

INTENSIVE CARE MEDICINE IN SPAIN

Spanish Society of Intensive and Critical Care Medicine and Coronary Units

GENERAL REPORT - 2010

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1. Definition

The Spanish National Commissions on Medical Specialties, dependent upon the Ministry of Health, are the bodies competent for the regulation of specialised medical training in Spain and the issuance of the title of 'Medical Specialist' by the Ministry of Education. Each of these National Commissions is composed of 11 members, which are selected amongst well-reputed professionals and appointed upon proposal from the following organisations:

- Three members appointed by the Ministry of Education from amongst professors in the Faculties of Medicine.
- Three members appointed by the Ministry of Health from amongst medical staff from health care centres with accredited teaching units.
- Two members representing legally constituted national scientific entities and societies, selected from amongst its members.
- Two members in representation of the resident physicians pertaining to the corresponding medical specialty, and selected by the residents themselves from amongst those in the 3rd year of training for specialties with 5-year training programmes, and in the 2nd year for specialties with 3-year or 4-year training programmes.
- A representative of the General Council of Official Medical Colleges of Spain.

The National Commission of Intensive Care Medicine defines the specialty of Intensive Care Medicine as the part of Medicine that deals with patients who experience current or potential life-threatening dysfunction of one or more body organs and who are amenable to recovery.

Setting of the Services of Intensive Care Medicine include polyvalent units (mixed medical-surgical patients) and single-specialty units (e.g., burns, coronary units) as well as other areas of the health care system in which there are severely ill patients requiring integral care. Moreover, additional settings of Intensive Care Medicine include Urgency and Emergency services, Intermediate Care units and in the outpatient setting, transport of patients with severe life-threatening conditions and health care in disasters. As a consequence of the progressive social demand for increasingly greater levels of care and of professional development which makes it possible to provide patient care beyond the conventional limits, Intensive Care Medicine represents the application of knowledge, skills and aptitudes that conform the last step within a system of progressive care for severely ill patients.

2. Historical perspective of the specialty

In our country, the first units for critically ill patients, which appeared during the 1970s, were managed by anaesthetists, internists and, to a lesser extent, by cardiologists and pneumologists. The need for continuous and specific care of these critically ill patients represented the basis and origin of the specialty known as Intensive Care Medicine. The training of medical specialists (Resident Physicians [*Médicos Internos y Residentes*, MIR]) was legally regulated in 1978; Intensive Care Medicine was one of the recognized medical specialties. The legal framework only

contemplated primary specialties, and there were no options for supra- or sub-specialties. The official MIR training programme, with a 5 year's duration, clearly defined two periods: an initial period comprising basic medical specialties, and a specific training period in Intensive Care Medicine. In 1979, the first MIR generation started its specialised training in Intensive Care Medicine – receiving the official title in 1984.

In 1973, 31% of physicians working in Spanish Services of Intensive Care Medicine were specialists in Internal Medicine, 25% in Cardiology, 16% in Anaesthesiology and 9% in different areas, mainly Respiratory Diseases and Surgery. The remaining 19% of professionals had started their work directly in the Services of Intensive Care Medicine without having passed through any other specialty.^{1,2}

The Spanish Society of Intensive Care Medicine and Coronary Units (*Sociedad Española de Medicina Intensiva y Unidades Coronarias*) was founded in 1974, five years after the creation of the first intensive care unit in Spain. Thereafter, the name of the Society was changed by the Spanish Society of Intensive and Critical Care Medicine and Coronary Units (*Sociedad Española de Medicina Intensiva Crítica y Unidades Coronarias*, SEMICYUC), being the name by which it is still known today.

The first issue of *Medicina Intensiva*, the official journal of SEMICYUC, appeared in 1976.³ SEMICYUC plays a fundamental role as guarantor of the specialty, providing complementary high-level training for specialists and residents, and stimulating and favouring the production of new specialised scientific knowledge. Amongst the different teaching aspects, mention must be made of the National Cardiopulmonary Resuscitation Plan (*Plan Nacional de Resucitación Cardio-Pulmonar*), created in 1985 in the setting of the SEMICYUC, and which has made it possible to train and educate not only physicians and other health care professionals, but also the general population.⁴

3. Current situation

The Spanish model of Intensive Care Medicine has been positive for a number of reasons. From the health care perspective, the polyvalent model has been shown to be efficient, as recognised by the majority of health care managers because in daily practice a single specialist is able to solve most of the critical situations in the hospital during 24 hours a day, 365 days a year.⁵

This polyvalent character has led intensivists to carry out multiple tasks, extending beyond the limits of the Services of Intensive Care Medicine. As an example, intensivists play a notorious role in the national organ donation and transplantation programme, since in most hospitals the transplant programme coordinator is an intensivist physician.⁶

The efficiency of the polyvalent model in the second-level hospitals has allowed intensivists to assume specific responsibilities, such as permanent pacemaker implantation or secondary risk transportation. Mention should also be made of the extension of intensivist activities to the field of urgencies and emergencies, implemented in the Autonomous Community of Andalucía and also in isolated hospital centres in the rest of the country, with very positive results.^{6,7} Lastly, an important number of health care planners and managers currently come from the area of Intensive Care Medicine.

The presence of Services of Intensive Care Medicine has become almost universal in all hospitals and private centres in Spain both at general and county levels. In large hospitals (either university-affiliated or non-university-affiliated) and in large private institutions, the Services of Intensive Care Medicine are mostly run by Intensive Care specialists.

4. Organ donation and transplantation programme

The Spanish model of organ donation and transplantation is universally recognized as the world's most effective for the development of a system of organ donation. The philosophy that inspired the programme from the beginning, was a system focused on the adequate organisation of all necessary steps to materialise the donation of organs from dead patients (Fig. 1).



Figure 1

Those responsible for managing this process are mostly intensivists. It could not be otherwise when the circumstances of organ donation are considered: a patient in whom a diagnosis of death should be made while maintaining good hemodynamic status, contact the family, organize the organ extraction and transplantation procedures, etc. These are tasks for which our Spanish Intensive Care Medicine specialists are well-trained, with more than 20 years actively and efficiently collaborating with the National Transplant Organisation, and the support of the entire organisational structure and care of the ICUs, actively involved in maintaining the potential donor patients. At the beginning of 2009, 79% of the 224 physicians who

were transplant coordinators at the 167 Spanish hospitals authorised for organ donation were intensivists, a percentage that continues to grow year after year.

In this same line of action, the National Transplant Organisation and the SEMICYUC established four years ago an agreement by which that all residents in Intensive Care Medicine should receive a specific course on organ donation and transplantation, inevitably call to strengthen the relationship between organ donation and intensive care. As a result of the excellent results obtained by the National Transplant Organisation and during the presidency of the European Union by our country in 2010, the model of organ donation and transplantation was evaluated as a reference for the remaining European countries and a directive related to the quality and safety of human organs was issued by the European Parliament. The aims of this directive intended for transplantation is to double the number of donations and to ensure that all transplants carried out in the European Union are going to be done with the same quality and safety standards. Several provisions are directly addressing medical specialists field of competence: i) Healthcare professionals involved in the transplantation process must be well trained and receive specific training programs (article 4. 3).ii) Health professionals should also play a crucial role in providing information to donors or their family (article 7), iii) When dealing with living donors, the selection should be done by “qualified or trained and competent” professionals (art 15.2).⁸

5. National cardiopulmonary resuscitation plan

The SEMICYUC, aware of the need to promote and disseminate the techniques of cardiopulmonary resuscitation (CPR) started in 1983, the CPR teaching plan embodied in the NATIONAL PLAN that the Ministry of Health granted the recognition of health interest and to which in 1990 the Queen of Spain gave "The Doctor" award for the best continuing education course.

The development of this plan began in November 1985 with the launch of a Continuing Education Course, which was attended by 1800 physicians. The theoretical content of the course with the collaboration of 67 specialists in Intensive Care Medicine from 15 hospitals crystallised in 12 teaching units of the first Advanced CPR Manual (currently, the 4th edition). The teaching teams were normalised, including simulation teams and a set of slides for the theoretical sessions was developed.

This Plan was a milestone in the continuing education in our country, because for the first time new technologies were applied in a training program for large health care groups. The implementation of the SEMICYUC “National CRP Plan” established the basis for teaching CPR in Spain, developing the teaching tools and necessary infrastructure in Spain to begin sustained teaching of resuscitation, but especially to disseminate among professionals and among citizens the need for integral emergency services that would allow preventing premature deaths, permanent sequelae and costs to our society.

In 1988, a training model for Advanced Life Support (ALS) instructors was developed, in order to strength the training system and to extend CPR teaching through a chain of training.

In 1997, the first edition of the Basic Life Support Instructor Manual was published following the lines for instructors’ training in ALS, but with particular emphasis on aspects related to basic life support (BLS).

In more than 25 years since the initiation the CPR National Plan, the project has grown and consolidated, with more than 120,000 health care professionals and 25,000 non-health care professionals attending CRP training courses.

Advanced CPR is taught in a formal way throughout the country and has more than 3500 instructors of ALS, BLS and external automated defibrillator (AED) to continue carrying out this teaching. In addition, SEMICYUC actively contributed as a founding partner, to the development of the Spanish Council of CPR since 1999.

6. Programmes of quality and safety

The SEMICYUC has considered the quality of care in all dimensions, and in particular the safety dimension as a major objective for action.

In 2005, our Scientific Society published a set of quality indicators for key processes in the care of critically ill patients⁹ (Fig. 2). A total of 120 quality indicators covering all areas and aspects of the Intensive Care Medicine were established. Twenty of these indicators were considered important enough to recommend their monitoring in all ICUs, with the other indicators depending on the case-mix of each individual ICU. The dimensions monitored with greatest frequency are safety and effectiveness. A prospective, observational, cohort study was carried out at 80 centres over a 3-month period. Compliance with five essential indicators in all patients meeting the criteria established in the quality indicators manual was monitored.¹⁰ The quality indicators have enabled specific, concrete aspects of critical care to be monitored with reliable, valid, objective, quantitative information. Although in many hospitals the degree of compliance was high, there is still room for improvement in most of the indicators monitored. Recently, a map of 27 indicators to measure the quality of care given to patients with acute coronary syndrome attended in the pre- and hospital areas was published.¹¹ At the present time, the SEMICYUC is participating in the safety task force led by the European Society of Intensive Care Medicine (ESCI) in the development a set of quality and safety indicators.



Figure 2

The SEMICYUC sponsored by the Quality Office of the Ministry of Health and Social Policy, undertook the “The Safety and Risk in Critical Patients” (SYREC) study to assess the incidence of adverse events and non-harm events, classify them, and evaluate their impact and the extent to which these events can be avoided. The probability of suffering at least one safety-related event for the only fact of being admitted to an ICU is 62%. On the day of study, 1.22 events were reported for each patient admitted to the ICU. The rate of events in our study was 5.89 per 100 patients and hour. The SYREC study showed a high individual risk for events in critically ill patients. Most events were related to medication, equipment and devices, nursing care, accidental withdrawal of catheters and other devices, or artificial airways and mechanical ventilation. Although in many cases, events did not result in harm to the patient, a significant percentage caused harm and a few were even related to the patient’s death. Most events, however, were considered avoidable.¹²

The SYREC Project has also developed a training national plan about safety and risk of the critical patient. This training programme aims to improve the safety culture in all ICUs and to facilitate training in this area for many professionals involved in the care of severely ill patients. Another important aspect of the project is the implementation of a voluntary and anonymous reporting system to identify adverse events and no-harm events.

The Bacteriemia-zero project is another example of the SEMICYUC involvement in patient safety. This project developed by the Quality Office of the Ministry of Health and Social Policy and led by the SEMICYUC aims to reduce the rate of central line-associated bloodstream infections in the Spanish ICUs. The results obtained have shown the effectiveness of the project.

7. Structures

At the present time, around 257 Services of Intensive Care Medicine are included in the census, with a total of about 3500 beds and a mean of 12–18 beds per service (range 8–40). University-affiliated hospitals account for the largest number of intensive care beds. A total of 240,000 patients are annually attended, and the mortality rate is approximately 11%. University-affiliated hospitals accounted for the largest number of ICU beds. The majority (90%) of the Services of Intensive Care Medicine belong to the public health care system. The type of patients attended in these Services is polyvalent, including medical, surgical, trauma and coronary patients. Only in large cities such as Madrid and Barcelona are the coronary units independent of the Services of Intensive Care Medicine. In some Autonomous Communities such as Andalucía, Emergency Departments are directly dependent upon the Services of Intensive Care Medicine.

Finally, a minority of critical care beds are dependent upon the Services of Anaesthesiology. Although most the Services of Intensive Care Medicine in Spain are directed by specialists in Intensive Care Medicine, approximately 6% of the critical care beds, --the great majority of them devoted to post-surgical care--, are run under the responsibility of specialists in Anaesthesiology.

In most hospitals, medical staff of the Services of Intensive Care Medicine is hierarchically structured into different professional categories: Head of Service, Chief

of Unit and Attending Physician. The number and professional category of the staff members vary according to the number of beds in the Service and to the hospital ownership. The nursing personnel, which may or may not have specific training in critical care medicine, is an important part of the staff of the Services of Intensive Care Medicine. Nursing staff usually includes one nurse for every 2–3 intensive beds, with a distribution of three daily shifts. The nursing personnel are directed by a supervisor who in turn is dependent upon nursing management, and sometimes upon the Head of the Service of Intensive Care Medicine. Furthermore, all Services of Intensive Care Medicine have additional personnel, such as administrative personnel, clinical assistants and specialised technicians in some centres.

8. Spanish Society of Intensive and Critical Care Medicine and Coronary Units (SEMICYUC)

The SEMICYUC was created in 1971 and initially comprised physicians from different areas with the common goal of promoting actions for the improvement of care for the critically ill patient. At present, most of its more than 2000 members are specialists in Intensive Care Medicine.

The organisation of the SEMICYUC comprises a board of directors of 10 members, a scientific committee, several working groups ($n = 13$) and the corresponding societies at the autonomous communities and territorial levels ($n = 14$). The scientific journal *Medicina Intensiva*, the National Cardiopulmonary Resuscitation Plan, and the Spanish Critically Ill Patient Foundation (*Fundación Española del Enfermo Crítico*, FEEC) are dependent upon the SEMICYUC. The SEMICYUC is a founding member of the Pan American and Iberic Federation of Critical Care Medicine and Intensive Care (*Federación Panamericana e Ibérica de Sociedades de Medicina Crítica y Terapia Intensiva*) (FEPIMCTI).

The main scientific activity of SEMICYUC is the organisation of the national congress of the specialty, held annually for over 30 years. This congress lasts three days and involves the presentation of about 500 abstracts, with the participation of approximately 1000 physicians and 800 nurses. In addition, the SEMICYUC each year organizes sessions for residents in training, and awards grants for stays in both national and foreign hospitals – as well as scholarships for research projects and participation in congresses. The working groups of the SEMICYUC also organise yearly meetings on monographic topics (e.g., infectious diseases, bioethics and cardiology).

9. The journal *Medicina Intensiva*

Medicina Intensiva is the official publication of the SEMICYUC, and is presently also the official journal of the FEPIMCTI.

The journal has been published uninterruptedly since 1977. Its aim is to promote improvement in knowledge amongst specialists in Intensive Care Medicine and other related fields (Cardiology, Anaesthesia, Infectious Diseases, etc.) through the publication of original research in the field of Critical Care Medicine. The collective scientific activity of the SEMICYUC and the working groups is reflected in the publication of the Consensus Conferences of the SEMICYUC and recommendations of the working groups, frequently carried out in collaboration with other scientific societies.

Unsolicited manuscripts submitted to *Medicina Intensiva* are subjected to peer review. At present, 10 issues of *Medicina Intensiva* are published a year. The journal is indexed in PubMed and EMBASE/Excerpta Medica databases. Recently, the journal *Medicina Intensiva*, which is the official publication of the SEMICYUC and FEPIMCTI has been included by Thompson Reuters in the “Science Citation Index Expanded” (Scisearch®) and in the “Journal Citation Reports, Science Edition” from the first 2008 issue of the journal.

10. Scientific contribution of Intensive Care Medicine

In scientific terms, Spanish specialists in Intensive Care Medicine participate actively in congresses, meetings and consensus conferences. In addition, the academic contribution of Spanish intensivists to current Intensive Care Medicine is very relevant and includes the presentation of research studies at the European Congress of the ESICM. In the last 6 years [2004–2009], the Spanish contribution in number of communications was one of the highest of all the participating countries (first or second country in the ranking) and this is clearly accompanied by high clinical impact publications in general medical journals, including the New England Journal of Medicine, JAMA, The Lancet, and in journals of Intensive Care Medicine, such as Critical Care Medicine, Intensive Care Medicine and the American Journal of Respiratory and Critical Care Medicine.

Medicine (All categories)

	Country	Documents	Citable documents	Citations	Self-Citations	Citations per Document	H index
1	United States	1.249.462	1.091.307	21.545.323	10.429.616	18,33	686
2	United Kingdom	375.099	302.540	5.341.629	1.284.907	15,13	436
3	Germany	303.493	266.911	3.594.608	906.989	12,31	364
4	Japan	278.570	264.161	2.711.586	741.030	9,69	275
5	France	208.165	179.015	2.438.178	486.629	12,01	356
6	Italy	187.390	166.756	2.246.743	446.968	12,77	333
7	Canada	154.212	135.678	2.582.152	441.563	18,89	375
8	Spain	127.422	108.542	1.075.971	230.548	9,23	244
9	Australia	113.589	96.734	1.472.922	274.851	14,69	267
10	Netherlands	111.103	99.432	1.925.982	332.131	19,01	325
11	China	110.468	108.089	365.736	111.182	5,46	126
12	Turkey	72.156	64.892	302.290	61.179	5,14	96
13	Sweden	70.457	65.177	1.267.870	200.233	18,80	278
14	Switzerland	68.922	60.933	1.060.037	126.494	16,55	273
15	India	68.787	57.872	282.276	76.083	4,93	104
16	Brazil	57.370	53.305	361.752	91.221	7,75	145
17	Belgium	55.136	49.208	843.656	104.613	16,28	253
18	Taiwan	44.603	42.056	340.902	64.877	8,92	132
19	Israel	43.000	38.931	529.605	65.644	13,15	193
20	Austria	42.247	37.369	530.896	66.569	13,20	184

SCImago. (2007). SJR — SCImago Journal & Country Rank.

Figure 3

The SCImago Journal & Country Rank is a portal that includes the journals and country scientific indicators developed from the information contained in the Scopus database (Elsevier B.V.). The scientific production of different countries in relation to the different medical specialties based on data obtained up to 2007 is shown in Figures 3 and 4. As shown in Figure 4, Spain ranks the fifth in the scientific production level as compared with other countries. When scientific production in the critical care field is considered, Spain is ahead of other specialties being the first specialty in scientific production of our country (Fig. 4), with Neurology and /Gastroenterology on the 8th position followed by Cardiology /Haematology, Oncology, and Anaesthesiology.

Critical Care and Intensive Care Medicine

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	Country	Documents	Citable documents	Citations	Self-Citations	Citations per Document	H index
1	 United States	14.929	11.527	150.515	67.028	10,57	122
2	 United Kingdom	6,571	5.047	44.512	10.242	7,62	75
3	 Germany	4.657	3.715	41.295	11.216	9,06	82
4	 France	3.295	2.560	37.459	7.936	11,64	75
5	 Spain	2.015	1.576	14.561	3.095	7,70	53
6	 Canada	1.907	1.521	25.427	3.582	15,78	71
7	 Netherlands	1.584	1.171	18.610	2.864	14,23	61
8	 Italy	1.400	1.071	16.469	2.816	14,65	56
9	 Australia	1.351	1.062	13.745	1.991	12,83	52
10	 Belgium	991	729	20.101	2.518	23,27	65
11	 Switzerland	930	765	13.709	1.486	17,49	57
12	 Austria	859	698	9.604	1.495	11,87	43
13	 Japan	686	624	6.413	1.544	9,45	37
14	 Sweden	660	587	9.343	1.682	15,59	47
15	 Turkey	506	466	1.502	237	9,83	19
16	 Brazil	388	300	3.744	573	15,48	32

SCImago. (2007). SJR — SCImago Journal & Country Rank.

Figure 4

11. The specialty of Intensive Care Medicine and future challenges

The recent publication of the Law of Regulation of Healthcare Professions¹³ in 2003 and its future developments are to be taken as the basis for restructuring specialisation in Intensive Care Medicine, according to the concept of common core training followed by supra-specialisation. The COBATRICE project¹⁴ aims to define the minimum required competences, skills and knowledge that specialists in Intensive Care Medicine in Europe should have. As can be seen in the Annex, these characteristics are more than satisfied by the 5-year training programme in Intensive Care Medicine in effect in Spain today.

The primary specialty of Intensive Care Medicine does not aim to secure exclusivity in dealing with critically ill patients. It simply aims to ensure correct development of this discipline by adequately trained professionals, with full-time dedication to these tasks, and attempting to optimise the resources both related to training and to the provision of care, in the framework of a policy of economical and social sustainability. This model has 30 years of experience and has been internationally recognised.¹⁵

CHARACTERISTICS OF THE SPANISH MODEL OF INTENSIVE CARE MEDICINE

- **ROBUSTNESS OF THE TRAINING PROGRAMME (official 5-year training period)**
- **INTEGRAL TRAINING: EFFECTIVE AND EFFICIENT: all type of patients**
 - **TRAUMA**
 - **POSTOPERATIVE**
 - **CORONARY**
 - **MEDICAL**
- **HIGH LEVEL OF IMPLEMENTATION AND ACCEPTANCE IN THE HEALTH CARE CONTEXT**
- **HIGH LEVEL OF IMPLEMENTATION AND ACCEPTANCE AMONG CITIZENS**
- **CLOSE COLLABORATION WITH MEDICAL-SURGICAL SPECIALTIES**
- **CONSOLIDATED ORGANISATIONAL MODEL: more then 30 years**
- **HEALTH CARE BASIS OF THE NATIONAL TRANSPLANT ORGANISATION (20 years working together): ORGAN DONOR AND TRANSPLANTATION HOSPITAL COORDINATORS (79% INTENSIVISTS)**
- **SEMICYUC: OVER 2700 MEMBERS**
- **CURRENTLY 850 RESIDENTS ON TRAINING AND 172 NEW INTENSIVISTS PER YEAR**
- **RELEVANT SCIENTIFIC PRODUCTION**
- **SCIENTIFIC JOURNAL: *MEDICINA INTENSIVA* (indexed in Science Citation Index Expanded" and "Journal Citation Reports/Science Edition Scisearch®, since 2008)**
- **QUALITY INDICATORS AND SAFETY PROGRAMMES**
- **ETHICAL CODE**
- **MAP OF COMPETENCIES**
- **NATIONAL PLAN OF CARDIOPULMONARY RESUSCITATION (25 years)**
- **PRIMARY SPECIALTY**

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