Local Nurse Telephone Triage in Primary Care

[This paper should be read in conjunction with 'Telephone Triage Services: Systematic review of the literature and survey of Canadian Call Centre Programmes' by Stacey D et al, CCOHTA, Ottawa, Canada, 2003]
Obtainable from: http://www.ccohta.ca/publications/pdf/180_teletriage_tr_e.pdf

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West Midlands Health Technology Collaboration Recommendation:

The recommendation for the adoption of local nurse telephone triage in primary care is:

SUPPORTED

The weight of available evidence indicated that nurse telephone triage was not unsafe and would likely result in cost savings in certain circumstances. Further research on the effectiveness and safety of nurse telephone triage should be undertaken.

Anticipated expiry date: End of 2005, or until such time as decisions regarding integration of local services with NHS Direct have been functionalised.

TABLE OF CONTENTS

APPENDICES

TABLES

SUMMARY

Background: Local Nurse Telephone Triage (NTT) is a service in which a nurse receives telephone inquiries about health concerns; with the aid of a computer based algorhythm the nurse assesses health care needs and directs the inquirer toward self care, routine or immediate visit to a practitioner within the local service, visit to an emergency department, or despatch of an ambulance. The nationwide NHS Direct NTT provides a similar service but currently, in contrast to a local NTT system, the link from nurse to practitioners is indirect. Published plans regarding expansion of NHS Direct indicate that more direct links with downstream services (e.g. practitioners) are envisaged.

Objective: This paper addresses the question " Is the introduction of a local nurse telephone triage (NTT) in primary care likely to deliver health care benefits additional to those of the current (and future) system of NHS Direct?" To do this we reviewed the literature on effectiveness and the cost of local NTT.

Evidence of effectiveness: A current Systematic Review of the effectiveness of local NTT systems was identified and critically appraised according to QUOROM criteria. The review was generally of good quality. Reviewers found that there was a paucity of studies on both the effectiveness and the cost of NTT. On the basis of available evidence the major conclusions of the review were:
i) NTT reduced immediate GP visits without causing adverse outcomes.
ii) About 50% of calls can be managed by telephone alone.
iii) The majority of callers are satisfied with the service and would reuse it.
iv) NTT is cost saving when provided as an out of hours service in a primary care setting.

Cost of local NTT: The cost (2003-2004 prices) of setting up and operating NTT in primary care for 1 year was estimated to be between £237,000 and £266,000 for a 24 hour service and between £91,000 and £102,000 for an out of hours service. These estimates depend upon data obtained for a rural NTT service and might require some adjustment for a service in a predominantly urban setting.

Local NTT in the West Midlands A survey of Primary Care Trusts across the West Midlands was conducted to assess the extent of current and planned local NTT systems. Response rate to the survey questionnaire was 33%. Amongst responders the current development of local NTT systems was relatively limited but most responding PCTs were either implementing a system or were seriously considering doing so in the light of the new contractual arrangements for general practitioners.

Conclusion The limited available evidence indicates that local NTT in primary care is effective and as an out of hours service is likely to be cost saving. However the rationale of introducing such systems depends on the timing, scale and manner of implementation of published national plans for integrating NHS Direct with primary care.

1. ORIGINAL QUESTION

A regional request was made in January 2001 to the Aggressive Research Intelligence Facility (ARIF) * for a review of the evidence base bearing on:-

"The effectiveness of nurse telephone triage (NTT) in primary care"

At the time of this response the nation wide NTT system NHS Direct was in development and its performance under process of examination. It was considered that before a full systematic review of the literature was undertaken the policy question should be allowed to mature in the light of further development and subsequent performance of NHS Direct.

2. CHANGES IN THE POLICY CONTEXT

Since the original question on the role nurse telephone triage in primary care was submitted, a number of key policy developments have taken place.

The setting up of NHS Direct was recommended in the Chief Medical Officer's report "*Developing Emergency Services in the community*" and its inception was announced at the end of 1997. It is self evident from the massive investment that was required to establish and develop NHS Direct, as also from the published plans regarding its expansion, that safety and effectiveness of nurse telephone triage are now considered issues for close monitoring so as to ensure good service performance rather than questions that might determine whether the intervention should be adopted.

Major developments have taken place and are planned for NHS Direct. They directly impinge on any requirement for local nurse telephone triage and are described in two key documents:-

i) *' NHS Direct in England '*.[1] A report by the Comptroller and Auditor General published Jan 2002. It considered the implementation and delivery of NHS Direct and its impact on the NHS and public. The report makes recommendations for the future development, monitoring and financing of NHS Direct. The conclusions with regard to safety and effectiveness are consistent with those of the CCOHTA review.

ii) ' *Developing NHS Direct; a strategy document for the next three years '*.[2] A report by the Department of Health published in April 2003.

This document describes 3-fold expansion plans for NHS Direct aiming to make it a single point of contact for out of hours access to care networks, and also a means to allow patients access to any part of the NHS at any time. In particular it explains plans to achieve local integration by allowing NHS Direct triage operatives computerised access to caller-patient medical records and details of all available local service providers. In addition it states that funding for NHS Direct will devolve to Primary Care Trusts from 2004/2005 and that choices regarding the extent and speed of local integration will rest with Primary Care Trusts; for

example, according to the strategy document, a Primary Care Trust may decide to "*accelerate the pace of integration by investing local resources to support out of hours provision during implementation of the new GP contract*".

In the light of these developments we believe that the policy question that is now of relevance to Regional Evaluation Panel is as follows:

Is the introduction of a local nurse telephone triage service in primary care likely to deliver health care benefits additional to that of the current (and future) system of NHS Direct?

In addressing this policy question, we believe that the Committee will need to consider the following additional issues:

a) The additional costs of providing a local system of primary-care based telephone triage.

b) The service implications of introducing such a service i.e. appropriately trained staff and provision of adequate information technology.

3. CCOHTA SYSTEMATIC REVIEW OF NTT

Early in 2002 it came to our attention that the Canadian Coordinating Office for Health Technology Assessment (CCOHTA) were undertaking a systematic review entitled:- "Telephone Triage Services: Systematic Review of the literature and survey of Canadian Call Centre Programmes". An early version of the report was made available to us in May 2003 and the final version of the report was published on the CCOHTA web site in December 2003.[3] It has been agreed with CCOHTA that this report be made available for the use by the West Midlands Regional Evaluation Panel. A detailed critique of this review was undertaken.

The review was characterised by a notably thorough search strategy and was of generally good quality according to QUOROM criteria for systematic reviews (see Appendix 1). The available evidence was found to be sparse so that from >3000 retrieved reference papers only 10 publications were included for the review of effectiveness of telephone triage. The reviewers judged these publications to be of only low to adequate quality. These publications encompassed several types of comparison (e.g out of hours service with or without telephone triage by MD or nurses) and various study designs including randomised controlled trials (6 publications, of which two reported different outcomes from the same trial), pre- post- time studies (3) and a time series study (1). Seven studies examined nurse telephone triage and three telephone triage performed by a physician. Of the six publications of studies conducted in the UK four examined nurse telephone triage and two physician telephone triage. The other publications were of studies conducted in the USA. Outcome estimates extracted by the reviewers included data concerning:- proportion of telephone calls handled by telephone alone, number and frequency of GP visits, hospitalisations and emergency department visits, deaths, and patient/caller satisfaction.

Three publications were retrieved that dealt with cost of telephone triage, however one of these was un-interpretable.

Major conclusions of the CCOHTA report with regard to nurse telephone triage were:-

i. Nurse telephone triage reduced immediate GP visits without causing adverse outcomes.
ii. About 50% of calls are managed by telephone alone.
iii. The majority of callers are satisfied with the service and would reuse it.
iv. Two of two economic studies show cost savings for nurse telephone triage provided as after hours service.

The characteristics of the relevant UK studies that have reported on nurse telephone triage together with the outcomes investigated and results obtained are summarised in appendix 3.

The major limitation in the interpretation of these findings was that none of the included studies examined the outcome of nurse telephone triage in the context of a national system of telephone support, such as NHS Direct. The added value of a system of local nurse telephone triage based in a primary care setting in the context of NHS Direct remains unclear.

4. SETTING UP COSTS AND ONE YEAR RUNNING COSTS OF LOCAL NURSE TELEPHONE TRIAGE IN PRIMARY CARE.

Lattimer et al (2000)[4] published the only available economic analysis of nurse telephone triage in UK primary care. We have used this study rather than conduct an independent cost description. Lattimer et al examined the costs and savings associated with establishment and running of an out of hours nurse telephone triage intervention operated for one year. The nurse telephone triage service concerned was embedded in a GP cooperative comprising 55 general practitioners serving a population of 97,000 registered patients in a predominantly rural setting (Wiltshire, England, area covered 197 km^2) and its operation required two on duty nurses at any time. Their analysis used 1997-1998 prices and applied an annuity factor of 6% for 3 years or 5 years (in arrears) for capital (mainly equipment) items. All relevant items of expenditure appear to have been considered, however any cost associated with providing a room from which the service would operate was not included since in the particular case analysed no cost for this was incurred.

To obtain an approximate 2003-2004 estimate of the cost of setting up a service and operating it for one year we have used the Lattimer et al ’97 – ’98 actual costs, and to these we have applied values for general inflation of 3% and 6% per annum; we then recalculated annual costs using the same annuity factors employed by Lattimer et al. To also obtain cost estimates for a 24 hour service (rather than “out of hours” service analysed by Lattimer et al) we have multiplied the cost of employing nurse operatives on a *pro rata* “hours in service” basis (i.e. a 24 hour service requires 3.185 times more input of nurse time than the “out of hours” service described by Lattimer et al). The results are shown in the Table 1 below and further details are presented in Appendix 2. Extrapolation of these costs from the Lattimer et al rural setting to an inner city setting with similar patients numbers may be problematical in terms of required on duty nurses.

Table 1 Estimated 2003-2004 cost of setting up and running local NTT service for 1 year.

	24 hr service	out of hours service	24 hour service	out of hours service
Inflation rate applied*	6% per annum	6% per annum	3% per annum	3% per annum
Total cost in one year	**£266,096**	**£102,358**	**£237,691**	**£91,432**

* Inflation rate applied to costs reported by Lattimer et al according to 1997-1998 prices.

Lattimer et al also reported cost savings (with very wide 95% confidence intervals) from the perspectives of the NHS and the GP cooperative. No attempt has been made here to recalculate these in terms of 2003-2004 costs and benefit gains since these calculations are likely to be inappropriate in view of the different context that now prevails from the presence and expansion of NHS Direct.

5. LOCAL NURSE TELEPHONE TRIAGE SERVICES IN WEST MIDLANDS

In December 2003 a questionnaire was circulated to PCTs across the West Midlands (n=30) with the aim to summarize the current and planned (next 12-months) local systems of nurse telephone triage operated by each PCT. Ten PCTs (33%) replied (Beacon and Castle *[Dudley]*, Cannock Chase, East Staffordshire, Heart of Birmingham, Rugby, South Warwickshire, Staffordshire and Moorelands, Telford and Wrekin, Walsall, and one other unidentified PCT). The results of this survey are summarized below:-

Two of the ten PCT responders operate a nurse telephone triage system within individual general practices) rather than on a PCT-wide basis, one is an ‘in hours’ service and one a ‘24 hour’ service. Of the remaining 8 PCTs two had definite plans in hand to implement a nurse telephone triage system within the next 12 months and six considered it likely they would discuss such plans within the next 12 months.

Thus although current development of local systems appears limited most PCTs are either implementing such a system of are seriously considering this in the light of the new contractual arrangements for general practitioners.

APPENDICES

Appendix 1. Assessment of CCOHTA systematic review according to QUOROM criteria[5]

Heading / Subheading	Description	Reported? (Y/N/I)
Title	Identify the report as a meta-analysis [or systematic review]	Y
Abstract	Use a structured format	Y
	Describe	
Objectives	The clinical question explicitly	Y
Data sources	The databases (ie, list) and other information sources	Y
Review methods	The selection criteria (ie, population, intervention, outcome, and study design); methods for validity assessment, data abstraction, and study characteristics, and quantitative data synthesis in sufficient detail to permit replication	Y
Results	Characteristics of the studies included and excluded; qualitative and quantitative findings (ie, point estimates and confidence intervals); and subgroup analyses	Y
Conclusion	The main results	Y
	Describe	
Introduction	The explicit clinical problem, biological rationale for the intervention, and rationale for review	Y
	Describe	
Methods		
Searching	The information sources, in detail (e.g., databases, registers, personal files, expert informants, agencies, hand-searching), and any restrictions (years considered, publication status,l anguage of publication)	Y
Selection	The inclusion and exclusion criteria (defining population, intervention, principal outcomes, and study design Validity assessment The criteria and process used (e.g., masked conditions, quality assessment, and their findings)	Y
Data abstraction	The process or processes used (completed independently, in duplicate)	Y
Study characteristics	The type of study design, participants' characteristics, details of intervention, outcome definitions, &c, and how clinical heterogeneity was assessed	Y
Quantitative data synthesis	The principal measures of effect (e.g., relative risk), method of combining results (statistical testing and confidence intervals), handling of missing data; how statistical heterogeneity was assessed; rationale for any a-priori sensitivity and subgroup analyses; and any assessment of publication bias	I
	Describe	
Results		
Trial flow	Provide a meta-analysis profile summarising trial flow	NA
Study Characteristics	Present descriptive data for each trial (e.g., age, sample size, intervention, dose, duration, follow-up period)	Y
Quantitative data synthesis	Report agreement on the selection and validity assessment; present simple summary results (for each treatment group in each trial, for each primary outcome); present data needed to calculate effect sizes and confidence intervals in intention-to-treat analyses (e.g. 2x2 tables of counts, means and SDs, proportions).	I
Discussion	Summarise key findings; discuss clinical inferences based on internal and external validity; interpret the results in light of the totality of available evidence; describe potential biases in the review process (e.g., publication bias); and suggest a future research agenda.	Y

Some Descriptors in the QUORUM table have multiple elements, with respect to these **Y** = all or nearly all elements reported in the review; **N** = none or very few of the elements reported in the review; **I** = incomplete i.e. some elements only reported in the review. **NA** = not applicable.

Appendix 2. Cost analysis.

The cost of setting up and 1 years operation of a local nurse telephone triage in a primary care setting was calculated using data presented by Lattimer et al 2000[4].

Table 2 Cost elements for set up and running of a local NTT service.

		out of hrs service ⁎			**24 hr service¶ (6% inflation)**	**out of hrs service (6% inflation)**	**24 hr service¶ (3% inflation)**	**out of hrs service (3% inflation)**
	Actual costs '97- 98 prices	Full year cost ('97-'98)	*Actual costs '03-'04 (inflation at 6%)*	*Actual costs '03-'04 (inflation at 3%)*	Full year cost ('03-'04)	Full year cost ('03-'04)	Full year cost ('03-'04)	Full year cost ('03-'04)
Human resources								
Recruitment	*997*	997	*1256*	*1122*	1256	1256	1122	1122
Nurse salaries	*29737•*	59474	*37469*	*33469*	238675	74937	213197	66938
Indemnity insurance	*1538*	1538	*1938*	*1731*	*1938*	*1938*	*1731*	*1731*
Cooperative management	*433*	433	*546*	*487*	546	546	487	487
Education programme (A) ©	*6131•*	4588	*7725*	*6900*	5778	5778	5162	5162
Education programme (B) ©	*1500*	561	*1890*	*1688*	707	707	631	631
Support for IT	*4510*	4510	*5683*	*5076*	5683	5683	5076	5076
subtotal	***44846***	**72101**	***56506***	***50474***	**254583**	**90845**	**227407**	**81147**
Equipment								
Computers ©	*3121*	1168	*3932*	*3513*	1471	1471	1314	1314
Decision support software ©	*16014*	5991	*20178*	*18024*	7546	7546	6741	6741
Furniture Θ	*580*	138	*731*	*653*	174	174	155	155
TelephonesΘ	*240*	57	*302*	*270*	72	72	64	64
Digital tape recorder Θ	*7508*	1782	*9460*	*8450*	2251	2251	2010	2010
subtotal	***27463***	**9136**	***34603***	***30910***	**11514**	**11514**	**10285**	**10285**
total per annum		**81,237⁎⁎**			**266,096**	**102,358**	**237,691**	**91,432**

IT = information technology

⁎ "Out of hrs service" defined as:- 6.15 pm to 11.15 pm weekdays and 11 am to 11.15 pm Saturdays and 8 am to 11.15 pm Sundays.

⁎⁎ Cost reported by Lattimer et al 2000.

¶ Calculations based on *pro rata* increase in hours (factor = 3.185) affecting nurse salaries.

© Annuity factor applied: 3 years at 6% (in arrears).

Θ Annuity factor applied: 5 years at 6% (in arrears).

• Actual cost represented by operating the system on alternate weeks only for one year.

Items for which actual costs refer to 0.5 years operation

Appendix 3. UK studies of effectiveness of nurse telephone triage.

Five studies that examined NNT in the UK were identified: Lattimer et al 1998[6], Thompson et al 1999[7], Elwyn et al 1999[8], and Richards 2002[9]. The major characteristics, outcomes measured and results of these studies are summarised in tables 3 and 4.

Table 3 Characteristics of studies of NTT in UK

Study ID	Setting	design	comparison	duration
Elwyn 1999	Inner city gen: practice. 4.5 GPs Pop: 8,500	Pre-Post study	In hours Standard management v. NTT for requests for same day visit	3.5 weeks –NTT then 3.5 weeks + NTT
Lattimer 1998 & Thompson 1999	Rural cooperative. 19 practices 55 GPs Pop: 97,000	RCT	Standard management v. NTT for out of hours service	1 year. Alternate weeks randomised to +NTT or -NTT
Richards 2002	City gen: practice with 5 surgeries. 6 GPs Pop: 25,000	Pre-Post study (staggered start at 3 sites‡)	In hours Standard management v. NTT for requests for same day visit	3 months –NTT followed by 9 months +NTT

‡ Start at each site was staggered by 3 months relative to the preceding site. Because each site minus-NTT period lasted for 3 months and there were 3 sites 1/4 (3 months) of the year was not investigated minus-NTT; because the plus-NTT period lasted for 9 months following on from minus-NTT at the 3 sites this 3 month period not examined minus-NTT was examined at all 3 sites plus-NTT, whereas each part of the rest of the year was examined at 2 sites. Thus the staggered start at 3 sites exacerbated any undesirable seasonal effects on the comparison of plus and minus NTT (a 4 site design would have damped out seasonal effects).

Table 4 Outcomes measured and results reported in studies of NTT in the UK

		OUTCOMES						
		IMMEDIATE		DELAYED / OTHER				
Study (length) popul'n design	Systems Compared	% calls by tel: only	% change in GP visits	no: GP visits in 1 month	Emerg'y Dept: visits	Hospita-lisations	Deaths	Costs¶
Elwyn '99 (7 wks) 8,452 Pre-Post	+ or – NTT in hours handling of requests for same day visit	17%	▼ by 27% *P ?*	-- --	-- --	-- --	-- --	-- --
Lattimer '98 & Thompson '99 (1 yr) 97,440 RCT	+ or – NTT for Out of hours Service	50%	▼ by 31% RR 0.69 *P<0.05*	-- -- --	▲ by 5% RR 1.05 NS	▼ by 13% RR 0.87 *P<0.05*	▼by 12% RR 0.88 NS	▼ (NHS persp-ective)
Richards '02 (1 yr) 20,800 Pre-post [3 sites]	+ or – NTT in hours handling of requests for same day visit	25%	▼ by 32% RR 0.68 *P<0.05*	▲ by 11% RR 1.1 *P<0.05*	▲ MD 0.02 *P<0.05*	-- -- --	-- -- --	0 diff: (NHS persp-ective)

P = probability; RR = relative rate; MD = mean difference. No: = number. ▲ = increased ▼ = decreased
¶ Comparison was between health care usage by presenting populations (+ v. - NTT, before v. after NTT) which assumes NTT availability does not influence behaviour; more correct comparison would be for whole enrolled populations.

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