APPENDIX A: GLOSSARY

The following brief definitions or explanations apply to technical or common terms used specifically in the *Action Plan*. For more detailed definitions, standard reference works should be consulted.

acute case management: an intervention approach in which individual cardiovascular disease (CVD) events (e.g., heart attack, heart failure, stroke) are treated as they occur.

age-adjusted death rate: the number of deaths occurring per 100,000 population per year, calculated in accordance with a standard age structure to minimize the effect of age differences when rates are compared between populations or over time.

Alzheimer's disease: the most common cause of dementia, or decline in mental function, characterized by degeneration of nerve cells and loss of brain substance, most common among people older than age 65 years.

assessment: the obligation of every public health agency to monitor the health status and needs of its community regularly and systematically; one of the three core functions of public health.

assurance: the guarantee of governments that agreed-upon, high-priority, personal and community health services will be provided to every member of the community by qualified organizations; one of the three core functions of public health.

atheroma: a concentrated area of mushy material within the wall of an artery, often encrusted or hardened (sclerosed) by deposited calcium, that is the pathological hallmark of atherosclerosis.

atherosclerosis: a pathological condition affecting the medium-sized and larger arteries, especially those that supply the heart (the coronary arteries), the brain (the carotid and cerebral arteries), and the lower extremities (the peripheral arteries), as well as the aorta; underlies the occurrence of heart attacks, many strokes, peripheral arterial disease, and dissection or rupture of the aorta.

behavioral change: an intervention approach that uses public information and education to promote behavioral patterns favorable to health for the population as a whole; also includes interventions (e.g., counseling) at the group or individual level for the same purpose.

behavioral patterns: habits of living (e.g., diet, physical activity, smoking) that influence health.

blood cholesterol: the blood concentration of a family of lipid or "fatty" molecular compounds obtained directly from the diet or produced in the body from fatty dietary components; a necessary factor in development of atherosclerosis; total cholesterol concentration is classified as "high" if it is ≥200 mg/dl. Subtypes of cholesterol differ in their relation to CVD risk, with high-density lipoprotein (HDL) cholesterol considered "good," and low-density (LDL) cholesterol considered "bad."

blood pressure: see *high blood pressure*.

cardiovascular disease prevention: a set of interventions designed to prevent first and recurrent CVD events (e.g., heart attack, heart failure, stroke). For CVD, *primary prevention* refers to detection and control of risk factors, whereas *secondary prevention* includes long-term case management for survivors of CVD events. CVD prevention complements cardiovascular health (CVH) promotion.

cardiovascular disease(s): may refer to any of the disorders that can affect the circulatory system, but often means coronary heart disease (CHD), heart failure, and stroke, taken together.

cardiovascular health: a combination of favorable health habits and conditions that protects against development of cardiovascular diseases.

cardiovascular health promotion: a set of interventions designed to reduce a population's risk for CVD through policy, environmental, and behavioral changes; also supports other approaches that apply to people who have suffered recognized CVD events (e.g., by facilitating public access to emergency care or by fostering social/environmental and behavioral changes that reinforce *secondary CVD prevention*); sometimes identified with *primordial CVD prevention*; complements CVD prevention.

carotid arteries: the four main arteries of the head and neck, which supply blood to the brain and elsewhere in the head.

case fatality rate: the proportion of cases of a disease event ending in death within a defined interval (e.g., 41% of those experiencing a first heart attack die within 28 days of onset of the attack).

cerebral arteries: blood vessels connecting the internal carotid arteries with the brain.

cerebral hemorrhage: rupture of a cerebral blood vessel, characterized by accumulation of blood at the site of the rupture and loss of blood supply beyond the point of rupture, often leading to a sudden focal loss of brain function or stroke.

cholesterol: see *blood cholesterol*.

chronic kidney (renal) disease: long-term impairment of kidney function often leading to high blood pressure or kidney failure; may be treated with medication, kidney transplantation, or dialysis.

circulatory system: the network of arteries, veins, capillaries, and lymphatic vessels throughout the body, including the heart, that pumps blood to the lungs and peripheral tissues.

comprehensive public health strategy: an approach to a major health problem in the population that identifies and employs the full array of potential public health interventions, including health promotion and disease prevention.

congestive heart failure: see *heart failure*.

core functions of public health: the three main areas of responsibility of official public health agencies as defined by the Committee for the Study of the Future of Public Health: assessment, policy development, and assurance.

coronary arteries: the arteries that supply blood to the heart muscle and whose narrowing or occlusion constitutes coronary heart disease and can precipitate a heart attack.

coronary heart disease: heart disease caused by impaired circulation in one or more coronary arteries; often manifests as chest pain (angina pectoris) or heart attack.

CVD prevention: see *cardiovascular disease prevention*.

CVH promotion: see *cardiovascular health promotion*.

diabetes (or diabetes mellitus): a metabolic disorder resulting from insufficient production or utilization of insulin, commonly leading to cardiovascular complications.

diastolic blood pressure: see *high blood pressure*.

dietary imbalance: a pattern of dietary intake that lacks a desirable combination and overall intake of foods and nutrients to promote good health (e.g., excessive intake of saturated fat, salt, total calories).

disparities: see *health disparities*.

economic development: the long-term process of economic growth in developing countries or economically disadvantaged areas of developed countries; can influence the health of residents favorably or unfavorably.

emergency care: treatment for people who have experienced a first or recurrent acute CVD event (e.g., heart attack, heart failure, stroke) designed to increase their probability of survival and to minimize associated damage or disability.

end-of-life care: treatment for late or terminal complications of CVD designed to minimize suffering and preserve the dignity of those treated.

epidemiology: the study of the causes and prevention of disease in populations or communities, making it the main source of evidence for public health decision making.

evidence-based medicine: the use of agreed-upon standards of evidence in making clinical decisions for treating individual patients or categories of patients.

evidence-based public health: the use of agreed-upon standards of evidence in making decisions about public health policies and practices to protect or improve the health of populations.

health disparities: differences in the burden and impact of disease among different populations, defined, for example, by sex, race or ethnicity, education or income, disability, place of residence, or sexual orientation.

Healthy People 2010: a document that presents health-related goals and objectives for the United States to be achieved by the year 2010.

Healthy People 2010 Heart and Stroke Partnership: established to achieve the *Healthy People 2010* goal for preventing heart disease and stroke. The members of the partnership divided this goal into four separate ones: prevention of risk factors, detection and treatment of risk factors, early detection and treatment of heart attacks and strokes, and prevention of recurrent cardiovascular events. This partnership was established by the American Heart Association/American Stroke Association, Centers for Disease Control and Prevention, Centers for Medicare & Medicaid Services, National Institutes of Health, and Office of Public Health and Science, U.S. Department of Health and Human Services.

heart attack: an acute event in which the heart muscle is damaged because of a lack of blood flow from the coronary arteries, typically accompanied by chest pain and other warning signs but sometimes occurring with no recognized symptoms (i.e., “silent heart attack”).

heart disease: any affliction that impairs the structure or function of the heart (e.g., atherosclerotic and hypertensive diseases, congenital heart disease, rheumatic heart disease, and cardiomyopathies).

Heart Disease and Stroke Control Program: a program established by the National Heart Act of 1948 through which the federal government supported state efforts to prevent and control heart disease and stroke; terminated in 1970.

Heart Disease and Stroke Prevention Program: a CDC program initiated in 1998 that supports states in their efforts to prevent heart disease and stroke; for more information see www.cdc.gov/cvh/stateprogram.htm.

heart failure: impairment of the pumping function of the heart as the result of heart disease; heart failure often causes physical disability and increased risk for other CVD events.

high blood pressure: a condition in which the pressure in the arterial circulation is greater than desired; associated with increased risk for heart disease, stroke, chronic kidney disease, and other conditions; blood pressure is considered “high” if systolic pressure (measured at the peak of contraction of the heart) is ≥140 mm Hg or if diastolic pressure (measured at the fullest relaxation of the heart) is ≥90 mm Hg.

high-risk approach: an intervention strategy that targets only people with the highest levels of recognized CVD risk factors for the purpose of reducing their level of risk to that of the most favorable level in the population; distinct from and complementary to the *population-wide approach*.

hypertension: see *high blood pressure*.

hypertensive heart disease: abnormality in the structure and function of the heart caused by long-standing high blood pressure; often manifests as heart failure.

incidence: the number of new cases of disease occurring in a population of given size within a specified time interval (e.g., the average annual incidence of stroke for women in Rochester, Minnesota, during 1985–1989 was approximately 120/100,000 population).

individual approach: see *high-risk approach*.

Inter-Society Commission for Heart Disease Resources: a commission established under U.S. Public Law 89-239 as part of the Regional Medical Programs Service; responsible for producing guidelines defining optimal medical resources and care for the prevention and treatment of cardiovascular diseases in the United States.

life cycle: the course of human development from conception until death, including gestation; infancy; childhood; adolescence; and early, middle, and late adulthood; important for targeting health promotion and disease prevention efforts to the distinct needs of people in each phase.

long-term case management: an intervention approach that targets survivors of CVD events; designed to reduce disability and the risk for recurrent events.

modifiable characteristics: factors related to CVD risk that are amenable to change (e.g., diet, physical activity, smoking), in contrast to those that are intrinsic to the individual (e.g., age, sex, race, genetic traits).

mortality: rate of death expressed as the number of deaths occurring in a population of given size within a specified time interval (e.g., 265 annual deaths from heart disease per 100,000 U.S. Hispanic women, 1991–1995).

obesity: usually defined in terms of body mass index (BMI), which is calculated as body weight in kilograms (1 kg = 2.2 lbs) divided by height in meters (1 m = 39.37 in) squared; adults with a BMI of ≥30.0 kg/m^2 are considered “obese,” and those with a BMI of 25–29.9 kg/m^2 are considered “overweight.” In children, overweight is defined as BMI greater than the 95th percentile value for the same age and sex group.

overt disease: for CVD, disease with signs or symptoms that are recognizable by the affected individual or health care provider.

overweight: see *obesity*.

peripheral arteries: arteries in the upper and lower extremities (arms and legs).

peripheral arterial disease: mainly atherosclerosis of the extremities; especially important in the lower extremities; also called peripheral vascular disease.

physical inactivity: lack of habitual activity sufficient to maintain good health, resulting in an unfavorable balance between energy intake and expenditure and fostering the development of overweight or obesity and other risk factors for heart disease and stroke.

plaque: the characteristic manifestation of atherosclerosis located in the arterial wall and extending into the lumen or channel of the artery; plaque can disturb or restrict blood flow and is prone to fissure or rupture, thus precipitating formation of blood clots that can cause an acute coronary event.

policy and environmental change: an intervention approach to reducing the burden of chronic diseases that focuses on enacting effective policies (e.g., laws, regulations, formal and informal rules) or promoting environmental change (e.g., changes to economic, social, or physical environments).

population-based observations: health data that pertain to a defined, usually large, population (e.g., vital statistics, surveillance, results of population surveys).

population-wide approach: an intervention strategy that targets the population as a whole without regard to the risk levels of various subgroups; distinguished from and complementary to the *high-risk approach*.

prevalence: the frequency of a particular condition within a defined population at a designated time (e.g., 12.6 million Americans living with heart disease in 1999 or 36.4% of African American men aged 20–74 years found to have hypertension in a survey conducted in 1988–1994).

prevention research: aims to prevent disease and promote health by developing and disseminating strategies applicable to public health programs and policies.

preventive dose: the intensity and duration of appropriate public health interventions needed to achieve their goals; similar to the dose and duration of medical treatment sufficient to control or cure an illness.

primary CVD prevention: a set of interventions, including the detection and control of risk factors, designed to prevent the first occurrence of heart attack, heart failure, or stroke among people with identifiable risk factors; this approach corresponds most directly to the objectives of goal 2 for preventing heart disease and stroke of the Healthy People 2010 Heart and Stroke Partnership.

primordial CVD prevention: a set of interventions targeting people without risk factors or CVD (including the maintenance or restoration of favorable social and environmental conditions and the promotion of healthy behavioral patterns) to prevent development of risk factors; this approach corresponds most directly to the objectives of goal 1 for preventing heart disease and stroke of the Healthy People 2010 Heart and Stroke Partnership. Although this approach was originally intended to apply to whole societies to prevent the first appearance of epidemic levels of risk factors, the term is commonly used in the sense of "early intervention" to prevent risk factors in individuals even in populations where risk factors are already epidemic; in the *Action Plan*, "CVH promotion" is used as equivalent to "primordial prevention."

priority populations: groups at especially high risk for CVD (e.g., those identified by sex, race or ethnicity, education, income, disability, place of residence, or sexual orientation).

randomized controlled trial: an experimental study of an intervention, most often a medical treatment, in which study participants are randomly assigned to treatment or comparison groups; much less often, communities rather than individuals are the units used to form treatment and comparison groups.

rehabilitation: an intervention approach designed to limit disability among survivors of CVD events and reduce their risk for subsequent events.

risk behavior: a behavioral pattern associated with increased frequency of specified health problems; for example, high salt intake, smoking, and binge drinking are all associated with CVD.

risk factor: an individual characteristic associated with increased frequency of specified health problems; for example, high LDL cholesterol, high blood pressure, and diabetes are all associated with CVD.

risk factor detection and control: an intervention approach that targets people with identifiable risk factors; includes both screening or other methods of detection and long-term disease management through changes in lifestyle, behavior, medication (when necessary).

secondary CVD prevention: a set of interventions aimed at survivors of acute CVD events (e.g., heart attack, heart failure, stroke) or others with known CVD in which long-term case management is used to reduce disability and risk for subsequent CVD events; this approach corresponds most directly to the objectives of goal 4 for preventing heart disease and stroke of the Healthy People 2010 Heart and Stroke Partnership.

stroke: sudden interruption of blood supply to the brain caused by an obstruction or the rupture of a blood vessel.

subclinical disease: presence of one or more forms of CVD (e.g., atherosclerosis, coronary heart disease) detectable only by special examination (e.g., ankle-arm blood pressure ratio, carotid artery ultrasound examination, electrocardiogram) and not recognizable from signs or symptoms expressed by the affected person.

survival: remaining alive for a specified period (e.g., beyond the 28-day definition of case fatality) after a CVD event.

tertiary CVD prevention: an intervention approach included in secondary prevention, as it is used in the *Action Plan*; sometimes distinguished as reducing disability among survivors of CVD events through rehabilitation; this approach combined with secondary prevention corresponds most directly to the objectives of goal 4 for preventing heart disease and stroke of the Healthy People 2010 Heart and Stroke Partnership.

vascular cognitive impairment: loss of mental function that occurs in association with a stroke, sometimes followed by dementia.

APPENDIX B: NATIONAL GOALS AND OBJECTIVES

The matrix in this appendix matches the *Healthy People 2010* objectives most pertinent to heart disease and stroke with the four goals identified by the Healthy People 2010 Heart and Stroke Partnership. These goals are based on Chapter 12, Heart Disease and Stroke, of *Healthy People 2010*. In addition to the 16 objectives listed in this chapter, 48 objectives in other chapters could, if addressed, help to achieve the four goals.

		Goal 1 Prevention of risk factors	Goal 2 Detection and treatment of risk factors	Goal 3 Early detection and treatment of heart attacks and strokes	Goal 4 Prevention of recurrent cardiovascular events
Objectives from Chapter 12, Heart Disease and Stroke					
12-1	Coronary heart disease (CHD) deaths	X	X	X	X
12-2	Knowledge of symptoms of heart attack and importance of calling 911 (D*)			X	
12-3	Artery-opening therapy (D)			X	
12-4	Bystander response to cardiac arrest (D)			X	
12-5	Out-of-hospital emergency care (D)			X	
12-6	Heart failure hospitalizations				X
12-7	Stroke deaths	X	X	X	X
12-8	Knowledge of early warning symptoms of stroke (D)			X	X
12-9	High blood pressure	X	X		X
12-10	High blood pressure control		X		X
12-11	Action to help control blood pressure		X		X
12-12	Blood pressure monitoring	X	X		
12-13	Mean total blood cholesterol levels	X	X		X
12-14	High blood cholesterol levels	X	X		X
12-15	Blood cholesterol screening	X	X		X
12-16	LDL-cholesterol level in CHD patients (D)				X
Objectives from Chapter 1, Access to Quality Health Services					
1-3	Counseling about health behaviors	X	X	X	X
1-7	Core competencies in health provider training (D)	X	X	X	X
1-10	Delay or difficulty in getting emergency care (D)			X	
1-11	Rapid prehospital emergency care (D)			X	
Objectives from Chapter 4, Chronic Kidney Disease					
4-2	Cardiovascular (CVD) deaths in persons with chronic kidney failure			X	X
Objectives from Chapter 5, Diabetes					
5-2	New cases of diabetes	X			
5-4	Prevent diabetes	X			
5-7	Cardiovascular deaths in persons with diabetes	X	X		X
Objectives from Chapter 7, Educational and Community-Based Programs					
7-2	School health education	X	X	X	X
7-5	Worksite health promotion programs	X	X	X	X
7-8	Satisfaction with patient education (D)	X	X	X	X
7-10	Community health promotion programs (D)	X	X	X	X
7-11	Culturally appropriate community health promotion	X	X	X	X
7-12	Older adult participation in community health promotion activities	X	X	X	X

		Goal 1 Prevention of risk factors	Goal 2 Detection and treatment of risk factors	Goal 3 Early detection and treatment of heart attacks and strokes	Goal 4 Prevention of recurrent cardiovascular events
Objectives from Chapter 11, Health Communication					
11-1	Households with Internet access	X	X	X	X
11-2	Health literacy (D)	X			
11-4	Quality of Internet health information sources	X	X	X	X
11-6	Satisfaction with providers' communication skills (D)	X	X	X	X
Objectives from Chapter 19, Nutrition and Overweight					
19-1	Healthy weight in adults	X			X
19-2	Obesity in adults	X	X		X
19-3	Overweight or obesity in children and adolescents	X	X		
19-5	Fruit intake	X			
19-6	Vegetable intake	X			
19-8	Saturated fat intake	X			
19-9	Total fat intake	X			
19-11	Calcium intake	X			
19-16	Worksite promotion of nutrition education and weight management	X	X	X	X
Objectives from Chapter 22, Physical Activity and Fitness					
22-1	No leisure-time physical activity	X			X
22-2	Moderate physical activity	X			X
22-3	Vigorous physical activity	X			X
22-6	Moderate physical activity in adolescents	X			
22-7	Vigorous physical activity in adolescents	X			
22-11	Television viewing	X			
22-13	Worksite physical activity and fitness	X			X
22-14	Community walking	X			X
22-15	Community bicycling	X			X
Objectives from Chapter 23, Public Health Infrastructure					
23-1	Public health employee access to Internet (D)	X	X	X	X
23-3	Use of geocoding in health data systems	X	X	X	X
23-10	Continuing education and training by public health agencies (D)	X	X	X	X
23-16	Data on public health expenditures (D)	X	X	X	X
Objectives from Chapter 27, Tobacco Use					
27-1	Adult tobacco use	X			X
27-2	Adolescent tobacco use	X			
27-3	Initiation of tobacco use (D)	X	X	X	X
27-4	Age at first use of tobacco	X			
27-5	Smoking cessation by adults	X	X		X
27-10	Exposure to environmental tobacco smoke	X			
27-16	Tobacco advertising and promotion targeting adolescents and young adults (D)	X	X	X	X
27-17	Adolescent disapproval of smoking	X	X	X	X

* Developmental (D) objectives provide a vision for a desired outcome or health status. All other objectives are considered measurable objectives, which provide direction for action.

Source: US Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health and Objectives for Improving Health.* 2nd ed. 2 vols. Washington, DC: US Government Printing Office; November 2000.

APPENDIX C: PROFILES OF THE CO-LEAD AGENCIES FOR THE *HEALTHY PEOPLE 2010* HEART DISEASE AND STROKE FOCUS AREA

The Centers for Disease Control and Prevention and the National Institutes of Health are co-lead federal agencies responsible for undertaking activities to move the nation toward achieving the *Healthy People 2010* goal for preventing heart disease and stroke and for reporting progress on the objectives for this focus area over the next decade. The following profiles highlight the work of these agencies in heart disease and stroke prevention. An exhaustive account of these and related activities is beyond the scope of this document, but further details and updates can be obtained from each agency's Web site.

Centers for Disease Control and Prevention (CDC)

www.cdc.gov

CDC is recognized as the lead federal agency for protecting the health and safety of people at home and abroad, providing credible information to enhance health decisions, and promoting health through strong partnerships. CDC serves as the national focus for developing and applying disease prevention and control, environmental health, and health promotion and education activities designed to improve the health of the people of the United States.

National Center for Chronic Disease Prevention and Health Promotion

CDC's National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) is at the forefront of the nation's efforts to prevent and control chronic diseases. The center conducts studies to better understand the causes of chronic diseases, supports programs to promote healthy behaviors, and monitors the health of the nation through surveys. Critical to the success of these efforts are partnerships with state health and education agencies, voluntary associations, private organizations, and other federal agencies. Together, the center and its partners are working to create a healthier nation.

Chronic diseases—such as heart disease, cancer, and diabetes—are the leading causes of death and disability in the United States. These diseases account for 7 of every 10 deaths and affect the quality of life of 90 million Americans. Although chronic diseases are among the most common and costly health problems, they are also among the most preventable. Adopting healthy behaviors such as eating nutritious foods, being physically active, and avoiding tobacco use can prevent or control the devastating effects of these diseases.

In the area of cardiovascular health (CVH), the center established in October 2000 the Cardiovascular Health Coordinating Committee, whose primary responsibility is communication and coordination among the several NCCDPHP divisions most actively engaged in CVH: the Divisions of Adult and Community Health, Adolescent and School Health, Diabetes Translation, and Nutrition and Physical Activity and the Office on Smoking and Health. Highlights of relevant programs in these divisions are outlined in the following sections.

State Heart Disease and Stroke Prevention Program

In 1998, Congress funded CDC to launch a nationwide effort to help states develop the capacity, commitment, and resources necessary for a comprehensive program to prevent death and disability from heart disease and stroke and to improve the cardiovascular health of all Americans. CDC funds states for basic implementation or at a lower capacity-building level. Program priorities include the following:

- Prevent and control high blood pressure and high blood cholesterol levels.
- Improve quality of care to prevent and manage high blood pressure, stroke, and heart disease.
- Get people to appropriate emergency care quickly.
- Eliminate health disparities (e.g., based on geography, gender, race or ethnicity, or income).
- Promote heart health in a variety of settings (health care facilities, work sites, schools, and communities) through education and policy and environmental changes.

CDC works with partners both inside and beyond the health sector to address the *Healthy People 2010* objectives for preventing heart disease and stroke. Partners include other federal agencies (e.g., Centers for Medicare & Medicaid Services, National Institutes of Health), national health organizations (e.g., American Heart Association/American Stroke Association, National Stroke Association), and professional groups (e.g., American College of Cardiology).

Surveillance of Heart Disease and Stroke

As part of its national leadership, CDC supports and conducts the surveillance necessary to build a strong foundation of science for preventing heart disease and stroke. The resulting data can be used to guide state and local public health programs. For example, the recently released *Atlas of Stroke Mortality: Racial, Ethnic and Geographic Disparities in the United States* presents detailed national and state maps with county-level data of local disparities in heart disease and stroke death rates for the nation's five largest racial and ethnic groups. This publication is the third in a series on cardiovascular health, following *Women and Heart Disease: An Atlas of Racial and Ethnic Disparities in Mortality* and *Men and Heart Disease: An Atlas of Racial and Ethnic Disparities in Mortality*.

In 2001, CDC established the Paul Coverdell National Acute Stroke Registry to design and test prototypes to measure the delivery of acute care for stroke. Eight sites are developing prototypes for statewide, hospital-based registries that are expected to improve hospitals' delivery of the critical emergency care that can prevent permanent disabilities from stroke.

Prevention Research Centers (PRCs) Program

In 1984, Congress authorized the secretary of the U.S. Department of Health and Human Services (HHS) to create a network of academic health centers to conduct applied public health research. The first three centers were funded two years later. CDC was selected to administer the PRC network and to provide leadership, technical assistance, and oversight.

Individual behaviors and environmental factors cause many chronic diseases as well as injuries and some infections. Prevention researchers develop strategies to help people reduce risk factors in their lives and their communities. By involving community members, academic researchers, and public health agencies, the PRCs find innovative ways to promote health and prevent disease. Together, these partners design, test, and disseminate strategies—often as new policies or recommended public health practices.

PRCs are associated with schools of public health, medicine, or osteopathy and are located throughout the country. Each center conducts at least one core research project with an underserved population that has a disproportionately large burden of disease and disability. The centers also work with partners on special interest projects defined by CDC and other HHS agencies. Expertise gained from this work makes the centers competitive for research funding from other sources.

PRCs are a national resource for developing effective prevention strategies and applying those strategies at the community level. Each center encourages interaction among faculty from different disciplines (e.g., education, social work, psychology, nursing), whose expertise is essential to solving complex health and psychosocial problems.

Behavioral Risk Factor Surveillance System (BRFSS)

The BRFSS is a state-based system of health surveys established in 1984 by CDC. Information on health risk behaviors, clinical preventive health practices, and health care access, primarily related to chronic disease and injury, is obtained from a representative sample of adults in each state. For most states, the BRFSS is the only source for this type of information. Currently, data are collected monthly in all 50 states, the District of Columbia, and Puerto Rico; annual point-in-time surveys are conducted in the Virgin Islands and Guam. Interviews are completed each year with more than 200,000 adults, making the BRFSS the largest telephone health survey in the world. In addition to being a unique source of risk behavior data for states, the BRFSS is also useful for measuring progress toward *Healthy People 2010* national objectives. Seven of the 10 leading health indicators for 2010 can be assessed through the BRFSS.

As the demand for data has increased, so has the number of requests to add questions to the survey. Currently, almost every division in NCCDPHP and other CDC Centers, Institutes, and Offices has questions on the BRFSS. Interest in the BRFSS has also grown outside CDC. Other federal agencies, such as the Health Resources and Services Administration (HRSA), the Administration on Aging (AoA), and the Department of Veterans Affairs (VA), have added questions. Requests for technical assistance also have come from other countries that are eager to develop similar surveillance systems, notably China, Australia, Canada, and Russia. The World Health Organization (WHO) is developing a model surveillance system based on the BRFSS for export to any country.

As the BRFSS data have become more useful, the demand for more local data (i.e., district-, county-, or city-level data) has increased. This demand led to the Selected Cities Project, in which data from the 1997–2000 BRFSS were used to calculate estimates for selected urban areas in the United States with at least 300 respondents. This project has yielded estimates for nearly 200 metropolitan areas for the 1997–1999 combined data. The 2000 data provided estimates for 100 metropolitan areas. Preliminary results showed that the prevalence of certain behaviors varied across cities, not unlike the differences found across states. Variation in prevalence was also observed when cities were compared with their surrounding metropolitan areas and with the rest of the state. Plans are to add the new weights soon to the BRFSS public-use data file, allowing researchers outside CDC to analyze data for metropolitan areas. This new use of BRFSS data fills a critical public health need for local surveillance data to support targeted program implementation and evaluation, and these data should help cities to better plan and direct their prevention efforts.

Racial and Ethnic Approaches to Community Health (REACH) 2010

REACH 2010 is the cornerstone of CDC's efforts to eliminate racial and ethnic disparities in health, one of the two overarching goals of *Healthy People 2010*. Launched in 1999, REACH 2010 is designed to eliminate disparities in the following six priority areas: cardiovascular disease, immunizations, breast and cervical cancer screening and management, diabetes, HIV infections/AIDS, and infant mortality. The racial and ethnic groups targeted are African Americans, American Indians, Alaska Natives, Asian Americans, Hispanic Americans, and Pacific Islanders.

REACH 2010 is a two-phase, 5-year demonstration project that supports community coalitions in designing, implementing, and evaluating community-driven strategies to eliminate health disparities. Each coalition comprises a community-based organization and three other organizations, of which at least one is either a local or state health department or a university or research group.

During a 12-month planning phase, REACH 2010 grantees use local data to develop a community action plan that addresses one or more of the six priority areas and targets one or more racial and ethnic minority groups. During the 4-year implementation phase, community coalitions carry out activities outlined in their community action plans and evaluate program activities.

Evaluating REACH 2010 programs is critically important in determining their effectiveness in reducing health disparities. Working with its grantees and partners, CDC has developed an evaluation model to guide the collection of national data. This model evaluates programs on their effectiveness in the following areas: building community capacity, developing targeted actions, improving health systems and agents of change, decreasing risk behaviors and increasing protective behaviors, and reducing disparity-related illness and death.

REACH 2010 projects are empowering community members to transform their neighborhoods into places that encourage people to adopt and sustain healthy behaviors and to avoid risk behaviors. Through close collaboration with community members and creative partnerships with public and private organizations, CDC will continue to spearhead the country's efforts to eliminate health disparities by carrying out the lessons learned from the REACH 2010 projects in communities across the country.

School Health

Every school day, 53 million young people attend nearly 117,000 schools across our nation. Because of the size and accessibility of this population, school health programs are one of the most efficient means to reach young people and prevent/address behaviors that lead to serious health problems. CDC began an initiative in 1992 to support coordinated school health programs in the states that promote healthy behavior, such as eating nutritious foods, being physically active, and avoiding tobacco use. These programs aim to reduce young people's risk for developing chronic diseases later in life.

CDC funding and assistance enable state departments of education and health to work together efficiently, respond to changing health priorities, and use limited resources effectively to meet a wide range of health needs among the state's school-aged population.

CDC has also established a national framework to support these programs. More than 40 national, nongovernmental education and health organizations work with CDC to develop model policies, guidelines, and training to help states establish high-quality school health programs. Through this national framework and in collaboration with health and education partners, CDC helps funded states provide young people with information and skills needed to choose healthy behaviors. The eight components of a coordinated school health program include health education, nutrition services, physical education, health services, health promotion for staff, counseling and psychological services, a healthy school environment, and parent and community involvement.

Since 1991, the Youth Risk Behavior Surveillance System (YRBSS) has provided data on health-related behaviors, such as tobacco use, physical activity levels, and fruit and vegetable intake, among young people. Developed by CDC with federal, state, and private-sector partners, this voluntary system includes a national survey of high school students plus surveys conducted by state and local education and health agencies. The YRBSS provides vital information to improve health programs.

Because national efforts for coordinated school health programs have been hampered by a lack of information on school health policies and programs, CDC has conducted the School Health Policies and Programs Study (SHPPS). SHPPS provides valuable answers to questions about programs in areas such as health education, physical education, and school food service at state, district, school, and classroom levels.

To help schools plan and implement effective health policies and programs, CDC has published guidelines for school health programs. These guidelines are based on a synthesis of theory, research, and best practices and were developed jointly by scientific experts, school practitioners, and appropriate national organizations. To help schools implement these guidelines, CDC has developed several tools, including *The School Health Index: A Self-Assessment and Planning Guide*, and supported development of other tools, such as *Fit, Healthy, and Ready to Learn: A School Health Policy Guide*, which was produced by the National Association of State Boards of Education.

Diabetes Prevention and Control

CDC provides leadership and funding to diabetes prevention and control programs nationwide. CDC also works with many partners to provide data for sound public health decisions, inform the public about diabetes, and ensure good care and education for Americans with diabetes. CDC provides support to states, territories, and the District of Columbia for core diabetes control programs and more substantial support to some states for comprehensive programs.

Timely data and public health research are essential for understanding how diabetes affects different populations and for improving quality of care. CDC analyzes information from several national data sources, including the BRFSS, and explores ways to collect better diabetes data on groups most at risk. To translate scientific data into higher-quality care, CDC works with many research partners, including the National Diabetes Laboratory. CDC also works with managed care organizations and community health centers to

- Assess how accepted standards of diabetes care are applied by health care providers and in clinical care settings.
- Explore variations in the quality of diabetes care provided.
- Develop and test strategies to move existing care practices closer to optimal standards.

Educating others about diabetes is a priority at CDC. The National Diabetes Education Program (NDEP) has a network of more than 200 public and private partners that provide education to improve treatment, promote early detection, and prevent the onset of diabetes. The NDEP is sponsored by CDC and the National Institutes of Health, and many NDEP products are available on the Internet (www.ndep.nih.gov).

CDC also develops new resources for health professionals, people with diabetes, and communities, including Diabetes Today, a train-the-trainer program that allows health professionals and community leaders to develop a community plan for preventing the complications of diabetes.

Nutrition and Physical Activity

Beginning in fiscal year 2001, Congress appropriated funds that allow CDC to help states plan and initiate nutrition and physical activity programs to help prevent and control obesity and other chronic diseases. With further funding, CDC will help to expand these programs and will support research to increase physical activity and improve nutrition in states and communities.

In 1995, CDC's landmark publication, *Physical Activity and Health: A Report of the Surgeon General*, brought together the results of decades of research on physical activity and health. Among its findings were that physical activity need not be strenuous to produce benefits and that inactive people can improve their health by becoming moderately active on a regular basis. The implications of these findings compel CDC to ensure that physical activity receives the attention and commitment given to other important public health issues. CDC research is strengthening knowledge of the role of physical activity and nutrition in health.

To further address these issues, CDC has established a nationwide framework for coordinated health education programs in schools. Inactivity and unhealthy diets are among the risk behaviors that these programs address. CDC has also collaborated with national health and education organizations to develop guidelines and materials to help schools promote healthy eating and physical activity.

Since the 1950s, the infrastructure to support walking and bicycling in the United States has been neglected. Trips made by walking or cycling have declined by more than 40% since 1977. CDC's Active Community Environments Initiative (ACES) works with partners to promote the development of accessible recreation facilities, including more opportunities for walking and cycling.

The National 5-A-Day program, which is a comprehensive, coordinated national nutrition program designed to increase consumption of fruits and vegetables to five or more servings each day by the year 2010, is implementing recommendations from a recent comprehensive review. The most significant recommendations were to strengthen and expand the program's organizational structure to include new partners and to support research, surveillance, and applied public health programs to increase vegetable and fruit consumption. The National Cancer Institute, the U.S. Department of Agriculture, and CDC are currently defining the roles and responsibilities of each partner in the new model.

Well-Integrated Screening and Evaluation for Women Across the Nation (WISEWOMAN)

WISEWOMAN is a CDC-funded program that helps women in need gain access to screening and lifestyle interventions that can reduce their risk for heart disease and other chronic diseases. Eligible women are 40–64 years old and have little or no health insurance. Many are from racial and ethnic minority populations. WISEWOMAN is the result of 1993 legislation that expanded the services offered within the National Breast and Cervical Cancer Early Detection Program (NBCCEDP). Through the NBCCEDP, CDC helps states, territories, and tribal organizations provide potentially life-saving screening for breast and cervical cancers to low-income and uninsured women. Through WISEWOMAN projects and community partnerships, women participating in the NBCCEDP are offered screenings and interventions for obesity, sedentary behavior, poor dietary habits, high blood pressure, high cholesterol, and smoking. Some projects also screen women for diabetes or osteoporosis, because these conditions also are affected by nutrition and physical activity. WISEWOMAN staff also provide referrals when treatment is needed.

Smoking and Health

CDC provides national leadership for a comprehensive, broad-based approach to reducing tobacco use. A variety of federal, state, and local government agencies; professional and voluntary organizations; and academic institutions have joined together to advance this comprehensive approach, which involves

- Preventing young people from starting to smoke.
- Eliminating exposure to secondhand smoke.
- Promoting quitting.
- Identifying and eliminating disparities in tobacco use among different population groups.

Essential elements of this approach include state- and community-based interventions, countermarketing, policy development, surveillance, and evaluation. These activities target groups (e.g., young people, racial and ethnic minority groups, people with low incomes or low levels of education, and women) at highest risk for tobacco-related health problems.

CDC supports programs to prevent and control tobacco use in all 50 states, 7 territories, 7 tribal organizations, and the District of Columbia. Supplemental funding is provided to some programs to identify tobacco-related disparities and develop strategic plans for reducing them. CDC also funds national networks to promote prevention and control efforts among organizations that serve priority populations; provides grants to states for coordinated school health programs that include components for preventing tobacco use; and provides technical assistance to help states plan, establish, and evaluate tobacco control programs.

CDC recently released several publications to help states manage their tobacco control programs, including *Best Practices for Comprehensive Tobacco Control Programs, Reducing Tobacco Use: A Report of the Surgeon General, and Investment in Tobacco Control: State Highlights 2002.* Guidance is also offered through CDC's *Guidelines for School Health Programs to Prevent Tobacco Use and Addiction* and the *Guide to Community Preventive Services: Tobacco Use Prevention and Control.*

To strengthen the scientific foundation for preventing and controlling tobacco use, CDC examines trends, health effects, and economic costs. Examples include the U.S. Surgeon General's reports on the health consequences of tobacco use, published since 1964; CDC's air toxicants laboratory, which is developing and applying laboratory technology to prevent death and disease from tobacco use and exposure to secondhand smoke; and the school-based Global Youth Tobacco Survey (GYTS), developed by WHO and CDC to track tobacco use among young people in over 140 countries using a common methodology and a core questionnaire. In addition, CDC's National Tobacco Information Online System (NATIONS) provides country-level data on tobacco use and its health effects, laws and regulations, and economics, and CDC's State Tobacco Activities Tracking and Evaluation (STATE) System provides similar state-level data.

CDC researches, develops, and distributes tobacco and health information nationwide. It also distributes hundreds of thousands of publications and video products each year and provides information and databases through its Web site. Through its Media Campaign Resource Center and its interactive database, CDC provides high-quality counteradvertising materials and technical assistance to help state and local programs conduct media campaigns to prevent tobacco use.

CDC's health communication messages continue to focus on reducing smoking among young people while increasing the emphasis on helping people to quit, reducing exposure to secondhand smoke, and reducing disparities. In partnership with other federal, state, and local agencies, CDC communicates key tobacco messages through the media, schools, and communities.

As the only WHO Collaborating Center on Global Tobacco Prevention and Control in North America, CDC implements international studies, conducts epidemiologic research, and provides international assistance on reducing tobacco use.

National Center for Environmental Health (NCEH)

The National Center for Environmental Health (NCEH) is dedicated to serving the global community by providing leadership, through science and service, to promote health and quality of life by preventing and controlling disease, disability, and death resulting from interactions between people and their environment. NCEH activities most directly related to CVH include laboratory programs, such as the Lipid Standardization Program, and the Public Health Genomics Program.

Lipid Standardization Program (LSP)

CDC developed and maintains reference methods and serum-based reference materials for total cholesterol (TC), high-density lipoprotein cholesterol (HDLC), low-density lipoprotein cholesterol (LDLC), and triglycerides (TG). In 1957, CDC began efforts to standardize cholesterol measurement and became the first to develop a standardization program designed to improve and normalize clinical test results. In 1961, CDC, in collaboration with the National Heart, Lung, and Blood Institute (NHLBI), National Institutes of Health, developed and continues to maintain a three-phase LSP to provide an accuracy-based standard for measuring TC, HDLC, LDLC, and TG in national and international lipid laboratories.

The LSP's standardization efforts extend to a variety of clinical trials and population studies, including the

- Multiple Risk Factor Intervention Trial (MRFIT).
- Framingham Heart Study.
- Lipid Research Clinics-Coronary Primary Prevention Trial (LRC-CPPT).
- Women's Health Initiative.

- West of Scotland Coronary Prevention Study (WOSCOPS).
- Air Force/Texas Coronary Atherosclerosis Prevention Study (AFCAPS/TexCAPS).
- National Health and Nutrition Examination Surveys (NHANES).

Each year, about 100 domestic and international laboratories participate in the LSP and receive about 16,000 individual vials of fresh-frozen serum reference samples to assess laboratory performance.

As a result of frequent and responsive assessments of laboratory performance, CDC ensures the accuracy and uniformity of population-study and clinical-trial data, regardless of the testing method or the analytical system used. These clinical investigations provide cardiovascular medicine with a reliable scientific database for evaluating risk factors associated with CVD. This database provides the basis for the National Cholesterol Education Program's (NCEP's) intervention strategy to reduce morbidity and mortality from CVD. CDC's Lipid Reference Laboratory is the cornerstone of the National Reference System for Cholesterol to which all cholesterol measurements are traceable, thus ensuring reliable testing results in the nation's clinical laboratories.

Cholesterol Reference Method Laboratory Network (CRMLN)

CDC established the CRMLN to help manufacturers calibrate diagnostic products used for lipid and lipoprotein testing. CDC researchers believe that working with manufacturers is the most effective way to improve and standardize these measurements within clinical laboratories and to achieve the NCEP's goals. CRMLN laboratories use CDC reference methods or designated comparison methods (DCMs) that are closely linked to CDC reference methods. Manufacturer certification is based on the analysis of fresh samples from patients by both the diagnostic test method and the CRMLN laboratory. Manufacturers who successfully complete the comparison are issued a Certificate of Traceability, which is valid for two years. Manufacturers are encouraged to repeat the certification on a regular basis. This approach ensures that diagnostic products are properly calibrated and traceable to the accuracy base maintained by CDC.

C-Reactive Protein Standardization Program

CDC convened a forum for manufacturers of high sensitive C-reactive protein (hs-CRP) assays to identify measurement problems, discuss the need for developing a reference method and materials, and plan approaches for methodology improvement and standardization. CDC conducted a major study to evaluate various materials for their applicability and commutability as potential reference materials for calibration and standardization of hs-CRP. CDC co-sponsored with NHLBI, the American College of Cardiology, the American Heart Association, and the American Association for Clinical Chemistry a special focus workshop to address issues concerning the appropriate clinical use of hs-CRP in predicting risk for CVD. This led to publication in 2003 of the American Heart Association/CDC Scientific Statement, *Markers of Inflammation and Cardiovascular Diseases: Application to Clinical and Public Health Practice*. CDC is helping the College of American Pathologists (CAP) implement proficiency testing surveys for hs-CRP and Lp(a) as part of its efforts to establish a cardiac risk survey program.

Homocysteine Standardization Program

CDC is addressing the need for accurate and precise laboratory measurements of plasma homocysteine on many fronts. Using a CDC reference method, the laboratory measures plasma homocysteine levels in samples obtained from participants in the NHANES. In 1998, CDC conducted an international laboratory comparison study for plasma homocysteine with 14 laboratories to evaluate method differences. In 2000, CDC helped the CAP develop its first homocysteine survey. CDC continues to provide confirmation values for each CAP homocysteine survey on the basis of results obtained using the CDC reference method. CDC is collaborating with the Mayo Clinic to evaluate a mass spectrometry method that the Mayo Clinic developed as a potential high-order reference method. CDC is also collaborating with the National Institute of Standards and Technologies to support reference materials development. CDC participates in the International Federation of Clinical Chemistry Working Group for Homocysteine Standardization. CDC continuously evaluates new assays for measuring homocysteine and publishes evaluation results in professional journals.

Genomics and Disease Prevention

To move beyond gene discovery to public health action requires additional research and planning. Clinical and epidemiologic studies are needed to assess the interaction between genetics and environment in causing disease and to evaluate the clinical validity and utility of genetic tests. Public health policies are needed to address related social, ethical, and legal issues and to guarantee access to genetic services. Training the public health workforce and keeping the public informed are also important components of a plan to integrate genetics into public health. CDC's activities in genomics and disease prevention reflect the enormity of the challenge facing public health today. They are based on a commitment to meet the challenge to use genetic information to improve health and prevent disease in the 21st century.

In October 2001, CDC established Centers for Genomics and Public Health in schools of public health at the Universities of Michigan, North Carolina, and Washington. The centers will help build the knowledge base on genomics and public health, focusing on chronic diseases with modifiable environmental risk factors such as diet, exercise, or exposure to chemicals. They will also provide training and technical assistance to local, state, and regional public health organizations. The Center at the University of Michigan is focused on cardiovascular diseases.

In collaboration with CDC, the Chronic Disease Directors convened a Genomics and Chronic Disease Summit in Atlanta in early 2002 to focus on emerging human genetic information relevant to prevention of cardiovascular disease, as well as asthma, cancer, diabetes, and obesity.

CDC is evaluating family history as a tool for assessing risk and influencing early detection and prevention of common diseases, including coronary heart disease, stroke, and hypertension. Coordinated by CDC's Office of Genomics and Disease Prevention (OGDP), this collaborative effort includes several CDC programs and NIH institutes, including CDC's Cardiovascular Health Branch and NHLBI, respectively.

A CDC-wide working group has developed a proposal for analyzing DNA samples collected in the NHANES III to determine the prevalence of genotypes of potential public health importance in a nationally representative, population-based sample and demographic subgroups. The proposal encompasses genes in pathways considered important in the pathogenesis and progression of cardiovascular diseases, including folate and homocysteine metabolism, lipid metabolism, blood pressure regulation, and hemostasis.

Epidemiological research is needed to understand how modifiable risk factors (e.g., diet, chemical exposures, infections, lifestyle) interact with genetic factors in the causation and progression of cardiovascular disease and to suggest ways that this information can help target disease prevention efforts. Through the 1999 Prevention Research Initiative, CDC funded the University of Texas Houston Health Science Center to study gene-environment interactions related to cardiovascular disease in over 15,000 African American and white men and women aged 45–64 years who participated in the multicenter Arteriosclerosis Risk in Communities (ARIC) Study conducted by NHLBI.

CDC supports the Stroke Prevention in Young Women Study, a population-based case-control study in Maryland and the District of Columbia that seeks to identify behavioral and genetic factors that may help explain the increased risk for stroke among African American women. CDC funds the Oregon Sudden Unexplained Death Study, which tracks all cardiac arrests that occur in Multnomah County, Oregon, and assesses the determinants of sudden death.

National Center for Health Statistics (NCHS)

As the nation's principal health statistics agency, NCHS compiles statistical information to guide actions and policies to improve the health of our people. NCHS is a unique public resource for health information—a critical element of public health and health policy. NCHS health statistics are used to

- Document the health status of the population and of important subgroups.
- Identify disparities in health status and use of health care by race, ethnicity, socioeconomic status, region, and other population gradients.
- Describe people's experiences with the health care system.
- Monitor trends in health status and health care delivery.
- Identify health problems.
- Support biomedical and health services research.
- Provide information for making changes in public policies and programs.
- Evaluate the impact of health policies and programs.

Working with partners throughout the health community, NCHS uses a variety of approaches to efficiently obtain information from the sources most able to provide information. The center collects data from birth and death records, medical records, interview surveys, and through direct physical exams and laboratory testing. NCHS is a key element of our national public health infrastructure, providing important surveillance information that helps identify and address critical health problems.

NCHS employs a variety of data collection mechanisms to obtain accurate information from multiple sources. This process provides multiple perspectives to help understand the population's health, influences on health, and health outcomes.

National Vital Statistics System (NVSS)

The NVSS provides the nation's official vital statistics data on the basis of the collection and registration of birth and death events at the state and local level. The NVSS provides the most complete and continuous data available to public health officials at the national, state, and local levels and in the private sector. Vital statistics are a critical component of our national health information system, allowing us to monitor progress toward achieving health and welfare reform goals.

Examples of NVSS data include

- Number of teen births.
- Prenatal care and birthweight.
- Risk factors for adverse pregnancy outcomes.
- Firearm-related mortality in teens.
- Infant mortality rates.
- Leading causes of death.
- Life expectancy.
- Firearm-related mortality.

National Health Care Survey (NHCS)

The NHCS is a family of surveys that collects data from health care establishments about the use of services across the major sectors of the U.S. health care system. These data may be used to profile changes in the use of health care resources, patterns of disease, and the impact of new medications and technologies. Information on the characteristics of providers, facilities, and patients allows researchers to study shifts in the delivery of care across the health care system, variations in treatment patterns, and patient outcomes.

Provider sites surveyed include

- Hospitals.
- Nursing homes.
- Emergency departments.
- Hospital outpatient departments.
- Office-based physicians.
- Ambulatory surgery centers.
- Home health agencies.
- Hospices.

National Health and Nutrition Examination Survey (NHANES)

The NHANES is NCHS's most in-depth and logistically complex survey, designed to assess the health and nutritional status of Americans. This comprehensive survey combines personal interviews with standardized physical and dental examinations, diagnostic procedures, and lab tests for approximately 5,000 persons each year.

The survey provides information related to

- Diseases.
- Health risk factors.
- Genetics and health.
- Diet and nutritional health status.
- Oral health.
- Environmental exposures.
- Obesity and physical fitness.

National Health Interview Survey (NHIS)

The NHIS provides information annually on the health status of the U.S. civilian noninstitutionalized population through confidential interviews conducted in households. The NHIS is the nation's largest household health survey, providing data for analysis of broad health trends, as well as the ability to characterize persons with various health problems, determine barriers to care, and compare racial and ethnic populations' health status, health-related behaviors, and risk factors.

Health topics addressed annually include
- Health status and disability.
- Insurance coverage.
- Access to care.
- Use of health services.
- Immunizations (child).
- Health behaviors.
- Injury.
- Ability to perform daily activities.

Additional topics addressed in 2002 include
- Alternative medicine.
- Arthritis.
- Disability and secondary conditions.
- Environmental health.
- Vision and hearing.

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National Heart, Lung, and Blood Institute

Cardiovascular Disease Research and Outreach Efforts

The National Heart, Lung, and Blood Institute (NHLBI) provides leadership for a national program in diseases of the heart, blood vessels, lung, and blood; blood resources; and sleep disorders. Since October 1997, the NHLBI has also had administrative responsibility for the NIH Woman's Health Initiative.

The Institute plans, conducts, fosters, and supports an integrated and coordinated program of basic research, clinical investigations and trials, observational studies, and demonstration and education projects. Research is related to the causes, prevention, diagnosis, and treatment of heart, blood vessel, lung, and blood diseases and of sleep disorders. The NHLBI plans and directs research in development and evaluation of interventions and devices related to prevention, treatment, and rehabilitation of patients suffering from such diseases and disorders. It also supports research on clinical use of blood and all aspects of the management of blood resources. Research is conducted in the Institute's own laboratories and by scientific institutions and individuals supported by research grants and contracts.

For health professionals and the public, the NHLBI conducts educational activities, including development and dissemination of materials in the aforementioned areas, with an emphasis on prevention.

The NHLBI supports research training and career development of new and established researchers in fundamental sciences and clinical disciplines to enable them to conduct basic and clinical research related to heart, blood vessel, lung, and blood diseases; sleep disorders; and blood resources through individual and institutional research training awards and career development awards. The Institute coordinates relevant activities in these areas, including the related causes of stroke, with other research institutes and federal health programs. Relationships are maintained with appropriate institutions and professional associations; international, national, state, and local officials; and voluntary agencies and organizations.

Each year, the NHLBI assesses progress in the scientific areas for which it is responsible and updates its goals and objectives. As new opportunities are identified, the Institute expands and revises its areas of interest. Throughout the process, the approach used by the Institute is an orderly sequence of research activities that includes

- Acquisition of knowledge.
- Evaluation of knowledge.
- Application of knowledge.
- Dissemination of knowledge.

Several components of the Institute are engaged in research and education activities aimed at the prevention and control of cardiovascular disease (CVD). Highlights of activities are summarized in the following sections.

Division of Heart and Vascular Diseases

The Division of Heart and Vascular Diseases (DHVD) plans and directs a coordinated research program on the causes of heart and vascular diseases and on their prevention, diagnosis, and treatment. Fundamental biomedical research is emphasized. Multidisciplinary programs are supported to advance basic knowledge of disease and to generate the most effective methods of clinical management and prevention. Clinical trials are an important part of the research program; they provide an opportunity to test and apply promising preventive or therapeutic measures.

Research in atherosclerosis encompasses the etiology, pathogenesis, diagnosis, prevention, and treatment of the disorder. Programs include pathobiology and genetics of the vasculature; vascular growth and angiogenesis; interactions of the vascular wall with systemic and humoral factors promoting atherogenesis; and lesion progression, complication, and regression. Targeted areas involve characterization of atherosclerotic plaque prone to rupture, pathogenesis of abdominal aortic aneurysms, the role of homocysteinemia in atherosclerosis, mechanisms of atherosclerosis in various vascular beds, and research on atherosclerotic lesions using human autopsy tissue. Additional studies focus on pathobiological determinants of atherosclerosis, cardiovascular complications of diabetes mellitus, vessel-wall calcification, the role of infectious agents in atherosclerosis, immunobiology of the vessel wall, hormone replacement therapy on atherosclerosis, and effect of protease inhibitors on atherosclerosis development in human immunodeficiency virus (HIV) infection. Of special interest is understanding atherosclerosis risk among minorities.

Studies related to hypertension focus on identifying and characterizing genes involved with hypertension; elucidating regulation mechanisms associated with blood pressure control; identifying causative factors of essential hypertension as well as rare forms of high blood pressure; examining mechanisms by which high blood pressure increases the risk of, or occurs concomitantly with other diseases, such as kidney failure, stroke, diabetes, atherosclerosis, preeclampsia, and left ventricular hypertrophy; and developing preventive strategies as well as novel interventions for hypertension. Additional areas of interest include understanding the biological underpinnings of salt sensitivity; identifying neurological mechanisms responsible for long-term control of blood pressure and functional neurological changes that result in essential hypertension; and understanding the basis of target-organ damage in hypertension. Of special interest is eliminating health disparities among minorities and between men and women.

Basic and clinical studies on arteriogenesis (formation of new arteries), angiogenesis (formation of new blood vessels), and the biology and pathophysiology of blood vessel structure and function in the cerebral, coronary, and peripheral vascular beds are designed to increase understanding of how oxygen, nutrient, and fluid exchange occurs within vessels; how vascular inflammatory response originates and contributes to CVD; how blood flow within the tissues is autoregulated; how vascular smooth muscle contraction is altered; how new vessels are formed; and how vascular remodeling is orchestrated. Scientists are investigating ways to control the inflammatory response in blood vessels, manipulate mechanisms that regulate blood flow, and stimulate the formation of new blood vessels (especially after an ischemic event in the brain, heart, or a limb).

Gene transfer is being used to deliver growth factors to the myocardium to promote development of new blood vessels. Clinical trials are under way to test the safety and efficacy of this approach in humans. Ultimately, these studies should offer insight into developing new therapeutic agents for ischemic disease.

Research in cardiovascular medicine is focused on new strategies to ameliorate disease through improving risk stratification and management and developing novel drugs and therapies. In addition to risk factor reduction, healthy lifestyles and behaviors are emphasized. The preventive and therapeutic potential of nutrition and exercise are currently being evaluated. To date, hormone replacement trials consistently demonstrate lack of benefit with regard to cardiovascular outcomes despite benefits suggested by fundamental and observational data. Devices are used to prevent fatal consequences of ventricular fibrillation in patients at high risk of sudden death, improve ventricular function in heart failure patients with intraventricular conduction delays, and improve survival in selected end-stage heart failure patients who are ineligible for heart transplantation. The development of drug-eluting stents holds promise of significant reduction of restenosis even in patients with a tendency for a hypercellular response to coronary interventions. Current projects encompass developing new strategies for acute and chronic heart disease, cardiomyopathies of different etiologies (i.e., ischemic, valvular, genetic, metabolic, and HIV-related), peripheral vascular disease, aortic aneurysms, and restenosis after percutaneous coronary interventions. Examples of therapies and approaches include diet, exercise, and pharmacologic management of dyslipidemias, genetic susceptibility and directed treatment, diagnosis and management of arrhythmias; surgical and medical management of heart failure; and novel imaging of atherosclerosis. Studies also seek to understand and reduce disparities associated with minority and women's cardiovascular health.

Division of Epidemiology and Clinical Applications

The Division of Epidemiology and Clinical Applications (DECA) plans, directs, and evaluates research on the causes, prevention, diagnosis, and treatment of CVD, as well as on the need for technological development in the acquisition and application of research findings. It supports epidemiologic studies, clinical trials, demonstration and education research, disease prevention and health promotion research, and basic and applied research in behavioral medicine.

Research in the prevention of CVD encompasses clinical trials, community intervention studies, prevention trials, nutrition studies, health education research, and behavioral medicine studies. DECA supports a number of multicenter prevention and education trials to test the efficacy and effectiveness of, and demonstrate the capability of, prevention strategies designed to reduce cardiovascular risk factors. Major studies include determining the effectiveness of school- and home-based interventions to reduce development of CVD risk factors in children, especially those from minority populations; examining the effects of dietary patterns, sodium intake, and other lifestyle factors on blood pressure; and comparing the efficacy of various treatments to prevent major cardiovascular events in adults with diabetes. Studies on increasing the implementation of interventions known to be effective are of particular interest.

Clinical trials are used to evaluate the effectiveness of various medical procedures and therapeutic agents in patients with coronary heart disease, hypertension, and heart failure. Examples include assessing the long-term safety and efficacy of an angiotensin converting enzyme inhibitor to prevent major CVD events in patients with documented normal ventricular function, testing the ability of selected antihypertensive and lipid-lowering drugs to prevent heart attack among individuals at high risk for hypertension and coronary heart disease (CHD), and comparing the use of an implantable cardiac defibrillator to conventional pharmacologic therapy to improve survival among heart failure patients.

Research in behavioral medicine focuses on biopsychologic and sociocultural factors involved in heart, lung, and blood diseases. Areas of interest include central nervous system regulation of the cardiovascular system; identification of psychosocial factors (social support, depression, and hostility) affecting disease etiology, treatment, and rehabilitation; and effects of psychosocial and behavioral interventions on risk factors (smoking, adverse diet, physical inactivity), disease outcomes, and quality of life. Study participants are from all levels of health and from all ages and racial groups.

Investigators are conducting long-term epidemiological studies of heart and vascular, lung, and blood diseases in defined populations in the United States and other countries. These studies focus on the development and progression of CVD risk factors in children and young adults, the development and progression of atherosclerosis measured noninvasively or at autopsy in middle-aged or older adults, and the development and progression of overt cardiovascular and pulmonary disease in older adults. Areas of emphasis include genetic and environmental influences on CVD and its risk factors; trends in incidence, prevalence, and mortality from CVD, stroke, peripheral vascular disease, congestive heart failure, and cardiomyopathy; and relationships between insulin, insulin resistance, and overt diabetes and CVD and its risk factors. Another area of interest is the incidence of and mortality from cardiovascular, lung, and blood diseases. Research strategies apply family, longitudinal, demographic, and vital statistics to study their natural history, etiology, and epidemiology.

Genetic epidemiology has become an increasingly important component of the DECA Research Program. Several long-term studies of twins, multiple generations, Native Americans, and blacks focus on related individuals to estimate heritability and identify genes that contribute to the development of CVD risk factors and CVD. Other long-term studies are storing DNA and testing candidate genes from unrelated individuals. In addition to examining associations between CHD risk factors and development of atherosclerosis, heart failure, cardiomyopathy, and stroke in adults and the elderly, investigators will seek to identify and characterize genes related to CHD and atherosclerosis and to determine how they interact with environmental factors in the development of disease. Additional studies are underway to identify genetic factors influencing coronary and aortic calcification and individual variability in the inflammatory response and to investigate gene-environment interaction, collaborative approaches to linkage analysis, and population screening for genetic diseases.

The research program also focuses on understanding the relationships between insulin, insulin resistance, overt diabetes, and CVD and its risk factors. Scientists are attempting to find and characterize genes linked to risk factors that are associated with insulin resistance syndrome and diabetes. Research strategies include family and longitudinal studies in racially diverse populations.

Office of Prevention, Education, and Control

The NHLBI Office of Prevention, Education, and Control (OPEC) coordinates the translation and dissemination of research findings and scientific consensus to health professionals, patients, and the public, so that information can be adapted for and integrated into health care practice and individual health behavior. To accomplish its mission, OPEC established health education programs and initiatives that address high blood pressure, high blood cholesterol, asthma, early warning signs of heart attack, obesity, and sleep disorders. The programs use two strategies: one focuses on individuals at high risk; the other focuses on the general public. The four largest programs have coordinating committees consisting of national medical, public health, and voluntary organizations and of other federal agencies. These committees help to plan, implement, and evaluate program efforts in professional, patient, and public education.

The National High Blood Pressure Education Program (NHBPEP) was initiated in 1972 to reduce death and disability related to high blood pressure through professional, patient, and public education programs. It is a cooperative effort among the NHLBI, professional and voluntary health agencies, and state health departments that has served as a model for national health education programs and continues to be adopted by other national and international groups. Special attention is directed to reducing health disparities among people with hypertension.

Since the program's inception, the number of people with hypertension who are aware of their condition has increased fourfold, and four times as many people are receiving treatment and controlling their disease. Data from the National Health and Nutrition Examination Surveys (NHANES) indicate that over the past four decades, mean systolic blood pressure has declined by 10 mmHg and age-adjusted mortality rates from heart disease and stroke have decreased by 50% and 60%, respectively.

The NHBPEP is focused on translating research results to improve medical care outcomes and the public's health. It is committed to raising public awareness of the importance of adopting a heart-healthy lifestyle. Research has identified steps that individuals can take to control their blood pressure and to lower their risk for heart disease. For example, certain dietary habits can decrease blood pressure and can prevent it from rising. The DASH (Dietary Approaches to Stop Hypertension) diet—rich in fruits and vegetables, low in saturated and total fat and cholesterol, and containing low-fat dairy products—has been shown to be beneficial for individuals who have high blood pressure and for those who wish to prevent high blood pressure. Combined with a reduced salt intake, the diet can further lower blood pressure.

In 2002, community and professional activities focused on updating the *Primary Prevention Report*, encouraging communities to hold local events to mark May as National High Blood Pressure Education Month, and redesigning and expanding the *Your Guide to Lowering High Blood Pressure* Web page. The NHLBI initiated the development of a major repositioning strategy, which will include new partners, to enhance its position as the U.S. leader in high blood pressure prevention and control, raise the importance of high blood pressure on the national public agenda, and reach individual audiences by designing activities directed specifically to them.

The National Cholesterol Education Program (NCEP) was initiated in 1985 to educate health professionals and the public about high blood cholesterol as a risk factor for CHD and about the benefits of lowering cholesterol levels to reduce illness and deaths from CHD. From 1983 through 1995, the percentage of the public who had their cholesterol checked rose from 35% to 75%, showing that 70 to 80 million more Americans were aware of their cholesterol levels in 1995 than in 1983. Moreover, in 1995, physicians reported initiating diet and drug treatment at much lower cholesterol levels than in 1983. Major elements of the NCEP guidelines for detection and treatment have become established practice.

NHANES III (1988–1994) data demonstrate that the NCEP's dual strategy—one emphasizing the need for detection and treatment for individuals whose high blood cholesterol places them at increased risk for CHD and the other encouraging heart-healthy eating patterns to lower average cholesterol levels for the general public—has had a substantial effect on measured blood cholesterol levels of U.S. adults. Since 1978, the intake of saturated fat, total fat, and cholesterol among the general public decreased significantly, resulting in an impressive decline in average blood cholesterol levels. The prevalence of high blood cholesterol in the U.S. population has also fallen significantly. Cholesterol levels in adolescents likewise have declined.

In 2002, the NCEP focused its attention on disseminating the new *Adult Treatment Panel III (ATP III) Guidelines* on managing high cholesterol in adults. It developed a Web-based kit of materials derived from the guidelines to support cholesterol education for Cholesterol Month 2002 and throughout the year. An ATP III Opinion Leader Dissemination kit was distributed to influential members of the medical community to encourage them to use the guidelines and communicate their importance to professional colleagues. The NCEP is producing a new patient booklet on therapeutic lifestyle changes based on the ATP III recommendations. Additional activities include developing an action plan for reducing lifetime risk for CHD and convening an international conference on scientific issues that should be addressed in developing cardiovascular guidelines. The NHLBI, the American College of Cardiology, and the American Heart Association issued a clinical advisory on the use and safety of statins—specifically focusing on myopathy—in response to concerns that arose after cerivastatin was voluntarily withdrawn from the market by its manufacturer. The advisory provides reassurance that the benefits of statins far outweigh the risks if patients are properly selected and attention is paid to possible side effects.

The National Heart Attack Alert Program (NHAAP) was initiated in June 1991 to reduce morbidity and mortality from acute myocardial infarction (AMI), including out-of-hospital cardiac arrest, through education of health professionals (e.g., physicians, nurses, and emergency medical services personnel), patients, and the public about the importance of rapid identification and treatment of individuals with heart attack symptoms. In 1997, the program's scope was broadened to include early identification and treatment of individuals with acute coronary syndromes such as unstable angina. Since its inception, the program has taught health care providers in emergency departments and emergency medical services systems about the importance of reducing the interval between a heart attack and treatment. Available treatments, if administered soon after heart attack symptoms start, can save lives and minimize heart muscle damage in heart attack survivors.

In 2001, the NHAAP, in partnership with the American Heart Association, the American Red Cross, and the National Council on Aging, launched a major campaign to urge physicians and health care providers to educate their patients about heart attack risk, warning signs, and steps to survival. As part of the campaign to increase awareness of the need to act fast when someone may be having a heart attack, the NHLBI established its *Act in Time to Heart Attack Signs* Web page with educational materials for health professionals, patients, and the public.

The NHLBI Obesity Education Initiative (OEI) began in January 1991 to inform the public and health professionals about the health risks associated with overweight and obesity. Obesity is not only an independent risk factor for CVD, but also a contributor to high blood pressure and high blood cholesterol and is related to sleep apnea.

In 2002, 50 at-risk communities belonging to the NHLBI Hearts N' Parks project, made a 3-year commitment to create model community-based programs to increase the number of children, adults, and seniors practicing heart-healthy behaviors. The project's goal is to reduce obesity, improve nutritional status, and increase physical activity. The American Dietetic Association, in partnership with the project, is providing nutrition consultation. A *Hearts N' Parks* Web page has been established with information on the program.

The NHLBI Women's Heart Health Education Initiative was launched in 2001 in response to the Women's Health Research and Prevention Amendments, Public Law 105-304, which requires the Institute director "to expand, intensify, and coordinate research and related activities, including information and educational programs, with respect to heart attack, stroke, and other cardiovascular diseases in women." The Heart Truth—a campaign directed at women 40–60 years old and health professionals—was launched in 2002 to increase awareness about heart disease, improve detection and treatment of risk factors by health professionals, and motivate national and community organizations to become involved in heart health education. Special attention is given to minority women who are at increased risk for developing CVD.

As a key part of its response to the *Healthy People 2010* national health objectives, the NHLBI initiated a new funding mechanism to establish CVD educational outreach programs in high-risk communities. The program—Enhanced Dissemination and Utilization Centers (EDUCs)—is a partnership between the NHLBI and local communities to eliminate cardiovascular health disparities and increase quality and years of health in underserved populations. In 2001, the Institute awarded EDUCs to high-risk health service areas in Arkansas, North Carolina, Texas, Virginia, and West Virginia to conduct educational projects targeting populations at greatest risk for heart disease and stroke. Multiple strategies to prevent and control CVD risk factors and to promote heart-healthy behavior have been designed specifically for different age groups, ranging from childhood to adulthood. Six additional EDUCs were awarded to areas in Maryland, Ohio (2), Colorado, Nebraska, and North Carolina in 2002.

A major goal of the Institute is to eliminate health disparities and to increase the quality and years of healthy life of all Americans. Through partnerships with groups that have special ties and access to targeted populations, the NHLBI is extending its outreach and educational activities to underserved communities. The Institute is collaborating with the Baltimore City Cardiovascular Health Partnership on a project that has a two-pronged strategy consisting of a population-wide public education campaign and a targeted subgroup outreach and educational approach to build and reinforce positive cardiovascular health lifestyle skills and behaviors. The targeted population consists of blacks who reside in Baltimore City public housing developments.

The Institute's Salud para su Corazón (Health for Your Heart) Initiative, a community-based heart health program for Latinos, is expanding across the United States. Trained local lay health workers (promotores), applying values and culture of the communities and mobilizing partners, teach people how to reduce their risk of developing CVD. As advocates for change, they have increased the number of Latinos in their communities who are engaging in heart-healthy behaviors. In 2002, the NHLBI and the Health Resources and Services Administration signed an interagency agreement to expand the program to communities along the Texas–Mexico border and along the southern border areas of California and New Mexico.

The NHLBI-Indian Health Service Partnership to Strengthen the Heartbeat of American Indian and Alaskan Native Communities is a collaborative effort to educate three tribal communities—the Ponca Tribe of Oklahoma, the Bristol Bay Area in Western Alaska, and the Laguna Pueblo in New Mexico—about cardiovascular health and to reduce their risk for CVD. In 2002, tribal heart health teams received training on topics related to cardiovascular health, including physical activity, obesity, smoking prevention, nutrition, high blood cholesterol, and high blood pressure, as well as on theories of team building, evaluation, and community interaction and intervention. Since then, they have initiated community outreach education activities on cardiovascular health and disease. In addition, they have developed connections with local organizations to aid them with their missions.

Asian Americans and Pacific Islanders are a diverse and heterogeneous group with varying levels of CVD risk factors, acculturation, and socioeconomic status and with different cultures, languages, immigration histories, and community norms related to health and well-being. In 2002, the NHLBI, along with the Asian and Pacific Islander American Health Forum, conducted health assessments among Americans of Philippine, Vietnamese, and Cambodian heritage to obtain information on their knowledge of and attitudes toward CVD and its risk factors, disease prevention, and health behaviors. The assessments will guide the Institute in its development of culturally and language-appropriate materials and activities for these groups.

National Institute of Neurological Disorders and Stroke

Stroke Research and Outreach Efforts

The National Institute of Neurological Disorders and Stroke (NINDS) is the nation's leading supporter of biomedical research on disorders of the brain and nervous system. The NINDS also supports basic, clinical, and population-based research to identify and study the causes, biology, prevention, early detection, and treatment of stroke. Through years of dedicated study, researchers supported by the NINDS have amassed a significant knowledge base about stroke.

- **Landmark Clinical Studies**

  For the past 25 years, the NINDS has been encouraging and supporting major multicenter, randomized, controlled clinical trials evaluating medical and surgical interventions to prevent and treat stroke. More than a score of trials, involving more than 20,000 participants, have assessed antiplatelet agents, anticoagulants, thrombolysis, carotid endarterectomy, hormone replacement, and psychosocial interventions. This large investment of public research dollars is justified by the huge public health burden caused by stroke, which costs billions of dollars yearly in the United States, and the likely savings in health care dollars garnered by the results of NINDS-sponsored clinical trials.

NINDS-sponsored clinical trials are flagship studies in many areas of stroke, influencing treatment decisions daily in clinics throughout the world. The North American Symptomatic Carotid Endarterectomy Trial (NASCET) and the Asymptomatic Carotid Atherosclerosis Study (ACAS) provided guidance on when carotid endarterectomy is indicated for patients with cervical carotid stenosis. The Stroke Prevention in Atrial Fibrillation (SPAF) I, II, and III trials showed which antithrombotic therapy should be given to prevent stroke in patients with atrial fibrillation.

The NINDS t-PA Stroke Trial resulted in the first FDA-approved acute treatment to reduce disability from stroke. Until the completion of that trial in 1995, physicians had nothing to offer their patients that could reduce brain injury from stroke.

- **Stroke in Minorities**

  Stroke remains the third leading cause of mortality in the United States and a leading cause of adult disability; however, the burden of stroke is even greater among minority racial and ethnic groups because of its higher incidence and mortality in these populations. Initial evidence suggests that African Americans may experience more severe strokes and greater residual physical deficits.

  The NINDS 5-Year Strategic Plan on Minority Health Disparities called for a planning panel and workshop to generate a set of recommendations to guide NINDS efforts in research, research capacity building, and outreach to reduce and eliminate disparities in stroke. A Stroke Disparities Planning Panel was held in June 2002, and a follow-up workshop was held in November 2002 to identify specific research needs and areas of opportunity.

  The NINDS is proceeding along several fronts to reduce or eliminate racial disparities in stroke, including support of a large number of research projects that focus on minorities. Additionally, as a result of the Stroke Disparities Workshop, several new prevention and intervention programs are underway or planned.

- **Outreach**

  The NINDS has been working with investigators, clinicians, and private groups such as the American Heart Association and the National Stroke Association to determine the steps that should be taken to educate the public and the medical community about the need for rapid diagnosis and treatment of stroke. Especially emphasized are the specific benefits of the acute stroke treatment, t-PA. The NINDS organized a historic meeting, a National Symposium on Rapid Identification and Treatment of Acute Stroke, in December 1996. The symposium drew more than 400 professionals representing wide areas of the health care system to draft guidelines on how to treat stroke on an emergency basis. The participants made recommendations for change in five key areas: prehospital systems, emergency departments, acute hospital care, hospital systems, and public education. The proceedings from the meeting were published and distributed nationally in an effort to increase the number of stroke patients who can benefit from treatment and the number of hospitals that can offer rapid treatment to their patients.

Building on the enthusiasm and spirit of cooperation generated by the symposium, the NINDS assumed leadership of the Brain Attack Coalition, an umbrella group of several national organizations that work together to launch major stroke education campaigns. The latest effort is called *Know Stroke. Know the Signs. Act in Time.* The *Know Stroke* campaign is a multifaceted public education program designed to raise awareness of the signs and symptoms of stroke and the need to act quickly to seek medical care. It includes public service advertising, media outreach, and community education. Through a variety of voluntary organizations and federal partners, the NINDS has distributed hundreds of thousands of brochures and posters and more than 1,000 community education kits. These organizations are using *Know Stroke* materials in educational sessions at hospitals, senior centers, and other places that serve those at the highest risk for stroke.

As a follow-up to the 1996 symposium, the NINDS hosted a national Stroke Symposium entitled *Improving the Chain of Recovery for Acute Stroke in Your Community* in December 2002. About 400 participants from many organizations attended this meeting, which was designed to address the problem of the relatively few number of patients nationwide who are receiving acute treatment for their strokes. Both the American Stroke Association and the National Stroke Association were co-sponsors of the meeting. The attendees were to develop workable plans of action to get more stroke patients treated rapidly. The NINDS will publish the symposium task force reports and post them on the Web, in order to provide practical information that can be used by the medical community for years to come. The result will be improved treatment for the nation’s stroke patients.

New Programs

- **Specialized Program of Translational Research in Acute Stroke (SPOTRIAS)**

  The NINDS has initiated a new concept called Specialized Programs of Translational Research in Acute Stroke (SPOTRIAS). The objective of this innovative model is to facilitate translation of basic research findings into clinical practice. This is done in settings where patients with acute ischemic and hemorrhagic stroke are evaluated and treated very rapidly after the onset of their symptoms. The intent of the SPOTRIAS is to support a collaboration of clinical researchers from different specialties whose collective efforts will lead to new approaches to early diagnosis and treatment of acute stroke patients. Training and career development will be part of the SPOTRIAS program.

- **Human Genetics Resource Center: DNA and Cell Line Repository**

  To support its mission of reducing the burden of neurological illnesses and to support outstanding investigators funded through its research programs, the NINDS has established a Human Genetics Resource Center: DNA and Cell Line Repository.

  The goal of the repository will be the elucidation of genetic factors associated with neurological diseases, including stroke. Genetic studies of neurological disorders are increasing in number and complexity. Such studies require a large and diverse sample and accompanying information base. Thus, a repository of DNA samples, immortalized cell lines (from which DNA can be extracted continuously), and accompanying clinical and pedigree data is clearly an invaluable resource for the neuroscience community.

- **Stroke Progress Review Group**

  The large body of research knowledge acquired over the years, coupled with new technologies, is providing a wealth of new scientific opportunities. At the same time, increasing research needs and scientific opportunities required that the NINDS determine the best uses for its resources. In order to address these issues and to fulfill a Congressional request, the NINDS set out to develop a national plan for basic and clinical research in stroke. In 2001, the Institute formed the Stroke Progress Review Group (SPRG), consisting of 30 nationally and internationally recognized stroke experts. The SPRG identified topics to be addressed through a large Roundtable Meeting, whose participants identified gaps in stroke knowledge and set research priorities. The SPRG members and other participants of the meeting issued a report reflecting the energy and enthusiasm of the clinical, research, industrial, and advocacy communities for identifying effective prevention strategies and treatments for stroke.

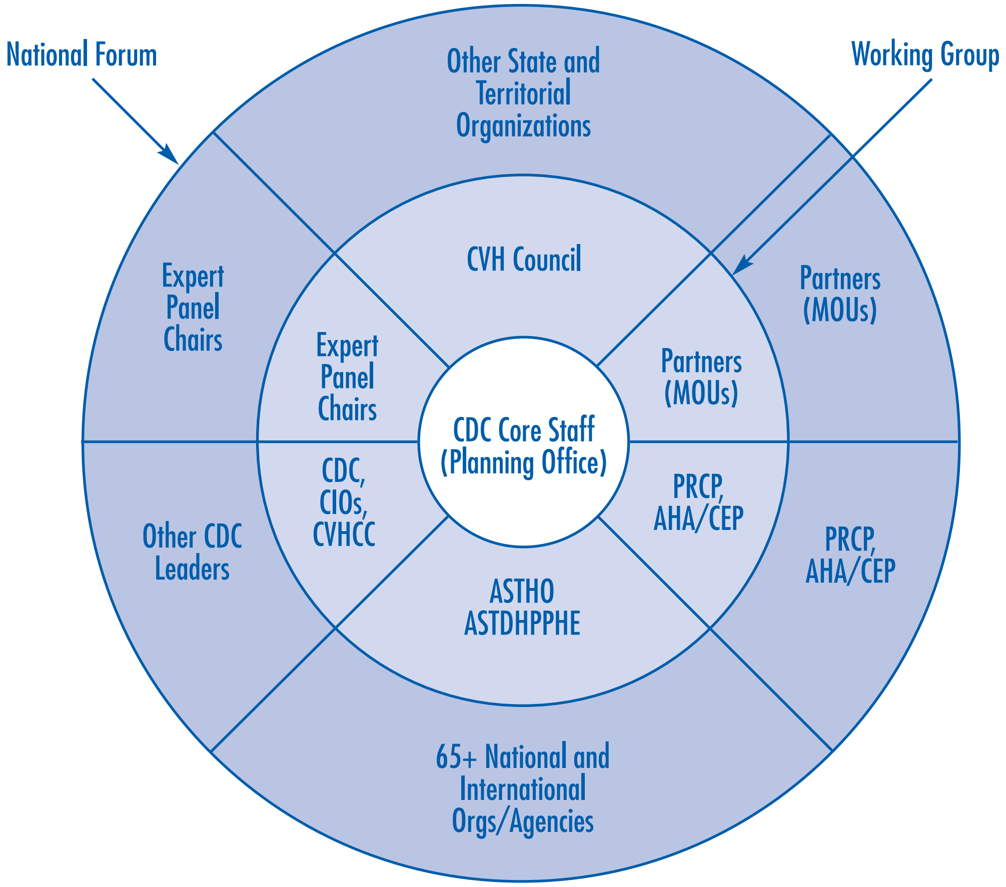
The comprehensive report from this meeting will serve as a guide for planning research in stroke prevention, diagnosis, treatment, and rehabilitation for the coming years.

APPENDIX D: DEVELOPMENT OF *A PUBLIC HEALTH ACTION PLAN TO PREVENT HEART DISEASE AND STROKE*

In 2001, CDC initiated development of *A Public Health Action Plan to Prevent Heart Disease and Stroke*. The concept of the plan and the process for its development were presented at the First National CDC Prevention Conference on Heart Disease and Stroke on August 24, 2001, in Atlanta. Valuable input was received, especially from the Cardiovascular Health Council of the Chronic Disease Directors (CDD), who identified representatives to join in the planning process. This appendix outlines this process and identifies the many partners who participated.

Organization

The planning process for the *Action Plan* included several key partners, public health experts, and heart disease and stroke prevention specialists in the United States and abroad. These participants were asked to contribute in several ways, including as members of a Working Group, one of five Expert Panels, or a National Forum. The figure illustrates the organizational structure for the planning process, which included CDC Core Staff.



Organizational Structure of the *Action Plan* Planning Process

Note: Abbreviations used in the figure are identified in the text or the participants list.

For the Expert Panels, each of which was chaired by an extramural public health expert, 45 national and international experts contributed to formulation of the recommendations and proposed actions steps. For the Working Group, which also was chaired by an extramural public health expert, 20 national and international experts served. For the National Forum, which was presided over by the chair of the Working Group, 81 individuals representing 66 national and international organizations and agencies other than CDC participated. With technical support from CDC, these groups developed the substance of the plan.

CDC Core Staff

The CDC Core Staff was responsible for coordinating the overall planning process. This staff works for the Associate Director for Cardiovascular Health Policy and Research in the Office of the Director, Division of Adult and Community Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention (OD/DACH/NCCDPHP/CDC). An outside contractor helped CDC with meeting arrangements and other logistical details.

Expert Panels

CDC convened five Expert Panels, each to address one of the five essential components of the *Action Plan*. The panels identified relevant concerns and problems, proposed solutions, and offered recommendations appropriate to their topics. The Working Group then reviewed these recommendations. The synthesized recommendations are presented in Section 3 of this plan. The corresponding action steps are presented in Section 4.

The titles and topics for the five Expert Panels were as follows:

- **Panel A: Policy and Programs**
  Taking action: Putting present knowledge to work.
- **Panel B: Capacity Development and Support**
  Strengthening capacity: Organization and structure of public health agencies and partnerships.
- **Panel C: Monitoring, Evaluation, and Communication**
  Evaluating impact: Monitoring the burden, measuring progress, and communicating urgency.
- **Panel D: Research in CVH Promotion and CVD Prevention**
  Advancing policy: Defining the issues and finding the needed solutions.
- **Panel E: Global Cardiovascular Health**
  Engaging in regional and global partnerships: Multiplying resources and capitalizing on shared experience.

Each Expert Panel had 16–22 members, including the following:

- Experts from outside CDC nominated from multiple sources and invited to participate on a particular panel based on the specific contribution they would make to the process.
- Members nominated by the Cardiovascular Health Council, CDD, which is part of the Association of State and Territorial Health Officers (ASTHO).
- The Cardiovascular Health Coordinating Committee (CVHCC), made up one or more representatives from each of the five NCCDPHP divisions that deal most directly with cardiovascular health: the Division of Adult and Community Health (DACH), the Division of Adolescent and School Health (DASH), the Division of Diabetes Translation (DDT), the Division of Nutrition and Physical Activity (DNPA), and the Office on Smoking and Health (OSH).

- NCCDPHP's Associate Director for Cardiovascular Health Policy and Research and the CDC Core Staff.

Working Group

The Working Group was responsible for initial critical review of the draft outline of the plan and the development process. Members also formulated the instructions for the Expert Panels, nominated members for the National Forum, and reviewed the final reports of the Expert Panels. In addition, they assessed the proposed implementation process and considered all input from the National Forum in preparing the final document. The 36-member Working Group included the following:

- The chairs of the Working Group and each of the five Expert Panels.
- Representatives from the Cardiovascular Health Council, CDD.
- Representatives from the five NCCDPHP divisions that deal most directly with cardiovascular health.
- Representatives from CDC's National Center for Environmental Health (NCEH) and National Center for Birth Defects and Developmental Disabilities (NCBDDD).
- Each partner working with CDC under a current memorandum of understanding (MOU) in the area of heart disease and stroke. These include one MOU with the American Heart Association (AHA) and American Stroke Association (ASA); the Centers for Medicare & Medicaid Services; the Office of Public Health and Science and the Office of Disease Prevention and Health Promotion, Department of Health and Human Services; and the National Heart, Lung, and Blood Institute and the National Institute of Neurological Disorders and Stroke, National Institutes of Health. CDC also has MOUs with the Ministry of Health and Welfare Canada and with the National Stroke Association.
- Representatives from CDC's Prevention Research Center Program (PRCP).
- Representatives from other national health professional organizations.
- NCCDPHP's Associate Director for Cardiovascular Health Policy and Research and the CDC Core Staff.

National Forum

National Forum participants were responsible for reviewing the draft plan from the perspectives of a wide range of partners, constituencies, and other interested parties. They also were asked to assess priorities for the many proposed action steps and to consider the potential contributions of partners to implementing the plan. The National Forum comprised the following participants:

- All members of the Working Group.
- Representatives from additional state and territorial organizations.
- Additional new partners.
- Additional representatives of the CVH research community.
- Additional CDC staff members from other Centers, Institutes, and Offices (CIOs).
- Other appointees as recommended during the planning process.

General Process and Format

The CDC Core Staff was responsible for overall planning and for executing production of the plan, including preparation of working drafts of all materials and the final draft for publication. The CDC Core Staff established and maintained Internet communications about the process and interim products to make the material widely accessible and to encourage broad-based input. A contractor was responsible for logistical arrangements for all meetings.

The Working Group met first in December 2001 to provide input to the draft outline, draft implementation plan, and Expert Panel instructions and to recommend members for the National Forum. During its second meeting in late May 2002, members reviewed and discussed the reports of the five Expert Panels and the implementation plan. Based on this discussion, the CDC Core Staff prepared a draft of the plan for review by the National Forum.

Each Expert Panel was convened for two meetings, the first during January–February 2002 and the second during March–May 2002. These meetings included preliminary discussions, interim work, and final discussions, which led to completed position papers for each panel that will be published separately.

In preparation for the first meeting, panelists received selected background material and were asked to prepare a written statement on their topics. This material was compiled and distributed to all members of each panel before the meeting. During the first meeting, participants discussed their designated component of the plan and identified approximately five issues of foremost importance regarding that component. This discussion facilitated development of a set of premises, which each panel used as the basis for their recommendations. These premises are as follows:

Panel A: Policy and Programs

- Policy development for cardiovascular health (CVH) promotion and cardiovascular disease (CVD) prevention must proceed under a comprehensive framework that recognizes the full array of cardiovascular disorders (e.g., heart attack, heart failure, stroke, vascular dementia) and the need to establish strategic links with efforts to prevent other chronic conditions of public health concern (e.g., obesity, diabetes, pulmonary disease, cancer).
- For maximum impact, community-wide interventions must address all appropriate settings, all opportunities throughout the life span, and the total U.S. population, with added emphasis on populations at high risk.
- A comprehensive public health strategy must focus on preventing major risk factors and assuring services to detect and control them once they develop. This strategy must also support efforts to widely implement guidelines for early identification and treatment of acute CVD events and prevention of recurrent events.
- The ideal program should be 1) national in scope, with state and local adaptation and implementation; 2) based on strategic partnerships, both innovative and established; 3) comprehensive with respect to CVD development and intervention approaches; and 4) responsive to community concerns.

Panel B: Capacity Development and Support

- Preventing heart disease and stroke requires a robust and effective public health infrastructure. Recent events have underscored the need for improved public health infrastructure in the United States. The current public health infrastructure urgently needs to be transformed to allow initiation of programs that are large enough and have the necessary competencies to achieve the goals of the plan. Such competencies include technical as well as political capacity (i.e., to develop policies, partnerships, and a societal commitment to prevent heart disease and stroke). Both aspects are essential. Technical capacity does not assure its own implementation, and a societal commitment cannot succeed without technical capacity.
- The public health capacities needed to prevent and manage CVD and other chronic diseases differ from those needed for communicable disease control. CVD presents special challenges because of its roots in societal conditions, its protracted duration of

development, its varied manifestations, and the need for a continuum of intervention approaches (from CVH promotion through the full spectrum of primary and secondary CVD prevention). Thus, addressing chronic diseases such as CVD requires an infrastructure of technical expertise and policies different from traditional public health agency models.

- The goals of this plan can best be met by recognizing the needed contributions of a diverse and culturally competent workforce.
- Capacity should be developed specifically to eliminate racial, ethnic, and geographic disparities in heart disease and stroke, through development of resources and competencies that address the causes of these disparities.
- Capacity should be developed at multiple levels, including local (i.e., city, county), state, tribal, and national. Challenges and opportunities unique to each should be considered. All levels should engage communities where people live, work, learn, and play.
- These recommendations can be supported by the accumulated knowledge and experience in public health practice and prevention research, which is sometimes derived from randomized trials but more often depends on other types of evidence (like many public health decisions).

Panel C: Monitoring, Evaluation, and Communication

- Surveillance is needed at national, state, and especially local levels, with indicators established for community and individual measures.
- A strong focus is needed on current and future uses of new data.
- Publicly funded CVH programs must conduct process and outcome evaluations. Privately funded programs should be encouraged to do the same.
- When planning surveillance and evaluation, three questions must be answered: What are the minimum data requirements? What additional data are highly desirable? What is the ideal scope of data collection? These answers are needed to develop appropriate interventions for CVD, to monitor the factors leading to CVD development, and to assess the impact of interventions on the population. These answers are also critical for setting priorities for data collection systems.

Panel D: Research in CVH Promotion and CVD Prevention

- A research agenda for heart disease and stroke prevention must recognize the opportunities for research throughout the life span. Conditions that lead to CVD development (e.g., atherosclerosis, high blood pressure) can result from exposures during childhood, adolescence, or even gestation. Risk factor levels generally progress throughout adulthood. Many older adults remain at high risk for continued progression of atherosclerosis and high blood pressure or recurrence of heart attacks or strokes unless adequate preventive measures are taken. Thus, preventive measures are important in childhood and adolescence (or earlier) and throughout early, middle, and later adult years.
- The concept of best practices is well established in public health and involves systematic review and assessment of available knowledge in accordance with accepted criteria. An appropriate review of the extensive knowledge and experience that already exists from public health practices in preventing heart disease and stroke would advance CVD best practices and help shape the prevention research agenda.
- The distinction between policy, environmental, and individual approaches to addressing CVD should be recognized. All are appropriate, and each has elements especially suited to particular settings.
- New prevention research will continually be needed to identify and evaluate current and proposed interventions, especially those related to policy and environment, which have rarely been investigated. Prevention effectiveness studies are needed to investigate inter-

ventions, addressing such aspects as the percentage of disease occurrence that can be prevented, costs and cost-effectiveness, feasibility (strengths/weaknesses/opportunities/threats), specific target populations, multiple levels (local, state, national), multiple settings (communities, work sites, schools, families), specific behaviors or health states studied as outcomes (e.g., smoking cessation, obesity), and effects of varied combinations of approaches (e.g., in a comprehensive model program).

- Important determinants of cardiovascular risk, including social and environmental conditions, have been investigated much less than personal behaviors (e.g., dietary imbalance, physical inactivity, smoking). These determinants require prominent attention in the research agenda.
- The infrastructure needed for such research includes multiple agencies and organizations at national, state, and local levels (including federal agencies, national voluntary organizations, and foundations). The roles of these and other potential partners in implementing the research agenda are an important aspect of implementing the plan.

Panel E: Global Cardiovascular Health

- A public health strategy for CVH promotion and CVD prevention is guided by commitment to the social values of health as a human right, equity, solidarity, participation, and accountability.[1]
- Cooperating on global CVD control and CVH promotion is imperative and urgent. Partners in this plan recognize the strategic need for strong U.S. involvement in global CVH issues.
- The basic needs of vast numbers of people continue to be unmet, and the resulting health challenges leave many people without hope. A more optimistic view recognizes and responds to the importance of a global context in addressing health and security. Better health—achieved through improvements in basic living conditions, income, education, and social services (including health care)—is a key element to achieving a better and safer world for everyone. Without these elements, better CVH cannot be fully achieved.
- With current knowledge and resources, a world that is substantially free from epidemic heart disease and stroke can be envisioned. Eliminating health inequalities and increasing the quality and years of healthy life are strategic goals for the global community in this century.
- To progress, we must maximize the use of all resources in our globalized, interconnected, and interdependent world. Despite the current picture of world affairs, our commitment to improving health conditions, especially CVH, offers the hope of a better future.
- The first four components of this plan (taking action, strengthening capacity, evaluating impact, and advancing policy) can also apply to global CVH promotion. Global recommendations in these areas must 1) correspond to global needs; 2) correspond to capacities and resources of CDC and its partners; 3) contribute to advancing national CVH or enrich the plan itself; and 4) reflect the underlying values and correspond to the stated vision of the plan.
- Based on the preceding criteria for global recommendations, CDC is assumed to be the primary agency to support their implementation, in conjunction with regional and global partners. The recommendations are directed accordingly.

The second meeting of each panel focused on making specific recommendations for the *Action Plan*. Areas of consensus and difference were identified, and salient points were incorporated in a set of recommendations and corresponding action steps. The recommendations and action steps constituted the primary products of the Expert Panels. These were used to prepare the draft plan, after synthesis by the Working Group.

The National Forum was appointed in spring and summer 2002 and received the draft plan in August 2002. The members met September 4, 2002, to discuss the proposed action steps and the interests of their respective agencies, organizations, and constituencies in implementing the plan. The Working Group then made its final revisions to the draft plan.

Reference

1. Advisory Board of the First International Conference on Women, Heart Disease and Stroke. *The 2000 Victoria Declaration on Women, Heart Diseases and Stroke*. Victoria, Canada: Advisory Board of the First International Conference on Women, Heart Disease and Stroke; May 8–10, 2000.

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Health Canada

Heart and Stroke Foundation of Canada

International Stroke Society

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