# The impact of social determinants on cardiovascular disease

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Cardiovascular disease is the leading cause of death among high-income countries and is projected to be the leading cause of death worldwide by 2030. Much of the current research efforts have been aimed toward the identification, modification and treatment of individual-level risk factors. Despite significant advancements, gross inequalities continue to persist over space and time. Although increasing at different rates worldwide, the magnitude of increase in the prevalence of various cardiovascular risk factors has shifted research efforts to study the causes of the risk factors (ie, the 'causes of the causes'), which include the social determinants of health. The social determinants of health reflect the impact of the social environment on health among people sharing a particular community. Imbalances in the social determinants of health have been attributed to the inequities in health observed between and within countries. The present article reviews the role of the social determinants of health on a global level, describing the epidemiological transition and the persistent trend known as the 'inverse social gradient'. The impact of social determinants in Canada will also be examined, including data from ethnic and Aboriginal communities. Possible solutions and future directions to reduce the impact of social factors on cardiovascular health are proposed.

**Key Words:** *Cardiovascular disease; Global health; Health inequity; Social determinants; Social gradient*

## Impact des déterminants sociaux sur la maladie cardiovasculaire

La maladie cardiovasculaire est la principale cause de mortalité dans les pays à revenus élevés et on s'attend à ce qu'elle devienne la principale cause de mortalité dans le monde d'ici 2030. Une bonne part de la recherche actuelle s'est attardée à la reconnaissance, à la modification et au traitement des facteurs de risque à l'échelon individuel. Or, malgré des progrès significatifs, d'importantes disparités persistent dans l'espace et le temps. Même si elle croît à un rythme différent selon les régions du monde, la prévalence de divers facteurs de risque cardiovasculaires force maintenant les chercheurs à étudier désormais l'origine des facteurs de risque eux-mêmes (c.à-d., « la cause des causes »), ce qui inclut les déterminants sociaux de la santé. Les déterminants sociaux de la santé témoignent de l'impact de l'environnement social sur la santé des personnes d'une communauté donnée. Les disparités quant aux déterminants sociaux de la santé ont été attribuées aux inégalités en matière de santé observées à l'intérieur des pays et entre eux. Le présent article fait le point sur le rôle des déterminants sociaux de la santé d'un point de vue mondial en décrivant l'évolution de l'épidémiologie et la tendance persistante connue sous le nom de « gradient social inverse ». L'impact des déterminants sociaux au Canada fera l'objet d'une analyse qui portera entre autres sur les données provenant des communautés ethniques et autochtones. On propose des solutions et des orientations qui pourraient éventuellement réduire l'impact des déterminants sociaux sur la santé cardiovasculaire.

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality among high-income countries of the industrialized world, accounting for more than one-third of total deaths (1,2). CVD is the leading cause of noncommunicable morbidity and mortality among low- and middle-income countries, accounting for almost 25% of total deaths (3) and, by the year 2030, is projected to be the leading cause of death worldwide (1,2). One of the most important advances in cardiovascular research of the 20th century was the identification of risk factors associated with CVD, with subsequent treatments developed and rigorously tested to modify these risk factors with the goal of preventing CVD. The INTERHEART study (4) examined more than 27,000 cases and controls from 52 countries and found that more than 90% of the population-attributable risk for myocardial infarction can be explained by nine potentially modifiable risk factors: apolipoprotein B/apolipoprotein A ratio, smoking, diabetes, hypertension, abdominal obesity, psychosocial factors, fruit/vegetable consumption, physical activity and alcohol consumption; thus, it is reasonable to believe that modification of these individual risk factors will significantly improve cardiovascular health. However, despite advances in the primary and secondary prevention of CVD, there are still gross inequalities in cardiovascular health care across space and time (5-7). To date, epidemiological studies have focused on identifying, modifying and treating individual risk factors; however, many cardiovascular risk factors have been increasing at different rates worldwide. Efforts to narrow the persistent health gap has spurred recent interest in developing approaches to study the causes of risk factors (ie, the 'causes of the causes'), which include the social determinants of health.

The term 'social determinants of health' is used to describe the health impact of the social environment on people living in a particular community (8). Specifically, they include the conditions in which people are born, grow, live, work and age, and are shaped by the distribution of money, power and resources at global, national and local levels (9). The social determinants of health (including the health care system) are mostly responsible for health inequities between and within countries (9). Historical research has significantly established the impact of economic development and social organization on health (10). Because the prevalence of some cardiovascular risk factors (eg, obesity, hypertension and diabetes) is rising worldwide (2,10,11), it is necessary to focus efforts on understanding the role of the 'causes of the causes' (ie, the social determinants of health) to help bridge the current gap in equality. For the purpose of the present article, the social determinants of health as they pertain to CVD will first be explored on a global level and, second, within Canada, including data from ethnic and Aboriginal communities. Possible solutions to reduce the impact of social factors on CVD are also proposed.

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## THE GLOBAL BURDEN OF DISEASE

The World Bank and the WHO commissioned the Global Burden of Disease study (1,2) to quantify mortality, morbidity and the health effects of selected diseases, injuries and risk factors for the world as a whole and within specific regions. Among worldwide noncommunicable causes of death, CVD accounts for more than one-half (1); this finding has been consistently projected to remain unchanged across multiple models for at least the next 20 years in countries of both the developed and developing world (1,2,11). This finding is at odds with the popular perception that noncommunicable disease, such as CVD, are 'diseases of affluence' whereby related risk factors are perceived to be more prevalent in high-income countries and not present among low-income countries (12). However, this apparent paradox of substantial noncommunicable death in adults of the developing world has insidiously been established without attracting global attention or local action (12,13). The magnitude of this problem has been greatly overlooked because more than 80% of CVD deaths worldwide currently occur in low- and middle-income countries (13). By the year 2020, CVD is expected to surpass infectious disease as the world's leading cause of death and disability (3), increasing from 25% in 1990 to 40% in 2020, illustrating the scale of this epidemic (13). Several factors are likely driving the worldwide increase in CVD, including the projected increase of 60% in the global population between 1990 and 2020, the increasing average life expectancy (due to a multitude of factors including improvements in nutrition, public health and medical care, while decreasing the rates of communicable diseases) and the economic, social and cultural changes that have led to increases in CVD risk factors including tobacco use, obesity, hypertension and diabetes (3). To put this into perspective, smoking, for example, is projected to kill 50% more people in 2015 than HIV/AIDS, and will be responsible for 10% of all deaths globally (11).

### The epidemiological transition

Global patterns of death and disability have been observed over time. As societies become increasingly urban and industrialized, infant mortality declines, and the major causes of death and disability shift from nutritional deficiencies and infectious disease to degenerative or noncommunicable diseases such as CVD, resulting in an increasing average life expectancy. This shift has come to be known as the 'epidemiological transition' (3,14). Originally, three main transition states were identified (15); however, recently, up to five transition states have been described and characterize the total rates of CVD change (3,10,16) as illustrated in Figure 1. Briefly, the first stage, known as 'the age of pestilence and famine', is indicative of countries in the earliest stage of development, in which death from CVD accounts for less than 10%, predominantly as rheumatic heart disease and cardiomyopathies due to infection and malnutrition (3,10). Geographical regions currently experiencing this transition state include sub-Saharan Africa and rural areas of South America and Asia. During the second stage, known as 'the age of receding pandemics', infectious disease burdens are reduced, nutrition improves and, correspondingly, deaths attributed to CVD increase to up to 35%, manifesting mostly as rheumatic heart disease, hypertension, coronary artery disease and stroke (3,10,16). Geographical regions currently experiencing this transition state include China and other Asian countries. In the third stage – 'the age of degenerative and man-made diseases' – life expectancy continues to improve, diets include higher fat content, cigarette smoking becomes more prevalent and sedentary lifestyles become more common (10). Not surprisingly, deaths attributed to CVD continue to rise, accounting for 35% to 65% of total deaths, primarily manifesting as atherosclerosis, coronary artery disease and stroke, often at ages younger than 50 years (10). Regions currently experiencing this stage include urban India, Latin America and former socialist European eastern block countries. In the developed world, most countries are in the fourth stage of transition referred to as 'the age of delayed degenerative diseases', in which up to 50% of deaths are attributed to CVD and typically present as coronary artery disease, stroke or congestive heart failure at more advanced ages (3,10,16). More recently, a fifth stage has been identified – 'the age of health regression and social upheaval' – which is used to describe conditions of social upheaval or war, resulting in a breakdown of the health system in which there is a resurgence of diseases seen in transition states one and two (eg, rheumatic heart disease), while the CVD diseases common in the third and fourth stage (eg, atherosclerosis) continue to persist (10). In total, approximately 35% to 55% of deaths are attributed to CVD, with a lower average life expectancy similar to what is currently experienced in Russia (10).

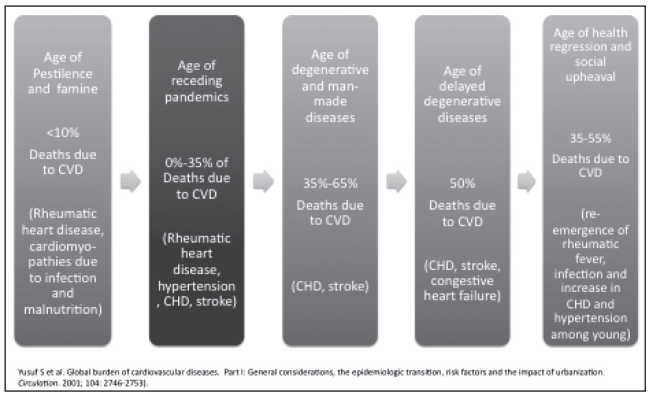


**Figure 1)** *The epidemiological transition states of cardiovascular disease (CVD). CHD Coronary heart disease. Reproduced with permission from reference 10*

Epidemiological transition states occur on a macro level, affecting specific countries or regions; however, they may also occur on a micro level within a country, including affluent countries. A country or a region can enter an epidemiological transition state at any time, with the progression from one state to another closely associated with parallel economic, demographic and nutritional 'transitions'. From an economic perspective, progression through the transition states is often accompanied by an increase in per capita income; a social transition to industrialization, shifting from predominately rural to urban life; and the establishment of a public health infrastructure including wider access to health care (3). At the same time, a demographic transition occurs in which fertility and age-adjusted mortality decline, leading to an increase in average life expectancy and an aging population (3). As life expectancy increases, a shift in nutrition also occurs and populations are exposed to more cardiovascular risk factors including 'Westernized' diets (higher animal products and fat), sedentary behaviours and low physical activity, which lead to an elevation in blood pressure, body weight, blood sugar levels and lipid concentrations (13). This pattern has been repeatedly observed in many developing countries. For example, body mass index and blood cholesterol levels have dramatically increased in the Chinese population, likely due to a sharp increase in fat consumption; it is expected that China will soon experience a rapid escalation of coronary artery disease, surpassing the current one-third of total lives that it claims each year (13,17). Even with China's booming economic growth, health care costs are currently unsustainable – the impact of which has been detrimental to the poor. Health care is less accessible while the health care system is inundated, having to cope with the double burden of infectious and chronic disease in an excessively large population (13,17).

The epidemiological transition has been observed to occur within countries. Affluent regions are typically affected first and, as the epidemic matures, the socioeconomically disadvantaged groups become increasingly more vulnerable, widening the health inequality gap in a phenomenon widely known as 'the inverse social gradient' (13). The socioeconomically disadvantaged groups have a greater exposure to cardiovascular risk factors such as smoking, increasing incidence of atherosclerotic risk factors (eg, obesity, diabetes, dyslipidemia and hypertension), poor working and living conditions, stress, lower rates

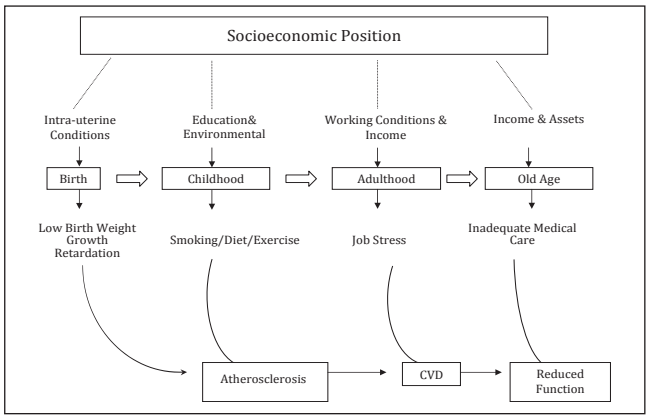


**Figure 2)** *Socioeconomic influences on cardiovascular disease (CVD) from a lifecourse perspective. Reproduced with permission from reference 18*

of formal education, and reduced access to health care and health education (3,5,13,17). As research continues to emerge, evidence is mounting, indicating that epidemiological transition is a poor and incomplete model to understand how the social determinants of health interact with cardiovascular health because education, occupation, social norms, culture, geography, policy, economic factors and environment are considered to be independent individual risk factors. A comprehensive understanding of the social determinants of health must consider their dynamic nature, which inevitably includes a temporal component of early life and childhood exposures impacting adult health. The life course perspective is a methodological approach that takes into account the cross-sectional relationship of social circumstances from the early stages of life that may later be accompanied by similar social advantage/disadvantage in other spheres of adult life (5,18) (Figure 2). For example, a longitudinal study (19) from Scotland found that social disadvantage, defined by a father's occupation and neighbourhood (postal code of residence), contributed to CVD even after controlling for CVD risk factors. An increasing number of longitudinal epidemiological studies have demonstrated the importance of early-life socioeconomic circumstances with respect to future development of cardiovascular risk factors and CVD in later life (20).

## CARDIOVASCULAR RISK FACTORS AND SOCIAL DETERMINANTS IN CANADA

CVD is the leading cause of death in Canada, accounting for one-third of total deaths (21,22). Despite the decline in CVD-related deaths over time in Canada, there are wide regional variations in death rates and risk factors (22). For example, the overall Canadian age-standardized CVD mortality rate (ASMR) from 1995 to 1997 was 245.8 per 100,000 population (22). Within Canada, there are significant differences in the ASMR from CVD, with Newfoundland and Labrador having the highest CVD mortality rate at 320.6 per 100,000 population, and the Northwest Territories having the lowest at 196.9 per 100,000. An east to west gradient in CVD mortality has been described, in which provinces in eastern Canada have higher CVD-related ASMR, with mortality rates generally decreasing westward, where the province of British Columbia has the lowest ASMR from CVD. However, the Territories have the lowest CVD ASMR in the country (22). In addition to between province/territory variation, variability within provinces has been observed. In a study using cross-sectional data from the National Population Health Survey of 1994, in combination with the Canadian Community Health Survey of 2005, Lee et al (21) compared temporal trends in the prevalence of cardiovascular risk factors across Canada. Over a 10-year study period, the prevalence of diabetes and obesity significantly increased, the prevalence of hypertension nearly doubled while smoking rates significantly declined (21). The prevalence of risk factors, when analyzed according to age and sex, indicates that they are increasing in both sexes and in

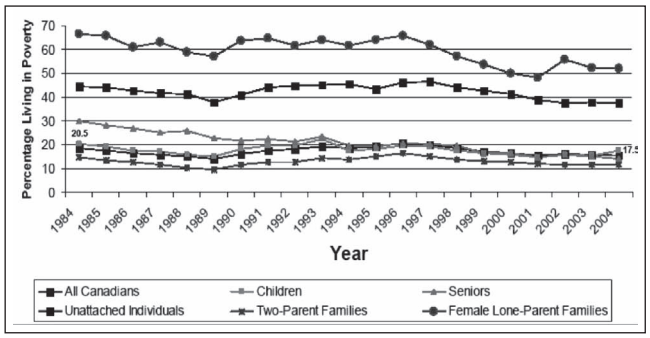


**Figure 3)** *Canadian poverty rates over time, 1984 to 2004. Reproduced with permission from reference 28*

all age groups among Canadians, particularly among the younger population groups (21). Such trends have important short- and long-term implications because the early presence of risk factors predisposes people to earlier onset of CVD, incurring greater health resource consumption and a greater potential for life-years lost (21,23,24).

**Evidence of the inverse social gradient in Canada**

When analyzing CVD mortality and risk factor prevalence rates according to income group, it is alarming to realize that despite affluence in Canada, individuals of lower socioeconomic status are more vulnerable to CVD than those of higher socioeconomic status (3,25). Evidence of the inverse social gradient and inequity gap reveals that mortality is highest among those in the poorest income group and, as income increases, the mortality rate decreases (3,25). Not surprisingly, these trends are also consistent with CVD risk factor prevalence rates in which individuals in a lower income group, especially in urban areas, have a greater exposure to risk factors (such as smoking and atherosclerosis) that manifest as obesity, diabetes, dyslipidemia and hypertension (21,22). Alarmingly, the inverse social gradient and inequity gap not only persisted but grew when the prevalence of cardiovascular risk factors according to income category over time were considered. Specifically, heart disease, hypertension, diabetes, smoking and obesity increased as income decreased in 1994. This trend was exaggerated when individual risk factors were compared between decades and within income group, with the exception of smoking (21). What is remarkable about these trends in a country such as Canada, is that they are persisting despite the availability and universality of health care. The presence and persistence of an inverse social gradient related to CVD mortality and associated risk factors is especially concerning because the inequity gap is widening between the highest and lowest income groups, and this trend is worsening with time (21).

It is likely that multiple factors contribute to the persistence of the inverse social gradient. Consistent with trends observed in the epidemiological transition state, the concurrent decline in malnutrition and communicable disease while CVD risk factors increase typically occur in privileged groups first, soon followed by higher rates of CVD including ischemic heart disease and stroke. This trend is likely responsible for the popular perception that CVD is a 'disease of affluence' (1,13). However, as the middle class expands and the epidemiological transition spreads to a broader population, individuals with the lowest socioeconomic status tend to acquire the harmful risk factors last, mostly due to their financial situation and the heavy physical activity usually associated with their work (3,17). At the same time, the socioeconomically disadvantaged are also less likely to have access to advanced health services, treatments and information for risk factor modification and, as a result, CVD mortality rates are slower to decline in this group (3,17). For example, of the percentage of the population living in poverty in Canada, two-parent families comprise the highest income group whereas female lone-parent families comprise the lowest-income group – a trend that has remained consistent over time (Figure 3). Socioeconomic status has been widely acknowledged as the

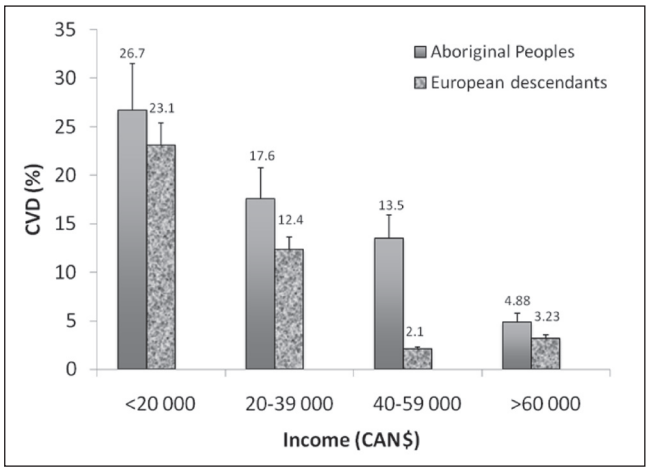


**Figure 4)** *Socioeconomic gradient and cardiovascular disease (CVD) among Aboriginal Peoples and European descendants in Canada. Reproduced with permission from reference 27*

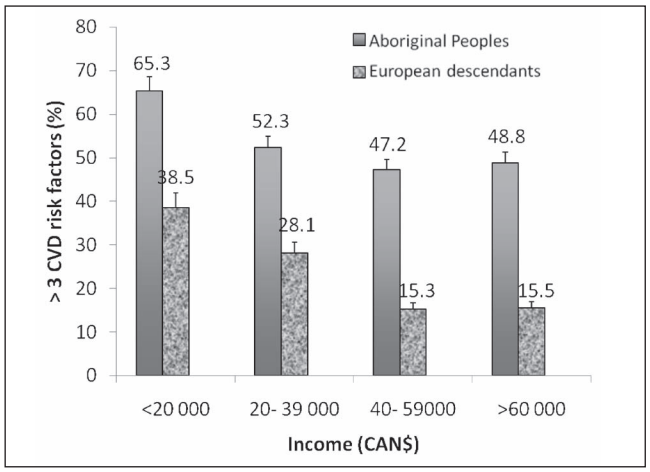


**Figure 5)** *Cardiovascular disease (CVD) risk factor prevalence and income among Aboriginal Peoples and European descendants in Canada. Reproduced with permission from reference 27*

most powerful social determinant of health; however, there are a multitude of factors that intersect with socioeconomic status, including systematic inequalities due to ethnicity and sex.

**The inverse social gradient and Aboriginals in Canada**

Ethnicity is a construct that embodies both genetic and cultural differences including language, religion and diet, to name a few. The construct of ethnicity is intertwined with variations in lifestyle, geography, socioeconomic position and education. Differences in morbidity and mortality among various ethnic groups are well documented within Canada. The Study of Health Assessment and Risk in Ethnic groups (SHARE) (26) used a population-based approach and confirmed differences in risk factor prevalence rates among three ethnic groups in Canada (26). This is an important finding because the overall prevalence of CVD is declining in Canada; however, CVD was observed to be rising within some ethnic groups. There are a number of explanations proposed for these differences including the concept of social exclusion, differences in risk factor frequency, access to screening/prevention, differences in treatment and adherence to treatment (26). Specifically, Aboriginals in Canada have been identified as the population group with the shortest life expectancy (25,27), averaging five to 14 years less than their fellow Canadians (28) despite a decline in infectious disease deaths. Aboriginal infant mortality rates that are 1.5 to four times greater than the Canadian rate contributed to the shorter life expectancy (29).

Not surprisingly, CVD health among Aboriginals is also poor. It has been demonstrated that Aboriginals have a higher prevalence of CVD and a greater burden of atherosclerosis than Canadians of European ancestry (27). Correspondingly, they also have a higher prevalence of conventional risk factors including higher rates of smoking, diabetes, obesity, abdominal obesity, hypertension, cholesterol and family history, which likely account for observed ethnic group differences (27). However, Aboriginals have also been identified to have an excess of social disparities including environmental dispossession – a term used to refer to the processes through which Aboriginal Peoples' access to the resources of their traditional environments are greatly reduced (30) – and high levels of poverty (27). Consistent with trends among other disadvantaged groups, there is evidence of an inverse social gradient; however, the social gradient is strikingly pronounced among Aboriginals when compared with their European-Canadian counterparts of similar income. In The Study of Health Assessment and Risk Evaluation in Aboriginal Peoples (SHARE-AP) (27), both Aboriginals and European-Canadians had the highest prevalence of CVD; however, even among individuals in the lowest income group (less than $20,000 household income), the absolute rate of CVD was significantly higher among Aboriginals than among European-Canadians of all income ranges (27), as illustrated in Figure 4. Consistent with this trend (and equally as shocking!), the burden of CVD risk factors (more than three CVD risk factors) was greatest among people in the lowest income group in both Aboriginals and European-Canadians; however, the absolute rate of CVD risk factor burden was at least twice as high in Aboriginals compared with European-Canadians within each income level group (27) (Figure 5). The social disadvantage index score was developed to incorporate social and economic exposures into a single continuous measure, and found that increased social disadvantage is associated with an increased burden of some – but not all – cardiovascular risk factors independently associated with CVD (31). Specifically, social disadvantage was found to increase with age, was higher among women than men and varied greatly according to ethnic group, in which the highest risk for CVD was among Aboriginal men (Figure 6) (31).

## THE TREATMENT GAP

In addition to the health inequities examined, both on a global and national level, the '10/90 gap' has been recognized as a serious limitation to the improvement of health care, citing that less than 10% of global health research spending is devoted to diseases that account for 90% of the global disease burden (32). Globalization may negatively affect countries in a lower epidemiological transition state by accelerating the transition of Western products and behaviours to non-Western cultures (13). At the same time, globalization can also offer opportunities to facilitate the prevention of CVD through risk factor modification, applying evidence of effective interventions and promoting health behaviour through mass media (13). Despite this, current effective therapies for secondary prevention, such as treatment with acetylsalicylic acid, blood pressure-lowering drugs and statins, are highly undersused. For example, a study conducted in rural India (13), where CVD is the leading cause of death, reported that less than one-sixth of the patients who experienced a previous CVD event acknowledged taking antiplatelet therapy.

The reasons for the treatment gap are complex. Several proposed explanations include the following: incomplete guidelines for physicians, health care systems and policy; the cost of therapy relative to wages; cultural barriers such as the stigma of taking long-term medication; urban versus rural accessibility to health care; and international neglect, for which low- and middle-income countries account for one-third of the world's population but only receive 2% of global health resources (17). Even within affluent countries such as Canada and the United States, a '5/95 gap' is used to describe the ratio of resources devoted to prevention versus treatment (33).

To help address issues related to health inequities occurring at both a global and local level, the Centre for Urban Health – commissioned

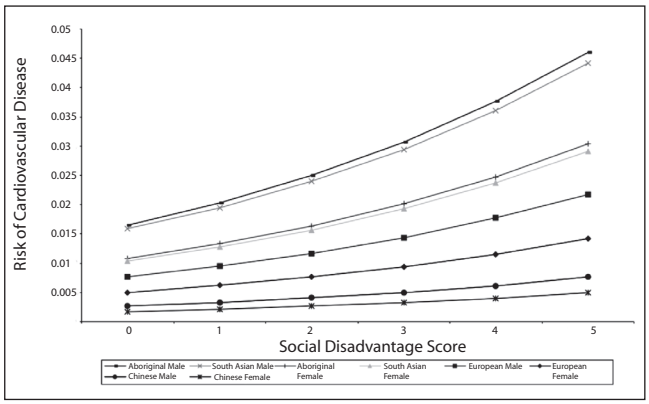


**Figure 6)** *Risk of cardiovascular disease and social disadvantage. Reproduced with permission from reference 31*

**TABLE 1**
**The traditional 10 tips for better health**

| |
|---|
| 1. Do not smoke. If you can, stop. If you cannot, cut down |
| 2. Follow a balanced diet with plenty of fruit and vegetables |
| 3. Keep physically active |
| 4. Manage stress by, for example, talking things through and making time to relax |
| 5. If you drink alcohol, do so in moderation |
| 6. Cover up in the sun, and protect children from sunburn |
| 7. Practice safer sex |
| 8. Take up cancer screening opportunities |
| 9. Be safe on the roads: follow the Highway Code |
| 10. Learn the first-aid ABC's: airways, breathing, circulation (Donaldson, 1999) |

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by the WHO – created a document titled 'The Solid Facts' to "promote awareness, informed debate and above all, action…a valuable tool for broadening the understanding of stimulating debate and action on the social determinants of health" (8). The Solid Facts document identifies 10 social determinants of health: social gradient, stress, early life, social exclusion, work, unemployment, social support, addiction, food and transport (8). This document is widely available, and every member state of the European Union (EU) has currently made efforts to integrate it into their health care agendas. Among the objectives for generating this document was to encourage other countries outside the EU to use it as a model/template for their health care agendas (8). However, current health models and dissemination of health information to the public from various government and health bodies have been strongly and individually oriented, and take the position that individuals can control the factors that determine their health, as exemplified in the 'Traditional 10 tips for better health' (29) depicted in Table 1. However, these conceptualizations have been recently refined to incorporate the information established from research on the social determinants of health using a socially oriented perspective, which assumes that the most important determinants of health are beyond the control of most individuals. The traditional 10 tips can be contrasted with the 'Social determinants 10 tips for better health' presented in Table 2 (29).

## SUMMARY

Because CVD is increasing globally, it is crucial that we understand the social and economic forces that promote the development of risk factors affecting who is screened and who is treated. The dissemination of knowledge and the application of effective strategies are essential. The social determinants of health are tools to help illuminate how social processes interact with CVD health on a global, national and individual level. Specifically, if disadvantaged groups can be identified, intervention strategies can then be tailored at an early age before the individual exhibits the conventional risk factors thereby improving population health and reducing the burden placed on health care resources. It is critical that people – including the scientific community – advocate, educate, organize, lobby and convince policy makers that minimizing social and economic inequities will diminish the social gradients of cardiovascular risk factors and CVD.

**TABLE 2**
**The social determinants 10 tips for better health**

| |
|---|
| 1. Do not be poor. If you can, stop. If you cannot, try not to be poor for long |
| 2. Do not have poor parents |
| 3. Own a car |
| 4. Do not work in a stressful, low-paying manual job |
| 5. Do not live in damp, low-quality housing |
| 6. Be able to afford to go on a foreign holiday and sunbathe |
| 7. Practice not losing your job and do not become unemployed |
| 8. Take up all benefits you are entitled to if you are unemployed, retired, or sick or disabled |
| 9. Do not live next to a busy major road or near a polluting factory |
| 10. Learn how to fill in the complex housing benefit/asylum applications before you become homeless or destitute (Gordon, 1999) |

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Improvements to implement change must be made on many levels. Currently, there is an international plea to improve national health monitoring and surveillance systems (34,35). Advances in statistical linkage techniques (eg, geocoding and area-based socioeconomic measures), in addition to multilevel hierarchical analysis frameworks, have contributed to assessing public health outcomes to identify disadvantaged groups (35). In particular, these techniques have aided researchers and policy makers to study risk factors such as smoking (36) and physical activity level (37) at the neighbourhood-of-residence level so that new approaches to develop community-level interventions can be targeted (36). For example, clean indoor air legislation prohibiting smoking in the workplace has aided in reducing overall cigarette consumption (38,39). Similarly, a study (40) using hierarchical regression analysis techniques suggested that greater social cohesion, which seeks to capture the presence of strong social bonds and the absence of latent social conflict, was found to be directly associated with more general physical activity in Chicago (United States) neighbourhoods, independent of previous participation in recreational programs and other neighbourhood- and individual-level covariates. To increase the promotion of physical activity in this urban population, the authors recommended that efforts should target neighbourhood-level social and psychosocial processes that influence social cohesion (37). These examples highlight that an understanding of the community and household determinants of the major cardiovascular risk factors, which may vary by geographical region and cultural background, is required to develop prevention strategies. Finally, such context-dependent strategies must be evaluated to ensure that they are efficacious.

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