

The Milan Declaration

Positioning Technology to Serve Global Heart Health

Table of Contents

List of Tables and Figures	iv
Foreword	v
Dedication	viii
Declaration	ix
Preface	xi
Chapter 1 Health, Development and Technology: The Global Context	1
Cardiovascular Disease: A Global Pandemic	1
Globalization and Poverty	4
Technology and Heart Health	5
Globalization, Trade and Technology	7
Chapter 2 Technology and Heart Health.....	9
Types of Technology.....	9
Health Promotion/Disease Prevention Technology.....	11
Information and Communication Technology.....	14
Food Technology	18
Medical Technology	19
Biotechnology.....	21
Chapter 3 Positioning Technology: Implications and Recommendations	23
Addressing the Growing Burden of Cardiovascular Disease	23
Implications of Technology for the Future of Global Public Health	24
Tailoring Technology to Meet Specific Needs.....	26
Technology Issues Facing Low- and Middle-Income Countries and Resource-Poor Regions in Other Countries	26
Evaluating the Impact of Technology on Global Health	27
Recommendations.....	29
References	31

List of Tables and Figures

Table 1-1	Estimates of Ischemic Heart Disease Mortality by Region and Sex and Projected Changes, 1990 and 2020.....	1
Table 1-2	Estimates of Cerebrovascular Disease Mortality by Region and Sex and Projected Changes, 1990 and 2020.....	2
Table 1-3	Selected Risks to Health: Other Diet-Related Factors, Inactivity and Tobacco.	3
Table 2-1	Roles for Technology in Attaining Global Heart Health Goals.....	10
Figure 2-1	The eUSER Demand-Supply Match Perspective.....	15

Foreword

Positioning Technology to Serve Global Heart Health was the theme of the 5th International Heart Health Conference held in Milan Italy June 13-16, 2004. The Conference and this, the resulting Declaration, have built upon the international heart health initiative begun in Victoria, Canada in 1992. Through successive conferences and their companion declarations, the International Advisory Board (now the International Heart Health Society) has advanced the cause of cardiovascular disease prevention and heart health promotion.

The Victoria Declaration (1992) identified the significance of the burden of cardiovascular disease and articulated the rationale for applying a health promotion and prevention approach to this preventable disease. The Catalonia Declaration (1995) provided examples of strategies from around the world that have been used to prevent cardiovascular disease by reducing risk factors and influencing the environments in which personal lifestyle choices are made. Singapore (1998) recognized that in addition to a strong science base, a country needed both capacity (infrastructure and the will to take action) and strong leadership to make a difference in the population health. In May 2000, the Victoria Declaration on Women, Heart Disease and Stroke raised the awareness of the significance of cardiovascular disease among women, which had been largely misunderstood and understated. The Osaka Declaration (2001) examined the factors that arise primarily from outside the mandate and control of the health 'sector' and that profoundly influence on a global scale, the context for individual lifestyle choices, the policy environment and ultimately the priorities of the health system. These significant forces, a consequence of globalization, often overwhelm the capacity of governments and political leaders to deal with them.

This, the 5th International Heart Health Declaration (Milan, 2004) examines a range of technologies – including health promotion/disease prevention, information and communications technology, food technology, medical technology and biotechnology - and their potential to reduce the burden of cardiovascular disease. Key considerations for all governments, especially those of low- and middle-income countries, include choosing the right mix of highly technical and expensive technologies that benefit a small number of individuals with equally or less-expensive population-level strategies that enhance the health status of the entire population.

The Milan Declaration, like all previous declarations, calls on all governments, organizations and individuals with an interest in cardiovascular disease to take immediate action to stem this growing pandemic and reduce the burden of cardiovascular disease.

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Dedication

Andrés Petrasovits

This 5th International Heart Health Conference was the occasion of the inaugural

Andrés Petrasovits Memorial Lecture in Heart Health.

This declaration is dedicated to Andrés as a tribute to his unparalleled contribution to the cause of global heart health.

Declaration

Recognizing that cardiovascular disease has reached epidemic proportions and has rapidly expanded in severity and breadth to become the leading cause of death, disability and rising health care costs throughout the world, and that it would be largely preventable through a public health approach to cardiovascular disease, given the resources and will to act, the Advisory Board of the 5TH International Heart Health Conference calls upon:

- Health, media, education and social science professionals and their associations;
- The scientific research community;
- Government agencies, especially those concerned with health, education, trade, finance, culture and recreation, commerce and agriculture;
- The private sector;
- International organizations and agencies concerned with health and economic development;
- Community health coalitions;
- Voluntary health organizations; and
- Employers and their organizations;

to join forces in marshalling technology to improve the heart health of the world's population.

Advisory Board

*5th International Heart Health Conference
Milan
June, 2004*

Preface

Cardiovascular disease has reached global pandemic proportions and is a pressing issue facing most of the world's nations. Despite some specific advances, it remains a very significant cause of morbidity, mortality, direct health system costs, as well as indirect societal costs, for countries with established market economies. Alarming, in the latter years of the last decade, it has become an ever-increasing cause of morbidity and mortality in low- and middle-income countries, as the effects of globalization, aggressive marketing and mass communications insinuate the risk behaviours (tobacco use, unhealthy diets, sedentary lifestyles) in these newly susceptible populations.

This declaration of the 5th International Heart Health Conference has a significant contribution to make in the pursuit of global heart health. The *Milan Declaration* examines technology in the service of global heart health and provides an opportunity to assess the key issues surrounding the development and adoption of technology and the impact on the population health status. While the general assumption is that more technology leads to improved health, reducing health problems and morbidity, and saving and prolonging life, in fact, technology is a two-edged sword.

In this document, technology is broadly defined to encompass a range of strategies from health promotion and disease prevention, to information technology, and to very sophisticated research, clinical interventions, medical devices and pharmaceuticals. Over the years, technological innovations have prolonged and saved the lives of individuals with cardiovascular disease.

Technology continues to evolve and advance - and to consume resources. This advance presents many challenges to health systems, their leaders and to policy developers. Technology is a commodity driven by profit and market forces and a driving force in globalization and international trade. As such, it cannot merely be considered for its benefit to individuals with cardiovascular disease but must be acknowledged for its influence on the direction, policies, and priorities of health systems worldwide. In fact, the relentless spread of technology has the capability of overwhelming not only low- and middle-income countries but countries with established economies as well.

The rapidity of advances in technology easily outpaces the ability of societies and governments to understand and develop the appropriate policy options surrounding its introduction. While this is problematic in all countries, it presents a particular dilemma for low- and middle-income countries. In these countries, scarce resources should be apportioned to produce the most benefit to the greatest number. Instead, highly expensive and technological solutions may be adopted because of external global commercial forces. The consequence is that scarce resources are directed towards strategies that benefit a small segment of the population, while population strategies in health, health promotion and social development that have an equitable

benefit across the population are neglected. In the end, the health status of nations fails to attain the best result for the financial investment.

The *Milan Declaration* discusses several technologies, including prevention and health promotion (such as behaviour change, lifestyle modification, community development, policy development, advocacy); information and communication technology; food technology; medical technology and biotechnology. The key message is that a range of strategies is essential in order to have an impact on the cardiovascular disease epidemic. The prevention measures need to be population focused and well resourced with adequate capacity. The treatment technology options need to be not only effective but also affordable and sustainable.

The *Milan Declaration* is a call to all governments and decision-makers to fully understand the implications of technology not only in terms of its benefits, but also in terms of its financial implications and opportunity cost. Decision-makers need to put tools in place to assess technology for its impact on equity and sustainability prior to its introduction, taking into account the economic and social reality and population health priorities. All governments, international agencies and the private sector are encouraged to work in partnership to tackle the global cardiovascular disease pandemic, ensuring that technology issues are well understood and that all available resources are directed towards achieving the most good for the greatest number.

Chapter 1 Cardiovascular Disease, Development and Technology: The Global Context

Cardiovascular Disease: A Global Pandemic

Cardiovascular disease is a major cause of death and disability worldwide. Its prevalence has increased significantly in the last two decades in low- and middle-income countries. The world now suffers from a global epidemic of chronic diseases such as coronary artery disease, stroke, hypertension, dyslipidemia, and diabetes along with their co-morbid risk factors such as tobacco consumption, obesity and sedentary living. It is estimated that by 2020 the number of people who die from ischemic heart disease will increase by approximately 50% in countries with established market economies and formerly socialist economies, and by over 100% in low- and middle-income countries. (Table 1-1) Similar increases will also be found in cerebrovascular disease by 2020. (Table 1-2)

Table 1-1 Estimates of Ischemic Heart Disease Mortality by Region and Sex and Projected Changes, 1990 and 2020.

Region	Women (000s)			Men (000s)		
	1990	2020	% Increase	1990	2020	% Increase
Established Market Economies	836	1,107	32	829	1,209	45
Formerly Socialist Economies	559	702	26	468	712	52
Total Developed Countries	1,387	1,609	29	1,297	1,921	48
India	556	1,197	115	819	1405	127
China	877	664	81	386	811	110
Other Asia and Pacific Island	227	552	143	233	581	149
Sub-Saharan Africa	117	283	125	92	222	141
Latin America	189	412	144	179	444	148
Middle East	291	717	148	319	674	174
Total Developing Countries	1,737	3,625	120	1,828	4,337	137
World	3,134	5,634	80	3,125	8,258	100

Source: Yusuf et al. Global burden of cardiovascular diseases, part I. Circulation 2001;104:2746-53.

Table 1-2 Estimates of Cerebrovascular Disease Mortality by Region and Sex and Projected Changes, 1990 and 2020.

Region	Women (000s)			Men (000s)		
	1990	2020	% Increase	1990	2020	% Increase
Established Market Economies	467	618	32	322	477	59
Formerly Socialist Economies	400	495	24	239	364	52
Total Developed Countries	867	1,113	28	539	841	56
India	220	463	104	227	493	124
China	601	1,087	81	672	1,413	110
Other Asia and Pacific Island	200	458	129	190	446	135
Sub-Saharan Africa	231	521	126	152	356	134
Latin America	127	302	138	121	297	145
Middle East	113	269	136	99	255	158
Total Developing Countries	1,499	3,100	107	1,454	3,250	124
World	2,366	4,213	78	1,993	4,101	106

Source: Yusuf et al. Global burden of cardiovascular diseases, part I. *Circulation* 2001;104:2746-53.

Chronic illness has overtaken communicable disease as a major cause of death and disability worldwide. The transition of chronic illness to its dominance as the leading cause of death in the latter part of the twentieth century is primarily the result of a general improvement in global health and increased life expectancy. The reduced mortality among the world's population is due to better control of communicable disease and the success of public health measures, such as improved nutrition, sanitation and food production. However, an important outcome of the ageing of the world's population is an accompanying rise in chronic diseases associated with advancing age. Moreover, although there have clearly been significant improvements in health on a global scale, the improvements have been uneven and not shared by all. In some regions, such as Sub-Saharan Africa, countries bear a double burden of disease, suffering from both communicable diseases, such as AIDS and tuberculosis, as well as rising rates of chronic illness. Within many nations, including countries with established market economies, chronic disease clusters in disadvantaged groups particularly those in low socio-economic categories.

The cardiovascular disease epidemic has a major economic impact in low- and middle-income countries. Cardiovascular diseases affect an increasing number of individuals between the ages of 35 and 64 years, removing people from the workforce. In addition, women may be left alone and in poverty when their spouses die from cardiovascular disease. The epidemic also increases demand for health services.

Risk Factors for Cardiovascular Disease

The modifiable risk factors for cardiovascular disease (high blood pressure, high cholesterol, being overweight, low fruit and vegetable intake, physical inactivity and tobacco use) are common throughout the world. They are increasing in low- and middle-income countries, contributing to the increased prevalence of cardiovascular disease in these countries. Part of this increase in prevalence of these risk factors is due to aging of the population and also to urbanizations with countries. Individuals in urban settings have a different diet (more saturated fat intake, sodium intake) and higher rates of obesity associated with greater intake of calories and less physical activity. Another contributing factor is globalization that contributes to the spread of unhealthy behaviours like smoking from high income to low- and middle- income countries.

Risk factors for cardiovascular disease are a major contributor to mortality and disability-adjusted life years (DALYs). In South-east Asia, for example, the burden of disease attributable to tobacco, blood pressure and cholesterol is similar to that of nutritional deficiencies and only marginally smaller than that attributable to poor water, sanitation and hygiene.

Addressing these risk factors will improve not only heart health, but also other chronic diseases such as cancer, chronic respiratory disease and diabetes. (Table 1-3) Therefore, an integrated approach to chronic disease prevention would be both effective and efficient. The multi-sectoral nature of the determinants of these risk factors calls for a variety of strategies including public policy, education, primary health care, and the creation of supportive environments.

Table 1-3 Selected Risks to Health: Other Diet-Related Factors, Inactivity and Tobacco.

Risk Factor	Measured Adverse Outcomes of Exposure
Blood pressure	Stroke, ischemic heart disease, hypertensive disease, other cardiac disease
Cholesterol	Stroke, ischemic heart disease
Overweight	Stroke, ischemic heart disease, diabetes, osteoarthritis, endometrial cancer, postmenopausal breast cancer.
Low fruit and vegetable intake	Stroke, ischemic heart disease, colorectal cancer, gastric cancer, lung cancer, oesophageal cancer
Physical inactivity	Stroke, ischemic heart disease, breast cancer, colon cancer, diabetes.
Tobacco	Stroke, ischemic heart disease, lung cancer, upper aerodigestive cancer, all other cancers, chronic obstructive pulmonary disease, all vascular diseases,
Source: World Health Report 2002, Tables 4.3 and 4.5	

Globalization and Poverty

Under the influence of a neo-liberal market philosophy, global interdependence is increasing, accompanied by the integration of economies, information and communication technology, and cultural values. All of these factors have important implications for health and health policy and pose new health challenges with global dimensions that will place increased demands on the international health system. The process of globalization has changed the traditional role of the state. International organizations and the commercial private sector interests make policy decisions that have implications on countries that have no control over the decisions themselves but must deal with the results. In many instances, public sectors and social programs have diminished, resulting in negative impacts on health. The World Bank Structural Adjustment Program, for example, has tied financial contributions to a country to a decrease in the public service.

Significant disparities exist among countries and regions of the world with respect to population health status and the capacity of their health systems to deliver health care. Primarily poverty and economic disadvantage explain these profound inequities that are observed worldwide. Economic prosperity is a strong predictor of health and well-being at both the individual and population level. Those countries with established market economies generally have the healthiest citizens. Likewise, within countries, those in lower socio-economic categories carry a disproportionate burden of disease. Healthy people form the basis of a vibrant and productive work force that is necessary for a successful economy. The United Nations Millennium Goals focus on the need to reduce poverty to improve economic well-being and health. While the goals recognize the impact of poverty on only communicable disease, poverty also has a profound impact on chronic diseases such as cardiovascular disease.

Despite the positive association between health and economic growth, economic growth alone is insufficient to achieve health for all of the world's population. The unabated process of globalization may create as many constraints as opportunities for national governments that are seeking to improve the health status of their populations.

Dr. Gro Bruntland, on assuming the position of Director General of the World Health Organization (WHO), stated that in order to advance global health it is critical that "health become central to development". The development enterprise needs to incorporate health outcomes as part of the measures that are used to justify approaches to economic development and the support provided for this purpose. As economist John Kenneth Galbraith has said:

"In the early stages of development we were too eager to transport the heavy industrial furniture of the developed lands to the new countries: steel mills, electric plants and dams. Human investment, that in health and education, we have now come to recognize as of central importance. Over the world we now recognize there is no literate population that is poor, no illiterate population that is other than poor."

One could add to Galbraith's assertion that there is also no healthy population that is poor, and the unhealthiest populations consist of the poorest people.

Economic growth must occur within the context of social equity and justice, in both national and international terms. Research has demonstrated that once a society achieves a certain level of income per capita (approximately \$5,000 US) the distribution of income becomes more important than the absolute level of income in terms of population health status.

Strategies for the promotion of heart health are rarely contemplated within a framework of social justice. Yet, both the spread and future prevention of disease may properly be seen within the contexts of human development, concepts centred on issues of basic needs and social equity. On the one hand, heart disease in poor countries may be considered a 'disease of development' – both a negative consequence of the homogenization of cultures brought about by globalization, and a positive indication of improved development in the country. On the other hand, ever-increasing demands on scarce resources in all countries impede efforts to prevent the spread of heart disease, and this is especially evident in low- to middle-income countries.

Technology and Heart Health

Technology, in its broadest sense, can be considered as the application of scientific knowledge to the development of strategies and tools for use in serving societal interests. This sense of technology includes both strategies and tools, and the body of current knowledge and experience concerning their use. Low technology interventions include such simple devices as blood pressure measuring tools as well as health education and community development. High technology interventions are more expensive and complex, such as cardiac catheterization.

The favourable trends in global health observed over the past thirty years have resulted significantly from the dissemination and uptake of many technological advances in public health and health care. Expensive technology often contributes to disparities in access to health services, however, and creates significant opportunity costs for prevention and promotion efforts directed at populations as a whole. The opportunity cost refers to the result of a decision to invest in one intervention over another. With limited resources, a decision to invest in expensive treatment technology that benefits a few people limits resources that are available for less expensive prevention technologies that would benefit a greater number of people.

Technology is both a driver and a product of globalization. Globalization and a neo-liberal agenda are driving the marketing of technology globally. In an increasingly competitive world, its uptake has been imperative, even for countries that can scarcely afford it. A political economy perspective of technology and its influence on its uptake and dissemination is a critically important concept to the analysis of health and technology.

As a concept, political economy is not just about how economics influences politics or how politics impinges upon the 'invisible hand' of the market, but is, rather, about the continual,

interactive, even indistinguishable relationship that exists between politics and economics. If politics is considered to be about power ("Who gets what, when and how"), then economics is a – or perhaps, the - fundamental driving force of politics. Political processes - the power differentials of relevant actors, institutions, ideas, norms and values - create and maintain structures that support and/or condition economic relations. To a large extent, these interactive political economy processes tend to control or influence social processes.

Through this lens, it becomes apparent why technology has become so highly valued in most societies and why its dissemination and uptake is viewed as important and seems to occur with a high priority even in poor societies. Political and social aspects of technology empower some people; technology both imparts credibility and changed or conditions social relations. In addition, many economic interests have a large stake in the transfer of technology solely for its economic benefit.

This situation has played out with respect to technological development aid for some time. Over the years, in many cases, a large proportion of development aid has been "tied aid", linked to the economic interests of the donor country. There are many examples of technological aid that was unsustainable and was ultimately of more benefit to the donor than the recipient.

Disseminating health-related technology to low- and middle-income countries potentially shares this fate if it is beyond the economic or technical capacity of the receiving country with respect to affordability and sustainability. In addition, many low- and middle-income countries can cite examples of sophisticated health care technology that is available mainly to the affluent in urban centres and most often subsidized by the public purse. At the same time, only low quality, under-funded, rudimentary health care is available to the rest the population.

Technology is not neutral: it has a profound influence on societies that adopt it. In all countries, but particularly in low- and middle-income countries, unless carefully assessed, the impact and opportunity costs of technology have a high likelihood of being negative, or a least double-edged. Technology is promoted as the solution in health and in many other areas, including agriculture, information, and transportation. While in some ways this perspective bears a certain amount of truth, there can be tremendous downsides, often associated with increased inequities. For all nations, technologies, particularly sophisticated expensive health technologies, are appropriate in certain situations. In others, they are not, however.

These inequities are at the centre of the dilemma of the spread and uptake of health and related technologies in all countries, but particularly for low- and middle- income countries. In many cases, the technology for health care that is procured is expensive and requires sophisticated technical capacity to operate and maintain. As such, it is often in limited supply with access restricted to a select group of individuals with appropriate economic means. In this context, technology widens health inequities between rich and poor. This gap is further extended by the fact that the technology is usually purchased with the use of scarce public funds and represents, therefore, a significant opportunity cost to the health and social systems of the country with

fewer resources available for the services and low cost technologies that would benefit a much wider component of the population as a whole.

Globalization, Trade and Technology

Advances in technology are both a major driving force behind globalization and international trade and the products of globalization and trade. Experience has demonstrated that rapid technological developments can occur at great speed that may overwhelm a society's capacity to understand or respond to its implications for public policy. Technology trade may result in inequities if the focus is on "goods" rather than people.

Telecommunications, the availability and increasingly wide spread use of the Internet as well as the area of informatics have had a significant impact on many societies and economies. These developments have been important drivers of employment creation, increased economic productivity and have greatly increased the speed and volume of information transmission around the globe. For many nations, how to address these developments in an era of accelerating globalization represents important policy issues involving both health and trade. For example, global communications have been revolutionized to the benefit of many around the world, but these benefits have not been equally distributed. This "digital divide" has created significant inequity not only globally between north and south, but also within most societies.

Information technology has created significant economic development activity related to trade in the provision of health services. This is particularly evident for diagnostic and treatment services that are being delivered more often using telecommunications technology. To participate in these ventures, countries require sophisticated, expensive infrastructure and technical capacity. These are major barriers both to the use of information technology in low- and middle-income countries and to its service to the poor in wealthier countries. It also may create significant opportunity costs if a country invests in this expensive technology that benefits a few people rather than investment in disease prevention and health promotion on a population basis.

Biotechnology has had a major impact on biomedical research that (with a few exceptions) has yet to be translated into practical applications in disease prevention and treatment. Genomics, as a technology, has had significant ascent over the past decade. However, it is often presented as part of an innovation agenda that has more to do with economic opportunities than potential public health benefits.

Critical issues of concern with respect to biotechnology are controversies over drug and vaccine patents, particularly those of potential vital public health importance. For example, while debate continues about the ability to legally patent human gene sequences, many commercial firms are now seeking such patents. The patentability of genetically modified proteins or DNA that may be essential key ingredients in new vaccines is also being debated. If successful, these patents could have a major impact on the price of new vaccines by limiting competition to a small

number of vaccine producers. Issues related to intellectual property and patentability raise ethical and moral questions that are at the heart of the debate about the patentability of life-forms.

The global context in which health technology is marketed and disseminated is a complex one. It is conditioned by political economy and influenced heavily by globalization and trade. Under these circumstances, considerations with respect to the health benefits of technology or its affordability, sustainability, or potential opportunity cost in any given society, are often not central to the decision-making process that leads to its acquisition and propagation.

Technology is a double-edged sword with respect to the advancement of global health. As a development instrument, it needs careful assessment prior to implementation and ongoing evaluation of its impact on the health of the people.

Chapter 2 Technology and Heart Health

Types of Technology

When appropriately applied, technology has the potential to promote heart health, prevent heart disease, and improve treatment of heart problems and prevent recurrences. Five technologies are particularly important in the discussion about global heart health:

- Health Promotion and Disease Prevention Technology - Personnel with specific knowledge and skills and resources for strategies such as health education, community mobilization, advocacy and policy development.
- Information and Communication Technology –A broad range of communication modalities, including print media, telephone, television, radio, Internet and the World Wide Web.
- Food Technology – Tools to enhance the food supply, such as genetically modified food and soil enrichment and policies on food labelling.
- Medical Technology –Non-intensive technologies, such as weighing scales, sphygmomanometers, electrocardiographs and drugs, as well as more intensive and expensive technology, such as cardiac catheterization and coronary angioplasty.
- Biotechnology – This technology concerns the knowledge of the genome and the application of this knowledge for medical interventions.

The 2002 World Health Report credits the great progress in public health, in part, to improvements in drinking water and sanitation, the development of national health systems, the introduction of antibiotics and mass immunizations, and better nutrition. All five of the technologies listed above have played a critical role in these improvements. The report also comments on the vast knowledge base on prevention and risk reduction made more accessible through information technology such as the Internet.

The US document, *Healthy People 2010*, outlines how each of these technologies can have a positive impact on heart health goals. (Table 2-1) They are also applicable to heart health globally. Preventing risk factors and promoting heart health can be supported with information and communications technology, food technology, and human resources with skills in health promotion and disease prevention. Detection and treatment of risk factors can be supported by the same three technologies, and medical technology. Early identification and treatment of heart attacks and strokes can be enhanced by medical technology, information and communications, and biotechnology. Prevention of recurrent cardiovascular disease events is supported by all five technologies. Thus, technology can support the full continuum of heart health goals from those at the earliest, population-wide, and “upstream” stage to those at the latest, patient-centered, and “downstream” stage.

Table 2-1 Roles for Technology in Attaining Global Heart Health Goals

Technology \ Goal*	Promotion of Heart Health & Minimization of Risk Factors	Detection and Treatment of Risk Factors	Early Identification and Treatment of Heart Attacks and Stroke	Minimization of Recurrent Cardiovascular Disease Events
Health Promotion / Disease Prevention	++++	+++	+?	+++
Information & Communication	++++	+++	++	+++
Food Technology	++++	++	-	++
Medical Technology	+?	+++	++++	++++
Biotechnology	+?	+?	++	++++

* Connection between technology and goal: ++++ (strongest) to +? (doubtful) or – (absent)

Source: Adapted from US *Health People 2010*

The impact of each of these technologies on each of the heart health goals varies. Broader-based technologies, such as food technology, apply most strongly to early, population-wide, “upstream” aspects of heart health, while narrower-focused or ‘high-tech’ technologies, such as medical technology, apply to later, patient-centered, “downstream” aspects.

Health Promotion/Disease Prevention Technology

Technology supports prevention and heart health promotion in two primary modalities:

1. Population approaches that address the conditions that predispose people to acquire risk factors for cardiovascular disease; and
2. Individual approaches that influence behaviour and lifestyle choices.

Health Promotion Technologies

In most settings, a combination of selected individual-based interventions with population-wide interventions is cost-effective. For example, the WHO Report 2002 states that the most cost-effective approach to reducing risk associated with high cholesterol and high blood pressure is a combination of salt reduction at a population level through legislation or voluntary agreements, health education through the mass media focusing on blood pressure, cholesterol and body mass, and the identification and treatment of individuals with a combination of risk factors that puts them at high risk for cardiovascular disease.

The technologies that can support both of the approaches do not rely on esoteric and expensive machines, equipment or structure. Instead, the technology consists of a very well trained and skilful cadre of health professionals in such fields as health education, community development, advocacy and policy development. Accordingly, acquiring these technologies is well within the reach of all countries and the resulting population health gains may offer a very substantial return on investment.

One of the major challenges facing the field of health promotion and disease prevention is combating the use of information and communication technology by commercial interests that promote harmful health behaviours such as smoking. Another challenge is ensuring that other people are aware of the programs and services that are available to them. A third challenge is ensuring that populations have equitable access to health promotion and prevention technologies.

Another major problem in low and middle countries is the lack of accreditation programs and organized continuing professional development to support the acquisition of knowledge and skills for both individual and population approaches to health promotion and prevention.

Population Technologies

The community, formal and informal community organizations, and the political and bureaucratic levels of government are all involved in creating an environment conducive to positive, healthy choices. Community workers have knowledge and skills in the following areas:

- A knowledge of community organization, mobilization, and community development – the building of community capacity;
- Leadership and champion development – the recruitment of influential individuals and the building of their capacity to take a leadership role in promoting health in their community;
- Skills in the policy development process and the ability to propose and advance policy options directly or through proxy champions;
- Skills in partnership development and network/coalition building;
- Marketing and mass communication skills – public communications;
- Political activation skills of advocacy/lobbying; and
- Mobilizing professionals to support prevention.

Individual Technologies

Health education is a key strategy for building the decision-making capacity of individuals to make positive, healthy choices. Choices are made in the context of the prevailing environment. The choice for a young person to commence smoking, for example, is influenced by a variety of external factors, including marketing, taxation policy, peer group attitudes and beliefs. Health promotion workers have skills in the following:

- Raising awareness;
- Developing knowledge to ensure sufficient understanding;
- Developing skill to make and sustain the healthy choice; and
- Supporting individual behaviour-change strategies.

California Tobacco Control Alliance

The California Tobacco Control Alliance is a state-wide coalition working to reduce tobacco use in California. The Alliance accomplishes this through collaboration between traditional tobacco control constituencies and the inclusion of new partners not traditionally associated with tobacco control. Founded in 1997, the Alliance has convened representatives of public, private, non-profit and academic interests in pursuit of a comprehensive state-wide tobacco control strategy, which complements the state-wide tobacco control program.

Originally established to address tobacco use along a broad spectrum of issues, the Alliance received primary funding in 1997 from the Robert Wood Johnson Foundation's SmokeLess States National Program to launch three flagship initiatives: youth advocacy; involvement with the entertainment industry; and collaboration with managed care organizations.

In 2001, the Alliance received continued funding from the SmokeLess States National Program to direct organization efforts exclusively on the third initiative. This narrowing of the Alliance's purpose the managed care environment provides an opportunity to focus on cessation, an aspect of tobacco control that is critical to decreasing the smoking rates in California.

The Alliance has convened a Managed Care Working Group to design a new cessation health benefit, establish a model for its delivery and pursue policy strategies to ensure statewide implementation. By working with managed care organizations, health care providers and health care purchasers, the Alliance engages the primary parties that have the power to make a change in California's health care landscape. Addressing tobacco cessation programs at the health system level offers an ideal opportunity to effectively utilize and direct the resources and expertise already integrated in the health care delivery structure.

In addition to the private and public sector interests represented on the Managed Care Working Group, a diverse group of organizations comprises the Alliance's core membership. Members include a diversity of organizations that support tobacco control efforts in public health, health care, academic, law enforcement and community sectors.

The Alliance is also a founding member of the Pacific Center on Health and Tobacco, a collaboration between organizations in California, Arizona, Hawaii, Oregon and Washington working to implement and evaluate comprehensive and effective state-wide tobacco cessation services. Through the Pacific Center, the Alliance brings resources, lessons and best practices from other Pacific states to the California tobacco control community.

The Alliance is also a member of the national Roundtable on State-wide Tobacco Cessation Services, a project of the Center for Tobacco Cessation. The focus of the Roundtable is to share state-level experiences in developing comprehensive cessation services, in order to promote improvements for tobacco cessation across the nation.

The Alliance's Website is at <http://www.tobaccofreealliance.org/>.

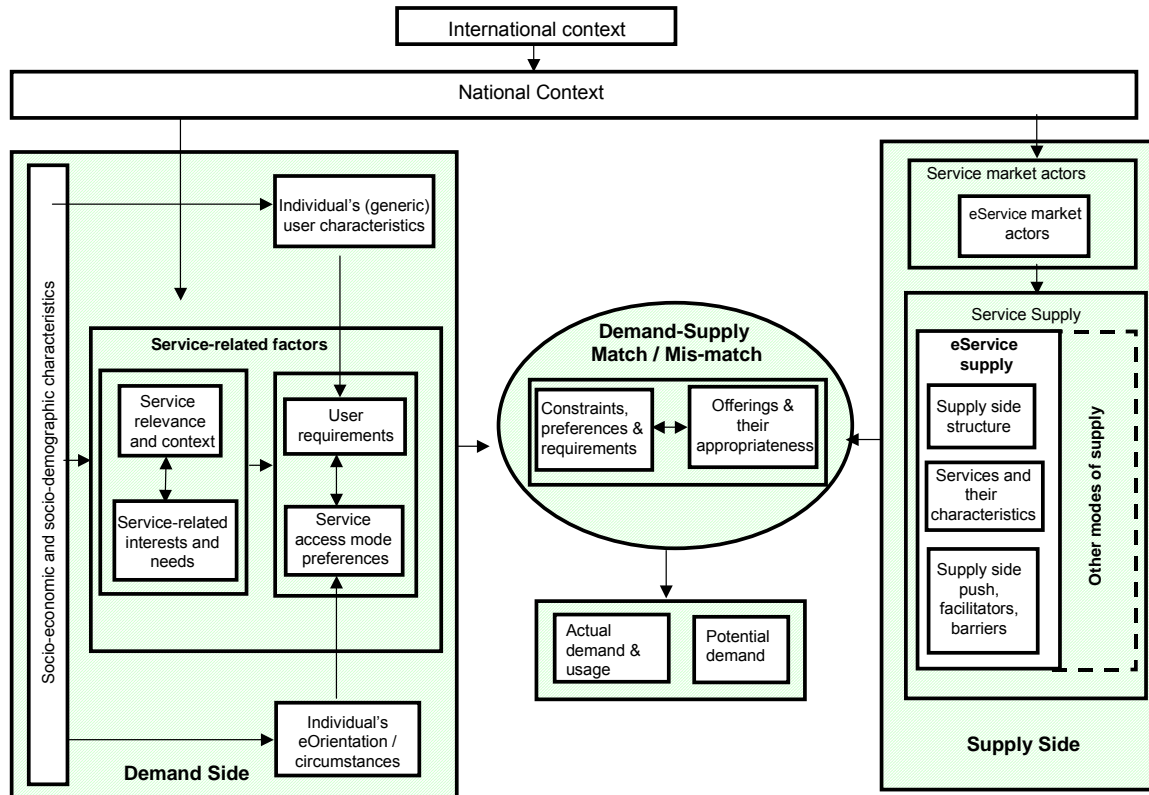
Information and Communication Technology

“Communication and information are critical - they promote knowledge, lead to the incorporation of science into daily practice, encourage formulation of relevant health policies and are a stimulus for innovative research. Knowledge translation is best achieved when there is a two-way flow of information. One loop is from bedside and community, posing meaningful policy and research questions; the other connecting loop is from policy experts and researchers providing guidelines and answers.” (Bernard Lown, 2004)

Today’s society is in an information society. Information is essential for all domains of human existence and activities, including health. Information and communication technologies offer new possibilities for advancing health. Tools such as e-mail and the World Wide Web can facilitate communication, social marketing, allow access to health resources for both health professionals and the lay public, promote research and facilitate management of the rapidly expanding volume of biomedical knowledge. The Internet is becoming more widely used for commercial and business purposes (e-commerce and e-business).

An online "service of public interest" is a service that is offered online in a domain that is of central public interest. These services are accessed/delivered via Web-type platforms, typically accessed over the Internet or in some cases via corporate intranets. “Services” may take many forms. In the eHealth domain, for example, both online clinical services (such as consultation with a doctor) and online provision of information about health matters (to help people manage their own health) are important and relevant services. In the eLearning domain, the main form of “service” is an online educational/training course. Both the potential and need for e-learning, especially concerning children, have been recognized by the Health Academy, an initiative of the WHO. In the eGovernment domain, online services may involve varying mixes of information, communication and transaction interactions with public agencies.

Figure 2-1 The eUSER Demand-Supply Match Perspective



Source: Online Public Services Expert Group (OPSEG). Briefing Document for First OPSEG Meeting, Brussels, 29 April 2004

The use of eServices is influenced by many factors (Figure 2-2). On one side are the constraints, preferences and requirements of users and potential users in relation to eServices. On the other side are the actual eService offerings and their appropriateness in terms of user and potential user needs. The interactions between these two elements affect whether or not, how and by which groups eServices are used (actual demand and usage). They also affect whether or not, how and amongst which groups of current non-users eServices have relevance and for which there would be likely to be demand and usage (potential demand) if the circumstances were conducive to use.

Unfortunately, information and communication technology is unevenly available in the world. This creates a "digital divide" between countries with an established market economy and low- and middle-income countries. In addition, low levels of literacy in some countries place a huge barrier to access even existing information technology. Research is needed regarding the best way to bridge this divide. A critical factor is the need to recognize that information and communication technology is a critical part of national development.

Use by Policy Makers

Information and communication technology offers a ready platform for policy makers to advance heart health. Widely disseminated information on benefits of cardiovascular disease prevention can inform decisions by policy makers about programs and services to promote heart healthy behaviours and provide health care.

Due to time constraints, policy makers at both the bureaucratic or political levels must rely on synthesized information for making decisions (knowledge translation). Without such evidence, decisions may be made on intuition. Researchers and health care providers play a major role in providing succinct yet evidenced-based information to the policy makers. Current and developing technologies can help to translate the evidence to useful information for decision-making. Simulation models can help policy makers make informed decisions, for example, by allowing them to project multiple scenarios and outcomes by altering the various parameters involved.

Use by health professionals

Access to information and communication technology offers many advantages for health professionals in their efforts to provide effective health services. Information and communication technology facilitates the dissemination of heart health information to low- and middle-income countries where journals and textbooks may be prohibitively expensive or inaccessible. The particular technology that is used will depend on the availability of and access to communication resources in the country.

Clinical practice and health policy guidelines synthesize research for both clinicians and policy makers. Technology plays an important role in the development and dissemination of the guidelines and the evaluation of their impact. During the process of developing the guidelines, Internet-based chat rooms and dedicated bulletin boards can encourage input from different contributors in various locations or countries. Guidelines can then be posted on the Internet for use by people all over the world.

Telemedicine can be an effective tool in providing medical care to rural areas by, for example, consultations with physicians in tertiary care centres. It can also be used to deliver health education to remote centres. With one broadcast station and multiple receiving stations, the education/information can be transmitted very effectively.

SATELLIFE: Adapting Technology to Reality

SATELLIFE, which began fifteen years ago, was one of the pioneers in the early use of electronic mail to the developing world. SATELLIFE supports multiple channels for the delivery of medical and public health information to providers in 150 countries. Stymied by the slow proliferation of email beyond the capital cities, however, SATELLIFE has developed an alternative approach to expanding the reach of health information. Using handheld computers (Palm PDAs) and the fast growing cellular telephone network, they and their partners at Uganda Chartered HealthNet and Makerere University Faculty of Medicine have created a new information sharing system.

Health workers equipped with handheld computers are able to look up treatment guidelines and medical reference texts at the point of care. Routine surveillance and utilization reports are completed on the handheld and sent from remote health clinics to the District Health Office electronically. Health workers use an “access point” called a Jack developed by Wide Ray, a US based company. The access point stores the outgoing data received from multiple handheld computers until it can send the combined data via a cellular telephone call at off peak hours. Data is received at a central server and forwarded on the right District Health office.

At the same time that they are sending out data from their individual handhelds, healthworkers are also downloading updates that are stored on each unit. These updates ensure that they have access to the latest treatment news. By late 2004, the system will be enhanced to enable users to send and receive email on their devices through this store-and-forward network. The Jack requires little or no maintenance beyond a periodic recharge of its batteries. Handheld computers are recharged much like the cellular telephones using electricity, car batteries or solar recharges. Where there is no cellular service, data collected on the handhelds can be transferred during regular supervisory visits. SATELLIFE is working with handheld computers in several countries to expedite data collection, improve monitoring and evaluation and disseminate information to the hands of those who heal.

Use by the Public

Information technology has the potential to reach everyone in the population. Within the last five years, rates of Internet use for accessing health information have increased by up to 46%. Socio-economic disparities have created a “digital divide” among health information seekers, however: technology may be either unaffordable or even unavailable to more than 70% of the world’s population. Over 50% of the global population lives on less than \$100 US per capita per year. For these people and their governments, information and communications technology is an unattainable luxury as they try to meet more pressing day-to-day issues, such as water, food and shelter. Thus, while information and communications technology has great potential for educating and empowering the masses, it remains inaccessible to much of the world’s population. As a result, in low- and middle-income countries, traditional means of communication such as television will continue to play an important role in disseminating

evidence-based information to the public. Even in the ideal situation, information and communications technology would not become a global reality for at least another twenty years.

Surveillance

Data on cardiovascular disease and risks by region and population identify the changing burden over time. This data can be used to identify need and evaluate the impact of policy and programmatic interventions to decrease risk factors and the impact of cardiovascular disease on the population. Unfortunately, at this time even mortality trends cannot be reliably estimated due to limitations of available data; long-term trends are subject only to projection, not verification. Incidence of ischemic heart disease and stroke, much less their risks, is unavailable except in specifically targeted community studies, and even in these instances no single community collects the full array of desired measures. The WHO MONICA Project accomplished most in this direction, but its methods have only limited applicability in much of the world in view of current resources and technical capacities.

It is vital that available technologies be used effectively made to enhance data systems and measures of both the burden and its response to intervention. Risk factor monitoring and rapid health behaviour monitoring, for example, with links to modern communication technology for rapid feedback, have proven their value to practical heart health work. In addition, CVD Infobase uses Internet technology to display data about cardiovascular disease risk factors and mortality for participating countries. The use of this communication technology provides all countries with access to data about each other at the same time.

Food Technology

The challenge of producing food for the world's over 6 billion people is immense. This is made more complex by the planet's limited land mass, its increasing population and life expectancy. In addition, as more and more arable lands are converted to housing, the ecology and environment on which agriculture depends are gradually being destroyed.

Technology can increase the production of food, through such means as soil enrichment or genetically modifying grains and vegetables that produce high volume/high energy crops. Both of these approaches exact a high price, however. Enriching the soil through increased use of chemicals is perceived to have a potential to harm human health. This influences political decisions and policies about the acceptance of this food technology. For example, countries that use genetically modified seed run the risk of growing crops that are unmarketable to other countries. These policies affect the low- and middle-income countries. The benefits and concerns of food technology must be carefully assessed before its adoption for wide use in the country.

It is important that developing food technologies targeted at increasing food production also aims to improve nutritional status. The technologies should be designed to produce foods with

a nutrient content consistent with decreasing the risk of developing chronic diseases. For example, biotechnology is currently focusing on producing foods with a healthy lipid profile and increased antioxidant content. Technologies should also aim at producing a more varied food supply to replace the mono-component diets currently ingested in much of the world.

Modern food technology offers great potential for developing food items that comply well with expert recommendations (less saturated fat, salt, sugar) and are at the same time tasty and affordable. This potential should be tapped, not only in countries with established market economies where such developments have started, but also in low- and middle-income countries.

Medical Technology

Health spending in countries with established market economies has grown dramatically over the last two decades, driven largely by rapid progress in medical technology. In low-income countries, however, health spending has grown very little, creating great disparities in global health spending and disparities in access to healthcare and medical technology.

If rationally selected and appropriately applied, medical technology has the potential to enhance the effectiveness of strategies for preventing and treating cardiovascular disease. However, investments in medical technology constitute an opportunity cost. In other words, if limited resources are invested in one technology for a specific benefit, the opportunity to invest another way for another benefit is lost. If medical technology is purchased indiscriminately, the productivity of resource-poor health systems in low- and middle-income countries can be seriously threatened. In such settings, efficiency of the system is critical and only a rational resource allocation for medical technology can ensure maximum health benefits and equity.

Primary Care Technologies

A few core medical devices and pharmaceuticals are essential for applying primary and secondary cardiovascular disease prevention strategies at the individual level. Weighing scales, sphygmomanometers, electrocardiographs, defibrillators and equipment for urine analysis, blood sugar and blood cholesterol assay can be considered core devices. Some of the essential drugs required to treat common cardiovascular conditions include aspirin, diuretics, beta-blockers, angiotensin converting enzyme inhibitors, statins, penicillin, metformin, insulin and streptokinase. Because all of these lifesaving drugs are off-patent, generic preparations are available.

The potential gains associated with the consistent use of these non-intensive technologies are substantial. For example, each of aspirin, beta-blockers, ACE-inhibitors and lipid-lowering therapies could lower the risk of future vascular events by approximately one-quarter in high-risk patients. When these four drugs are used together, up to three-quarters of future vascular events could be prevented. When in addition to these drug therapies, smoking cessation and

aggressive blood pressure lowering are attained, the risk of future vascular events could be reduced by approximately four-fifths in high-risk people. If the above basic technologies combined with skilled personnel and referral systems are available in primary health care, patients with most treatable cardiovascular conditions can be offered prevention, treatment and long-term management across the life span.

Advanced Technology

Costly diagnostic and treatment interventions, such as cardiac catheterization, coronary artery bypass grafting, coronary angioplasty or valve surgery, are essential for treating people with advanced cardiovascular disease. For humanitarian and political reasons, low- and middle-income countries are compelled to provide these lifesaving curative services despite limited financial resources and the limited numbers of skilled personnel. If such technologies are not made available, the affluent few will purchase them from countries with established market economies - causing foreign exchange drain. This creates a disparity between the wealthy and the poor in the country. Given the need to provide these expensive high-technology interventions, strong government stewardship is essential to both ensure the quality of these services and minimize inequities that may result from their use.

In many countries, market forces drive the purchase and use of a variety of medical devices, pharmaceuticals and interventions in both public and private health sectors that are not cost effective. In low- and middle-income countries with a rapidly growing private sector, patients often make large payments to access these inappropriate interventions. Appropriate policy development for technology assessment and rationalization can control such practices so that scarce resources are used wisely. Steps also need to be taken to update the knowledge of health care providers in evidence-based use of medical technologies. Education is also needed to assist people in becoming informed consumers, rather than passive receivers, of medical technology.

Financing Medical Technology

According to the report of the Commission on Macroeconomics and Health, interventions costing less than three times GDP Gross Domestic Product per capita for each DALY (Disability Life-Adjusted Year) averted represent good value for money. Based on this benchmark, most of the aforementioned primary care devices and medicines are cost effective and should be widely available in the primary health care system. In reality, however, this is not feasible in most low-income countries due to the fundamental constraint of limited resources. Most of these countries spend less than \$60 US per capita on health, the minimum estimate required to put in place a set of basic health interventions and the infrastructure necessary to deliver them. Even middle-income countries spend only 3%-7% of national income on health, which represents an annual expenditure between \$75 US and \$550 US. Thus, even in these countries health financing system is a critical barrier to making basic technologies accessible to all.

A suitable combination of sustainable financing mechanisms (taxation, social insurance contribution, private insurance premiums or community insurance schemes and private/public partnerships) is key to addressing inequalities. It will also improve access to essential medical technology for prevention and control of cardiovascular disease.

The Millennium Development Goals adopted by the United Nations at the Millennium summit in 2000 provide an opportunity for global action to improve access to basic health care and medical technology world wide. One of the eight health related goals concerns actions that rich countries can take to create a more enabling environment in poorer countries in the areas of debt relief, trade, development assistance, essential medicines and technology transfer. If poorer countries are to have equitable access to medical technology and are to overcome the structural constraints that keep them in perpetual poverty, concrete action is critical.

Biotechnology

Non-modifiable risk factors for cardiovascular disease include an individual's sex, age and genetic makeup. Recent advances in genomic and proteomics have given some insight into the expression of genes among individuals, genetic markers for certain diseases, and the reaction of genes to the environment. At this time, because biotechnology is expensive, only wealthier countries can afford to conduct this kind of research.

With the explosion of available data from millions of structural and functional genetic analyses, combining and analyzing the information requires powerful bio-informatics platforms. Furthermore, data are generated both in the commercial and academic sector: integrating this information and making it accessible is a vital part of the process, and requires international coordinated efforts.

To date, no specific genetic markers have been found for predisposition for cardiovascular disease or stroke. While biotechnology may be able to offer both diagnostic and therapeutic solutions in the near future, gene modification is still far off. It is important to keep the balance between biotechnology and genetics research and more general population health approaches to obtain improvements in the health status of the population.

Biotechnology is also used to create biopharmaceuticals such as recombinant insulin for diabetics. Other applications include therapeutic angiogenesis – a novel treatment for myocardial ischemia, and angiogenesis effects of cell therapy. While these approaches show promise to improve cardiovascular health, they are not available in all countries.

Chapter 3 Positioning Technology: Implications and Recommendations

Addressing the Growing Burden of Cardiovascular Disease

Cardiovascular diseases, specifically ischemic heart disease and stroke, are pandemic in all regions of the world and have been so for decades. Given the high prevalence of risk factors for cardiovascular disease, this pandemic will continue unless interventions are enhanced. If risk factors are not adequately addressed, even areas that have enjoyed improvements in cardiovascular disease mortality in recent decades could have a resurgence of cardiovascular disease.

This pandemic has major health and economic implications. While technology offers some solutions, policy makers at every level must be innovative and critical in selecting and applying the most appropriate technologies to improve global heart health.

Many countries approach cardiovascular disease largely as a late stage clinical problem leading to significant expenditures on diagnostic and treatment technologies for those with advanced cardiovascular disease. This results in low investment for primary health care, prevention and health promotion. Research has provided ample evidence to support these latter strategies as better and more cost-effective options.

Prevention, health promotion and modern epidemiology are key technologies to serve global heart health. They are good investments with good returns.

In countries where public funding is used to provide health care, and where governments have a direct commitment to provide health care, significant expenditures are made on high-end care for advanced disease for the relatively smaller high-risk populations. This means that such governments are under financial pressure when it comes to providing and paying for prevention, which affects a majority of the population. This raises issues pertaining to equity. While it may be argued that publicly funded universal care should attempt to address equity issues, opportunities exist for promoting low cost, effective technology for prevention and education that should reach the majority of the population, mobilizing and empowering communities and individuals into positive action.

Equitable access to technology can be achieved through increased funding of the public health system.

In contrast to curative services, prevention programs and primary health care tend to be significantly under-funded. Country-level decision makers in policy and practice need to consider the right mix of technologies that support equitable access to technology for both prevention and curative care. Evidence suggests that there are cost-

effective interventions that utilize integrated approaches to the prevention of cardiovascular and other non-communicable diseases. These approaches have clear benefits, which include a healthier population and better control of health care costs as a consequence of averted premature morbidity and disability.

Globalization has negative social consequences. The increased use of tobacco and unhealthy foods, for example, due to increased global marketing and trade agreements, is especially relevant for the global cardiovascular epidemic. Global agreements that protect health, such as Framework Convention on Tobacco Control and the WHO Global Strategy on Diet, Physical Activity and Health can counteract such influences.

Implications of Technology for the Future of Global Public Health

Technology can be harnessed or exploited to have the most favourable impact on health. Technologies for manufacture and efficient distribution of essential drugs for primary health care; technologies supporting the cultivation and processing of nutritious food; and technologies supporting information, education and communication, are examples of the positive effect of technology on health. Technology brings its own set of needs and consequences, forcing decision makers to address issues such as who will benefit from the technology. Technology is not a neutral entity and its impact depends on the environment in which it is applied.

The manner in which technology is introduced and used in any given setting indicates the norms and values endorsed by the people and systems that embrace it. If technology is primarily used to support tertiary clinical care, then it would more likely reflect the way health is viewed and the values that are emphasized in that given health system.

Inappropriate use of technology has often widened, rather than reduced, inequities in health status.

As countries face the burgeoning cost of dealing with cardiovascular disease, any existing policies that favour acquisition of expensive “high-tech” technologies need to be reviewed in the interest of sustainability. Broad policies that favour improving the health of the population as a whole need to be actively pursued. Finding the balance or right “mix” of technological applications from the array of interventions that are available for controlling cardiovascular and other diseases is an essential step in the process.

Technology is not a neutral entity. It conditions the environment in which it is applied.

Consumers of health care and patients are now more empowered by information technology, such as the Internet, which provides direct access to knowledge about health conditions and risks. As a result, physicians and other health care providers face more knowledgeable consumers than a decade ago. This has several consequences and implications. Health care providers will need more training to better relate to and respond to a more informed public.

Health care providers will need to adapt to a new culture where consumers are seen increasingly as partners in delivering health, and in less paternalistic ways.

Technology has the capacity to empower or enslave. It can be harnessed or exploited to have the most favourable impact on health.

On the other hand, advances in technology in such areas electronic patient records have presented health care providers with a new interface with patients. Increasing reliance on these electronic profiles of patients will risk modifying patient-provider interaction. This could establish new cultures where patients become more objectified, and providers will spend less time on developing personal connections and more on gathering and reviewing data. Therefore, even though there are clear benefits for the introduction of these technologies, training and improvements in practice guidelines will have to be tailored to mitigate any negative consequence of introducing new technology.

If fully utilized, information and communication technology has the distinct potential to assist and augment the translation of knowledge and health intelligence for decision-making. This will improve the evidence base from which policy makers will review options for establishing good policies for impacting health in general, and especially in the context of cardiovascular disease prevention and control.

Feeding the world's population is a significant challenge. Food technology is a valuable tool, if used well. It can make heart healthy food items more affordable or an easier choice. Policy makers must consider how to best take advantage of this technology to improve population health. The economic benefits must be balanced with attention to the health benefits.

Tailoring Technology to Meet Specific Needs

Technology assessment is required prior to adoption to assess the potential impact on the health the population.

While technology has made significant contributions to the evolution of society, changing the lives of people and their relationships, all societies face the dilemma of the opportunity costs of technology. Technology is a double-edged sword with many benefits, but often accompanied by unintended negative consequences. All countries need to create a balance between investments in costly, specialized,

sophisticated treatment technologies and less costly technology to prevent modifiable risk factors.

The consequences of technology can be both economic and political. Technology assessment needs to be carried out and should take into account the principles of equity, effectiveness, social and economic reality, return on investment, and fit with the size of the problem and the population in need.

Priority setting needs to be done at an up-stream/policy level considering the best mix of technology to match resources and desired impact.

Technology Issues Facing Low- and Middle-Income Countries and Resource-Poor Regions in Other Countries

From both the opportunity-cost and technical standpoints, some technologies may be inappropriate in some environments. In some instances in low- and middle-income countries, certain types of technology transfer have failed because technology has not been adapted to that environment.

Developing the capacity to use evidence and to educate policy makers and providers on cost effective options for interventions in heart health, is particularly important for low- and middle-income countries. These countries, and other resource-poor settings in countries with established market economies, will also need to develop their own models for assessing effectiveness and appropriateness for their own contexts. Such contextual knowledge should be used to develop policy guidelines for selecting appropriate technologies to prevent and control diseases of public health significance.

Technology has several important dimensions including cost, availability, novelty, affordability, cost effectiveness, sustainability and impact.

Non-intensive low cost technology strategies are not inferior strategies and are effective in improving health outcomes.

Policies should take into account appropriateness, equity, effectiveness, fit with social and economic reality, return on

investment, and “fit” with the size of the problem and population in need.

A major challenge for low- and middle-income countries would be to resist the transfer and adoption of technology models from advanced-market economies whenever there are cheaper alternatives that are effective in the local environment. This would entail investments in evaluation and effectiveness studies on technologies and intervention tools. This would be a significant contribution towards bridging the impact of the technological divide between countries.

Opportunities now exist for investments in technologies that would yield significant benefits to overall global health and reduce the impact of a growing pandemic that threatens to cripple the health care infrastructure of many countries.

Global partnerships to respond to technology challenges will be incomplete without the active involvement of industry. Corporate responsibility to the larger community is particularly crucial in helping to bridge the global technological divide. Greater corporate investment in innovations that would make technology affordable and accessible to resource-poor settings, especially technologies that support prevention and health promotion, would serve global public health well. Adhering to the principle of equity and appropriateness of technology is of paramount importance. An investment in research is also required to identify the causes of the digital divide and effective interventions to bridge this divide.

Evaluating the Impact of Technology on Global Health

Technology can be used to monitor the current global picture of heart health and forecast future changes.

The impact of the use of technology on global heart health needs ongoing evaluation. Changes in the burden of cardiovascular disease resulting from its use will differ for each country, depending on underlying demographic and cultural forces, as well as globalization, mass marketing and urbanization. Fully evaluating the

effectiveness and potential impact of technology on global heart health will require a critical research capacity to conduct policy, outcome and economic evaluation studies on the role of technology in global health. With limitations in data for assessing mortality, morbidity and risk, it will be vital that technology to enhance data systems be used effectively. The use of technology to enhance surveillance can be used to evaluate the impact of the use of technology on the health of the population and to inform policy development.

Recommendations

It is recommended that:

1. Governments, the World Health Organization (WHO) and international social and economic development agencies develop policies regarding the appropriate use of technology to address the growing global burden of cardiovascular disease.
2. Governments at all levels and international social and economic development agencies invest a greater share of their resources on health promotion and disease prevention as a technology to improve heart health for the population as a whole.
3. Governments at all levels develop the capacity, either internally or with assistance, for broadly based assessment of cost, sustainability, impact on the health status of their populations, and cultural appropriateness of technologies, clearly recognizing the opportunity costs of the technologies.
4. WHO, Member States and the World Bank establish, fund and sustain an international technology assessment facility to assist countries in the appraisal and assessment of technologies that have an impact on health.
5. Governments, economic development agencies and international non-government organizations that provide foreign aid and development assistance, when considering investments in technology, give priority to the impact of technology on the health status of the recipient population.
6. Governments at all levels, non-government organizations, health professional organizations and community groups ensure equitable access for all, to relevant and appropriate health-improving technologies.
7. Governments, national and international research granting agencies, and NGOs that fund health research, support research in biotechnologies that have significant application to improving the health status of populations.
8. Governments (particularly those of countries with established market economies), international health and social development agencies, and the private sector form partnerships that would improve availability and affordability of and access to appropriate health-related technologies within low- and middle-income countries.
9. WHO, Member States and the World Bank establish a mechanism to make affordable generic essential drugs (aspirin, diuretics, beta-blockers, ACE Inhibitors and statins) for reduction of cardiovascular disease and its risk factors in low- and middle-income countries.

10. Governments, international health and social agencies, and the private sector form partnerships to bridge the "digital divide" by supporting initiatives that make Internet tools more accessible to facilitate health promotion and disease prevention efforts within low- and middle-income countries.
11. Governments (particularly those of countries with established market economies), international social and economic development agencies (such as the World Trade Organization, the World Bank and the International Monetary Fund), and the private sector develop a consensus, on an urgent basis, to remove political and economic barriers that impede the distribution of nutritious food produced through the use of safe technologies that ensure food security to the populations of low- and middle-income countries.
12. Governments, international agencies and national institutes invest in technologies to improve the timely data collection and dissemination of information for surveillance and evaluation purposes, and invest in technologies to develop and improve measures of health status and indicators of program and policy impact.

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