ORIGINAL ARTICLE

Review of calls to NHS Direct related to attendance in the paediatric emergency department

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Objective: To examine the outcomes of calls to NHS Direct (NHS-D) in relation to attendance at the accident and emergency (A&E) department.
Design: A prospective collection of data about consecutive calls to NHS-D North West Coast was matched with attendances at the A&E department over a period of 3 months.
Setting: NHS-D Regional Trust and a large urban paediatric A&E department.
Patients: Children and young adults aged <16 years living in local postal code areas.
Main outcome measures: To examine (1) whether advice given by NHS-D was followed and (2) the differences in disease severity and necessity of attendance of patients referred by NHS-D and those referred by general practitioners and self-presenters.
Results: The relationship between the advice given and subsequent action is complex. Only 70% of calls advised to attend the A&E department did so. A further 1% (176) were advised not to attend the A&E department did in fact attend the department. Patients referred by NHS-D represented only 3.2% of department attendances. There was little difference in the triage categories of the presenting groups, but there were significantly less admissions ($p<0.01$) in the NHS-D group.
Conclusions: Delivering telephone advice about illness severity in children is difficult as visual clues are so important. More collaborative prospective studies are needed, including with primary care, to understand families' choices, and to refine and assess NHS-D's ability to discriminate those requiring further clinical assessment.

NHS Direct (NHS-D) seeks to provide telephone advice using call triage and assessment by qualified nurses underpinned by decision support software. NHS-D is now the world's largest provider of healthcare advice,[1] and 30–40% of calls are about children. A large amount of public money has been invested and efforts have been made to refine and improve the process and efficiency of handling calls. Although NHS-D has been operating in several areas since 1998, there have been few attempts to follow the clinical outcome of calls systematically. A review of the service tends to concentrate on these aspects[2] rather than the clinical course, which relies on voluntary feedback from clinicians.

Telephone advice about acute illness is challenging in cases where children are concerned; not only because a carer acts as a third party interpreting the patient's symptoms but also because of the non-specific nature of the symptoms of many childhood illnesses. This might result in a higher hospital referral rate for children who are less ill.

Working in collaboration with the Medical Director of NHS-D North West Coast we investigated the outcome of all calls regarding children to this service for a period of 3 months. The primary aim was to determine whether advice in relation to hospital attendance was followed and to examine the types of patients referred to the accident and emergency (A&E) department by NHS-D. A secondary aim was to compare patients referred by NHS-D with those referred by general practitioners and those who self-presented to check whether there were differences in terms of disease severity and necessity of attendance.[3]

METHOD

At the time of the study, calls to NHS-D from Merseyside were co-coordinated by the NHS-D North West Coast managed by the Lancashire Ambulance Primary Care Trust before the move to a single national system. Most paediatric A&E attendances in this region come to the A&E department at the Royal Liverpool Children's Hospital (RLCH), Liverpool, UK, with relatively small numbers of children attending other hospitals. Between 1 December 2002 and 28 February 2003, NHS-D North West Coast provided the Clinical Audit Department at Alder Hey with details of all contacts regarding children and young adults aged ⩽16 years who lived in designated postal code areas (L1–L36). The postal codes were chosen as they represented the geographical areas of most of the attendances at the A&E department. Sufficient demographic data on patients were required to ensure that mismatches due to mis-spellings and duplicate surnames were avoided. The presenting complaint and advice given by NHS-D were also collected.

Reception staff in the A&E department routinely ask parents whether they had been referred to the department.

The NHS-D data were matched with the A&E department's Meditech computerised database of attendances. In addition, triage category, date and time of visit, presenting complaint, referral source and discharge disposition were also noted.

Patients were excluded if >12 h had passed between the time of call and subsequent attendance at the A&E department. This was chosen because advice about a child's condition would alter as the natural history of the illness progressed.

Permission to use the data was granted by the Medical Director and National Caldicott Guardian of NHS-D at the time (RF). This was also discussed with the Caldicott Guardian of RLCH. The data were transferred electronically and secured by a password. Matching of the datasets was limited to one member of the audit team who held the

Abbreviations: A&E, accident and emergency; NHS-D, NHS Direct; RLCH, Royal Liverpool Children's Hospital

Table 1 Advice given to callers at NHS Direct

Advice given by NHS Direct	Number of calls (% of total n = 3312)
999 as soon as possible	55 (1.6)
A&E as soon as possible	329 (9.9)
A&E within 4 h	76 (2.2)
Total advised A&E	460 (13.8)
GP within 4 h	735 (22)
GP within 12 h	227 (6.8)
GP within 36 h	229 (6.9)
Total advised GP	1191 (36)
Contact dentist	184 (5.4)
Contact health visitor	34 (1)
Home care advice	605 (18)
Call back contact failed	73 (2.2)
Speak to GP	96 (2.8)
Walk in centre	93 (2.8)
Caller refused triage questioning	27 (0.8)
Other	503 (15)

A&E, accident and emergency; GP, general practitioner.

password. The two sets of data were matched using Microsoft Access for Windows 2000 and statistically analysed using the χ^2 test.

Matched patients were divided into two groups:

1. *NHSD patients*: those who had called NHS-D, were advised to attend an A&E department and had done so within 12 h of their call (n = 299).
2. *NHSD-Other patients*: those who had called NHS-D, and had attended the A&E within 12 h of their call, although they had not been advised to (n = 163).

For the study period, two other patient groups satisfying the study criteria of geographical location and age were selected from comparison:

1. *GP patients*: those patients who had attended the A&E department and been referred by their general practitioner (n = 1452).
2. *Self-referred patients*: those who had attended the A&E department on advice of parents or relatives (n = 9893).

Although most patients attend the A&E department at RLCH, attendances at two other local A&E departments (Whiston Hospital, Prescot, UK, and Aintree Hospital, Liverpool, UK) were also contacted and matched with the data from NHS-D. Data on outcome were not available for these patients, and hence they were not analysed further.

RESULTS

In the 3 months, NHS-D provided advice to 3312 relevant callers (table 1).

In the same period, 14 029 new patients attended the A&E department from the same postal code areas.

Of the 14 029 patients who attended the A&E department at RLCH, 462 (3.2%) were identified as having called NHS-D in the previous 12 h. It was also found that 42 patients who called NHS-D had attended the other A&E department in the region (16 had attended at the Aintree Hospital, one of these had also come to the RLCH A&E, and 26 had attended Whiston Hospital). In all, 504 patients had contacted NHS-D and attended hospital within 12 h.

Despite the similarity in the numbers between those advised to attend and those who actually attended, NHS-D advice was not always followed (table 2).

Only 77 (17%) of the identified 462 patients mentioned NHS-D referral when questioned. However, on checking written records to obtain missing data, contact with NHS-D was documented in the clinical notes. Another 142 patients reported on arrival that they had been referred by NHS-D, although these patients could not be traced when matching with the information provided by NHS-D.

Table 2 Patients actually attending the advice given by NHS Direct to attend the accident and emergency department

Advice given by NHS Direct	Attending A&E (n)	Total advised (n)	Percentage of group
999/A&E	299	460	65.0
Contact GP	105	1191	8.8
Home care	10	605	1.6
Failed contact	10	73	13.6
Triage refused by caller	4	27	14.8
Walk-in centre	7	93	7.5
Other	27	863	3.0
Total not advised A&E	163	3312	4.0

A&E, accident and emergency; GP, general practitioner.

The time interval between contacting NHS-D and attending the A&E department varied between those who had been advised to do so (88% attended within 1 h of the call) and those who had been advised another course of action (88% within 4 h of the call). Most patients who had called NHS-D attended between 17:00 and midnight (54%). There was some variability in the day of the week of attendance, from 11% (on Tuesdays and Fridays) to 24% on Sundays.

Age of patients

The age distribution of patients who attended the A&E department and those who called NHS-D was broadly similar. In both groups, more than half of the contacts were for children aged <5 years (20% were aged <1 year).

Presenting complaint

In all groups, most children had medical conditions (mostly respiratory), ranging from 94% of those referred by general practitioners to 63% of those who self-presented. The highest percentage of injuries was in the self-presentation group (table 3).

Triage category

The A&E department uses the Manchester Triage Group 5-point triage system (colour coded) as an indicator of disease severity and priority[4] (red indicating the highest priority). Comparison of the different presenting groups by triage category showed that the only significant difference was in the green category where NHS-D referred significantly less than self-referrals ($p<0.01$).

Discharge destination

Most patients were discharged home after attendance at the A&E department: 74% of patients in the NHS-D group and 56% of the patients referred by general practitioners. The number of patients admitted varied: from 27% in the patients referred by general practitioners to 10% in the self-referral group (table 4).

Outcome in admitted patients

In all, 71 (15%) patients who had called NHS-D were admitted. Table 5 shows the advice that they had been given, and the specialty where they were admitted. Of them, 37 patients were advised to attend the A&E department and 34 were given other advice.

Table 3 Clinical groups of patient by source of referral

Clinical group	Source of referral, n (%) NHS-D, n = 299	NHS-D-Other, n = 163	GP referral, n = 1452	Self-referral, n = 9893
Medical	219 (73)*†‡	143 (88)‡	1365 (94)†	6195 (63)*
Injury	62 (21)§¶**	14 (9)¶	82 (6)§	3504 (35)**
Ingestion of fumonisin B	10 (3)	2 (1)	3 (0.3)	176 (2)
Poisoning	8 (3)	4 (2)	—	17 (0.1)
Social	—	—	2 (0.1)	1 (0.01)

GP, general practitioner; NHS-D, NHS Direct.
NHS-D referred significantly more medical patients than self-referred patients (*$p<0.01$), and less patients than GPs and NHS-D-Other (†$p<0.01$, ‡$p<0.01$). In the injury group, NHS-D referred significantly more patients than GPs and NHS-D-Other (§$p<0.01$, ¶$p<0.01$) and significantly less than self-referrals (**$p<0.01$).

DISCUSSION

Despite the large number of calls received by NHS-D, this was still exceeded fourfold by attendances at the A&E department. There has been concern that NHS-D may result in increased attendances at the A&E departments. The proportion of NHS-D calls that are referred to the A&E department varies by region and has been quoted between 10% and 17%[5]; recently, however, this figure has been reported to be decreasing to around 7.7%.[6] In our study, of the total calls received by NHS-D, 13.8% were referred and 15.2% attended A&E. Although our study suggests a higher rate of attendance compared with adult services, this still represented only 3.2% (462 patients) of all attendances at the A&E department at RLCH (about 5 patients per day, range 0–15).

The situation is more complex than it first appears, because, of the 462 patients who did attend, not all of these had been advised by NHS-D to do so. Some people who were advised to attend A&E did not do so and other people who were advised another course of action still attended the A&E department. Another 176 patients called NHS-D and were given different advice, but still attended A&E. This represents just <1% of all those calls given non-A&E attendance advice by NHS-D.

These results suggest that many people do not perceive NHS-D to be the definitive source of advice but use it in combination with other influences to affect their behaviour. It also means that when NHS-D calls are perceived to save unnecessary contacts or attendances at the A&E department, the figures may not reflect the actuality, as 100% compliance with advice given cannot be assumed. Apparently, for some, NHS-D represents an additional source of advice to consider in their decision making rather than a definitive one.

Just about 70% of calls advised to attend the A&E department subsequently did so. The outcomes for the missing 30% are unknown, as it would have needed a collaboration with primary care and families to complete the information. However, they were not unwell enough to present to the A&E department, suggesting that they could have been appropriately offered different advice, as over-assessment of the need for attendance at the A&E department represents an understandable safety net for the advice given, but results in dissatisfaction with the service and interprofessional distrust as well as a waste of NHS time and resources.[3]

Only 17% of the patients who had contacted NHS-D mentioned this when booking in at the A&E department. If parents had been advised not to come to the A&E department, they would be clearly reluctant to mention the contact. Some parents may not consider it to be relevant, and in other situations the NHS-D contact may become apparent during history taking. In addition, 142 parents reported on arrival that they had been referred by NHS-D, although there was no evidence of contact with these families within the preceding 12 h. Many of these parents may have contacted NHS-D at some time before that in the past. Such misinformation also serves to foster distrust between the organisations. People may feel the need to add credibility to their attendance by citing NHS-D, whereas others may not wish to disclose that they had previously sought another source of advice, especially if it conflicts with their subsequent action.

As might be expected, we found no differences in the age and type of patients accessing the services. Nearly twice as many patients had telephoned NHS-D attending on Sundays compared with other days. Subsequent changes in out-of-hour primary care services may have altered this.

Interestingly, 56% of those who called NHS-D and attended the A&E department did so within an hour of their call. Twice as many of who were advised to attend came in the first hour compared with those who were advised another course of action (23%). By 4 h, 96% of the group advised to attend the A&E department and 88% of the group advised a

Table 4 Discharge destination by source of referral

Discharge destination	Source of referral, n (%) NHS-D, n = 299	NHS-D-Other , n = 163	GP-referred patients, n = 1452	Self-referral, n = 9893
Home	220 (74)*†	102 (63)	810 (56)*	6286 (64)†
Admitted	37 (12)‡	34 (21)‡	388 (27)	1013 (10)
Follow-up	22 (7)	12 (7)	236 (16)	2256 (23)
GP	12 (4)	12 (7)	—	2 (0.02)
Dentist	1 (0.3)	—	—	9 (0.1)
Died in department	—	—	—	1 (0.01)
Left before treatment	7 (2)	3 (2)	18 (1)	326 (3)

GP, general practitioner; NHS-D, NHS Direct.
The patients advised by the NHS-D accident and emergency department had significantly less admissions than NHS-D-Other (‡$p<0.01$) and there were significantly more discharges than self-referrals and GP-referred patients (*$p<0.01$, †$p<0.01$).

Table 5 Patients admitted to hospital according to the advice given by NHS Direct

Advice	Number of patients admitted			
	Medical	Surgical	Other	Total
999, ambulance as soon as possible	12			12
A&E, as soon as possible	18	2	2	22
A&E, within 4 h	1	1	1	3
All advised A&E				37
Contact GP practice within 4 h (as soon as possible)	22	4		22
Contact GP practice within 12 h (same day)	2			2
Speak to doctor within 12 h (same day)	1			1
Contact GP practice within 36 h (next day)	1			1
Routine appointment with GP	1			1
Information provided	1			1
No answer/no contact	1			1
Other	1			1
Total advised no A&E				34

A&E, accident and emergency; GP, general practitioner.

different option had done so. Clearly, other factors may have been taken into account when deciding to attend the A&E department, which may have delayed the attendance. This has been highlighted by others, but rarely acknowledged in NHS-D documents that attempt to assess the effect of the service and assume that advice given will be followed.[2 7]

Triage category of the patient is a widely used method for allocating priority at presentation. As it is a standardised tool that is consistently applied to all groups of patients, it enables comparison between groups with regard to the urgency of medical review,[4] but this may not always reflect the severity of the underlying diagnosis. The lack of significant differences in most of the triage categories at presentation suggests that NHS-D protocols are comparable to other methods in categorising disease priority.

A significantly higher proportion of patients in the NHS-D group were discharged compared with either patients referred by the general practitioner or self-referred patients. The number of patients admitted was significantly less than in those referred by the general practitioner and NHS-D-Other groups. This suggests that NHS-D is not better at assessing the most ill group of patients—namely, those requiring admission—than parents who bring their children directly to the hospital or to general practitioners. This supports the accepted fact that visual assessment plays an important part in detecting a major problem in children even where the observer is not a healthcare professional.

Of those patients admitted, the ones who had been advised not to attend by NHS-D represent a small but worrying group. Some of these (26/34, 76%) had been advised to contact their general practitioner within 4 h, which suggests that the clinical algorithms concerned may be discriminatory as far as the need for medical review is concerned but not the severity of presenting disease or need for hospital admission. Also, clinical algorithms used may not be able to deal with the rather non-specific nature of childhood illness, especially as they rely on the interpretation of the symptoms by a parent (third party). Furthermore, there was a greater delay on the presentation of this group, giving more time for potentially serious conditions to become apparent.

Limitations

This study is a result of a great deal of work and cooperation between the two trusts. Although data presented are a few years old, and pre-date the national standardisation of the NHS-D software, we consider the main messages relevant and interesting, while acknowledging that it is an imperfect insight into a complex area. Similar studies published, especially on children, are few.

CONCLUSION

A robust and properly funded liaison system is needed to establish closer working relationships between NHS-D and paediatricians. This would enable a more detailed look at specific outcomes, with the opportunity to trace them back to the specific clinical algorithm used to determine whether adjustments and improvements can be made. Recently, it has been acknowledged that the groups need to work more closely[1 6]; however, no formal mechanism by which NHS-D is made aware of important outcomes is in place other than on the initiative of the individual clinician.

The relationship between NHS-D and attendance at the A&E department is complex. Families act on advice given in different ways, but clearly, not all families choose to follow any one source of information or advice given. Referrals from NHS-D represent a small proportion of patients attending our paediatric A&E department. A large, prospective, multidisciplinary study, including primary care, is needed to clarify the outcomes of NHS-D calls and examine its cost effectiveness.

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