

# High-Users of Pediatric Emergency Room: Who, How and Why

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## Abstract

**Introduction:** The number of visits to emergency departments has increased over time, and Portugal has one of the highest number of visits *per capita*. This study aims to characterize the high-user population (10 or more visits per year) of a level II hospital, identify the profile of the high-user, and to develop strategies to decrease the possible emergency department misuse.

**Methods:** Retrospective, case-control study. Children under 18 years old at the end of 2017 were included. Children with fewer than three visits were considered as controls.

**Results:** 66 children were identified as high-users (0.7% of the total users, responsible for 810 visits). Of these, 66.7% were younger than 3 years old and 40% were chronic patients. There was a previous primary care visit or *Saúde 24* contact in 3%, 70% were non-urgent, and only 8% were hospitalized. The control group had an average age of 8 years old, higher use of primary care or *Saúde 24* contact (20%), and 80% used the emergency room for non-urgent reasons.

**Discussion:** In both groups, the emergency room is used as the main form of access to health care, the utilization of primary care consultation was low, and the reasons for access were non-urgent. Young age (odds ratio = 6.75) and chronic disease (odds ratio = 4.69) were risk factors for higher use. An improved proximity to primary care services, further teaching of which symptoms need a hospital evaluation, and the creation of other access paths to chronic patients may help to lower the unnecessary use.

**Keywords:** Child; Emergency Services, Hospital/statistics & numerical data; Health Services Misuse/statistics & numerical data; Pediatric Emergency Medicine; Portugal

## Introduction

The emergency room department is the main source of medical assistance for some users, even though the

majority would not need this sort of urgent hospital care.<sup>1</sup>

This preference toward hospital care rather than primary care facilities is explained by several reasons, namely the lack of easy access to a general practitioner (GP) appointment, perceived severity of the child illness, preference for a pediatrician observation, or the possibility of taking medical tests.<sup>2,3</sup> Furthermore, persistent or worsening symptoms are also mentioned, but less frequently.<sup>4</sup>

The number of visits to emergency services has increased over the past decade, according to data from the Organization for Economic Cooperation and Development (OECD). Portugal distances itself as the country with the highest visits *per capita*, with over 70 visits per 100 inhabitants.<sup>5</sup>

The emergency room department use for non-urgent reasons leads to long waiting periods, high staff burden, caregiver dissatisfaction, and lower quality of care for patients requiring actual urgent care.<sup>2</sup>

Regarding this matter, data in the pediatric population is lacking, both at the national and international levels. In our country, the available records are chiefly concerning the adult population and there is some variability regarding the definition of a high-user.

This study aims to characterize the high-user population of a level II hospital, identify the profile of the high-user and develop strategies to decrease the possible emergency department misuse.

Our emergency room department functions year-round, 24 hours per day, and it is the only one existing in our district. Access to the department does not require prior medical referral.

In our district, there are 14 GP centers and five of them are in our county. From these latter, three are located within 350 meters of our hospital. Just 0.8% of the patients do not have an assigned GP.<sup>6</sup>

## Methods

A retrospective case-control study of the pediatric emergency department high-users during the year of 2017, in a level II hospital was conducted. Children with  $\geq 10$  vis-

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its/year were defined as high-users, and children with  $\leq 3$  visits/year were considered as controls. From these latter, 70 children were randomly selected as the control arm. It was considered that there had been prior contact with primary care when the child had contacted *Saúde 24* or had a prior GP visit for the same symptoms that motivated the emergency room visit, in the previous five days.

It was also considered that the visit was non-urgent if the child was triaged with blue, green, or white color, according to the Manchester triage system.

The data was gathered through Alert® and *Plataforma de Dados de Saúde* (PDS). Microsoft® Excel® version 14 and IBM SPSS Statistics version 23® were used to perform statistical analysis, including frequency analysis and chi-square test to non-parametric variables and the odds ratios (OR) calculation. The level of significance considered was  $p \leq 0.05$ .

## Results

There were 66 children identified as high-users, which corresponds to 0.7% of the total emergency room department users. These children were responsible for 810 emergency room visits (4% of the total visits in the year). The median was 11 visits and the highest number was 40 visits/year in one of the children. The sample is characterized in Tables 1 and 2.

In both groups, the majority were males. Among the high-users, 67% were 3 years old or younger, compared to 22.9% in the control group ( $p < 0.001$ ). The median age of the high-users was 2 years old and 8 years old in the control group. Among the high-users, 60.6% of them were a resident in the county where our hospital is located.

In the high-users group, 40.9% had a chronic disease diagnosis, compared to 12.9% in the control arm ( $p = 0.008$ ). Around 40% of the emergency room department visits among the chronic patients were due to exacerbations of their disease, but the proportion of hospital admissions is not different compared with the high-users without a chronic disease diagnosis. The chronic diseases reported are listed in Table 3.

Concerning the high-users visits, 3.21% were preceded by a GP visit or a call to *Saúde 24*, contrasting with 19.8% in the control arm ( $p < 0.001$ ).

In both groups, most of the visits were for non-urgent reasons (70.1% vs 80.2% for high-users and for the control arm, respectively), with a low rate of admission (8.8% vs 4.5% for high-users and for the control arm, respectively). The high-users are more frequently referred to the hospital ambulatory clinics than the control group.

The main risk factors to the emergency room department over use were young age (OR = 6.75) and chronic disease (OR = 4.69) (Table 4).

Table 1. Sample description (n = total patients)

Category	High-users		Control		p	
	n	%	n	%		
Gender	Male	38	57.6%	38	54.3%	0.831
Age (years)	$\leq 3$ years	44	66.7%	16	22.9%	< 0.001
	Median	2		8		
	Interval	1-17		1-16		
Residence in hospital county		40	60.6%	29	41.4%	0.287
Chronic disease		27	40.9%	15	12.9%	0.008
Ambulatory consultation		40	60.6%	11	15.7%	< 0.001
<b>Total</b>		<b>66</b>		<b>70</b>		

Table 2. Sample description (n = total visits to emergency department)

Category	High-users		Control		p	
	n	%	n	%		
Contact with primary care/ <i>Saúde 24</i>	26	3.2%	22	19.8%	< 0.001	
Triage	Non-urgent	568	70.1%	89	80.2%	0.335
	Urgent	242	29.9%	22	19.8%	
Admission		71	8.8%	5	4.5%	0.673
<b>Total</b>	<b>810</b>		<b>111</b>			

**Table 3. Organs and systems affected by chronic disease, according to the International Classification of Diseases, 10<sup>th</sup> revision (ICD-10)**

Chronic disease	High-users (n)	Control (n)
Diseases of the blood	6	1
Diseases of the respiratory system	5	6
Perinatal period	4	2
Mental and behavioral disorders	4	0
Diseases of the genitourinary system	3	0
Diseases of the circulatory system	2	0
Diseases of the musculoskeletal system	1	0
Diseases of the eye and adnexa	1	0
Diseases of the nervous system	1	0
<b>Total</b>	<b>27</b>	<b>9</b>

**Table 4. Predictors of pediatric emergency room department high use**

	High-users (n)	Control (n)	OR	95% CI
Age ≤ 3 years old	44	16	6.75	3.17-14.39
Age > 3 years old	22	54		
Chronic disease	27	9	4.69	2-11.03
Non-chronic disease	39	61		

95% CI - 95% confidence interval. OR - Odds ratio.

## Discussion

Our study found a higher rate of the emergency room department visits per year compared to the national one (76 vs. 71 visits/100 inhabitants), and also a higher frequency of non-urgent visits.<sup>5,7</sup> If we consider the reality of our emergency room department, these 810 visits correspond to 15 days in a year solely dedicated to the care of 66 children.

In both groups, the emergency room department is used as the main form of access to health care and the use of primary health care was residual. The reasons to visit the emergency room department are frequently non-urgent in both groups, and there is no statistical difference regarding admission rates. Other national studies in the pediatric age also found a percentage of non-urgent visits above 50%.<sup>8,9</sup> The use of the pediatric emergency room as the main form of access to health care is also described in our country, and the main reason to do so is the personal choice of caregivers.<sup>10</sup> This displays a resistance to the use of primary health care, which we also verified in our study. Although the use of primary health care is small in both groups, the control arm still shows a rate of 20% of primary health care contact contrasting to 3.21% in the high-users. These findings are consistent with another national study.<sup>11</sup>

The Manchester triage system has moderate sensibility

and specificity in the pediatric population.<sup>12</sup> Often, the assigning of the colors yellow and orange are only justified by the temperature of the child in the moment of triage, which does not always reflect the emergency of the condition. There is probably a higher number of non-urgent visits than accounted for.

Regarding the international reality, a similar rate of high-users and emergency room department visits as our study is described in Spain, with most of the children being under 2 years of age. In addition, as in our study, the largest part of emergency room department visits are non-urgent and admission rates similar to that of the general pediatric population.<sup>13</sup>

The pre-hospital telephone triage in our country (*Saúde 24*) aims to decrease the non-urgent visits to emergency hospital services. Although hospital referral is not always accurate, perhaps due to this system's inherent limitations, they can still contribute to the decongestion of the pediatric emergency room department.<sup>14</sup> Some authors suggest that the co-location of GP centers with the emergency room department or introducing telephone triage systems are the preferred interventions to reduce emergency room department misuse.<sup>15</sup>

In our reality, both these interventions are used. However, the use of the emergency room department is both growing and excessive. Considering the specific group of the high-users, a better and close coordination with primary care centers seems to be a strategy to reduce emergency room department use.<sup>15,16</sup>

In some centers, a case-manager was assigned to these patients, who is responsible for a more personalized assistance in order to promote an adequate use of health care resources.<sup>17</sup> This strategy has shown efficacy in reducing the number of hospital visits, namely in the high-users.<sup>18</sup>

The nonexistence of out-of-pocket cost to visit the emergency room department for any individual under 18 years old in both primary and hospital care may be a stimulating factor for this high misuse. However, data to assess if this justifies the preference of the high-users of hospital care rather than primary care is lacking.

In light of our experience, we consider the possible strategies to diminish the misuse of our emergency room department and the establishment of a different access route for chronic patients, for example a faster urgent appointment with their doctor, better patient education, with an emphasis on alarm symptoms that should motivate the use of the emergency room department, and the management of symptoms at home.

We also suggest greater investment in health literacy, namely which are the preferable ways to access health care, what are indeed urgent situations, and their symp-

toms. This approach should be interdisciplinary including television, radio, and social networks. Other important factors in promoting health literacy would be, at time of discharge, to provide caregivers with written information with diagnosis, treatment, and other advice. These would both capacitate and reassure them regarding the illness, and at the same time share responsibility.

Moreover, an improved proximity to primary care facilities, with referral by primary care physicians being required in order to access the emergency room department, better divulgation of primary care functioning hours, specifically the extension times during the winter months, could be effective. We also encourage primary care physicians to contact the hospital pediatrician by phone in case of any doubt regarding diagnosis or treatment. In our hospital, there is a telemedicine consultation that is rarely used.

Finally, another strategy could be the reactivation of the pediatric clinics in primary care<sup>19</sup> or the ambulatory pediatrician as it exists in other countries, for example, in Spain. Despite this, the Spanish study previously mentioned has findings like our own, which questions the necessity of this figure to solve the high-users problem, specifically. Like any study using administrative data, there is a possibility that these are wrongly classified or altered. There are data as the literacy of parents, number of siblings, or private pediatrician access that could not be analyzed due to incomplete records.

Because some of the GP centers in our district have the possibility to take diagnostic tests such as radiographs or blood tests, we chose not to analyze this factor regarding the possible preference for hospital care. This was also because we could not assess such specifically and retrospectively if any medical test was performed in the GP centers. This may be a limitation of our study.

Regarding the referral to the pediatric hospital ambulatory clinic, we were only able to consider the visits until March 2018, whereby our analysis could be underestimated. Our methodology could not evaluate the adequacy of referral by the GP or *Saúde 24*.

It was not in the scope of this study to evaluate children who may have used primary health care facilities, and by which they forgo the need for hospital observation or the relationship between periods of higher affluence to hospital and GP centers closing times.

As we empirically identified the existence of a percentage of children who excessively use the hospital emergency room department, we opted for this limit value ( $\geq 10$  visits). In the future, it would be interesting to study children with fewer visits per year and those who only use primary care centers rather than hospital care in order to understand which other strategies could be put to practice mitigating this problem.

We understand that the problem regarding the high use of the pediatric emergency room department is complex and it is hard to point out just one solution. Our study translates our local reality and is not generalizable to the national scale. Still, we identify the inadequate use of the pediatric emergency room department and the need to improve the integration of the various levels of care. The authors would like to draw the attention of other health care providers to this problem, encourage the assessment of this topic in other centers in order to achieve health policies promoting the better use of care.

#### WHAT THIS STUDY ADDS

- This study characterizes the high-user population of a pediatric emergency room, comparing it with a control group;
- The high-users scarcely use primary health care centers, preferring to use the emergency room instead as the main form of access to health care.

#### Conflicts of Interest

The authors declare that there were no conflicts of interest in conducting this work.

#### Funding Sources

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#### Provenance and peer review

Not commissioned; externally peer reviewed

#### Consent for publication

Consent for publication was obtained.

#### Confidentiality of data

The authors declare that they have followed the protocols of their work centre on the publication of patient data.

#### Awards and presentations

This study was presented at the XIX Jornadas da Pediatria de Évora, in 2018. It was awarded Prémio Dra. Lurdes Lorga - Melhor Comunicação Oral.

#### References

1. Oliveira A. Hiper utilizadores e urgência. *Acta Med Port* 2008;21:553-8.
2. Kua PH, Wu L, Ong EL, Lim ZY, Yiew JL, Thia XH, et al. Understanding decisions leading to nonurgent visits to the paediatric

emergency department: Caregivers' perspectives. *Singapore Med J* 2016;57:314-9. doi: 10.11622/smedj.2016023.

3. Brousseau D, Bergholte J, Gorelick MH. The effect of prior interactions with a primary care provider on nonurgent pediatric emergency department use. *Arch Pediatr Adolesc Med*

- 2004;158:78-82. doi: 10.1001/archpedi.158.1.78.
4. Farion KJ, Wright M, Zemek R, Neto G, Karwowska A, Tse S, et al. Understanding low-acuity visits to the pediatric emergency department. *PLoS One* 2015;10:e0128927. doi: 10.1371/journal.pone.0128927.
  5. Berchet C. Emergency care services: Trends, drivers and interventions to manage the demand. *OECD Health Working Papers* 83. Paris: OECD Publishing; 2015.
  6. Administração Central do Sistema de Saúde. Publicação periódica sobre o número de utentes inscritos nos cuidados de saúde primários. Lisboa: ACSS; 2016.
  7. Serviço Nacional de Saúde. Atendimentos em urgência hospitalar por triagem de Manchester [accessed 31 May 2018]. Available at: <https://transparencia.sns.gov.pt/explore/dataset/atendimentos-em-urgencia-triagem-manchester/>
  8. Rafael MS, Portela SL, Sousa P, Fernandes AC. Utilização do serviço de urgência pediátrica: A experiência de um centro Português. *Sci Med* 2017;27:1-8.
  9. Caldeira T, Santos G, Pontes E, Dourado R, Rodrigues L. O dia-a-dia de uma urgência pediátrica. *Acta Pediatr Port* 2006;37:1-4.
  10. José M, Gonçalo B, Lemos S. Referenciação pediátrica - que realidade? *Acta Pediatr Port* 2003;34:89-93.
  11. Viseu ST, Pinheiro AP. Referenciação à urgência pediátrica do Hospital S. Teotónio – Viseu. *Rev Port Clin Geral* 2008;24:671-8.
  12. Roukema J, Steyerberg EW, van Meurs A, Ruige M, van der Lei J, Moll HA. Validity of the Manchester triage system in paediatric emergency care. *Emerg Med J* 2006;23:906-10. doi: 10.1136/emj.2006.038877.
  13. Rivas García A, Manrique Martín G, Butragueño Laiseca L, Mesa García S, Campos Segura A, Fernández Iglesia V, et al. Hiperfrecuentadores en urgencias ¿Quiénes son? ¿Por qué consultan? *An Pediatr* 2017;86:67-75.
  14. Pinheiro M. Saúde 24: O que chega a um serviço de urgência de pediatria. [Dissertation]. Coimbra: Universidade de Coimbra; 2014.
  15. Van den Heede K, Van de Voorde C. Interventions to reduce emergency department utilisation: A review of reviews. *Health Policy* 2016;120:1337-49. doi: 10.1016/j.healthpol.2016.10.002.
  16. Althaus F, Paroz S, Hugli O, Ghali WA, Daepfen JB, Peytremann-Bridevaux I, et al. Effectiveness of interventions targeting frequent users of emergency departments: A systematic review. *Ann Emerg Med* 2011;58:41-52.e42. doi: 10.1016/j.annemergmed.2011.03.007.
  17. Lee KH, Davenport L. Can case management interventions reduce the number of emergency department visits by frequent users? *Health Care Manag* 2006;25:155-9.
  18. Kumar GS, Klein R. Effectiveness of case management strategies in reducing emergency department visits in frequent user patient populations: A systematic review. *J Emerg Med* 2013;44:717-29. doi: 10.1016/j.jemermed.2012.08.035.
  19. Machado MC. O pediatra consultor no centro de saúde. *Acta Pediatr Port* 2005;36:3-4.

### Hiperfrecuentadores da Urgência Pediátrica: Quem, Como e Porquê

#### Resumo:

**Introdução:** O afluxo à urgência, sobretudo de situações não urgentes, é uma tendência crescente, sendo que Portugal se destaca com o maior número de admissões *per capita*. Os nossos objectivos foram caracterizar a população hiperfrequentadora de um hospital de nível II ( $\geq 10$  admissões/ano), identificar o perfil do hiperfrequentador e estabelecer estratégias para diminuir o eventual acesso indevido.

**Métodos:** Estudo retrospectivo, caso-controlo das crianças hiperfrequentadoras durante 2017. Foram selecionadas as crianças com idade inferior a 18 anos e consideraram-se controlos  $\leq$  três admissões. Na análise estatística considerou-se significativo  $p \leq 0.05$ .

**Resultados:** Foram identificadas 66 crianças como hiperfrequentadoras (0,7% dos utilizadores do SU, responsáveis por 810 episódios de urgência (4% das admissões). Destas, 66,7% tinham idade menor que três anos e 40% eram portadores de doença crónica. Três por cento dos episódios foram precedidos por consulta de cuidados de saúde primários/

Saúde24, 70% eram pouco urgentes e a taxa de internamento foi baixa (8%). Os controlos têm mediana de oito anos, maior recurso aos cuidados de saúde primários/Saúde24 (20%) e 80% recorre por motivos pouco urgentes.

**Discussão:** Em ambos os grupos a urgência é utilizada como primeiro acesso aos cuidados de saúde, a procura dos cuidados de saúde primários foi residual e os motivos de admissão frequentemente não urgentes. Idade precoce (OR=6,75) e doença crónica (OR=4,69) são fatores de risco para maior utilização. A aproximação da população aos cuidados de saúde primários, a existência de outras vias de acesso para doentes crónicos e o melhor esclarecimento sobre a doença poderão contribuir para a redução deste acesso excessivo.

**Palavras-Chave:** Criança; Mau Uso de Serviços de Saúde/estatística & dados numéricos; Medicina de Emergência Pediátrica; Portugal; Serviço de Urgência Hospitalar/estatística & dados numéricos