The Philippines is an archipelago of about 7000 islands, with an area about the size of England, situated just above the equator in Southeast Asia. It has a population of 70 million. The Philippines has had extensive commercial and social contact with Asian neighbors, specifically the Chinese, even before the 377 years of Spanish colonization from 1521 to 1898 and the 48 years of American rule from 1898 to 1946. More than 80% of Filipinos are Catholics; the rest are Muslims and Protestants of various denominations, including those who belong to Filipino church groups. Infectious diseases such as tuberculosis, amoebiasis, typhoid fever, and malaria are still prevalent, and arteriosclerosis, cancer, and stroke are common and on the rise.

HISTORY

Before the colonization of the Philippines by Spain in the early 16th century, wounds were treated by application of leaves and bark of trees, a system that is still practiced among indigenous tribes in remote areas that were not colonized. There may have been rudiments of foreign medical practice, since the Philippines engaged in trade with China, India, and successive empires in Southeast Asia. The systematic and purposeful destruction of early Philippine civilization by the Spanish colonizers left little of written accounts of medical practice by early Philippine natives.

Like any colonizing power, Spain took care of her soldiers and her citizens in the Philippines. The first hospital in the Philippines was a military one that was built on the southern island of Cebu in 1563. This was transferred to the walled city of Intramuros in Manila in 1571 and later renamed Sternburg Hospital by the invading Americans in 1898. This hospital was destroyed during World War II. In 1577, another dispensary made of bamboo and thatched material was built by a Spanish Franciscan missionary in Manila. This was destroyed by earthquake or fire several times, but was always rebuilt. This hospital was renamed the Hospital de San Juan de Dios in 1596 and became the teaching hospital of the Royal and Pontifical University of Santo Tomas, one of Asia's oldest universities, until the start of World War II in 1941. The first recorded exploratory laparotomy in the Philippines was performed at the Hospital de San Juan de Dios by the Philippines' finest surgeons in 1900. During this time, surgical instruments were washed and polished with the belief that the brighter and more shiny the instrument, the less danger there was of producing contamination.

During the Spanish possession, surgery was being practiced by Spanish barber surgeons, Chinese physicians, Dutch surgeons, and physicians of various nationalities, although the type of surgery is not known. The Philippines was at the center of a busy trading route in Southeast Asia, even before the Spanish colonization. Mention from written reports of Spanish expeditions was also made of sutured head wounds among the crew of expeditions sent to colonize the Muslims in the southern islands of the Philippines. The
only abdominal operation performed during the early Spanish regime by Spanish surgeons was a postmortem cesarean section, a practice that was sanctioned by the Catholic Church.

Manila as a city did not seem, in the medical aspect, to be behind other medieval cities of Europe. The University of Santo Tomas was founded before any other academic institution in North America. There were many attempts to establish a medical school in this university, starting in 1682, which was only realized in 1871. There was opposition to establishment of schools of science by the colonizers because of the fear that further education of the natives would make them aware of their rights and therefore they would be difficult to govern. This was proved true during the closing years of Spain’s rule. Filipinos educated in Europe, exemplified by the physician and national hero of the Philippines, Dr Jose Rizal, were at the forefront of the insurrection against Spain.

The first medical graduates in 1877 were called licenciates or medicos titulares and these degrees were not invested doctoral degrees; they could only be obtained at the Universidad Central de Madrid. Ether was used as an anesthetic in 1847, 1 year after William T. C. Morton, DDM, described its use in Boston, Mass. Chloroform was used not long after James Young Simpson, MD, used it in Edinburgh in 1847. A list of operations at the Hospital de San Juan de Dios from 1878 to 1879 included trephination, rhinoplasty, cheiloplasty, staphylorrhaphy, operation for squint, cataract extraction, enucleation of the eye, amputation of arm and forearm, disarticulation of shoulders and elbow, and ligation of the common carotid, subclavian, and axillary arteries for aneurysms.

The defeat of the Filipinos by the better-equipped American army at the turn of the century saw the establishment of hospitals in the Philippines by American military surgeons. American influence in Philippine medicine was deep and lasting. In 1904, as part of the American policy of attraction for the ilustrados or Filipino elite, Filipino surgeons were sent to the United States to study and train in American hospitals. Their eventual return to the Philippines marked the beginning of the golden age of Philippine surgery. Thyroidectomies, colon resections, and mastectomies were performed, along with the introduction of low-segment cesarean section, craniotomy, treatment of fractures and burns, and open prostatectomy.

MEDICAL SCHOOLS AND UNDERGRADUATE SURGICAL EDUCATION

There are now 30 medical schools in the Philippines; 6 are government owned and the rest are private institutions. The system of medical education is Western oriented, specifically American influenced, whether in curriculum, textbooks, or teaching methods, including postgraduate training. Many of the practicing specialists are trained abroad, usually in American hospitals and university medical centers. A few of the medical schools, particularly the new ones, use problem-based learning.

A 4-year bachelor’s degree in preparatory medicine is a requirement for entry into the 4-year medicine proper course. After graduation, graduates undergo 1 year of rotating internship in a hospital of their choice. Only after completion of internship are medical graduates allowed to take the physician licensure examinations, which are given twice a year. A licensed physician usually proceeds to residency training in the Philippines or abroad, goes into general practice, or opts to continue further schooling. At the state-run University of the Philippines, an additional entry point for the top 50 freshmen with inclination to go into medicine is the 7-year integrated arts and medicine curriculum, which includes 2 years of liberal arts, 4 years of medical school, and a year of rotating internship.

During the second year of medical school, students are taught the principles of surgery, followed by general and specialty surgery the third year. Didactic lectures, small group discussions, and preceptorships are the teaching methods used. English is the medium of instruction. In the fourth year, medical students undergo a clinical clerkship rotating through the different clinical departments with a graduated process of increasing responsibilities and expectations. An average of 2300 medical students graduate each year; they then participate in an intern-matching program with 118 accredited hospitals throughout the country. Interns undergo rigorous clinical training, particularly those who choose to work in large urban government-run hospitals.

SURGICAL RESIDENCY TRAINING

The earliest evidence of surgical training in the Philippines was through a royal decree during the Spanish colonial period at the Hospital de San Juan de Dios, the teaching hospital of the Royal and Pontifical University of Santo Tomas. During the American occupation, a Pensionado Law was passed in 1904 that enabled Filipino doctors to train in surgery in the United States. Prior to the 1930s, the apprenticeship method of surgical training predominated. It was basically tutorial, haphazard, but highly personalized. Between 1930 and 1950, there was a gradual shift to the hospital-based type of training as it slowly became evident that those who trained as apprentices were less skilled and competent than their hospital-based colleagues. The influx of US-trained surgeons into the established medical schools from 1950 to 1960 led to the establishment of more formally structured surgical residency training programs that were essentially patterned after the American or Halsted model.

Basically, residency training in general surgery is a 4- to 5-year program designed to develop in the trainee a satisfactory level of clinical maturity, surgical judgment, and technical skill. Basic areas of study include wound healing, hemostasis, oncology, shock, circulatory physiology, gastrointestinal physiology, surgical endocrinology, surgical nutrition, fluids and electrolytes, metabolic response to stress and injury, applied surgical anatomy, surgical pathology, surgical infections, and burns.

General surgical residents are provided opportunities for direct patient management experience with trainees in government and university-based hospitals given a wider latitude. Residents are required to have a work-
ing knowledge of congenital, degenerative, neoplastic, infectious, and other surgical diseases of the gastrointestinal tract and other abdominal organs, the head and neck, breast, and soft tissues. Residents are also expected to develop surgical expertise from rotations in the management of trauma and surgical intensive care, aside from subspecialty rotations in thoracic and cardiovascular surgery, neurosurgery, plastic and reconstructive surgery, burns, pediatric surgery, urology, gynecology, and orthopedic surgery.

Residents in the specialties need 1 or 2 years of general surgery residency training except for those who go to pediatric surgery and thoracic and cardiovascular surgery, who must be board-eligible in general surgery. In addition, residents are given ample opportunities for research work as well as opportunities to present research papers in special conferences, scientific paper contests, and surgical congresses.

In 1936, the Philippine College of Surgeons (PCS) was organized and in 1969, the Philippine Board of Surgery was formed. In 1975, both organizations started work through the joint committee on accreditation to establish a system of accrediting general surgery training. Similar accreditation procedures for other surgical specialties followed.

The number of accredited training programs in general surgery and other surgical specialties has grown progressively over the last decade (Table). For general surgery alone, there are 66 accredited training programs that are classified into private hospitals, government medical centers, and university hospitals. Evaluation of these training programs, however, have pinpointed a number of problems resulting in marked discrepancies in the quality of residency training. These include (1) maldistribution—the majority of training programs and resources are in Manila and other highly urbanized centers; (2) lack of resources—most training programs are poorly funded with a poorly compensated faculty; and (3) erratic training program implementation—differences in characteristics such as caseload, operative experience, adequacy of faculty supervision, and quality of teaching activities exist between university-based government and privately owned institutions.

However, several developments over the past few years have given some cause for optimism and possible progress in the area of surgical training. Among them are the formulation of a standard curriculum and evaluation system for residency in general surgery that is constantly being reviewed and streamlined, the formation of an association of training officers in 1992 committed to upgrade the skills of the surgical faculty, and establishment of training programs and upgrading the skills of noncertified surgeons in underdeveloped far-flung areas of the Philippines.

**CERTIFYING PROCESS AND ACCREDITATION OF TRAINING PROGRAMS**

The accreditation committee of the PCS evaluates and certifies all general surgery training programs in the Philippines. Its main objective is to upgrade and standardize surgical training programs to ensure graduates who are ethical, safe, and competent. Minimum requirements, policies, and guidelines for accreditation are implemented by all training programs. This committee has 12 members, which is divided into 3 groups for accreditation visits to all surgical training centers nationwide.

The accreditation process focuses on the training center's implementation of a unified competency-based training curriculum and the performance of its residents and graduates. Through the process of internal evaluations, in-training, certifying examinations, and feedback from accreditation visits, surgical departments formulate and design what is needed to improve the quality of their programs (Figure). Accredited training programs are evaluated once every 4 years and based on the overall evaluation, the program may be fully accredited, placed on conditional status, warned, or suspended for cause as stipulated in the official guidelines and standards. Only graduates of surgical residency training programs accredited by the PCS can qualify for the certifying written and oral examinations. An average of 150 board-eligible general surgeons graduate from these programs each year.

The Philippine Board of Surgery is the examining arm of the college. It is composed of 11 directors who elect from among themselves a chair, a vice-chair, and a...
secretary. The certifying examinations are given in 2 parts: part 1 is the written examination and part 2 is an oral examination. The written examination is multiple-choice questions addressing all aspects of general surgery, while the oral examination involves use of case modules given by selected examiners, most of whom are university-based surgeons. All examiners attend seminars and participate in workshops on how to conduct structured, fair written and oral examinations. On average, about 50% of candidates pass the written examination and about 30% pass the oral examination. Candidates who pass both examinations are awarded a certificate of a specialist in general surgery and are referred to as diplomates in general surgery. After 2 years, a diplomate in general surgery may apply as a fellow of the PCS, which is the mother organization of all surgical specialties.

Residency in-training examinations are also given by the Philippine Board of Surgery once a year to evaluate theoretical knowledge of residents at a given level of training. Another role of the Philippine Board of Surgery is to assist training officers in assessing the strengths and weaknesses of the surgical residents who take these examinations by providing the standard scores and percentile rank of their residents compared with the other examinees.

SURGICAL RESEARCH AND TECHNOLOGICAL ADVANCES

Progress and development in surgical research has been slow. Much of this can be attributed to poor economic conditions with a consequent low priority given to research in other areas as well. The Philippine Journal of Surgical Specialties, the official publication of the PCS, has been in existence since 1946 along with later journal publications in obstetrics and gynecology, ophthalmology, orthopedics, urology, and thoracic and cardiovascular surgery. Despite these avenues for publication, there remains a lack of institutional direction and support given for surgical research, except for a few selected university training programs. Financial incentives are few and confined to sponsorship of research competitions. Furthermore, there are very few surgeons with full-time careers in research.

Likewise, economic conditions have influenced the influx and development of new surgical technology. Although advances in communications and information technology have made the Filipino surgeon up-to-date with the latest surgical advances, applications of this new technology have been limited to a few, well-financed private medical centers in urban areas.

Open heart surgery was first performed in the Philippines in 1959, with 2 university medical centers performing open correction of congenital heart defects, although ligation of patent ductus arteriosus and closed mitral commissurotomy were being performed a few years earlier.12 Surgery for abdominal aortic aneurysms using a homograft cadaver aorta was introduced in the Philippines 5 years after Charles DuBost, MD, performed his pioneering operation.13 The first attempts at kidney transplantation were done in 1968 and 1969; to date, about 1500 kidney transplants have been performed and about 150 transplants are performed annually.14 Heart, liver, pancreas, bone marrow, and other multiorgan transplantations are done occasionally mainly because of economic reasons. Minimally invasive surgery is part of surgical reality in the Philippines today since the introduction of laparoscopic cholecystectomy in 1991. Video-assisted thoracic surgery is also being used in some tertiary care hospitals. Surgery for the aftermath of tropical diseases such as schistosomiasis and biliary ascariasis is also performed.15,16

ECONOMIC IMPACT OF HEALTH MAINTENANCE ORGANIZATIONS

Health maintenance organizations (HMOs) proliferated in the Philippines after the historic 1986 bloodless revolution that toppled the Marcos dictatorship. Its modest rate of growth of 20% annually is commensurate with the slow but steady industrialization of the country. Presently, there are 36 registered HMOs with a total enrollment of more than 2 million. Like its counterpart in the United States, HMOs were introduced in the Philippines as an antidote to the escalating premiums of medical insurance.

A great majority of the population depends on free government primary and tertiary health care. With HMO coverage, about 33% of the population can afford private medical care. The professional fees covered by the HMO are lower than the average fee for service. The hospitals are paid their normal fees with a discount ranging from 5% to 10% based on the volume of business generated. This enables hospitals to have a higher occupancy rate. The percentage of HMO patients admitted in different hospitals at a given time varies form 25% to 70%.

MANPOWER DISTRIBUTION

The population—health manpower ratio for physicians is 1190:1, which is similar to that of Japan.17 The Philippines has an adequate number of physicians, including surgeons, to handle its medical needs; the problem lies in regional maldistribution. More than 50% of board-certified general surgeons and other surgical specialists are practicing in Manila and its environs. This skew toward the urban centers is primarily because of better financial and professional remuneration. To address this problem, short-term strategies such as offering better compensation packages and incentives for specialists to practice in the provinces have been considered. A long-term strategy is changing the medical curriculum to a community-oriented type. Again, as in most developing countries, this problem can be traced to its economic roots.

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REFERENCES


JAMA

Impact of Hospital Volume on Operative Mortality for Major Cancer Surgery
Colin B. Begg, PhD; Laura D. Cramer, ScM; William J. Hoskins, MD; Murray F. Brennan, MD Mortality for Major Cancer Surgery

Context.—Hospitals that treat a relatively high volume of patients for selected surgical oncology procedures report lower surgical in-hospital mortality rates than hospitals with a low volume of the procedures, but the reports do not take into account length of stay or adjust for case mix.

Objective.—To determine whether hospital volume was inversely associated with 30-day operative mortality, after adjusting for case mix.

Design and Setting.—Retrospective cohort study using the Surveillance, Epidemiology, and End Results (SEER)–Medicare linked database in which the hypothesis was prospectively specified. Surgeons determined in advance the surgical oncology procedures for which the experience of treating a larger volume of patients was most likely to lead to the knowledge or technical expertise that might offset surgical fatalities.

Patients.—All 5013 patients in the SEER registry aged 65 years or older at cancer diagnosis who underwent pancreatectomy, esophagectomy, pneumonectomy, liver resection, or pelvic exenteration, using incident cancers of the pancreas, esophagus, lung, colon, and rectum, and various genitourinary cancers diagnosed between 1984 and 1993.

Main Outcome Measure.—Thirty-day mortality in relation to procedure volume, adjusted for comorbidity, patient age, and cancer stage.

Results.—Higher volume was linked with lower mortality for pancreatectomy (P = .004), esophagectomy (P < .001), liver resection (P = .04), and pelvic exenteration (P = .04), but not for pneumonectomy (P = .32). The most striking results were for esophagectomy, for which the operative mortality rose to 17.3% in low-volume hospitals, compared with 3.4% in high-volume hospitals, and for pancreatectomy, for which the corresponding rates were 12.9% vs 5.8%. Adjustments for case mix and other patient factors did not change the finding that low volume was strongly associated with excess mortality.

Conclusions.—These data support the hypothesis that when complex surgical oncologic procedures are provided by surgical teams in hospitals with specialty expertise, mortality rates are lower. (1998;280:1747-1751)

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