

# Medical telephone triage and subsequent patient behaviour: How do they compare?

Steffen Niemann, Andreas Meer, Christian Simonin, Thomas Abel

Institut für Sozial- und Präventivmedizin, Universität Bern

## Summary

**Questions under study:** In the medical call centre Medi-24, medical experts advise people with health problems on the optimal treatment. The purpose of the first part of this study was to answer two questions: To what extent do callers and medical experts differ in their judgement of a health problem, and to what degree are patients compliant to experts' advice.

**Methods:** 834 callers were selected for study inclusion. At the call centre, study participants were asked about their intended behaviour prior to the call and approximately 90% of these were interviewed one week later about their subsequent behaviour following the call. The standardised data were analysed fitting a logistic regression model.

**Results:** 61% of callers had not intended to behave the way they were subsequently advised to do. The compliance rate after the triage call was 56%.

Non-compliance was largely due to the caller's recollection errors or to a change in the perceived intensity of the health problem. Advice on self-care resulted in an above average compliance. A high compliance was also found when the advice on emergency treatment coincided with the patient's own intended emergency treatment.

**Conclusion:** The high compliance for the self-care advice showed that patients could be persuaded by the Medi-24 service that professional health care was not necessary. It appeared more difficult to persuade those patients to make an emergency consultation who had initially not intended to do so.

**Key words:** telephone triage; patient compliance; health services

## Introduction

Medvantis Medi-24 is the first medical call centre in Switzerland and has been operational since May 2000. Various health care insurance companies provide this service and advertise it amongst their customers. Since August 2001 the service is also used by several general practitioner cooperatives for their out-of-hours calls. Whilst the insured person pays a local telephone-fee, the insurance company reimburses the medical communication centre on a combined capitation and fee for service base. In 2001 the communication centre handled a call-volume of 25,397 calls. The service is available 24 hours a day, 7 days a week and covers the German, French and (since April 2003) Italian speaking regions of Switzerland. It provides general medical information in addition to telephone triage.

The staff of the medical call centre consists of 20 nurses with an average job experience of 15 years in various health care institutions. They undergo a six week full-time special training prior to starting their job as health advisors in the communication centre. The nurses are supported 24 hours a day by four board approved general practition-

ers and internists. For the triage the nurse is assisted by a computerised decision support system (TAS/Plain Software Company/UK). TAS was designed by the University of Warwick. It is based on a series of UK studies which have defined nurses' telephone consultation practice, their training and their decision support needs in a variety of different settings. The system is being further developed in an ongoing international process (UK, Holland, Switzerland).

The telephone triage system is based on the assumption that with a high probability (medical) laymen will without appropriate advice utilize treatment options inappropriate for their specific health problems. The wrong choice of service by a patient, such as unnecessary use of emergency services, can cause considerable expense. On the other hand, lack of action and failure to use the health care services offered, could result in serious health problems and, in the longer term, also lead to increasing costs. Consequently, there is a need to evaluate the benefits of this new service for the Swiss health market. While the NHS Direct service has already been evaluated to a great extent [1,

2], there is still a lack of information on the characteristics and quality of the Swiss system. The fact that the results of the UK study are not easily applicable in Switzerland due to the differences between the two countries, ranging from specific aspects of their health care systems to cultural characteristics in their patients' behaviour, makes it especially important to compare both systems.

The principal research question is whether a service like Medi-24 can, in the longer term, contribute to cost saving in the Swiss health care system [3]. To answer this, a scientific evaluation was

undertaken by the Department of Social and Preventive Medicine of the University of Bern. As it is almost impossible to perform a complete cost/benefit analysis due to the complexity of the different time and person parameters, only two minor hypotheses were investigated in the first part of this study. The first assumes that users of Medi-24 service do not behave appropriately in respect to their health problem and the second equally important hypothesis is that they will follow the advice given to them during a telephone triage.

## Methods

The study design is divided into two steps. At the initial contact patients were first asked by the Medi-24 nurses what they would have done if Medi-24 had not existed. After the triage, they were then asked for their consent to participate in the next part of the study. The telephone numbers and answers to these questions were passed on to the Department of Social and Preventive Medicine (ISPM). One week at the earliest after this interview, the participants were telephoned by trained interviewers from the CATI laboratory of the ISPM and asked about their behaviour following the Medi-24 advice. Patients who decided not to or failed to follow the advice were asked for their reasons.

The advice given by Medi-24 in computer-assisted triage was summarized into three categories: The first included those callers requiring immediate treatment and was designated as "emergency", leading to immediate hospital admission or emergency treatment by a general practitioner. In the second category the callers were advised to consult a general practitioner within one week (GP routine). The third and least urgent advice category was termed self-care. These categories were chosen to reflect their effect on the cost to the insurer. In the first category reimbursement rates can vary considerably, in the second they are considerably lower, whereas self-care recommendations cause no further costs for health insurers.

Further categories, such as referral to another call centre and calls for a reason other than triage were grouped together in the category "other".

The questions the callers were asked in the CATI interview concerned their intended and their subsequent behaviour. They were asked, "What did you do after calling Medi-24?" and "When did you do it?". The answers to the first question were divided into 14, those to the second, into 6 categories. In agreement with medical experts and the study team, the matrix of 14 × 6 behaviour categories and time ranges were assigned to the three categories of urgency.

The fieldwork started with the call centre choosing the study participants between 23. February 2001 and 30. June 2001. Unfortunately it was not possible to integrate the evaluation questionnaire into the TAS software. As a consequence the health advisors had to select participants with paper and pencil questionnaires. Although they were instructed to recruit all callers for study participation, only 24% of total callers were included in the study. Table 1 shows a comparison between the triage results of included patients and the total of triaged patients within the study period. In contrast to the assumption that patients with the more urgent triage result would be under-represented because health advisors skipped the evaluation questionnaire in urgent calls, table 1 shows that the highest mismatch

**Table 1**

Inclusion of patients for evaluation study.

| triage results               | included patients for CATI interviews (n = 834)<br>% | total triage results in study period (n = 3543)<br>% |
|------------------------------|------------------------------------------------------|------------------------------------------------------|
| emergency                    | 33.3                                                 | 32.9                                                 |
| routine general practitioner | 45.2                                                 | 39.5                                                 |
| self-care                    | 21.5                                                 | 27.6                                                 |
| total                        | 100.0                                                | 100.0                                                |

**Table 2**

Patient intention, triage advice and patients' behaviour in five triage categories.

| stage | Category                     | patients' intentions prior to the triage (n = 748)<br>% | Medi-24 recommendations (n = 748)<br>% | patients' behaviour after triage (n = 748)<br>% |
|-------|------------------------------|---------------------------------------------------------|----------------------------------------|-------------------------------------------------|
| 1     | emergency                    | 19.3                                                    | 33.7                                   | 29.0                                            |
| 2     | general practitioner routine | 19.5                                                    | 44.7                                   | 27.4                                            |
| 3     | self-care                    | 41.0                                                    | 21.5                                   | 39.6                                            |
|       | other call centre            | 17.2                                                    | –                                      | –                                               |
|       | do not know/other /NA        | 2.9                                                     | 0.1                                    | 4.0                                             |
|       |                              | 100.0                                                   | 100.0                                  | 100.0                                           |

between both populations can be found in the category “self-care”. Additional comparisons between sample and population distributions, e.g. on sex and age of callers, showed no large differences. The number of selected patients is evenly distributed over all weekdays.

Approximately one week later, interviewers of the ISPM interviewed those patients recruited. Up to 15 at-

tempts were made to contact every single patient on the telephone. Approximately nine percent of participants could not be contacted within one month, and after this period these patients were excluded from the study because of the likelihood of recollection errors. Twelve patients refused to participate. Thus out of the total study sample of 834, 748 patients were interviewed (89.7%).

## Results

Table 2 shows the distribution of patients’ behaviour intentions before triage, triage advice by Medi-24, and patients’ behaviour approximately one week after triage.

Out of the total study sample, 252 patients were advised to seek emergency treatment in hospital or from a general practitioner. A high number of patients (44.7%) were recommended to consult a general practitioner within one week, whilst in 22% self-care was considered appropriate. When compared to the respective stages of the pa-

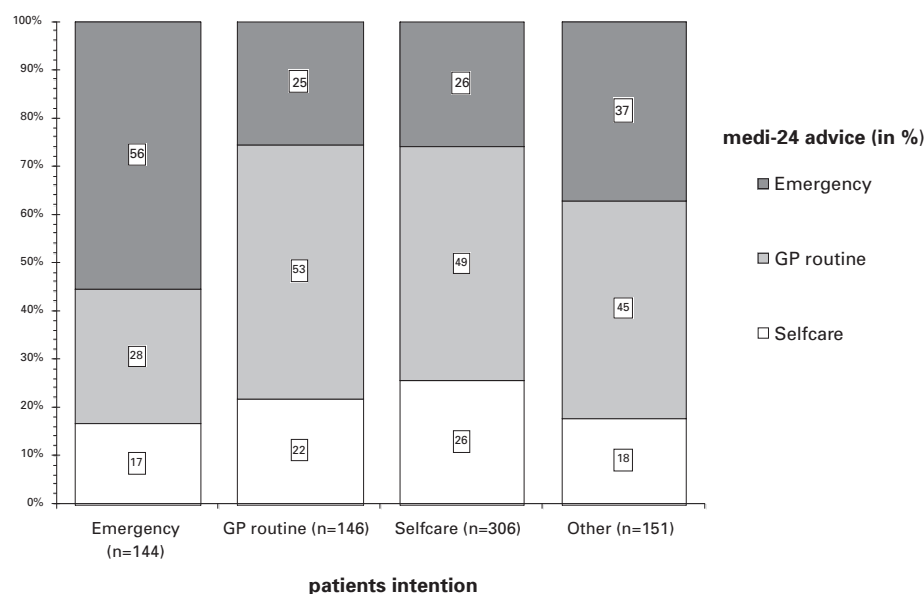
tient’s initial intention and their subsequent behaviour, the stage “self-care” showed higher rates, while the others showed lower rates.

Regarding demographic characteristics the patients were predominantly women (62%) and aged from less than one year to 93 (mean = 36 years, sd = 22.5).

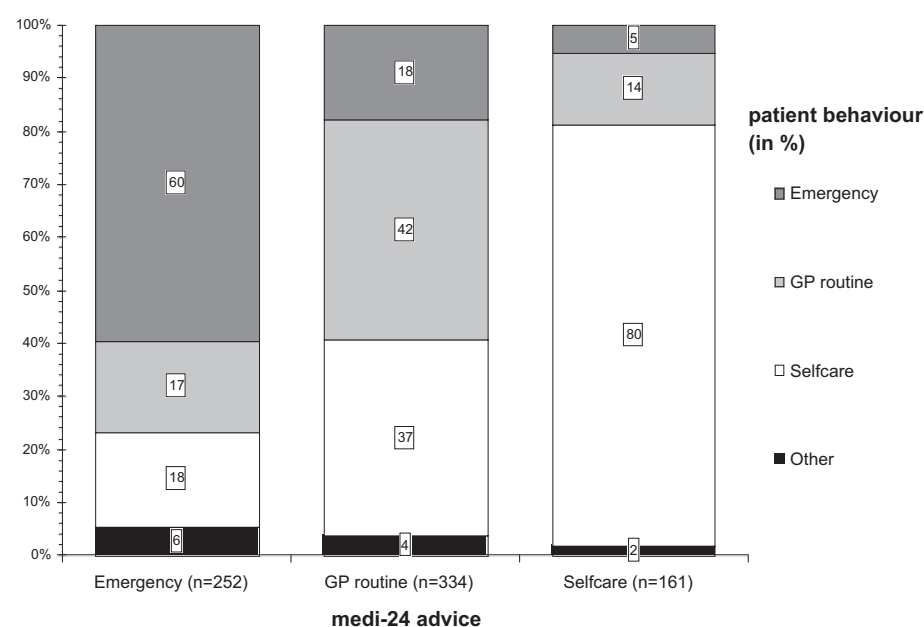
### Patient’s intention and medical triage

To test the hypothesis that patients seeking adequate medical service make inappropriate de-

**Figure 1**  
Patient’s intention  
and Medi-24 advice.



**Figure 2**  
Medi-24 advice and  
patient behaviour.



**Table 3**

Triage advice and patients recall.

| Recall                       | triage                      |                                                   |                             |                         |
|------------------------------|-----------------------------|---------------------------------------------------|-----------------------------|-------------------------|
|                              | emergency<br>(n = 252)<br>% | routine general<br>practitioner<br>(n = 334)<br>% | self care<br>(n = 161)<br>% | total<br>(n = 747)<br>% |
| emergency                    | 68.3                        | 16.2                                              | 2.5                         | 30.8                    |
| general practitioner routine | 21.4                        | 61.7                                              | 16.1                        | 38.3                    |
| self care                    | 4.4                         | 17.1                                              | 78.3                        | 26.0                    |
| do not know                  | 6.0                         | 5.1                                               | 3.1                         | 5.0                     |
| total                        | 100.0                       | 100.0                                             | 100.0                       | 100.0                   |

cisions, their original intentions were compared with the subsequent triage advice.

It is reasonable to question the accuracy of callers' answers regarding their intended behaviour. The current study was therefore designed to secure maximum validity, as, unlike other, similar studies, questions on patient's intended behaviour were asked *prior* to the triage. As a result, the answers could not be biased by the triage results.

As shown in figure 1, the correspondence between a patient's intention and the medical experts' advice was highest in the category "emergency". Of the 144 patients who had intended to use an emergency service, 56% were advised to do so. In 44% of calls the triage resulted in a less urgent response. The lowest correspondence, 26%, was found in the self-care category, 26% of whom were urged to use an emergency service. Within the second category (GP-routine), about a half of the patients had intended to act correctly, a quarter was advised to seek emergency treatment, and in the remaining quarter self-care was recommended. Leaving aside the category "other", a total of 361 patients had not intended to do what they were subsequently advised to do by medical experts (61%). In addition, the results show that a significantly higher percentage of patients were advised to seek a more urgent treatment than they had intended than were "graded down" to a less urgent course of action (265 vs. 96, proportion of change 28.4%, 95% confidence interval 22.4% to 34.3%).

### Medical triage and patient behaviour

To test the second hypothesis, patients' compliance was examined by asking them "what did

you do following your call to Medi-24 (with regard to the specific health problem)?" and "within which time did you do this?" Analogously to the coding of their intentions, their behaviour was coded in three triage categories. The resulting overall compliance rate was 55.7%. Figure 2 shows the highest compliance in those patients recommended self-care (80%) and the lowest in those in the "GP routine" category. Of 58% of non-compliant patients, a smaller proportion (18%) made use of an emergency service. The most urgent advice i.e. to seek emergency treatment was followed by 60% of patients. A significantly higher proportion of patients used a less urgent health service than they were advised to do. (211 vs. 89 proportion of change –17.0%, 95% confidence interval –12.3% to –21.7%).

There can be several reasons for non-compliance, such as patient's recall of triage advice differing from that which was actually recommended by Medi-24, a worsening or improvement of the patient's health situation within the week following the triage, etc. Within the scope of examining the different causes for non-compliance, all patients were questioned about their recollection of the advice they were given. Patients who did not comply with it were then asked an open-ended question about their reasons.

As shown in table 3, the highest correspondence between the advice given and the patients' subsequent recall of it could be found in the category self-care. Approximately 78% of patients recalled the same triage decision that had actually been made by Medi-24.

In the other two categories, the patients' consistency was lower, but still at a high level. Table 4 lists the main reasons for non-compliance. Beside recall errors, decreasing symptoms due to the health problem was one of the most frequent answers obtained.

While interpreting the results, it is important to follow and examine the whole process from the patient's initial intention in seeking medical triage advice up to and including his subsequent behaviour.

Table 5 shows the compliance rates depending on patient's intention and triage results.

Patients with the triage result "emergency" were more compliant if their own initial intentions corresponded with their subsequent assignment to

**Table 4**

Reasons for non-compliance.

|                                                         | %<br>(n = 176) |
|---------------------------------------------------------|----------------|
| Increasing symptoms                                     | 7.4            |
| Decreasing symptoms                                     | 23.9           |
| GP telephone advice: no need for consultation           | 7.4            |
| GP telephone advice: consultation urgently needed       | 0.6            |
| Patient wanted additional advice                        | 8.0            |
| Patients own decision                                   | 4.5            |
| Appointment organisation, i.e. early appointment vacant | 14.2           |
| Do not know                                             | 2.8            |
| Patient believed to be compliant                        | 30.1           |
| Other reason                                            | 1.1            |

**Table 5**

Compliance rate by patients' intention and triage advice.

| Intention  | Triage     | total<br>n | compliant<br>patients (in %) |
|------------|------------|------------|------------------------------|
| Emergency  | Emergency  | 80         | 81.3                         |
|            | GP routine | 40         | 27.5                         |
|            | Self-care  | 24         | 66.7                         |
| GP routine | Emergency  | 37         | 51.4                         |
|            | GP routine | 77         | 53.2                         |
|            | Self-care  | 32         | 90.6                         |
| Self-care  | Emergency  | 79         | 50.6                         |
|            | GP routine | 149        | 35.6                         |
|            | Self-care  | 78         | 76.9                         |
| other      | Emergency  | 56         | 46.4                         |
|            | GP routine | 68         | 50.0                         |
|            | Self-care  | 27         | 85.2                         |
| total      |            | 747        | 55.8                         |

**Table 6**

Logistic regression results predicting compliant behaviour on triage advice and intention, controlled for socio-demographic patient characteristics (n = 748, Hosmer Lemeshow goodness of fit: Chi-square 5.534, df = 8, p = .699).

|                                                                     | Odds<br>ratio | Confidence<br>interval |        |
|---------------------------------------------------------------------|---------------|------------------------|--------|
|                                                                     |               | lower                  | upper  |
| Constant                                                            | 1.106         |                        |        |
| age in years                                                        | 1.004         | .997                   | 1.011  |
| female patient                                                      | .756          | .546                   | 1.049  |
| patients' intention: (base = GP routine)                            |               |                        |        |
| emergency                                                           | .333          | .172                   | .645   |
| self-care                                                           | .579          | .379                   | .884   |
| other intention                                                     | .794          | .489                   | 1.291  |
| triage advice (base = GP routine)                                   |               |                        |        |
| emergency                                                           | 1.278         | .872                   | 1.873  |
| self-care                                                           | 6.008         | 3.818                  | 9.452  |
| interaction term (triage advice<br>emergency × intention emergency) | 9.610         | 4.032                  | 22.902 |

that category. On the other hand, where patients' intentions were "graded down" (from making use of an emergency service to "GP routine" or "self-care") they showed the lowest compliance rates in their respective triage categories. A notable high compliance rate can be found for the triage category "self-care".

In order to test the influence of caller intention and triage advice on compliance rate, a logistic regression analysis was applied. In addition to the intention and triage categories, patients' sex, age, and a second-order interaction term of advice and patient's intention of seeking emergency treatment were included in the equation. Due to small group size in most categories, the confidence intervals are wide and estimates are not as precise as wished. However, the interpretation of the direction of significant effects is quite reliable. Table 6 shows a significant decrease in compliance for the intention categories "emergency" and "self-care". Compared to "General Practitioner routine", the advice for self-care increases compliance. On the other hand, a match between patients' intention and triage result in the category "emergency" increases compliance rate exceedingly. The results support the conclusion that the probability of patient's compliance increases with his/her intention being verified by the triage result, especially in those cases with urgent health problems. A check of the overall results with regard to age and sex shows that patient's compliance seems to be independent of age and sex.

## Discussion

The present evaluation of Medi-24 service is the first of its kind in Switzerland. In its current stage, two research questions could be answered, namely "To what extent does the intended behaviour of the patients calling differ from the subsequent triage advice?" and "To what extent do patients follow the advice received from the call centre?"

A total of 61% of patients had not intended to behave the way they were subsequently advised to by medical experts, and the overall compliance of patients with the triage advice received was 56%. These are results comparable with other findings [4, 5]. Besides changes in intensity of the patient's health problem symptoms, non-compliance was frequently the result of a discrepancy between the advice actually given to the patient and his/her recollection of it.

Differences between advice, patient's recall and behaviour have been reported in other studies. Dale and colleagues assumed that these results might be caused by various factors related to tele-

phone triage, such as ineffective telephone assessment and communication skills or poor record keeping [4]. However, health advisors at Medi-24 are supervised once a month, record triage results and the taped calls are compared, keeping biases in communication to a minimum. In particular, the clear and unambiguous wording of triage advice is trained.

The high compliance for the self-care advice, controlled for patients' intention, showed that patients could be persuaded by the Medi-24 service that professional health care was not necessary. However, it seemed more difficult to induce an emergency consultation in those patients who had not initially intended to make use of one. To judge the consequences of these results the medical adequacy and cost efficiency of triage advice has to be taken into account, as has been tried in other studies [3, 6]. Our results show that a high proportion of callers were advised to seek professional health care. However, the assumption that this leads to increasing costs can neither be confirmed nor

rejected on the basis of the present data. In order to do this a longitudinal study design with observation of patient records is needed.

Medical call centres have only recently been introduced in the Swiss health market. With increasing publicity and usage, the demographic characteristics of callers, service acceptance and behavioural compliance may change significantly. Therefore it is important to continue evaluating these services in the future.

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*Correspondence:*

*Steffen Niemann, M.A.*

*Abteilung für Gesundheitsforschung*

*Institut für Sozial- und Präventivmedizin*

*Universität Bern*

*Niesenweg 6*

*CH-3012 Bern*

*E-Mail: niemann@ispm.unibe.ch*

Researchers interested in the data set for further analysis may contact the authors directly.

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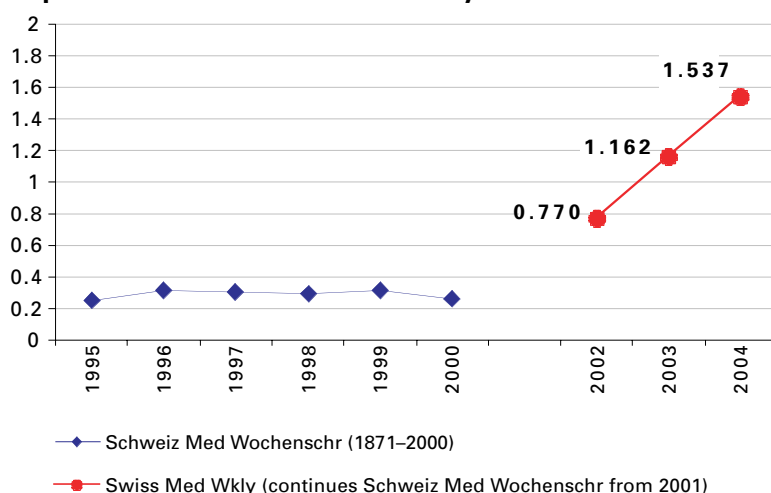
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