

## PREHOSPITAL CARE

# Patients either contacting a general practice cooperative or accident and emergency department out of hours: a comparison

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**Introduction:** Lack of collaboration between general practice (GP) cooperatives and accident and emergency (A&E) departments and many self referrals may lead to inefficient out-of-hours care.

**Methods:** We retrospectively analysed the records of all patients contacting the GP cooperative and all patients self referring to the A&E department out of hours in a region in the Netherlands.

**Results:** 258 patients contacted the GP cooperative and 43 self referred to the A&E department per 1000 patients per year. A wide range of problems were seen in the GP cooperative, mainly related to infections (26.2%). The A&E department had a smaller range of problems, mainly related to trauma (66.1%). Relatively few urgent problems were seen in the GP cooperative (4.6%) or for self referrals in the A&E department (6.1%). Women, children, the elderly, and rural patients chose the GP cooperative significantly more often, as did men and patients with less urgent complaints, infections, and heart and airway problems.

**Discussion:** The contact frequency of self referrals to the A&E department is much lower than that at the GP cooperative. Care is complementary: the A&E department focuses on trauma while the GP cooperative deals with a wide range of problems. The self referrals concern mostly minor, non-urgent problems and can generally be treated by the general practitioner, by a nurse, or by advice over the telephone, particularly in the case of optimal collaboration in an integrated care facility of GP cooperatives and A&E departments with one access point to medical care for all patients.

The organisation of out-of-hours primary medical care is changing in many countries. We see more and more large scale general practice (GP) cooperatives with central triage and sometimes a combination of primary care and accident and emergency (A&E) departments in hospitals.<sup>1-6</sup> These changes are due in part to increased medical workloads and the changing attitudes of general practitioners.<sup>1-5</sup> Inefficiency and a lack of coordination among the various organisations providing out-of-hours emergency care also influences these changes.<sup>6-13</sup> The numbers of non-urgent self referred patients taken by taxi to A&E departments also affects the organisation of out-of-hours medical care,<sup>7-12</sup> but there is enormous variability (6-80%) in the proportions of non-urgent patients self referred to A&E departments who could be treated by GP care providers.<sup>6-9 13-16</sup> The reasons cited most frequently by patients for skipping GP care providers is the belief that radiography is necessary and, less frequently, convenience, lack of timely access to GP care providers, and the belief that the medical complaint is very urgent.<sup>12-15</sup>

Around the year 2000, primary medical care in the Netherlands started to change from small groups of practitioners taking turns on call out of hours to large scale GP cooperatives (box 1). Although GP cooperatives are usually situated near hospitals, as yet there is very little collaboration between the cooperatives and the hospitals.<sup>11</sup> In case of emergency, patients in the Netherlands can contact either GP care or secondary care by going to the hospital A&E department or by ringing the emergency number 112. Apparently in the Netherlands this free choice has also led to a patient shift from GP care to secondary care for non-urgent complaints.<sup>5 9 11 12</sup>

Lack of collaboration and the large number of self referrals may lead to inefficient organisation of out-of-hours care with different approaches in different places for the same medical

problems. An example concerns the experience of a patient with uncomplicated ankle distortion: at the GP cooperative such a patient receives, after triage, self care advice or a bandage, but when this patient visits an A&E department they often receive an X ray or plaster cast.

However, it is perhaps inefficient and very expensive to have three health care teams (GP cooperative, ambulance, A&E department) on duty for relatively few patients, especially during the night. Organisation models of greater collaboration and integration of GP cooperatives and A&E departments should be examined. To prepare and develop effective models for collaboration out of hours, insight into current patient characteristics and the care received at both GP cooperatives and A&E departments is required. We have therefore studied all patient contacts with a GP cooperative and with the linked A&E department as regards:

- Differences in contact frequency and characteristics of patients contacting a GP cooperative and an A&E department.
- Differences in care provided between a GP cooperative and an A&E department.
- Factors explaining differences in the patients' decisions.

## METHODS

### Design and population

We retrospectively analysed the records of all patients who contacted either a GP cooperative or an A&E department out of hours in a defined and overlapping region in the east of the

**Abbreviations:** A&E, accident and emergency; GP, general practice; ICPC, International Classification of Primary Care

### Box 1 Features of general practice cooperatives in the Netherlands<sup>9</sup>

- Usually situated near a hospital
- Access via a single regional telephone number
- Access daily from 5 pm to 8 am and the whole weekend
- Large scale handling of 100 000–500 000 patients within a radius of 20–30 km
- Chauffeurs in recognisable fully equipped GP cars (with, for example, O<sub>2</sub>, infusion drip, automatic defibrillation equipment)
- ICT support including electronic patient files, electronic feedback to the GPs, and on-line connection to the GP car
- Triage nurses in contact by telephone (that is, GP or hospital nurses)
- General practitioner shifts of 6–8 h

Netherlands (223 410 inhabitants). We limited the research to 4 weeks in February 2003.

### Procedures and variables

We examined every patient record available at the GP cooperative and the A&E department; two observers and a GP supervisor coded each record. These trained observers used defined code protocols, and dubious coding was discussed. Interobserver analysis gave a  $\kappa$  of 0.82. We did not exclude any of the patients, and a missing value code was used in the case of missing information or none at all.

We recorded the following:

- Sex
- Age (0–15, 16–65, >65 years)
- Complaint or diagnosis coded according to the International Classification of Primary Care (ICPC).<sup>17</sup> We then clustered ICPC codes that appeared to be similar
- Origin (city or rural area)
- Contact moment (evening, night, or weekend daytime)
- Urgency (U1–U4); we used a validated urgency classification developed by the Dutch College of General Practitioners (<http://nhg.artsennet.nl>) (box 2)
- Care of choice (GP cooperative versus secondary care by going to the A&E department or phoning the national emergency number 112)
- Referral from A&E (yes/no)
- Follow up: self care, referral to regular GP, referral to out-patient clinic, or hospital admission.

### Analysis

We compared the patients contacting the GP cooperative and those contacting the A&E department by absolute numbers and number of contacts per 1000 patients per year. The patient and follow-up characteristics were calculated in numbers and percentages.

We used logistic regression analysis to explain the determinants for choosing GP care or secondary care. The dependent variable was the choice of either the GP cooperative or the A&E department. The independent variables were sex, age, origin, contact moment, urgency, and type of complaint. We calculated the outcomes in odds ratios, while variance was calculated in confidence intervals and significance (significance set at  $p < 0.05$ ).

### Box 2 Urgency criteria (<http://nhg.artsennet.nl>)

- Life threatening (U1). Vital functions are in danger. The triage nurse informs the general practitioner at once. The general practitioner interrupts work and immediately goes to the patient. When necessary, an ambulance is simultaneously called.
- Acute (U2). Real danger of patient's condition quickly deteriorating with risk of vital functions failing. The triage nurse informs the general practitioner at once. The general practitioner goes to the patient as soon as possible – within an hour at most.
- Urgent (U3). Complaint(s) should be evaluated within a couple of hours for medical or emotional reasons.
- Routine (U4). Complaint(s) with no urgency. The triage nurse arranges an appointment with the GP or gives advice themselves.

**Table 1** Contact frequency and patient characteristics at the general practice cooperative and self referral to the accident and emergency department

	Total region	GP cooperative	Self referral to A&E department
Contact frequency	n = 5178 (100%)	n = 4423 (85.5%)	n = 755 (14.5%)
Contact frequency/ 1000 patients per year	301	258	43
Men (%)	45.8	43.4	60.1
Age (%)			
0–15	26.4	27.9	17.5
16–65	55.7	53.0	71.7
>65	17.9	19.1	10.9
Urgency (%)			
U1+U2	4.9	4.6	6.1
U3	17.4	13.0	43.6
U4	77.7	82.4	50.3
Complaints (%)			
Trauma	15.4	6.8	66.1
Infection	22.9	26.2	3.7
Musculo-skeletal problems	11.4	12.8	3.4
Digestive tract	9.0	10.1	2.4
Respiratory problems	4.2	4.8	0.9
Heart	4.2	3.9	6.1
Other problems	32.8	35.4	17.4

A&E, accident and emergency; GP, general practice.

## RESULTS

### Contact frequency and characteristics of patients

The population of 223 410 inhabitants in the studied region requested out-of-hours help 5178 times over a period of 4 weeks. To make these requests, 4423 patients (85.4%) contacted the GP cooperative, and 755 patients (14.6%) self referred to secondary care by going to the A&E department ( $n = 644$ ; 12.4%) or by ringing the national emergency number 112 ( $n = 111$ ; 2.1%). This results in a contact frequency of 258 with the GP cooperative and 43 self referrals to the A&E department per 1000 patients per year.

Of those who contacted the GP cooperative, men were in the minority (43.4%), while they were the largest group in the A&E department (60.1%).

Only a small minority of contacts with the GP cooperative (4.6%) and the A&E department (6.1%) concerned very urgent problems (U1 and U2). In absolute numbers, more

**Table 2** Diagnostics and care advised by the GP cooperative and the A&E department

	GP cooperative (n = 4423)	Self referral to A&E department (n = 755)
Diagnostics* (%)		
Blood tests	–	17.7
EKG	–	12.3
X ray	–	50.4
Advised care (%)		
Self care	78.1	34.9
GP care	14.8	25.7
A&E	7.1†	–
Hospital care	–	39.4‡

\*GP cooperatives have no facilities for EKG, X ray, or extensive blood tests.

†Of these patients, 28.1% were referred to the out-patient clinic and 52.5% of these were admitted to hospital.

‡Of these patients, 25.9% were referred to the out-patient clinic and 13.5% of these were admitted to hospital.

patients with very urgent problems (U1 and U2) went to the GP cooperative (4423 × 4.6% = 203) than to the A&E department (755 × 6.1% = 46).

The GP cooperative dealt with a wide range of problems, mainly concerning infections (26.2%), while the A&E department had a smaller range of problems, mainly concerning trauma (66.1%; table 1).

**Differences in care provided**

A minority of the patients (7.1%) attending the GP cooperative were referred to the A&E department, and half of these (52.5%) were admitted to hospital. Some of these patients were referred because GP cooperatives have no facilities for EKG, X ray, or extensive blood testing (table 2).

The self referring patients at the A&E department received an X ray in 50.4% of cases.

At the GP cooperative, most patients were given advice for self care (78.1%) or were advised to go to the general practitioner for follow-up care.

Of the self referrals to the A&E department, most patients were given advice for self care or were referred to the general practitioner (60.6%). Of the self referrals, 13.5% were admitted to hospital.

**Factors explaining differences in patients' decisions**

Women, children, the elderly, and patients from rural areas chose the GP cooperative significantly more often, as did patients with less urgent complaints (U4) and patients with infections and heart and airway problems (table 3).

The total explained variance for contacting the GP cooperative or the A&E department was 48.5% (Nagelkerke test:  $R^2 = 0.485$ ).

**DISCUSSION**

The contact frequency for the GP cooperative was found to be more than five times greater than the contact frequency for patients self referring to the A&E department. Interestingly, more than three quarters of all contacts with the GP cooperative and half of all contacts self referred to the A&E department did not concern urgent problems.

The GP cooperative dealt with a wide range of problems, most of which involved infections. In contrast, the self referrals at the A&E department were concerned with a small range of problems, mainly trauma. Half of these patients received an radiograph.

Most patients at the GP cooperative and patients self referring to the A&E department received advice for self care or general practitioner care. The referral rate of the GP cooperative was very low, and half these patients were admitted to hospital, while the admission rate of the self referrals to the A&E department was also very low.

As reported in the literature, self referrals particularly concerned young men with non-life-threatening trauma who lived in urban areas. They mostly expected a radiograph and got it.<sup>12-15</sup> The admission rate for this group was generally low.

The results of this study show that the problem of self referrals is relative. Contact frequency at the A&E department is much lower than that at the GP cooperative.

**Table 3** Factors related to attending the GP cooperative instead of the A&E

	n	% patients contacting GP cooperative	Odds ratio	95% CI	Significance
Total	5178	85.4			
Age					
0-15 years	1368	90	1.89	1.45 to 2.48	0.00
16-65	2883	81	Ref*		
>65	927	91	2.39	1.76 to 3.26	0.00
Sex					
Men	2373	81	Ref		
Women	2805	89	1.48	1.21 to 1.82	0.00
Origin					
City	4014	84	Ref*		
Rural area	1164	90	2.17	1.65 to 2.85	0.00
Contact moment					
Weekend daytime	2120	89	1.92	1.42 to 2.59	0.00
Evening	2290	84	1.31	0.99 to 1.74	0.06
Night	761	82	Ref		
Urgency					
U1+U2	251	82	1.24	0.76 to 1.98	0.37
U3	899	64	Ref		
U4	4012	91	4.07	3.23 to 5.13	0.00
Complaint					
Trauma	800	38	Ref*		
Infection	1188	98	48.80	32.33 to 73.66	0.00
Heart problems	217	79	9.86	6.11 to 15.91	0.00
Respiratory problems	220	97	56.54	25.71 to 124.34	0.00
Other problems	2753	94	21.83	17.34 to 27.49	0.00

\*Patients who attended the A&E department constitute the reference group (Ref). A&E, accident and emergency; CI, confidence interval; GP, general practice.

Moreover, care is complementary: the A&E department particularly focuses on trauma, while the GP cooperative deals with other problems. This may agree with patient expectations and experience in that “when you have a trauma, you go to the A&E department”. In contrast, the self referrals concern mostly minor, non-urgent problems.

Two studies examining general practitioners' work in A&E departments found that the general practitioners managed “non-emergency” patients as safely as the hospital A&E doctors, and the patients were equally satisfied. However, the general practitioners requested fewer imaging tests, referred more patients to primary care, admitted fewer patients to hospital, and were more cost effective than the hospital A&E doctors.<sup>13 14</sup>

As supported by the literature, we estimate that most self referrals can be treated by the general practitioner, by a nurse, or by advice over the telephone in case of integrated care facility with one single site for patients.<sup>6-9 13-16</sup> When general practitioners also have access to radiography and EKG and blood tests (as they do during the day), we expect this percentage to be even higher.

There are some limitations to our study. It is a retrospective analysis of records and the A&E contacts were sometimes incompletely recorded and sometimes difficult to read. To classify the urgency of the complaint we used a classification validated for telephone triage. This classification was not originally developed for retrospective documentary analysis and the research population may have had more urgent problems than are reflected by the registration.

Our study took place in only one region and lasted only 4 weeks. This may limit the generalisability of the findings to other settings and periods. However, the results are comparable to those found in the literature.<sup>7 8 13</sup>

The organisation of out-of-hours primary medical care is changing in many countries. Alternative services, separate from A&E departments offering first contact care for non-urgent health problems, are likely to have little impact on the demand for emergency services.<sup>15</sup> Therefore it may be essential to create an integrated care facility of GP cooperatives and A&E departments with one access point to medical care for patients. In such a system patients no longer need to choose between different entrances to care as they are always at the right place. We recommend further research into this model or combinations of models of out-of-hours care, such as shared emergency patient telephone numbers or general practitioners working in A&E departments. Such research should result in the most effective, evidence based, and patient tailored care.

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