across primary and secondary care.

Discussion

This pilot study has demonstrated that, although complicated by the lack of joined up IT services in the NHS, data linkage between healthcare organisations from primary and secondary care is possible. Furthermore, combining data from their respective computer systems can give useful information regarding the interactions between patients and urgent care providers and can illuminate stages of individual healthcare journeys as well as overall patient flow through the whole system.

Patient safety

Our findings show that it is feasible to study the use of paediatric services across different care settings. This linkage is essential in evaluating the quality and value of services such as NHS 111, and providing improvement measures that would reduce the strain on the emergency care services (both primary and secondary) and in doing so, substantially improve the patient experience and health outcome.

Previous studies have highlighted this primary and secondary care interaction as an important research gap, when developing and evaluating new models of care for children. The National Institute for Health and Care Excellence (NICE) Guidelines for fever (NICE guidelines, fever 2013) recommend research into the referral patterns between primary and secondary care services, and highlight the lack of research literature surrounding remote assessment strategies and the impact on the service user and care provision. This call has been repeated in other NICE guidance such as bacterial meningitis and septicaemia (NICE guidelines, bacterial meningitis and septicaemia 2010). Concern regarding the treatment of sepsis has increased recently following cases of incorrect management, an example being an avoidable death of a three year old child due to overwhelming infection (Ombudsman report 2014). The expected level of incidents has not yet been determined by a whole system analysis (i.e. after the child has moved on from NHS 111 advice). This is an important area of service provision to study so that a gap analysis of how and what care is delivered can be identified and where necessary improved.

The commissioning of services needs to take into account the needs of the patients (as indicated by PREMS), patient interactions within the healthcare system (so to determine patient flow) and the quality of care received. This is feasible by evaluating the children who enter the healthcare system via NHS 111.

There is often a significant level of complexity involved in adverse clinical incidents (often due to an alignment of circumstances that lead to patient harm). Further studies of how children with different illnesses access the healthcare system, and the subsequent behaviour of their carers in interacting with the NHS services will lead to a better understanding of their needs. The services can then be adapted through quality improvement measures, giving an efficient, timely and safe system which can be easily accessed to producing the optimal clinical and patient focussed outcomes.

Cost effectiveness

The cost effectiveness of NHS 111 in managing under 5s presenting with fever is unknown. This pilot study has identified elements of the patient journey, child and family experience and system impacts that need to be explored in more detail with regard for the PREM. The costs as examined from a technical perspective alone may indeed demonstrate that NHS 111 is relatively cost effective compared to all patients presenting directly to ED. However, the cost effectiveness should be considered beyond technical efficiency and take account of health outcomes with patient experience. In this pilot study, it was identified that a relatively small proportion of cases were actually referred to ED by NHS 111, however the number attending was much higher. This poses a challenge both in terms of understanding patient and carer behaviour as well as the hidden system costs of patients presenting in other parts of the health and social care system which are rarely considered both in terms of resources or outcomes.

The need to develop PREMS and quality of care

As seen above, patient and parent behaviour is key in how services are used.

The Government's agenda highlights the necessity of healthcare research to evaluate both patient perceptions and experiences along with the ability of services to meet quality standards. NICE guidelines recommend the examination of parental perceptions on their experience of services and identifying whether these services are meeting national standards. As the NHS 111 service is recently introduced, there are no data regarding the impact that this service provides on the quality of care received or ultimately a child's journey through the system and their subsequent outcomes. The quality of care delivered during the episode of child's illness and their experiences throughout the journey of care are essential components in determining not only if the patient was satisfied but if they also received the correct treatment.

The need for integrated care pathways and reducing costs by effective clinical care

A significant proportion of those children who come to ED have already sought review by another health professional, reflecting an inappropriately high number of referrals from one healthcare provider to another for young children (Sands et al., 2012; Hendry et al., 2005; RCGP et al., 2011). The RCPCH fever study found that families commonly have 3 consultations with professionals and up to 13 for one episode of febrile illness (RCPCH 2010).

The current use of healthcare services by paediatric patients is expensive for the NHS. It costs between £58 and £78 per low acuity condition seen in ED (NHS England 2014) compared to approximately £40 - 50 in a primary care type setting (this is based on unpublished conservative

estimates of the cost of GP out-of-hours consultations in North London). A recent joint publication by the Royal College of General Practitioners, Royal College of Nursing and the RCPCH found that treating children with minor medical conditions in the community rather than to ED could save the NHS £179 million (RCGP 2013) (RCGP 2013, Clinical Innovation and Research Centre, (2013). Commissioning a good child health service. [online]. Available from: <http://www.rcgp.org.uk/-/media/Files/CIRC/Child-and-Adolescent-Health/RCGP-Child-Health-Modelling-Task-Group-April-2013.ashx>.) Reducing variation in the pathways of care could also save substantial amounts as commissioners with clinicians could produce integrated care pathways for the patient flow and ensure better care being delivered to children with better outcomes. Recent analysis forecast that by reducing ED attendances for those children in the 40% most deprived populations would save £78 million (Mooney 2014).

Limitations

This study is limited in that data have been obtained from only 2 of the many urgent care providers in North London and is therefore unable to give a comprehensive picture of all patient journeys and of the whole patient journey- in effect many NHS 111 callers have inevitably been 'lost to follow-up' by the nature of the study. Patients may have interacted with primary urgent care services (Urgent Care Centres and GP out-of-hours services) as well as other secondary urgent care services than St Mary's ED and these interactions have not been captured. Despite this limitation, exploration of the data has suggested areas for interventions to improve NHS 111 assessment as well as the referral pathways onward to other urgent care services.

Conclusion

Through this study it has been demonstrated that it is possible to map the healthcare journey of a patient from the NHS 111 call demonstrating if, when and where they accessed the emergency care in person, regardless of the guidance and advice received during the original call.

This study has proven the concept that it is possible to map the flow of patients with a specific condition/ailment following a call to NHS 111 and through this gain clearer understanding of the impact/difference that telephone triaging is making. The information provided here together with greater insights into the patients experience of care received and why they chose the route they took through the NHS would highlight where improvements to care and cost savings could be made. This will go towards achieving the ultimate goal of rolling successful quality improvement measures out wider and thus improving the journey of the under 5 year old children through urgent and emergency care services.

We would therefore recommend extending the study and using tools such as PREMS (developed with the PICKER Institute Europe) specific for the each of the four conditions, fever, constipation, diarrhoea and vomiting and breathlessness to gain further qualitative information to understand the patients/parents experience of the call and map key aspects of the care that the child received. It would also be possible to elucidate the reasoning behind their choice of attending either the primary or secondary care centres for emergency and highlight key quality improvement measures/interventions that can be implemented. These could include educational packages for primary/ secondary care and/or having clinicians present at the call centre to reassure the concerned patient. Further studies would enable the evaluation of the quality improvement measures and demonstrate the effectiveness of subsequent adaptations of care at primary or secondary settings, allowing a landscape view of the health environment and not just isolated effects on either primary or secondary care services. These adaptations could also be rolled out wider across the London region and eventually, form a nationally accepted mode of accessing patient flows, the quality of care delivered to those patients and their PREMS, improving clinical outcomes and delivering integrated safe pathways of care.

The service evaluation utilises a whole systems approach allowing investigation of the interface between primary and secondary care settings, and to better understand how patient safety of children can be enhanced whilst risk of future adverse events reduced. The evaluation aims to provide insight into mitigating circumstances, where the expected outcomes of the patient pathway could not have been predicted. This learning is key to define the limitations and strengths of a system that maintains a culture of improvement of care.

Recommendations

Data linkage of primary and secondary care interactions to study patient flows for common conditions and quality of care

Further research accessing and linking data from other urgent care providers (including GP out-of-hours, Urgent Care Centres and neighbouring hospital EDs) to reveal complete patient healthcare journeys and to aid in assessing the quality and efficiency of urgent care services for children, the utility according to the users of NHS 111 advice, patient behaviour and compliance with advice. The conditions that are commonly seen are fever, diarrhoea/vomiting, breathlessness and constipation and have national guidelines for their management. Using these guidelines may be helpful to get an indication of the quality of care that children receive.

Patient Recorded Experience Measures (PREMs)

In this study, 6.4% of callers to NHS 111 attended St Mary's ED despite advice to use another healthcare service. Although some may have attended following deterioration in their condition, or due to referral on from an intermediate urgent care service, the short time before attendance in many cases suggests that patient are choosing to seek an ED assessment. This figure of 6.4% is likely to be a significant underestimation, as many patients are likely to have attended an alternative ED (of the patients advised to attend an ED, only a quarter were directed to St Mary's ED potentially suggesting that ~30% of patients advised to use non-ED services may actually have attended an ED). Further research obtaining patient feedback on their reasons for their healthcare seeking behaviours following interaction with NHS 111 would be useful to look at this in detail.

Clinician involvement in NHS 111 calls

Should a lack of confidence in remote non-clinical assessment be revealed as a reason for subsequent ED attendance, the level of compliance with advice might improve by direct involvement of a clinician during NHS 111 calls.

Advice from NHS 111 of the need to attend St Mary's ED did not appear to be a significant predictor of the need for hospital based treatment or admission with the proportion of children admitted from this (albeit small) group not being substantially higher than the national ED admission rate. Again direct clinician involvement in NHS 111 calls might be a potential improvement measure by enhancing accuracy of triage and reducing a perceived tendency to 'over-triage' although as the numbers involved are relatively small this may not be justifiable.

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