

Primary care



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Nurse telephone triage for same day appointments in general practice: multiple interrupted time series trial of effect on workload and costs

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BMJ 2002;325:1214-7

Abstract

Objective To compare the workloads of general practitioners and nurses and costs of patient care for nurse telephone triage and standard management of requests for same day appointments in routine primary care.

Design Multiple interrupted time series using sequential introduction of experimental triage system in different sites with repeated measures taken one week in every month for 12 months.

Setting Three primary care sites in York.

Participants 4685 patients: 1233 in standard management, 3452 in the triage system. All patients requesting same day appointments during study weeks were included in the trial.

Main outcome measures Type of consultation (telephone, appointment, or visit), time taken for consultation, presenting complaints, use of services during the month after same day contact, and costs of drugs and same day, follow up, and emergency care.

Results The triage system reduced appointments with general practitioner by 29-44%. Compared with standard management, the triage system had a relative risk (95% confidence interval) of 0.85 (0.72 to 1.00) for home visits, 2.41 (2.08 to 2.80) for telephone care, and 3.79 (3.21 to 4.48) for nurse care. 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).

Conclusions Triage reduced the number of same day appointments with general practitioners but resulted in busier routine surgeries, increased nursing time, and a small but significant increase in out of hours and accident and emergency attendance. Consequently, triage does not reduce overall costs per patient for managing same day appointments.

Introduction

Changes in the delivery of primary care¹ have led to an increase in workload.² Much of this workload is accounted for by requests for same day appointments (urgent appointments),³ home visits,⁴ and out of hours calls.^{5,6} Studies of the effect of triage on workload have been small and had a restricted focus (for example, calls in the morning only,³ out of hours,⁷ and home visit requests received before 10 30 am⁴). Triage has been reported to reduce general practitioners' same day activity by between 25% and 49%,^{3,4,7} but only one small study examined use of services after triage. This study found an increased rate of return to the practice within the first week after triage.³

We are not aware of any studies of comprehensive nurse telephone triage systems for patients requesting same day appointments during working hours or of any studies examining the costs of such services in routine practice. We investigated the effect on general practitioner and nurse workloads and cost of patient care of nurse telephone triage and standard appointment management systems—both operating routinely in primary care.

Participants and methods

The study took place in a large general practice in York. The practice had five surgery sites in inner city York, a list size of 25 000, 16 general practitioners (nine full time, four part time, two retainers, and one registrar), and a nursing team consisting of one full time nurse team leader and seven practice nurses (whole time equivalents 3.3). The practice population had a slightly poorer standardised mortality ratio, higher unemployment, and more pensionable residents than the regional average. Three of the practice's surgery sites participated in the study, giving a total study population of 20 800.

Design

We entered all consecutive patients requesting same day appointments into the trial using the broadest possible inclusion criteria. At each study site for one week in each of three consecutive months, all patients requesting same day appointments entered the trial

and were managed by the standard management system. The triage system was then introduced, data being collected on patients for one week in each of the next nine months. Surgery sites entered the study sequentially at three monthly intervals. All patients requesting same day contact between 8.30 am and 5 pm during data collection weeks were eligible. There is more about our trial's design on bmj.com.

Interventions

In both systems, patients requesting a same day appointment were offered a routine appointment by receptionists, who were instructed not to attempt any triage. If patients continued to request a same day appointment the following procedures applied:

Standard management—Patients requesting same day appointments were fitted into extra general practitioner appointments at the end of each surgery by receptionists. Occasionally, general practitioners took telephone calls and practice nurses saw some patients on an ad hoc basis.

Triage system—Receptionists passed on requests for same day appointments to six experienced practice nurses who had received 30 hours of minor illness management training and were supported by computerised management protocols developed by the practice. Nurses assessed and managed the call through telephone advice only, a same day nurse appointment, a same day general practitioner appointment, a home visit, or a routine nurse or general practitioner appointment.

Measures

We collected data on all requests for same day appointments for one week in every month. The information recorded included the type of consultation (telephone, appointment, or visit), the time taken for the consultation, up to three presenting complaints per patient (chosen from 10 categories), and up to three clinical decisions made during the consultation (chosen from 13 categories—for example, prescription, advice, or type of onward referral). We checked and validated recorded data against clinical notes in the electronic patient record. We also used the electronic patient record to determine demographic details, final point of same day contact, and use of services during the month after contact.

All costs for same day appointment activity and one month follow up care were calculated at the level of the individual patient. We calculated costs of general practitioner and nurse time using salary and earning scales current at the time of the study. Prescription costs were taken from the *British National Formulary*, and the costs of tests and emergency care were obtained from local provider units. Because follow up consultations were not timed, we used the average time for telephone consultations, appointments, or home visits recorded in the standard management or triage conditions to calculate follow up general practitioner and nurse costs.

Analysis

We analysed the data on an intention to treat basis. The only patients for whom data were not analysed were those who had no further contact with a general practitioner or nurse after their request and so had no data recorded.

Table 1 Final point of contact for patients requesting same day appointment handled through standard management or triage according to surgery site

Type of contact	No (%) of patients			
	Surgery A	Surgery B	Surgery C	Total
Nurse phone:				
Standard management	4 (1.1)	1 (0.2)	17 (3.9)	22 (1.8)
Triage	233 (20.8)	335 (27.8)	322 (28.6)	890 (25.8)
Nurse appointment:				
Standard management	34 (9.3)	34 (7.9)	39 (8.9)	107 (8.7)
Triage	242 (21.5)	171 (14.2)	101 (9.0)	514 (14.9)
General practitioner phone:				
Standard management	54 (14.8)	27 (6.3)	58 (13.2)	139 (11.3)
Triage	79 (7.1)	58 (4.8)	86 (7.6)	223 (6.5)
Home visit:				
Standard management	27 (7.4)	61 (14.2)	88 (20.0)	176 (14.3)
Triage	72 (6.4)	160 (13.3)	186 (16.5)	418 (12.1)
General practitioner appointment:				
Standard management	246 (67.4)	306 (71.3)	237 (54.0)	789 (64.0)
Triage	495 (44.2)	482 (39.9)	430 (38.2)	1407 (40.8)
Total:				
Standard management	365 (100)	429 (100)	439 (100)	1233 (100)
Triage	1121 (100)	1206 (100)	1125 (100)	3452 (100)

tioner or nurse after their request and so had no data recorded.

To determine if triage influenced the time taken to manage same day requests, we did time series analyses of the mean total, general practitioner, and nurse times per patient. We used these analyses to predict the time taken to manage requests by general practitioners, nurses, or both. We calculated relative risks and associated confidence intervals for the final point of contact after standard management or triage and for the impact of different types of triage outcome on subsequent use of services. We summated cost data for each individual patient, calculating sample means and standard deviations for each cost variable. We compared the average (mean) costs between the groups using independent *t* tests. See bmj.com for more details of our analysis.

Results

We included 4685 patients, 1233 in standard management and 3452 in the triage system. The triage group had more presenting complaints per patient, a higher proportion of respiratory and dermatological complaints, and fewer mental health complaints.

At all surgery sites, triage resulted in fewer patients receiving a general practitioner appointment than standard management (table 1). More patients in the triage group received telephone consultations (relative risk 2.41, 95% confidence interval 2.08 to 2.80) or nurse care (3.79, 3.21 to 4.48), and there was a small reduction in home visits (0.85, 0.72 to 1.00).

Time taken to manage same day requests

Management time in the triage system was higher, but both the total amount of general practitioner time and the proportion per patient was reduced (table 2). The extra time required for triage and some of the existing general practitioner management time was taken up by nurses.

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$ for difference between standard and triage.

Table 2 Mean (SD) general practitioner, nurse, and total time per patient by final point of contact for patients managed by standard management or triage

Final point of contact	No of patients		Nursing time (min)		General practitioner time (min)		General practitioner and nurse time (min)	
	Standard	Triage	Standard	Triage	Standard	Triage	Standard	Triage
Nurse telephone	22	890	6.55 (3.25)	5.00 (2.29)	0.00	0.00	6.55 (3.25)	5.00 (2.29)
Nurse appointment	107	514	8.69 (3.59)	10.47 (3.85)***	0.00	0.00	8.69 (3.59)	10.47 (3.85)***
General practitioner telephone	139	223	0.00	2.23 (3.14)	3.92 (2.21)	4.69 (2.73)	3.92 (2.21)	6.92 (4.67)***
General practitioner home visit	176	418	0.05 (0.43)	3.44 (2.15)***	21.09 (7.92)	20.05 (7.76)	21.14 (7.92)	23.49 (7.96)***
General practitioner appointment	789	1407	0.22 (1.73)	4.33 (3.33)***	8.12 (4.31)	8.51 (4.49)	8.34 (4.68)	12.84 (5.40)***
Total	1233	3452	1.02 (3.09)	5.17 (3.83)***	8.65 (7.35)	6.20 (7.56)*	9.67 (6.98)	11.37 (7.42)***

Triage took a mean 1.7 minutes longer per patient than standard management ($P < 0.001$), with nursing time 4.15 minutes longer ($P < 0.001$). However fewer general practitioner appointments, general practitioner telephone consultations, and home visits in the triage system resulted in general practitioners spending a mean 2.45 minutes less per patient for the total population of triaged patients ($P < 0.05$).

Follow up care

More patients in the triage system returned for further practice based care within one month of the initial appointment request than in standard care (relative risk 1.11, 95% confidence interval 1.01 to 1.22). The mean number of return consultations was greater in triaged patients, and more patients used out of hours and accident and emergency services (table 3). Patients were more likely to have contact with the practice after same day telephone care than after appointments (1.32, 1.23 to 1.41) and after nurse care than general practitioner care (1.15, 1.08 to 1.23).

Costs of providing a triage service

General practitioner same day costs and drug costs were significantly less for the triage patients, but these savings were offset by significant increases in costs for nurses (both for same day appointments and at follow up) and for out of hours and accident and emergency care. Overall triage costs were higher than those for standard management, but the difference did not reach significance. There was a mean difference of £1.48 more per patient for triage (95% confidence interval -0.19 to 3.15), the largest component of which was out of hours and accident and emergency care. See bmj.com for a detailed break down of costs and our sensitivity analysis.

Discussion

Our triage system resulted in general practitioners having 29-44% fewer same day appointments than standard management, with 40% of requests being

managed by nurses alone. However, although general practitioner time was 2.45 minutes less per patient in the triage system, the total time to manage same day requests was 1.70 minutes more per patient. Triage was no cheaper than standard management.

Robustness of results

The type of presenting problems differed between the standard and triage groups. This cannot be because receptionists selected certain patients for triage because we included data from every patient requesting a same day appointment during data collection periods. These differences do not account for cost differences between standard management and triage. In both groups, respiratory and dermatological disorders were cheaper to treat than other conditions. The increased numbers of respiratory and dermatological disorders in the triage group, therefore, do not account for the increase in costs. The larger number of patients with multiple diagnoses in the triage group is not explained by nurses eliciting more complaints or categorising problems under multiple headings—general practitioners made more diagnoses in triage than in standard management. Furthermore, although the difference between costs of one and multiple diagnoses was highly significant ($P < 0.001$), the larger number of multiple diagnoses in the triage group accounted for only £0.69 of the cost difference between the groups.

Effect of triage

During triage, patients were more than twice as likely to receive telephone advice only and almost four times as likely to be managed by a nurse. The triage system affected general practitioner time by reducing the proportion of patients managed by general practitioners not by reducing individual consultation times during general practitioner appointments or home visits.

In line with previous findings,³ more patients returned to surgery within one month after triage than standard management. However, more patients also required accident and emergency or out of hours care. This observation is at odds with the findings of the South Wiltshire Out of Hours Project (SWOOP) trial, which reported no difference in the number of accident and emergency attendances between triage and standard care.⁸ However, that trial measured attendance only three days after triage whereas we measured it after 28 days. Furthermore, the number attending accident and emergency is relatively small. The effect on emergency care needs further investigation since additional use of out of hours and accident

Table 3 Differences in length of same day appointment and care within one month according to type of initial management

	Mean (SD) for standard management	Mean (SD) for triage	Mean difference (95% CI)	P value
No of out of hours consultations	0.08 (0.38)	0.11 (0.49)	0.04 (0.01 to 0.07)	0.005
No of accident and emergency visits	0.010 (0.1)	0.033 (0.19)	0.023 (0.015 to 0.032)	<0.001
No of return consultations	0.93 (1.30)	1.24 (1.78)	0.32 (0.22 to 0.41)	<0.001

What is already known on this topic

Nurse telephone triage is used to manage the increasing demand for same day appointments in general practice

Evidence that nurse telephone triage is effective is limited

What this study adds

Triage resulted in 29-44% fewer same day appointments with general practitioners than standard management

Nursing and overall time increased in the triage group as 40% of patients were managed by nurses

Triage was not less costly than standard management because of increased costs for nursing, follow up, out of hours, and accident and emergency care

and emergency services may be a consequence of patients not having their needs met in the triage system. Other measures of patient outcomes are also required in future studies to investigate the clinical

effectiveness and quality of triage for individual patients.

We thank the patients, nurses, doctors, and receptionists who took part in this study and Phil Heywood, who provided advice at the later design stage and during data collection and made helpful comments on an earlier draft of this paper.

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Funding: The research was supported by a grant from the NHS Executive Northern and Yorkshire Regional Office Responsive Funding Programme.

Competing interests: None declared.

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(Accepted 15 August 2002)

The aspect of the King's illness

In the early days of the King's illness many people ventured upon the tolerably safe prediction that one result of the melancholy event would be that closer attention would be given to the subject of appendicitis, the disease which necessitated the operation from which His Majesty has now happily recovered. That increased attention has been directed to the subject, but so far it seems to have expended itself in discussion, and we do not appear to be any nearer to a solution of the questions upon which opinion is divided among those to whom we look for guidance. With all anxiety removed in reference to the King's health, we may perhaps be permitted to glance at some aspects of this subject which afford a strange mixture of tragedy and comedy. Whatever may be said, it is evident that there is a wide difference of opinion among surgeons and physicians in this country, as there is between the medical profession of Britain and that of the United States. Except where there is an abscess, as in the King's case, our physicians are strongly opposed to an operation. It is said by some surgeons that when a physician treats a case where an operation should be undertaken, he holds out to the last, and then says, "Let us try one more drug before we operate," with the result that when the operation takes place it is too late, and the patient dies. To this suggestion the physician replies, "Don't talk to me about your operations. Haven't I been present as a student at many operations which ought never to have been done, and in several cases the patient has died in consequence? That is how you surgeons get your skill!" We have the most intense admiration for the British medical profession, which we believe to be the most honorable and the most skilful in the world; but these remarks and their general meaning are not the mere product of anybody's imagination. With this diversity

of opinion what is the patient to do? He asks a surgeon whether an operation is necessary, and the reply is "Certainly." Then if he consults a physician he is advised that an operation is altogether unnecessary. If he compares the practice in the United States with that at home, he will not obtain any further light. In the States there is no hesitation. As soon as it is clear that the case is one of appendicitis, the surgeon operates, and thus, by one process, relieves the patient from his agony and secures him from future attacks. But the British medical profession will not hear of such a thing. Unless there is an abscess they positively refuse to operate with a high temperature, and tell the patient that he must get well before they make him ill again.

Then there is another divergence of opinion which may be noted in passing. Some distinguished medical men have recently formed an opinion that there is some connection between appendicitis and tonsilitis, and when a patient goes to them who has had an attack of appendicitis they astonish him by carefully examining his tonsils. The rest of the profession say it would be quite useful to examine the lining of the patient's hat.

Framlingham Weekly News, 9 August 1902. This article is reproduced with permission of the Lanman Museum, Framlingham. Submitted by J A Black, retired consultant paediatrician, Victoria Mill House, Framlingham.

The operation on Edward VII, performed by Sir Frederick Treves on 24 June necessitated the postponement of the coronation from 26 June to 9 August, the day on which this article was published; elsewhere are featured the King's address to his people and the arrangements for the coronation service.