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Implementation of a hospital-integrated general practice - a successful way to reduce the burden of inappropriate emergency-department use

Chmiel, Corinne; Wang, Mathyas; Sidler, Patrick; Eichler, Klaus; Rosemann, Thomas; Senn, Oliver

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Implementation of a hospital-integrated general practice – a successful way to reduce the burden of inappropriate emergency-department use

Corinne Chmiel^a, Mathyas Wang^a, Patrick Sidler^b, Klaus Eichler^c, Thomas Rosemann^a, Oliver Senn^a

^a Institute of Primary Care, University of Zurich, University Hospital Zurich, Switzerland

^b Emergency Department, Waid City Hospital, Zurich, Switzerland

^c Winterthur Institute of Health Economics, Zurich University of Applied Sciences, Switzerland

Summary

PRINCIPLES: Emergency departments (EDs) are overcrowded by lower acuity patients, which might be more efficiently treated by general practitioners (GPs). This study evaluated the impact of triaging lower acuity patients to a new hospital-integrated general practice (HGP) on ED case-load and the reasons for choosing the ED/HGP.

METHODS AND RESULTS: Patients were consecutively assessed according to the emergency severity index (ESI) to triage lower acuity patients to the HGP. Consultation numbers at the emergency centre (ED and HGP) increased by 43% between 2007 (n = 16 974) and 2011 (n = 24 331) (implementation of HGP in 2009). Although self-referrals increased significantly at the emergency centre from 54% to 63% (p < 0.001), the proportion of self-referrals at the ED was significantly reduced to 48% (p = 0.007). The HGP was able to reduce the burden of increasing total consultations by 36%; 4.6% were referred back to the ED after triaging to the HGP. Overall, 95% of HGP patients were self-referred, Swiss nationals (65%) and with a personal GP (82%) they attended regularly (69%). The most common reason for presenting at the emergency centre was not being able to reach the GP (60%). Diagnoses were injury- (29%) and infection- (23%) related problems affecting the musculoskeletal (27%) system and skin (21%).

CONCLUSION: The HGP succeeded in reducing the burden of inappropriate ED use: the majority of low acuity self-referred patients were conclusively treated at the HGP. The HGP does not represent competition to the GP out-of-hours care service, since the main reason for presenting at the hospital was not lacking a relationship but the GPs' inaccessibility.

Key words: primary care; emergency medicine; resource allocation; access to care; care management

Introduction

Inappropriate use and overcrowding of emergency departments (EDs) are well known international problems, espe-

cially in countries with no primary care gate-keeping function, as it is the case in Switzerland. Since the 1990s the number of emergency medical visits is increasing dramatically nationally and internationally [1–4]. Potential consequences are compromised patient access to care and the quality of care provided [2, 5–9]. Several studies have indicated that the EDs are inappropriately visited by self-referred patients with nonurgent or lower acuity problems, which could possibly be more efficiently treated by a general practitioner (GP) in an outpatient setting [3, 5, 10–13]. To overcome the inappropriate use of the EDs, hospitals and healthcare authorities have come up with different models to reorganise emergency services. One increasingly popular model in Switzerland is a hospital-integrated general practice for emergency care services (HGP), based on a team of GPs and emergency staff physicians. These HGPs are located within the hospitals, sharing the same access point as the ED, as well as a certain amount of infrastructure (e.g., x-ray), but are otherwise very similar to a primary care practice in organisational structure and the diagnostic possibilities offered. With the aim of improving the delivery of its emergency service, the City Hospital Waid in Zurich, Switzerland, implemented a new HGP in 2009. Triage of self-referred patients to either the ED or HGP is performed by means of the Emergency Severity Index (ESI) score. This score has been shown to be a reliable tool for predicting the severity of a patient's condition and for clearly identifying patients requiring minimal resources. Its application therefore has the potential to optimise resource utilisation and deployment of appropriate and more efficient care [14–16]. From our own previous studies we know that by implementing this new model of triaging lower acuity patients to the HGP, significant improvements could be made in treatment times, use of diagnostic tests and costs [10, 17–21]. The current study aimed to evaluate the impact of the HGP on the ED case-load and to identify the reasons for choosing the ED/HGP in a non-gate-keeping healthcare system.

Materials and methods

Setting, intervention and participants

In Switzerland no gate-keeping system exists, meaning that patients generally have unlimited access to all healthcare providers, unless they are voluntarily insured in a managed care model (currently about 21% of the population) [22]. Patients seeking emergency care can choose to contact their private GP, GP cooperatives providing 24-hour emergency services, sporadic urban walk-in emergency centres, or a hospital ED with or without an HGP. Access to these treatment options is unrestricted and the mandatory health insurance covers all costs (except for basic annual deductibles for adults, which can be chosen by the patient to lie between 500 and 2 500 Francs, and patient copayment of 10% of all costs up to a maximum of 700 Swiss Francs per year).

The new HGP at the City Hospital Waid (catchment population of approximately 180 000) was implemented in March 2009. During HGP opening hours patients presenting at the hospital ED were triaged by a trained emergency nurse using the ESI score ranging from 1 (life-threatening) to 5 (no resources needed) [14–16]. Patients with an ESI score ≥ 4 (no immediate life-saving intervention and no or only one resource needed) were routed to the HGP. Depending on the capacity of the HGP, the ED continued to treat lower urgency classes. The HGP does not offer any long-term care and is therefore no substitute for usual GP care.

Figure 1 shows the four phases of data collection performed in the context of prospectively evaluating the intervention: in these study periods patients were recruited consecutively among all patients admitted to the ED and triaged to the HGP. Measurement phases at the ED and/or HGP were undertaken between August 17th 2007 (preintervention) and June 30th 2011 (postintervention). Since the HGP was implemented shortly before the evaluation period in 2009, only a selection of GPs and/or patients at the HGP were questioned in that specific study period about a reduced stress burden of the new system. Opening hours

of the HGP were from 09:00 until 22:30 (weekdays) and 10:00 until 22:30 (weekends). The study periods focussed on different aspects of the intervention such as feasibility, patient/staff satisfaction and whether improvements could be made in treatment times, use of diagnostic tests and costs. The content of evaluation sheets and questionnaires partially differed between the different study periods in order not to strain ongoing emergency care. In order to nonetheless ensure continuity of data and enable quality control, a certain basic data set was collected in every study period. The data set was designed according to and assessed by a validated outcome tool (“emerge”) to evaluate clinical performance in emergency care [3]. “Emerge” comprises of a set of clinical performance indicators which includes two main components: objective measures that evaluate clinical performance in terms of speed and accuracy of patient assessment, and patients’ experiences with the care provided. More details on the organisation of the emergency services under investigation as well as the results of the previous evaluations concerning aspects of feasibility of the intervention, patient and staff characteristics/satisfaction, as well as reduced treatment times, diagnostic tests and costs have already been reported elsewhere [10, 17–21]. The current study evaluated the last missing puzzle pieces in the evaluation of the new model: the impact of triaging lower acuity patients to the HGP on ED case load and the reasons for patients choosing the HGP/ED over other emergency services.

Methods of measurement, data collection and processing

During the four study periods, the following parameters were collected on specific data sheets by different staff members (nurses and doctors) directly involved in patient care at the ED and/or HGP [3]: time intervals between predefined stages of care, source of referral, medical problems, diagnostic procedures, and mode of discharge after treatment. These data were collected on each consecutive patient treated in the ED or HGP. Patients completed a questionnaire concerning care provided which was distributed by the attending staff after discharge/transfer from the ED. Questionnaires were confidential and quasi-anonymous (coded by code number) and related to clinical data sheets by code number. Diagnoses were classified according to the International Classification of Primary Care, second edition (ICPC-2), a validated classification system of medical problems in primary care [23]. In 2007, a random sample of 20% of diagnoses were coded according to ICPC-2, in the following study periods all the diagnoses of HGP patients were coded according to ICPC-2. A maximum of four diagnoses per patient were recorded by the physicians. Verein Outcome, Zurich, a professional, nonprofit data processing company responsible for quality control measurements in healthcare, provided comprehensive additional support to ensure data quality. The support included recurrent training in data collection for hospital staff before measurements, a manual describing the indicators and the data collection procedure, answering frequently asked questions, hotline support during measurement phases, and data controlling. Processing of the raw data was also performed by Verein Outcome. Data were checked for eligibil-

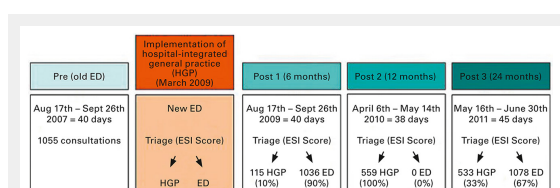


Figure 1

Study measurements at the ED and/or HGP.

Study flow of different phases of data collection at the emergency department (ED) from August 17th 2007 until June 30th 2011. In 2007 baseline measurements at the old ED were performed before implementation of the hospital integrated general practice (HGP) in March 2009. In the new model patients presenting at the ED are triaged by a trained emergency nurse using the Emergency Severity Index score (ESI) to either the ED or the HGP. Follow up measurements at the ED and/or HGP were undertaken in 2009, 2010 and 2011. Since the HGP was implemented shortly before the evaluation period in 2009 only a selection of GPs at the HGP were questioned in that specific study period to reduce stress burden of the new system. In 2010 only measurements at the HGP were performed.

ity, completeness, and was tested against a set of predefined plausibility criteria by Verein Outcome and the involved research team members. These included checks for contradicting data, double information and plausibility of time measurements. Data for the current study originated from two data sources: (1) from the four above mentioned study periods for the pre- versus post-intervention analysis (fig. 1); (2) from routinely collected administrative data of the hospital. These data were used to estimate the development of consultation numbers over the years and patient flows within the emergency centre (ED and HGP) (table 1).

Ethics approval

The study was approved by the ethics committee of the canton Zurich (reference number 26/09). According to this ethics approval, no informed consent was necessary for the execution of the study.

Statistical analysis

Continuous variables were summarised as medians with interquartile ranges (IQRs) and analysed with the Wilcoxon-rank sum test. Categorical variables were summarised as frequencies and analysed with the chi-square test. For comparisons between more than two independent groups one-way analysis of variance (parametric) or Kruskal-Wallis (nonparametric) tests were applied. A two-sided alpha of 0.05 was set as level of significance for all comparisons. Statistical analyses were performed using STATA statistical program (version 13.1; Stata Corporation, College Station, TX, USA). Reliability of the ICPC coding was assessed by the kappa statistics. Corresponding agreements for the various ICPC levels resulted in high Cohen's kappa coefficients ranging from 0.88 (component level) to 0.96 (chapter level).

Results

Consultation numbers at the emergency centre (ED and HGP) and effectiveness of triage to the HGP

Consultation numbers at the emergency centre (ED and HGP) were continuously increasing (table 1). Data for table 1 originated from hospital's administrative data, except for data on the proportion of self-referrals, which originated from study evaluation periods. In 2007 a total of 16 974

consultations were recorded, all treated at the ED. From March 2009 on, patients with an ESI score ≥ 4 were routed to the HGP during opening hours. Between 2009 and 2011 the annual proportion of patients treated by the HGP increased from 25% (n = 5 366) to 36% (n = 8 845). In 2011 a total of 24 331 consultations were recorded at the emergency centre (+ 43.34% compared with 2007). The number of patients self-referred to the emergency centre (ED and HGP) increased significantly (p < 0.001) by 17.62% (54.03% in 2007 and 63.55% in 2011). In contrast to this general trend the burden of self-referrals to the ED was significantly reduced from 54.03% to 48.05% (p = 0.007). The HGP was able to reduce the burden of increasing patient numbers at the ED by up to 36.35% (2011). Patients triaged to the HGP were mainly self-referred (97.39% in 2009, 94.75% in 2011). Outpatient management at the HGP was possible in 95.43%. The rate of incorrect triage, defined as patients referred back to the ED from the HGP after have been seen at the HGP, was between 3.9 and 4.75% in the years 2009 to 2011, and 4.57% overall.

Patient and consultation characteristics at the HGP and reasons for choosing the emergency centre

Patient and consultation characteristics from the various study periods are presented in table 2. Data for this table originated from the study evaluation phases. In these phases parameters were collected by different staff members involved in patient care and patient questionnaires were distributed. In 2010, 95.2% (532 of 559) of the patient questionnaires were completed; in 2011 this was the case in 92.1% (491 of 533). A total of 1 207 patient contacts were analysed. Median age was 36 years (IQR 25–51), 48.95% were female, 65.36% were Swiss nationals, 65.67% spoke German as their native language and 63.71% were working. A total of 82.08% stated that they have a personal GP, 69.97% had at least one contact with the GP within the past 6 months, and 25.34% had three or more contacts. Overall, 95.24% were self-referred. In patients having their own GP, the main reason for choosing the HGP, besides not being able to reach their own GP (60%), was its good accessibility (19.16%).

Table 1: Consultation numbers at the emergency centre.

Year	Emergency centre (ED + HGP)	Self-referrals emergency centre*(ED + HGP)	ED	Self-referrals ED*	HGP	Self-referrals HGP*	HGP % of emergency centre	Incorrect triages	Incorrect triage rate %
2007	16 974	54.03% [†]	16 974	54.03% [‡] (570/1 055)	–	–	–	–	–
2008	18 470	–	18 470	–	–	–	–	–	–
2009	21 003	48.91%	15 637	43.53% (451/1 036)	5 366	97.39%	25.55	255	4.75
2010	23 691	–	15 756	–	7 935	–	33.49	370	4.70
2011	24 331	63.55% [†]	15 486	48.05% [‡] (518/1 075)	8 845	94.75%	36.35	348	3.90

ED = emergency department; HGP = hospital integrated general practice

In March 2009 the HGP was implemented. Incorrect triage was defined as patients referred back to the ED from the HGP after have been seen at the HGP.

* Data on % self-referrals originated from evaluation periods, all other data in this table originated from the hospital's administrative data.

[†] The number of self-referred patients to the emergency centre (ED + HGP) increased significantly from 54.03% to 63.55%, (p < 0.001).

[‡] In contrast to this general trend the burden of self-referrals to the ED was significantly reduced from 54.03% to 48.05% (p = 0.007).

Characteristics of self-referred patients to the HGP

The proportion of self-referred patients among Swiss ($n = 293$, 94.21%) and foreign nationals ($n = 169$, 97.69%) showed a trend towards foreign patients ($p = 0.078$). Overall, 82.53% ($n = 378$) of the self-referred and 90.91% ($n = 22$) of the referred patients reported having a personal GP ($p = 0.308$). Swiss self-referred patients reported significantly more often having a personal GP (86.11%, $n = 248$) compared with foreign patients (75.19%, $n = 128$) ($p = 0.007$). Also in self-referred patients who had a personal GP, the most common reason for not seeking care at their personal GP was that the GP was not reachable (60%).

Diagnoses at the HGP

The most common diagnoses classified according to ICPC-2 are shown in table 3. A total of 1 491 different diagnoses from 1 203 patients were recorded. On average, each patient had 1.24 diagnoses. The most common diagnosis was S16 (bruise/contusion) with 8.35%, the second S18 (laceration/cut) with 5.88% and the third L84 (back syndrome without radiating pain). Diagnoses were mainly injury- (29.20%) and infection- (23.65%) related medical problems affecting the musculoskeletal (27.32%), skin (21.53%) and respiratory systems (14.03%).

Distribution of visiting rates at the HGP

HGP opening hours were 9 a.m. to 10.30 p.m. on weekdays and 10 a.m. to 10.30 p.m. on weekends and holidays. Visiting rates throughout the HGP opening hours were evenly distributed over two-hour time categories ($p = 0.142$). The earlier in the day the consultation occurred the older the patients were ($p < 0.001$). There was no overall significant difference between time intervals concerning patient's sex, patients being self-referred or referred by the GP or other healthcare professional, patients having a GP, and living alone. Foreign patients were more likely to visit the HGP in the evening compared with Swiss nationals, who visited in the morning and lunchtime ($p = 0.001$). There was a trend ($p = 0.082$) towards working patients presenting rather in the morning or evening, compared with nonworking patients who showed a more homogenous distribution of visiting rates throughout the opening hours.

Discussion

This prospective pre-post study on the implementation of a new hospital-integrated general practice (HGP) concerning ED lower acuity case-load and reasons for choosing the HGP showed the following results. ED consultation numbers in general, and especially self-referrals, increased steadily between 2007 and 2011. The implementation of the HGP was able to reduce the burden of increasing patient numbers and self-referrals at the ED. Almost all HGP patients were self-referred and could be conclusively treated at the HGP. The majority had a personal GP who they attended regularly. The most common reason for presenting at the emergency centre was not being able to reach the GP.

The project "Waid"

The current study represents the last missing puzzle piece of the comprehensive evaluation of the new service model, which was prospectively evaluated between the years 2007 (preimplementation of HGP) and 2011 (postimplementation of HGP). Aspects of feasibility of the intervention, patient and staff characteristics as well as satisfaction, and reduced treatment times, diagnostic tests and costs have already been published [10, 17–21]. The efficiency of the HGP has been shown to be determined by the system change *per se*, focusing on the specific emergency needs for walk-in patients, and is not caused by the fact that GPs are involved instead of residents, or by differences in case mix and usage of diagnostic tests [21]. Besides the evident benefits of the new service model, it remained unclear until now whether the implementation of the HGP might also reduce the burden of inappropriate ED use and why patients choose to consult the HGP.

Emergency consultation numbers

Consultation numbers at EDs are increasing nationally and internationally [2, 4, 10], as reflected in our own findings. The challenge of the EDs is to find an effective way to redirect lower acuity patients not in need of an ED, in order to offer the capacity of an ED to patients in need of it. In our study the reorganisation of the emergency service was successful, i.e., the majority of self-referred patients with nonurgent problems previously seen in the ED were successfully triaged to the new HGP. The ED was therefore unburdened by inappropriate use. Our findings are in line with findings from other healthcare settings in western countries [24–26]. The maximally possible impact of the HGP in reducing the burden of ED overcrowding is even underestimated in our study for following reasons: the HGP was not open 24/7 and, depending on the capacity of the HGP, some patients who according to the ESI score could have been treated at the HGP were treated at the ED, depending on capacity of the HGP. One could argue that the generation of a new service model itself draws patients to the emergency centre. This argument seems neglectable because: (1) EDs without HGPs also show an increasing burden of overcrowding due to self-referrals [1–4]; (2) our long-term observation of ED use does not show a significantly larger increase in consultation numbers after the implementation of the HGP, the increase rather follows the trend observed before the intervention; (3) our trend in increasing ED case load is comparable to national and international data. The success of the HGP therefore reflects an increasing patient demand for emergency care and not overtreatment [24–26].

Effectiveness of triage

The German version of the ESI had already been validated in the Swiss setting [15, 27] and its utility as a triage tool for self-referred patients in an ED has been demonstrated [14]. Comparisons of our retriage rates with international data were not possible, since no literature on the subject is available. Unpublished quality measurement data from Swiss EDs using the ESI score in a similar setting as the Waid hospital show retriage rates ranging between 4 and 6% in past years (personal communication from Patrick

Table 2: Patient and consultation characteristics at the HGP.

	2009 (n = 115)	2010 (n = 559)	2011 (n = 533)	Total/mean (n = 1 207)
Age (median, IQR)	34 (23–49)	37 (26–51)	35 (25–52)	36 (25–51)
Female sex (%)	48.39	53.54	47.71	48.95
Swiss nationality (%)	NA	66.46	64.26	65.36
German as native language (%)	NA	65.67	na	65.67
Working (%)	NA	63.75	63.67	63.71
Having personal GP (%)	NA	81.27	82.92	82.08
Number of contacts with personal GP within the past 6 months (%)	NA	NA		
Never			30.03	30.03
1–2			44.63	44.63
3 or more			25.34	25.34
Referral mode (%)		NA		
Self	97.39		94.75	95.24
By GP as emergency	1.74		2.43	2.30
By GP not as emergency	0.87		0.19	0.31
By other external physician	0.00		0.19	0.15
Ambulance or emergency physician	0.00		0.19	0.15
Other	0.00		2.24	1.84
Outpatient management (%)	98.26	95.48	94.77	95.43
Patients with GP: Reasons for not consulting GP (%)	NA	NA		
GP not reachable			60.00	60.00
Do not want to consult GP with current problem			14.37	14.37
GP too far away			13.44	13.44
GP sent me			12.19	12.19
Reason for choosing the HGP (%)	NA		NA	
I could not reach my GP		19.25		19.25
Chose HGP because of good accessibility		19.16		19.16
Did not choose HGP/triaged to HGP from ED entrance		8.65		8.65
The GP cooperative sent me		7.16		7.16
I do not have a GP and came on my own		5.95		5.95
My GP sent me		4.56		4.56
Chose HGP because of short waiting times		4.46		4.46
Chose HGP because of long opening hours		4.09		4.09
Chose HGP for medical competence		3.44		3.44
I have a GP but do not want to consult him or her		2.51		2.51
Another doctor/pharmacist/health insurance sent me		2.23		2.23
My GP is too far away		2.14		2.14
Recommended by relative/friend/boss		2.05		2.05
GP had no time		1.30		1.30
Emergency, had to come fast		1.21		1.21
Other reasons*		11.81		11.81

ED = emergency department; HGP = hospital integrated general practice; GP = general practitioner; NA = not applicable (these questions were not asked in all study phases)

Data originated from parameters collected by various staff members involved in patient care as well as patient questionnaires. * Each with occurrence less than 1% (examples: staff member, was an accident/needed radiography, good experience in the past).

Table 3: Ten most common diagnoses in the hospital integrated general practice.

ICPC-2	Diagnosis	Frequency	Percent of responses	Percent of cases
S16	Bruise/contusion	98	6.76	8.52
S18	Laceration/cut	69	4.76	6.00
L84	Back syndrome without radiating pain	65	4.41	5.57
R74	Acute upper respiratory infection	51	3.52	4.43
L77	Sprain/strain of ankle	49	3.38	4.26
L79	Sprain/strain of joint	39	2.69	3.39
D73	Gastroenteritis presumed infection	38	2.52	3.30
R76	Acute tonsillitis	32	2.21	2.78
L74	Fracture: hand/foot bone	26	1.79	2.26
R80	Influenza	25	1.72	2.17

ICPC-2 = International Classification of Primary Care, second edition

Total n = 1 203 patients. 1 491 different diagnoses registered. On average 1.24 diagnoses per patient.

Sidler, co-author and member of ED quality circle). Our mean triage rate over the study period of 4.5% can therefore be seen as adequate and the high percentage of patients with an ESI ≥ 4 who were definitively managed in the HGP confirms the effectiveness of the ESI score as a triaging tool.

Reasons for choosing the emergency centre

Interestingly the vast majority of patients stated they had a personal GP, a finding seen in two previous Swiss studies, one assessing out-of-hours demand in primary care [20] and the other assessing referral practice in a surgical ED [11]. Our study, as well as the study in the surgical ED, showed that foreign nationals are less likely to have a GP than Swiss nationals. Nevertheless, our study showed a much larger proportion of foreign nationals with a GP. Compared with the two reference studies, our study was the only one assessing not only whether the patients had a personal GP, but also the intensity of their relationship with the GP. This relationship was astonishingly strong; the vast majority stated that they had at least one contact with the GP within the past 6 months. It has often been assumed that EDs are overcrowded because the patients lack a personal GP or do not have a relationship with the personal GP. This assumption seems not to suffice in explaining ED overcrowding, at least in the Swiss setting. The finding that the main reason for patients presenting at the ED was not a lack of a relationship with the GP but the GP's inaccessibility, shows that the HGP does not represent competition with the traditional GP emergency services but rather a complementary service, especially when considering that the HGP does not offer long-term care. Probably, GPs are less available to their clients for emergency consultations and/or are not anymore willing to be available out-of-hours, as they used to in the past. The steadily growing number of GPs with the necessity to balance work and family needs might be a contributing factor, besides the wish of younger generations to reduce workload, a finding also reflected in the increasing rate of part-time employment among GPs [28].

Diagnoses

The broad and low prevalence spectrum is typical for a primary care setting and has been observed in out-of-hours emergency care as well as in nonemergency care [10, 20, 29–31]. This finding implies that GPs, who are specialists for the broad and low prevalence spectrum, are the most suitable physicians for the management of HGP patients. This assumption is fortified by the low triage rate in our study. Since most diagnoses were injury related, patients probably felt the need to rule out a fracture or the necessity of suturing a wound as soon as possible, rather than waiting for the GP to be available. Patients probably preferred the hospital based emergency services (ED or HGP) rather than out-of-hospital services, such as GP cooperatives, as a result of the (mis)perception that the GP practice may lack the necessary resources to treat injury-related problems, such as x-ray or suturing. Why the patients chose to consult the ED instead of the out-of-hours service offered by the GP cooperative of the city was unfortunately not assessed in our study. Nevertheless, in light of our study findings it seems prudent to bring the GPs to where the patients

go with problems GPs are specialized in solving, since in a non-gate-keeping system such as that in Switzerland the patients can freely choose the service provider.

Distribution of visiting rates

The distribution of visiting rates throughout the HGP opening hours was even, showing a constant demand for emergency services, also during opening hours of GP practices. The earlier during the day the consultation occurred, the older the patients were, most likely because older people tend to get up earlier in the morning [35]. Foreign patients were more likely to visit the HGP in the evening compared with Swiss nationals, who presented in the morning and lunchtime, a finding consistent with Clément et al. [11]. Possible reasons for this observation can only be speculated upon.

Strength and limitations

Our study was carried out prospectively in a real-life emergency care setting. It focussed on patients presenting to the ED with low acuity medical problems, which accounted for more than one third of all patients presenting to the hospital emergency entrance. Our data collection was based on a validated benchmarking tool "emerge", which was developed for quality control purposes for Swiss hospitals [3]. Since the City Hospital Waid took part in the development as well as the evaluation study of the "emerge" tool and showed no significant difference compared with the other participating hospitals, data from City Hospital Waid can be considered representative for other Swiss hospitals, even though the study evaluation periods comprised less than 10% of the whole patient population treated at the ED. Also, the fact that >90% of the patient questionnaires were available for analysis underlines the representativeness of our findings. We assume our data to be representative not only for the Swiss setting but also for other healthcare systems, since the distribution of diagnoses in our study are similar to countries with non-gate-keeping healthcare systems [30, 31]. Diagnoses were coded with the ICPC-2 classification, an internationally recognised and validated classification system for primary care [23]. The ESI triage system used is validated for the German language, which is the main language in Zurich, Switzerland and its reliability, validity as well as utility was widely tested among self-referred patients [14–16, 27, 36]. These well-established measurement and coding tools therefore enable international comparisons. A limitation of our study is the lack of follow-up of patient outcomes; therefore, it was not possible to assess the quality of care provided. A further limitation is that data collection in the four study periods was not always conducted in the same months of the year (see fig. 1), possibly introducing a certain selection bias concerning disease spectrum and consultation frequencies. Evaluation periods in general were quite short, possibly under- or overestimating consultation frequencies. But since more than one evaluation period were performed, this effect is minimised.

Conclusions

The HGP succeeded in reducing the burden of inappropriate ED use: the majority of low acuity self-referred patients were conclusively treated at the HGP. The HGP does not represent competition to GP out-of-hours care service, since the main reason for presenting at the hospital was not a lacking relationship but the GP's inaccessibility.

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Correspondence: Corinne Chmiel, PD MD, Institute of Primary Care, University of Zurich, Pestalozzistrasse 24, CH-8091 Zurich, [corinne.chmiel\[at\]usz.ch](mailto:corinne.chmiel[at]usz.ch)

References

- Diserens L, Egli L, Fustinoni S, Santos-Eggimann B, Staeger P, Hugli O. Emergency department visits for non-life-threatening conditions: evolution over 13 years in a Swiss urban teaching hospital. *Swiss Med Wkly.* 2015;145:w14123.
- Santos-Eggimann B. Increasing use of the emergency department in a Swiss hospital: observational study based on measures of the severity of cases. *BMJ.* 2002;324:1186–7.
- Schwappach DL, Blaudszun A, Conen D, Ebner H, Eichler K, Hochreutener MA. "Emerge": Benchmarking of clinical performance and patients' experiences with emergency care in Switzerland. *Int J Qual Health Care.* 2003;15:473–85.
- Tang N, Stein J, Hsia RY, Maselli JH, Gonzales R. Trends and characteristics of US emergency department visits, 1997–2007. *JAMA.* 2010;304:664–70.
- Derlet RW, Richards JR. Overcrowding in the nation's emergency departments: complex causes and disturbing effects. *Ann Emerg Med.* 2000;35:63–8.
- Fatovich DM. Emergency medicine. *BMJ.* 2002;324:958–62.
- Roberts DC, McKay MP, Shaffer A. Increasing rates of emergency department visits for elderly patients in the United States, 1993 to 2003. *Ann Emerg Med.* 2008;51:769–74.
- Schneider SM, Gallery ME, Schafermeyer R, Zwemer FL. Emergency department crowding: a point in time. *Ann Emerg Med.* 2003;42:167–72.
- Xu KT, Nelson BK, Berk S. The changing profile of patients who used emergency department services in the United States: 1996 to 2005. *Ann Emerg Med.* 2009;54:805–10 e1-7.
- Chmiel C, Huber CA, Rosemann T, Zoller M, Eichler K, Sidler P, et al. Walk-ins seeking treatment at an emergency department or general practitioner out-of-hours service: a cross-sectional comparison. *BMC Health Serv Res.* 2011;11:94.
- Clement N, Businger A, Martinolli L, Zimmermann H, Exadaktylos A. Referral practice among Swiss and non-Swiss walk-in patients in an urban surgical emergency department. *Swiss Med Wkly.* 2010;140:w13089.
- Flaig C, Zehnder K, Zürcher H, et al. Selbsteinweisungen ins Spital. *Primary Care.* 2002;10:280–3.
- Hugentobler W. Die Belastung des Hausarztes im regionalen Notfalldienst. *Primary Care.* 2006;2006:26–7.
- Elshove-Bolk J, Mencl F, van Rijswijk BT, Simons MP, van Vugt AB. Validation of the Emergency Severity Index (ESI) in self-referred patients in a European emergency department. *Emerg Med J.* 2007;24:170–4.
- Grossmann FF, Nickel CH, Christ M, Schneider K, Spirig R, Bingisser R. Transporting Clinical Tools to New Settings: Cultural Adaptation and Validation of the Emergency Severity Index in German. *Ann Emerg Med.* 2010.
- Wuerz R. Emergency severity index triage category is associated with six-month survival. ESI Triage Study Group. *Acad Emerg Med.* 2001;8:61–4.
- Eichler K, Hess S, Chmiel C, Bögli K, Sidler P, Senn O, et al. Sustained health-economic effects after reorganisation of a Swiss hospital emergency centre: a cost comparison study. *Emerg Med J.* 2014;31:818–23.
- Eichler K, Imhof D, Chmiel C, Zoller M, Senn O, Rosemann T, et al. The provision of out-of-hours care and associated costs in an urban area of Switzerland: a cost description study. *BMC Fam Pract.* 2010;11:99.
- Hess S, Sidler P, Chmiel C, Bogli K, Senn O, Eichler K. Satisfaction of health professionals after implementation of a primary care hospital emergency centre in Switzerland: A prospective before-after study. *International emergency nursing* 2015.
- Huber CA, Rosemann T, Zoller M, Eichler K, Senn O. Out-of-hours demand in primary care: frequency, mode of contact and reasons for encounter in Switzerland. *J Eval Clin Pract.* 2010.
- Wang M, Wild S, Hilfiker G, Chmiel C, Sidler P, Eichler K, et al. Hospital-integrated general practice: a promising way to manage walk-in patients in emergency departments. *J Eval Clin Pract.* 2014;20:20–6.
- Studie des Forum Managed Care: Kräftiges Wachstum der Versicherten in Ärztenetzen. (Accessed 24. December, 2014, at <http://fmc.ch/infothek/erhebung-aerztenetze/>.)
- WONCA. International Classification of Primary Care. New York: Oxford University Press; 2005.
- van Uden CJ, Crebolder HF. Does setting up out of hours primary care cooperatives outside a hospital reduce demand for emergency care? *Emerg Med J.* 2004;21:722–3.
- van Uden CJ, Ament AJ, Voss GB, Wesseling G, Winkens RA, van Schayck OC, et al. Out-of-hours primary care. Implications of organisation on costs. *BMC Fam Pract.* 2006;7:29.
- van Uden CJ, Winkens RA, Wesseling G, Fiolet HF, van Schayck OC, Crebolder HF. The impact of a primary care physician cooperative on the caseload of an emergency department: the Maastricht integrated out-of-hours service. *J Gen Intern Med.* 2005;20:612–7.
- Grossmann FF, Nickel CH, Christ M, Schneider K, Spirig R, Bingisser R. Transporting clinical tools to new settings: cultural adaptation and validation of the Emergency Severity Index in German. *Ann Emerg Med.* 2011;57:257–64.
- Tandjung R, Senn O, Marty F, Krauss L, Rosemann T, Badertscher N. Career after successful medical board examination in general practice – a cross-sectional survey. *Swiss Med Wkly.* 2013;143:w13839.
- Laux G, Rosemann T, Korner T, Heiderhoff M, Schneider A, Kühlein T, et al. Detailed data collection regarding the utilization of medical services, morbidity, course of illness and outcomes by episode-based documentation in general practices within the CONTENT project. *Gesundheitswesen.* 2007;69:284–91. German.
- Green J, Dale J. Primary care in accident and emergency and general practice: a comparison. *Soc Sci Med.* 1992;35:987–95.

- 31 Lee A, Lau FL, Hazlett CB, Kam CW, Wong P, Wong TW, et al. Factors associated with non-urgent utilization of Accident and Emergency services: a case-control study in Hong Kong. *Soc Sci Med*. 2000;51:1075–85.
- 32 Afilalo J, Marinovich A, Afilalo M, Colacone A, Léger R, Unger B, et al. Nonurgent emergency department patient characteristics and barriers to primary care. *Acad Emerg Med*. 2004;11:1302–10.
- 33 Lowe RA, Localio AR, Schwarz DF, Williams S, Tuton LW, Maroney S, et al. Association between primary care practice characteristics and emergency department use in a medicaid managed care organization. *Med Care*. 2005;43:792–800.
- 34 Shesser R, Kirsch T, Smith J, Hirsch R. An analysis of emergency department use by patients with minor illness. *Ann Emerg Med*. 1991;20:743–8.
- 35 National Heart, Lung, and Blood Institute. The National Sleep Foundation. National Institutes of Health. (Accessed September 30, 2014, at [http://www.nhlbi.nih.gov/health-pro/resources/sleep/.](http://www.nhlbi.nih.gov/health-pro/resources/sleep/))
- 36 Wuerz RC, Milne LW, Eitel DR, Travers D, Gilboy N. Reliability and validity of a new five-level triage instrument. *Acad Emerg Med*. 2000;7:236–42.
- 37 Jann B. Tabulation of multiple responses. *Stata J*. 2005;5:92–122.

Figures (large format)

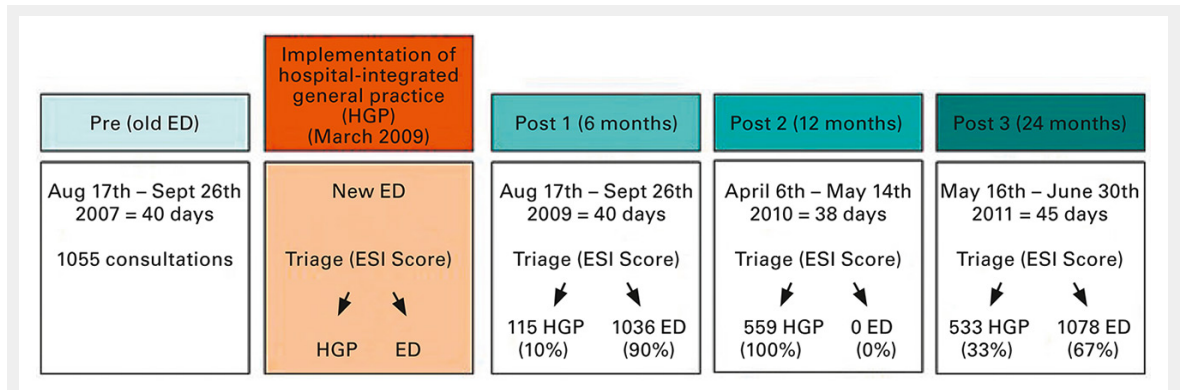


Figure 1

Study measurements at the ED and/or HGP.

Study flow of different phases of data collection at the emergency department (ED) from August 17th 2007 until June 30th 2011. In 2007 baseline measurements at the old ED were performed before implementation of the hospital integrated general practice (HGP) in March 2009. In the new model patients presenting at the ED are triaged by a trained emergency nurse using the Emergency Severity Index score (ESI) to either the ED or the HGP. Follow up measurements at the ED and/or HGP were undertaken in 2009, 2010 and 2011. Since the HGP was implemented shortly before the evaluation period in 2009 only a selection of GPs at the HGP were questioned in that specific study period to reduce stress burden of the new system. In 2010 only measurements at the HGP were performed.