November 2002 marked the 75th Scientific Sessions of the American Heart Association (AHA), a milestone that permits us to contemplate the remarkably rich heritage of the Association’s scientific meetings. The first Scientific Sessions were organized by a small group of visionary physicians at Haddon Hall in Atlantic City, New Jersey, on the afternoon of May 26, 1925 (Figure 1). The fledgling AHA was less than a year old. Presiding over the sessions were the Association’s four officers: Lewis A. Conner, Robert Halsey, James B. Herrick, and Paul Dudley White. Each played major roles in the founding of the AHA, and each served a term as its President. Little did they anticipate that their meeting of a few hundred people would grow to become — as it has over the past several decades — the world’s preeminent meeting for cardiovascular science.

The scientific and public health challenges facing the Association in its first decade were formidable, as reflected in the first edition of Dr White’s 1931 textbook, Heart Disease. As noted by Dr W. Bruce Fye in his history of American cardiology, Dr White wrote that “treating hypertension is a difficult and almost hopeless task;” that “there is no specific treatment for coronary artery disease;” and that “there is no treatment for aortic valve disease” and “no specific treatment for mitral valve disease.” Clearly, there was much work to be done.

The extraordinary advances in basic science, epidemiology, diagnostic techniques, surgical procedures, and pharmaceutical development that have occurred in the past seven decades and their impact on human lives are unparalleled in human history. These remarkable advances were chronicled each year in the Scientific Sessions and in the scientific journals of the AHA. The founders of our Association could scarcely imagine that one day we would decipher the human genome and use this knowledge to diagnose and treat cardiovascular disease, or use stem cells for tissue engineering and organ regeneration. Yet now, despite such breathtaking achievements, we still have many challenges before us. Our work has just begun.

Every year that the Scientific Sessions have taken place, cardiovascular disease has been the leading cause of death in the United States. Today, nearly 62 million Americans have one or more forms of cardiovascular disease. More than 2600 Americans die from cardiovascular disease each day — an average of 1 every 33 seconds. Cardiovascular diseases cost our society nearly 330 billion dollars per year. This is a continuing crisis of truly epidemic proportions.

Moreover, this crisis is not limited to the United States. Cardiovascular disease is now the leading cause of death worldwide. It is responsible for nearly 17 million deaths each year. This represents 30% of all deaths, and this figure is increasing. Importantly, 80% of cardiovascular deaths occur in low- and middle-income countries. Cardiovascular disease is not only a disease of the affluent. Diabetes now affects 150 million patients worldwide, and its prevalence, especially among younger people, is expected to double in the next 25 years; 300 million adults are obese; and tobacco sales and consumption are increasing at alarming rates in many regions of the world.

In confronting the cardiovascular epidemic, in 1998, the AHA established an aggressive strategic goal to reduce coronary heart disease, stroke, and risk by 25% by the year 2010. Now, when we are more than a quarter of the way to 2010 — and the clock is ticking — it is a propitious time to explore the challenges that confront us in reaching our goal and improving cardiovascular health in our society, and indeed, throughout the world.

Reducing the burden of cardiovascular disease presents many challenges, but two are the most critical. They are, first, discovering new knowledge, and second, successfully transferring existing and new knowledge to others — in other words, research and translation. Achieving our goal means balancing the needs of the future against those of the present.

From the American Heart Association. Reprint requests to Robert O. Bonow, MD, President, American Heart Association, 7272 Greenville Ave, Dallas, TX 75231.

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Special Report

The Challenge of Balancing Scientific Discovery and Translation

Robert O. Bonow, MD

Scientific Discovery

First and most obvious, funding for research must increase. The AHA is strongly committed to funding biomedical research and creating opportunities for fundamental discov-
In fact, in addition to our own substantial commitment to research of over 130 million dollars a year, our organization has been among the leading proponents for doubling the budget of the National Institutes of Health.11 This doubling initiative, with the foresight of our congressional leaders, is moving forward and should culminate this year.

Beginning with the 1998 budget, appropriations for the National Institutes of Health (NIH) have experienced an average increase of 15% per year, placing us on track toward an actual doubling by fiscal year 2003. The final installment of this doubling effort is currently jeopardized by the lack of a final 2003 federal budget approved by the 107th Congress and the continuing resolution under which the federal government is now operating.12 However, even if or when the budget is successfully doubled, our work will not be over. The post-doubling era is potentially troubling. The Office of Management and Budget has recommended a 2.2% rate of annual increase in NIH funding after 2003.13 If implemented, this meager annual increase will intersect within a few years with the historical 9% annual rate of growth of the NIH budget over the past 30 years (Figure 2). That means that by the year 2007, the impact of the NIH doubling effort will be virtually eliminated, and with each passing year, we will fall further and further behind — again. A significantly higher rate of growth in the post-doubling era is essential to maintain our progress. We applaud the recent proposal of Senator Arlen Specter to triple the NIH budget over the 10-year period from 1999 to 2008.14

The NIH research funding initiative is critically important. If support for research slows abruptly, it will undermine or negate the advances we have made in funding scientific breakthroughs and in stimulating our brightest young people to pursue careers in biomedical research. The current trends regarding young scientists continue to be alarming. There is convincing, troubling evidence that the young investigator pool is rapidly and steadily declining.15-17 This point was made clear recently by Goldman and Marshall,18 who pointed out that NIH awards received by investigators aged 35 and under have fallen steadily over the past two decades. In 1980, 23% of NIH grants were awarded to investigators in this age group (Figure 3). Last year, this figure was a paltry 4%. Awards to investigators aged 36 to 45 have not increased. The beneficiaries of the increase in NIH funding have been older, established investigators. Although the effect this has on scientific discoveries may be debatable, its effect on knowledge transfer is indisputably damaging. We have already lost a generation of young investigators, and in doing so, we have also lost the mentors for the next generation of investigators. These are the scientists on whom we will rely to achieve our future goals. The Task Force on Young Investigators and the Early Career Development Forum are strong attempts by the AHA to reverse this trend. Exciting new funding mechanisms for beginning investigators at the AHA and NIH are designed to stimulate career pathways in research. Our future cardiovascular health demands that such efforts succeed.

We must also focus research funding strategically in areas that pose the greatest threats. For example, the rapidly emerging threats of obesity and diabetes are experiencing explosive growth in the United States and the world and are fueling the cardiovascular epidemic. The AHA and other health organizations can serve a vital role as leaders in addressing these threats.

Recent reports indicate that the prevalence of obesity in America is worse than ever, with 65% of adults now considered overweight or obese.19 For decades, the prevalence of obesity was under 50%, but since 1988, there has been an alarming escalation. Of real concern is that these data, based on overweight and obesity, really represent an increase in those who are frankly obese (Figure 4). The prevalence of obesity, a body mass index greater than 30 kg/m², has increased from 13% in 1960 to 31% today. As anticipated, the trends in obesity are paralleled by similar nation-wide trends in type II diabetes.20 These trends in the United States are, of course, paralleled by similar trends in other countries throughout the world.6,7 Clearly these are areas that deserve considerable research, and also action at the community level to focus attention on diet, physical activity, and healthy lifestyles.
Scientific Translation

This leads to the other challenge confronting our cardiovascular health: successful translation of science into clinical practice and to the community. As much as we need research to ignite future medical advances, we cannot ignore our responsibility to alleviate real human suffering in the present. That is why the AHA set its 2010 goal, and that is why effectively transferring knowledge from research advances to clinical practice is so critical. If we do not effectively apply advances from research, we fail in our duties to patients and society. We will also jeopardize future research funding by failing to show the vital benefits research can provide.

As pointed out by Dr Claude Lenfant, Director of the National Heart, Lung, and Blood Institute (NHLBI), most of the progress in the NHLBI Specialized Centers of Research (SCOR) program, a program specifically designed to stimulate translation from basic to clinical investigation, has occurred in the basic science arena with little systematic collaboration occurring between basic and clinical research-ers. Dr Lenfant further pointed out that scant evidence of translation of basic findings to medical practice can be found. The implications of these statements are frightening for patients and ominous for research.

The clinician-investigator is a particularly endangered species, and programs to support translational research must be maintained and strengthened. Without sufficient clinical investigators and effective programs to support translational research, we will not have the quality of care that we need or want.

To achieve our 2010 goal, we need more than an infusion of clinician-investigators. We also must have better systems of care to ensure the effective application of established therapies. We need to apply proven prevention and treatment strategies more broadly and more successfully in community healthcare systems, in clinical practices and among members of the general public. One way to do that is by adherence to recommended guidelines, like those developed jointly by the American College of Cardiology (ACC) and the AHA. Research shows that following guidelines can dramatically improve patient care.

Physicians are often well aware of guidelines, but a gap exists between what we know and what we do. National data regarding the rate of hospital implementation of post-myocardial infarction (MI) secondary prevention treatment with aspirin, β-blockers, angiotensin converting enzyme inhibitors, and lipid-lowering drugs, as well as counseling regarding smoking cessation, bear this out. The actual rates of implementation in patients who are candidates for these guideline-driven therapies are substandard by a wide margin. This is critically important, as it has now been demonstrated that patients cared for in hospitals that adhere to MI treatment guidelines have a significantly better outcomes than patients treated in facilities with low adherence to these guidelines.

The American Heart Association launched its Get With The Guidelines program to address this treatment gap. Get With the Guidelines is a prospective, hospital-based intervention...
program to increase compliance with coronary artery disease secondary prevention treatment guidelines by the time of hospital discharge.28 Get With The Guidelines is based on established AHA/ACC guidelines and provides a web-based hospital tool kit and a patient management tool that can be individualized for each patient’s particular characteristics. It also serves as a program for continuing medical education for healthcare providers and best practice examples for hospitals. If 75% of patients with acute MI are enrolled in Get With The Guidelines at discharge with an 85% adherence rate to secondary prevention guidelines, it is estimated that 80,000 lives would be saved annually. This represents one-third of our goal of reducing cardiovascular deaths by 25%.

Through the Get With The Guidelines program, the AHA has taken an important step, moving from developing guidelines to helping medical professionals and patients implement them.

To achieve our 2010 goal, we also must better translate our science discoveries to patients. The American Heart Association’s new web-based Heart Profiler communicates guideline information to practitioners and patients.29 The Heart Profiler is an interactive program that provides credible, scientifically accurate information based on clinical trials and guideline recommendations that is tailored to individual patient characteristics. Five profilers are available: coronary artery disease, heart failure, hypercholesterolemia, hypertension, and atrial fibrillation. Providing credible information to the patient will serve to strengthen the partnership between patients and doctors and nurses.

Get With The Guidelines and Heart Profilers help physicians improve care to patients through secondary prevention guidelines. Equally important is adherence to the National Cholesterol Education Program’s Advanced Treatment Panel (ATP) III guidelines and the AHA’s primary prevention guidelines, which place a new emphasis on primary prevention in people with multiple risk factors.30,31 We also cannot lose sight of risk factors in our children, because if untreated, they will lead to the next wave of the cardiovascular disease epidemic.32,33

Effectively translating knowledge and implementing it in the community also requires addressing specific issues related to at-risk populations. Identifying and addressing healthcare disparities is critically important if we are to achieve our 2010 goals.34 In the year 1999, the Centers for Disease Control and Prevention (CDC) and West Virginia University published Women and Heart Disease: An Atlas of Racial and Ethnic Disparities in Mortality,35 which was followed two years later by a companion volume on Men and Heart Disease.36 These volumes point out the marked disparities that occur in the United States on the basis of sex, race, ethnicity, and region.

In particular, these data underscore the strikingly poor outcomes of black men compared with white men. Among men age 55 to 64, black men have twice the death rate from heart disease and three times the death rate from stroke.36 There is also troubling evidence of racial and ethnic disparities in treatment decisions. In 81 studies recently reported by the Kaiser Family Foundation and ACC, 84% found evidence of reduced diagnostic testing, procedures, and medical therapy in patients in racial and ethnic minorities.37 The reason for these results is multifactorial and does not necessarily reflect bias on the part of the practitioner alone. Additional important contributing factors include access to insurance coverage, language and cultural barriers, and trust in the healthcare system. The AHA is partnering with the Kaiser Family Foundation, the ACC, and the Association of Black Cardiologists to better understand and address this major problem.

One way to address the problem of disparities is through programs directed at specific groups. To reach minority populations with important health information, the AHA created Search Your Heart. This faith-based program is established primarily in the inner cities for the medically underserved, high-risk segments of our population. Important cardiovascular health messages are delivered through the 5000 places of worship enrolled in this program nationwide.

Balancing Discovery and Translation

What steps are we taking to further research and the translation of science to reduce the worldwide epidemic of heart disease and stroke? Both research and research translation are essential to reduce cardiovascular disease prevalence, incidence, and mortality, and this can only be achieved through strengthening the partnership between the research scientist and the healthcare professional who does the translation.

In October 2002, the World Health Organization (WHO) released its World Health Report 2002, which shows that cardiovascular disease mortality and morbidity can be reduced more than 50% by implementing concerted, prospective preventive measures.38 Governments, healthcare providers, and the public must hear this public health message clearly. The global cardiovascular epidemic can only be overcome through strategic, collaborative, and international partnerships.

The AHA has forged a formal memorandum of understanding with the US Department of Health and Human Services10 and has participated extensively in the process initiated by CDC to develop the National Action Plan to Prevent Heart Disease and Stroke, scheduled for implementation in February of 2003. Through this plan, we hope to stimulate more physicians and nurses to participate in cardiovascular prevention in the office and in the community. Indeed, it was concerned and forward-thinking physicians and nurses experiencing the impact of heart disease first-hand who determined that coordinated efforts were needed to confront the clinical and societal issues in the United States in the early 1900s, and who were instrumental in forming the AHA more than 75 years ago.

The AHA is about research and translation. We must continue our commitment to the twin objectives of discovering new knowledge and transferring it to clinical practice and to the community. Physicians, nurses and other healthcare providers need to support research and advocate increased funding. To support translation, scientists need to become more knowledgeable about the challenges of community implementation, such as disparities, and take action to reduce or eliminate them. Clinicians must implement guidelines in their practice, and programs such as Get With The Guidelines.
provide systems to facilitate this process. We all need to work together in developing and strengthening our strategic partnerships with organizations that can advocate research and quality of health care, such as the ACC and the American Diabetes Association; with key strategic partners like the AHA Pharmaceutical Roundtable; with federal agencies such as the NIH, the CDC, and the Center for Medicare and Medicaid Services; and with international organizations such as the WHO, the World Heart Federation, and the many international partner organizations represented each year at our Scientific Sessions.

As members of the community of science and medicine, we are no strangers to challenges. We face them every day. But history has also shown that in the face of enormous challenges, we find innovative solutions. We have been finding solutions since the first Scientific Sessions in 1925, and we can find solutions now. It is through our individual and collective efforts that we will strike the right balance between the discovery and the translation of science and, in doing so, take action to reduce the toll of the global cardiovascular epidemic.

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