ResearchSummary

The costs and benefits of managing low priority 999 ambulance calls by NHS Direct nurse advisors

The rising demand for emergency ambulance services (Office of National Statistics, 2002) and the need to provide a clinically appropriate 999 emergency service (Department of Health, 2005) has led to the exploration of alternative methods of responding to non-urgent 999 calls. This research summary looks at a study that evaluates one such method (Turner, 2006). It involved diverting non-urgent calls to a nurse advisor who discussed the most appropriate immediate treatment options with the caller. This approach was generally welcomed by callers, however nearly half the calls still required the dispatch of an ambulance.

This research was commissioned by the NIHR Service Delivery and Organisation Programme (SDO) and undertaken by a team led by Janette Turner at the Medical Care Research Unit, University of Sheffield. This research summary will be of interest to commissioning managers in Primary Care and Ambulance Trusts, NHS Direct and emergency/unscheduled care networks as well as patients and those responsible for their care in the community.

Key findings

- Diverting non-urgent 999 calls to nurse advisors reduced the mean costs of emergency care in comparison with the current approach. The cost impact on subsequent services is less certain but it appears that further savings are possible.
- There is an expectation amongst some 999 callers that an ambulance should always be despatched when requested.
- Many callers still require transport by ambulance or a face-to-face health assessment even if their medical condition is non-urgent. Consequently, the proportion of calls that can be effectively managed through nurse advice alone is sometimes smaller than anticipated.
- In general, callers referred to the nurse advisor were satisfied with the advice and reassurance provided by the nurse. The main reasons for dissatisfaction were the number of questions and the delay in sending the ambulance (if subsequently required).
- The ambulance service and nurse advisors participating in the study acknowledged the positive experience of joint working.
- Four key factors for an effective 'transfer' system were identified: strong leadership with staff fully engaged in new processes; good knowledge of local health/social care services and the development of local care referral pathways; appropriate training; and fit-for-purpose IT systems that facilitate good communication between services.

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Background

Emergency 999 calls are classified into three categories with a more rapid performance response/time target for category A [immediately life-threatening] calls than for category B [serious] and C [not life threatening or serious] calls. The steadily increasing demand for emergency ambulance services together with research evidence that up to 40% of 999 calls do not require an emergency response (Snooks, 1998), precipitated the need to identify appropriate alternative response options for non-urgent calls. This also supported the push towards more patient-focused health services for users of the ambulance service (Department of Health, 2005).

Developments such as the use of computerised clinical decision support software and telephone-based, nurse-led services, where a trained nurse can assess a health-related problem and determine an appropriate course of action for the caller, have prompted a number of small studies that explored alternative management procedures for non-urgent 999 calls. These studies still required the patient to make only one call, but included the use of telephone advice and assessment to determine the most appropriate outcome for the caller/patient. Criteria for a successful alternative service model include:

- the delivery of a service more clinically appropriate to the needs of patients with non-urgent conditions
- the release of resources which can be diverted to more serious calls and improve the management of demand for emergency ambulances
- a reduction in unnecessary journeys to hospital for patients and inappropriate demand on accident and emergency (A&E) departments.

This study was commissioned to increase the evidence base on the safety and service impact of passing non-urgent 999 calls to a nurse advisor for further telephone assessment.

Practical findings

"I think it is probably one of the most exciting things I have been involved with since joining the ambulance service because it is such a huge step forward for the ambulance service."
Manager, Ambulance service

Is there an alternative to dispatching a 999 ambulance to low priority calls?

The emergency ambulance service provides a rapid response to 999 calls made by the public. All ambulance service control centres are equipped with a computer-based call prioritisation system which 'triages' each call and gives it a priority code and category. This ensures that the most serious calls take priority so that an ambulance is dispatched with the urgency appropriate to the category of call. This triage system can also potentially identify non-urgent – category C – callers for whom a more suitable response may be contact with a health professional (such as a nurse advisor) who can offer self-management advice or referral to a more appropriate community-based health provider. The increasing cost and operational pressures on the ambulance service and on A&E services – both of which have stringent time targets to meet as well as the desire to improve quality and appropriateness of care – have led to the exploration of appropriate alternative ways of responding to non-urgent 999 calls. This study explored whether this was an acceptable, clinically safe, cost-effective alternative to routinely sending a fully staffed emergency ambulance to all callers.

What was the study?

Three ambulance services covering geographically diverse locations in England and Wales took part in this study. Agreement was reached on inclusion criteria for the sample of patients who would be invited to participate in a randomised control trial. During the course of the trial, all three services followed the standard procedure of answering the 999 call and dispatching an ambulance while the call was assessed and triaged for its degree of urgency. Non-urgent category C callers (a third of whom were also the patient) who fulfilled the inclusion criteria for the trial were then randomly allocated either to the *control group* – where the ambulance continued on its journey with the appropriate speed of urgency – or to the *intervention group*, where the caller's consent was sought to participate in the trial. These callers were given two options: either to continue with the dispatch of an ambulance or for the call to be transferred to a nurse advisor, who was based either within the

ambulance service or within NHS Direct, for further clinical assessment of the problem that had prompted the 999 call. In this second option, the ambulance was 'stood down' and became available for another 999 call. This further contact between caller/patient and nurse advisor led to a fuller assessment of the health problem and helped determine the appropriate next stage. Following advice from the nurse or through the choice of the caller, the call could be passed back to request an ambulance to be dispatched again. Alternatively, the patient accepted the advice offered by the nurse advisor on self-management or of more suitable referral options and the call was completed and closed. See Figure 1.

Who participated?

In order to ensure the safety of the patient and to deal with operational constraints, there were a number of exclusion criteria in the trial: calls made from a public place; those made outside agreed operational hours when nurse advisors were not available; those from a medical practitioner or someone under 16; and all calls relating to children under two years. As a result, only 13% (4408) of category C calls from the three ambulance services were eligible for inclusion. Older people over 75 years old constituted a large proportion (35%) of the participants in both trial groups and there were marginally more women than men. The most common diagnostic 'codes' identified amongst patients in the intervention arm were diabetic problems, falls, lacerations and/or haemorrhage, psychiatric problems and traumatic injuries. There was little difference in the diagnostic codes of patients who agreed to be passed to the nurse advisor and of those who refused with the exception of falls, where refusals were twice the number of consents. This was probably due to a high proportion of these callers/patients being older people where help was needed to lift the patient from the floor.

Are ambulances still required for non-urgent 999 calls?

Following contact with the nurse advisor, 67% of all calls resulted in an ambulance being dispatched for a second time, although this varied between services from 36% to 75%. This was a higher proportion than anticipated by the participating ambulance services. Just under half of these calls were referred back as they required a 999 response and a further 25% needed urgent transport to hospital (although the option to send an urgent rather than emergency ambulance was only available in one service). In nearly 10% of cases, the main reason for calling an ambulance was the need for a face-to-face response, frequently as a result of a fall. Many of the returned calls were for elderly patients; of these, 75% were a response to patient choice or simply because transport was needed. The study reported that 52% of all calls (including those returned to the ambulance service) assessed by nurses were not transported to hospital compared with 22% in the control group. See Table 1 for a summary of the reasons for returning nurse-managed calls back to the ambulance service.

Figure 1. The patient pathway within the intervention arm of the randomised control trial

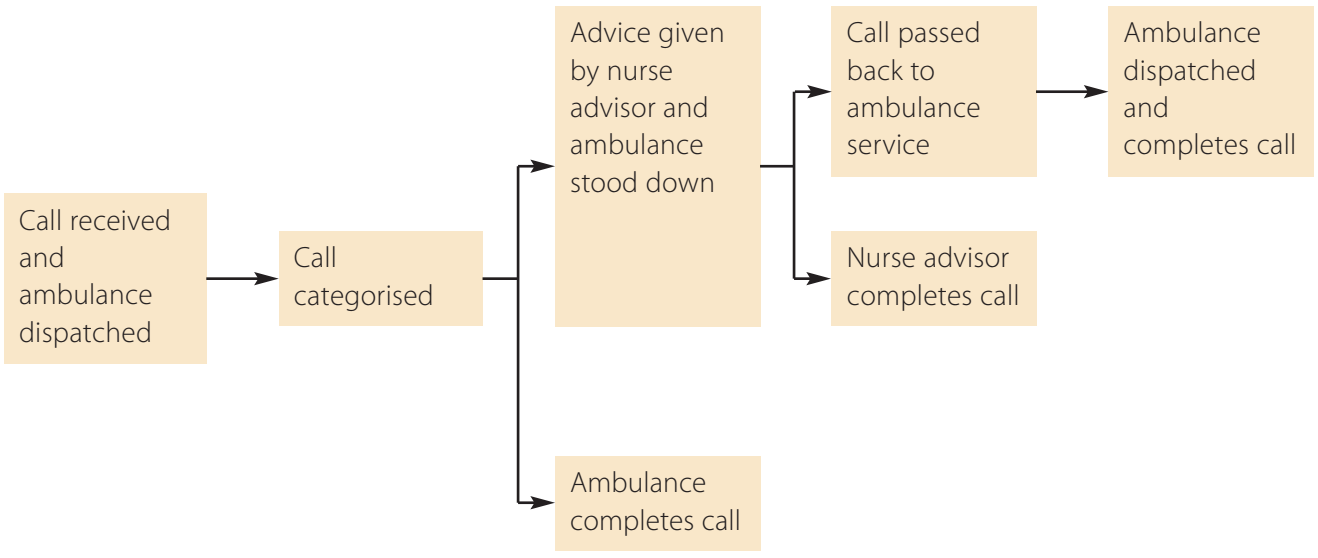

Table 1. Reasons for referring nurse-managed calls for an ambulance

Return reason	All calls (%)
Requires 999 ambulance	525 (44.4)
Urgent transport	295 (25.0)
Requires lift and assessment	111 (9.4)
Caller requested ambulance	61 (5.2)
Public place or patient not with caller	36 (3.0)
Refused assessment or hung up	19 (1.6)
GP had advised calling 999	53 (4.5)
Unable to assess, disconnected/system fail	44 (3.7)
Missing	38 (3.2)
Total	**1182 (100)**

Acceptability to callers and patients

A follow-up questionnaire elicited the views of callers/patients in both the intervention and control group on the treatment of the call and the service provided (from the nurse advisor and the ambulance service where applicable). There was a high level of satisfaction in both groups, although this was slightly lower in the intervention group (75% compared with 85%). Many callers welcomed the contact with the nurse advisor as they had been unsure of the appropriateness of making the 999 call; they found the advice they received reassuring irrespective of whether an ambulance was later called.

> ***"The people on the phone – both 999 and NHS Direct – were very helpful and pleasant. I had panicked and phoned 999 but I was reassured and felt very happy when I had spoken to the nurse, I was glad afterwards that an ambulance hadn't been sent as it would have wasted their time."***
> Caller/patient

The main sources of dissatisfaction were the degree of repeat questioning and an undesirable delay in the arrival of the ambulance where it was subsequently needed or requested. Another finding was that there remained an expectation amongst some callers that an ambulance should be dispatched immediately on request.

> ***"Although everything was done quickly and both operator and NHS nurse were polite, I felt that the information given by myself merited an ambulance straight away, but I fully agree that a lot of the 999 calls are unnecessary and can be dealt with differently."***
> Caller/patient

The views of the ambulance service and NHS Direct

The study also looked at the impact and satisfaction of this service change for ambulance and NHS Direct personnel (including nurse advisors). Despite some disappointment in the low number of calls that were eligible to be passed to the nurse advisor, and the high number of ambulances that were subsequently dispatched, staff were pleased that the potential risk of serious adverse events associated with the transfer to a nurse advisor appeared to be small since the triage process had resulted in only six cases where the delay had caused slight concern regarding clinical effectiveness. They appreciated the potential operational benefit of this method of handling non-urgent calls and welcomed the opportunity to develop an integrated service with a high level of joint working.

> ***"...a lot of calls that you know in my opinion do not need an ambulance response or not an immediate emergency ambulance response and by using NHSD it can help relieve our load and the caller and patient can get better advice than we can give."***
> Operational staff, Ambulance service

A number of features were identified as key change factors in rolling out this approach more generally, including:

- strong leadership
- early involvement of staff at all levels
- a detailed change management timetable, allowing ample time for testing, modification and implementation
- good communication channels facilitating regular exchanges of information, experience of the process and case review
- complementary computer-aided clinical support decision systems to allow for smooth exchange of information.

> ***"One of the main things that we found that was critical to the success of the project was firstly understanding the role of the other parties involved. It was very easy to become disassociated and feel we were just doing our bit and somebody else was doing their bit … the old adage that you can't communicate enough was probably true in this case too."***
> NHS Direct service manager

Is the approach effective?

The study found that the intervention of the nurse advisor has the potential to significantly reduce the total ambulance 'job cycle time' with the saving of around nine minutes on the complete cycle.

Table 2. Mean job cycle times

	Mean job cycle time (min:sec) Intervention	Mean job cycle time (min:sec) Control	Mean difference
All calls	41:35	50:36	-9:10
Passed calls only	41:08	50:36	-9:27

An economic evaluation was undertaken alongside the study in order to capture changes in resource use. This involved reviewing the cost at each stage of the process outlined in Figure 1. It considered the cost components associated with the nurse advisor training and time; all ambulance activity; the cost of A&E attendances; and all other NHS care that was incurred by patients in the week following the 999 call. Although there were increased costs associated with the nurse advisor time, this was offset by reductions in the use of emergency ambulance services and A&E attendances. The overall impact of the service was a reduced cost of emergency care that ranged from £8 to £102 per patient, with the variation depending primarily on the cost of an emergency ambulance attendance. The impact on subsequent NHS services is less certain, but suggests that further savings are possible.

Conclusions

This study found that the transfer of non-urgent callers/patients to a nurse advisor for further advice and triage is an acceptable and cost-effective approach to managing the increasing demand on high cost services such as emergency 999 ambulance services and treatment at A&E departments. Although, in this study, the proportion of callers who were eligible for 'transfer' was low, this can be attributed to the study's numerous high exclusion criteria due to operational constraints, concerns for clinical safety, management changes and other organisational factors.

The frequency of times that an ambulance was called to attend to patients who had contact with a nurse advisor was higher than anticipated and can partly be explained by caller/patient choice but also to some extent by the cautious approach adopted by the nurse advisors during the trial. Since older people who have suffered a fall constituted a substantial number of calls passed back for an ambulance, the capacity for nurse advisors to resolve such calls remains limited where the option to refer the caller to a suitable alternative such as a falls or lifting service does not exist.

There was a high degree of satisfaction with the service from caller/patients and professionals alike, with the latter group acknowledging the benefits of closer working. The study identified further strategies to improve a 'transfer' service for the caller/patient. This includes the production of locally-based directories with details of alternative services, which will facilitate the development of appropriate local care and referral pathways for the patient. It can be extrapolated from the findings of this study that up to 10% of all 999 calls and 90% of non-urgent calls could be transferred safely and effectively to a nurse advisor. It would also result in shorter job cycle times and fewer A&E attendances, and have the potential for further savings.

Further research

A number of factors and changes had an impact on the scale and scope of the analysis of this study. As already highlighted, the high number of exclusion criteria impacted on recruitment to the randomised control trial with a consequent effect on the follow-up study to measure satisfaction with the service. In addition, different computerised systems were used by the participating ambulance services, resulting in some inconsistencies in classification of calls. Finally, the Department of Health announced an amended calculation of the target response time for category C 999 calls which stated that a new call could be logged – and given a fresh response/time target – when an ambulance was dispatched for a second time following assessment by a nurse advisor (Department of Health, 2004).

The study also identified a number of issues which could benefit from further investigation and research.

- Further development of computerised systems to improve their ability to identify calls suitable for transfer to a nurse advisor for further telephone assessment and advice.
- More detailed investigation of the factors that influence the decision of the nurse advisor (or other assessors) as to whether a call should be returned to the ambulance service, so that pass-back rates can be minimised.
- Further evaluation of similar transfer systems to identify the optimal method of providing telephone advice to non-urgent 999 callers.
- The development of a system for measuring and monitoring adverse events that may result from the transfer of non-urgent ambulance calls to an alternative service.

About the study

The study had three stages. Stage 1 involved a preliminary review of existing evidence and the analysis of data from participating ambulance services to identify which clinical diagnostic codes were appropriate for transfer to a nurse advisor. This led to agreement on the inclusion criteria for the randomised controlled trial which was Stage 2 of the study. This trial, which took place over a 15-month period in 2003/04, involved over 4000 calls. It compared the outcomes of calls transferred for nurse advice (2250 calls) with calls receiving a standard emergency ambulance response (2158 calls). The main process outcomes were the return rates of calls passed back to the ambulance service, transports to hospital and ambulance service job cycle times. Patient satisfaction and the acceptability of the new service were measured via a follow-up postal questionnaire which generated a response from 584 trial participants. Stage 3 was a qualitative study with management and operational staff from the participating ambulance services and nurse advisors to identify the practical and operational issues that affect service development and implementation. The safety and reliability of call transfer was also assessed through a review of patient clinical outcomes and, finally, an economic evaluation was conducted.

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Further information

The full report, this research summary and details of current SDO research in the field can be downloaded at: www.sdo.lshtm.ac.uk

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Feedback

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Addendum

This document was published by the National Coordinating Centre for the Service Delivery and Organisation (NCCSDO) research programme, managed by the London School of Hygiene & Tropical Medicine.

The management of the Service Delivery and Organisation (SDO) programme has now transferred to the National Institute for Health Research Evaluations, Trials and Studies Coordinating Centre (NETSCC) based at the University of Southampton. Prior to April 2009, NETSCC had no involvement in the commissioning or production of this document and therefore we may not be able to comment on the background or technical detail of this document. Should you have any queries please contact sdo@southampton.ac.uk.