

ORIGINAL ARTICLE

Return visits to the Paediatric Emergency Department: first analysis in Italy

S. COSTABEL, E. PICCOTTI, M. SARTINI*, M. MAGNANI, P. DI PIETRO

Pediatric Emergency Department, I.R.C.C.S. "Giannina Gaslini" Children's Hospital, Genoa; * Department of Health Sciences, University of Genoa, Italy

Key word

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Summary

Return visits to the emergency room have come under scrutiny with a view to identifying the reasons for these events. The aim of the study was to estimate the incidence of return visits to emergency room and to compare this with data from other countries, with a view to proposing a method of monitoring this parameter nationwide. Ours is the first Italian study to report the incidence of return visits to the ER and to analyse the factors correlated with this phenomenon.

The incidence of return visits within 72 hours of the first visit proved to be 2.5%. Statistical analysis revealed a significant difference in the number of return visits between patients under 1 year of age and those older than 1 year. Our future objective is to re-analyse recent case-records on the basis of the indicators identified, with a view to assessing the quality of the service.

Introduction

In recent years, return visits to the emergency room (ER) have come under scrutiny with a view to identifying the reasons for these events. Various studies have also attempted to pick out specific demographic or clinical features that may serve as indicators of this phenomenon [1-3]. Moreover, the percentage of return visits to the ER is regarded as an important indicator of quality, and is one of the aspects to be taken into account in clinical risk management. The incidence of return visits reported in the literature varies markedly according to both the type of patients considered (adults or children) and the case-records examined [4-5].

In a large series of case-records from adult emergency departments, Adeyoka [6] reported a 17% incidence of return visits within 72 hours of the first visit, while in the paediatric setting the incidence has been seen to vary from 3.5% [7] to 5.2% [8]. A common feature of the various studies concerns the hospitalisation rate at the time of the second ER visit; in ample case-records, it has been seen that the need for hospitalisation on the second visit is generally due to the progression of the disease that prompted the first visit, rather than to diagnostic errors made during the first visit [9].

The aim of the present study was to estimate the incidence of return visits to our ER and to compare this with data from other countries, with a view to proposing a method of monitoring this parameter nationwide. Moreover, we sought to pick out any risk factors that might be correlated with repeat ER visits and which might be

of use in the future in implementing effective strategies to reduce the incidence of such visits.

Methods

The study was conducted at the G. Gaslini Scientific Institute, a children's hospital and the only referral centre in our region (Liguria). All visits to the ER in 2004 (35,644) were considered. Patients who returned to the ER within 72 hours of the first visit were identified by means of a computerised system (GST, Siemens Italia). At each visit, the following data were collected: the patient's nationality, sex and age, the date and time of the visit, the triage code assigned, the diagnosis and the discharge modality. All visits were classified as either first visits or return visits.

In accordance with the nursing triage system in use in our ER, each patient was assigned a colour-code denoting the level of priority for medical examination. The triage code was validated by the examining physician before the patient was discharged. A few patients walked out of the ER without waiting to be examined by the doctor.

In our ER, a surgeon is present 24 hours of the day, in addition to the paediatrician. Each patient entering the ER is therefore referred by the triage nurse to the pertinent specialist according to the type of treatment required.

In order to pick out risk factors for repeat ER visits, patients were subdivided into age-groups (over or under 1 year) and each visit was classified in terms of "work-

ing day/non-working day (weekend days and holidays)" and daytime (07.00-20.59) or night-time (21.00-06.59). Non-working days also included Saturdays (when family paediatricians in Italy are generally on call until 10 a.m.) and the canonical feast days (New Year's Day, the Epiphany, Easter Monday, April 25, May 1, June 2, August 15, November 1, December 8, Christmas Day, Boxing Day). Visits were also subdivided by month, in order to assess any seasonal differences (autumn-winter: from October to March; spring-summer: from April to September). Patients who returned to the ER for reasons other than that which had prompted the first visit were excluded from the analysis.

In addition, we analysed the modality of discharge following the first entry to the ER. In the case of our ER, discharge may take the form of sending the patient home, referral to an outpatient clinic, hospitalisation in an ordinary ward or, since 2003, referral for Short Intensive Observation (SIO); our SIO unit is equipped with 5 beds. In Italy, SIO involves keeping ER patients in for diagnostic and therapeutic purposes for up to 24 hours, and is aimed at avoiding unnecessary hospitalisation.

After the first entry to the ER, each return visit was therefore classified in terms of the patient's provenance (home, outpatient clinic, SIO unit, ordinary hospital ward, refusal of hospitalisation or walk-out), the triage code assigned and the reason for the visit.

We then analysed in greater detail those subjects to whom a higher-priority code was assigned on their return visit on account of the worsening of the same pathology that had prompted the first visit.

The data were analysed by means of the STATA SE9™ statistical software. Initially, a descriptive analysis of the data was performed; subsequently, any differences emerging between first visits and return visits, and between categories of subjects, were analysed for statistical significance by means of the χ^2 test.

Results

A total of 35,644 visits to the emergency department of Gaslini Hospital were recorded in 2004 (urgent hospitalisations: 13%; SIO: 4.2%); 954 subjects returned to the ER within 72 hours of discharge following their first visit. Of these 954 subjects, 22 had left the ER without waiting to be examined on the occasion of their first visit, while 13 left at the time of their second visit. In 20 cases, the reason for the return visit was unrelated to that which had prompted the first visit. These patients were excluded from the statistical analyses, leaving a total of 899 return visits to the ER (2.5%).

The mean age of the patients returning to the ER was 4 years (range 0-14 years) and the median age was 3 years. Italian nationals accounted for 719 (80%) of the cases examined, while 180 (20%) were of other nationalities (mainly South Americans, as there is a large Ecuadorian community in our region). On comparing these figures with the total number of ER visits in the period considered, a significant difference emerged between foreigners

and Italians with regard to the risk of return ER visits ($\chi^2 = 68.9632$; $p < 0.001$). Significant differences also emerged with regard to age; 4.7% of the total number of patients aged less than 1 year returned to the ER, while among subjects over the age of 1 year, the corresponding figure was 2.01%, a difference which proved to be highly significant ($\chi^2 = 163.16$; $p < 0.001$). We considered this age-group because in this period frequently can be difficult to recognize also critical pathologies. Figure 1 shows a breakdown into age-groups of the patients returning to the ER.

Comparison between the "hot" season (March-September) and the "cold" season (October-March) revealed no significant differences in the frequency of return visits ($\chi^2 = 3.10$; $p = 0.08$). Figure 2 shows the monthly trend in return visits. The risk of returning proved to be 2.38% in summer and 2.67% in winter.

Moreover, no significant differences emerged with regard to either the time of day or the type of day (working/non-working). The risk of returning during the day (08.00-20.59) proved to be 2.48%, while the corresponding night-time (21.00-07.59) figure was 2.69%, a difference which did not prove to be statistically significant ($\chi^2 = 1.10$; $p > 0.05$). The risk of returning on non-working days was 2.89%, as against a percentage of 2.52% on working days. Again, this difference was not significant ($\chi^2 = 2.86$; $p = 0.09$).

Fig. 1. Return visits subdivided according to patient age.

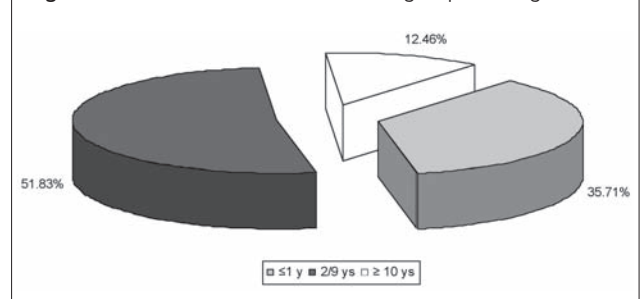
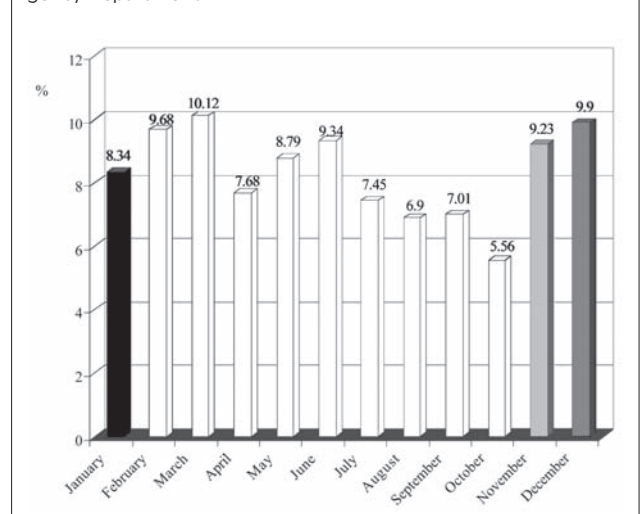


Fig. 2. Monthly incidence of repeated admissions to the Emergency Department.



Tab. I. Triage codes assigned on return visits in relation to those assigned during the first visit.

First visit codes	Return visit codes								Total first visit	
	White		Green		Yellow		Red		N.	%
	N.	%	N.	%	N.	%	N.	%		
White	68	48.92	69	46.64	2	1.44	0	0	139	15.76
Green	136	19.07	543	76.16	34	4.77	0	0	713	79.31
Yellow	5	10.64	35	74.47	6	12.77	1	2.13	47	5.23
Total return visit	209	23.25	647	71.97	42	4.67	1	0.11		

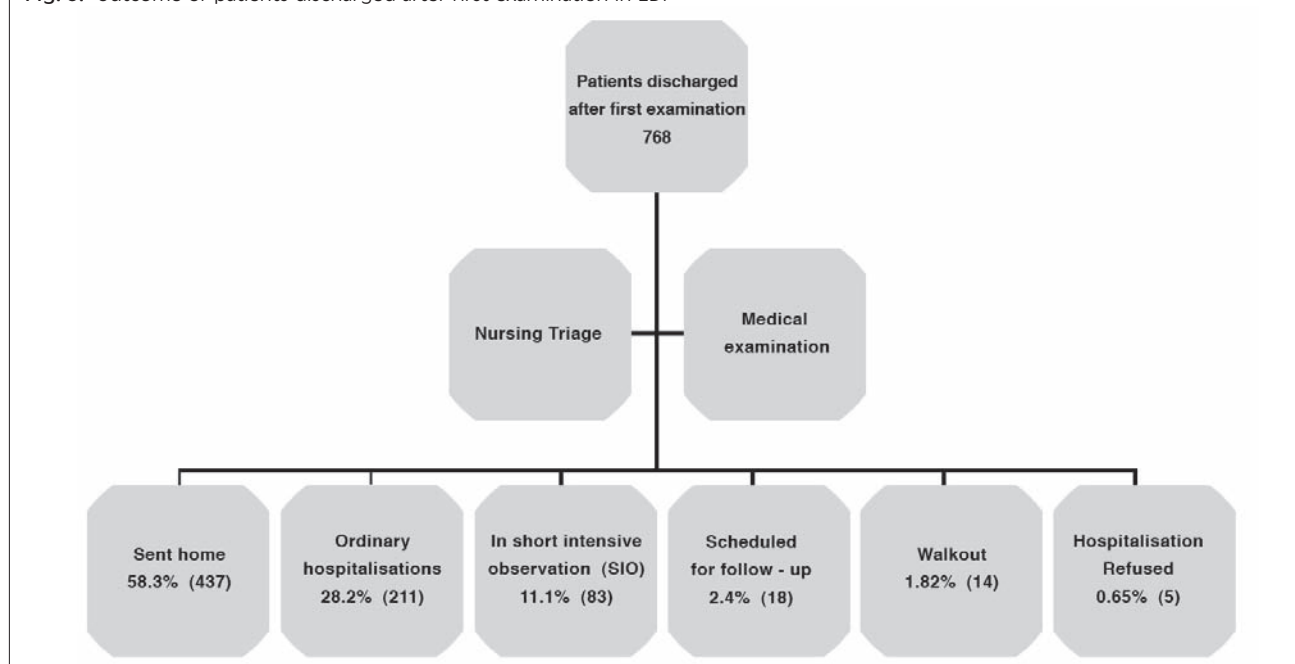
A high level of concordance was seen between the triage codes assigned by the nurse and by the doctor, both during the first visit (95.22%; overestimation 4.46% and underestimation only 0.32%) and during the return visit (97.07%; overestimation 1.88% and underestimation 1.05%).

Analysis of the triage codes assigned on return to the ER in relation to those assigned on discharge after the first visit (Tab. I) revealed that in 88.3% of cases (n = 793) the code assigned on return was the same as, or lower than, that assigned on discharge after the first visit, while in 11.7% (n = 106) of cases, a higher code was assigned. A more detailed analysis of patients returning with a yellow or red code was therefore conducted in order to ascertain the reason for the worsening of the clinical picture.

Only one patient, who had been sent home after the first visit, was given a red code on return. Affected by mitochondrial encephalopathy, this patient had presented with fever during the first visit, and had consequently been kept under observation (SIO) for 24 hours before being discharged in a fair general condition. Forty-eight hours after discharge, the patient displayed repeated vomiting and the onset of severe metabolic acidosis. On

their return, 42 patients received a yellow code owing to worsening of the symptoms that had prompted their first visit (e.g. dehydration due to gastroenteritis, dyspnoea due to respiratory disease, persistence of fever, or worsening abdominal pain). Twenty-seven (64.3%) of these patients were hospitalised in ordinary wards and 9 (21.4%) were kept under observation (SIO). The remaining 6 (14.3%) were sent home after treatment in the ER (e.g. administration of antipyretics or intravenous therapy in these latter cases, a green discharge code was assigned by the doctor).

It emerged from our analysis that 85.4% (n = 768) of the patients returning to the ER had been sent home after their first visit with instructions to contact their family doctors, while 3.9% (n = 35) had been referred to the outpatient clinic for follow-up. After the second visit, 56.9% (n = 437) of those who had been discharged after the first visit were again sent home as no evidence was found to indicate a worsening of their condition; in 18 cases (2.3%) a follow-up examination in the outpatient clinic was scheduled. In 27.5% of cases (n = 211), the patients were hospitalised in ordinary wards, while 83 patients (10.8%) were kept under observation in the SIO unit (Fig. 3). Table II shows the destination of returning

Fig. 3. Outcome of patients discharged after first examination in ED.

Tab. II. Outcome after return visits in relation to outcome after first visits.

First visit outcome	Return visit outcome											
	Discharge		Outpatient clinic		Hospitalisation		SIO		Hospitalisation refused		Walkout	
Discharge	437	56.90	18	2.34	211	27.47	83	10.81	5	0.65	14	1.82
Outpatient clinic	11	30.56	4	11.11	16	44.44	4	11.11	1	2.78	0	0
Hospitalisation	6	40	0	0	8	53.33	1	6.67	0	0	0	0
SIO	13	30.95	0	0	23	54.76	3	7.14	0	0	3	7.14
Hospitalisation refused	7	46.67	0	0	6	40.00	1	6.67	0	0	1	6.67
Walkout	19	82.61	1	4.35	3	13.04	0	0	0	0	0	0

patients in relation to their provenance following their first visit.

Some patients (1.8%) left the ER without waiting to be examined by the doctor.

While more than half of returning patients had been sent home after their first visit, 15 patients (1.6%) who had been hospitalised after their first visit returned to the ER within 72 hours of discharge. Eight of these patients were again hospitalised owing to the persistence or worsening of the symptoms that had prompted the first hospitalisation; six were sent home and one was discharged after a period of observation in the SIO unit. Moreover, 42 patients (4.5%) who had been kept under observation in the SIO unit during their first visit returned to the ER within 72 hours of discharge. Of these, 23 (48%) were hospitalised in ordinary wards owing to the persistence or worsening of symptoms; 13 were sent home, and 3 left the ER without waiting to be examined. Three patients were sent home after further observation in the SIO unit.

Overall, 29.7% of all returning patients were hospitalised in ordinary wards, while 10.2% were kept under observation in the SIO unit. More than half (54.84%) of the patients returning to the ER within 72 hours of their first visit were sent home.

The pathologies most frequently observed among patients returning to the ER were infectious diseases (45.8%), followed by those requiring surgical treatment (27.5%) (Tab. III). The most common infectious diseases were gastroenteritis, followed by infections of the upper respiratory tract and persistent fever. The high frequency of returns due to gastroenteritis is linked to the persistence of symptoms which parents often find difficult to manage. With regard to the conditions requiring surgical treatment, injuries were seen to be the most frequent cause of return visits to the ER; this can be partly explained by the fact that the guidelines for the management of head injuries followed in our ER recommend clinical observation at home in the case of asymptomatic mild-moderate trauma, with instruction to return to the ER if symptoms arise. Abdominal pain is also a frequent cause of return to the ER. We analysed cases of abdominal colic (73 patients) in greater

Tab. III. Most frequent diagnoses on return visit.

Infectious	412
Gastroenteritis	156
Upper airway infections	100
Fever	97
Exanthema	21
Urinary tract infections	10
Other	28
Surgical	247
Trauma	114
Abdominal pain	26
Wounds	33
Burns	15
Foreign body	7
Abscess	10
Other	42
Respiratory	94
Bronchitis-asthma	33
Bronchiolitis	12
Broncopulmonitis	27
Laryngitis	15
Cough	7
Neurological	29
Syncope-Lipothymia	11
Headache	11
Convulsions	7
Cutaneous	45
Rash-urticaria	15
Dermatitis	10
Other	20
Miscellaneous	72
Abdominal pain	47
Nosebleed	8
Conjunctivitis	6
Poisoning	6
Other	5

detail. Of these, 12% underwent surgery (7 for acute appendicitis, 1 for an ovarian cyst and 1 for gallstones).

Conclusions

In recent years, various studies have investigated the phenomenon of return visits to the ER as an indicator both of possible diagnostic or therapeutic errors and of the quality of service. In the paediatric setting, some studies have reported an incidence of return visits ranging from 3% to 18%, depending on the criteria selected to evaluate the phenomenon (patient age, time-interval: 48-72 hours).

To date, ours is the first Italian study to report the incidence of return visits to the ER and to analyse the factors correlated with this phenomenon. In our study, the incidence of return visits to the ER within 72 hours of the first visit proved to be 2.5%, which is in line with the findings reported by Alessandrini [7] at the Pediatric Emergency Department in Philadelphia. Statistical analysis of our data revealed a significant difference in the number of return visits between patients under 1 year of age and those older than 1 year, a finding which confirms the results of other studies. Indeed, comparison of the number of hospitalisations among patients under and over the age of 1 year who returned to the ER also showed a statistically significant (albeit marginal) difference. This seems to indicate that greater care should be taken in the clinical evaluation of patients less than 1 year old in order to promptly establish whether "early" hospitalisation is required, especially since it may be difficult to diagnose pathologies that, in this age-group, can be manifested through unclear and misleading symptoms.

No statistically significant differences emerged on comparing the times (day/night) of visits to the ER. This suggests that a good level of medical and nursing assistance is maintained round the clock. Moreover, although decidedly more return visits take place on non-working days than on working days, the absence of a significant difference demonstrates a substantial organisational stability in our emergency facility.

Our analysis of the data regarding ER visits by foreign nationals revealed that these patients display a higher risk of repeat visits than native Italians ($\chi^2 = 68.9632$; $p < 0.001$). This finding reflects the many problems that "non-EU" citizens encounter within the health service, especially if they are not in possession of a stay permit. In our region, these subjects have access to "territorial" paediatric clinics, but are not entitled to medical assistance by "family" paediatricians working within the National Health Service. They therefore frequently turn to the ER for medical treatment.

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An important finding that emerges from the analysis of our data concerns the high level of concordance between the triage codes assigned by the nursing staff and those assigned by the doctor. This confirms the validity of triage as a tool for the prompt evaluation of the patient's medical needs. In particular, the rate of underestimation of the triage code on the part of the nursing staff did not exceed 1% on either the first or return visit. This is undoubtedly the result of the policy of rigorous selection and training of triage personnel that has been implemented in our institution in recent years.

More than 50% of patients were sent home after their second visit to the ER, while about 29% were hospitalised in ordinary wards and 10% were kept in SIO. The high percentage of hospitalisations observed can in part be attributed to the higher number of return visits involving patients aged less than 1 year. In addition, however, post-discharge supervision may be lacking on account of poor compliance on the part of the family, the difficulty of following up patients of foreign nationality and, not least, difficulty in communicating with the family paediatrician.

The high number of return visits among patients suffering from gastroenteritis within the setting of infectious diseases suggests a greater need for health education programmes for families. In this regard, much remains to be done in order to achieve greater co-operation and better integration between hospitals and regional authorities.

A noteworthy finding concerns the low percentage of returning patients kept in SIO. Our analysis shows that SIO has been underutilised in the past. Indeed, this function of the ER is very useful in the diagnostic work-up of emergency department patients and its greater application enables both the rate of hospitalisation and the risk of clinical error to be reduced considerably. In particular, the data reveal a need to increase the utilisation of SIO in the surgical setting, in order to improve the clinical and diagnostic evaluation of the patient and to obtain more accurate indications for surgical treatment. In order to achieve this, the criteria for the application of SIO must be clearly defined. Moreover, a solid and well organised support structure (stable personnel, specialised nursing staff, facilities and equipment) is essential. Our future objective is to re-analyse more recent case-records on the basis of the indicators identified, with a view to assessing the quality of the service provided. We hope that further studies in a national setting will provide information that can contribute to improving healthcare standards.

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■ Correspondence: Simona Costabel, Pediatric Emergency Department, I.R.C.C.S. "Giannina Gaslini" Children's Hospital, largo G. Gaslini 5, 16147 Genoa, Italy - Tel. +39 010 5636273 - Fax +39 010 3760603 - E-mail: sicostab@tin.it