The Iberian Peninsula—the southwestern point of Europe, between the Mediterranean Sea and the Atlantic Ocean—was visited and settled in ancient times by a variety of peoples. Phoenicians, Carthaginians, Celts, Greeks, Romans, Visigoths, and Arabs all left their mark on the peninsula, and their cultures blended together to found, among other things, a rich tradition in medicine and surgery. During the Renaissance, the fluid exchange of technical skills and knowledge with the rest of Europe and the emergence of universities ensured the development of a high level of medical expertise. Today, surgery in Spain is at the forefront of innovations in the field.

HISTORY

There is evidence that in the megalithic era (2000 BC), certain surgical procedures, above all trepanation, were performed in the Iberian Peninsula. Until the Renaissance, Spanish surgery followed the tradition of the Greeks and the Arabs and the surgical texts of the Middle Ages, but major advances were made through anatomical studies performed during the 16th century. Nevertheless, surgery remained in the hands of military and naval surgeons and barber-surgeons, who, although lacking scientific training, performed surgical operations because physicians did not consider surgery to be one of their responsibilities. A royal decree laid down provisions for the activities of the barber-surgeons, while in England the question of the guilds was solved through the merging of the Fellowship of Surgeons and the Barber-Surgeons Company (1540). The creation of chairs in surgery in Spain’s university medical schools in the second half of the 16th century provided surgery with social recognition and gave it a scientific basis.1 However, surgery in Spain lacked a standardized structure until the creation of the Reales Colegios de Cirugia (the Royal Colleges of Surgeons), set up by military surgeons in the middle of the 18th century. The first to be established were the colleges of Cadiz (1748) and Barcelona (1764), set up by Virgili, followed by the College of Madrid (1780), founded by Gimbernat.2 These colleges, and those that followed, played a key role in the development and teaching of surgery; now, for the first time, surgery began to be considered in conjunction with medicine rather than as a separate entity. Many surgeons visited their colleagues throughout Europe, discussing procedures and exchanging technical expertise. Gimbernat (Figure 1), for example, described the ligament that was later named after him and presented a new technique for treating crural hernia to Hunter in England. In 1843, “medicine and surgery” was instituted as a joint subject in universities, and until recent years, students who successfully completed their studies were awarded the qualification of “graduate in medicine and surgery.”

During the 19th century, Spanish surgery began to acquire scientific principles and to experience major advances, mainly due to new breakthroughs in the use of anesthesia, asepsis, antisepsis, and other technical improvements. The emergence of scientific publications and visits by Spanish surgeons to hospitals and institutions throughout all of Europe encouraged the exchange of knowledge and facilitated the standardization of criteria. The work of leading European surgeons such as Dupuytren, Roux, Pean, Hartmann, Delorme, Quenu, Billroth, Kocher, and Lister deeply influenced the technical and scientific development of Spanish surgery. Many surgeons, usually in possession of thorough anatomical training,
practiced new operations on cadavers. New techniques described abroad were swiftly incorporated into clinical practice; in fact, Rubió performed axillary node dissection for breast cancer before Kocher and Halsted.1

During the 20th century, surgery in Spain has evolved more or less along the same lines as in the rest of Europe, except during the Spanish Civil War years (1936-1939), although that period of strife gave Trueta the opportunity to expand his work in the treatment of open fractures and the crush syndrome. Trueta later became a professor of surgery at Oxford. In recent years, Spanish surgery has plainly attained the levels of other, more developed countries.

GEOGRAPHY AND DEMOGRAPHICS

Spain is located at the southwestern point of Europe, sharing a northern border with France. The Mediterranean Sea is to the east, and to the south are the Straits of Gibraltar, where the Atlantic Ocean meets the Mediterranean Sea, and the peninsula is separated from Africa by a narrow stretch of sea. Portugal and the Atlantic Ocean are to the west. With a surface area of 500,000 km², Spain's topography is diverse, with a variety of climates and geographic areas.

The population of Spain is 39 million. Life expectancy is 74.8 years for men and 82.0 years for women, one of the highest in the world along with Iceland, Norway, Sweden, Switzerland, Holland, and Japan. The birth rate has fallen to 1.15 newborns per 1000 inhabitants, far below the mean European Union (EU) figure of 1.40. These demographic data indicate an increase in the population most likely to require surgical intervention and point to increases in expenditure on treatment of chronic and degenerative diseases. Average per capita income is $11,500, and unemployment is 18%.3

Since 1977, Spain has been a democratic monarchy with 2 debating chambers, and the state is composed of 13 autonomous regions, some of which are responsible for health care management in their geographical areas.

Spain has been a full member of the EU, or European Economic Community, since 1986 and today makes up 10% of the EU’s population.

THE HEALTH SYSTEM

The National Health System cares for 99.6% of the population and offers all kinds of medical services, except certain areas of dentistry. People without financial resources may also receive medical care from local charities working in conjunction with the public health system. About 17% of the population also has additional private medical insurance policies; the number of policyholders varies widely according to geographical area. Private health care is also available in selected private clinics.

The management and allocation of public health resources is the responsibility of the Sistema Nacional de Salud (the National Health System), with its own network of primary care centers, specialized outpatient clinics, and hospitals (the INSALUD) and arrangements with public or private centers. Public health was initially funded via deductions from workers’ salaries and contributions from companies, but today, between 70% and 80% of the financial support comes from the national budget. The Spanish health budget for 1997 represents 8.2% of the gross national product (the public health budget accounting for 6.6% of the gross national product). Primary care and expenditure on pharmaceutical products accounts for more than 30% of spending and specialized care for more than 60%.

The Spanish hospital network includes more than 800 hospitals, with 175,000 beds and a ratio of 4.4 beds per 1000 inhabitants (225 inhabitants per bed), although these figures vary according to geographical area (150-450 inhabitants per bed). Hospitals are classified into 3 levels depending on the complexity of medical care that they provide, and there are other institutions that specialize in 1 area of medicine, such as psychiatry, obstetrics, or pediatrics. Approximately 50% of hospital beds are used in surgical units, and 8% to 15% are devoted to general and digestive surgery wards.4-9

Each health care area has primary health care centers where patients are seen by general practitioners on an outpatient basis. Patients with surgical problems are referred to a specialist or directly to the regional hospital. People tend to go to the emergency departments of the major hospitals even for mild emergencies, even though they often have to wait several hours before receiving attention. This means that emergency departments are often overcrowded with patients with acute illnesses.

General and digestive surgical units receive patients referred from outpatient centers and emergency departments or after intrahospital consultation. The admission of surgical patients from emergency departments is relatively high, reaching 45% to 80% of all surgery ward admissions in some centers. Waiting lists for common surgical problems such as hernia, gallstones, and varicose veins are long; more than a year in most public hospitals.10

In recent years, great efforts have been made to optimize health financial resources and to make provisions for the future.8 Health authorities today strive to provide adequate numbers of surgical beds to meet both the real needs of the population and the requirements of the budget, emphasizing short-stay surgery and day-case surgery programs.
MEDICAL TRAINING

Students seeking to enter medical school must have completed high school and must have passed the university entrance examination. Based on examination scores, the number of applications, and the number of places available at each medical school (the system known as numerus clausus), successful candidates are granted places. Given the competition for places and the number actually available, medical schools are among the most difficult university faculties to enter. In 1996, there were 26 medical schools offering 4309 places (Figure 2). The undergraduate course lasts 6 years; proficiency in the different subject areas is tested by examinations, and successful students obtain the qualification of graduate in medicine. This qualification entitles the graduate to practice medicine in Spain and throughout the EU, but those who seek to work in public centers or to become specialists require further training.

The last stage of the academic training is the doctoral thesis (PhD in the United States); it is obtained after a 2-year course in a university department with a specific research training program. The doctorate is awarded after the presentation and defense of a research work in front of a tribunal. Few surgeons obtain doctorates, and these are usually surgery residents who prepare their doctoral thesis during or immediately after their internship, especially if their training has been in a university-affiliated hospital.

Specialized training is supervised by the Médicos Internos y Residentes National Program (known as the MIR), a program designed by the national committee of each specialty and overseen by the National Council of Medical Specialties. The qualification is awarded by the Ministry of Education on the proposal of the Ministry of Health, which is responsible for the National Health System. All the hospitals accredited for training surgery residents must meet a list of requirements that ensure consistent levels of training throughout Spain, and the hospitals are inspected regularly. In accordance with the training that each center can offer, the requirements of the budget, and society's actual need for specialists, approximately 4900 posts are offered for medical specialization every year in 220 accredited hospitals (Figure 3). Access to these resident posts is obtained after a national examination, and, based on their score on this examination, young physicians choose the specialty and the center where they wish to be trained.

Every year, about 600 of these places are allocated to surgical specialties (Table). In 1997, 100 new general and digestive surgery residents began a 5-year training period. During this time, they will spend 2 years in the departments of thoracic, urologic, orthopedic, plastic, and pediatric surgery, as well as in the surgical intensive care unit. They are also on duty 1 day a week in the emergency department. The next 3 years are devoted to general and digestive surgery. The final program depends on the characteristics of the hospital, but all hospitals that obtain the accreditation for training residents must be able to guarantee adequate training. The resident system for training of young physicians was introduced in the Spanish health system in a few hospitals in the late 1960s and has been operating in all the ac-

Figure 2. Analysis of the evolution of the number of new medical students in Spain in recent years shows a gradual reduction because the society's need for medical graduates is considered to have fallen.

Figure 3. The number of new medical students, graduates, and hospital posts available for postgraduate specialization in Spain during the past 20 years. Shows how university resources adapt to the society's need for new professionals.
The aim of the resident system is to develop well-trained general surgeons who are able to deal with most of the standard clinical situations in general surgery; who are well-versed in laparoscopic surgery, surgical oncology, surgical intensive care, and trauma; and who will go on to work in first- or second-level hospitals.

In Spain, there are currently no superspecialties in general surgery (such as transplantation, esophageal surgery, colorectal surgery, hepato-bilio-pancreatic surgery, etc.). However, most surgical units in tertiary care centers set up work groups with special interest in these fields.

After finishing the residency period, surgeons are now qualified to practice surgery. The job market for these specialists has become overcrowded in recent years, and many young surgeons must wait several years for a definitive job in a hospital; as a result, they take less sought-after posts, covering the emergency needs in hospitals. The shortage of surgical posts is because most hospitals are well staffed and because in recent years the production of trained residents was greater than the actual needs of society; in addition, the first- and second-level network of hospitals, which has become consolidated during the past 10 years, has been filled with young surgeons.

Those seeking to obtain accreditation as specialists must present an annual personal report, approved by the hospital tutor, the hospital’s training committee, and the specialty’s national committee. The qualification allows indefinite practice of the specialty, with no periodic system of reaccreditation. Today, Spain has 175 000 physicians, with a ratio of 1 per 260 inhabitants. More than 4000 of these physicians are specialists in general and digestive surgery.

Spain has no formal continuing training system in any medical specialty, but medical colleges, medical associations, and hospitals offer a range of continuing training courses and activities. Physicians also broaden their knowledge via stays at foreign centers and by participating in courses, symposia, and congresses.

GRANTS, FUNDS, AND RESEARCH

Interest in research in hospitals, as a complement to physicians’ clinical duties, has grown in recent years as a consequence of an active policy to encourage research and development projects. Research and development supported by government funds is supervised by the Comisión Interministerial de Ciencia y Tecnología and the research and development budget rose from 0.55% of the gross national product in 1985 to 0.90% in 1992. Surgical research is mainly carried out in surgical departments of university-affiliated hospitals. Since 1986, medical research in Spain has been overseen mainly by a state institution, the Carlos III Health Institute. This institution seeks to encourage and oversee research and development in health and to evaluate health technology, public health training, managed care, and methodological sciences applied to health; it also acts as a national laboratory for referrals. Funds mainly come from the Fondo de Investigación Sanitaria Health Research Fund, which finances research projects and supports training in foreign centers and projects involving international cooperation. The Fondo de Investigación Sanitaria Health Research Fund’s annual budget is about $30 million for a total of 600 new research projects and 800 continuing projects. Grants for research into surgery and cancer account for 15% of the total number of projects and 12% of the total budget for research. In addition, medical schools, hospitals, and the pharmaceutical industry offer private grants, but the main proportion comes from state funds.

On the basis of the number and the impact factor of papers published in peer review journals, Spain currently ranks seventh among EU countries in terms of scientific production. Surgery and related disciplines account for 4% of the total number of publications.

In recent years, more surgeons have begun to spend several months abroad, visiting foreign centers to improve their skills and their knowledge of the latest technological developments. These stays range from 1 month to 1 year. This contact has had a positive impact on quality in specialized areas such as transplantation, hepatobiliary-pancreatic, and laparoscopic surgery.

AREAS OF INTEREST IN CLINICAL SURGERY

Surgical epidemiology in Spain is similar to that in other developed countries in Europe and America, with a growing proportion of cancer cases. This is mainly due to the high number of older people in our society and the rise in life expectancy. Major recent developments in clinical surgery are rapidly incorporated into everyday practice in most hospitals. Minimal-access surgery has met with great success, and laparoscopic surgery is the rule for gallstones, hiatal hernia, and, in some centers, large bowel lesions or splenectomy. Transplantation surgery in Spain merits special mention, with an increasing number of solid organ transplants performed each year (Figure 4). Approximately 3000 transplantations were conducted in 1996 throughout the country: more than 1700 kidney transplantations, 700 liver transplantations, 282 heart transplantations, 192 lung transplantations, and 20 pancreas transplantations. There are 40 authorized centers for kidney transplantation, 19 for liver transplantation, and 14 for heart transplantation in Spain.

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Table:

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Figure 4: Approximate number of transplants in Spain in 1996.
that achieve clinical results in line with European and US standards. Passing a law that facilitates organ retrieval from cadavers was an important step forward. Spain now boasts the highest organ donation rates in the EU (26.8 organs per million), but the major factor in this increase was the growing public awareness that there is little point in restricting the retrieval of organs.

**THE SPANISH SOCIETY OF SURGEONS**

The Spanish Society of Surgeons was founded in 1935 but was not officially constituted until 1936. During the Spanish Civil War (1936-1939) and due to the hardships of the following years, the Society did not resume its activities until 1949. The main activities of the Society today are the organization of the Spanish Surgical Meetings and the publication of its journal, *Cirugía Española*. The society has 1996 members, and the journal prints 3100 issues monthly. More than 10% of the issues are sent abroad, principally to South America. The society organizes an annual scientific meeting. Every 2 years, the Spanish Surgical Week is held in Madrid, and in the intermediate years, the Annual Meeting is held in another Spanish city. Eight hundred ninety delegates attended the last National Congress in 1996.

The Spanish Society of Surgeons also coordinates several sections, including surgical research, colorectal surgery, hepatobiliary surgery, endocrinology, surgical infections, scar and sutures, thoracic surgery, laparoscopic surgery, postgraduate training, breast diseases, and esophageal surgery. The aims of these sections are to maintain interest, to update Spanish surgeons’ knowledge of the areas in question, and to encourage the production of protocols, surveys, and multicenter studies.

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### References


**ANNOUNCEMENT**

**NEW SECTION: OPERATIVE TECHNIQUES**

The *Archives of Surgery* is instituting a new section, Operative Techniques, wherein a variety of simple and complex procedures will be presented. Drawings of operative photographs should clearly illustrate sequential steps in the procedure. Each drawing should be accompanied by a legend and sufficient descriptive text so that the reader is taken through the procedure in an orderly fashion. Color drawings or photographs may be utilized if they would clearly enhance the reader’s understanding of the procedure.

Figure 4. *Rise in organ donation in Spain, 1991 through 1995.*