

ORIGINAL ARTICLE

Prehospital emergency services in Catalonia: the SEPHCAT analysis

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Objective. To describe the main characteristics of all prehospital emergency services (SEPHs, the Catalan acronym) in Catalonia (the SEPHCAT study).

Methods. A professional survey researcher interviewed the medical directors of all services in Catalonia, using a questionnaire prepared by the authors. Questions covered aspects related to organization, professional staffing and employment conditions, as well as the staff's training, instructional activity and research. Only closed answers were collected. The survey reflected the situation in 2015.

Results. We identified 13 SEPHs (11 in the public health service and 2 private companies). Together they received 2482627 calls (16.4% to private services) and attended 943 849 emergencies (11.8% attended by private companies). Three hundred thirty-six basic life support units and 73 advanced life support units were reported. They were mostly considered to be of sufficient size and quality. The SEPHs contracted 1 374 845 person-hours/y (753 995 physician-hours and 620 850 nurse-hours; 23.4% in private companies). These figures correspond to 815 full-time staff positions (447 for physicians and 368 for nurses). The numbers of physicians and nurses working were relatively stable during the morning, afternoon and evening shifts but decreased during the midnight-to-early-morning shift (physicians, by 31%; nurses, by 9%). A majority of the physicians employed were trained in family and community medicine (56.8%), but 21.3% had no specialized training; 6.5% had PhD degrees. SEPH physicians (61.5%) and nurses (46.2%) also taught undergraduate medical students; 46.2% of physicians and 84.6% of nurses taught postgraduate medical courses. Both undergraduate medical and nursing students were received in the same measure for practical training by 15.4% of the SEPHs; 69.2% also offered practical training for physicians at the postgraduate level and 76.9% trained postgraduate nurses.

Conclusions. SEPHs in Catalonia are very active, and private companies account for nearly 12% of the activity. Together the public and private sectors employ a large number of physicians and nurses. Staff members are involved in training others but are less involved in research.

Keywords: Emergencies. Emergency medicine. Urgent care. Nursing.

Estudio SEPHCAT: análisis de los servicios de emergencias prehospitalarios en Cataluña

Objetivo. Describir las principales características de todos los servicios de emergencias prehospitalarios (SEPH) existentes en Cataluña.

Método. Una encuestadora profesional entrevistó a los responsables clínicos de todos los SEPH de Cataluña. La encuesta fue preparada por los autores, y abordaba diversos aspectos organizativos, profesionales, laborales, formativos, docentes y de investigación. Las preguntas contenidas en la encuesta solo permitían respuestas cerradas, y hacían referencia a la situación en 2015.

Resultados. Se identificaron 13 SEPH (11 públicos, 2 privados), que recibieron 2.482.627 consultas (16,4% a SEPH privados) y realizaron 943.849 atenciones (11,8% por SEPH privados). Había 336 bases de soporte vital básico y 73 de avanzado, con instalaciones mayoritariamente consideradas de tamaño suficiente y calidad buena. Se contrataron 1.374.845 horas anuales (753.995 de médico y 620.850 de enfermero), el 23,4% de ellas por SEPH privados, que globalmente corresponderían a 815 puestos de trabajo a jornada completa (447 de médico, 368 de enfermero). La dotación de médicos/enfermeros era relativamente estable durante el día, pero decaía un 31%/9% de madrugada. La especialidad médica mayoritaria era medicina familiar y comunitaria (56,8%), el 21,3% no tenía formación especializada, y el 6,5% tenía título de doctor. Había médicos/enfermeros profesores universitarios de grado en el 61,5%/46,2% de los SEPH; y de postgrado en el 46,2%/84,6%. Recibían estudiantes de medicina/enfermería en prácticas de grado el 15,4%/15,4% de los SEPH, y de postgrado el 69,2%/76,9%.

Conclusiones. La actividad de los SEPH en Cataluña es elevada; un 12% la desarrollan SEPH privados, y globalmente implica a un número alto de médicos y enfermeros, los cuales además desarrollan un rol docente y, en menor medida, investigador.

Palabras clave: Emergencias. Medicina de Urgencias y Emergencias. Urgencias. Enfermería.

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Introduction

Unlike most medical specialties, Emergency Medicine (EM) in Spain does not currently have a regulated specialized training through the system of Medical Internship (MIR). This circumstance clashes with the predominant situation in most developed countries^{1,2}, and makes the EM field in Spain converge with professionals of different previous training trajectories, with a clear heterogeneity at the time of incorporation into the practice of the specialty. At the same time, the structures in which EM activity takes place may differ between different autonomous communities and even between hospitals in the same community. Therefore, in an attempt to understand the real situation, a few years ago the Catalan Society of Emergency Medicine (SoCMUE) developed a survey that mapped the situation of hospital emergency departments (ED) and their professionals in Catalonia for 2012³⁻⁷. A similar initiative made it possible to know the situation of the EDs in the Community of Madrid in 2015⁸.

However, there are no studies comparable to the above that draw the map of the EM activity in the pre-hospital setting in Spain. Some data in this regard, although limited exclusively to the services provided directly by the corresponding regional health department, can be extracted from the white paper on Spanish Emergency Medical Systems (EMS)⁹. With the intention of helping to fill this information gap, SoCMUE decided to launch a study based on a survey specifically designed and aimed at finding out about the organizational and professional situation of prehospital emergency medicine practice in Catalonia, called the SEPHCAT study (Prehospital Emergency Systems in Catalonia), whose main objective was to describe the organizational, professional, occupational, training, teaching and research characteristics of prehospital emergency services (SEPH in Spanish) in Catalonia.

Method

A total of 13 SEPH were identified in Catalonia: 9 publicly owned corresponding to the EMS that covers the entire geographical and population area of Catalonia (EMS Barcelona -assigned population of 1,602,386 inhabitants-, EMS Barcelona Sud -1,344,457 inhabitants-, SEM Barcelona Nord -1,685,853 inhabitants-, EMS Girona -839,958 inhabitants-, EMS Catalunya Central -509,670 inhabitants-, EMS Lleida i Pirineus -366,469 inhabitants-, EMS Tarragona -631,332-, EMS Terres de l'Ebre -182,867-, and EMS Central Health Coordination -CECOS, without assigned population-), 2 of public ownership corresponding to fire brigades (Bombers de Barcelona -assigned population 1,602,386 inhabitants- and Grup d'Emergències Mèdiques de Bombers de Catalunya -coverage of the whole territory of Catalonia-) and 2 of private ownership (Servei d'Urgències Domiciliàries -SUD- de Assistència Sanitària- coverage of the province of Barcelona, num-

ber of affiliates 190,000-, and Advance Medical- coverage of the whole territory of Catalonia, number of affiliates not provided-).

The SoCMUE Board of Directors prepared a survey with closed response questions that was structured, following the same strategy as the SUHCAT study, in different sections referring to organizational, professional, occupational, training, teaching and research aspects³⁻⁷. A professional interviewer, who was the same as in the SUHCAT study, was instructed during two sessions of 3 hours each on the objective of the study, the content of the survey and the specific meaning of each question. After this training, the pollster made an appointment with the heads of the 13 SEPH to interview them personally and carry out the survey on site, which had been sent to the head of the SEPH in the weeks prior to the interview. These interviews were carried out in the last quarter of 2016 and the data requested from the interviewees corresponded to 2015.

Results are given as mean (standard deviation) or median (interquartile range and distribution interval) if they corresponded to quantitative variables, and by absolute values and percentages when they corresponded to qualitative variables. To estimate the total number of potentially existing jobs in the SEPH in Catalonia, the authors decided to follow the same scale used in the SUHCAT study, 1,688 hours per year, which corresponded to the full annual working day existing at that time (2012) in the public hospital system (XHUP, Xarxa d'Hospitals d'Utilització Pública) in Catalonia. Although the study is eminently descriptive, when comparisons in data distribution were made, the chi-square test (linear trend test, if necessary) or the Fisher exact test were used.

Results

General, activity and organizational aspects

In total, the 11 people responsible for the 13 SEPH in Catalonia were interviewed, as 2 of them were responsible for two EMS territories simultaneously: one for EMS Catalunya Central and EMS Girona, and the other for EMS Tarragona and EMS Terres d'Ebre. The 13 SEPH provided uninterrupted service all year round for any type of consultation (medical, traumatological, paediatric, gynaecological, psychiatric). All of them had doctors in their facilities and all but one had a nurse. There was a coordination centre in 12 of the 13 SEPH (92.3%) and, in these, 2,482,627 calls were received during the year 2015, which generated 943,849 pre-attending attendances (38.0% of the calls). Of all this activity, private SEPH received 406,806 calls (16.3%) and attended 111,218 patients (11.8%) in person.

In total, there are 336 stations with basic life support (BLS) and 73 with advanced life support (ALS). In these facilities, SEPH professionals have exclusive working space in 7 of the 336 BLS locations (2.0%) and in 68 of the 73 ALS (93.2%). SEPH managers considered

100% of the BLS centres and 91.8% of the ALS centres to be sufficiently large. Of these, 100% were rated as being of good quality.

Nine of the 11 publicly owned SEPHs had activation codes (heart attack, polytrauma, stroke, heart failure) and one of the 2 private SEPHs had an infarct code. In total, 9 of the 13 SEPHs cited delays in transferring the patient upon arrival at the hospital, although no problems were identified between pre-hospital and hospital professionals in such transfer. Generally, the transfer was not denied and low priority patients were not redirected to their health center for an emergency visit, although 9 of the SEPH recognized that, exceptionally, this circumstance could occur.

Most of the interviewees considered that the economic crisis and the associated cuts had affected the SEPH in a similar way to that which had affected hospitals, both from an organizational (66.7% of the responses) and an economic perspective (75% of the responses).

Professional and work aspects

The total number of daily hours of medical care (excluding the hours of doctors on duty) taken on by the SEPH was 2,067 on working days and 2,063 on public holidays, making an annual total of 753,995 hours in 2015, of which 300,160 hours (39.8%) of medical care are taken on by private SEPHs. In most cases, Saturdays were covered by the same contractual hours as public holidays. The presence of doctors on duty was highest in the morning (108 professionals working at 10 am, 107 on public holidays), diminished slightly in the afternoon and evening and significantly in the early hours of the morning (31% decrease, Figure 1). When the theoretical estimate of full-time medical jobs in the SEPH in Catalonia is made, taking as a full day the same criteria used in the SUHCAT study (1,688 hours/year)⁴, the result is 447 full-time jobs.

There were 598 doctors working in the SEPH (not all of them with a full working day), 472 with a fixed contract and 126 with a non-fixed contract. Of these, 230 (38.5%) work in the private SEPH. The predominant specialty of doctors in the SEPH in Catalonia was family and community medicine (FCM, 56.8% of the total number of doctors), while 21.3% of doctors had no specialized training (Table 1). The presence of FCM and pediatric specialists was statistically significantly higher among those with fixed contracts. In contrast, doctors specializing in other medical specialties and without specialist qualifications were more frequent among those with non-fixed contracts. With regard to their origin, the professionals were mainly of Spanish nationality (91.5%), which was significantly more frequent among those with permanent contracts.

Regarding nursing, the number of hours hired was 1,706 and 1,690 on working days and public holidays, respectively, making a total of 620,850 hours of nursing in Catalonia's SEPHs per year, of which 21,520 correspond to private SEPHs (3.5%). Of these contracted hours, as in the case of doctors, a decrease in nursing

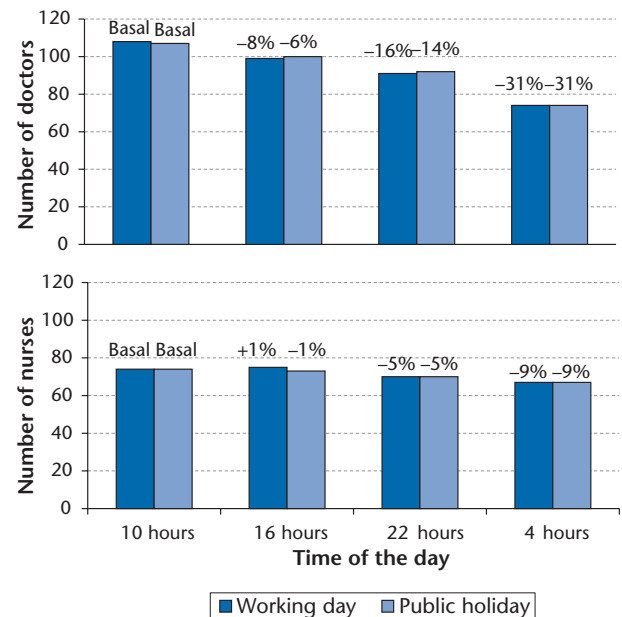


Figure 1. Distribution of the number of doctors and nurses in the pre-hospital emergency services in Catalonia active at different times of the day.

staff during the early morning hours can be found, although this was not as marked (9%, Figure 1). Using the same annual working hours used for doctors to estimate full-time jobs, there are 368 full-time nursing jobs in the SEPH in Catalonia.

Regarding the effects of the economic crisis on the working conditions of doctors and nurses, the majority

Table 1. Description of the training specialty and place of origin of physicians working in pre-hospital emergency services in Catalonia

	Total N = 598 n (%)	Fixed contract N = 472 n (%)	Non-fixed contract N = 126 n (%)	P
Specialty*				
Family and Community Medicine	315 (56.8)	267 (62.5)	48 (38.1)	< 0.001
Pediatrics	29 (5.2)	29 (6.8)	0 (0)	< 0.001
Internal Medicine	23 (4.2)	19 (4.4)	4 (3.2)	0.71
Intensive Care Medicine	16 (2.9)	2 (0.5)	14 (11.1)	< 0.001
General and Digestive Surgery	5 (0.9)	2 (0.5)	3 (2.4)	0.08
Other medical specialty	45 (8.1)	24 (5.6)	21 (16.7)	< 0.001
Other surgical specialty	2 (0.4)	2 (0.5)	0 (0)	1.00
Without a specialist qualification	118 (21.3)	82 (19.2)	36 (28.6)	0.03
Nationality				
Spanish	547 (91.5)	464 (98.3)	83 (65.9)	< 0.001
Non-Spanish residents	35 (5.9)	3 (0.6)	32 (25.4)	< 0.001
Non-Residents	16 (2.7)	5 (1.1)	11 (8.7)	< 0.001

*Specialty data were missing from 45 of the 472 doctors on fixed contracts.

The values in bold highlight the statistically significant differences between groups ($p < 0.05$).

Table 2. Attendance of pre-hospital emergency service professionals at training activities

	Doctors N = 11* n (%)	Nurses N = 11* n (%)
Attendance at own sessions		
Rarely	2 (18.2)	0 (0)
With some frequency	3 (27.3)	1 (9.1)
Often	6 (54.5)	10 (90.9)
Attendance to external conferences		
Rarely	0 (0)	0 (0)
With some frequency	2 (18.2)	3 (27.3)
Often	9 (81.8)	8 (72.7)
Attendance to the Catalan Emergency Congress		
They don't usually go	1 (9.1)	1 (9.1)
Usually 1 or 2	4 (36.4)	4 (36.4)
Often several	6 (54.5)	6 (54.5)
Attendance at the Spanish Emergency Congress		
They don't usually go	1 (9.1)	1 (9.1)
Usually 1 or 2	5 (45.5)	4 (36.4)
Often several	5 (45.5)	6 (54.5)
Attendance at international conferences		
They don't usually go	4 (36.4)	7 (63.6)
Usually 1 or 2	5 (45.5)	2 (18.2)
Often several	2 (18.2)	2 (18.2)
Organizational difficulties in attending training		
Rarely	9 (81.8)	9 (81.8)
With some frequency	2 (18.2)	2 (18.2)
Often	0 (0)	0 (0)
Economic difficulties in attending training		
Rarely	4 (36.4)	3 (27.3)
With some frequency	2 (18.2)	3 (27.3)
Often	5 (45.5)	5 (45.5)

*The managers of two of the 13 pre-hospital emergency services did not provide data in this regard.

opinion of those responsible for the SEPH was that it had affected them in a similar way as it had done in the EDs (66.7% in both cases, doctors and nurses).

Training, teaching and research aspects

In 10 of the 13 SEPH, doctors had reserved an exclusive time for training within the paid working day, on average, 3.4% of the working day (interval: 1.4-10.5%), while in nursing this protected time was 3.9% (interval: 1.4-10.5%). Eleven of the 13 SEPHs provided data regarding the attendance of their doctors and nurses to training activities (sessions, days and conferences). The results are shown in Table 2.

Regarding the specialty of EM, 12 of the 13 SEPH (one declined to answer) were in favour of its creation. In turn, the personal perception they had about the positioning among professionals of their services was that they were also in favour of its creation. On the other hand, they felt that the impact on the SEPH of the creation of the specialty of EM would be low in the short term, but greater in the medium to long term and that, in general, it would have a positive impact on the SEPH (Table 3).

Thirty-nine doctors with doctor's degrees were selected, and those in charge of the SEPHs recognized a

Table 3. Subjective opinion regarding the specialty of Emergency Medicine (EM) by those responsible for pre-hospital emergency systems in Catalonia

	N = 12* n (%)
Personal position regarding the establishment of the specialty of EM	
Clearly and openly in favour	11 (91.7)
Rather in favor than against	1 (8.3)
Overall indifferent	0 (0)
Rather against than for	0 (0)
Clearly and openly against	0 (0)
Position of the department with regard to the establishment of the specialty of EM	
Clearly and openly in favour	10 (83.3)
Rather in favor than against	1 (8.3)
Overall indifferent	1 (8.3)
Rather against than for	0 (0)
Clearly and openly against	0 (0)
Short-term organisational impact on your department of EM specialty approval	
High and overall positive	1 (8.3)
Low and overall positive	8 (66.7)
None	2 (16.7)
Low and overall negative	1 (8.3)
High and overall negative	0 (0)
The medium and long-term organisational impact of the approval of the specialty of Emergency Medicine on your service	
High and overall positive	8 (66.7)
Low and overall positive	1 (8.3)
None	2 (16.7)
Low and overall negative	0 (0)
High and overall negative	1 (8.3)
Economic impact on your service of the approval of the specialty of EM	
It would make it cheaper	1 (8.3)
None	11 (91.7)
It would make it more expensive	0 (0)

*The manager of one of the 13 prehospital emergency services did not provide data on this subject.

total of 26 doctors and 24 nurses who were carrying out research on a regular basis, that is, professionals who had been carrying out regular research activity in recent years (not occasional and sporadic). In total, SEPH professionals presented 54 papers at conferences in 2015, were conference speakers on 27 occasions (18 in Catalan and 9 in Spanish) and participated in the publication of 12 papers in scientific journals, 9 of which were indexed.

Eight SEPH (61.5%) had physicians who taught undergraduate classes at the university (in 5th and 6th grades of medicine), although only half did so in the subject of emergency medicine. In addition, 2 SEPH (15.4%) received medical students for internships (all in 6th grade). In addition, 9 SEPH (69.2%) had university professors with a nursing degree (all but one in the subject of emergency medicine), but only 2 SEPH (15.4%) received nursing students for internships (all in the 4th year). In 6 of the SEPH (46.2%), there were physicians who taught the third cycle at the university (master's or postgraduate), and 9 SEPH (69.2%) recei-

ved these students for internships. With regard to nursing, these figures were 11 (84.6%) and 10 (76.9%), respectively.

Discussion

The SEPCAT study provides a large amount of data for consultation and discussion, although the main findings can be summarised in six. First, the activity carried out by SEPH is significant. Taking into account that the population in Catalonia in 2015 was 7.4 million inhabitants, the annual rate of consultations to the SEPH was 670 consultations per 1000 inhabitants and the rate of attendance was 260 attendances per 1000 inhabitants. Of all this activity, 24% and 14%, respectively, is carried out by private SEPH. Second, the recruitment of professionals, in parallel with this high activity, is also high, almost 1,350,000 hours of doctors and nurses (23.9% by private SEPH), which means the theoretical existence of 815 full-time jobs. However, while in public SEPHs the recruitment of nurses predominates, generating 355 theoretical full-time jobs compared to 268 for doctors, in private SEPHs the recruitment of doctors (179 theoretical full-time jobs) predominates compared to nurses (13 jobs). This activity is contracted during the morning, afternoon and night, and falls in the early hours of the morning, specifically, it falls by 31% in doctors and 9% in patients. Thirdly, doctors come from a variety of backgrounds. In terms of training, the majority of medical specialties in the SEPH are FCMs (57%). However, although there are many other specialties among physicians in emergency medicine, 21% lack specialized training, which is more common among professionals with non-regular contracts, where 29% are found. In terms of the origin of these doctors working in the SEPH, while the vast majority of doctors with permanent contracts are Spanish (91%), more than a third of non-regular doctors are foreigners (34%). Fourth, SEPH professionals receive training through internal and external sessions and conferences, and around 3% of their paid working day is protected for training purposes. The difficulties in attending this training are similar for doctors and nurses, and are more economic (paying for it) than organisational (obtaining the required time). Fifth, many of the SEPHs are related to university teaching, so some of their medical and nursing professionals teach both theory and practice, and both undergraduate and graduate students. And sixth, research activity is low, as less than 5% of doctors and nurses are involved in it. Probably as a result, research results are scarce, and are mostly focused on presentations at conferences and, to a lesser extent, on scientific publications.

We are not in a position to discuss in detail all the aspects discussed in the previous paragraph. However, data from the SEPHCAT study (referring to 2015), supplemented by data from the SUHCAT study (referring to 2012), allow us to estimate the complete professional map of EM practice in an autonomous community,

which is summarized in Table 4. The specialties of internal medicine, orthopedic surgery and traumatology, general and digestive surgery, and pediatrics are also very present among emergency physicians in Catalonia. Likewise, it is noteworthy that 13% of physicians do not have a training specialty, and this is twice as frequent in SEPH. On the other hand, the presence of non-EU doctors is lower in SEPH. A relevant fact is that EM activity generates almost 6,000 jobs in Catalonia (3,346 as doctors and 2,641 as nurses, of which 13.3% and 13.9%, respectively, correspond to SEPH activity). A linear extrapolation of our data to the whole of Spain (46.5 million inhabitants in 2015) allows us to estimate 21,026 full-time jobs as doctors and 16,715 as nurses which are provided by the practice of EM, although the population, territorial and organizational disparity in health care is large between Autonomous Communities, so this estimate should be considered a mere approximation, which includes a certain degree of (unknown) inaccuracy. Finally, it should be noted that although the quantitative production of the SEPH has always been lower than that reported by the EDs, and that in general it is low in both groups¹¹⁻¹³, when this production is relativised by the size of the EDs and the SEPHs, the scientific production of the latter is very similar to that of the EDs.

The SEPHCAT study has limitations. Perhaps the main one is that some of its results are based on the opinion of the person responsible for the service and not on the professionals working in them, which may differ significantly⁷. Another limitation would be the possibility of different interpretation of some questions by the participants, although the personal interview by a single interviewer has helped to minimise these errors and to achieve more homogeneous interpretations of the questions. Another limitation is that the calculation of full-time jobs was made based on a theoretical day (that of the XHUP) which may not be the one applied in the agreements of some SEPH (in general, less than that of the XHUP), and neither was the protected training time in which no care activity is carried out (although this is scarce, around 3-4%) nor that of professionals without care responsibility taken into account in this calculation. This fact means that our estimate of theoretical jobs has been downwards, since the entire doctor's working day has been considered as assistance. Another limitation is the lack of a more detailed analysis of the nursing professionals, such as the type of contracts or whether they have a PhD degree, since these aspects were not considered in the survey. On the other hand, some of the percentage estimates made, such as those of participation in teaching or research activity, have been made in relation to the SEPH and not to their professionals. Therefore, the percentage of doctors and nurses in the SEPH who have teaching or research activity is clearly lower than the percentages of SEPH who have some professional involved in these activities. It is also a limitation that the results of the SUHCAT refer to data from 2012 and those of the SEPHCAT to 2015, so the considerations made when

Table 4. Combination of some of the most relevant results of the SEPHCAT study (current study, data referring to 2015) and the SUHCAT study³⁻⁷ (data referring to 2012)

	SEPHCAT (2015) N = 13 n (%)	SUHCAT (2012) N = 79 n (%)	TOTAL N = 92 n (%)
Physicians' specialty			
Family and Community Medicine	315 (56.8)	598 (24.0)	913 (30.1)
Internal Medicine	23 (4.2)	412 (16.6)	435 (14.3)
Orthopedic Surgery and Traumatology	0 (0)	273 (11.0)	273 (9.0)
Pediatrics	29 (4.4)	241 (9.7)	270 (8.9)
General and Digestive Surgery	0 (0)	200 (8.0)	200 (6.6)
Obstetrics and Gynecology	0 (0)	160 (6.4)	160 (5.3)
Intensive Care Medicine	16 (2.9)	49 (2.0)	65 (2.0)
Other medical specialty	45 (8.1)	259 (10.4)	304 (10.0)
Other surgical specialty	2 (0.4)	15 (0.6)	17 (0.6)
No specialized training	118 (21.3)	280 (11.3)	396 (13.1)
Nationality of doctors			
Spanish	547 (91.5)	1,563 (76.1)	2,110 (79.6)
Residents (not Spanish)	35 (5.9)	52 (2.5)	87 (3.3)
Outside the EU	16 (2.7)	439 (21.4)	455 (17.2)
Recruitment			
No. of contracted doctor's hours per year	753,995	4,894,264	5,648,259
No. of theoretical full-time medical positions (1,688 h/year)	447	2,899	3,346
Annual number of hours of nurses hired	620,850	3,836,579	4,457,429
No. of theoretical full-time nursing jobs (1,688 h/year)	368	2,273	2,641
No. of contracted nurse hours per 100 doctor hours	82.3	78.4	78.9
Research activity			
No. of doctors with a doctor's degree (% in relation to permanent doctors)	39 (8.3)	62 (5.8)	101
No. of doctors carrying out research (% in relation to permanent doctors)	26 (5.5)	78 (7.3)	104
No. of publications in journals (doctors and nurses)	12	115	127
Publications per 100,000 contracted hours (of doctors and nurses)	0.93	1.32	1.27
No. of publications in indexed journals (doctors and nurses)	9	71	80
Publications per 100,000 contracted hours (of doctors and nurses)	0.70	0.81	0.80
No. of communications to Catalan and Spanish congresses on emergencies (doctors and nurses)	54	379	426
Publications per 100,000 contracted hours (of doctors and nurses)	4.18	4.34	4.25
Number of invited papers to Catalan and Spanish congresses (doctors and nurses)	27	196	223
Lectures per 100,000 contracted hours (of doctors and nurses)	2.09	2.24	2.23

aggregating results from both studies should take this fact into account. However, the authors have not perceived any relevant changes in this 3-year period, so the error due to this limitation is probably discrete. Another aspect to consider is that this global map of EM activity in Catalonia has not contemplated the primary care emergency centres (CUAP in Spanish), which in recent years have been set up in some urban areas and which provide 24-hour emergency care. Although the target population and the link in some cases of the CUAPs with the health centres means that they are halfway between continuous and urgent care, it is possible that future maps of EM activity will have to contemplate them. Finally, in Spain, competences in health care are transferred to the communities, which means that in each of them the organization of care provision is different. Therefore, the extrapolation of data from Catalonia to other Spanish autonomous communities or to Spain as a whole should be done with caution.

In conclusion, the SEPH in Catalonia carry out a high level of activity, part of which is carried out by private SEPHs, and involves a large number of professionals with different educational backgrounds, and almost a quarter of doctors do not have specialised training via

MIR. Despite this, their training time is limited. Some of these professionals carry out university teaching and research activities, although the results of the latter are not quantitatively very high.

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