Use of emergency medical services by patients encompassed by the Regular GP scheme

Summary

Background. Norwegian emergency medical services are used with frequency, often in relation to conditions that could wait until the next day to be handled by the patient's regular GP (RGP). We investigated whether there are characteristics of particular GPs that may help explain why patients on their list use the emergency medical services.

Material and methods. We used data from the billing cards for 2008 from all emergency doctors, linked to information from the Regular GP database and Statistics Norway, for a total of 4 097 RGPs. For each RGP we estimated a contact rate: The total number of contacts reported for their list patients (identified by their personal ID numbers), divided by the length of the RGP's list. This rate was subsequently analysed with regard to characteristics of the RGP (bivariate analyses and multiple logistic regression).

Results. The average contact rate amounted to 27.4 contacts per 100 list patients, with significant variation between the RGPs (the 25th percentile was 17.8 contacts and the 75th percentile 33.1). Patients of male RGPs, young RGPs and immigrant RGPs used the emergency medical services more frequently than patients of female RGPs, older RGPs and Norwegian RGPs. Patients from long lists, single-doctor practices and open lists used the emergency medical services less frequently than patients from short lists, group practices and closed lists. The contact rate was higher in rural municipalities than in urban areas.

Interpretation. The large variations in the use of emergency medical services indicate that more RGPs should take measures to improve accessibility for emergency calls during the daytime.

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In 2010, Norwegian emergency medical services had a total of 1.75 million patient contacts. Three of four contacts involved a consultation with a doctor, somewhat less than 20 % were telephone contacts and 4 % were house calls (1). Compared to other countries, Norwegian emergency medical services are frequently used, often for conditions that could have been handled by the RGPs (2–4). Other countries are also concerned about unnecessary use of emergency medical services (5–7).

The use of the emergency services not only varies from one municipality to another (2, 3, 8), but also within the municipalities as well as between different RGPs and RGP offices (9, 10). Most of the patients who come to the emergency wards have not attempted to contact their RGP on beforehand, but up to half of them would be willing to wait until the next day if they could be guaranteed an appointment with their RGP (10, 11). Many of those who initially attempt to contact their RGP are being told that there are no more available appointments left (11).

The accessibility of the RGP is assumed to have an impact on the patients' use of the emergency services (12), and feedback to the RGPs concerning the «leakage» of patients to the emergency services may give rise to changes and a reduction in the frequency of use of the emergency services (10). Improved accessibility, in the form of waiting times for regular consultations and same-day consultations, was registered after the introduction of the RGP scheme, and in parallel with this, some studies reported reduced use of emergency services (12, 14, 15). These findings are not unambiguous, however (8).

Close to 20 % of the RGPs are immigrants. These have open lists more frequently than Norwegian RGPs, they are overrepresented in the rural areas and are less often chosen by patients as their RGP (16, 17). At the Oslo Emergency Ward, patients from minority backgrounds are overrepresented (18), although studies from Copenhagen indicate that the use of emergency services among immigrants varies according to their country of origin (19, 20). In addition, inhabitants with poor socioeconomic status and people who live a short distance from the emergency ward tend to use these services more frequently than others (21).

In other respects we have little knowledge that can explain the large variations in people's proclivity to access the emergency services. The purpose of this study was to investigate whether characteristics of the individual RGP practice may be correlated with the use of emergency services among the list patients.

Material and method

The material comprises all electronic billing cards from emergency doctors in Norway in 2008 (22). The material is near-complete; the degree of coverage in corresponding material from the Norwegian Health Economics Administration (HELFO) has been estimated as approaching 98 % in 2009 (23).

Through registry linkages to the Regular GP Database and Statistics Norway we obtained more information on the patients' RGPs. For 22.8 % of the patients we have no personal ID number, and for these, the RGP could not be determined. The variables for each RGP were gender, age (< 40 years, 40–49 years, 50–59 years, > 59 years), immigration status, duration of residence in Norway, form of salary (fixed salary or private practice), type of practice (single-doctor or group prac-

Main message

- The RGPs are «leaking» patients to the emergency services to a widely varying extent
- Patients on long lists use the emergency services least frequently
- Many RGPs should have better accessibility for emergency calls

tice), type of municipality where the practice is located (centrality), list capacity (open or closed) and list length. Substitute doctors who were not included in the RGP database were excluded from the analyses.

An immigrant is defined as a person who was born abroad and whose parents were both born abroad, and who at some point in time has immigrated to Norway.

Centrality is defined as the geographical location of a municipality in relation to a centre where high-order functions are located (central functions). Centrality is calculated on a scale from 0 to 3, where 0 denotes the least central municipalities and 3 the most central ones (24).

The RGPs' lists are considered as open when the difference between the list ceiling and the list length exceeds 20. We calculated the difference between the list ceiling and the mean list length throughout the year, and defined the list as open if this difference exceeded 20.

A contact with the emergency services was defined as a consultation (fee code 2ad, 2ak, 2fk), a house call (11ad, 11ak), a telephone contact (1bd, 1bk, 1g) or a simple contact (1ad, 1ak, 1h). A contact rate was calculated for each individual RGP as the total number of contacts with the emergency services reported for their list patients, divided by the list length and multiplied by 100. The contact rates for the different RGPs could thus be analysed with regard to various background variables. The results are reported as average contact rates, with the 25th and 75th percentiles. The differences were also tested with the aid of a t-test. Statistical significance was set at 5 % ($p < 0.05$).

Using the median value (24.3 contacts per 100 list patients) the contact rate was dichotomised into a high and a low rate. This variable was used as a dependent variable in a multivariate logistic regression analysis. We used the same explanatory variables as in the descriptive analysis. All variables pertaining to the RGPs and the lists were simultaneously included in the model, irrespective of whether they were statistically significant in the bivariate analyses, and they were adjusted for each other. The explanatory variables included are gender, age group, immigrant status with short and long duration of residence (dichotomised with the aid of the median value of 11 years), type of salary (private practice or fixed salary), type of practice (single-doctor or group practice), centrality, list capacity (open or closed list) and list length (four groups with decreasing group size and increasing list length, since this would capture the effect of long lists). We also undertook equivalent analyses using the upper and lower quartiles as the dependent variable, i.e. we dichotomised at the upper and lower quartiles and used consultations as the only dependent variable. Finally we undertook an analysis where those lists that had more than 100 available slots were defined as open.

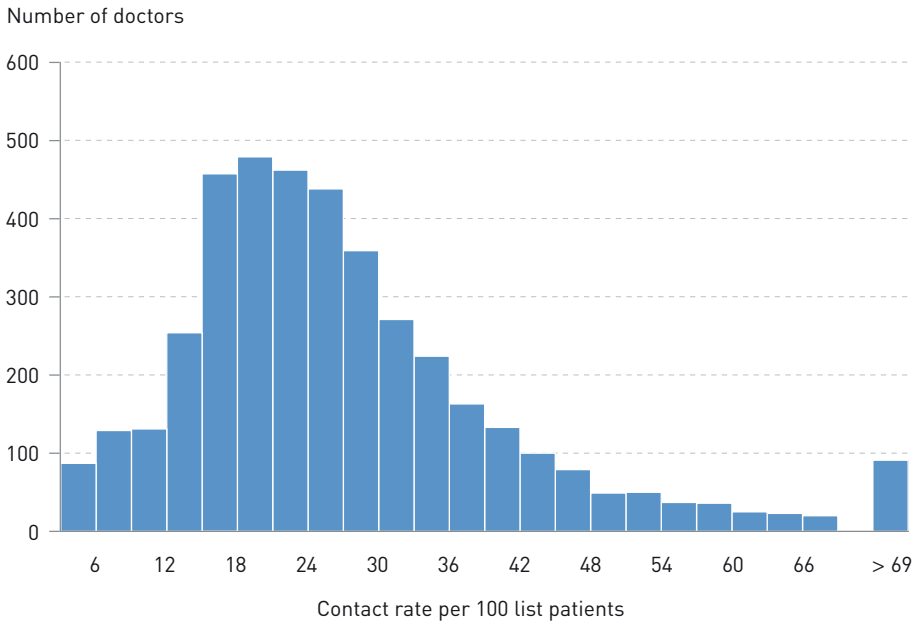

Figure 1: *Histogram: Distribution of contacts with the emergency services (per 100 list patients) per regular GP*

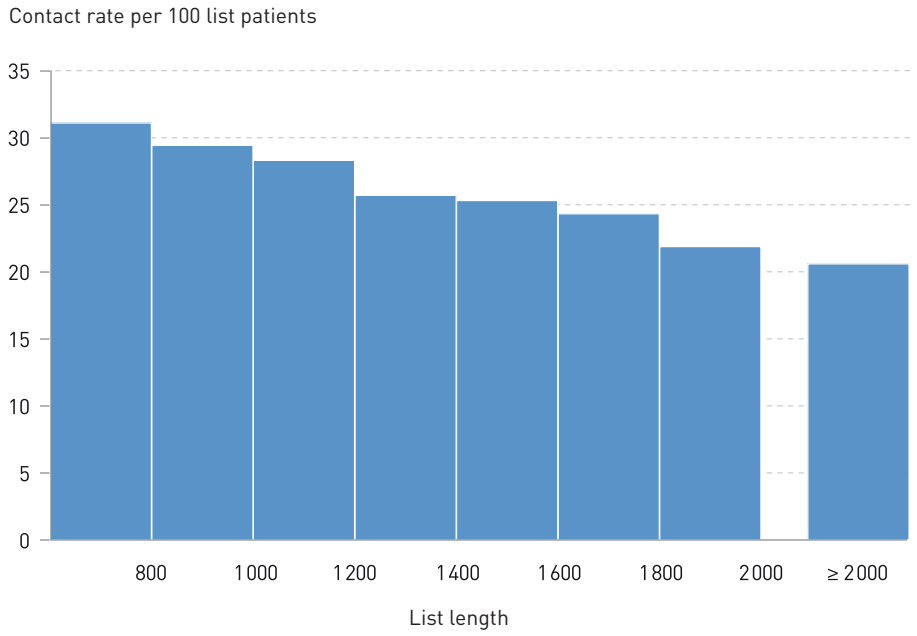

Figure 2: *Contact rate with the emergency services for patients of RGPs (per 100 list patients) by the RGPs' list length*

The study is included in the project Immigrant Health in Norway at the Research Group for General Practice, Department of Public Health and Primary Health Care, University of Bergen. The project employs data from the Norwegian Health Economics Administration (HELFO), the Regular GP Database, Statistics Norway and the Norwegian Prescription Database. The project has been granted a concession by The Data Inspectorate and is approved by the Regional Committee for Medical and Health Research Ethics. The Norwegian Labour and Welfare Administration (NAV) and the Directorate of Health have granted exemptions from the duty of confidentiality. The registry linkages were established by the Norwegian Prescription Database and Norwegian Social Science Data Services (NSD). The anonymised data file was adapted for analysis by the latter.

Results

Altogether 4 097 RGPs are included in the analysis, 1 373 women and 2 724 men (66 %). Their list patients had a total of 1 287 203 contacts with the emergency services in which their personal ID number was known. The average contact rate was 27.4 contacts per 100 list patients, even though

Table 1: Use of emergency medical services by patients of RGPs (number of contacts per 100 list patients) according to characteristics of their RGPs and the list to which they belong. Bivariate and unadjusted analyses (t-test)

Regular GP	Number	Contact rates (per 100 list patients)	25th and75th percentile	P value[1]
Gender				
Man	2 724	27.8	18.0–33.4	
Woman	1 373	26.6	17.1–32.3	0.015
Age				
Age < 40	1 093	29.2	18.3–36.4	
Age 40–49	1 045	27.6	18.3–32.5	0.021
Age 50–59	1 405	26.8	17.7–32.0	< 0.001
Age > 59	554	24.7	16.4–30.1	< 0.001
Nationality				
Norwegian	3 278	26.6	17.7–32.3	
Immigrant, resident ≤ 11 years	383	31.9	19.0–40.8	< 0.001
Immigrant, resident > 11 years	378	27.9	18.6–33.1	0.089
Type of salary				
Private practice	3 808	26.8	17.8–32.5	
Fixed salary	285	35.4	18.5–45.7	< 0.001
Type of practice				
Group practice	3 447	27.5	18.0–33.4	
Single-doctor practice	613	26.7	16.7–30.1	0.220
Centrality				
0 (least central)	645	35.0	19.7–45.5	
1	319	31.6	19.7–40.5	0.016
2	943	23.4	16.3–28.7	< 0.001
3 (most central)	2 115	26.2	18.0–30.9	< 0.001
List				
Closed	2 599	27.0	18.3–32.6	
Open (at least 20 available slots)	1 498	28.0	16.6–33.9	0.061
List length				
< 1 100	1 681	29.8	18.0–36.6	
1 100–1400	1 298	26.9	18.0–32.6	< 0.001
1 401–1 700	764	25.2	18.0–29.8	< 0.001
> 1 700	354	22.2	16.2–27.0	< 0.001

[1] Compared to the first value in the same group of variables

there were major variations between the RGPs (Figure 1).

If all the RGPs who have a contact rate above the 75th percentile (33.1 contacts per 100 list patients) had this rate reduced to 33.1, the total rate of contact with the emergency services would drop from 27.4 to 23.8, equivalent to savings of 144 208 contacts. If all RGPs with contact rates above the 50th percentile (24.3 contact per 100 list patients) had this rate reduced to 24.3, the total rate of contact with the emergency services would drop to 20.6, equivalent to savings of 288 745 contacts. If all RGPs with contact rates above the 25th percentile (17.8 contact per 100 list patients) had this rate reduced to 17.8, the total rate of contact with the emergency services would drop to 16.6, equivalent to savings of 482 877 contacts.

In the bivariate analyses, the following characteristics of the RGPs were associated with a statistically significant higher use of emergency services: male, young, immigrant, fixed salary. The differences between open and closed lists and between single-doctor and group practices were not statistically significant. Emergency services are more frequently used in rural municipalities, and those patients who were entered on long lists use the emergency services significantly less often than others (Table 1, Figure 2).

In the multivariate analyses we found that patients of male doctors, young doctors and immigrant RGPs were more frequent users of the emergency services, but in these analyses the type of salary was not significant. On the other hand, there were significantly fewer patients from single-doctor practices who used the emergency services, and also significantly fewer from open lists. With regard to list length and centrality, the findings were equivalent to those in the bivariate analyses (Table 2).

The alternative multivariate analyses yielded generally similar results, even when open lists were defined as having more than 100 available list slots. However, when consultations were used as the dependent variable, the divergence was no longer significant for the least central municipalities.

Discussion

The data material comprises basically all recorded contacts with the emergency services, but 22.8 % of the contacts could not be associated with a specific RGP, since no complete personal ID number had been entered for the patient. Many of these patients will be foreign residents who have no RGP, whereas others may not have recalled their own or their children's personal ID number. All patients who have an RGP have either a personal ID number or a so-called D number (for foreign residents), and we do not believe that the patients' ability to recall their personal ID number will vary significantly and systematically from one RGP to another. There may, however, be certain groups of patients whose particular problems may cause them to have greater difficulty than others in recalling their personal ID number, and if these patients are overrepresented among some RGPs we may underestimate the «leakage» of patients from these RGPs to the emergency services. Differences in the composition of the lists may obviously explain some of the large variations in the use of emergency services from one list to another, but in our analyses we had no possible way of controlling for this.

Many of the variables that describe the RGPs are interdependent. Women RGPs tend to be younger than their male counterparts, and their lists are shorter. In non-central regions the RGPs tend to have shorter lists and more often work on a fixed salary. Open lists are shorter than closed lists. Such circumstances may explain the differences between the results of the bivariate and the multivariate analyses.

Previous studies have been largely unable to explain the variation in the use of emergency services on the basis of characteristics of the RGPs and their lists, most likely because they have been too small in scope and lacking in strength (9, 21, 25, 26). Our study comprises practically all RGPs in Norway, and therefore has the strength to identify a greater number of explanatory factors.

We find that the list patients' use of emergency services varies considerably from one RGP to the next. This confirms previous findings, from Norway as well as abroad (2, 3, 8–10, 27). We have estimated that there is a potential for relocating several hundred thousands of contacts from the emergency servi-

ces to the RGPs, provided that those RGPs who have the greatest «leakages» of patients can approach the average, i.e. establish a better capacity to receive emergency calls.

The lack of freedom of choice within the RGP scheme may in some cases induce some patients to use the emergency services because they are dissatisfied with their RGP (15). There is also reason to believe that poor accessibility of the RGP may cause more patients to call on the emergency services (12, 27). It is thus scarcely surprising that the multivariate analysis shows that patients from open lists use the emergency services less frequently than patients from closed lists. Open lists are more common in rural areas, where the emergency services are used more frequently than in more central regions. Open lists are also shorter than closed lists, and this will also influence the patients' use of emergency services. These circumstances may serve to mask the correlation between open/closed lists and the patients' use of emergency services in bivariate analyses.

Contrary to widespread belief and what is often claimed in public debate, RGPs with long lists have the best accessibility (13). Their list patients therefore have less reason to use the emergency services, a claim which is supported by our findings. One may imagine that the patients on these long lists tend more often than others to use private healthcare services instead of the emergency services, or that these RGPs are more often than others being helped out by locums. However, the correlation between the list length and the patients' use of emergency services appear to be so unambiguous and strong that there is little reason to doubt the validity of this result.

When selecting an RGP, the patients considered continuity as the main criterion; they wished to stay with the RGP they already had (28, 29). This criterion was more important than accessibility. Established doctors are therefore preferred by established patients, while the selection of an RGP was less significant for the healthy. Women use health services more frequently than men, and they prefer women doctors. These factors may indicate that older RGPs and women RGPs have more burdensome lists than their colleagues.

Compared to their male colleagues, women RGPs have slightly less accessibility (30), but we still find that they have less «leakage» of patients to the emergency services, similar to older RGPs. Most likely, the same applies to RGPs in single-doctor practices, while the opposite may be true for immigrant doctors (17).

It appears that patients of immigrant doctors use the emergency services more frequently than patients of Norwegian RGPs, but this difference subsides in proportion to the immigrant doctors' time of residence in Norway. We may assume that immigrant patients are overrepresented on the lists of immigrant RGPs (31). If it is true that immigrant patients use the emergency services more frequently than other patients (18), this may explain why immigrant doctors are «leaking» patients to the emergency services more frequently than their Norwegian counterparts, but we have insufficient knowledge of this. Studies from Copenhagen indicate that there are considerable variations in the use of emergency services between the various immigrant communities (19, 20).

The bivariate analysis may indicate that patients of RGPs with a fixed salary use the emergency services more frequently than patients of RGPs in private practice. This finding was weakened by the multivariate analysis, and is likely to be caused by the fact that fixed salaries are more prevalent in non-central regions. Previous studies indicate that doctors with fixed salaries have nearly as many patients per hour as those in private practice, but that they spend more time on other tasks and therefore have fewer patients per week (32).

The emergency services are used more frequently in non-central municipalities than in central regions. This may be an effect of recruitment problems and rapid turnover among the RGPs in the non-central regions. The absence of an RGP forces the patients touse the emergency services. Short-term locums will often have an interest in earning as much as they can over the shortest possible period, and may therefore choose to receive as many patients as they can through the emergency services.

We know that the emergency services in non-central municipalities deal with a relatively higher number of contacts by telephone and by making house calls (1). This may partly be due to the fact that the doctor on call will more often be familiar with the patient and thus able to clarify many issues by telephone, and partly to the fact that the on-

Table 2 Use of emergency medical services by patients of RGPs according to characteristics of their RGPs and the list to which they belong, multivariate analysis (logistic regression). All variables pertaining to the RGPs and their lists are included in the model and adjusted for each other. For definitions on the dependent variable see the description of methods.

Regular GP	Odds ratio	95 % confidence interval
Gender		
Man	Reference	
Woman	0.68	0.58–0.78
Age		
Age < 40	Reference	
Age 40–49	0.70	0.58–0.84
Age 50–59	0.73	0.61–0.87
Age > 59	0.56	0.44–0.70
Nationality		
Norwegian	Reference	
Immigrant, resident ≤ 11 years	1.64	1.28–2.01
Immigrant, resident > 11 years	1.44	1.15–1.81
Type of salary		
Private practice	Reference	
Fixed salary	1.21	0.92–1.60
Type of practice		
Group practice	Reference	
Single-doctor practice	0.74	0.61–0.89
Centrality		
3	Reference	
2	0.56	0.48–0.66
1	1.76	1.36–2.29
0	1.56	1.26–1.92
List		
Closed	Reference	
Open (at least 20 available slots)	0.62	0.53–0.72
List length		
1 100–1 400	Reference	
< 1 100	1.01	0.86–1.19
> 1 400	0.72	0.59–0.87
> 1 700	0.50	0.38–0.64

call periods are quieter, giving the doctor more time to make house calls. Such circumstances may explain why the higher contact rate in non-central regions was no longer significant when we only included consultations at the emergency ward.

Patients in the second most central municipalities (centrality rank 2) use the emergency services least frequently. These areas comprise medium-sized towns and adjacent rural municipalities (24). Here, large inter-municipal emergency services have frequently been established (33). As a consequence, patients in the adjacent municipalities may perceive a higher threshold for calling on the emergency ward. It is known that long distances reduce the use of emergency services (21).

We believe that a low consumption of emergency medical services is indicative of a well organised and well-functioning system of general practice. Only a small minority of the calls to the emergency services are true emergencies (3), and most of them can be characterised as unnecessary, in the sense that they may well wait until the next day. Many patients also agree that they could have waited, provided that their RGP had time available for them on the following day (10, 11). Most likely, several hundred thousand consultations with the emergency services could be avoided if the emergency services could refer patients to their own RGP on the following day and if the differences between the contact rates of the RGPs could be reduced (34). The large variation in the use of emergency services indicates that more RGPs should take steps to improve their accessibility for emergency calls during the daytime.

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