

Global Cardiovascular Health Promotion and Disease Prevention : 2011 and Beyond Darwin R. Labarthe and Sandra B. Dunbar

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Recent Advances in Preventive Cardiology and Lifestyle Medicine

Global Cardiovascular Health Promotion and Disease Prevention 2011 and Beyond

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As part of a series of reports on cardiovascular disease (CVD) prevention, this review provides a global perspective on the needs and opportunities for effective public health action. The global burden, disparities, and costs of CVD have been a mounting concern in recent decades, with repeated calls for action to arrest and reverse this global epidemic. Over the past decade, attention to the challenge and opportunity for meaningful intervention has grown. This is due in part to improved estimates of the magnitude of the problem; forecasts of its increasing adverse impact not only on health but also on social and economic development, especially in low- and middle-income countries; and assessments of the cost-effectiveness of feasible interventions. The case for CVD prevention and long-established intervention strategies are reviewed as background to recent developments. An extensive review and recommendations reported by the Institute of Medicine in 2010 signaled important potential changes in approaches to CVD prevention globally.

In the current context of global health, CVD is seen not in isolation but as a major component of the leading noncommunicable diseases (NCDs): CVDs, cancers, chronic respiratory diseases, and diabetes mellitus. Accordingly, the broader arena of NCD prevention and control has come to predominate over CVD alone. From this viewpoint, 3 recent developments are of central importance: the United Nations' Millennium Development Goals (MDGs; which omitted reference to NCDs), the global response that led to the historic High-Level Meeting of the United Nations General Assembly (UNGA) on NCDs in September 2011, and currently proposed policies and recommendations on NCD prevention.

The charge from the UNGA to the World Health Organization (WHO) in the declaration from the September 2011 meeting establishes an aggressive timeline for progress. Options for intervention are to be presented by the end of 2012, and an extensive review of progress is planned for 2014. Several opportunities, in principle, for the CVD community to contribute to this process in the interest of cardiovascular health (CVH) promotion and CVD prevention conclude this report.

Global Dimensions of CVH Promotion and CVD Prevention

The health of populations throughout the world is seriously compromised by the ubiquitous occurrence of CVD. Most important are the atherosclerotic and hypertensive diseases, mainly ischemic heart disease and cerebrovascular disease. (Unless otherwise noted, the term cardiovascular here includes both ischemic heart disease and cerebrovascular disease. Heart failure, whether resulting from ischemic heart disease or other causes, is also included.)

These 2 conditions have been projected for the year 2020 to rank first and second in frequency among causes of death, first and third among causes of years of life lost, and first and fourth among causes of disability-adjusted years of life lost. Together, they dominate all other contributors to the global burden of death and disability.¹ They also are preeminent among the chronic diseases or NCDs. Prevention and control of these several conditions (principally CVDs, cancers, chronic respiratory diseases, and diabetes mellitus) have now been recognized by the UNGA as "one of the major challenges for development in the twenty-first century."²

This challenge is not only a major one but also an urgent one, and the needed level of intervention is long overdue. A WHO poster declared in 1988 that "Heart attacks are developing in developing countries," and reexamination of data from the World Bank demonstrates that death rates for ischemic heart disease and cerebrovascular disease were already high in most regions of the world by 1985.³ Recognition of the extent of CVD around the world has lagged significantly behind the growth of the epidemic itself.

In 2004, *A Race Against Time* projected a devastating impact of CVD specifically on the working-age populations (ages 35–64 years) of low- and middle-income countries by the year 2030: "...[W]ithout concerted, ongoing intervention to prevent the precursors and reverse the negative effects of CVD in developing countries, a global health crisis in the current workforces (and later among the elderly) of those countries will occur—and sooner, rather than later."⁴ This

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forecast was illustrated for countries in 5 diverse regions of the world: Brazil, South Africa, Russia, China, and India.

Low- and middle-income countries are not alone in being challenged to quickly mount intensified national efforts in view of economic and social consequences of epidemic CVD. In the United States, for example, the economic cost (direct medical expenditures plus lost productivity costs) of CVD is projected to reach \$1.1 trillion annually by 2030.⁵ In addition, persisting racial/ethnic disparities in health and life expectancy (especially between blacks and whites) result largely from CVD.⁶

CVD prevention is increasingly recognized as a challenge and opportunity at the global level and for every nation.³ Research and practice in CVD prevention, continuous essentially since the mid-20th century, provide a broad base of experience through which contemporary approaches have evolved. As a result, recommendations, policies, and guidelines abound. They range in application from global calls to action to advice to individuals. The former is illustrated by reports from international organizations calling for government-wide action; the latter, by clinical guidelines typically developed at the national level to influence the practices of healthcare providers and the behavior of their patients.

From the public health perspective, 2 broad strategies of intervention are often distinguished: health promotion and disease prevention or, in the present context, promotion of CVH and prevention of CVD. As these terms are generally used, CVH promotion is focused on good CVH, with interventions to foster and maintain low cardiovascular risk, whereas CVD prevention is focused on high cardiovascular risk or occurrence of critical events such as heart attacks and strokes with interventions to ameliorate them. CVH promotion is often associated especially with interventions at the population level, whereas those for CVD prevention take place especially at the individual level. Although these distinctions between CVH promotion and CVD prevention are not absolute, we find the contrast useful in considering global strategies to address CVD, as discussed below.

The Case for Intervention

Intervention to reverse the global CVD epidemic demands scale, intensity, and duration and requires broad international consensus and commitment of resources. These prerequisites depend in turn on the conviction that prevention is needed, is feasible, and is economically justifiable. Such considerations are expected to be evidence based but are also subject to decision makers' judgments, taking other influences into account.

The Large and Growing Burden of Disease

Data from the 2006 report of the Global Burden of Disease Study indicated the proportions of deaths attributed to ischemic heart disease and to stroke as of 2001 for each of 6 regions among low- and middle-income countries and overall for high-income countries.¹ The proportionate mortality from ischemic heart disease ranged from 3.2% in sub-Saharan Africa to 29.7% in Europe and Central Asia; the same regions were lowest and highest for stroke deaths as well at 3.3% and 18.2%, respectively. Although at the low extreme, sub-

Saharan Africa experienced an estimated 698 000 deaths resulting from these causes in 2001; proportionate mortality tells only a fraction of the story. The number of deaths reveals that the causes of epidemic CVD are deeply rooted in all regions of the world.

In 2007, the WHO reported the prevalence of $\geq 10\%$ risk of a cardiovascular event (coronary, cerebrovascular, or peripheral vascular) within 10 years for each of its 14 subregions, ie, categories of countries, according to child and adult mortality, within each region of Africa, the Americas, Eastern Mediterranean, Europe, Southeast Asia, and the Western Pacific.⁷ Taking 1 age stratum for illustration, the prevalence of $\geq 10\%$ risk at 50 to 59 years of age ranged from 10.1% to 30.7% for men and from 5.5% to 20.9% for women. The high risk of CVD is ubiquitous.

Projected increases in deaths from CVD at working ages in Brazil, South Africa, Russia, China, and India were noted above.⁴ The total increase from 2000 to 2030 in productive years of life lost in just these 5 countries would be nearly 8 million (38%), reaching a total of >28 million. The impact of high risk on consequent disability and loss of economic productivity among those who survive a critical event is very substantial.

Severe Economic Impact

Analyses of economic impact of CVD at the national and regional levels around the globe by the World Bank and others have brought the CVD epidemic into focus. A prodigious amount of work has been accomplished in efforts to quantify the magnitude of the CVD/NCD problem and its economic importance.^{8,9} A series of reports published in *The Lancet* in 2007, for example, addressed the economic impact of NCDs and the potential economic benefit of intervention in 23 developing countries where these conditions together account for 50% of the total disease burden.¹⁰ It was estimated that cost-effective interventions could reduce the number of deaths in these 23 countries by 24 million, reducing their economic cost by \$8 billion. *A Race Against Time* concluded that investments in health would, in turn, reduce the burden of disease, stimulate economic growth, and raise societies' abilities to invest in public health.⁴

Universal Causal Factors

Although research continues to refine our understanding of the underlying mechanisms of atherosclerotic and hypertensive diseases, modifiable causes have been recognized for decades.³ The "established" or "traditional" CVD risk factors—high blood pressure, adverse blood lipid profile, diabetes mellitus and obesity (with their shared underlying determinants of dietary imbalance and physical inactivity), and smoking—have been addressed in recommendations, policies, and guidelines beginning a half-century or more ago.^{11,12} The Global Burden of Disease Study has demonstrated that the commonly recognized risk factors jointly account for 80% of the burden of ischemic heart disease and 65% of the burden of stroke globally.¹

More recently, the INTERHEART Study of factors associated with myocardial infarction in 52 countries throughout the world demonstrated that 9 factors accounted for $\geq 90\%$

of the risk of myocardial infarction among men and women in these populations. The investigators concluded:

Abnormal lipids, smoking, hypertension, diabetes, abdominal obesity, psychosocial factors, consumption of fruits, vegetables, and alcohol, and regular physical activity account for most of the risk of myocardial infarction worldwide in both sexes and at all ages. This finding suggests that approaches to prevention can be based on similar principles worldwide and have the potential to prevent most premature cases of myocardial infarction.¹³

Similarly, INTERSTROKE investigated risk factors associated with stroke through a case-control study in 22 countries and identified 10 factors accounting for 90% of the risk of stroke. Hypertension was the most important of these for all stroke subtypes, especially for intracerebral hemorrhage.¹⁴ Blood pressure can easily be measured in many settings and can be targeted for reduction through lifestyle and policy approaches (eg, salt intake reduction).

Projected Effectiveness of Intervention

From decades of experience, there is abundant evidence for interventions that work and models to show the potential impact of bringing effective interventions to scale. The well-known experience of Finland beginning in the early 1970s is a classic example of broad-based, multitarget intervention first in the region of North Karelia and then nationwide.¹⁵ Reductions in prevalence of high blood pressure and cholesterol among both men and women and in smoking in men predicted declines in mortality from ischemic heart disease of $\approx 45\%$, declines that were actually exceeded over the 20 years ending in 1992. This apparent success of intervention led to the establishment of the Countrywide Integrated Noncommunicable Diseases Intervention program, supported by the WHO and the National Public Health Institute of Finland.¹⁶ Since the mid-1980s, the Countrywide Integrated Noncommunicable Diseases Intervention has grown to 24 member countries, primarily in Europe, that have continued to replicate the model of local or regional within-country intervention as the starting point for national policy development.

Several modeling projects to evaluate the impact of risk factors or interventions on CVD outcomes have been reported in recent years, in some cases including a cost-effectiveness evaluation.¹⁷ Ford et al¹⁸ have developed and applied the IMPACT model for this purpose. Using this method, they have assessed relative contributions of both population-wide risk factor change and treatment of patients with existing CVD. The model has been applied to data from several countries. For example, data for the United States accounted for a major decline— $>845\,000$ deaths—in coronary heart disease mortality in the year 2000 from the number expected on the basis of 1980 rates.¹⁸ Population-wide improvements in risk factor distributions—blood pressure, cholesterol, smoking, and physical activity—were sufficient to account for 61% of the reduction but were offset by 17% by increases in obesity and diabetes mellitus. The net 44% contribution of risk factor change was matched by the effect of treating

patients with known CVD (47%), whether by pharmacological treatment of their risk factors, coronary artery bypass surgery, or other clinical and lifestyle interventions. In a total of 10 such analyses with the IMPACT model, risk factor change in the whole population accounted for 44% to 76% of the mortality reduction, whereas treatment of patients accounted for 23% to 47%.

Several caveats accompany these results as a result of both limitations of the data and uncertainty of the assumptions that underlie the models. The relative contributions of population-wide and clinical approaches depend in part, of course, on how widely the effective interventions were implemented over the periods studied. A firm conclusion, however, is that both population-level changes and adoption of individual-level treatments for persons at high risk appear to have made major contributions to favorable trends in coronary mortality where they have been observed.

On a global scale, further analysis of the 23 developing countries noted above addressed the question of whether population-wide reductions in salt intake or tobacco use could be effective at an acceptable cost.¹⁹ Results indicated that reducing salt intake by 15%, at an annual per capita cost ranging from US \$0.04 to \$0.32, could avert 8.5 million deaths over the 10-year period of 2006 to 2015; feasible reductions in tobacco use could prevent an additional 6.5 million deaths; and a reduction of average salt intake to the WHO goal of <5 g/d would avert 28 million deaths over the same period.

Congruent Support of Leading Organizations

Several citations make the case for widespread confidence regarding the potential for effective intervention. At the national level, in the United States, both governmental and voluntary agencies have expressed commitments to improving the CVH of the nation (the American Heart Association's 2020 Impact Goal includes "improving cardiovascular health for all Americans by 20%" and reducing mortality from CVDs and stroke by 20% by 2020.^{20,21} A joint report from the AHA, American Diabetes Association, and American Cancer Society projects reductions in the number of myocardial infarctions of 63% and strokes of 31% by optimum delivery of clinical preventive services alone.²²

The WHO Regional Office for Europe published *Gaining Health: The European Strategy for the Prevention and Control of Noncommunicable Diseases*, a visionary depiction of "a health-promoting Europe free of preventable NCD, premature death, and avoidable disability."²³ The 2005 WHO report, *Preventing Chronic Disease: A Vital Investment*, declared, "The chronic disease threat can be overcome using existing knowledge. The solutions are effective—and highly cost-effective. Comprehensive and integral action at country level, led by governments, is the means to achieve success."²⁴

The 7 International Heart Health Conferences that began in Victoria, BC, Canada, in 1992 consistently sounded calls for action that were ultimately synthesized in the 2005 publication, *International Action on Cardiovascular Disease: A Platform for Success Based on International Cardiovascular Disease Declarations*.²⁵ That report concluded, "Cardiovascular disease (CVD) is a challenge of global proportions. It is

largely preventable. Unfortunately, overall investment in CVD prevention has been insufficient to achieve optimal results. Applying the existing knowledge with the wisdom that has accumulated over the past twenty years could stem the epidemic of CVD around the world.”

Concepts of Intervention

Goals

The goals of CVH promotion and CVD prevention have been expressed in various ways, as broadly as that from the WHO, “to halt and turn back the growing threat of chronic diseases,”²⁴ or as specifically as the Healthy People national goal for heart disease and stroke in the United States, as expressed in *A Public Health Action Plan to Prevent Heart Disease and Stroke*²⁶: “To improve cardiovascular health and quality of life through: prevention of risk factors; detection and treatment of risk factors; early identification and treatment of heart attacks and strokes; and prevention of recurrent cardiovascular events.”

We consider the distinction between CVH promotion and CVD prevention to be increasingly relevant to global health goals and interventions. In the United States, the Healthy People blueprint that updates national goals each decade introduced the concept of improving CVH for 2010 and retained it for 2020.^{21,27} For 2020, the Healthy People objectives for heart disease and stroke begin with improving the CVH and quality of life of the population. Improving CVH for the US population as a whole is its first listed objective. This concept has been further elevated to prominence with the adoption by the AHA of its 2020 Impact Goal, quoted above.²⁰ These commitments to applying concepts of health promotion in the cardiovascular arena have important consequences: They demand explicit definition of CVH, identification of metrics by which to assess its prevalence across the population, and strengthening of surveillance of these metrics to monitor progress toward the goal throughout the decade and beyond.

In terms of the Healthy People goal and its 4 components, the goal of preventing risk factors is most closely aligned with CVH promotion, whereas those of reducing risk factors once present, treating critical cardiovascular events, and managing their sequelae are more clearly in the traditional domain of CVD prevention.³ An integral part of the AHA 2020 Impact Goal is stratification of the population in accordance with the several criteria that define CVH: current smoking status, physical activity, diet score, body mass index, total cholesterol, blood pressure, and fasting plasma glucose. In accordance with these “health behaviors” and “health factors” (note: no longer “risk behaviors” and “risk factors”), persons free of CVD can be classified as in “ideal,” “intermediate,” or “poor” CVH (even in the absence of known CVD).²⁰

One way to improve CVH for the population is by favorable change in behaviors or factors that result in shifting from poor to intermediate or from intermediate to ideal CVH. Another way—preferable in principle—is to preserve ideal CVH in the first place: It has been shown that the prevalence of ideal CVH declines with age sharply from childhood and

adolescence (47% at 12–19 years of age) into adulthood (17% over all ages ≥ 20 years and continuing to decline throughout the adult years).²⁸ This suggests a critically important additional pathway to increasing the prevalence of ideal CVH: working to promote and retain it from the beginning.

Strategies

This understanding of goals provides a framework in which strategies first described 3 decades ago can be revisited. A prominent concept in CVD prevention over the past 30 years has been Rose’s “population-wide” and “high-risk” or “individual” strategies.²⁹ The population-wide strategy aims to improve the already adverse population distribution of risk by shifting the whole distribution favorably. The high-risk strategy entails clinical intervention through lifestyle change or pharmacotherapy among persons at the upper extreme of CVD risk in an effort to reduce their already-established risk of CVD events. Because extreme risk is by definition infrequent, the benefit of the high-risk strategy, although potentially great for affected individuals, reaches only a small proportion of the population. In contrast, although the benefit to individuals through the population-wide approach is comparatively small, it is far-reaching and reduces risk at levels where the great majority of CVD events occur: above optimum but not extreme. In concept, then, these 2 strategies of CVD prevention are considered to be complementary.

A distinct strategy proposed at about the same time by Strasser³⁰ called for preventing risk factor epidemics in whole societies by intervening in childhood. Strasser contrasted this concept with primary, secondary, and tertiary prevention, seen as largely clinical approaches to CVD prevention. He proposed the terms primordial prevention and proto-prophylaxis to denote this concept. The term primordial prevention has been widely used in reference not only to population-wide interventions to prevent epidemics of the risk factors but also to early intervention more generally such as in clinical child care or school health programs. As with the Rose population-wide and high-risk strategies, then, primordial prevention also has 2 potential levels of application.

If the focus of primordial prevention is on prevention of risk factors, it is clearly aligned with concepts of CVH (including ideal CVH) and health promotion, as well as life-course approaches to health.³¹ The high-risk and population-wide strategies of Rose, in contrast, are aligned mainly with goals of reducing already-established risk to prevent critical CVD events. It may be useful to distinguish between these broadly as primordial and remedial strategies. Across the 4 goals of prevention, noted above, the first, prevention of risk factors, is the subject of the primordial strategy or CVH promotion; the second and fourth, detection and treatment of risk factors and prevention of recurrent cardiovascular events, are the subjects of the remedial strategies of CVD prevention. The third goal, early identification and treatment of acute cardiovascular events such as heart attacks and strokes, is not directly addressed by either Strasser’s or Rose’s concept and requires separate consideration.

Approaches

Deployment of these strategies for the goals of CVH promotion and CVD prevention entails devising practical ap-

proaches that can bring about change. In today's terms, these encompass, for example, policy and environmental and systems approaches at the highest levels of intervention, clinical recommendations and guidelines for use in healthcare systems and settings, and individual-level information and education. Specific types of interventions applicable to each of the 4 goals are outlined in the *Public Health Action Plan* (cited above) in the current US context.²⁶ These approaches can be traced back 30 to 50 years, eg, in recommendations of the US National Health Education Committee report of 1959 and a series of reports under the aegis of the WHO CVD unit between 1980 and 1990.^{11,32–34} These examples represent a range from advice to “the average man and woman” in working with their doctors, nurses, and other health providers to reduce risk to the adoption of far-reaching policies for CVH promotion and CVD prevention, including those beginning in youth, by member states at the urging of the WHO.

There has been continuous development of recommendations, guidelines, and policy proposals to address CVH promotion and CVD prevention over the intervening decades. Their impact in some high-income countries has been a marked reduction in CVD death rates. However, the demographic shift toward increasing proportions of populations at older ages (where rates are highest) has resulted in persistently high numbers of CVD deaths with attendant disparities and costs.

Consequently, a number of action plans have been created to translate the foregoing principles into practical applications. Examples from the Americas, Europe, and South Asia are reviewed elsewhere with detailed consideration of a case study from the United States (the above-mentioned action plan and establishment of the National Forum for Heart Disease and Stroke Prevention to implement the plan).³ Such plans are a necessary step to enable and guide meaningful action, yet they are not sufficient in themselves to mobilize it. Leadership, institutionalization, and resources are further requirements.

Despite longstanding advocacy for such approaches, current efforts remain insufficient to meet the challenge, especially in low- and middle-income countries. In addition, although emphasis on these countries is needed, the question should be borne in mind, Is there any country that can afford not to intensify these efforts, especially recognizing the most recent calls for action?

This question leads to consideration of recent developments on the global level against the background of the case for intervention and concepts of intervention reviewed above: How is the case being advanced, and how are established concepts of intervention reflected in the most current recommendations?

Global Developments Through 2011

The MDGs

The United Nations Millennium Development Declaration, adopted by the UNGA on September 8, 2000, reaffirmed the values and principles of the United Nations and committed the agency and its members to a number of broad and far-reaching goals of global importance for the new millen-

nium.³⁵ Included were a number of provisions that have become denoted as MDGs that address extreme poverty and hunger; universal primary education; sex equality and empowerment of women; child mortality; maternal health; HIV/AIDS, malaria, and “other diseases”; environmental sustainability; and global partnership for development.

Notably absent from these provisions, despite their reference to global health priorities, was any mention of cardiovascular or other chronic diseases or NCDs. Most specifically, target 6.C, to “have halted by 2015 and begun to reverse the incidence of malaria and other major diseases,” refers only to tuberculosis in this connection.³⁵ In retrospect, the declaration and its omissions were catalytic in producing an outcry of global proportions regarding the neglect of chronic diseases. The impact of this response continues to be felt and has generated new prospects for action with important implications for CVH promotion and CVD prevention.

A Global Response

By the middle of the decade, a global response to the MDGs had gained momentum. *A Race Against Time*, published in 2004, was a direct rejoinder with its message of urgency.⁴ The editor of *The Lancet* in 2005 referred to chronic diseases as “the neglected epidemic” and called for health policymakers to take meaningful action.³⁶ *Circulation* published a special report in 2007 that outlined the rationale for including CVD and other chronic diseases in the MDGs and called the absence of investment in the prevention of these conditions in low- and middle-income countries “a mistake.”³⁷ Notably, the authors of this report were among the top leaders of the World Heart Federation.

In 2007, 19 global health leaders from 16 institutions and organizations around the world published “Grand Challenges in Chronic Noncommunicable Diseases: The Top 20 Policy and Research Priorities for Conditions Such as Diabetes, Stroke and Heart Disease” in *Nature*.³⁸ The report was the product of a “grand challenge” exercise conducted by use of the Delphi method involving 155 stakeholders from 50 countries. Six goals were presented: “raise public awareness; enhance economic, legal and environmental policies; modify risk factors; engage businesses and community; mitigate health impacts of poverty and urbanization; and reorientate health systems.” Under each goal, 2 to 5 “grand challenges” and 4 to 9 research needs were proposed. (Each topic calls for a substantial program of research, which could be a years-long enterprise, perhaps at odds with the sense of urgency of action—a difficult balance.)

With this publication, the founding members (the Oxford Health Alliance, UK Medical Research Council, Canadian Institutes of Health Research, Indian Council of Medical Research, and US National Institutes of Health) declared the establishment of a partnership now known as the Global Alliance for Chronic Diseases (GACD), with the following priorities³⁹:

- The GACD plans to avoid duplication by facilitating collaborative funding activities for innovative, original research directed at the prevention and treatment of chronic

diseases, especially where the need for robust evidence to inform policy is most urgent.

- The members of the GACD have agreed on a number of priorities for early studies that will be followed by a more extensive program as the alliance evolves. These priorities will be taken into account in collaboration with the prioritized research agenda developed by the WHO, the 2008 to 2013 Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases. The creation of the GACD brings to fruition a global commitment to urgently increase the resources and attention to chronic NCDs, which constitute the major burdens of illness and disability in almost all countries of the world.
- With concerted action, many millions of premature deaths can be averted in the decade ahead. The formation of this alliance brings us closer to developing a serious, funded course of action.

This new initiative, reasonably considered a direct consequence of the omission of NCDs from the MDGs, may have an important impact in mobilizing research to fill perceived gaps in evidence for policy development and implementation.

The Institute of Medicine Report

Another important contribution to thinking about CVH promotion, published in 2010, is the US Institute of Medicine report, *Promoting Cardiovascular Health in the Developing World: A Critical Challenge to Achieve Global Health*.⁴⁰ Already in 1997 to 1998, the Institute of Medicine's Board on International Health (now Board on Global Health) had convened the Committee on Research, Development, and Institutional Strengthening for Control of Cardiovascular Diseases in Developing Countries.⁴¹ The committee's primary focus was continued and increased investment in health research. But, it also recognized the already-existing body of evidence supporting programmatic interventions. These had been outlined as early as 1993, nearly 2 decades ago.⁸ A priority concern was the prevailing lack of awareness of ready-for-action, low-cost, and cost-effective interventions. This concern anticipates the research priority of the GACD to raise public awareness of NCDs and the potential for effective intervention.

The 2010 Institute of Medicine report importantly extended the review of evidence for actions to reduce the global burden of CVD. The committee's 12 recommendations reflect a changing concept of CVD in relation to other health concerns (see the Table); all but 2 recommendations (recommendations 8 and 9) refer explicitly to chronic diseases, not to CVD alone. With CVD having been subsumed under the broader designation of chronic diseases, it has become important to recognize that attention to NCDs necessarily includes a focus on CVD. This is not to detract from the specific importance of cancer, chronic respiratory diseases, and diabetes mellitus but rather to underscore the common factors underlying these conditions: dietary imbalance, physical inactivity, and tobacco use, together with their "upstream" determinants.³

In the realm of CVH promotion, the commonalities across these conditions add considerable weight to the case for

Table. Recommendations for Promoting Cardiovascular Health in the Developing World

No.	Recommendation
1	To recognize chronic diseases as a developmental assistance priority
2	To improve local data
3	To implement policies to promote cardiovascular health
4	To include chronic diseases in health systems strengthening
5	To improve national coordination for chronic diseases
6	To research to assess what works in different setting
7	To disseminate knowledge and innovation among similar countries
8	To collaborate to improve diets
9	To collaborate to improve access to CVD diagnostics, medicines, and technologies
10	To advocate for chronic diseases as a funding priority
11	To define resource needs
12	To report on global progress

CVD indicates cardiovascular disease. Adapted from: Institute of Medicine. *Promoting Cardiovascular Health in the Developing World: A Critical Challenge to Achieve Global Health*. Washington, DC: National Academies Press; 2010.⁴⁰

intervention: Not only CVD but also the other major chronic conditions will be affected by effective interventions. Particular features of each condition become important further "downstream," where interventions become more clinical, individual, and specific (eg, Recommendation 9). Still, even downstream, where chronic conditions require long-term clinical management and community support, there may be important commonalities across the major chronic diseases.

This report presents a second level of integration of CVD into the larger context of global health: the idea that progress in prevention and control of HIV/AIDS provides models of organization and implementation that should be emulated or, better, joined by efforts to address CVD and other NCDs. Three other points are especially noteworthy. First and second, briefly, are the importance of early intervention, beginning with maternal and child health and a life-course approach, and the readiness to implement and evaluate interventions now, in specific settings, recognizing that their impact may differ under various circumstances and require adaptation accordingly.

Deserving special emphasis is point 3, discussed under "resource needs." Recommendation 11 is a proposal that the GACD conduct

case studies of the CVD financing needs of five to seven countries representing different geographic regions, stages of the CVD epidemic, and stages of development....Several scenarios for different prevention and treatment efforts, training and capacity building efforts, and demographic trends should be evaluated....These initial case studies should establish an analytic framework with the goal of expanding beyond the initial pilot countries.⁴⁰

This proposal suggests a practical means of moving forward with concentrated attention to several pilot or model countries in which demonstrations of best available approaches could be achieved and evaluated. This work could

add importantly to the case for prevention by showing the impact of intervention within each of several regions of the world, motivating neighboring countries to pursue similar efforts.

A Call to Action for Global Prevention Involvement by Nurses

Another recent analysis of the global burden of CVD addresses the role that nurses can play in CVH promotion and CVD prevention. Its publication in a series of articles in the July-August 2011 supplement to the *Journal of Cardiovascular Nursing* was a collaborative effort among the Preventive Cardiovascular Nurses Association, the Council of Cardiovascular Nursing of the American Heart Association, and the Council of Cardiovascular Nurses and Allied Health Professionals of the European Society of Cardiology.⁴² Approaches discussed include a life-course approach to CVD prevention, successful nurse-led primary or secondary prevention programs for modifying multiple risk factors at the population level, community-based models, and capacity building by preparing nurses to assume leadership roles in CVD prevention. Such practical, evidence-based strategies can inform the development of clinical care and health policy and strengthen the healthcare workforce. These advances in addressing CVD prevention are urgently needed in both more developed and developing countries.

Ongoing Work of the WHO

Meanwhile, over this first decade of the new millennium, the WHO has continued its work on CVH promotion and CVD prevention that began in the 1950s. A milestone in this progression is the *Draft Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases*, adopted by the 61st World Health Assembly in May 2008. This was the subject of a WHO issues paper noting the suggestion from some member states that NCDs were a major issue for development and should be incorporated into an amended MDG list to be called MDGs Plus.⁴³

The global strategy calls for implementing many of its provisions during the period of the WHO's midterm strategic plan, 2008 to 2013.⁴⁴ The plan focuses on low- and middle-income countries and "vulnerable populations," with the purpose of mapping the emerging epidemics of NCDs and analyzing their social, economic, behavioral, and political determinants; reducing the level of exposure of individuals and populations to the common modifiable risk factors for NCDs, namely tobacco use, unhealthy diet, and physical inactivity, and the harmful use of alcohol and their determinants; strengthening the capacity of individuals and populations to make healthier choices and to follow lifestyle patterns that foster good health; strengthening health care; and reorienting health systems to respond to the need for effective management of chronic diseases.⁴⁴

Actions toward these ends were proposed on the basis of current scientific knowledge, evidence, and experience. Requirements for implementation were seen to be high-level involvement by political, governmental, community, and healthcare leaders; reorientation of public health policies; and improved resource allocation. Immediate objectives were to

raise the priority of NCDs and to engage all government departments in policies for their prevention and control; to establish and strengthen national policies; to promote interventions reducing the common modifiable risk factors, with specific proposed actions for controlling the use of tobacco, promoting healthy diet and physical activity, and reducing the harmful use of alcohol; to promote research for NCD prevention and control; to promote partnerships; and to monitor NCDs and their determinants and to evaluate progress from national to global levels. For each of these objectives, specific tasks were outlined for member states, the secretariat, and international partners.

As implementation proceeds, the WHO continues to report on the global status of the NCDs. An April 2011 publication notes that "the epidemic of these diseases is being driven by powerful forces now touching every region of the world: demographic ageing, rapid unplanned urbanization, and the globalization of unhealthy lifestyles. While many chronic conditions develop slowly, changes in lifestyles and behaviors are occurring with a stunning speed and sweep."⁴⁵ Against these influences, the WHO proposes both population-wide and individual healthcare interventions considered actions to be undertaken immediately "to produce accelerated results in terms of lives saved, diseases prevented and heavy costs avoided." These cost-effective interventions, called best buys, are the following at the population level:⁴⁵

- Protecting people from tobacco smoke and banning smoking in public places
 - Warning about the dangers of tobacco use
 - Enforcing bans on tobacco advertising, promotion, and sponsorship
 - Raising taxes on tobacco
 - Restricting access to retail alcohol
 - Enforcing bans on alcohol advertising
 - Raising taxes on alcohol
 - Reducing salt intake and salt content of food
 - Replacing *trans* fat in food with polyunsaturated fat
 - Promoting public awareness about diet and physical activity, including through mass media
- Corresponding best buys for CVD prevention at the individual healthcare level are the following:⁴⁵ counseling and multidrug therapy ("a regimen of aspirin, statin, and blood pressure-lowering agents in people at high cardiovascular risk"), including glycemic control for diabetes mellitus for people ≥ 30 years of age with a 10-year risk of fatal or nonfatal cardiovascular events $\geq 30\%$, and aspirin therapy for acute myocardial infarction. In addition to these immediate interventions, others are listed that are both low cost and cost-effective and still others that are strongly supported by available evidence but lack sufficient data on cost-effectiveness.
- Although details of implementation would need to be specified at the appropriate level of action such as the national or local government, these proposed interventions provide very concrete steps by which to move forward. New tax revenues, eg, those on tobacco and alcohol, could supplement existing national budgets to support these activities.

- The WHO proposes adoption of national NCD programs that comprise the 3 components of surveillance, prevention, and health care through 7 lines of action:⁴⁵
- A comprehensive approach targeting the whole population beginning early in life, including both prevention and treatment
- Multisectoral action from government, civil society, and the private sector
- Surveillance and monitoring of specific, measurable, worldwide indicators (Annex 5 to the report lists key exposure and outcome indicators, including behavioral, physiological, and metabolic risk factors, cause-specific mortality, and, for cancer only, incidence data from registries.)
- Strengthening of health systems through innovative financing, increasing efficiency, and focus on primary care
- Best buys, as above, including both population-wide and individual healthcare interventions
- Sustainable development with NCD prevention and control considered an integral part of poverty reduction
- Civil society and the private sector assuming their needed roles in mobilizing political and public awareness and taking responsible corporate actions such as product reformulation and desirable marketing approaches from the health perspective On the one hand, the WHO predicts the reversal of the advance of these diseases and achievement of quick gains if these actions are taken; on the other,⁴⁵

The NCD epidemic exacts an enormous toll in terms of human suffering and inflicts serious damage to human development in both the social and economic realms. The epidemic already extends far beyond the current capacity of lower-income countries to cope with it, which is why death and disability are rising disproportionately in these countries. This state of affairs cannot continue. There is a pressing need to intervene. Unless serious action is taken, the burden of NCDs will reach levels that are beyond the capacity of all stakeholders to manage.

High-level political commitment is a critical need, as is a well-qualified and engaged multidisciplinary healthcare workforce devoted to the goals.

New Prospects for Action

The recent High-Level Plenary Meeting of the UNGA on September 19 to 20, 2011, was the culmination of a years-long effort, intensified over many preceding months, to secure recognition by the UNGA of NCD prevention and control as a global priority. This was only the second occasion in its history that the UNGA had met on a health issue; the first was an AIDS meeting a decade earlier. Drawing on the AIDS experience and noting analogies in some of the intervention tools to be applied, WHO Secretary Margaret Chan in her remarks to the meeting called for implementation and accountability by member states in enacting provisions of the declaration. She called attention to the WHO's best buys (above) as providing "excellent guidance" for the work to be done.⁴⁶

The meeting came about as a result first of efforts in the Caribbean region through the declaration on NCDs of the heads of state and government of the Caribbean community, adopted in September 2007. This was followed by several regional documents published through July 2011 that similarly called attention to NCDs around the world. In the interim, the UNGA had resolved in May 2010 to convene the September 2011 high-level meeting, including heads of state and government, with details of its scope and format to follow in early April 2011. Immediately after this April meeting, the Russian Federation's Ministry of Health and Social Development, with the WHO, convened in Moscow a key preparatory meeting, the First Global Ministerial Conference on Healthy Lifestyles and Noncommunicable Disease Control. The Moscow Declaration presented a commitment to action with 23 provisions at the level of the whole government, the level of the Ministry of Health, and the international level.⁴⁷ These actions were to be taken at the national level, except the latter, in which substantial emphasis was on the role of the WHO. This was to provide the basis for final preparation of the high-level meeting of the UNGA.

That meeting served for discussion and adoption by the UNGA of the *Political Declaration of the High-Level Meeting of the General Assembly on the Prevention and Control of Noncommunicable Diseases*.² This declaration proposes a new statement of commitments, including 23 items (56 in all including subitems). These items address the reduction of risk factors and the creation of health-promoting environments; strengthening of national policies and health systems; international cooperation, including collaborative partnerships; research and development; monitoring and evaluation; and follow-up.

The last item may be most important to anticipate future developments. The Secretary-General of WHO is requested to present to the UNGA "options for strengthening and facilitating multisectoral action for the prevention and control of NCDs through effective partnership" by the end of 2012 and in 2013 a "report on the progress achieved in realizing the commitments made...including on the progress of multisectoral action, and the impact on the achievement of the internationally agreed development goals, including the Millennium Development Goals...in preparation for a comprehensive review and assessment in 2014 of the progress achieved in the prevention and control of noncommunicable diseases."²³

The expectations expressed in this timeline may represent the most optimistic view to date of the potential for rapid measurable change in indicators of the NCD epidemic. At a minimum, they pose a formidable challenge to WHO and all interested parties to act soon and effectively to address the global NCD epidemic.

Conclusions

CVD is now understood as the predominant component of the leading NCDs throughout the world: CVDs, cancers, chronic respiratory diseases, and diabetes mellitus. The global dimensions of this compound epidemic today are now recognized, as are forecasts of its intensification in the decades ahead in the absence of effective public health intervention.

The case for intervention is well supported in terms of the magnitude of the problem, including its economic impact, the universality of the main causal factors, the projected effectiveness of intervention, and the congruent support of leading organizations and agencies throughout the world.

The interventions most commonly discussed are those that focus chiefly on the common determinants of the NCDs such as tobacco, diet, and physical activity. It is noteworthy that references to actions most specific to CVD such as emergency response and acute case management for critical clinical events are essentially absent from the global health outlook, a reflection in part of policy priority accorded to early, primordial, prevention. These, of course, are longstanding priorities in CVH promotion and CVD prevention.

The impact of intervention on these determinants requires, in turn, the adoption of supporting government-wide policies, health systems transformation, and innovative financing approaches if they are to be addressed effectively. Furthermore, translation of these policy and environmental changes into health impact requires explicit action plans supported by institutionalization, leadership, and resources. Basing such plans explicitly on long-recognized goals, strategies, and approaches to CVH promotion and CVD prevention, founded on established concepts of primordial and remedial prevention, could strengthen efforts across the spectrum of the NCDs beyond CVD alone. An earlier report in this series, "Public Policy Approaches to the Prevention of Heart Disease and Stroke," outlines clearly and concisely just such a process of translation.⁴⁸

The view that CVD-related and, more broadly, NCD-related activities should become closely aligned with successes in HIV/AIDS, at least in the setting of long-term case management, expands the frame of thinking even further. CVD is less clearly visible in this new context than formerly. If this is a loss, it may be far outweighed by the evident growth in attention to NCD prevention and control over the past decade. To have moved from neglect in the MDGs to prominence in deliberations at highest levels of the UNGA in a decade is cause for optimism that meaningful progress is being made, to the great benefit of CVH promotion and CVD prevention.

The further agenda for the NCDs will be developing rapidly, given the UNGA request to the WHO in the political declaration of September 2011, the first step being to provide before the end of 2012 a set of options for strengthening and facilitating multisectoral action for NCD prevention and control. Important contributions from the CVD community to this process could include at least the following through appropriate partnerships and consultations:

- Working to implement the multiple country-level case studies as models across all regions of the world referred by the Institute of Medicine report of 2010 to the GACD
- Ensuring successful development of NCD indicators to include key measures relevant to CVD risk and CVH status
- Embracing the charge to expand surveillance for baseline and ongoing assessment of CVH, CVD, and measures of intervention impact

- Supporting cost-effective interventions such as the best buys that have specific implications for CVH like sodium reduction in foods and diets of populations worldwide and simplified, standardized regimens for reducing cardiovascular risk
- Building capacity through training for policy development, workforce development for program implementation, and evaluation of interventions through implementation science, economic analysis, and related approaches
- Advocating for greatly increased focus on the prevention of risk in the first place through health promotion to avert the loss of health from early life when the burden, disparities, and cost of CVD and the other NCDs begin

All countries will benefit from the anticipated progress of global NCD prevention and control. There are lessons to be learned for all, after expanded investment in prevention in low- and middle-income countries. This is a moment of opportunity without precedent; seizing it can have an immense global health impact.

Disclosures

None.

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