

# LEADERSHIP

IN HEALTH SERVICES

DANS LES SERVICES DE SANTÉ

---

## Beyond medicine and lifestyle: addressing the societal determinants of cardiovascular disease in North America

**Dennis Raphael**

York University, Toronto, Ontario, Canada

**E. Sara Farrell**

Queens University, Kingston, Ontario, Canada

### Keywords

Health care, Lifestyles, Cardiovascular disease

### Abstract

Increasing evidence is accumulating that biomedical and lifestyle factors account for rather small proportions of population variance in incidence of cardiovascular disease (CVD). In North America, however, the medical and public health communities – reinforced by narrow media coverage focused on biomedical and lifestyle issues – remain wedded to these models of cause and prevention. Not surprisingly, public perceptions of the causes of CVD mirror these preoccupations. A review commissioned by a community heart health network brought together the evidence of how CVD results primarily from material deprivation, excessive psychosocial stress, and the adoption of unhealthy coping behaviors. The review has served to help shift thinking about CVD prevention in Canada and the USA.



---

Leadership in Health Services  
15/4 [2002] i–v

© MCB UP Limited  
[ISSN 1366-0756]  
[DOI 10.1108/1366075021045214 3]

---

### Introduction

As with any area of medical or scientific research, the selection of “factors” to be studied cannot be immune from prevailing social values and ideologies ... It is also evident that so-called lifestyle or behavioural factors (such as the holy trinity of risks – diet, smoking and exercise) receive a disproportionate amount of attention. As we have seen, the identification and confirmation of risk factors are often subject to controversy and the evidence about causal links is not unequivocal (Nettleton, 1997, p. 319).

In this paper an analysis is made of the societal determinants of cardiovascular disease (CVD). Though the emphasis is on Canada, the results of this analysis of the causes and means of preventing CVD are clearly applicable to those working in the USA and elsewhere. This article is based on findings contained in two comprehensive literature reviews of the societal determinants of CVD (Raphael, 2001a, 2002). The genesis of these efforts to explore the societal determinants of CVD was the recognition by members of the North York Heart Health Network – a community-based heart health coalition – that lifestyle programming was clearly an incomplete means of addressing this important health issue.

CVD is the leading cause of mortality among Canadians and US citizens, responsible for 40,000 Canadian deaths per year, representing 36 percent of all mortality, and 959,000 US deaths per year or 41 percent

of all US mortality (Heart and Stroke Foundation of Canada, 1999; American Heart Association, 2002). The estimate of the total annual cost to Canada of CVD is near \$20 billion, and to the USA, close to \$300 billion (Heart and Stroke Foundation of Canada, 1999; Fox, 2002). An expanding literature – much of it European – is making clear that the economic and social conditions under which people live, rather than biomedical risk conditions and lifestyle choices, are the major factors determining whether one develops CVD (Wilkinson and Marmot, 1999). The one life condition with the greatest influence upon the development of CVD is low income (Raphael, 2001b). This article provides evidence of the magnitude of income-related differences in CVD and the mechanisms by which low income influences the development of CVD. These effects result from material deprivation, psychosocial stress, and the adoption of unhealthy coping behaviours (Benzeval *et al.*, 1995). The clear conclusion from this analysis is that new ways of thinking about CVD are needed. Some examples of how this paradigm in thinking about CVD is occurring are provided.

---

### Income and CVD: the magnitude of the problem

A series of studies in the UK document how those living on lower incomes are more likely to suffer from and die from CVD – and a number of other diseases – at every age (Black and Smith, 1992; Whiteside, 1992;

Acheson, 1998). In the USA, lower-income Americans have a higher incidence of a range of diseases. Lower income Americans are much more likely – risk ratio of 2.52 – to die from CVD than highest income Americans (US Department of Health and Human Services, 1998).

In Canada, national examinations of the relationship between income and mortality from diseases use census tract of residence to estimate individuals' income. Canadians living within the poorest 20 percent of urban neighborhoods have much higher mortality rates for CVD, cancer, diabetes, and respiratory diseases than other income groups (Wilkins *et al.*, 1989; Statistics Canada, 2001).

In 1996, 23 percent of years of life lost from disease and injuries prior to age 75 in Canada could be attributed to income differences. CVD was the disease most responsible for these differences, accounting for 22 percent of all of these years lost. In terms of absolute CVD mortality, income differences accounted for a 24 percent excess prior to 75 years. Were all Canadians' death rates from CVD disease equal to those in the wealthiest quintile group, 6,366 fewer deaths each year from CVD would occur (Statistics Canada, 2001).

---

### **What mechanisms mediate the low income and CVD relationship?**

Biomedical and lifestyle factors account for rather small proportions of variance in CVD rates among populations (Feldman *et al.*, 1989; Lantz *et al.*, 1998; Roux *et al.*, 2001). Typically, studies show that lower income people are much more likely to develop CVD and these effects remain strong when controlling for tobacco use, level of physical activity, presence of hypertension or diabetes, level of cholesterol, and body mass index, and a host of other biomedical and lifestyle risk factors.

A World Health Organization (1998) study found CVD changes rates among 21 nations were unrelated to national changes in a range of biomedical and lifestyle factors such as weight, smoking, blood pressure, or cholesterol levels. Societal unrest, poverty, and social and economic change were suggested as potentially the best predictors of CVD rates.

There is also continuing uncertainty regarding the processes that contribute to CVD. Marmot and Mustard (1994, p. 213) question the importance of cholesterol levels:

For example, since the main cause of *myocardial ischemia* (heart attacks) is a thromboembolic event, it is difficult to see how changes in cholesterol levels in adult males will dramatically change outcomes, since there is no evidence that cholesterol has a major clinical effect on the thromboembolic process. This may be one of the reasons why risk modifications by trying to lower cholesterol levels has not had a dramatic effect on the incidence of heart attacks.

Efforts to reduce CVD mortality through lifestyle change and cholesterol reduction have rather limited efficacy (O'Loughlin *et al.*, 1999; Fitzpatrick, 2001). In contrast, impressive evidence of the impact of living on low income continues to accumulate. There are three main ways in which low income contributes to CVD. Low income is associated with material deprivation during early life and adulthood, excessive psychosocial stress, and the adoption of health threatening coping behaviors (Benzeval *et al.*, 1995). Each of these serves as a pathway from low income to CVD.

### **Material deprivation**

Material deprivation refers to differences in exposures to both beneficial and damaging aspects of the physical world. These exposures are determined in large part by income (Lynch *et al.*, 2000). Individuals experiencing material deprivation have greater exposures to negative events such as hunger, and poor quality food, housing, clothing, and environmental conditions at home and work (Davey Smith *et al.*, 2002). These individuals also have fewer exposures to positive resources such as books, newspapers, cultural events, quality education, opportunities for recreation, and involvement in other stimulating activities that support health.

Increases in incidence of low income, food bank use, and homelessness in Canada and the USA during the past decade contribute directly to poor population health, including the incidence of CVD (Raphael, 2001a, b, c). While each level of the income scale shows different levels of health – including CVD – the greatest burden is concentrated at the lower end of the income range (Lynch, 2000).

Low income during childhood and adulthood makes independent contributions to the likelihood of developing CVD (Davey Smith and Gordon, 2000). Low-income children carry a strong CVD health burden into adulthood regardless of adult income status. To illustrate, low birth weight – itself related to income status – is associated with

---

Dennis Raphael and  
E. Sara Farrell  
*Beyond medicine and lifestyle:  
addressing the societal  
determinants of  
cardiovascular disease in  
North America*

---

Leadership in Health Services  
15/4 [2002] i-v

---

greater likelihood of mortality from CVD in later life (Eriksson *et al.*, 1999, 2001; Forsen *et al.*, 1999).

### **Excessive psychosocial stress contributes to CVD**

Living on low income creates uncertainty, insecurity, and feelings of lack of control over one's life: conditions that have powerful effects on health (Antonovsky, 1987). The *National Population Health Survey* found that, among Canadians in the lower third of the income distribution, 47 percent reported seeing the world as not being meaningful, events as being incomprehensible, and life's challenges as being unmanageable (Federal Provincial and Territorial Advisory Committee on Population Health, 1999). The comparable figure for the highest third income group was 26 percent. Similarly, people in the lower income group were 2.6 times more likely to have a low sense of control over their lives than the higher income third of Canadians (31 percent vs 12 percent).

The means by which continuous stress leads to CVD disease – through psychological and biological pathways – are becoming better understood (Stansfeld and Marmot, 2002). Adverse social environments produce the “fight or flight” reaction, that lead to lipid abnormalities, high blood pressure, and clotting disturbances (Bruner and Marmot, 1999).

Animal researchers have identified the biological and psychological mechanisms by which chronic stress and hierarchy create illness and eventually death (Shivey *et al.*, 1997). These models are consistent with studies of the experience of living on low incomes and help explain the low income and CVD relationship.

### **Adoption of health threatening behaviors contributes to CVD**

Behavioral risk factors for CVD of tobacco smoking, diet, and physical inactivity are not adopted through voluntary lifestyle choices, but are strongly shaped by the social and economic environments in which people live. They ameliorate the stress of daily living for many low-income people (Jarvis and Wardle, 1999). Lifestyle approaches for avoiding CVD are inappropriate for numerous reasons. Behavioral factors account for a small proportion of the likelihood of developing CVD compared with income. It blames the victim whereby those with disadvantage are blamed for adopting means of coping with

difficult life situations, that is, it fails to address underlying issues of why disadvantaged people adopt these behaviors. Finally, it is rather ineffective as a population health approach (Jarvis and Wardle, 1999).

---

## **Beyond medicine and lifestyle**

CVD, therefore, can be seen as resulting from processes of material deprivation, excessive psychosocial stress, and societal features that lead to unhealthy behaviors. Yet, in spite of this increasing evidence, the medical and public health communities persist in excluding these issues from discussion. The public shares this perception.

A recent study in the *Canadian Journal of Public Health* asked 601 residents of Hamilton, Ontario to identify “the major cause of heart disease” (Paisley and Midgett, 2001). Respondents were then provided with an additional six opportunities to identify “any other cause of heart disease”. In response to these open-ended questions, only one respondent out of 601 identified poverty as a cause of heart disease – out of 4,200 potential responses!

One of the goals of the North York Heart Health Network in commissioning these reports was to counter these understandings and raise awareness of the role societal factors play in the incidence of CVD. In many ways this goal has been met. The report received international attention through numerous list-serves and bulletin boards. Its content has been quoted in numerous submissions to commissions reviewing health and social policy in Canada. It was featured in a United Church of Canada video entitled *Keeping the Vision Alive: Saving Canadian Health Care*.

Traditional media coverage has been good across Canada and it received significant attention coverage in the alternative progressive media. Articles have been published in the *Canadian Journal of Public Health* and the *Canadian Review of Social Policy*, with additional articles in press in the *Canadian Review of Social Policy*, *Health Promotion International*, *Harvard Health Policy Review* and *Health Education*.

Additionally, the first author has made presentations to Ontario medical officers and health unit board members, and numerous conferences including a keynote at the Maine Governor's Conference Keynote Address. The CVD area, however, represents a

significant challenge to policy-oriented approach to promoting population health.

Lifestyle messages remain clearly dominant despite increasing evidence of their limited role in the incidence of CVD and the ineffectiveness of behaviorally-oriented health promotion programs. The North American medical communities and much of the public health community in Canada have actively ignored the work described here. Despite increasing attention being paid to the societal determinants of population health in Canada and the USA, the extent to which the newly emerging paradigm of the societal determinants of health can influence thinking about CVD remains an open question (Raphael, in press).

---

### References

- Acheson, D. (1998), *Independent Inquiry into Inequalities in Health*, Stationery Office: London, available at: [www.official-documents.co.uk/document/doh/ih/contents.htm](http://www.official-documents.co.uk/document/doh/ih/contents.htm)
- American Heart Association (2002), *Heart and Stroke Statistical Update*, American Heart Association, Washington, DC.
- Antonovsky, A. (1987), *Unraveling the Mystery of Health: How People Manage Stress and Stay Well*, Jossey-Bass, San Francisco, CA.
- Benzeval, M., Judge, K. and Whitehead, M. (1995), *Tackling Inequalities in Health: An Agenda for Action*, King's Fund, London.
- Black, D. and Smith, C. (1992), "The Black Report", in Townsend, P., Davidson, N. and Whitehead, M. (Eds), *Inequalities in Health: the Black Report and the Health Divide*, Penguin, New York, NY.
- Bruner, E. and Marmot, M.G. (1999), "Social organization, stress, and health", in Marmot, M.G. and Wilkinson, R.G. (Eds), *Social Determinants of Health*, Oxford University Press, Oxford.
- Davey Smith, G. and Gordon, D. (2000), "Poverty across the life-course and health", in Pantazis, C. and Gordon, D. (Eds), *Tackling Inequalities: Where Are We Now and What Can Be Done?*, Policy Press, Bristol.
- Davey Smith, G., Ben-Shlomo, Y. and Lynch, J. (2002), "Life course approaches to inequalities in coronary heart disease risk", in Stansfeld, S.A. and Marmot, M. (Eds), *Stress and the Heart: Psychosocial Pathways to Coronary Heart Disease*, BMJ Books, London.
- Eriksson, J.G., Forsen, T., Tuomilehto, J., Osmond, C. and Barker, D.J.P. (2001), "Early growth and coronary heart disease in later life: a longitudinal study", *BMJ*, Vol. 322 No. 7292, pp. 949-53.
- Eriksson, J.G., Forsen, T., Tuomilehto, J., Winter, P.D., Osmond, C. and Barker, D.J.P. (1999), "Catch-up growth in childhood and death from coronary heart disease: a longitudinal study", *BMJ*, Vol. 318 No. 7181, pp. 427-31.
- Federal Provincial and Territorial Advisory Committee on Population Health (1999), *Towards a Healthy Future: Second Report on the Health of Canadians*, Federal, Provincial, and Territorial Advisory Committee on Population Health, Ottawa, Canada.
- Feldman, J.J., Makuc, D.M., Kleinman, J.C. and Cornoni-Huntley, J. (1989), "National trends in educational differentials in mortality", *American Journal of Epidemiology*, Vol. 129 No. 5, pp. 919-33.
- Fitzpatrick, M. (2001), *The Tyranny of Health: Doctors and the Regulation of Lifestyle*, Routledge, London.
- Forsen, T., Eriksson, J.G., Tuomilehto, J., Osmond, C. and Barker, D.J.P. (1999), "Growth in utero and during childhood among women who develop coronary heart disease: a longitudinal study", *BMJ*, Vol. 319, pp. 1403-7.
- Fox, M. (2002), "Heart disease affects 61.8 million in US", Reuters.
- Heart and Stroke Foundation of Canada (1999), "The changing face of heart disease and stroke in Canada 2000", Heart and Stroke Foundation of Canada, available at: [www.hc-sc.gc.ca/hpb/lcdc/bcrdd/hdsc2000](http://www.hc-sc.gc.ca/hpb/lcdc/bcrdd/hdsc2000)
- Jarvis, M.J. and Wardle, J. (1999), "Social patterning of individual health behaviours: the case of cigarette smoking", in Marmot, M. G. and Wilkinson, R.G. (Eds), *Social Determinants of Health*, Oxford University Press, Oxford.
- Lantz, P.M., House, J.S., Lepkowski, J.M., Williams, D.R., Mero, R.P. and Chen, J.J. (1998), "Socioeconomic factors, health behaviors, and mortality", *Journal of the American Medical Association*, Vol. 279 No. 21, pp. 1703-8.
- Lynch, J. (2000), "Income inequality and health: expanding the debate", *Social Science & Medicine*, Vol. 51 pp. 1001-5.
- Lynch, J.W., Smith, G.D., Kaplan, G.A. and House, J.S. (2000), "Income inequality and mortality: importance to health of individual income, psychosocial environment, or material conditions", *BMJ*, Vol. 320, pp. 1220-4.
- Marmot, M. and Mustard, C.F. (1994), "Coronary heart disease from a population perspective", in Evans, R.G., Barer, M. and Marmor, T.R. (Eds), *Why Are Some People Healthy and Others Not?: The Determinants of Health of Populations*, Aldine de Gruyter, New York, NY, pp. 189-216.
- Nettleton, S. (1997), "Surveillance, health promotion and the formation of a risk identity", in Sidell, M., Jones, L., Katz, J. and

- Peberdy, A. (Eds), *Debates and Dilemmas in Promoting Health*, Open University Press, Buckingham, pp. 314-24.
- O'Loughlin, J.L., Paradis, G., Gray-Donald, K. and Renaud, L. (1999), "The impact of a community-based heart disease prevention program in a low income, inner city neighbourhood", *American Journal of Public Health*, Vol. 89, pp. 1819-26.
- Paisley, J. and Midgett, C. (2001), "Heart health Hamilton-Wentworth survey: programming implications", *Canadian Journal of Public Health*, Vol. 92, pp. 443-7.
- Raphael, D. (2001a), *Inequality Is Bad for Our Hearts: Why Low Income and Social Exclusion Are Major Causes of Heart Disease in Canada*, North York Heart Health Network, Toronto, Canada, available at: <http://depts.washington.edu/eqhlth/paperA15.html>
- Raphael, D. (2001b), "From increasing poverty to societal disintegration: how economic inequality affects the health of individuals and communities", in Armstrong, H., Armstrong, P. and Coburn, D. (Eds), *Unhealthy Times: The Political Economy of Health and Care in Canada*, Oxford University Press, Toronto.
- Raphael, D. (2001c), "Letter from Canada: an end of the millennium update from the birthplace of the Healthy Cities Movement", *Health Promotion International*, Vol. 16, pp. 99-101.
- Raphael, D. (2002), *Social Justice Is Good for Our Hearts: Why Societal Factors – not Lifestyles – Are Major Causes of Heart Disease in Canada and Elsewhere*, Centre for Social Justice Foundation for Research and Education: Toronto, available at: [www.socialjustice.org](http://www.socialjustice.org)
- Raphael, D. (in press), "Bridging the gap between knowledge and action on the societal determinants of cardiovascular disease: how one Canadian community effort hit – and hurdled – the lifestyle wall", *Health Education*.
- Roux, A., Merkin, S., Arnett, D. *et al.* (2001), "Neighbourhood of residence and incidence of coronary heart disease", *New England Journal of Medicine*, Vol. 345, pp. 99-106.
- Shivey, C.A., Laird, K.L. and Anton, R.F. (1997), "The behavior and physiology of social stress and depression in female cynomolgus monkeys", *Biological Pathways*, Vol. 41, pp. 871-2.
- Stansfeld, S.A. and Marmot, M. (Eds) (2002), *Stress and the Heart: Psychosocial Pathways to Coronary Heart Disease*, BMJ Books, London.
- Statistics Canada (2001), *Estimates of Premature Deaths (Prior to Age 75) Due to Cardiovascular Disease among Canadians*, special tabulation of mortality by neighbourhood income data for urban Canada, Ottawa.
- US Department of Health and Human Services (1998), *Health, United States, 1998: Socioeconomic Status and Health Chartbook*, US Department of Health and Human Services, Washington, DC.
- Whiteside, M. (1992), "The health divide", in Townsend, P., Davidson, N. and Whitehead, M. (Eds), *Inequalities in Health: The Black Report and the Health Divide*, Penguin, New York, NY.
- Wilkins, R., Adams, O. and Brancker, A. (1989), "Changes in mortality by income in urban Canada from 1971 to 1986", *Health Reports*, Vol. 1 No. 2, pp. 137-74.
- Wilkinson, R. and Marmot, M. (1999), *Social Determinants of Health: The Solid Facts*, (0192630695) European Office – WHO, Copenhagen.
- World Health Organization (1998), *World's Largest and Longest Heart Study Produces Some Surprises*, available at: [www.ktl.fi/monica/public/vienna/press\\_release.htm](http://www.ktl.fi/monica/public/vienna/press_release.htm)

---

### Further reading

- Raphael, D., Brown, I., Bryant T. *et al.* (2001), "How government policy decisions affect seniors' quality of life: findings from a participatory policy study carried out in Toronto, Canada", *Canadian Journal of Public Health*, Vol. 92, pp. 190-5.