

# Primary care 'demand management' pilot in New Zealand: Telephone triage using symptom-based algorithms

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## Abstract

**Aim:** To present some of the results of a 2-year pilot of a nurse-run, software-supported, primary care telephone triage service in New Zealand, and specifically to discover whether symptomatic callers could be triaged to lower levels of care than they would have used without decision support.

**Methods:** Data that were routinely collected for reporting and quality improvement purposes were collated and analyzed.

**Results:** Of 79 254 calls over the 2-year pilot, 65% were seeking advice on symptoms. Their age and sex, and the nature of their symptoms matches that for general practice in New Zealand. Overall they were able to be triaged to lower levels of care. Callers were satisfied with the service, and most acted on the advice.

**Conclusions:** Many symptomatic people cannot judge the urgency or severity of their symptoms, but they can be safely and happily triaged to 'the right place at the right time' by telephone contact with a nurse supported by algorithm-based decision software.

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**Key words:** nurses, primary health care, self care, symptoms, triage.

## Introduction

Healthline, a nurse-run telephone triage service, has now been operating in New Zealand for more than 2 years.<sup>1</sup> Callers telephone a free-dial number that is available 24 hours per day, 7 days per week for symptom triage, general health information, or identification of health care providers in the caller's region.

Telephone access to a single call centre is now available for large populations for applications such as banking, travel and computer assistance, and now for health advice. Health call centre services range from primary triage to determine the level and timing of care needed to the management of chronic illness.<sup>2</sup>

The New Zealand Health Ministry's primary objective in establishing the service was to increase timely

and appropriate access to health advice and services by population groups that had poor access or low use.

Many people with symptoms do not know where or when to seek help, or they are simply wrong about the optimal timing and care source. Furthermore, their intent is usually to seek help more urgently and at a higher level of care than proves necessary or efficient. 'Demand management' aims to educate patients to use health services astutely. Critics accuse demand management of aiming to reduce cost at the expense of safety; its proponents claim it can reduce cost while enhancing safety and quality of care, by educating the patient to seek care at the right place and at the right time.

'Demand management' interventions include the provision of telephone decision support. Nurses can reduce doctor workload in general medical practice and emergency departments (ED).<sup>3</sup> In Britain it was reported that general practitioners (GP) bore the cost of nurse telephone consultation, but benefited least from the savings associated with it.<sup>4</sup> Call centre technology allows nurses working from a remote site to use decision support software to manage calls from patients or

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their carers. The safety and effectiveness of telephone triage by nurses have been demonstrated in Australia<sup>5</sup> and Britain.<sup>6,7</sup> Patient satisfaction with a nurse triage service has proved to be high in New Zealand,<sup>2</sup> and in the USA<sup>8</sup> the service was cost-effective<sup>9</sup> and adherence to advice was as high as for doctor recommendations.<sup>10</sup>

Healthline began in 2000 in four pilot areas of New Zealand: Gisborne and east coast North Island, Northland, Westland, and Canterbury. Evaluation of the results will determine whether the service is extended nationwide.

Healthline uses decision software in the form of binary chain logic algorithms to support its nurses. The algorithms are designed to help the nurse rule out important conditions, however rare they are, and stop at the condition that cannot be excluded; it thus sets the level and timing of the intervention. There are more than 570 symptom-based algorithms, and more than 1200 self care instructions. The algorithms are able to triage patients safely to appropriate care, while at the same time providing comprehensive automated call documentation and reporting for analysis, risk management and quality improvement. The algorithms have been shown to triage more callers from ED to GPs and self care than protocols, guidelines or nurse judgement alone, and to do so safely.

Callers telephone a free 0800 number that is available 24 hours per day, 7 days per week. The nurse creates a caller chart, identifies the caller region, records the clinical complaint and selects and traverses the appropriate algorithm, reaches a triage outcome or endpoint (see later), searches for an appropriate provider or offers self care advice and refers if necessary.

## Methods

Healthline's call documentation software routinely analyzes all data for risk management and continuous quality improvement purposes, but these data have also been used to provide quarterly reports to the New Zealand Ministry of Health. They are analyzed in the present study to test the hypothesis that symptomatic callers to Healthline would be able to be triaged satisfactorily to lower levels of care than they had intended.

Symptomatic callers were asked, 'What would you have done if you had not been able to call Healthline?' Their response to that question was called their 'intent', and the advice given after triage called the 'endpoint'. Endpoints were as follows.

- Emergency: immediate ambulance transfers and call out required
- Urgent care: caller is advised to seek care via ED or GP within 2–24 hours
- Speak to provider: caller is advised to speak to their GP within time specified (2–24 hours)

- Appointment: caller is advised to seek care by GP during regular hours; 3-day or 2-week timeframe specified
- Self care: caller is advised of self care measures. A follow up call is offered.

A satisfaction survey of 450 callers was carried out independently as part of an external evaluation of the service.

## Results

Healthline received 79 254 calls from 7 May 2000 to 30 April 2002. The monthly call volume ranged from 1853 to 5065, the fluctuation being a result of promotional activity and seasonal variability in demand (Fig. 1). The average weekly call volume was 759, or slightly more than 100 calls a day. The overall utilization rate (the assumed annual use of the service by the pilot population) for the 2 years was 6–7%, given the population in the pilot areas of 627 500 (1996 New Zealand Population Census).

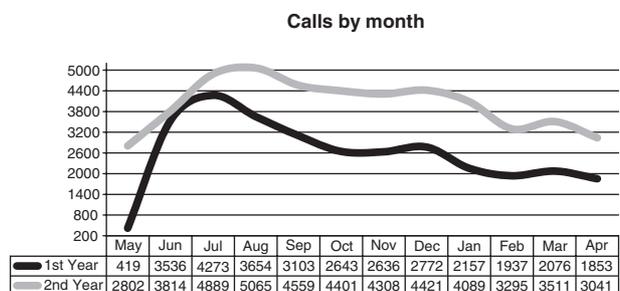
Sixty-five percent of the callers were seeking advice on acute medical symptoms. The most commonly accessed symptomatic algorithms were child vomiting, adult abdominal pain, child rash, child upper respiratory tract infection, child diarrhoea, child temperature, adult possible insect bite, adult chest pain, adult limb trauma, and adult new headache.

The age and sex of the patients who were the subject of symptomatic calls is compared with the population distribution in Fig. 2. Figure 3 shows the time of calls, and Fig. 4 compares the symptomatic callers' stated intent with the endpoint advised after traversing the algorithm.

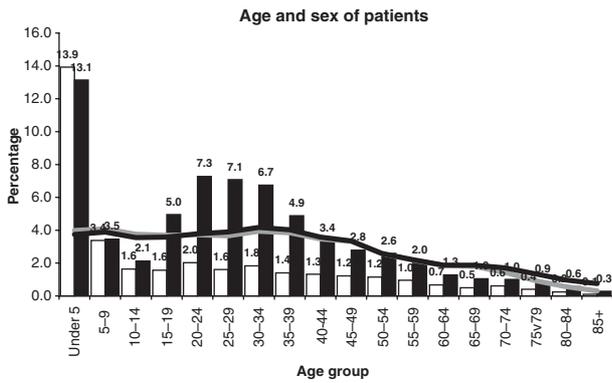
An independent telephone survey of 450 callers showed 97% were satisfied or very satisfied, 98% would use the service again, and 99% would recommend it to another person.

## Discussion

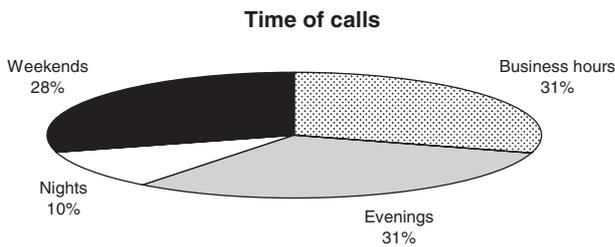
Overall, approximately 7% of the population called Healthline during each year of the pilot. That utiliza-



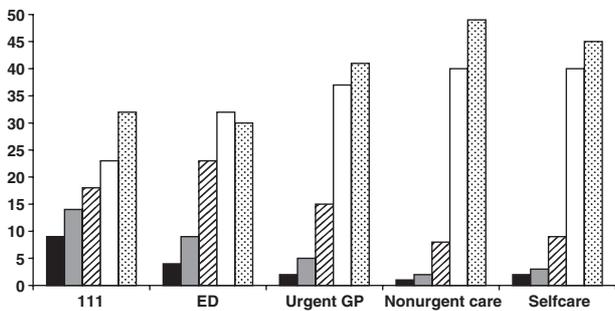
**Figure 1** Calls per month during the 2-year pilot.



**Figure 2** Age and sex of patients. (□), Percentage of male use of Healthline; (■), percentage of female use of Healthline; (—), percentage of male population; (—), percentage of female population.



**Figure 3** Timing of calls. Evenings, 5.30 pm to 12 am; nights, 12 am to 8 am.



**Figure 4** Intent compared with endpoint of 100 callers whose stated intent is represented on the horizontal axis, the vertical bars show the triaged endpoints. Of the 100 callers who stated they would have dialled 111, 9 were advised to do so (■), 15 were advised to go to an emergency department (▨), 18 to urgent GP (▩), 24 to seek non-urgent medical care (□), and 33 to selfcare (▤).

tion rate may reflect the full proportion who wanted their symptoms assessed for severity and urgency, or (more likely) it may simply reflect constraints on promotion. Certainly the advent of the service has demonstrated a significant perceived need in the community.

Figure 4 demonstrates that the need is not just perceived, but is real: significant numbers of people with symptoms were unable to judge their urgency or their

severity, with the result that they would have sought care inappropriately. Many stated they would have sought a higher level of care than was judged necessary after triage; a few stated they would have managed their symptom with a low level of care, when the triage endpoint suggested urgency. In general, however, there was a shift after triage to a lower level of care than had been intended before the call.

We made no attempt to assess whether this shift after triage to a lower level of care was safe, except to note a high degree of patient satisfaction in the independent survey. The safety of telephone triage by nurses has been carefully established elsewhere.<sup>5-7</sup>

The age and sex distribution of the patients, and the range of their symptoms triaged, were similar to those found in general practice acute morbidity surveys, with the exception that the elderly were somewhat under-users of the service, even in proportion to their representation in the population. Their under utilization may reflect an unwillingness to use the telephone in this way, an unwillingness to consult a 'stranger' about their health (and a corresponding long term relationship with their own doctor), a stoical approach to illness, or lack of promotional targeting to this age group.

Approximately two-thirds of the calls were made outside office hours, and in fact rural general practices in the pilot regions have noted a decrease in the number (and an increase in the aptness) of after-hours and weekend calls made to them, as a result of offering the option of nurse triage of symptomatic callers.

Satisfaction levels were exceptionally high for the service, and the claimed compliance rate was also high.

A wide range of patients with a wide range of primary care symptoms sought telephone advice from a call centre, mostly out of hours. Overall, they were triaged to lower levels of care than they stated they had intended. They were satisfied with the service.

The results of the New Zealand pilot reflects the experience of algorithm-assisted telephone triage in other countries, and is consonant with the experience of most GPs: many of those attending do not need the services of a doctor. The results suggest significant resource savings may be made if telephone triage were more readily available in primary care in the Asia Pacific region. Furthermore, other primary care services might be more logically deployed or better funded if such a service were available.

## Acknowledgments

The competing interests in the study included Dr I. St George is Medical Director of McKesson New Zealand; Dr M. Cullen is Co-president of McKesson Asia-Pacific; Ms M Branney is Site Director of McKesson New Zealand.

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