

## The use of a Swedish telephone medical advice service by the elderly – a population-based study

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### ABSTRACT

**Objective:** The present study aimed to describe contact made by the elderly to Sweden's nationwide medical helpline, Healthcare Guide 1177 by Phone (HGP). Other objectives were to study potential gender differences and the association between different HGP referral levels and acute visits to hospital-based emergency departments and acute visits to primary care centres.

**Design:** De-identified data from recorded calls to HGP was extracted for analysis ( $n = 7477$  for the oldest age group). Information about acute visits to emergency departments and to primary care reception was extracted from the patient administration system.

**Setting:** Västerbotten County, Sweden.

**Subjects:** Patients over 80 years.

**Main outcome measures:** Calling and visiting frequencies for different age groups as well as reasons for contact and individual recommendations.

**Results:** The utilisation rate of the telephone advice service for the oldest age group was high, with an incidence rate of 533 per 1000 person-years. Women had a 1.17 times higher incidence rate compared with men. The most common reason for contact was drug-related questions (17% of all contacts). Calls that were recommended to care by a medical specialist correlated with total emergency department visits ( $r = 0.30$ ,  $p < 0.05$ ) and calls that were given advice correlated with acute primary healthcare visits ( $r = 0.38$ ,  $p = 0.005$ ).

**Conclusion:** The high utilisation of the telephone advice service by the elderly gives the telephone advice service a unique ability to function as a gatekeeper to further healthcare. Our data suggest that with the telephone advice service's present guidelines, a significant proportion of all calls are being directed to further medical help. The high frequency of drug-related questions raises concerns about the elderly's medication regimens.

### KEY POINTS

- Patients over 80 years of age had a high utilisation of the telephone medical advice service compared with other age groups.
- Drug-related questions were the most common reason for contact.
- A significant proportion of all calls made resulted in further healthcare contacts.

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## Introduction

In Sweden, as well as globally, the number of older people is expected to increase [1–3]. A major contributing factor to the ageing population in high-income countries is an increase in life expectancy resulting from medical advances, enabling older people to survive their illnesses [3]. There is wide support for the notion that future healthcare systems will face great challenges in aiding populations with a higher prevalence of disease and a higher demand for healthcare,

with increasing health expenditure as a probable consequence [1,4–7].

For several years, there has been a continuing expansion of various telephone triage and advice services globally. Their main functions have generally been to assess the patients' symptoms, evaluate their care needs, give advice and to guide the patients to the appropriate levels of care. This expansion was predominantly driven by the aim to increase effectiveness by directing patient flow, while ensuring safety and

improving the accessibility to healthcare [8–10]. In 2013, “1177” was introduced as the national telephone number for Healthcare Guide 1177 by Phone (HGP) in Sweden (previously called Swedish Health Care Direct [11]). The main purpose was to provide a health information service that was readily accessible to the public, 24 h a day, all year round. As the first line of healthcare, telephone triage and advice services have been postulated to have a unique ability of directing patient flow by providing the patients with medical advice and to guide them to the appropriate level of care. A survey carried out in 2013 found great differences between counties in Sweden concerning public awareness of the telephone advice service [12] and found the oldest age group (80 years or over) to have the lowest awareness of the service throughout all age groups [13]. Research on older people’s use of the telephone advice service is very limited and we found no previous studies aiming to describe their utilisation of the service.

The present study set out to describe contact by the elderly to HGP during 2013 in the county of Västerbotten, Sweden. The main aims were as follows: (1) to explore the extent to which the oldest age group used HGP by characterising their most common reasons for contact; (2) to study potential gender differences; and (3) to study the association between different HGP referral levels, that is, recommendations and acute visits to hospital-based emergency departments (EDs) and acute visits to primary care centres (PCs).

## Materials and methods

The present study was an observational study on contact to the national Swedish telephone medical advice service by patients 80 years of age or older in Västerbotten, Sweden, during 2013. In addition, visits to hospital EDs and acute visits to PCs were studied for the three cities, Umeå, Skellefteå and Lycksele.

### Ethical considerations

This study was approved by the Regional Ethical Review Board in Stockholm.

### Data collection

The Swedish national telephone medical advice service (HPG): Sweden’s national medical helpline was accessible to the public via the phone number 1177. Patients’ calls were automatically connected to the

geographically closest call centre, out of the 21 county-specific centres. If the system could not detect the caller’s location, a randomly selected centre answered the call, regardless of county. Nurses administered all calls and documentation of the calls was made in the patient’s medical record. No documentation was made when the patients asked for non-medical information (e.g. questions regarding opening hours or patient fees). For calls concerning a relative (i.e. other provider of history), the documentation was generally made in the relative’s (not the callers) medical record.

Deidentified data from 2013 were retrieved from the patient administration system. The data comprised all recorded calls made by patients permanently residing in the county of Västerbotten and whose calls were answered by Västerbotten’s HGP centre. Data included the number of calls, the patients’ age and sex (which was registered automatically from the social security number), the county of residence (registered automatically from the social security number and the Swedish Total Population register), and specifically for patients aged 80 years or over, the main *reason for contact*, that is, chief complaint and the *referral level*, that is, the recommendation given by HGP (both were recorded by the nurse with guidance from a computerised medical decision support system [14,15]). It was always up to the patients themselves to decide what to do with the information and/or the recommendation given by HGP.

The population size used for calculating incidence rate was based on the number of residents in Västerbotten by the end of 2013 according to Statistics Sweden (<http://www.scb.se>).

Merging of reasons for contact: For the reason for contact classified as urinary tract symptoms, a small number of contacts classified as “urinary tract symptoms – man” were made by women and they were transferred to “urinary tract symptoms – woman” prior to merging the titles. The equivalent was done for the few contacts made by men that was classified as “urinary tract symptoms – woman”.

### Merging of referral levels

The different referral levels were pooled into three groups: Secondary care, Primary care, and Advice. The Secondary care group included two referral levels: care by a medical specialist and recommendation to direct ambulance care, which were grouped together because they both had the potential to direct patients to the ED. The referral level Secondary care (as well as the referral level Care by a medical specialist) could

include contacts with junior doctors and medical specialists at EDs or at other departments in the hospital but did not include primary care. Care by a medical specialist could also involve telephone consultations with the previously mentioned physicians. The Primary care group only consisted of the referral level, primary care. The Advice group included the referral levels: advice on self-care, dental care, municipality functions, follow-up, other healthcare, etc.

### Emergency department visits and acute visits to primary care

The numbers of visits to one of the three hospitals in Västerbotten were collected from the patient administration system. Only de-identified data were collected. The primary catchment areas and longest distance to hospital were 140,000 residents and 60 km for Umeå University hospital, 85,000 residents and 80 km for Skellefteå hospital, and 40,000 residents and 230 km for Lycksele hospital. Similarly, de-identified data concerning acute visits to PCs were collected from the patient administration system. Acute PC reception in Umeå, Skellefteå and Lycksele was open between 17:00 and 23:00 on weekdays and between 08:00 and 23:00 on weekends. In 2013, the oldest age group's total visits ( $n$ ) to the ED and acute PC reception in Umeå, Skellefteå and Lycksele were: 4905 ED visits and 578 acute PC visits for Umeå, 3627 ED visits and 478 acute PC visits for Skellefteå, and 1668 ED visits and 82 acute PC visits for Lycksele.

### Statistical analysis

Statistical analysis was performed using STATA version 13.1 (STATA Corp., TX) and Microsoft Excel 2013. Comparisons between groups were made using Pearson's chi-squared test ( $p < 0.05$ ). Regression analyses were made to study potential associations

between the HGP referral levels and the acute visits to PCs and to EDs, respectively.

### Results

In 2013, patients over 80 years of age had a total of 7477 contacts to HGP in the county of Västerbotten. This reflected 8% of the total number of contacts ( $n = 93\ 250$ ) (Table 1). The incidence rate was 533 per 1000 person-years, which was higher compared with all other age groups except for young children (0–9 years of age).

Women aged 80 years or over had 1.87 times more contacts and 1.17 times higher incidence rate (Table 1) compared with men. The fact that women had a higher incidence rate than men was not unique for the oldest age group. The same pattern was observed for all other age groups, except for the 0–9-year olds, where boys had a slightly higher incidence rate (Table 1).

The 10 most common reasons for contact with HGP for the oldest age group represented 55% of all their contacts (Table 2). The primary reason for contact was drug-related questions, ( $n = 1264$  contacts, 17% of total contacts). The 10 most common reasons for contact were similar for women and for men and women grouped together. The 10 most common reasons for contact differed slightly for the men; ear disorders were the fourth most common (177 contacts for men, 12 for women) and fever was the fifth most common (66 contacts for men, 70 for women) and both had a significant gender difference ( $p < 0.001$ ) (data not shown). Back problems and vomiting or nausea were the 16th and 17th most common for men. Considering the 10 most common reasons for contact for the whole group, we found that women had a higher incidence for nine of them and a statistically significant higher incidence of drug-related questions ( $p < 0.000$ ), back problems ( $p < 0.001$ ) and vomiting or nausea ( $p < 0.001$ ). Urinary tract problems were the most

**Table 1.** Number of contacts to a telephone medical advice service in the västerbotten county, Sweden during 2013.

| Age group<br>(years of age) | Population size |         |         | Number of HGP contacts (share of total<br>number of contacts within women/men/total) |                |                | Incidence rate (HGP<br>contacts/1000 person years) |     |       |
|-----------------------------|-----------------|---------|---------|--|----------------|----------------|--|-----|-------|
|                             | Women           | Men     | Total   | Women  | Men            | Total          | Women  | Men | Total |
| 0–9                         | 14,040          | 14,811  | 28,851  | 10,579 (19.6%)   | 11,863 (30.3%) | 22,443 (24.1%) | 753  | 801 | 778   |
| 10–19                       | 13,605          | 14,553  | 28,158  | 4299 (7.9%)  | 3213 (8.2%)    | 7512 (8.1%)    | 316  | 221 | 267   |
| 20–29                       | 18,830          | 20,604  | 39,434  | 10,037 (18.6%)   | 4932 (12.6%)   | 14,969 (16.1%) | 533  | 239 | 380   |
| 30–39                       | 14,957          | 16,268  | 31,225  | 6649 (12.3%)   | 3716 (9.5%)    | 10,365 (11.1%) | 445  | 228 | 332   |
| 40–49                       | 15,989          | 16,655  | 32,644  | 4994 (9.2%)  | 3038 (7.8%)    | 8032 (8.6%)    | 312  | 182 | 246   |
| 50–59                       | 15,789          | 16,085  | 31,874  | 4129 (7.6%)  | 2728 (7%)      | 6857 (7.4%)    | 262  | 170 | 215   |
| 60–69                       | 16,065          | 16,741  | 32,806  | 4198 (7.8%)  | 3789 (9.7%)    | 7987 (8.6%)    | 261  | 226 | 243   |
| 70–79                       | 11,650          | 10,437  | 22,087  | 4328 (8%)  | 3280 (8.4%)    | 7608 (8.2%)    | 372  | 314 | 344   |
| ≥80                         | 8631            | 5402    | 14,033  | 4868 (9%)  | 2609 (6.7%)    | 7477 (8%)      | 564  | 483 | 533   |
| Sum                         | 129,556         | 131,556 | 261,112 | 54,081 (100%)  | 39,168 (100%)  | 93,250 (100%)  | 417  | 298 | 357   |

HGP: Healthcare Guide 1177 by phone.

**Table 2.** The 10 most common reasons for contacting a telephone medical advice service for the oldest age group ( $\geq 80$  years) in the Västerbotten county, Sweden during 2013.

| Reason for contact                       | Number of HGP contacts |     |       |                    | Incidence rate (HGP contacts/1000 person years) |     |       |
|--|------------------------|-----|-------|--------------------|---|-----|-------|
|  | Women                  | Men | Total | Sex difference (P) | Women   | Men | Total |
| Drug-related questions                   | 927                    | 337 | 1264  | 0.000              | 107   | 62  | 90    |
| Administrative procedures <sup>a</sup>   | 395                    | 209 | 604   | ns                 | 46  | 39  | 43    |
| Urinary tract problems                   | 177                    | 361 | 538   | 0.000              | 21  | 67  | 38    |
| Abdominal pain                           | 240                    | 104 | 344   | ns                 | 28  | 19  | 25    |
| Dyspnoea                                 | 179                    | 92  | 271   | ns                 | 21  | 17  | 19    |
| Chest pain                               | 175                    | 80  | 255   | ns                 | 20  | 15  | 18    |
| General medical information <sup>b</sup> | 148                    | 69  | 217   | ns                 | 17  | 13  | 15    |
| Vertigo                                  | 151                    | 64  | 215   | ns                 | 17  | 12  | 15    |
| Back problems                            | 152                    | 48  | 200   | 0.001              | 18  | 9   | 14    |
| Vomiting or nausea                       | 151                    | 47  | 198   | 0.001              | 17  | 9   | 14    |

HGP: Healthcare Guide 1177 by phone.

<sup>a</sup>Administrative procedure was assigned to contacts for which an administrative procedure was made and for which record keeping was required and had no connection to symptoms described by the patient (e.g. patient requesting a copy of their medical record).

<sup>b</sup>General medical information was assigned to contacts for which the patient asked for general information, was symptom free, and for which the nurse did not assess medical needs (e.g. patient asking about treatments or physical exercise).

**Table 3.** Recommendations to the three referral levels for the 10 most common reasons for contacting a telephone medical advice service for the oldest age group ( $\geq 80$  years) in the Västerbotten county, Sweden during 2013.

| Reason for contact          | Women            |                  |                  | Men             |                  |                  | Total            |                  |                  |
|-----------------------------|------------------|------------------|------------------|-----------------|------------------|------------------|------------------|------------------|------------------|
|                             | Secondary care   | Primary care     | Advice           | Secondary care  | Primary care     | Advice           | Secondary care   | Primary care     | Advice           |
| Drug-related questions      | 76 (8%)          | 204 (2%)         | <b>647 (70%)</b> | 19 (6%)         | 75 (22%)         | <b>243 (72%)</b> | 95 (8%)          | 279 (22%)        | <b>890 (70%)</b> |
| Administrative procedures   | 45 (11%)         | 147 (37%)        | <b>203 (51%)</b> | 18 (9%)         | 86 (41%)         | <b>105 (50%)</b> | 63 (10%)         | 233 (39%)        | <b>308 (51%)</b> |
| Urinary tract problems      | 14 (8%)          | <b>153 (86%)</b> | 10 (6%)          | 46 (13%)        | <b>298 (83%)</b> | 17 (5%)          | 60 (11%)         | <b>451 (84%)</b> | 27 (5%)          |
| Abdominal pain              | 78 (33%)         | <b>125 (52%)</b> | 37 (15%)         | 41 (39%)        | <b>49 (47%)</b>  | 14 (13%)         | 119 (35%)        | <b>174 (51%)</b> | 51 (15%)         |
| Dyspnoea                    | <b>94 (53%)</b>  | 69 (39%)         | 16 (9%)          | 39 (42%)        | <b>46 (50%)</b>  | 7 (8%)           | <b>133 (49%)</b> | 115 (42%)        | 23 (8%)          |
| Chest pain                  | <b>139 (79%)</b> | 28 (16%)         | 8 (5%)           | <b>64 (80%)</b> | 9 (11%)          | 7 (9%)           | <b>203 (80%)</b> | 37 (15%)         | 15 (6%)          |
| General medical information | 10 (7%)          | 30 (20%)         | <b>108 (73%)</b> | 7 (10%)         | 13 (19%)         | <b>49 (71%)</b>  | 17 (8%)          | 43 (20%)         | <b>157 (72%)</b> |
| Vertigo                     | 51 (34%)         | <b>68 (45%)</b>  | 32 (21%)         | 22 (34%)        | <b>26 (41%)</b>  | 16 (25%)         | 73 (34%)         | <b>94 (44%)</b>  | 48 (22%)         |
| Back problems               | 23 (15%)         | <b>104 (68%)</b> | 25 (16%)         | 15 (31%)        | <b>28 (58%)</b>  | 5 (10%)          | 38 (19%)         | <b>132 (66%)</b> | 30 (15%)         |
| Vomiting or nausea          | 52 (34%)         | 37 (25%)         | <b>62 (41%)</b>  | 16 (34%)        | 15 (32%)         | <b>16 (34%)</b>  | 68 (34%)         | 52 (26%)         | <b>78 (39%)</b>  |

The table shows descending order with the most common reason for contact at the top.

Numbers in bold highlight the dominant referral level for each reason for contact, for women men and total respectively.

common reason for contact for men with 361 contacts and this reason for contact was significantly higher compared with the women ( $p < 0.000$ ).

Out of the total number of calls for the oldest age group, around 23% ( $n = 1747$ ) were recommended to Secondary care (Care by a medical specialist and Ambulance care), 45% ( $n = 3369$ ) were recommended to primary care, and finally 32% ( $n = 2361$ ) were given advice. Referral levels for the 10 most common reasons for contact are presented in Table 3.

Chest pain ( $n = 203$ ), neurological symptoms ( $n = 141$ ) and dyspnoea ( $n = 133$ ) were the three main reasons for contact which resulted in a recommendation to secondary care. The three main reasons for contact, which were directed to Primary care, were urinary tract problems ( $n = 451$ ), drug-related questions ( $n = 279$ ) and administrative procedures ( $n = 233$ ). Drug-related questions ( $n = 890$ ), administrative procedures ( $n = 308$ ) and general medical information ( $n = 157$ ) were the three main reasons for contact

which were given advice. Advice on self-care represented 94% of all contacts within the combined referral-level advice. The most common reason for contact, drug-related questions, was given advice in 70% of cases and directed to secondary care and primary care in 8% and 22% of cases, respectively.

Significant sex differences concerning referral levels were only seen for back problems ( $p < 0.040$ ). Men with back problems (31% of cases) were twice as likely to be recommended to Secondary care compared with women (15% of cases). For both women and men, the majority of calls concerning back problems were directed to primary care (68% for women and 58% for men) and only 16% of women and 10% of men were given advice (Table 3).

We also wanted to study the association between the different referral levels and acute visits to EDs as well as PCs. Simple regression analyses revealed significant correlations between recommendations to care by a medical specialist and ED visits ( $r = 0.30$ ,

$p < 0.05$ ) and recommendations defined as advice correlated significantly to acute PC visits ( $r = 0.38$ ,  $p < 0.005$ ). No other associations were found.

## Discussion

In summary, we observed a surprisingly high utilisation of the national Swedish telephone advice service by the elderly in the county of Västerbotten and in this cohort only children between 0 and 9 years of age had a higher incidence rate. Most calls were directed to further medical help, giving the telephone advice system a unique ability to function as a gatekeeper to further healthcare. In addition, we found an association with acute visits to medical help when patients were directed to care by a medical specialist, as well as when given advice. Finally, the most common reason for contact for older people was drug-related questions, which constituted 17% of the total number of contacts.

The utilisation rate of the telephone advice service among the old residents was surprisingly high considering the age group's low awareness [13], suggesting a local discrepancy, with a higher awareness in the county of Västerbotten. The pattern seen for all age groups resembles that seen for telephone consultations in Denmark and the Netherlands [16]. During the same year, the oldest age group had the highest incident rate (767 per 1000 person-years, data not shown) for doctor's appointments in Västerbotten's three EDs, suggesting high overall care needs, as well as a high healthcare consumption.

We observed a significant association between calls with the referral-level advice and acute PC visits. These results possibly indicate that advice on self-care did not satisfying the patients, who instead decided to seek acute medical help at the PC. Thus, our findings could support the recognition of higher compliance for contacts recommended further medical care compared with contacts only given advice [15]. A similar interpretation could be made regarding the finding that calls directed to care by a medical specialist were associated with ED visits, even though not all of them were advised to seek acute healthcare. Interestingly, the most common reasons for contacts directed to secondary care (e.g. dyspnoea, chest pain, neurological symptoms and abdominal symptoms) were similar to the most common reasons for the oldest age group's ED visits in the county of Västerbotten [17]. If we add the assumption that all calls directed to ambulance resulted in acute healthcare we can conclude that a significant proportion of all calls resulted in acute visits to either a PC or an ED.

In 2013, the total number of ED visits in the county of Västerbotten by this age group was 10,758 (including ambulance transports, data not shown). If we assume that all calls that were recommended secondary care,  $n = 1747$ , also resulted in an ED visit, we can see that the total number of calls only represented about 16% of the total number of ED visits. This suggests that the majority of the oldest age group sought medical care at the ED without any prior contact to the telephone advice service. We cannot explain this finding and further investigation is required. However, a major component of these visits most probably includes patients from different aged care facilities [18]. It is also reasonable to believe that this age group has more severe illnesses requiring ED care, compared with younger patients suitable for treatment at the PC [19].

For the elderly, we found no significant difference between men and women in total number of doctor appointments in Sweden in 2012–2013 [20], or for ED visits in the county of Västerbotten during 2013 (data not shown, local analyses from the county of Västerbotten). However, our observation that women had a higher utilisation of the telephone advice service compared with men is in line with previous findings suggesting higher care needs among older women compared with older men [6,21]. In addition, older men have been shown to not seek help for physical and psychological problems to the same extent as women [22], and it is possible that this behaviour is more evident in telephone advice service contacts compared with ED contacts.

Drug-related questions were the most common reason for contacting the telephone advice service in the oldest age group and were more common among women. Adverse drug reactions are believed to cause 5–10% of ED visits and unplanned hospitalisations of the elderly [23,24]. In Västerbotten, around 11% of older people  $\geq 75$  years of age had excessive polypharmacy (10 or more prescribed medications) and it was more common among women compared with men during 2013 [25,26]. Taken together and similar to other experiences, it is very likely that our findings reflect concerns about the usage of drugs as well as side effects and polypharmacy [27]. Patients with adverse drug reactions were likely classified under their experienced symptoms as reason for contact, rather than drug-related questions, unless they themselves were suspicious and asked about adverse drug reactions. Thus, the total number of drug-related contacts to the telephone advice service could be even higher.

We do not know the reason for the higher frequency of contacts regarding vomiting or nausea

among women and this has to be studied further. It is likely that the high frequency of calls regarding back pain among women is due to the higher incidence of osteoporosis among older women compared with men of the same age [28,29]. The difference among women and men for calls regarding urinary tract problems could be due to the somewhat higher prevalence of lower urinary tract symptoms seen in men [30].

Our study has several strengths; since the whole of Västerbotten uses the same patient administration system, we have a large coherent data material for analysis. Data collection should only allow for minor human error, because a large part of the data was recorded automatically from callers' social security numbers and because the nurses' classifications of the referral levels were guided by the medical decision support system.

Limitations of the study include that our data does not allow us to identify and exclude frequent users of the HGP service, that is, individual patients that deviate by an excessive amount of contacts. Hence, there is a risk of single individuals making a symptom appear more frequent in the population than what was truly the case. There were missing data for patients who chose to remain anonymous, for those residing permanently in another county (but staying temporarily in Västerbotten), and for calls that were connected to another county's HGP centre due to the system's inability to detect the caller's location. However, these data are most likely missing at random. Our knowledge of the patients is limited to age group, gender and main reason for contact. Consequently, several important factors (e.g. comorbidities, home situation, geographical location) underpinning the nurses' decision of how to advice the patient cannot be assessed. We cannot follow the patients after their contact to HGP and, consequently, there is no possibility to evaluate the recommendations or to assess the patients' compliance.

In conclusion, our study raises many important questions. The high utilisation of the telephone advice service indicates the service can fulfil its role as a first line of healthcare towards the elderly. Our results indicate that a significant proportion of the elderly's calls to the telephone advice service result in further contact with medical care. Our data suggest that some calls result in acute visits to an ED or PC even though this was not recommended by the telephone advice service. Whether the advice given was appropriate or not has to be studied in another study setup. The large number of drug-related questions indicates that this may be a major underlying cause of total healthcare contacts for these patients and much higher than

previously expected. Further studies on the underlying causes of the drug-related questions are necessary to prevent this patient group from unnecessary and harmful visits to healthcare, as well as from avoidable and harmful medication.

### Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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