

Trauma manpower in the decade of aftershock

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The last decade of a century receives special notice as a springboard to a new era. It is a time when predictions for a new order, coincident with a new century, are anticipated. At the close of the 19th century, the term *fin de siecle*, loosely translated as "end of the century," implied a distinct cultural and social period.¹

The events of the decade of the 1990s in this century, as in the last, resonate to a preceding cataclysmic decade, the 1960s. The '60s in both centuries are akin to an earthquake, with the '90s as the response decade of aftershock. During the 19th century, the decade of the 1860s was the time of the Civil War (1861-1865). In the 20th century, the 1960s were a time of racial unrest, the Vietnam War, and civil disobedience. The events of the 1960s continue to have an impact and evolve in the 1990s as we prepare for the 21st century. The civil rights movement of the 1960s, cataclysmic in nature, has evolved in the 1990s to further improve racial equality. The civil rights movement was the precursor of multiculturalism and feminism.

Civil disobedience, riots, and disaffection of the youth of the 1960s have developed into materialism: the "hippie" has been replaced by the "yuppie." The Vietnam War resulted in a changed concept of warfare as evidenced by management of the recent conflict in the Persian Gulf. The cold war has been replaced by international accord and an international economy. The drug culture is also a legacy of the 1960s.

Our current trauma system and manpower are products of the 1960s, also. During the 1960s, the drug culture, increasing domestic violence, and motor vehicle accidents resulted in the development of trauma teams by hospitals. The lessons emanating from Vietnam regarding trauma care and transport were a stimulus to trauma systems. The need for improvement in trauma care was strongly stated in the landmark report, *Accidental Death and Disability: The Neglected Disease of Modern Society*, published by the National Academy of Science/National Research Council (NAS/NRC) in 1966.² Trauma, however, remains a health care problem in spite of progress since that time.

Trauma is the fourth leading cause of death in the U.S., resulting in 150,000 deaths annually at a cost of \$158 billion (1985). An estimated 25,000 deaths annually are the result of the lack of a trauma system. Violence accounts for 4.5 million assaults annually, 22,032 homicides, and is the most common cause of death in black males aged 15-24.³

Many of the pioneers of trauma pleaded for recognition of trauma within our surgical organizations, the National Institutes of Health, and in the training of our house officers. Since the publication of *Accidental Death*, the National Institutes of Health through the National Institutes of General Medical Sciences has developed trauma center research programs and fellowships. A generation of surgeons was stimulated by strong role models to academic careers in

trauma. Between 1960 and 1990, trauma entered the mainstream of academic medicine and was emphasized in residency education. Emergency medicine became the 23rd American Board of Medical Specialists' (ABMS) board.

Although trauma developed as a discipline in the 1960s, it was not targeted as an area of manpower needs at a time of health manpower expansion. During the 1960s, medical schools in the United States increased from 88 to 126. The number of medical school graduates increased from 7,409 to approximately 17,000.⁴ The expansion of medical school manpower addressed the accurate perception that too few physicians were available to the American public. Much of the medical manpower in the United States has been provided by foreign medical graduates (FMGs). Currently, approximately 20 percent of our health manpower is from graduates of foreign medical schools. The expansion of medical school class sizes and graduates was intended to correct the putative "doctor shortage."

It is likely that a shortage of general surgeons interested in trauma will occur. It is possible that general surgeons, orthopaedists, neurosurgeons, and other specialists necessary for our trauma system will minimize their involvement in direct trauma patient care and administration. The trauma system depends not only on the trauma surgeon specialist, but on the surgical specialist who provides trauma care as part of his/her practice.

Because general practitioners were retiring and medical school graduates after World War II opted for specialties, the manpower expansion was intended to also increase the diminishing primary care manpower pool.* Concern over the declining number of general practitioners was also addressed by development of new types of primary care physicians.

The definition of primary care physicians con-

*The emphasis on primary care manpower by our educational institutions is not causally related to the trauma manpower deficit predicted.

**Table 1
Health Manpower**

Specialty	Number	Percentage
Primary care	207,325	34.5
Surgery	135,125	22.5
Residency	82,103	13.7
Other	176,236	29.3
Total	600,789	100

Source: American Medical Association. *Physician Characteristics and Distribution in the U.S., 1990*

tinues to vex health planners. While family practice, general internal medicine, and pediatrics are clearly primary care specialties, other specialties also provide primary care. Diseases such as AIDS and a diversity of traumatic injuries may create a demand for specialists with primary care or other unique skills.

Currently, expansion of medical school classes has resulted in growth of physician manpower that exceeds the growth of the general population (see Table 1 on this page). Currently, there are 600,789 physicians in the United States and its possessions. Of this number, 13.7 percent (82,103) are residents in training, and 135,125 (22.5 percent) are in surgical specialties, including obstetrics and gynecology. The primary care specialties encompass 34.5 percent of the total, or 207,325 individuals.⁵

The largest medical school enrollment occurred in 1983 and 1984, when 67,443 students were enrolled. For the 1989-1990 academic year, the total medical school enrollment was 65,081. The ratio of total applicants to accepted applicants declined to 1.6:1 in 1989-1990.

An increasing tendency toward board certification has occurred in the past 30 years, with over 60 percent of physicians now holding an American Board of Medical Specialists certificate. The certified specialist is the focus of future manpower considerations. From 1970 to 1990, 80,039—or 22.8 percent of the total number of certified specialists—were in 10 surgical special-

ties. Primary care specialists in that same 20-year period accounted for 164,973—or 48.5 percent of the certified specialists. In the primary care area, 52 percent, or 85,785 physicians, were in internal medicine, with 79,187 in pediatrics and other specialties. The remaining 27.9 percent of American Board of Medical Specialists certificates (95,096) awarded during that 20-year period were mostly in psychiatry and radiology (see Table 2 on page 9).⁵

In 1970, 2,129 surgeons were female, accounting for only 2.5 percent of the total of 25,401 female physicians. The number of female surgeons increased to 12,140 in 1989. Three specialties account for the majority of women in surgery: obstetrics and gynecology, 58 percent; general surgery, 18.6 percent; and ophthalmology, 12.1 percent. The number of women in residency programs has increased steadily. During the 1970 training year, 3,929 residents were women (10.6 percent). By 1988-89, 21,879 female residents were in training (27 percent). This expected increase reflects the fact that 35.2 percent of all U.S. medical students are women. Women in all medical specialties as a group work fewer hours weekly than their male cohorts. It is unclear if that small difference has implications for manpower planning as the role of women in medicine expands.

The goal of increasing primary care manpower is reflected in the growth of residency positions (see Table 3 on page 9). In 1969-1970, there were 37,139 filled residency positions in all specialties, and 40.2 percent of all resident positions (14,937) were occupied by specialties of surgery. By 1988-1989, the number of resident positions for all specialties had increased to 81,093. Of that total, 19,877, or 24.5 percent, were occupied by specialties of surgery. The percent of residency positions in surgical fields has decreased from 40.2 percent to 24.5 percent of the total. The percent of primary care physicians increased from 25.5 percent in 1969-1970 to 38.8 percent in 1989-1990. The general growth of primary care residency

positions is partial fulfillment of the goal of health care planners of the 1960s.

Although many manpower studies have been done, none will equal the Graduate Medical Education National Advisory Committee (GMENAC) in scope or cost. The GMENAC projections published in 1978 had target predictions for 1990, 2000, and on. It is useful to compare GMENAC predictions of 1978 with actual specialty number counts in 1990. The GMENAC projection for physician manpower in 1990 was 535,750, representing an excess of 62,750, and a 43 percent increase over 1978.⁷

While the total estimate is close to the actual number, specialty estimates are inaccurate. The specialty of internal medicine in 1985 exceeded the GMENAC projections by 16 percent. Surgical manpower in 1985 was 18.6 percent less than projected by GMENAC. Other studies come to different conclusions based in part on methodology. The Health Services Research Agency (HRSA) predicted 708,600 physicians, a demand of 637,000, and an excess of 71,600 by 1990.⁸ Contrariwise, Swartz predicted as few as 585,000 physicians, with a demand of 592,000 or a deficit of 7,000 physicians.⁹

The 1990 *Longitudinal Study of Surgery Residents (LSR)* by the American College of Surgeons shows that the number of first curricular year entering residents has remained stable in 10 specialties of surgery for eight years.¹⁰ In the 12 specialties currently being tracked, the number of completing residents has dropped continually, from 4,407 in 1987 to the current adjusted count of 4,259. The number of women in surgical residency training has continued to increase for seven years, from 2,834 in 1982-1983 to the current 3,709, a 30.9 percent overall increase. The number of foreign medical graduates has decreased 63 percent since the peak year of 1982-1983.

Of the 12 specialties of surgery currently being tracked, *only* neurologic surgery has been accurately predicted by the GMENAC methodology. Neurologic surgery in 1989-1990 graduated 718

individuals and was predicted to finish 700. The specialty of general surgery was predicted by GMENAC to graduate 9,200 individuals by 1990, but current numbers are 7,799. Other specialties are even more at variance with GMENAC predictions. For example, ophthalmology was predicted by GMENAC to finish 2,600 individuals by 1990, while the actual number finishing was 1,562.¹¹

When the Council on Graduate Medical Education (COGME) was established in 1985 by the Consolidated Omnibus Budget Reconciliation Act (COBRA), manpower was an identified responsibility of COGME.¹² During the past year, COGME has attempted to update some of the GMENAC study through a contract with Abt Associates.¹³ Six specialties were selected for study. General practice/family practice was anticipated to have a 10 percent increase in requirement and a 24 percent increase in supply. General Doctor of Osteopathy (D.O.) was projected to have a 5 percent increase in require-

Table 2
Board Certification: 1970-1990

	Number	Percentage
Surgical specialties	80,039	23.5
Primary care	164,973	48.5
Other	95,096	28.0

Source: American Medical Association, *Physician Characteristics and Distribution in the U.S., 1990*.

Table 3
Residency Positions

	1969-1970	%	1988-1989	%
Surgery	14,937	40.2	19,877	24.5
Total	37,139	59.8	81,093	75.5

Source: *Bulletin of American College of Surgeons*¹⁰

Table 4
Reported Career Plans of Surgery
Residents: 1985-1990

Activity	Career plans: 1985 cohort @ QE application (n = 1,080)	Career plans: 1990 IT/SBSE level V examinees (n = 980)
Practice	41%	36%
Academic	5	N.A.
Cardiothoracic	14	15
Vascular	11	12
Plastic	8	13
Colon and rectal	4	6
Pediatric	3	3
Critical care/trauma	3	N.A.
Oncology	3	N.A.
Other	10	16
Total	100%	100%

N.A. = Not available.

Source: Ward O. Griffen, MD, American Board of Surgery, Inc.

ment and a 22 percent increase in supply. General internal medicine had a projected 27 percent increase in requirement and a 33 percent increase in supply. General surgery had a 33 percent increase in requirement and a 9 percent increase in supply. Adult psychiatry had an 18 percent increase in requirement and a 20 percent increase in supply. Child psychiatry had a -3 percent increase in requirement and a 21 percent increase in supply. Specialty organizations provided testimony relative to these projections and often disagreed with the conclusions.

The estimates for surgical manpower are probably accurate, as they are partially based on the data base of the American College of Surgeons and the American Board of Medical Specialists. Surgical manpower estimates are more predictable, as resident positions require approval of the Residency Review Committee for Surgery. The allowed

residency positions are based in part on quantitative criteria; specifically, numbers of operations. They cannot be increased as readily as positions in specialties with less quantitative criteria.

All manpower studies are flawed by the inability to predict future needs. The framers of the GMENAC study could not have known that AIDS would be a significant health problem in the 1990s. We are similarly disadvantaged by the lack of a crystal ball. Some conclusions, however, need to be drawn for purposes of planning. At the very least, the data of the American College of Surgeons shows minimal, if any, growth in general surgery and other surgical specialties. The AMA Council on Long Range Planning and Development has projected that with a change in demography of the U.S. population, utilization of services of general surgeons is projected to increase by 16 to 19 percent between 1985 and the year 2000. The projection for the supply of general surgeons is for an increase of 6 percent between 1986 and 2000.¹⁴

Data from the American Board of Surgery (ABS) would support the conclusion of a minimum growth in general surgery.¹⁵ Approximately 1,000 individuals annually take the American Board of Surgery examination, a number that has been constant for some years.

In 1985 and in 1990, the candidates for board certification were surveyed as to their future practice plans (see Table 4 on this page). Of these, 59.6 percent planned training beyond first certification or five years. In 1990, only 36 percent of the examinees indicated a wish to enter the practice of surgery. Of the 1,080 candidates in 1985, only 3 percent indicated an interest in trauma and critical care. With many graduates of general surgery residency specializing in cardiothoracic, plastic, vascular, and pediatric surgery, they are probably not involved in delivering trauma or general surgery care.

An additional manpower consideration is years in practice. Recent data from the American College of Surgeons indicate that retirement of Fellows is occurring at a younger age than previously, i.e., age 60.

It is likely that negative manpower balance already exists for the specialty of surgery. There are probably as many surgeons retiring or dying as there are entering the practice of general surgery annually. Moreover, not all general surgeons participate in trauma care. A survey of the Washington State Chapter of the American College of Surgeons elicited a response that 39 percent of the sample preferred not to treat trauma patients.¹⁶ Some of the reasons cited were urban practice, a negative impact on elective surgery, insufficient reimbursement, medicolegal risk, and AIDS.

Data generated by H. Brownell Wheeler, MD, FACS, University of Massachusetts (Worcester), for a retreat conducted by the American Board of Surgery (ABS) in 1990 indicated that the median trauma experience of the ABS recertification examination candidates encompassed only 4.5 percent of their practice. The practice profile (222 cases a year) revealed trauma to be a surprisingly small part of the experience of the practicing general surgeon. Data from Wheeler's extensive survey of 987 nonfederal acute care hospitals in the U.S. reveals that 8.7 percent of the procedures in acute care hospitals were related to trauma and emergency room.¹⁷ This finding suggests that severe trauma is more likely to be concentrated to centers, while minor trauma is diffuse in distribution.

If the surgeon manpower pool is in shortfall by the year 2000, who will lead our trauma centers? If the available general surgeons opt out of trauma care, the situation will be severe. A survey by Drs. J. David Richardson and Frank B. Miller of 1,800 residents received a disturbing response.¹⁸ Two-thirds of the residents who were surveyed believed that trauma was a rewarding field, but only 18 percent wanted it as a career or as a major part of their practice. The interest in trauma fellowships was low. Dissatisfaction with trauma care was prominent, with negative feelings engendered about the large amount of non-operative care rendered. Lifestyle issues were also cited. A surprising and disturbing observation was cited as a reason for not pursuing

trauma as a career—the negative impact of some trauma surgeons as role models.

Ironically, the leadership of the trauma community has successfully involved the American Board of Surgery and the Residency Review Committee for Surgery to emphasize experience in trauma for residents in surgery. The cohort of today's residents are better trained in the care of trauma patients than were their predecessors of the 1960s. It is unfortunate that trauma as a field may appear to be unattractive to them.

Quality assurance and experience are required to maintain skills in trauma. The American College of Surgeons' Committee on Trauma has expressed opinions that reflect the belief that the occasional trauma surgeon, like the occasional heart surgeon, will have suboptimal skills. Studies in progress suggest that the skills obtained in the Advanced Trauma Life Support (ATLS) course correlate positively with reduced death rates in many communities.¹⁹

The increase in health manpower evolving from the 1960s has been largely in primary care fields, as was intended. The increase has not addressed the epidemic of trauma as a national priority requiring a specific and dedicated manpower pool. The experience of residents in trauma has improved since the 1960s. Since the 1960s, a number of traumatologists have risen to positions of leadership in academic medicine. However, the predicted 30 to 40 individuals who elect careers in trauma annually are probably insufficient to sustain the national need and to provide the leadership of trauma centers that is currently required.²⁰

The approach to trauma manpower in the decade of the 1990s, the decade of aftershock, involves the restructuring of many priorities related to health care delivery. It demonstrates a need to address the career goals of our residents. The fin de siècle of the 20th century hopefully will be remembered as a period of visionary planning for trauma manpower for the 21st century. There is a need to expand research fellowship.

through our societies and the National Institutes of Health, as well as clinical manpower.

Financing of graduate medical education currently under review by federal budgetary agencies is a significant concern. As the indirect costs of medical education are decreased with further implementation of diagnosis-related group (DRG) system, hospital commitment to residency training lessens.

All of these issues require attention as we attempt to provide manpower in the 21st century for the "neglected disease of modern society." □

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