

# Technical Report

## To Medical and Allied Professions

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## Socioeconomic and Ethnic Inequalities in Cardiovascular Disease

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The association between socioeconomic position\* and cardiovascular disease is robust and has been widely reproduced through much public health research. Cardiovascular inequalities in New Zealand extend across socioeconomic position and ethnicity. These inequalities exist throughout the lifecourse and determine patterns of disease. This report summarises the evidence for the association between socioeconomic position, ethnicity and cardiovascular disease.

## Background

The relationship between socioeconomic position and health is strong and consistent. Health disparities extend across the socioeconomic continuum (there is no apparent threshold), across geographically diverse populations, and across time. The relationships are strong for a range of socioeconomic measures and a range of health outcome indicators.

Following the earlier Ministry of Health report, *Social Inequalities in Health*,<sup>1</sup> health disparities have been brought into focus again by *The New Zealand Health Strategy*<sup>2</sup> and *He Korowai Oranga: Māori Health Strategy Discussion Document*.<sup>3</sup> *The New Zealand Health Strategy*, which sets the strategic direction for the health sector, emphasises the importance of removing socioeconomic and ethnic inequalities in health. Equity, as a concept of justice and fairness in health policy, is plainly outlined in this document. *He Korowai Oranga* highlights that, as a population group, Māori have the poorest health status of any group in New Zealand. Improving Māori health is therefore the priority for action to address health inequalities in New Zealand.

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\*For simplicity, "socioeconomic position" is used as a universal term in this report.

Cardiovascular disease is a major health problem in New Zealand, accounting for 40% of all deaths.<sup>4</sup> Age-specific death rates from cardiovascular disease have been declining in New Zealand, but remain appreciably higher than the corresponding rates in similarly developed countries such as Australia, Canada and the United States.<sup>5</sup> While there has been a reduction in cardiovascular mortality across all socioeconomic groups, this decline has been greatest among those of higher socioeconomic position. As a result, socioeconomic inequalities in cardiovascular disease have widened, with cardiovascular disease increasingly associated with disadvantage.<sup>6,7</sup>

This socioeconomic gradient is also reflected in cardiovascular morbidity rates both in New Zealand and elsewhere.<sup>8,9</sup> While medical advances in the management of cardiovascular disease have halved age-specific mortality rates over the past 30 years, the growing number of older and at-risk people mean that cardiovascular morbidity may be rising. The increasing prevalence of risk factors for cardiovascular disease, such as smoking, obesity and diabetes, in lower socioeconomic groups<sup>10</sup> may further widen these inequalities over the next decade. Greater cardiovascular morbidity among lower socioeconomic groups places a heavier burden on this group, resulting in increasing demands for health services.

Since the late 1960s (when coronary heart disease rates peaked in New Zealand), age-standardised death rates for coronary heart disease have fallen at a slower pace in Māori than in non-Māori.<sup>10</sup> Presently, Māori coronary heart disease mortality rates are about twice those of other New Zealanders. In 1996, the largest difference in all-cause mortality between Māori and non-Māori was in the 45-64 year age group. These excess deaths were dominated by chronic diseases such as coronary heart disease, diabetes and smoking-related cancers.<sup>11</sup> Such data indicate the disproportionate burden of premature cardiovascular death and disease among Māori.

The concept of cumulative disadvantage over the lifecourse is a key issue in health disparities.<sup>12</sup> A lifecourse perspective considers how social circumstances at different stages in life determine the accumulation and interaction of cardiovascular disease risk factors. Cardiovascular risk is associated with parental health, intrauterine development, nutrition, growth, and health in childhood and in adulthood. This concept is important in the New Zealand context, where many Māori children are born into, and grow up in, low-income households.

In New Zealand, persisting socioeconomic and ethnic inequalities in coronary heart disease mortality have been accompanied by increasing income differentials over the same period. Since the mid-1980s the spread in income inequality has seen the rich becoming richer and the poor becoming poorer.<sup>13</sup> The resulting social polarisation in New Zealand appears to have been more rapid than that seen in other developed countries.

## **The Evidence**

### **Measurement of socioeconomic position**

Socioeconomic position can be ascribed by measuring individual characteristics such as occupation, income and educational level, or characteristics of the area in which individuals live. Socioeconomic position is difficult to measure, and debate surrounding its measurement is ongoing.

Occupational measures, which have been widely used in public health research, categorise occupation into defined ranks such as professional, managerial, clerical, non-manual and manual. The use of occupational measures is limited by their lack of applicability to "economically inactive" people such as "home-keepers" (particularly women) and beneficiaries.

Income-based measures exhibit consistently strong associations with health status. Measuring income is, however, a complex process, and these measures are unable to capture the socioeconomic circumstances of some population subgroups whose taxable incomes are prone to miscalculation, such as the self-employed and retired people.

Educational measures are relatively less complex and tend to be fixed after young adulthood. However, although educational measures can be applied to most people, they do not discriminate adequately between population subgroups. For example, the link between a given level of education and its "economic return" varies by gender and by ethnicity in New Zealand.<sup>14,15</sup>

Several area-based indices have sought to measure deprivation as distinct from individual socioeconomic position.<sup>16,17</sup> Deprivation indices are easier to apply in practice than most other measures of socioeconomic position,<sup>18</sup> and have consequently become popular among public health researchers, especially where personal data are not available for individuals. However, deprivation indices have limitations. Measurement error is a frequently cited problem, especially error arising from inferences about individuals on the basis of aggregated population data (the so-called "ecological fallacy"). For example, the New Zealand Index of Deprivation (NZDep) is an area-based measure that is used as a proxy for socioeconomic position. When used to "target" interventions, NZDep is problematic because:

- not all deprived people live in deprived areas;
- NZDep fails to measure socioeconomic position throughout the lifecourse;
- additional socioeconomic measures are required to accurately reflect socioeconomic position.

Overall, each measure demonstrates an association between worse health status and lower socioeconomic position. However, no one measure is comprehensive enough to portray the entire picture of socioeconomic position, and none are without their limitations. The intended purpose of the research and availability of data are likely to determine the choice of measure used.<sup>19</sup>

## **Explaining socioeconomic health inequalities**

A number of explanations for the way in which socioeconomic inequalities impact on health have been proposed. In 1980, *The Black Report*<sup>20</sup> outlined four possible explanations: artefact, health selection, behaviour/lifestyle, and social causation.

The artefact explanation proposes that biases inherent in data collection and analysis produce "artificial" inequalities. The health selection explanation suggests that illness precedes downward social mobility, i.e. when someone gets sick, their social position worsens, influencing both their later health status and their social trajectory. The behavioural explanation suggests that differences in lifestyle risk factors (such as smoking, sedentary lifestyle and poor diet) between individuals of lower and higher socioeconomic groups are the underlying determinant of socioeconomic inequalities in health. Lastly, the social causation explanation proposes that inequalities in income, education, occupation and housing produce inequalities in health by systematically disadvantaging the poor and privileging the rich.

Of the four explanations, social causation has received increasing interest, and two models reinforcing its importance have been developed. First, it has been proposed that the psychosocial environment – characterised by social capital, which encompasses such things as community participation, reciprocity and trust in others, and having control over one's life – is an explanatory mechanism for health inequalities.<sup>21,22</sup> These studies have shown that the way in which income is spread may be more important than the level of average income within a society. Second, the "neo-material" model argues that health inequalities have their origin in the material world. Institutional and political factors differentially influence access to individual and public resources such as income, education, health services, transportation and quality of housing. This model emphasises the direct impact of material resources on population health outcomes, rather than perceptions of relative inequality.<sup>23</sup> Both models provide insight into the complex nature of socioeconomic health inequalities.

## **Explaining ethnic health inequalities**

None of the models outlined above fully acknowledge the importance of ethnicity.

Three different theoretical interpretations have been proposed to explain ethnic health disparities. In New Zealand, the "gap framework" uses NZDep to interpret the effects of socioeconomic deprivation on health outcomes. The "distribution gap" (Figure 1) shows that the distribution of deprivation for Māori is sharply skewed, with over one half of the Māori population living in the three most deprived deciles in New Zealand. The "outcome gap" (Figure 2) shows that Māori life expectancy at birth is consistently worse than Pākehā life expectancy after controlling for the level of deprivation. The "gradient gap" (Figure 3) illustrates that as deprivation increases, the ethnic health differential widens. Increasing deprivation therefore compounds the risk for Māori, producing additional and significant ill health effects.

The "cultural deficit" model attributes ethnic inequalities in health to genetic, biological or "cultural/lifestyle" factors. This model assumes that ethnic health disparities are due to the failings and deficits of indigenous and ethnic minority peoples and their cultures, rather than the structural institutions and discriminatory practices that produce them.<sup>24</sup>

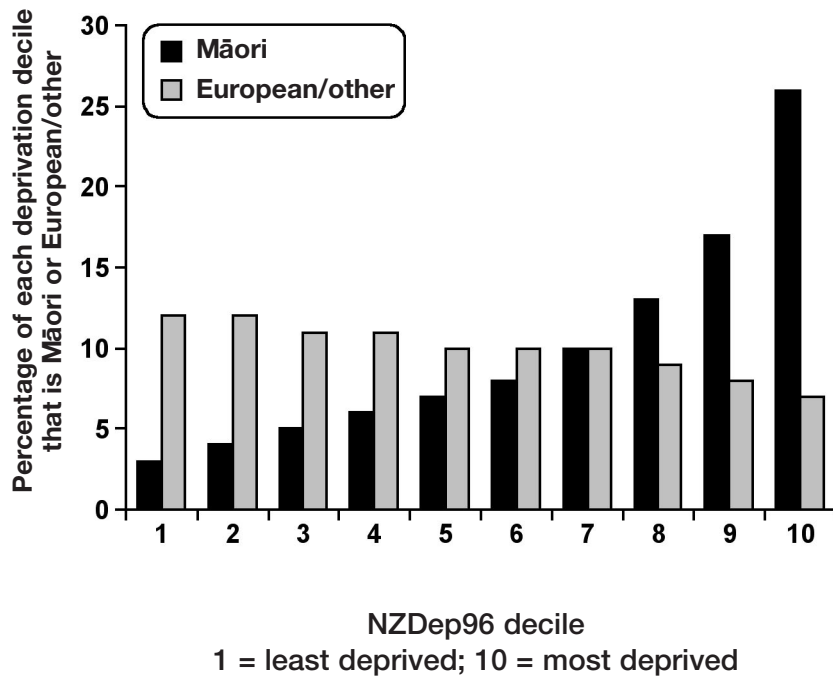
Jones, however, postulates that the association between socioeconomic position, ethnicity and health is determined by racism.<sup>25</sup> She describes three levels of racism: institutional, personally-mediated and internalised racism.

Institutional racism is the most important because it generates and maintains ethnic differences in income, education, occupation and housing. Personally-mediated racism – defined as prejudice and discrimination – also contributes to the association by facilitating barriers in access to care, neglecting the role of advocacy for indigenous or ethnic minority patients, and condoning discriminatory medical practices such as poor or no service, or failure to communicate treatment options. Internalised racism is the belief that one does not have the right to self-determination. This erodes a person's worldview and belief in the right to equal treatment and wellness.

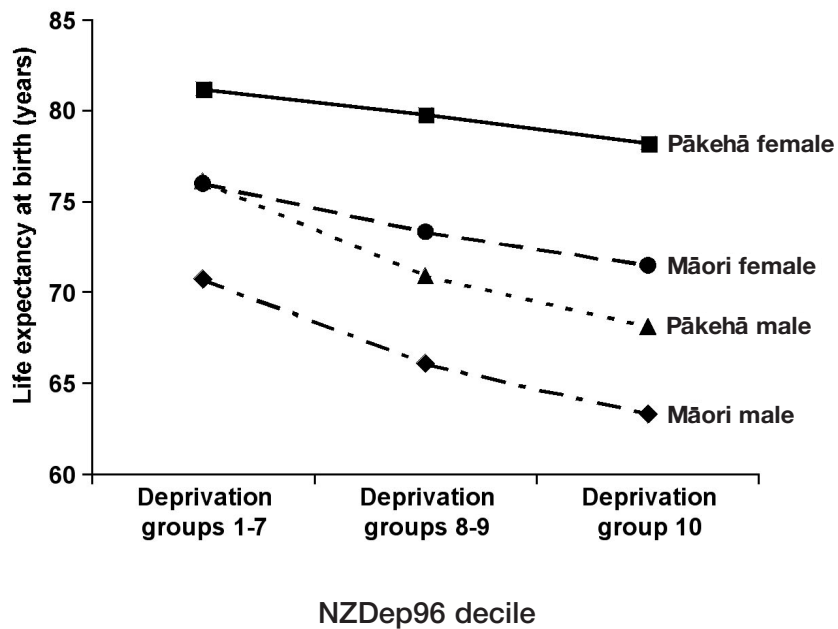
## **Evidence for a causal association between socioeconomic position and cardiovascular disease**

Socioeconomic position is associated with both cardiovascular disease prevalence and mortality.

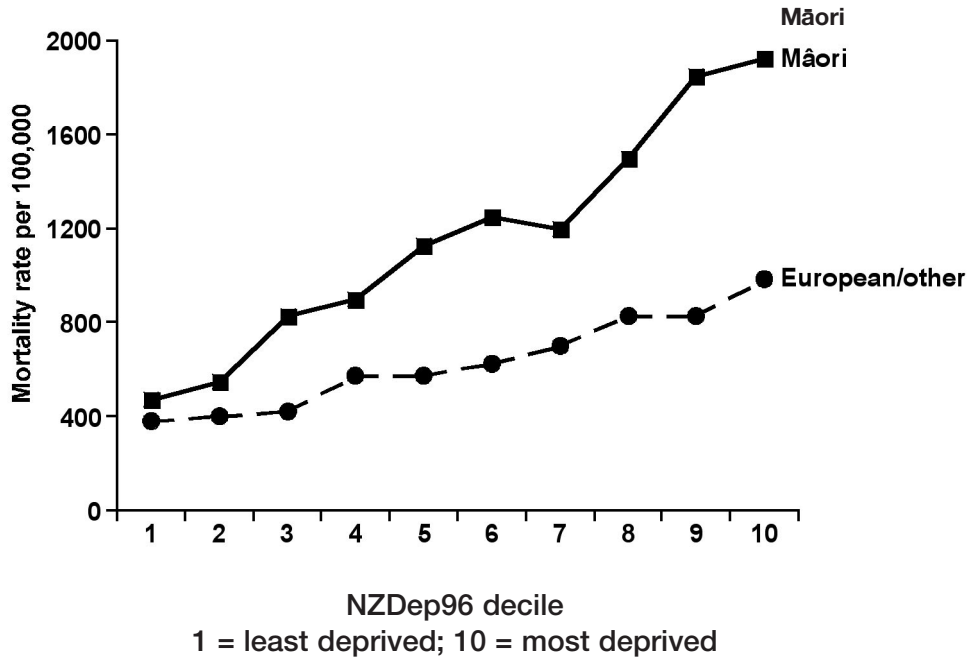
The Whitehall I study<sup>26</sup> was a landmark study of socioeconomic position and coronary heart disease. Its subjects were British civil servants aged 40-65 years at baseline in 1968. Using an occupational measure of socioeconomic position, this study demonstrated a substantial gradient in the 10 year risk of coronary heart disease, namely a 2.7-fold variation in the relative risk of coronary heart disease death between the highest and lowest employment grades. When differences in age, smoking status, blood pressure, cholesterol level, height and blood sugar were taken into account, the variation reduced only slightly to 2.2-fold (Figure 4).



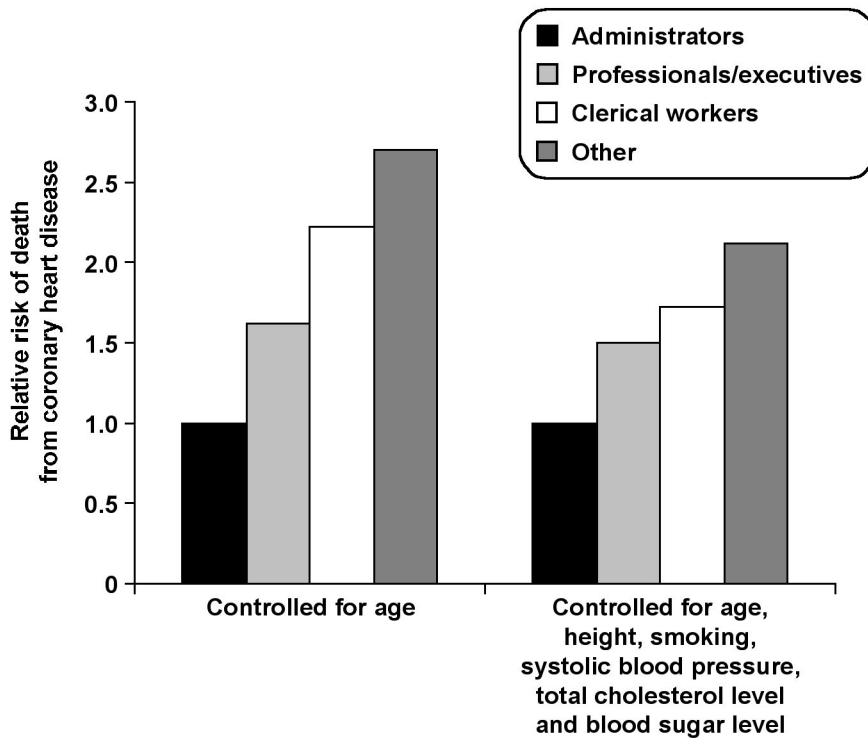
**Figure 1:** The "distribution gap" – distribution of Māori and non-Māori populations by deprivation decile, based on the 1996 census. [Reproduced with permission from reference 24].



**Figure 2:** The "outcome gap" – male and female life expectancy at birth by deprivation decile, 1995-1997. [Reproduced with permission from reference 24].



**Figure 3:** The "gradient gap" – mortality in Māori and European/other males aged 45-64 years, 1996-1997. Note: Poor-quality ethnicity data collection may mean that a numerator/denominator bias influences the gradients apparent in this graph, i.e. bias may cause an underestimation of rates in more deprived Māori. [Reproduced with permission from reference 24].



**Figure 4:** Relative risk of coronary heart disease in different occupational groups over 10 years, controlled for age and other risk factors.<sup>26</sup>

The socioeconomic gradient was continuous – each grade in the civil service had a coronary heart disease mortality rate higher than the grade above it. The participants in this study, who were employed civil servants, were not representative of the range of poverty in the United Kingdom. Despite this, position in the occupational hierarchy strongly influenced cardiovascular mortality risk.

Other analyses,<sup>27,28</sup> including a number of important New Zealand studies,<sup>7,9,29</sup> have demonstrated a clear association of socioeconomic position with cardiovascular disease and all-cause mortality.

In the 1950s, coronary heart disease in England and Wales was more common among higher socioeconomic groups. In the 1970s, however, a crossover occurred whereby the disease became more common in lower socioeconomic groups. Cardiovascular disease, initially regarded as a disease of the affluent, became known instead as a disease of the poor within rich societies.<sup>30</sup> Since then, an uneven socioeconomic patterning has occurred in that the mortality decline has been concentrated in high socioeconomic groups, thus widening the social gradient for coronary heart disease deaths.<sup>7,31</sup> Similar trends were observed in New Zealand,<sup>32</sup> where coronary heart disease mortality rates among men declined over the 10 year period from 1975-7 to 1985-7, with those in the highest socioeconomic groups experiencing the greatest decline.

The association between socioeconomic position and coronary heart disease mortality has not been as thoroughly studied in women as it has been in men. It should be noted that most studies have examined men, and even when women were included in the analysis, their marital status and/or spousal occupational class were ascribed. There is some evidence, however, that the socioeconomic gradient seen in men is evident also in women,<sup>33</sup> although the strength of the association and trends over time may differ. In the recent New Zealand Census-Mortality study, socioeconomic position (measured using income, education and NZDep) was more strongly associated with cardiovascular disease mortality in women than it was in men.<sup>34</sup>

A socioeconomic gradient in cardiovascular morbidity rates has also been observed. In the Whitehall II study, lower-grade civil servants had a higher prevalence of angina, hypertension and diabetes than those of higher-grade employment status.<sup>35</sup> Similarly, in a cross-sectional British survey of 20,000 men and women aged 35 years and older, histories of angina, myocardial infarction and stroke were all more common among people living in deprived areas than among those living in affluent areas.<sup>8</sup> Socioeconomic position has also been related to the development of atherosclerosis. A study measuring levels of education, occupational status and income found that all three measures were associated with greater severity of carotid atherosclerosis.<sup>36</sup>

An association between socioeconomic position and survival after myocardial infarction has been noted. People who lived in the most deprived areas of Scotland were estimated to have twice the risk of a first myocardial infarction and death before reaching hospital compared with those from the least deprived areas. They were also 20% more likely to die within the first month after myocardial infarction.<sup>37</sup> A similar relationship was seen in Canada, where people from lower-income neighbourhoods had a higher incidence of acute myocardial infarction and a lower 12 month survival rate post-infarction than those from wealthier neighbourhoods.<sup>38</sup>

## **Evidence for an association between ethnicity and cardiovascular disease**

Few studies of socioeconomic position and cardiovascular disease have examined ethnicity concurrently.

In the United States, an analysis of the Multiple Risk Factor Intervention trial (MRFIT) dataset<sup>39</sup> determined that socioeconomic position was the major contributor to differences in cardiovascular mortality between white and African-American men. Between 1985 and 1995, a population-based analysis showed that African-American men were 25 times more likely than white men to be part of a local population experiencing increases in coronary heart disease mortality.<sup>40</sup>

In New Zealand, the work of Pearce and colleagues<sup>41,42</sup> has highlighted that the poor state of Māori health cannot be explained solely by occupational class. The development of NZDep has permitted another means of measuring socioeconomic gradients by ethnic group. After controlling for deprivation, heart failure mortality and morbidity remained substantially higher in Māori than in non-Māori.<sup>43</sup> Crampton and colleagues<sup>44</sup> explored the importance of socioeconomic deprivation and ethnicity in relation to smoking prevalence. They determined that for both genders, at all ages and at all levels of deprivation, Māori smoked more than non-Māori, and that the marginalised position of Māori in New Zealand society may have contributed to this difference.

There is a large body of literature examining ethnic disparities in the specialist investigation and treatment of coronary heart disease. Most are United States studies that have focussed on differential cardiac procedure use (i.e. coronary angiography, percutaneous transluminal coronary angioplasty and coronary artery bypass graft surgery) in black and white populations. The differences found have been large (up to two- to three-fold) and clinically significant.<sup>45,46</sup> More recent studies in the United States have attempted to examine the effect of ethnic bias in the delivery of, and access to, specialist cardiology care.<sup>47,48</sup> A consistent finding of all of these studies was that although both socioeconomic position and ethnicity determined patterns of access to care, ethnicity remained the overriding determinant.

New Zealand studies have documented similar findings. An analysis of the New Zealand cardiac register in the 1980s found that Māori men were three and a half times less likely to receive publicly-funded coronary artery bypass graft surgery than non-Māori men, despite being one and a half times more likely to die of coronary heart disease at this time.<sup>49</sup>

## **Proposed explanations for socioeconomic and ethnic inequalities in cardiovascular disease**

Many explanations for the association between socioeconomic position and cardiovascular disease have been proposed and reviewed. These are: the differential distribution of cardiovascular disease risk factors (such as hypertension and smoking); psychosocial risk factors; impact of socioeconomic position throughout the lifecourse, including early life events; and access to medical care. At the community level, neighbourhood characteristics have also been associated with cardiovascular disease risk. For ethnic inequalities in cardiovascular disease, additional forms of disadvantage are explanatory.

**Impact of socioeconomic position on cardiovascular disease risk factors:** Numerous researchers have found an inverse relationship between socioeconomic position and almost all of the major cardiovascular risk factors. Most have studied the influence of socioeconomic position on individual risk factors.

There is substantial and consistent evidence that the prevalence and incidence of hypertension<sup>50,51</sup> and the prevalence of smoking<sup>35,52</sup> are inversely related to a low socioeconomic position.

The data regarding diabetes,<sup>53</sup> plasma fibrinogen levels,<sup>54</sup> physical activity<sup>55</sup> and obesity<sup>50</sup> are more limited, but suggest an important inverse relationship between socioeconomic position and each of these variables. The data regarding serum cholesterol levels are inconsistent.

Some studies have found that cardiovascular risk factors accounted for no more than one half of the socioeconomic gradient in cardiovascular disease.<sup>56</sup> The different socioeconomic distribution of traditional cardiovascular risk factors therefore explains a good part – but by no means all – of the link between socioeconomic position and cardiovascular disease.

**Impact of socioeconomic position on psychosocial risk factors:** A second possible explanation is that psychosocial measures act as mediators in the relationship between socioeconomic position and cardiovascular disease. Hemingway and Marmot<sup>57</sup> found strong evidence that social support and depression, and to a lesser extent job stress, were independent aetiological and prognostic risk factors for coronary heart

disease. Other authors have argued that job stress plays an important role in the socioeconomic patterning of coronary heart disease.<sup>58</sup>

**Impact of socioeconomic position throughout the lifecourse, including early life events:** Most studies have tended to focus on risk factors in adulthood. There is increasing interest in evidence supporting the effect of adverse exposures throughout the entire lifecourse. It is postulated that social processes that concentrate risk over time within the lives of the same individuals underlie inequalities in disease. Several studies have examined the effect of socioeconomic influences throughout the lifecourse on cardiovascular disease risk. These have demonstrated that deprived circumstances in childhood increase the risk of poor cardiovascular outcomes in adulthood independently of socioeconomic position in later life,<sup>12,59</sup> although an additive effect of deprivation in adulthood has been noted elsewhere.<sup>60</sup>

In the United Kingdom Boyd Orr cohort,<sup>61</sup> short leg length in childhood – a sensitive indicator of childhood growth and nutritional status – was associated with an increased risk of coronary heart disease in adulthood. Another study demonstrated that short height – an indicator of socioeconomic circumstances and nutrition in childhood – was associated with an increased risk of coronary heart disease in adulthood.<sup>62</sup>

Lifestyle risk factors, such as smoking and exercise, have been shown to be mostly associated with socioeconomic position in adulthood, while physiological risk factors, such as hypertension, obesity and serum cholesterol level, were associated with socioeconomic position in both childhood and adulthood.<sup>63</sup> In another study, physiological obesity and elevated triglyceride levels were found to depend on socioeconomic position in childhood, but not in adulthood.<sup>64</sup>

Barker's hypothesis<sup>65</sup> on the influence of biological programming in utero and infancy has linked differential development during critical periods to adult coronary heart disease risk. Variation in fetal growth rate – as distinct from size at birth – was found to be aetiologically important to adult coronary heart disease risk.<sup>66</sup>

In summary, the accumulation of risk both throughout the lifecourse and during developmentally critical periods appears to be important to cardiovascular disease risk in adulthood.

**Impact of socioeconomic position on access to medical care:** It has been hypothesised that poor access to, and quality of, healthcare services for those living in deprived circumstances may contribute to socioeconomic inequalities in health. In the United Kingdom, Pell and colleagues<sup>67</sup> showed that socioeconomically deprived coronary heart disease patients were less likely to be investigated and offered coronary artery bypass graft surgery, and were further disadvantaged by having to wait longer for surgery. Similarly, Payne and Saul<sup>68</sup> found that angina patients from the most deprived areas of Sheffield had only half the number of revascularisation procedures per head of population compared with patients from more affluent areas.

In New Zealand, lower income groups utilise general practice and publicly-funded hospital services more frequently than higher income groups.<sup>11</sup> However, people on lower incomes may still experience greater barriers in access to healthcare – particularly specialist cardiology services – than their higher-income counterparts. Furthermore, their rates of health service utilisation may be less than proportionate to greater healthcare need in these groups.

**Impact of socioeconomic position at the community level:** Several researchers have argued that it is important to investigate whether factors that operate at the community level are related to cardiovascular disease outcomes and risk factors, independently of individual-level variables. In the United States, Diez-Roux and colleagues<sup>69</sup> examined whether neighbourhood socioeconomic characteristics were associated with coronary heart disease risk factors and coronary heart disease prevalence. Using four measures of socioeconomic position (income, occupation, education and house value), they found that living in deprived neighbourhoods was associated with both an increased prevalence of coronary heart disease and increased levels of risk factors. These associations persisted after controlling for individual-level variables. These researchers suggested that neighbourhood environments may be an additional pathway through which social structures shape cardiovascular disease risk, and that characteristics of communities, as well as individuals, require consideration.

**Impact of socioeconomic position and ethnicity:** The interaction of socioeconomic position with ethnicity, and its association with cardiovascular health, are complex. In New Zealand the relatively poor socioeconomic position of Māori means that being Māori is strongly related to all of the explanations for socioeconomic inequalities in cardiovascular disease. While socioeconomic position fundamentally determines Māori inequalities in cardiovascular disease, this explanation is partial. Other important forms of disadvantage play a role in Māori health inequalities.

A reductionist approach views Māori health disparities as being due to genetic and behavioural/lifestyle factors. "Culture" undoubtedly impacts, both positively and negatively, on health. However, this explanation is poorly understood and demands closer examination. More importantly, institutional racism leads to differential access to material goods, primary healthcare services and specialist cardiology care, which result in poorer health outcomes for Māori. In addition, disadvantage in childhood accumulates for Māori throughout the lifecourse and inter-generationally, producing a "spiral of poverty" into which many Māori children are born.<sup>70</sup> The impact of living in impoverished communities also impacts more on Māori in New Zealand, who are concentrated into particularly deprived areas (such as the Far North, South Auckland and the Eastern Bay of Plenty). Lastly, bias among health professionals leads to differences in the selection of patients for medical treatments ranging from simple pharmacological therapy to heart transplantation.<sup>71,72</sup>

## Conclusions

The literature indicates that:

- systematic inequalities in the distribution of income, education, employment, housing and health services are the main determinants of cardiovascular disease inequalities;
- socioeconomic and ethnic inequalities in health are the consequence of a lifetime of exposure to disadvantage;
- these inequalities differentially shape population groups' exposures to health risks and their access to, and utilisation of, health services;
- there are additional determinants, including racism, that impact on Māori in New Zealand.

The pathways by which socioeconomic position and ethnicity increase cardiovascular risk are multifactorial. The effects of cardiovascular lifestyle risk factors, such as smoking, are well established. These risk factors probably explain much of the association between socioeconomic position, ethnicity and cardiovascular disease, and are themselves socioeconomically patterned. Psychological risk factors may be additional mediators in this association. Poor living conditions throughout the lifecourse appear to be important to cardiovascular risk in adulthood. Poor access to health services also contributes to an increased risk of cardiovascular death and disease (and may, furthermore, be determined by bias among health professionals). Finally, the communities in which individuals live appear to impact on health outcomes.

Lifestyle interventions promoted by the health sector may partially address the problem of socioeconomic and ethnic inequalities in cardiovascular disease. However, action must go beyond the traditional approach of risk factor reduction in adults to focus on the root causes of poverty, poor education and poor housing in New Zealand. Structural problems require structural solutions. It may therefore be necessary to allocate healthcare resources unequally by targeting those most in need of health promotion and disease prevention strategies. The challenge to health professionals is to develop and implement policies that explicitly address socioeconomic and ethnic inequalities in cardiovascular disease. Making a difference will require policy initiatives that impact on all stages of life from conception to death. Central to our commitment to the Treaty of Waitangi, Māori cardiovascular health needs to be the priority. Ignoring the impact of socioeconomic and ethnic health disparities in New Zealand carries a cost for all New Zealanders. A key question to consider is: what will be the price of failing to act on this knowledge now?

# Recommendations

## 1 A national strategy

A comprehensive national strategy to address socioeconomic and ethnic inequalities in cardiovascular disease is needed. Long-term government investment will be required. National and local targets should be set and monitored at the population level.

Such a strategy should address:

- the Treaty of Waitangi;
- the underlying socioeconomic determinants of health;
- the impact of public policy on population health;
- environmental factors that promote unhealthy behaviours and lifestyles.

For example, policy is required to rectify the distribution of deprivation, such as measures to raise Māori family income and increase Māori access to education, employment, adequate housing and culturally competent health services.

## 2 A lifecourse perspective

The national strategy should adopt a lifecourse approach to removing socioeconomic and ethnic inequalities in cardiovascular disease. Long-term policy is required that addresses cumulative disadvantages throughout the lifecourse and that focuses on the direct impact of deprivation on children. For example, measures are needed that intervene at the level of childhood poverty, educational opportunities, likelihood of smoking, prevalence of illness, and maternal and childhood nutrition.

## 3 Multiple interventions at multiple levels

The national strategy will require both broad public policy measures and measures specific to cardiovascular disease and its risk factors. A combination of measures across sectors (health, housing, education, employment, food industry and agriculture) and at multiple levels (national, local government, communities and individuals) is necessary.

For example, redistributive policies to reduce income inequality are likely to be the most effective ways to reduce socioeconomic and ethnic inequalities in cardiovascular disease. This involves policy beyond the health sector, but does not preclude health professionals from advocating such measures or developing local health plans that directly impact on community housing, education, nutrition, smokefree environments, transport, leisure, and access to healthcare. There is substantial scope at all levels to integrate policy that targets population groups and to design programmes that take account of both deprivation and ethnicity. As part of this, evaluation will be essential to identify programmes that work.

## 4 Lifestyle interventions

While it is important to tackle lifestyle behaviours (such as smoking, nutrition and physical activity), this must be only one part of the overall strategy. A concerted effort to address socioeconomic and ethnic inequalities in cardiovascular disease will mean shifting the focus away from individuals to the wider determinants of lifestyle risk behaviours and the environments in which people live, work and play.

For example, within Māori communities it will be necessary to address the availability of, and access to, affordable and high-quality food, and provide appropriate nutritional programmes specifically for Māori.

## 5 Health sector interventions

The health sector should set a precedent for the strategy. Population health programmes, personal health services and disability support services can and should:

- include the Treaty of Waitangi in policy development so that Māori health gain is recognised as a priority in service planning and provision documentation, including strategic goals and objectives;
- commit to service-wide education and recognition of the Treaty of Waitangi and the wider socioeconomic determinants of health;
- conduct cardiovascular health needs assessments for the populations they serve in order to identify levels of unmet need;
- allocate resources appropriately to reflect identified need, and match it with government commitment to removing socioeconomic and ethnic inequalities in health;
- develop programmes that take account of both deprivation and ethnicity;
- identify barriers in access to care, and expand Māori access to cardiovascular preventive and treatment services, including new models of service delivery such as ambulatory care in marae or community-based clinics;
- promote and support the development and maintenance of kaupapa Māori health services.

## 6 Research

Research should be an essential component of the national strategy. There is a need for long-term investment in intervention studies aimed at removing socioeconomic and ethnic inequalities in cardiovascular disease. Priority areas for future research include:

- population-based cardiovascular disease prevalence, incidence and aetiological studies that measure socioeconomic position and ethnicity accurately and have adequate Māori representation;
- primary healthcare studies, particularly studies that seek to identify and remove barriers in access to care;
- pilot projects to investigate new models of cardiovascular service delivery within communities;
- qualitative studies that seek to gain contextual information on patient and whānau experiences, perceptions and preferences.

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