Cardiovascular Manpower

The Looming Crisis

Robert O. Bonow, MD; Sidney C. Smith, Jr, MD

Less than 10 years ago, conventional wisdom taught that there was an oversupply of specialists in a managed care environment and that the majority of needs in cardiovascular prevention and care could be provided by generalists. Healthcare planners called for a reduction in specialty training, and a number of cardiovascular training programs went through a period of downsizing. The demand for subspecialty care has not diminished and, with the continued needs for cardiovascular practitioners in the community and in academic medical centers, most training programs that downsized in the early 1990s have reversed the trend and increased the number of trainees. We agree with others that despite these changes, the current number of training positions is inadequate to meet the future demand for cardiovascular care and that a manpower crisis is imminent.

Manpower needs in the treatment of cardiovascular disease are driven by three fundamental factors, as follows: (1) the prevalence and incidence of cardiovascular disease, (2) expanded strategies in the management of cardiovascular disease necessitating new responsibilities for healthcare providers, and (3) the impact of new technologies in the treatment of cardiovascular disease.

During the past decade, significant changes and advances have occurred involving each of these three areas that are currently contributing to an increasing shortage of manpower in cardiovascular disease. Left unchecked, the current problem will soon escalate and evolve into a major crisis, limiting our ability to treat and prevent the continued epidemic of cardiovascular disease—the No. 1 cause of death and disability in the United States today.

Increasing Burden of Cardiovascular Disease

In the latter half of the 20th century, major demographic changes in the US population have resulted in the increasing prevalence of risk for cardiovascular events. Most notable among these is the aging of the population and the increasing numbers of elderly patients with chronic disease. It is estimated that nearly 10% of individuals 75 years and older have chronic heart failure, and 10% of those 80 years and older have atrial fibrillation. Based on 1997 data, 10.7% of US men and 14.7% of women were over the age of 65. It is estimated that 16.5% of the population will be 65 and older in the year 2020 and that this will increase to 20.5% by 2040. A number of major risk factors increase with aging, including hypertension, diabetes, obesity, and the metabolic syndrome, all of which will continue to fuel the prevalence of cardiovascular disease in an aging population.

The second most notable trend in the past few decades has been the accelerating increase in overweight and obesity, which is not limited only to the elderly. Almost two thirds of the US population is considered overweight (body mass index [BMI] ≥25), and nearly one third are frankly obese (BMI ≥30). Nearly 40% of adult Americans, age 18 or older, report no regular physical activity. Both obesity and lack of exercise are risk factors for coronary heart disease, and obesity is a frequent precursor of diabetes, a recognized coronary heart disease equivalent that has increased in prevalence by 33% in the 8-year interval from 1990 to 1998 (4.9 to 6.5%). This increase in the prevalence of diabetes and its associated atherosclerotic vascular disease has occurred.
among men and women, all ages, all ethnic groups, and all geographic locations in the country.

At the same time, little progress has been made over the past decade in controlling the established risk factors for cardiovascular disease, which include smoking, hyperlipidemia, and hypertension. The combined results of these trends coupled with an aging population has resulted in an increased pool of patients at risk for cardiovascular events and an increased need for physicians with skills in primary prevention, secondary prevention, and treatment of acute cardiac events. Moreover, the growing ethnic diversity of the United States and evidence of disparities in cardiovascular care has generated a serious need for physicians with specific skills in relating to Hispanic, Asian-Pacific, and African American patients, in a way that is culturally aligned to ensure the best outcomes from preventive strategies and therapeutic interventions, be they medical or surgical. Unfortunately, our current training programs are not creating an ethnically diverse cardiovascular workforce.

**Need for Specialized Care**

In addition to the expanded population of patients at risk for a primary cardiovascular event, for the reasons noted above, there are (1) an increasing number of patients surviving myocardial infarction and living with congestive heart failure requiring complex medical management strategies; (2) a growing population of patients with cardiac transplantation; (3) an increasing number of patients with internal cardioverter defibrillators, pacemaker implantation, and/or radio frequency ablation procedures; and (4) a growing number of patients with corrected congenital heart disease now surviving until young adulthood. Each of these categories of patients requires specialized treatment and follow-up by a cardiologist or team with specific training.

Also occurring during the same period of time have been advances in strategies involving the utilization of healthcare providers to render cardiovascular care. Cardiologists now find themselves with increased responsibility for the prevention of cardiovascular disease. Lipid and multiple-risk-factor clinics have been established to provide primary prevention therapies for at-risk patients and secondary prevention therapies for the growing number who survive an acute event. Specialized clinics in congestive heart failure have evolved that combine the skills of physicians and nurses in the management of the dramatically increasing number of patients with end-stage heart failure. Similar clinics have also been developed in electrophysiology to deal with the complex diagnostic and postprocedure issues surrounding patients undergoing device implantation.

Finally, multiple new technologies have evolved in the past decade requiring increasing levels of sophistication ranging from the decisions and skills associated with the implantation of drug-eluting stents; to the placement and management of intra-aortic balloon assist devices in patients hospitalized with end-stage heart failure; and to sophisticated procedures involving internal cardioverter defibrillators, dual-chamber pacing, and complex electrophysiological studies.

The cardiology community at once finds itself stretched from broader responsibilities in preventive cardiology to an ever-increasing need for highly subspecialized skills in interventional cardiology, electrophysiology, and congestive heart failure. The time required for the training of a general cardiologist after graduation from medical school before embarking on the subspecialty training, which is sought after by the majority cardiology fellows, is now 6 years, with an additional 2 to 3 years required for subspecialty training. The demanding nature and time requirements of cardiology training and clinical practice are viewed negatively by many choosing a career, and this will have a negative impact on the future cardiovascular workforce. Fewer cardiologists are entering into general practice of cardiology, and major deficiencies exist in the training of cardiologists skilled in the concepts of preventive cardiovascular disease. The growing recognition that atherosclerotic vascular disease is a generalized process involving multiorgan systems has expanded the interests and responsibilities of cardiologists beyond their traditional focus on the heart to involvement with medical and revascularization strategies focusing on the lower-extremity and cerebrovascular systems.

The combination of a broadened patient population at risk for cardiovascular disease, an increased technical sophistication of treatments, and the current prolonged period of training has contributed to a growing deficiency of cardiologists. Whereas 10 years ago, fellows graduating from cardiology programs faced stiff competition in finding positions in practice or academia, currently there are multiple private and academic positions that remain unfilled. The recent change in hospital working hours and coverage by medical residents has introduced yet another demand on cardiology faculty and fellows at a time when resources are not available to support expansion of cardiology fellowship positions.

Unless these disturbing trends in cardiovascular training are reversed, we will be unable to meet the needs of our patients and stem the epidemic of cardiovascular disease. The United States is not alone in this regard. Our problems are magnified among the nations with developing economies, where 80% of the global deaths from cardiovascular disease now occur, and where the resources and support for training are substantially less than those available in the United States.

**The Crisis in the Nonphysician Workforce**

Paralleling the growing demand for cardiologists is an increased need for cardiovascular nurses, ranging from those who are skilled in acute coronary care and cardiac catheterization procedures to those working in preventive cardiovascular medicine. It is hoped that the role of the cardiologist can be extended by the development of a cardiovascular healthcare team encompassing a number of nonphysician healthcare providers. However, these providers are also in short supply, with no long-term strategy to increase their ranks or...
to create cohesive, team-based care in a systematic manner. Although there is evidence that preventive care is increasingly provided by nonphysician clinicians, there is an undersupply of cardiovascular nurses, nurse practitioners, and physician assistants to meet the growing workforce demand. There is also uncertainty regarding the coordination of these services with the physician community. The level of nurse staffing is associated with improved quality of care in hospitals, but the national shortage of nurses, particularly critical in acute-care settings, and the declining number of students enrolled in nursing schools indicate that an infusion of nurses to solve the workforce crisis is not likely in the near term.

Unmet Needs in Cardiovascular Research

In addition to discussing the inadequate workforce to address the burgeoning clinical demand for the treatment of cardiovascular disease, we must also recognize that it is absolutely essential for physicians to enter careers in basic research and clinical research. It is equally essential that we train future clinical and population scientists who will overcome the barriers to translate the existing research base into effective community implementation. Unfortunately, declining revenues have limited the expansion of our academic training programs in cardiology, and within this framework, few who graduate from these programs are choosing careers in academic medicine and research.

At a time when there is already troubling evidence of a declining young investigator pool, the abrupt deceleration in funding for the National Institutes of Health (NIH) in the postdoubling era will have a further chilling effect that will tend to discourage many talented individuals from careers in biomedical research.

Addressing the Workforce Crisis

One immediate step that would contribute to the solution to the workforce dilemma is to find a way to shorten the training period for cardiologists and other cardiovascular healthcare providers in order to bolster the number of physicians and nurses available to meet this growing clinical demand. It is clear that a significant portion of our investment must be in the training of physicians and nurses to embark on careers in cardiovascular medicine and the development of accelerated programs in training that allow them to enter into a practice sooner with comparable skills. It is time for the old concepts about length of training and specific role toward the physicians to change in a manner that allows earlier differentiation among cardiologists in training. A broadened development of healthcare provider teams with physicians and nurses working together can expand the scope of care.

At the same time, the clinical and basic research needs of our academic institutions must be met. This suggests that a major commitment of resources must be directed toward supporting the careers of young investigators. Separate training tracks for those who have an interest in clinical and basic research can hasten their entry into productive research careers. The American Heart Association has actively developed programs to encourage those interested in cardiology to pursue clinical and basic research through grants, regular forums for young investigators, and the recently published Mentoring Handbook. It seems unlikely that funds from the private sector can adequately address these issues, and major partnerships between NIH, the Centers for Disease Control and Prevention, the academic community, and organizations such as the American Heart Association and American College of Cardiology are needed to recognize and address this challenge.

We are at a critical point in our efforts to reduce the epidemic of cardiovascular disease. It is time to change our concepts about the training of cardiovascular physicians to allow for earlier differentiation into clinical or academic and research careers. We must begin to develop innovative strategies for the prevention and treatment of cardiovascular patients, which recognize the cardiologist as a partner of a team rather than the sole provider. Finally, a national emphasis must be placed on funding, training, and supporting the careers of those with an interest in research and teaching.

References

27. Goldman E, Marshal E. NIH grantees: where have all the young ones gone? Science. 2002;298:40–41.