

Round Table Discussion

Prevention is both moral and cost-effective

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Lenfant presents a lucid and compelling argument for cardiovascular disease (CVD) prevention in developing countries (1). The case he makes is particularly strong for so-called middle-income countries, such as South Africa, that currently experience a “triple burden” of pre-transitional and post-transitional diseases. According to the *The world health report 1999*, CVD accounted for 28.5% of all deaths in low- and middle-income countries in 1998 (2). In South Africa in 1996 over 22% of all deaths were due to stroke and heart disease, and 19% were due to injury caused by violence and accidents. South Africa’s per capita gross domestic product of US\$ 3450 places it in the higher echelons of middle-income countries, and its demographic profile is typical of such countries. Half its population are under 18 years of age and are thus exposed to the “globalization of risk factors” that is occurring.

Rapid liberalization and opening up of the economy lowers trade barriers to both regional and global partners. This can speed up the development of human and economic potential, but brings with it disadvantages such as easier access to tobacco products, diets higher in salt and sugar, and the more sedentary lifestyles associated with obesity and type II diabetes mellitus. Many of these influences are known as determinants — socioeconomic and behavioural patterns in which the classical risk factors for CVD emerge. Their spread and adoption is of course augmented by the global media and information technology revolution taking place in most of the countries of the world.

The relatively young populations of middle-income countries are thus exposed to these changing determinants and risk factors for longer periods of time, resulting in CVD at relatively young ages. For example, in South Africa stroke in 1995 accounted for 4.8% and 2.3% of deaths in women and men respectively in the 35–39 year-old age group, and these proportions rose with increasing age (3). In 1990, 46.7% of the deaths attributable to CVD in the developing countries occurred below the age of 70 years, in contrast to 22.8% of such deaths below that age in the high-income industrial countries (4).

The relative youth of CVD victims in developing countries has a profound economic impact, in terms not only of lost productivity (5) but of caring for the orphans they leave behind. Prevention of such deaths is a moral imperative and probably a more

cost-effective option than treating CVD after it is established. Responding to the urgent need to test this hypothesis in emerging nations, a number of projects are being planned by the Initiative on Cardiovascular Health in Developing Countries (ICH) organized by WHO and the Global Forum for Health Research.

In addition, pregnant women in developing countries are exposed to deficits in nutritional and environmental resources that could result in fetal “programming” (6) leading to hyperinsulinaemia, hypertension, and central obesity in their children later in life, particularly as they are exposed to the increasingly prevalent determinants and risk factors we have mentioned. Preventive cardiologists and public health specialists have grown to recognize the importance of “primordial” prevention measures aimed at determinants of CVD affecting children as well as adults, and of community-based interventions (7). Such interventions are obviously more important in countries whose demographic profile is weighted towards younger people.

In summary, prevention, both for individuals and for populations, is likely to be the most effective and affordable way to limit the increase in CVD in developing countries, but much more research is needed. ■

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2. *The world health report 1999 — making a difference.* Geneva, World Health Organization, 1999.
3. *Recorded death, 1995.* Pretoria, Central Statistical Service, 1998 (CSS Report No. 03-09-01, 1995).
4. **Murray CJL, Lopez AD.** *Global comparative assessments in the health sector.* Geneva, World Health Organization, 1994.
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6. **Reddy KS, Yusuf S.** The emerging epidemic of cardiovascular disease in developing countries. *Circulation*, 1998, **97**: 596–601.
7. **Murray CJL, Lopez A, eds.** *The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020.* Cambridge, Harvard School of Public Health on behalf of the World Health Organization and the World Bank, 1996 (Global Burden of Disease and Injury Series, Vol. 1).

Prevention of cardiovascular disease is possible but a major challenge

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There are three points I wish to raise in response to the statement by Lenfant (1). The first is that

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cardiovascular diseases (CVD) are already leading causes of mortality and morbidity in many low-income and middle-income countries. For lack of action, the situation is getting worse in these countries and the level of cardiovascular risk factors is now high. Today, more than 80% of smokers live in poorer countries, partly because of inadequate tobacco control initiatives (2). While tobacco consumption is falling in most industrialized countries, it is increasing in developing ones by about 3.4% per annum. Overall, smoking prevalence among men in developing countries is about 48%. In terms of other cardiovascular risk factors, studies also clearly show that high blood pressure and glucose intolerance are at least as prevalent in poorer populations as they are in richer ones. Action to prevent these diseases and their determinants is therefore long overdue.

The second point is about the strategies for CVD prevention in low-income and middle-income countries. Lenfant rightly states that since the risk factors for CVD are the same in different populations, reducing them can be expected to slow down the rise of CVD. There is no controversy over the importance of tackling risk factors. As stated in the global strategy for the prevention and control of noncommunicable diseases, which was endorsed by the World Health Assembly in 2000, health promotion and disease prevention are the most important components of reducing the burden of premature mortality and disability due to CVD. This is seen as the most feasible approach, particularly in low-income populations experiencing a rise in risk factors due to the epidemiological transition (3).

I agree that there is no reason to doubt that strategies for CVD prevention which have worked in established economies would work in developing ones too. However, the main challenge is in implementing these strategies through community-based action and health system interventions. It is not enough to recognize the need and increase the commitment of policy-makers. Considerable constraints have to be overcome before the successful work of developed countries can be fully translatable. It is because of these constraints that many countries in which CVD is a leading cause of premature death have failed to take comprehensive action or establish effective prevention programmes.

Health care systems are unable or ill-prepared to provide the services needed to prevent CVD. In many developing countries, there is no clear strategy for health or appropriate approach to delivering health services in the context of limited resources. Reforming and reorganizing health systems to respond more effectively to the needs of chronic diseases represents a huge challenge. A broader health agenda is needed, with greater emphasis on population health and on assessing the social and economic determinants of a healthy population.

Primary prevention of CVD is based on lifestyle interventions requiring the joint work of many sectors. Failure to initiate effective programmes is reinforced in many countries by neglect

of intersectoral approaches and lack of ways to influence government policies that have a major bearing on health. Human resources are another major part of the challenge. At the moment not enough health professionals in developing countries have training and experience in public health and noncommunicable disease prevention.

My third and last point is about Lenfant's emphasis on screening and pharmacological interventions. The decline in CVD mortality in industrialized countries is attributed to a combination of prevention and improved care, and there is no doubt that secondary prevention is another effective approach to controlling the rising epidemic. But where resources are scarce there is often a need to strike a balance between preventing disease and providing the services for identifying and treating it. Where poverty is extreme, secondary prevention will have to be limited to interventions that are known to be highly cost-effective and affordable. There is a pressing need for research to evaluate the impact of these interventions on risk factor levels and cardiovascular outcomes in low- and middle-income countries. WHO is currently launching an initiative to work out sustainable strategies for integrating secondary prevention into existing health care infrastructure. The aim is to build national capacity to meet health service needs related to CVD prevention. ■

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2. *The world health report 1999 — making a difference.* Geneva, World Health Organization, 1999.
3. *Global strategy for the prevention and control of noncommunicable diseases. Report by the Director-General.* Geneva, World Health Organization, 2000 (document A53/14, presented at the 53rd World Health Assembly).

Neglecting cardiovascular disease is unaffordable

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The emergence and acceleration of cardiovascular disease (CVD) epidemics in low- and middle-income countries is explained by demographic shifts and lifestyle changes propelled by urbanization, industrialization, and globalization. Low birth weight and ethnic diversity in gene–environment interactions may magnify the impact of these changes (1–3).

While the determinants of the health transition in low- and middle-income countries are similar to those in the high-income countries, their dynamics are different. The compressed time frame of the

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transition in poorer countries imposes a double burden of communicable and noncommunicable diseases. Urbanization occurring in prospering economies differs in important respects from that which occurs in settings of poverty and international debt, which restrict resources for public health responses. Organized efforts at prevention began in high-income countries when the epidemic had peaked, and they often accelerated a secular downswing, while the efforts in low- and middle-income countries are starting when the epidemic is still on its upswing. Strategies to control CVD must be based on recognition of these similarities and differences. Principles of prevention must be based on the evidence gathered in high-income countries, but the interventions must be context-specific and resource-sensitive.

Prevention must aim at risk reduction across the lifespan and be guided by the following facts. First, risk operates across a continuum for most variables. Second, many more events arise from the “moderate” middle of the distribution than from the “high-risk” tail. Third, risk is multiplied when risk factors coexist, which they often do. Fourth, the majority of CVD events occur in persons with modest levels of multiple risk factors rather than in those with a high level of a single risk factor. Fifth, “comprehensive” or “absolute” CVD risk is the best guide for individual interventions, while “population-attributable risk” should guide mass interventions, maximizing benefits by bringing about modest distributional shifts. Sixth, a synergistically complementary blend of cost-effective “population-wide” and “high-risk” interventions must extend from primary prevention in children to secondary prevention in older adults (4–6).

Community empowerment through education (mass and targeted) and policy change (to provide an enabling environment) are essential for health promotion in populations at all stages of health transition. Populations at high risk need, in addition, strategies and services for early detection and effective control of risk. Opportunistic screening (for tobacco use, being overweight, and high blood pressure) and targeted screening (for diabetes and dyslipidaemia) must be followed by risk stratification and management. In the case of manifest CVD, the following practices should be promoted for acute care: recognition and response by the community, along with resuscitation skills; use of chest pain algorithms and cost-effective interventions such as aspirin in primary care; rational pharmacotherapy in secondary care; and rational use of diagnostics and interventions in tertiary care. Chronic care must effectively integrate secondary prevention into primary care, improve the management of left ventricular dysfunction in secondary care, and promote rational use of high technology in tertiary care. The centre of gravity for chronic care must shift closer to the community through the promotion of self-care and the provision of care by family

members, community health workers, and other non-physicians.

Health systems need to be reoriented to include the expanded mandate of chronic disease control. Access to life-saving drugs and technologies must be promoted through public–private partnerships. Surveillance and delivery systems need to be established through the synergy of public, private, and voluntary agencies.

The challenge facing low- and middle-income countries is to move quickly to mitigate the burden of CVD in midlife. This can be done by applying existing knowledge to catalyse the convergence of an empowered community, an enlightened policy, and an energetic medical profession for CVD prevention. The question is not whether poorer countries can afford to invest in CVD prevention but whether they can afford not to. ■

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Health-related lifestyles are the key Pekka Puska¹

Claude Lenfant (1) makes a number of important points. Noncommunicable diseases (NCDs) are becoming the main cause of death and disease in the developing world. Thus the greatest health gains are achieved in preventing major NCDs, especially cardiovascular diseases (CVDs). Furthermore, these diseases and their risk factors tend in most countries to accumulate in lower socioeconomic segments of the population, thus greatly contributing to inequities in health.

Is prevention of CVDs possible in low- and middle-income countries? A good reason for thinking so is that the main factors behind the CVDs seem to be the same in different parts of the world, even if their

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cultural backgrounds and relative importance vary. Tobacco use, unhealthy nutrition, and physical inactivity seem to be major factors in most populations.

Thus the main question is what strategies for preventive interventions are most feasible, effective, and cost-effective. As Lenfant comments, the information varies. A US analysis emphasizes treatment interventions (2). Finnish analyses, supported by a very recent US study, indicate that the role of general lifestyle changes has been crucial (3, 4).

Ideally, we should prevent the risk factors in childhood through adoption of healthy lifestyles. This should be a key objective in all countries, but will only improve public health after 20–40 years. In the meantime we can greatly improve public health by reducing risk factors that have already developed — in both developing and developed countries.

Although the efficacy of several drug treatments has been clearly demonstrated in developed countries, the feasibility of widespread drug use is restricted by the considerable costs involved, and for other reasons. Promotion of healthy lifestyles, when possible, is much cheaper. In real life a balanced combination of these strategies is needed. Certain drugs have their place, but general lifestyle changes can and should be vigorously promoted. In low- and middle-income countries heavy emphasis should be put on the latter strategy, using policy measures and other actions that cost very little.

For instance, WHO has long recommended a set of actions that can greatly reduce tobacco use, thereby directly preventing diseases that will otherwise occur, particularly in low-income groups. Some of these measures, like tax increases, cost nothing and can actually even increase public revenues. Thus the idea that controlling noncommunicable disease always favours the rich more than the poor is misleading. For instance, *The world health report 2000* states that “Doubling the pace of reduction of NCD damage, in contrast [to infectious disease control], world preferentially benefit the well-off as well as costing considerably more”(5) but in some instances, such as raising tobacco taxes, this is clearly not the case.

Most low- and middle-income countries have a double burden of disease: a heavy communicable disease burden and an increasing noncommunicable one as well. Concentrating only on infectious disease control will lead to higher health care costs in the future. Thus the prevention of CVDs and other major NCDs that often have common risk factors must not be neglected. It is the most crucial question of global public health for the future.

Some have suggested that middle-income countries should take the lead in CVD prevention, making inexpensive population-wide measures their priority, encouraging low-income countries to follow suit. At the same time, specific programmes should be considered, including simple community-based demonstration projects and feasible risk factor treatment measures in primary health care. Some of

these measures are spelt out in WHO’s recent NCD strategy paper (6) and a World Health Assembly resolution adopted last year (7). ■

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Primary prevention must have priority Robert Beaglehole¹

I agree with Lenfant (1) that there is great potential for the prevention of cardiovascular disease (CVD) in low- and middle-income countries. My main concern is the lack of a sense of the urgency of this challenge. The developing epidemics of CVD in low- and middle-income countries will result in a public health catastrophe unless we take serious action now. I want to emphasize three points.

First, we could do much more to prevent the epidemics of CVD in wealthy countries. We are not applying fully the information and experience gained over the last 50 years of CVD research. Even in the USA, which has seen one of the greatest declines in CVD mortality rates over the last three decades, CVD remains the leading cause of death and is responsible for untold economic and social costs. This is not due to lack of knowledge; it is due to the lack of application of appropriate evidence-based strategies.

The successes in the USA and elsewhere in partially controlling these epidemics have come from the application of the high-risk-based and, to a lesser extent, population-based strategies of primary prevention. This is the model that Lenfant recommends for low- and middle-income countries. However, because this approach relies heavily on individual screening and the long-term management of people who are at high risk, it is not a viable solution to the

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problem of how to prevent the epidemics in most of the world. This approach does nothing to stem the rising flow of high-risk people, all too apparent in the new epidemic of obesity in the USA. The only rational approach to CVD prevention in all countries is one that gives the greatest priority to population-based primary prevention. Where resources are scarce, and this applies to most of the world, this strategy should be the only one adopted.

My second point is that we know enough about the causes of the CVD epidemics to act now. Of course there is room for more research, though I don't think much useful and widely applicable information will come from further research on new risk factors or on the genetic determinants of CVD. With appropriate analyses of epidemiological data and in the absence of the three or four standard risk factors, CVD is extremely rare (2). The goal should be to achieve an ideal population risk factor profile through the population-wide approach to

primary prevention based on appropriate economic, legislative, social, and environmental programmes.

The third point is that despite all the research conducted in wealthy countries, we know little about the occurrence of CVD in poorer countries. We cannot even be sure if age-specific CVD rates are rising in much of the world and, if so, for what reasons. How much of the projected burden of CVD will be due to ageing and how much to changing population risk factor profiles? This fundamental question will only be answered when we have suitable and sustainable surveillance systems in sentinel sites in low- and middle-income countries. ■

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