It is a privilege and an honor to speak with the scientific community about the need to integrate the behavioral and social sciences with the biomedical sciences and how this relates to the mission of the American Heart Association. My observations and thoughts are influenced by my experiences as a nurse researcher and behavioral scientist at Johns Hopkins, where I have been involved in a research program on high blood pressure control in urban black communities.

Tremendous advances in biology are providing new knowledge about genetics, physiology, pathophysiology, and disease, creating exciting opportunities for clinical research. From the laboratory this research evolves into new applications for diagnosis, therapy, and prevention in humans. At the same time, important advances in behavioral science, clinical outcomes, and healthcare delivery have provided needed knowledge about prevention and treatment. This research transitions from the healthcare setting into the community.

Individuals’ lifestyles significantly impact their health, with unhealthy habits accounting for about 54% of known contributions to heart disease. Behavioral and biological interventions can reduce morbidity, disability, and death due to heart disease and stroke. They can improve quality of life and influence the behavior of policy makers in their decisions, health professionals in their practice, and people in their daily lives.

However, there is a gap between the efficacy of interventions in studies and their effectiveness in practice, a gap between potential and reality, intention and action, and information and behavior. This gap illustrates the urgent need to more fully integrate the social and behavioral sciences with the biomedical sciences. Three questions arise:

- Why does the gap exist?
- Why must it be closed?
- What are we, as scientists and the AHA, doing to close it?

The Gap

Despite extensive studies of strategies to prevent and treat risk factors for heart disease and stroke, current evidence documents disappointing slow, and in many cases limited, implementation of these therapies in practice and daily life. The following examples of underdiagnosed and insufficiently treated risk factors illustrate this point.

Adherence to National Cholesterol Education Program treatment goals in almost 3000 postmenopausal American women with documented coronary heart disease was reported earlier this year by investigators from the Heart and Estrogen-Progestin Replacement Study (HERS). In 1993 and 1994, baseline measurements were made of lipids and lipoproteins, frequency of achieving the 1988 and 1993 Adult Treatment Panel treatment goals, and being on a regimen of lipid-lowering medication. The distribution of plasma LDL cholesterol levels showed that 36.6% of participants had a cholesterol level <130 mg/dL and attained the ATP I treatment goal. In 1993, when the ATP II treatment goals were published, 9.6% of these women had LDL cholesterol levels <100 mg/dL (Figure). Forty-seven percent of participants were taking lipid-lowering medications. Almost two thirds of women with LDL cholesterol levels <130 mg/dL were treated with lipid-lowering drugs. Only one third of the women with LDL cholesterol levels >160 mg/dL were taking a lipid-lowering agent.

The National Health and Nutrition Examination Surveys (NHANES) documented impressive increases in rates of awareness, treatment, and control of hypertension from 1960 to 1991. In 1960 to 1962 and 1971 to 1974, only 16% of all people with hypertension had it controlled to <160/95 mm Hg. By 1991 64% were below this original goal. However, with increasing evidence of the benefits of lower blood pressure, in 1988 the Fourth Joint National Committee reset the goal at <140/90 mm Hg.

In Phase 1 of the third NHANES, conducted from 1989 to 1991, 29% of participants were below the treatment goal level. In Phase 2, from 1991 to 1994, analysis showed decreases in awareness, treatment, and control rates, with only 27% below the goal level (Table). These are two of many examples of...
Blood Pressure in Adults: United States, 1976-1994*

Trends in the Awareness, Treatment, and Control of High Blood Pressure in Adults: United States, 1976-1994

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>51%</td>
<td>73%</td>
<td>68.4%</td>
</tr>
<tr>
<td>Treatment</td>
<td>31%</td>
<td>55%</td>
<td>53.6%</td>
</tr>
<tr>
<td>Control</td>
<td>10%</td>
<td>29%</td>
<td>27.4%</td>
</tr>
</tbody>
</table>

*Data are for adults aged 18 to 74 years with systolic blood pressure \( \geq 140 \) mm Hg, diastolic blood pressure \( \geq 90 \) mm Hg, or taking antihypertensive medication.

1Systolic blood pressure \( > 140 \) mm Hg and diastolic blood pressure \( > 90 \) mm Hg.

From the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure1,4 and published data (NHANES III, Phase 2, Centers for Disease Control and Prevention, National Center for Health Statistics).

Why Does the Gap Exist?

There are powerful reasons why the results of clinical trials have historically been difficult to generalize and apply to diverse and large groups in the “real world.” First, in the biomedical community the emphasis has been on basic science and its translation into clinical research. The struggle for how much work remains to be done in risk factor management.

A third example shows startling improvements in survival when social and behavioral strategies are used at the community level. In Rochester, Minn, survival rates after witnessed cardiac arrest increased to 30% after public education about signals and actions for heart attack. Because police often arrived at least 2 minutes before other emergency personnel, they were given automatic external defibrillators, and survival rates jumped to 49%. The major determinants of survival were the 911-call-to-shock time and return of spontaneous circulation after initial shocks without the need for advanced life support.5

Funding priority between this research and research in demonstration and education and research in dissemination of knowledge has handicapped our understanding of how to implement interventions shown to be effective in clinical trials. For example, in a review of the literature on the impact of medication nonadherence on coronary heart disease outcomes, no clinical trials that specifically tested the impact of a compliance-enhancing intervention were identified.6

Second, steady advances in scientific knowledge and the ability of physicians to diagnose and intervene have generated several expectations. One is that if experts come to a consensus and disseminate practice guidelines to practitioners, the recommendations will be implemented, practice will improve, and patients will benefit. Another is that if physicians know the cause of a patient’s illness, select the appropriate therapy, and tell the patient what to do, the patient will do it, and the problem will be solved.

In fact, the physician’s behavior is influenced by many factors, a growing number of which are beyond his or her control. The patient’s behavior is also complex and influenced by many factors. Physical and social environments, the healthcare system, and policies are important. They influence awareness, knowledge and desire to change behavior, skills to change behavior, and changes in risky behavior. These are all precursors to risk factor modification and reductions in cardiovascular disease, disability, and death.

Third, the organizational structure, staffing, and reimbursement of academic medical centers do not encourage interdisciplinary health education and promotion. Yet large trials such as the Multiple Risk Factor Intervention Trial (MRFIT); Hypertension Detection, Follow-up, and Prevention (HDFP)8,9; the Lipid Research Clinics Coronary Primary Prevention Trial (LRC-CRP); and the Systolic Hypertension in the Elderly Program (SHEP11 have shown that patient care and risk factor management improve when nurses, physicians, pharmacists, and other health professionals share roles and responsibilities and when interventions are based on sound principles of health education and behavioral science. These efficacious interdisciplinary approaches are addressed briefly, if at all, in most practice guidelines.12 Formal integrated interdisciplinary teams are the exception, not the norm, in most inpatient and ambulatory care settings.

Finally, I propose a new paradigm for risk factor management that recognizes the importance of the social and behavioral sciences. Boundaries are changing among those responsible for primary prevention and secondary prevention, populations at risk and people at risk, health promotion and health protection, as well as in individual and societal responsibilities.

What was once considered within the purview of medicine, nursing, or public health can be readily found in the research and practice of the other professions. At Johns Hopkins, faculty and students from the Schools of Medicine, Nursing, and Public Health are collaborating on clinic- and community-based educational and behavioral interventions implemented by a nurse practitioner-community health worker-physician team to improve care and control of high blood pressure. In addition, in this clinical trial, investigators from nursing and cardiology are working...
together to assess genetic and physiological factors. This comprehensive interdisciplinary approach to improving patient outcomes is designed to integrate the biomedical sciences with the social and behavioral sciences.

**Why Must the Gap Be Closed?**
The gap between what we know and what we do must be closed if the AHA is to meet its mission to reduce disability and death due to cardiovascular disease and stroke.

The gap must be closed because there is an emerging global epidemic of cardiovascular disease and stroke, and these problems are, in large and increasing part, preventable. The gap must be closed because heart disease and stroke are the most prevalent, expensive, chronic diseases of lifestyle, and chronic diseases are our most serious health threat. The gap must be closed if we are to meet expectations of the community as well as government and other regulatory authorities to improve outcomes.

The gap must be closed because in the current era of cost containment we cannot afford not to close it. And the gap must be closed because it is the right thing to do, the moral and ethical thing to do.

**What Are We, as Scientists and the AHA, Doing to Close the Gap?**
To close the gap, I propose that we, as scientists, take the following steps.

1. **Recognize the broad continuum of science**
   We must recognize and embrace the broad continuum of science relevant to the AHA mission. Closing the gap calls for translation of research not only from the bench to the bedside but from the hospital to the ambulatory care center and into the home and community. While we anticipate the role of genetics in prevention and treatment, we must tap all available talent to improve health behavior in the information age. This will require the same support, commitment, and enthusiasm given to biomedical research.

   The fundamental importance of basic science must be protected. However, the AHA must address the entire continuum of science relevant to its mission. Five years ago the association established the Behavioral, Science, Epidemiology, and Prevention Study Group and began to fund research on educational and behavioral change strategies. The association’s science activities are now organized around three interrelated areas: laboratory, clinical, and community/preventive. The AHA recognizes that the behavioral sciences, including health education, focus on the many individual, interpersonal, social, and cultural factors that can inhibit or promote changes in health behavior.

2. **Identify and set science priorities and strategies**
   Important challenges and questions confront us as we demonstrate effectiveness in the real world. What kinds of studies are needed to better understand how to prevent disease? What kind of evidence is needed and how much? What is the problem? How can we overcome the barriers to improving health and reducing disability and death? As we test approaches to improving health at the individual and community levels, we must move beyond who does it to getting it done (behavior) and documenting the difference it makes (results/outcomes).

   Through the Office of Communications and Public Advocacy in Washington, DC, the AHA works to incorporate cardiovascular disease and stroke science into Congressional report language for the National Institutes of Health (NIH). This year’s efforts to highlight scientific opportunities focused on the origins of atherosclerosis, congestive heart failure, congenital heart disease, and healthful lifestyle. The AHA is also working to ensure enactment of the 7.1% increase over current funding agreed to by the House-Senate conference and is actively involved in efforts with Research!America and other organizations to double the NIH budget by the year 2002.

   Each of us has the responsibility to communicate with our congressional representatives. Please, take action now. Write the President. Join the AHA grassroots network.

3. **Develop health promotion skills of health professionals and the public**
   We can close the gap faster if we encourage patients, providers, and the healthcare system to work together as partners and develop the necessary skills. Providers need help in knowing what to do and how to do it, and patients need help in making decisions about treatment and developing strategies to meet their goals.

   Professional and patient education now requires active learning techniques and consideration of cultural and environmental factors. This is where interdisciplinary teams with the appropriate mix of expertise and competencies can maximize patient outcomes. We have an opportunity to influence the evolution of the healthcare system. If managed care is to be successful, it must support prevention activities in humanistic ways.

   The AHA continues to bring together different disciplines with expertise in the behavioral as well as biological sciences to guide us in the development of policy and scientific statements that are the basis for its patient and public education information. Some examples are

   - The Expert Panel on Awareness and Behavior Change, chaired by Richard Carleton
   - Optimal Risk Factor Management in the Patient After Coronary Revascularization, chaired by Thomas Pearson and Elliott Rapaport
   - Preventing Heart Attack and Death in Patients With Coronary Disease, chaired by former AHA President Sidney Smith
   - Guide to Primary Prevention of Cardiovascular Disease, chaired by Scott Grundy
   - The Multilevel Compliance Challenge, cochaired by Nancy Houston Miller and Martha Hill

The AHA is developing a comprehensive approach to risk factor management, “The Compliance Action Program,” which will involve patients, providers, and the healthcare system. The Women’s Health Campaign is another major new program aimed at women and their healthcare providers.

These programs are based on expanded interdisciplinary health-focused models. They recognize the importance of the public’s growing use of self-help materials as well as cultural
and ethical issues in communities and patients’ lives. The professional education components address new realities in practice settings and the advantages of new technologies.

4. Reach out to a broader constituency

To close the gap, we must broaden our reach to provide increased access to our messages. One way the AHA is doing this is by renewing previous partnerships while forming new ones. Other stakeholders include

- Research!America
- The American College of Cardiology
- The North American Vascular Biology Organization
- The Centers for Disease Control and Prevention
- The Health Care Finance Administration
- The Health Employers Data Information Set
- The National Committee for Quality Assurance
- The High Blood Pressure, Cholesterol, and Heart Attack Alert Education Programs of the National Heart, Lung, and Blood Institute
- Members of the AHA Pharmaceutical Roundtable

These collaborations need our thought and support. To succeed, we must reach further into diverse and disadvantaged communities and form more effective partnerships. Even with all of this focused activity, much remains to be done. The AHA has the talent and resources to bridge the gap and accelerate its closing by developing and implementing new interdisciplinary knowledge.

The AHA is expanding the scope of its research program. A new initiative is planned to promote cutting-edge research in behavioral science and health services to improve patient care and outcomes. The call for proposals will be available March 1, 1998.

This initiative is made possible by the new members of the AHA Pharmaceutical Roundtable. Through their generosity, the AHA will be able to fund not only this new initiative but also its established research program.

I pledge my commitment to retain the AHA’s world-class reputation in science and its position as the American public’s most credible source of cardiovascular and stroke information. This will require the involvement of the very best behavioral and biological scientists, funding of only the most meritorious research, and dissemination of the most valid and useful information. Our mission challenges us to use more effective strategies to improve the health of populations and individuals, especially those at high risk, so that they can benefit in their daily lives. I urge you to join the AHA and me in closing the gap between what we know can work and what we do.

Let us begin by recognizing that behavior and biology are the sciences basic to AHA action.

References


Key Words: AHA Medical/Scientific Statements | risk factors | prevention | lifestyle