

Pediatric Preparedness of European Emergency Departments A Multicenter International Survey

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Emergency Medicine (REPEM) network

Introduction: Children and adolescents often lack optimal emergency care. The objective of the study was to assess the level of preparedness of European emergency departments (EDs) for pediatric patients.

Methods: This was an international multicenter Internet-based survey of EDs with attending children and adolescents younger than 18 years in 101 EDs from 21 countries. Questionnaires were based on the recommendations in the consensus document published by the International Federation for Emergency Medicine, which defines quality of care standards for children aged 0 to 18 years in the ED. A multivariate binary logistic regression was performed to identify independent factors that are related to the expected standards of care provided by the EDs.

Results: Most (95.0%) of the EDs fulfilled more than 50% of the International Federation for Emergency Medicine essential standards of care, and 24 (23.7%) EDs fulfilled more than 80%. Best results were obtained in the standards that related to equipment, departmental policies, procedures, and protocols, and being able to stabilize an ill or injured child. Worst results were associated with inadequate staffing levels, quality, and safety; adolescents, mental health, and substance misuse delivery issues; and major incidents. Being included in a multicenter international research network was the unique independent factor associated with a good level of preparedness of the EDs for pediatric cases.

Conclusions: Overall, surveyed European EDs fit well the essential standards of pediatric emergency care. Certain improvement actions are required to guarantee that essential standards of care for pediatric emergency care are always fulfilled in European EDs.

Key Words: quality, Europe, care

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Every day, millions of children and adolescents visit different emergency settings within Europe that rank from prehospital emergency settings to well-structured pediatric emergency departments (ED).

Globally, the aim is to provide good quality of care to all incoming ill or injured children and adolescents. Several factors influence the optimal standard of care, which may cause substandard levels of service delivery.¹ In the United States, the care of children in emergency settings has been described as “uneven”²; different

concerning issues have been detected in EDs in the United States,^{3,4} Canada,⁵ and Europe.⁶ These concerns have led to standards of care for children in EDs being published^{1,7–11} to improve the emergency care of children in those regions. In 2012, the International Federation for Emergency Medicine (IFEM) published a consensus document aimed at assisting hospitals around the world by defining the minimum standards of care for children aged 0 to 18 years in the ED.¹ These standards of care have been developed for use in countries with established hospital EDs.

To date, the only study published with a European scope⁶ had certain limitations. The sample was relatively small, with an unbalanced distribution of countries, and only included tertiary centers while focusing on a limited number of determinants of quality of care.

This study, published in 2008, reflected the urgent need for the structured development of pediatric emergency medicine as a specialty in Europe. Since then, the situation has substantially changed, but not uniformly. Pediatric emergency medicine has been evolving rapidly but heterogeneously in many countries.¹²

Analyzing the quality of the care provided to children and young people throughout Europe can help identify different areas of improvement required within the individual countries.

Our hypothesis was that there would be substantial variability in the pediatric preparedness of European EDs and that areas of improvement could be identified as compared against the standards established by the IFEM.

The objective of the study was to assess the pediatric preparedness of European EDs based on an international survey including topics about the organization and equipment of the ED and the preparedness of the providers in the EDs in Europe.

METHODS

This was an international multicenter Internet-based survey via Google Drive of EDs attending children and adolescents less than 18 years of age.

In an initial phase, predefined dedicated researchers of Research in European Paediatric Emergency Medicine (REPEM) were contacted (a maximum of 2 per country). These dedicated researchers contacted 5 to 10 EDs from university, teaching, and general hospitals that assess children and adolescents in their country. In those countries without a member being affiliated to REPEM, e-mails were sent from the research committee of the European Society for Emergency Medicine (EuSEM) to EDs affiliated to this society.

Initially, questionnaires were elaborated by 2 investigators (S. M. and J. B.) based on 127 essential recommendations included in the consensus document published by the IFEM, which defines minimum standards of care for children aged 0 to 18 years in the ED.¹ This questionnaire was reviewed and discussed with the predefined dedicated researchers of REPEM to enhance the clarity of the methods and to improve the quality of the collected data (Appendix 1, Supplemental Digital Content 1, <http://links.lww.com/>

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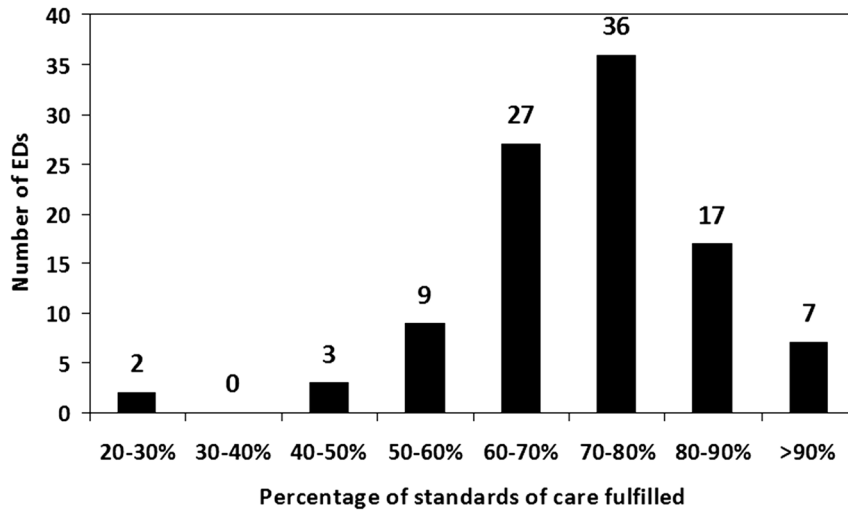


FIGURE 1. Percentage of essentials standards of care defined by the IFEM fulfilled by the EDs (N = 101).

PEC/A465). The questionnaires were completed by the responsible lead of each ED and then sent to the principle investigator (S. M.). Data were collected between September 2017 and February 2018.

The study was endorsed by the REPEM network and the research committee of EuSEM.

We considered that an ED was well prepared to provide an adequate quality of care when it was fulfilling, at least, 80% of the essential recommendations given by the IFEM.

A multivariate binary logistic regression was performed to identify among the different characteristics of the surveyed hospitals those independent factors related to an adequate quality of care provided by the EDs. The outcome measure was the group of EDs with an adequate response of at least 80% of the items. A univariate logistic regression analysis was carried out initially. All variables with $P < 0.2$ were subsequently included in a nonautomatic multivariate stepwise model. All variables with $P < 0.05$ were included in the final multivariate model. The results of the model are presented as odds ratio and 95% confidence interval.

We obtained approval from the Clinical Research Ethics Committee of the Basque Country.

RESULTS

Initially, we received 108 surveys from 21 countries. Of these, 7 were excluded owing to duplications or missed data, that is, 101 surveys from 21 countries were included (Supplemental Table 1, Supplemental Digital Content 2, <http://links.lww.com/PEC/A518>).

Most of the EDs fulfilled more than 50% of the IFEM essential standards of care, and 24 (23.7%) more than 80% (Fig. 1).

The number of EDs that fulfilled more than 80% of the essential standards is shown in Supplemental Table 2, Supplemental Digital Content 3, <http://links.lww.com/PEC/A519>.

The essential standards of care for the initial assessment of an ill or injured child are shown in Table 1.

Forty-one (40.6%) of the surveyed EDs had a written policy about child and family-centered care. Emergency medicine physicians were considered to be familiar with the laws and the policies

TABLE 1. Essential Standards of Care for the Initial Assessment of an Ill or Injured Child as Established by IFEM

The Essential Standards of Care	Affirmative Answers, n (%)
Every child has a rapid visual inspection, very soon after arrival at the ED	90 (89.1)
Triage system in place	93 (92.0)
Local systems	31
Validated systems	
Manchester	27
Canadian	20
Emergency Severity Index	12
Andorran system	3
More than 95% of patients are triaged within 15 min of arrival	72 (71.3)
All ED clinical staff are considered highly competent in recognizing the seriously ill or injured child	82 (81.2)
All ED clinical staff are considered highly competent in recognizing a deterioration in a child's condition	82 (81.2)
All critically ill or injured child are always moved immediately to a suitable resuscitation area	95 (94.1)
More than 95% of seriously ill children have temperature, respiratory rate, and heart rate measured	95 (94.1)
More than 95% of seriously ill children have systemic blood pressure measured	85 (84.2)
More than 95% of seriously ill children have peripheral oxygen saturations measured	94 (93.1)
More than 95% of the patients get a pain assessment score at presentation	57 (56.4)
More than 95% of the patients in moderate or severe pain have pain relief provided within 30 min of arrival	62 (61.4)

of their institutions regarding the death of a child in 80 (79.2%) EDs. Senior staff and managers ensured that their staff members were prepared for and helped with the emotional consequence of dealing with deceased child in 73 (72.3%) EDs. There was a social worker available 24 hours/7 days for such cases in 32 (31.7%) EDs.

There were 59 (58.4%) ED directors who reported that their EDs fostered education of pediatric emergency medicine to the general health community and participated in creating publishable research (64.2% of the academic centers vs 35.0% of those nonacademic; $P = 0.02$; 81.5% of the EDs included in REPEM vs 50.0% of those not included in the research network, $P = 0.003$). Sixty-two (61.4%) directors reported that ED staff performed research. Performing research was related to the ED being included in REPEM (81.5% of the EDs included in REPEM vs 54.1% of those not included, $P = 0.01$) and being an ED in an academic center (67.9% vs 35.5% of those nonacademic, $P = 0.01$).

Being a member of a multicenter international research network was the unique independent factor associated with an adequate pediatric preparedness of the EDs (Table 2).

Minor differences were found related to the number of visits, the type of ED, and the number of visits to the ED (Supplemental Tables 3, 4 and 5, Supplemental Digital Content 4, Supplemental Digital Content 5, and Supplemental Digital Content 6, <http://links.lww.com/PEC/A520>, <http://links.lww.com/PEC/A521>, and <http://links.lww.com/PEC/A522>).

DISCUSSION

This study is the first to survey EDs in different European countries regarding pediatric preparedness and to provide information on the awareness of hospital ED managers regarding the IFEM essential recommendations for the emergency care of children. Globally, surveyed respondents addressed a good preparedness of their EDs, mainly in those stand-alone pediatric EDs. Certain improvement areas should be considered.

Globally, EDs are suitably organized for the adequate assessment of incoming patients. In this way, it is remarkable not to have a triage system in place, and the variability of the triage system used is high. In addition, nearly one third of the EDs recognized that not all the children are triaged within 15 minutes of arrival as recommended.^{13,14} Moreover, nearly 20% of the respondents considered that not all ED clinical staff were highly competent in recognizing the seriously ill or injured child. Emergency care settings must ensure that all children and young people with undifferentiated illness or injury are assessed by competent staff trained in the assessment of children.¹⁴ The assessment and management of pain at presentation are also worrisome as this is a priority by

several organizations and accreditation bodies.^{14–17} Finally, those standards related with the staffing of the ED had the poorest result of our survey.

Training to manage critical situations seems to be globally adequate. Nevertheless, around 20% of the EDs do not have an organized “resuscitation team” or a plan to maintain staff knowledge and skills in pediatric resuscitation. In addition, access to specialists in pediatric emergency medicine is limited. This might be because, in Europe, pediatric emergency medicine developed later than in other countries and the subspecialty is not recognized everywhere in Europe.

Equipment necessary to manage critical situations seems to be globally acceptable with minor differences between combined adult and pediatric EDs, and the stand-alone pediatric EDs. Nevertheless, up to a quarter of the EDs lacked certain essential equipment, for example, automatic external defibrillator, capnography, and ventilators in resuscitation areas.

Only around 50% of the surveyed EDs fulfilled the recommendations for child- and family-centered care. Patient- and family-centered care can improve patient and family outcomes and satisfaction, and staff members have more positive feelings about their work and health care costs.^{18,19} In addition, over 20% of surveyed EDs did not fit with the recommendations related to the death of a child in the ED. This has to be urgently considered.

Finally, the highest rates of participation in research were obtained in those EDs within REPEM. It is quite worrisome that many academic centers do not participate in education or research in pediatric emergency medicine. Efforts for collaboration between academic centers and research networks seem to be justified. In fact, being a member of a multicenter international research network was the unique independent factor associated with an adequate pediatric preparedness of the EDs.

This study has certain limitations. There may be reporting bias due to physicians self-reporting their perspectives. Nevertheless, we have focused the article in those items that can be more objectively evaluated. There may be selection bias because only countries affiliated to EuSEM were included. In addition, most of the included EDs are tertiary centers that might have higher standards of essential care. Therefore, the results might overestimate the standard of care compared with general hospitals. Nevertheless, most of them are not affiliated to the research network, and they show a great variability related to the number of attendances registered and the age of the pediatric patients, reflecting the European situation. As commented above, our results must be very cautiously extrapolated to all European EDs. Probably, the situation in other settings may be different. Nevertheless, we think that, being a multicenter international study, the improvement areas identified are applicable globally to European EDs.

TABLE 2. Univariate and Multivariate Analyses to Identify the Factors for an Adequate Pediatric Preparedness of the EDs

	Univariate		Multivariate	
	<i>P</i>	OR (95% IC)	<i>P</i>	OR (95% IC)
Type of facility (A stand-alone pediatric ED)	0.055	3.57 (0.97–13.08)		
No. visits to the ED (>25,000)	0.058	2.53 (0.97–6.61)		
Tertiary facility (tertiary)	0.422	1.53 (0.54–4.32)		
Academy facility (yes)	0.466	0.667 (0.224–1.984)		
Quality of care criteria defined for the ED (yes)	0.093	2.28 (0.87–5.95)		
Member of a research network (REPEM) (yes)	0.004	4.133 (1.553–11.001)	0.004	4.133 (1.553–11.001)
Head of the ED (PEM physician)	0.224	1.832 (0.691–4.86)		

CI indicates confidence interval; OR, odds ratio; PEM, pediatric emergency medicine.

We conclude that, overall, surveyed European EDs fit well with the IFEM standards of care in having a good level of pediatric preparedness. Nevertheless, we identified certain organization differences, and the study may assist in the improvement of the care provided to these patients.

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