

# Social determinants of health and disease

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In Chapter 1, evidence was presented to indicate that the improvements in health observed during the eighteenth and nineteenth centuries were the product of rising standards of living and sanitary reform. This illustrates the general principle that the health of a population is closely tied to the physical, social and economic environment. This chapter expands on this point of view by examining some of the social factors that have been linked to health and disease. Over the past 40 years research in this field has grown significantly, with relatively new disciplines such as social epidemiology and psychophysiology devoted to the investigation of the links between the social environment, psychological and emotional states, physiological change and disease. The broad implication of this work, and the view of health it embodies, is that health and illness are social, as well as medical, issues.

## THEORIES OF DISEASE CAUSATION

Before the rise of modern medicine, disease was attributed to a variety of spiritual or mechanical forces. It was interpreted as a punishment by God for sinful behaviour or the result of an imbalance in body elements or 'humours'. Many infectious diseases were

ascribed to a life of vice or a weak moral character or believed to be due to 'miasma', that is, bad air arising out of dirt and decaying organic matter. The ancient Greeks rejected the notion that disease was a punishment for sin or the consequence of witchcraft and saw disease as being related to the natural environment or the way in which human populations lived and worked. However, they failed to recognize that many diseases were contagious. The idea that disease could be passed from person to person arose in the Middle Ages and coexisted with the belief that disease was linked to evil behaviour. For example, by the mid-nineteenth century there was good evidence that cholera could be transmitted by close personal contact with a cholera victim. The observation that outbreaks occurred at great distances from existing cases led to the idea that the disease could also be transmitted in the water supply. John Snow, a physician who investigated the London cholera epidemics of 1848–9 and 1853–4, provided convincing evidence that the disease was spread by water contaminated by the excretions of cholera victims. While this provided a means to control epidemics of the disease it was not for another 40 years that the organism causing cholera was identified. However, Snow's work did illustrate the important principle that epidemics of disease could be controlled without knowing the biological mechanisms involved.

Ideas about disease that emerged during the late nineteenth century were influenced by two developments that provided a philosophical and empirical basis for the biomechanical approach characteristic of modern medical practice. These developments were the 'Cartesian revolution', which gave rise to the idea that the mind and body were independent, and the doctrine of specific aetiology, which flowed from the discovery of the microbiological origins of infectious disease. These effectively denied the influence of social and psychological factors in disease onset. Rather, the body was viewed as a machine to be corrected when things go wrong, by procedures designed to neutralize specific agents or modify the physical processes causing disease. These ideas have been progressively challenged as the monocausal view of disease has been modified by multicausal models of disease onset. The key features of these theories of health and disease are summarized in Box 2.1.

### ■ The germ theory of disease

During the second half of the nineteenth century, the work of Ehrlich, Koch and Pasteur revealed that the prevailing health problems of the time were the product of living organisms which entered the body through food, water, air or the bites of insects or animals. In 1882, Koch identified and isolated the bacillus causing tuberculosis, and between 1897 and 1900 the organisms responsible for 22 infectious diseases were identified. This work gave rise to the idea that each disease had a single and specific cause. This was embodied in Koch's postulates, a set of rules for establishing causal relationships between a micro-organism and a disease. These state that, to be ascribed a causal role, the agent must always be found with the disease in question and not with any other disease. This doctrine and its monocausal approach came to dominate medical research and practice. As a result, research effort moved from the community to the laboratory and concentrated on the identification of the noxious agents responsible for a given disease, while medical practice became devoted to the destruction or eradication of that agent from individuals already affected (Najman 1980).

### ■ Multicausal models of disease

Although the infectious organism theory of disease made a significant contribution to explaining and solving the major health problems of its time, it has serious limitations

## PART 1 SOCIAL ASPECTS OF DISEASE

## BOX 2.1

## Theories of disease causation: Key ideas

**Germ theory**

- Disease is caused by transmissible agents
- A specific agent is responsible for one disease only
- Medical practice consists of identifying and neutralizing these agents

**Epidemiological triangle**

- Exposure to an agent does not necessarily lead to disease
- Disease is the result of an interaction between agent, host and environment
- Disease can be prevented by modifying factors which influence exposure and susceptibility

**Web of causation**

- Disease results from the complex interaction of many risk factors
- Any risk factor can be implicated in more than one disease
- Disease can be prevented by modifying these risk factors

**General susceptibility**

- Some social groups have higher mortality and morbidity rates from all causes
- This reflects an imperfectly understood general susceptibility to health problems
- This probably results from the complex interaction of the environment, behaviours and life-styles

**Socioenvironmental approach**

- Health is powerfully influenced by the social and physical environments in which we live
- Risk conditions integral to those environments damage health directly and through the physiological, behavioural and psychosocial risk factors they engender
- Improving health requires political action to modify these environments

in terms of our understanding of disease processes. The most important of these is that not all those exposed to pathogens become ill: an organism or other noxious agent is a necessary, but not a sufficient, cause of disease. The *epidemiological triangle* approach sees disease as the product of an interaction between an agent, a host and the environment. Agents are biological, chemical or physical factors whose presence is necessary for a disease to occur. Host factors include personal characteristics and behaviours, genetic endowment and predisposition, immunological status and other factors which influence susceptibility, while environmental factors are external conditions other than the agent that influence the onset of disease. These can be physical, biological or social in nature. For example, the extent of HIV transmission in a population is the result of multiple agent, host and environmental factors (Box 2.2). In this respect, all diseases, including infections, are multifactorial and have multiple causes. One of the benefits of this broader view is that the health of a population may be promoted by procedures which modify susceptibility and exposure as well as by procedures which attack the agent involved in the disease. That is, disease can be prevented as well as cured.

The epidemiological triangle is useful in understanding infectious disorders, but is less useful with respect to chronic, degenerative disorders such as heart disease, stroke and arthritis, for here no specific agent can be identified against which individuals and populations may be protected. Many contemporary medical problems are better understood in terms of a *web of causation*. According to this concept, disorders such as heart disease develop through complex interactions of many factors which form a hierarchical causal web of events. These factors may be biophysical, social or psychological and may promote or inhibit the disease at more than one point in the causal process. Ultimately, they determine the level of disease in a community. This is illustrated with respect to heart disease in Fig. 2.1. Since many of these factors can be modified, prevention offers better prospects

**BOX 2.2****Agent, host and environmental factors in HIV transmission****Agent**

- HIV subtype (A, B, C, D, E)
- Phenotypic differences
- Genotypic differences
- Antiretroviral drug resistance

**Host**

- Host genetics
- Stage of infection
- Antiretroviral therapy
- Reproductive tract infections
- Cervical ectopy
- Male circumcisions
- Contraception
- Menstruation and pregnancy

**Environment**

- Social norms
- Average rate of sex partner change
- Local prevalence/probability of exposure
- Social and economic determinants of risk behaviours such as unsafe sex

Source: Royce et al (1997).

for health than cure. It is also important to note that many of the factors implicated in heart disease have been identified as increasing the risk of other disorders, such as stroke and cancer.

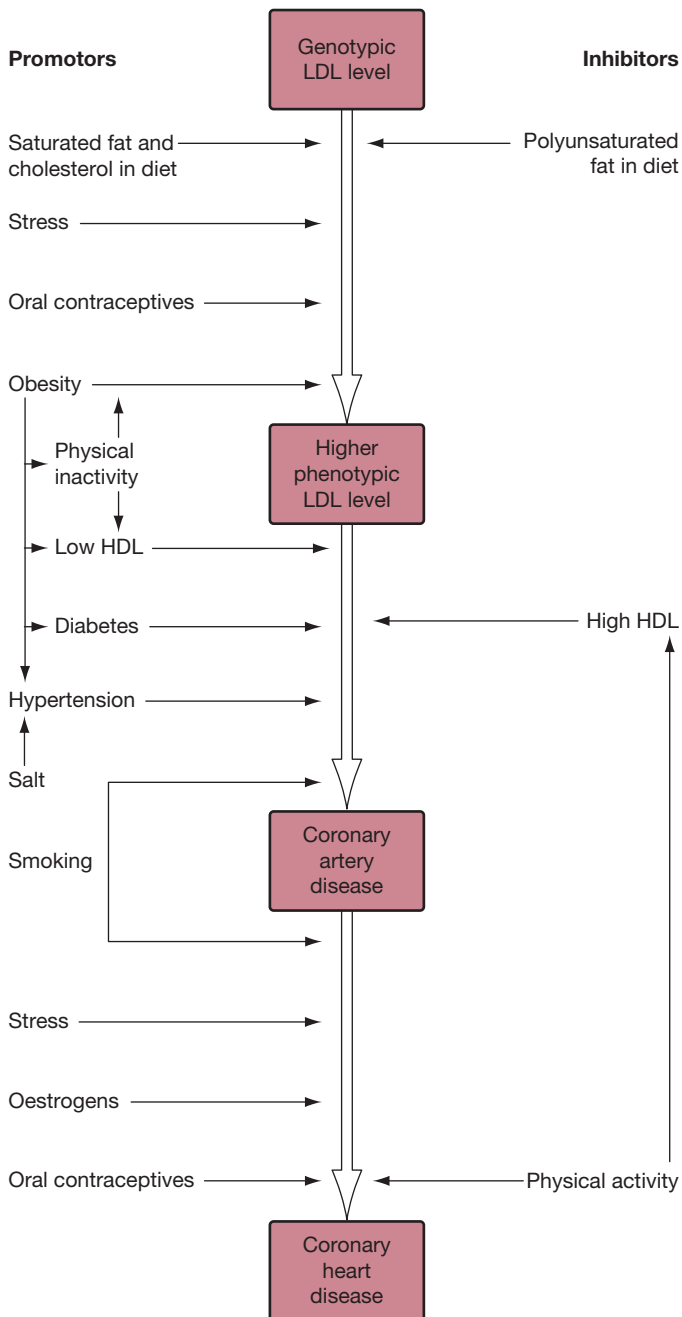
### ■ The theory of general susceptibility

The theory of general susceptibility has emerged over the past 20 years and departs in important ways from monocausal and multicausal models of disease. It is not concerned with identifying single or multiple risk factors associated with specific disorders, but seeks to understand why some social groups seem to be more susceptible to disease and death in general. For example, numerous studies have shown that social class, measured by occupation, education, income or area of residence, is closely related to health, even in countries with nationalized and egalitarian healthcare systems such as the National Health Service (NHS) in the UK (see Chapter 8).

### ■ The socioenvironmental approach

During the late 1980s, the theory of general susceptibility became more explicitly formulated as the socioenvironmental approach. This approach is not so much concerned with the causes of disease, rather it seeks to identify the broad factors that make and keep people healthy. In its concern with populations rather than individuals, it forms the basis for the health promotion strategies described in Chapter 17. One framework concerning the determinants of health identifies five broad factors that can be targeted in order to improve population health: the social and economic environment; the physical environment; personal health practices; individual capacity and coping skills; and health services. An expanded list along with a rationale for each broad factor is presented in Box 2.3.

## PART 1 SOCIAL ASPECTS OF DISEASE



**Fig. 2.1** The web of causation: risk factors for heart disease. LDL/HDL = Low density lipoproteins/high density lipoproteins.

(Reproduced with permission from Mausner & Kramer 1985.)

**BOX 2.3****Social and environmental determinants of health****Income and social status**

There is a close association between income and health so that health improves at each step up the income and social hierarchy. In addition, societies with a high standard of living in which wealth is more equally distributed are healthier, irrespective of the amount spent on health services.

**Social support networks**

Support from family, friends and social organizations is associated with better health. Moreover, people living in communities with higher levels of social cohesion tend to be healthier.

**Education**

Higher levels of education are associated with better health. Education increases opportunities for income and job security and equips people with the means to exert control over their life circumstances.

**Employment and working conditions**

Hazardous physical working environments and the injuries they induce are important causes of health problems. Moreover, those with more control over their work and jobs which involve fewer stress-inducing demands are healthier. However, unemployment, particularly if long term, is associated with poorer health.

**Physical environments**

The quality of air, water influence the health of populations. So do features of the constructed physical environment, such as housing, roads and community design.

**Personal health practices and coping skills**

Social environments which encourage healthy choices and healthy lifestyles are key influences on health as are the knowledge, behaviours and skills which influence how people cope with challenging life issues and circumstances.

**Healthy child development**

Prenatal and early childhood experiences can have a powerful effect on development and health throughout the life span.

**Health services**

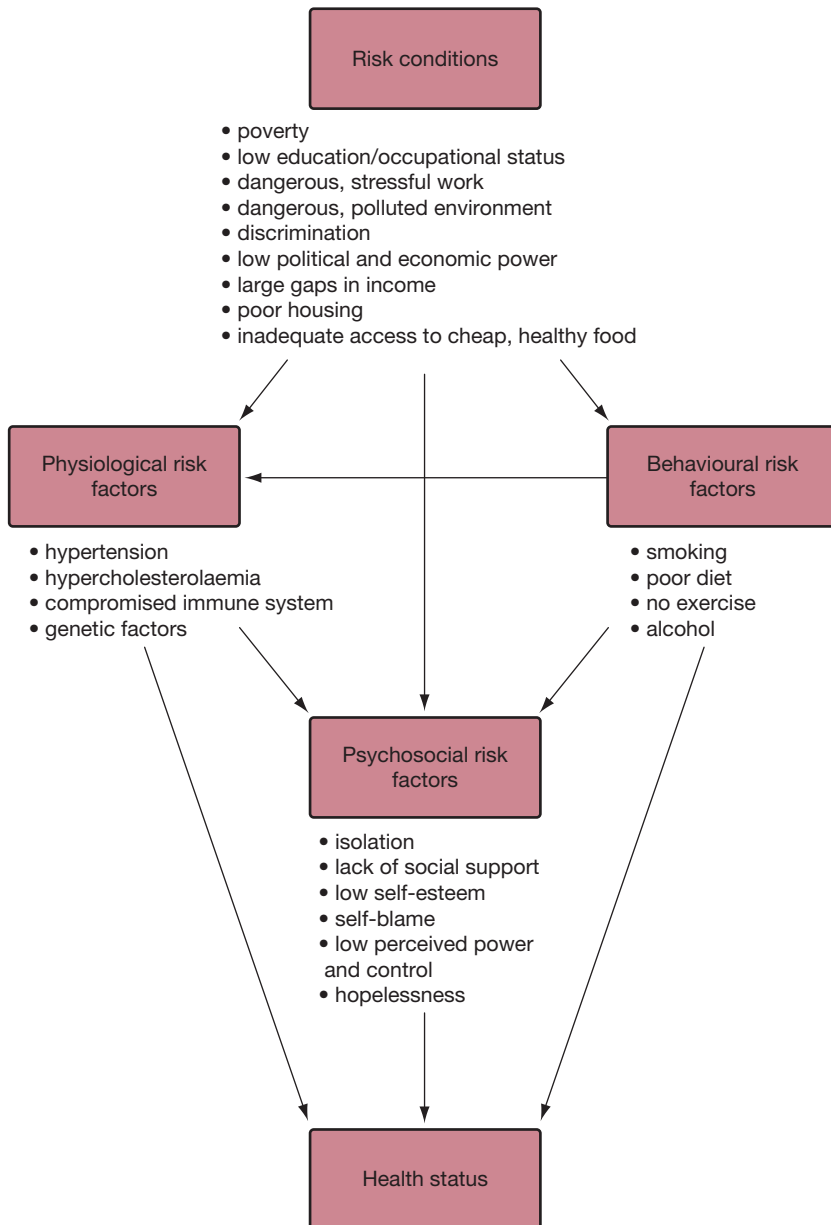
Although not a major determinant of population health, health services can, if appropriately organized and delivered, prevent disease and help promote and maintain health.

Source: Federal, Provincial and Territorial Committee Advisory Committee on Population Health (1994).

Other factors which have been cited as determinants of health include social exclusion in the form of racism and discrimination, food and transportation (Wilkinson & Marmot 1998).

According to Labonte (1993), social and environmental factors constitute risk conditions which have a direct effect on health and well-being and also affect health through the numerous psychosocial, behavioural and physiological risk factors which they engender (Fig. 2.2). One implication of the model presented in Fig. 2.2 is that material deprivation and a lack of control over important dimensions of one's life are the main issues that need to be addressed in promoting the health of the population. It is no accident that those countries where the income gap between the rich and the poor is narrowest have the lowest overall mortality rates. As a consequence, social and political change, including income redistribution, may be necessary to modify the health experience of lower socioeconomic groups.

## PART 1 SOCIAL ASPECTS OF DISEASE

**Fig. 2.2** The socioenvironmental approach.*(Reproduced with permission from the University of Toronto from Labonte 1993.)*

These theories of the causes of disease have been presented in a more or less historical sequence. From the brief descriptions offered it is clear that the role ascribed to the physical, social and psychological environment increases as we have progressed from the germ theory of disease to socioenvironmental models of health. The latter completely overturns

the doctrine of specific aetiology central to the former, for broad non-specific social and psychological factors are seen to be associated with a variety of disease outcomes and ultimately the health and well-being of the population.

It would, however, be a mistake to assume that the role of social and psychological factors as causes of disease has been realized only in modern times. Many of the so-called 'pre-scientific' explanations of disease gave recognition to the part played by such factors. In many cultures, disease is still seen in social terms, as the outcome of a lack of harmony in social relationships. In the context of modern medical history the idea that disease can be brought about by psychological influences was integral to the work of Freud, who explained disorders such as asthma and gastric ulcers as the product of unresolved psychological conflict. Freud's work gave rise to the notion that some diseases were 'psychosomatic' whereas others were not. The contemporary view is that social and psychological factors are implicated in all diseases, although the mechanisms by which they influence health are complex and variable.

## SOCIAL AND PSYCHOLOGICAL FACTORS AND HEALTH

The research effort invested in studies of social and psychological factors and health is substantial and the body of work that has been produced is difficult to summarize. One reason for this is that a wide variety of factors having a potential influence on health and disease have been studied. As the discussion of theories of disease indicated, these factors fall into three broad types: socioenvironmental, behavioural and psychological.

Clearly, there are close links between many of these factors, and contemporary models of illness attempt to specify how and when they are involved in the mechanisms leading to disease. Even though behaviours such as smoking are individual acts, a number of social and cultural factors influence whether someone will become a smoker and continue to smoke. These factors include 'cultural themes associated with smoking such as relaxation, adulthood, sexual attractiveness and emancipation; the socioeconomic structure of tobacco production, processing, distribution and legislation; explicit and continual advertising by the tobacco companies and the influence of peers, siblings and significant others' (Syme 1986).

Some of the social and psychological factors having an influence on health and explanations of their role as causes of disease are reviewed below.

### ■ Social and cultural change

Most of the early studies of social factors and disease onset were concerned with the effects of social and cultural change. They included studies of industrialization and urbanization, migration and social, occupational and geographical mobility. The major disease outcome studied was coronary heart disease since this is predominantly a disease of industrialized, urbanized nations. Some populations isolated from western culture have low blood pressure which does not rise with age. However, blood-pressure levels and coronary heart disease rates increase when these populations move to urban settings.

A number of studies conducted during the 1960s and early 1970s found higher rates of disease among people who changed jobs, place of residence or life circumstances. For example, one study found that men reared on farms who moved to urban centres to take middle-class jobs had higher rates of coronary heart disease than men who continued to work on the farm or who took up labouring jobs in cities (Syme et al 1964). Similar observations have been made with respect to cancer.

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A number of mechanisms might be responsible for the negative effects of social and cultural change on health. The adverse effects may be the direct result of change itself, a product of the circumstances to which individuals move or the product of personal characteristics which predispose individuals to both mobility and poor health. One study which attempted to evaluate these explanations compared rates of heart disease among Japanese immigrants to California and Hawaii with those of Japanese men still living in Japan (Marmot et al 1975). Coronary heart disease and mortality rates were highest among those living in California and lowest in Japan. Among those living in California, some had become 'acculturated' and had adopted western lifestyles, whereas others retained traditional Japanese ways. The former had disease rates up to five times as high as the latter. This suggests that being mobile is not, in itself, the important factor, rather it is the change in the environment in which these people lived that explained the increase in disease risk.

### ■ Social support

One of the earliest studies of the relationship between social environment and health was undertaken by the French sociologist Durkheim and published in 1897. In this work Durkheim pioneered the use of statistical methods for exploring and explaining differences in suicide rates across different social groups. Although suicide is an individual act, these differences in rates have persisted over time and across cultures. Durkheim explained suicide in terms of the social organization of these groups, particularly the extent to which individuals were integrated into the group, and the way in which this encouraged or deterred individuals from suicide. High rates of suicide were associated with groups that had very high and very low levels of integration.

More recent studies of social ties and health have focused on the relationship between social support and well-being. Some of this early work looked at differences in health according to marital status. The single, widowed and divorced have higher mortality rates than the married, the differences being much larger for men than for women (Table 2.1). These differences, which were first observed and reported in the mid-nineteenth century, have been remarkably consistent over time, and are consistent across cultures and healthcare systems. Only a small part of the differences in mortality rates can be explained by the selective effects of marriage (Morgan 1980).

One possible explanation of these differences is that marital status has an influence on psychological states and life-styles (Gove 1979). Studies have shown that the married

**TABLE 2.1**

Mortality, all causes: ratio of mortality rate of the unmarried to the mortality rate of the married; whites aged 25–64 years, USA 1960

Marital status	Sex	Ratio
Single	Male	1.96
	Female	1.68
Widowed	Male	2.64
	Female	1.77
Divorced	Male	3.39
	Female	1.95

Reproduced with permission from the University of Chicago Press from Gove (1979).

tend to be happier and more satisfied with life than the unmarried, they are less likely to be socially isolated and have more social ties. In a society in which marriage and family life are a central value, being married gives meaning and significance to daily life, promotes a sense of well-being and is a source of social and emotional support. This explanation tends to be supported by data on marital status and specific causes of death. Variations in mortality rates are large where psychological states or aspects of life-style play a direct role in death, as in suicide or death from accidents, or are associated with acts such as smoking or alcohol consumption. Large differences are also observed with respect to diseases such as tuberculosis, where family factors may influence entry into medical care, willingness to undergo treatment or the availability of help and support.

An influential study which clearly demonstrated that integration into the community has a direct effect on health was undertaken by Berkman & Syme (1979). They followed a random sample of adults over a 9-year period. At the start of the study a social network score was calculated for each subject based on marital status, contacts with friends and relatives and membership of religious and other social groups. Over the 9-year period of the study those with low network scores were more likely to die than those with high network scores. After controlling for other factors such as weight, cigarette smoking, alcohol consumption, physical activity, health practices and health status at baseline, mortality rates for the socially isolated were two to three times higher than those with extensive social networks. These early findings have been confirmed in a number of other longitudinal studies. For example, a 6-year study of men in Finland found that risk of death was highest among those who reported having few persons to whom they gave or from whom they received support. Lack of participation in social organizations, having few friends and not being married were associated with mortality after taking into account baseline health and other risk factors including income (Kaplan et al 1994).

Other evidence suggests that social integration and social support have a broad influence on health. Early studies found that they were linked to heart disease, complications of pregnancy and emotional illness. More recent studies have found that social integration exerts a protective effect on the incidence of non-fatal myocardial infarction in men aged 50 and over (Vogt et al 1992) while social isolation increased the risk of stroke in a study of male health professionals in the USA (Kawachi et al 1996). There is also strong and consistent evidence to show that lack of social support, social isolation and not being married have an influence on long-term survival among men following an initial myocardial infarction (Williams et al 1992). More recent studies have found that social support predicts survival in dialysis patients (Thong et al 2007), patients with acute myeloid leukaemia (Pinquart et al 2007) and among women following diagnosis of breast cancer (Kroenke et al 2006). In the last study women who were socially isolated before diagnosis had a 66% increased risk of all cause mortality and a two-fold increase in breast cancer mortality over women who were socially integrated. Other studies have found that social support was related to levels of residual disability following a stroke and was related to the onset of depression and degree of disability among rheumatoid arthritis patients (Fitzpatrick et al 1991). A 2-year follow-up study of people with disabilities living alone found that people with few social contacts were more likely to deteriorate in physical and psychosocial functioning than people with high levels of contact with others (Patrick et al 1986). However, the greatest and most significant difference between those with and without social support occurred among those reporting an adverse life event during the period of the study.

Social support refers to a fairly broad category of events and includes practical assistance, financial help, the provision of information and advice and psychological support.

## PART 1 SOCIAL ASPECTS OF DISEASE

A 10-year study of elderly women in Finland examined the effect of practical support and emotional support on mortality and found that the risk of death was 2.5 times higher in those lacking emotional support (Lyyra & Heikkinen 2006). However, a large scale Swedish study found that having diverse sources of support was associated with better health outcomes, with economic support, social contacts and the opportunity to discuss personal problems being the most important (Ostberg & Lennartson 2007).

The mechanisms by which social and emotional support enhances or protects health are not known. One hypothesis concerning this mechanism has emerged in the context of studies of the negative health impact of stressful life circumstances. This research suggests that such support acts as a buffer against adverse events that would otherwise have health-damaging effects. In their research on the social origins of depression, Brown & Harris (1978) found that social support was protective only in the context of a severe life event. Certainly, social support has been shown to be associated with reduced psychological distress and enhanced coping when the life event in question is the onset of a medical condition such as cancer (Baider et al 2003). Although studies suggest that social support enhances coping and the ability to tolerate stressful life circumstances, it is also possible that it exerts an influence via psychological, hormonal and neurophysiological pathways.

### Life events

A more comprehensive attempt to assess the influence of life experiences such as bereavement and unemployment is to be found in studies of life events and health. This approach emerged at the end of the 1960s with the development of instruments such as the Social Readjustment Rating Scale (SRRS). This scale consists of a list of 42 events, each of which involves personal loss or some degree of change in roles or personal relationships. Each event is given a score depending on how much life change it involves. Scores for an individual are totalled to give a numerical estimate of the amount of life change experienced in a defined period, usually the past year. A number of studies have shown that there is some relationship between scores on this scale and future changes in health.

There have been a number of criticisms of this method of measuring the frequency and severity of life events. Perhaps the most important is that scales such as the SRRS fail to take account of variations in the meaning and significance of life events. The birth of a child, for example, may be a positive event for some women but a negative event for others, depending on the social context in which it occurs. More sophisticated measures of life events have been developed which take account of variations in the meaning of life events based on contextual factors (Brown & Harris 1978).

A second criticism of the SRRS is that it focuses on major life events and ignores less severe but more common life difficulties. A measure which attempts to assess such difficulties is the Hassles Scale (Kanner et al 1981). Its proponents claim that measures of life stress based on daily 'hassles' are better predictors of changes in physical and psychological health than measures based on major life events.

Clearly, the measurement of life stress is a complex issue and establishing a relationship between such stress and negative health outcomes is challenging. Many studies showing such a relationship have design weaknesses making interpretation of their results difficult.

One particularly noteworthy study is that conducted by Brown & Harris (1978) which was mentioned above in connection with social support. This was an investigation of the social and economic circumstances causally implicated in the onset of depression in women. Using measures that were context sensitive, they were able to show a clear relationship between life events with long-term threatening implications and the onset of

depression in women. Events with short-term implications, no matter how stressful, were not associated with depression. However, whether or not a woman became depressed after an event involving long-term threat depended on the presence of four 'vulnerability factors'. These were: the absence of a close, confiding relationship with a spouse or other person, loss of mother before age 11 years, lack of employment outside the home, and having three or more children under the age of 15 living at home. The greater the number of these factors present, the greater was the likelihood of depression following an event with long-term threatening implications. Brown & Harris (1978) believe that these vulnerability factors produce ongoing low self-esteem and an inability to cope with the world. These interact with life events to produce generalized feelings of hopelessness and, subsequently, depression.

Life events have also been implicated in the mechanisms leading to physical disorders. They have been linked to disturbances in the control of diabetes, to diseases such as duodenal ulcer, and to abdominal pain leading to appendectomy (Creed 1981).

### ■ Occupational hierarchies and the organization of work

The physical environments in which people work are often hazardous and damaging to health. Air pollution at work, exposure to carcinogens, working with machinery and industrial accidents take a large toll on the health of manual workers. However, the psychosocial environments in which we work can also have a negative impact on health. Two models that identify important aspects of the psychosocial work environment are the demand-control model and the effort-reward imbalance model (Marmot et al 1999). The former suggests that jobs that combine a high level of psychological demands with low levels of control and skill utilization lead to stress and increase the risk of illness such as coronary heart disease. The latter suggests that jobs which combine a high degree of effort but low levels of gain in the form of financial or emotional rewards, employment security or career advancement lead to emotional distress, job strain and illness.

Evidence in support of the demand-control model comes from a study of British civil servants conducted in the mid-1980s which explored the links between the organization of their work and health outcomes (Marmot & Theorell 1988). None of the subjects in the British study were living in poverty; nevertheless, there were differences in health status according to occupational grade. Those in the lowest grade had mortality rates three times that of those in the highest grade, higher rates of onset of heart disease and higher rates of sickness absence. These differences were directly related to the degree of control in the workplace. Another noteworthy finding was that although blood pressure levels were similar for low and high-grade civil servants when at work, they declined much more for the latter than the former when they were at home. This study concluded that a lack of freedom to make decisions at work, particularly when jobs are stressful or psychologically demanding, is linked both to at-risk behaviours such as smoking, physiological risk factors such as high blood pressure and health outcomes such as heart disease. A follow-up of study participants a decade later confirmed these findings. Those with job strain, a combination of low decision latitude and high demands, were at the greatest risk for the onset of coronary heart disease (Kuper & Marmot 2003) with the effects being greatest among younger individuals. One factor which may explain this link is psychological distress; data from the same study indicated that the risk of onset of angina was predicted by anxiety and sleep disturbance (Nicholson et al 2005). Studies from Sweden have also found a higher risk of myocardial infarction among men in high demand/low control jobs, with this association being particularly evident among manual workers (Hallqvist 1998).

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To date, few studies have explored the effort-reward imbalance model. However, these studies indicated that chronic stress associated with effort-reward imbalance results in a two to six-fold increase in the risk of onset of heart disease (Bosma et al 1998, Siegrist et al 1990). This increased risk could not be explained by other biomedical or behavioural risk factors. More recent evidence concerning effort-reward imbalance comes from the longitudinal study of British civil servants cited above. This indicated that an increase in effort-reward imbalance over time was associated with the onset of angina in men and these increases were more common in lower grade civil servants (Chandola et al 2005). However, this relationship was not observed in women. Other studies have documented the adverse effects of effort-reward imbalance on mental health, musculoskeletal and gastrointestinal disorders, sleep disturbance and sickness absence.

## ■ Unemployment

Although the physical and social environments in which we work can have a negative effect on health, so can unemployment. There are two main reasons why unemployment could conceivably affect health (Marmot & Madge 1987). First, it is related to standards of living and the material conditions of life, and second it is a stressful event which may become chronic and deprive an individual of a social role, meaningful daily existence and contact with others.

Two approaches are evident in studies of unemployment and health and both are subject to problems in interpretation, largely because it is difficult to separate the effects of unemployment from the effects of other social and economic conditions (Marmot & Madge 1987). The first of these approaches attempts to demonstrate an association between unemployment rates and mortality rates and the way these co-vary with the ups and downs of the economic cycle. The most recent of this work was conducted by Brenner (1979) and is reviewed in Chapter 1. The second approach attempts to assess the health of people who are, or have recently become, unemployed. Since ill health can lead to unemployment as well as vice versa, such studies need to be conducted carefully before it can be concluded that unemployment is a cause of poor health. Nevertheless, evidence from well-designed research does suggest that the unemployed experience more illness, have higher blood pressure, poorer psychological health and increased mortality (Jin et al 1996, Montgomery et al 1999, Turner 1995). Poverty, stress and insecurity, particularly housing insecurity, have all been implicated in the onset of the health problems following unemployment (Nettleton & Burrows 1998).

Although a recent review of 104 studies confirmed that the unemployed have worse physical and psychological health than their employed counterparts, it indicated that the magnitude of the effects varied according to the length of unemployment, and according to individual characteristics such as age, gender and coping resources. (McKee-Ryan et al 2005). The most marked effects tended to be observed among younger persons and males (Artazcoz et al 2004, Reine et al 2004). Contextual factors such as the local unemployment rate did not influence the health effects of being unemployed. It is also the case that other employment transitions, such as starting maternity leave or staying home to look after family members, can lead to compromised psychological well-being among women (Thomas et al 2005).

## ■ Health behaviours

There are many behaviours which can have a positive or negative impact on health. Diet, exercise, drinking, smoking, use of illegal drugs are examples which have been the subject

of numerous investigations. These behaviours are often characterized as being the result of individual choice and personal responsibility even though it is more useful to see them as the product of social circumstances (Jarvis & Wardle 1999). Evidence that they are linked to social contexts is to be found in data showing that behaviours likely to promote health are less common in groups subject to poverty and social deprivation while behaviours likely to damage health are more common. For example, the percent of smoking among both men and women is inversely related to occupational class and education. However, a broad range of circumstances are related to smoking (Jarvis & Wardle 1999). Rates are higher among the unemployed, those living in rented accommodation, those without access to a car and those who are divorced, separated or single parents. Clearly, material deprivation and factors which indicate stressful social and personal circumstances all predict whether or not an individual will smoke. The highest rates of all are found among groups characterised by combinations of these factors. There is also evidence to suggest that rates of smoking cessation are substantially lower in deprived compared to non-deprived groups even though there appears to be little difference between these groups in terms of wanting to quit smoking. One reason for this may be that nicotine dependence is strongly related to deprivation. Another reason is that the social environments in which deprived groups live and work are less conducive to quitting. One implication of this research is that smoking rates among the deprived are unlikely to decline unless the social circumstances which foster smoking and nicotine dependence are addressed.

### ■ Sense of coherence

Much of the work on psychosocial factors and health attempts to identify those that increase the risk of specific diseases or poor health overall. By contrast Antonovsky's salutogenic theory attempts to identify individual characteristics that promote health (Antonovsky 1987). The central concept of this theory is sense of coherence (SOC). Individuals with a high SOC tend to be resilient in the face of stress; they perceive events as less stressful, are able to mobilize resources to deal with stressors and possess the commitment, motivations and desire to cope. SOC has been linked to the adjustment to the onset of chronic illness such as cancer and rheumatoid arthritis (Buchi et al 1998) and has been found to be strongly associated with health behaviours such as alcohol use and smoking (Glanz et al 2005). A study of premenopausal women found that those with a strong SOC had lower systolic blood pressure and total cholesterol than those with a weak SOC (Lindfors et al 2005), while longitudinal studies of men suggested that a strong SOC is associated with the delayed onset of cancer (Poppius et al 2006) and cancer mortality (Surtees et al 2006). Studies have also indicated that the role of SOC may be as moderator of the effects of stressful life events (Richardson & Ratner 2005).

## PEOPLE, PLACES AND HEALTH

Although a great deal has been made of the links between social and physical environments and health, it is rare for these environments themselves to be the focus of research. The overwhelming tendency has been to look at the characteristics of individuals rather than the characteristics of the places in which they live. However, as evidence begins to accumulate, it is clear that the immediate neighbourhood in which one lives can have an impact on health. Simply put, poor people living in wealthier neighbourhoods have better health than similarly poor people living in poor neighbourhoods (Blaxter 1990). For example, data from the Whitehall II study (Stafford & Marmot 2003) found that 12.3%

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of High Grade civil servants living in the most deprived areas had poor health compared with 35.9% of Low Grade employees. Among those living in the least deprived areas the percent with poor health was 8.8% for High Grade and 19.7% for Low Grade employees. Such neighbourhood effects have been found for a variety of health outcomes including mortality and coronary heart disease.

MacIntyre et al (1993) have argued that findings such as these indicate a need for research to discover precisely which features of local areas either damage or promote health. Although some research is available which tries to link aspects of the physical environment, such as air pollution or water hardness, to diseases such as bronchitis and cancer, there is very little work that tries to identify the social, cultural or economic characteristics of areas that affect health. The importance of such work is clear; we may be able to improve health by changing places rather than people.

As an example of this kind of research, MacIntyre et al (1993) compared two areas of Glasgow to identify differences in the living environments they provided. One was in the north west of the city and had relatively low mortality rates; the other was in the south west of the city and had high mortality rates. They found differences between the areas such that living in the north west would be more conducive to good health than living in the south west. Healthy foodstuffs were more available and cheaper in the north west, there were more sporting and recreational facilities, better transport services, better health services, less crime and a less hostile environment. Even though two people might have the same personal characteristics (the same income, family size and composition, and housing tenure, for example) the one living in the north west would be advantaged compared to the one in the south west in ways likely to be related to physical and mental health. A more recent study conducted in Scotland and England identified additional features of neighbourhood social and physical environments that were predictive of poor health (Cummins et al 2005). These were: poor quality physical environment, a more left wing political climate, lower political engagement, high unemployment, low access to private transport or low transport wealth. Interventions to change these features of the environment offer one way of improving the health of local populations.

## ■ Social cohesion and social capital

Another community-level factor which is associated with health is that of social cohesion. This is a difficult idea to grasp but essentially refers to 'the extent of connectedness and solidarity among groups in society' (Kawachi & Berkman 2000). At the individual level it is indicated by a personal sense of connectedness to a community which can be aggregated to provide an area level indicator of social cohesion (Patterson et al 2004). Cohesive communities are ones in which there is a high level of participation in communal activities and high levels of membership of community groups (Stansfield 1999). Important components of social cohesion seem to be the friendliness and support of neighbours, opportunities for interaction with other members of the community and lack of fear of violence and crime. Recent evidence has indicated that both individual and area level social cohesion is associated with at-risk behaviours such as smoking (Patterson et al 2004).

Social cohesion is one component of what has come to be called social capital. This is measured at an area level by the percentage who feel that people can be trusted and by the 'density of associational life'; that is, the per capita membership of groups such as church groups, fraternal organizations, sports clubs and labour unions (Kawachi & Kennedy 1997). Emerging evidence suggests that social capital is associated with an area's overall mortality rate, as well as rates of death from cancers and heart disease (Kawachi & Kennedy 1997, Kawachi et al 1997, Wilkinson 1996). It has also been shown to be

associated with self-rated health and violent crime (Kawachi et al 1999). Consequently, interventions which improve the physical characteristics of a community so as to promote feelings of safety and perceptions of the friendliness of an area have resulted in improvements in the mental health and self-esteem of residents (Halpern 1995).

The main conclusion to be drawn from this and the other research summarized above is that patterns of health and disease are largely the product of social and environmental influences. Although health and illness may involve biological agents and processes, they are inseparable from the social settings in which people live. Ultimately, it is these which influence the challenges people encounter in daily life and their capacity to manage them. Changing these environments is one way in which the health of a community can be improved. However, the nature of communities and the social determinants of health they embody are shaped by public policies and these are influenced by the social, economic and political forces that influence governments. Gaps in our knowledge of how these forces operate and the lack of professional and public understandings of the social determinants of health are barriers to improvements of the environments in which people live (Raphael 2006).

## THE SOCIAL CAUSES OF DISEASE: BIOLOGICAL PATHWAYS

Although the evidence linking socioenvironmental factors and health is compelling, the question remains as to how social factors operate to influence health and disease. Psychoneuroimmunology, an emerging and sometimes controversial field of knowledge, is beginning to provide evidence of the biological pathways linking social factors and disease and filling in the gaps in the social stress-illness model. Although there are a number of formulations of this model, most assume that stressors (threatening environmental circumstances) give rise to strains (psychological and physiological changes) which increase an individual's susceptibility to disease. There is evidence to suggest that stress, or its outcome in the form of depression, leads to a number of changes in the human body. It interferes with the normal functioning of neuroendocrine, autonomic metabolic and immune systems, leads to increased heart rate and respiration, dilatation of blood vessels to the muscles and alterations in gastrointestinal function. These changes are believed to cause disease directly or render an individual more prone to disease (Brunner & Marmot 1999).

The most recent evidence of the biological correlates of stress-inducing social environments comes from the study of British civil servants cited in many of the sections above. Some of their extensive findings are as follows:

- Stress at work is associated with metabolic syndrome, a group of metabolic risk factors in the same person that increase the risk of heart disease and stroke. These include, abdominal obesity, blood fat disorders, high blood pressure, insulin resistance and elevated C-reactive protein. Those with chronic work stress were more than twice as likely to have the syndrome than those without work stress (Chandola et al 2006).
- Men whose work was characterized by effort-reward imbalance and over-commitment had higher cortisol and systolic blood pressure levels with the effect on systolic blood pressure being marked in low status over-committed men (Steptoe et al 2004).
- There is a strong inverse relationship between employment grade and plasma viscosity. In turn, plasma viscosity was associated with a number of other biological factors such as fibrinogen, triglycerides and fasting insulin (Kumari et al 2005). In a related study, men with low job control showed greater fibrinogen responses to acute stress than did those with high job control (Steptoe et al 2003a).

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These and other analyses of data from the study suggest that the influence of employment status on cardiovascular disease may be the outcome of differences in stress related activation of autonomic and neuroendocrine processes (Hemingway et al 2005, Steptoe et al 2003b).

However, this essentially simple model is more complex than it seems. The link between stressors and illness is mediated by a number of factors that may increase or decrease an individual's vulnerability when faced with a stressor. Social factors such as social support and psychological variables such as personality characteristics, perceptual processes and coping styles, interact in complex ways to affect health outcomes. Moreover, as the socioenvironmental approach suggests, behavioural responses to environmental stressors in the form of health-damaging activities such as smoking also play an important role (Najman 1980). However, while the specification of these biological and behavioural pathways strengthens the credibility of the research evidence, the implications of that evidence are clear. Changing the social circumstances of low status or economically deprived groups is necessary to improve population health.

## References

- Antonovsky A 1987 Unravelling the mystery of health – how people manage stress and stay well. Jossey-Bass, London
- Artazcoz L, Benach J, Borrel C, Cortes I 2004 Unemployment and mental health: understanding the interactions among gender, family roles and social class. *American Journal of Public Health* 94:82–88
- Baider L, Ever-Hadani P, Goldzweig G 2003 Is perceived family support a relevant variable in psychological distress? A sample of prostate and breast cancer couples. *Journal of Psychosomatic Research* 55:453–460
- Berkman L, Syme S 1979 Social networks, host resistance and mortality: a nine-year follow-up of Alameda County residents. *American Journal of Epidemiology* 109:186–204
- Blaxter M 1990 Health and lifestyles. Tavistock-Routledge, London
- Bosma H, Peter R, Siegrist J, Marmot M 1998 Alternative job stress models and the risk of heart disease. *American Journal of Public Health* 88:68–74
- Brenner M 1979 Mortality and the national economy. *Lancet* ii:568–573
- Brown G, Harris T 1978 The social origins of depression. Tavistock, London
- Brunner E, Marmot M 1999 Social organization, stress and health. In: Marmot M, Wilkinson R (eds) *Social determinants of health*. Oxford University Press, Oxford
- Buchi S, Sensky T, Allard S et al 1998 Sense of coherence: a protective factor for depression in rheumatoid arthritis. *Journal of Rheumatology* 25:869–875
- Chandola T, Sigerist J, Marmot M 2005 Do changes in effort-reward imbalance at work contribute to an explanation of the social gradient in angina? *Occupational and Environmental Medicine* 62:223–230
- Chandola T, Brunner E, Marmot M 2006 Chronic stress at work and the metabolic syndrome: prospective study. *British Medical Journal* 332:521–525
- Creed F 1981 Life events and appendicitis. *Lancet* i:1381–385
- Cummins S, Stafford M, Macintyre S et al 2005 Neighbourhood environment and its association with self-rated health: evidence from Scotland and England. *Journal of Epidemiology and Community Health* 59:207–213
- Federal, Provincial and Territorial Advisory Committee on Population Health. *Strategies for Population Health: Investing in the Health of Canadians*. Ottawa: Minister of Supply and Services Canada, 1994
- Fitzpatrick R, Newman S, Archer R, Shipley M 1991 Social support, disability and depression: a longitudinal study of arthritis and depression. *Social Science and Medicine* 33: 605–611
- Glanz K, Maskarinec G, Carlin L 2005 Ethnicity, sense of coherence and tobacco use among adolescents. *Annals of Behavioral Medicine* 29:192–199

- Gove W 1979 Sex, marital status and mortality. *American Journal of Sociology* 79:45–67
- Hallqvist J, Diderichsen F, Theorell Y et al and the SHEEP study 1998 Is the effect of job strain on myocardial infarction due to interaction between high psychological demands and low decision latitude. Results from the Sweden Heart Epidemiology Program. *Social Science and Medicine* 46:1405–1415
- Halpern D 1995 Mental health and the built environment. More than bricks and mortar? Taylor and Francis, London
- Hemingway H, Shipley M, Brunner E et al 2005 Does autonomic function link social position to coronary risk? The Whitehall II Study. *Circulation* 111:3071–3077
- Jarvis M, Wardle J 1999 Social patterning of health behaviours: the case of cigarette smoking. In: Marmot M, Wilkinson R (eds) *Social determinants of health*. Oxford University Press, Oxford
- Jin RL, Shah CP, Srobona TJ 1996 The impact of unemployment on health: a review of the evidence. *Canadian Medical Association Journal* 153:529–540
- Kanner A, Coyne J, Schaefer C, Lazarus R 1981 Comparison of two modes of stress measurement: daily hassles and uplifts versus major life events. *Journal of Behavioural Medicine* 4:1–39
- Kaplan G, Wilson T, Cohen R et al 1994 Social functioning and overall mortality: prospective evidence from the Kuopio ischemic heart disease risk factor study. *Epidemiology* 5:495–500
- Kawachi I, Kennedy P 1997 Health and social cohesion: why care about income inequality? *British Medical Journal* 314:1037–1041
- Kawachi I, Berkman L 2000 Social cohesion, social capital and health. In: Berkman L, Kawachi I (eds) *Social epidemiology*. Oxford University Press, New York
- Kawachi I, Colditz G, Ascherio A 1996 A prospective study of social networks in relation to total mortality and cardiovascular disease in men in the USA. *Journal of Epidemiology and Community Health* 50:245–251
- Kawachi I, Kennedy P, Lochner K 1997 Social capital, income inequality and mortality. *American Journal of Public Health* 87:1491–1499
- Kawachi I, Kennedy P, Glass R 1999 Social capital and self-rated health: a contextual analysis. *American Journal of Public Health* 89:1187–1194
- Kroenke C, Kubzansky L, Schernhammer E et al 2006 Social networks, social support and survival after breast cancer diagnosis. *Journal of Clinical Oncology* 24:1105–1111
- Kumari M, Marmot M, Rumley A, Lowe G 2005 Social, behavioural and metabolic determinants of plasma viscosity in the Whitehall II Study. *Annals of Epidemiology* 15:398–404
- Kuper H, Marmot M 2003 Job strain, job demands, decision latitude and risk of coronary heart disease within the Whitehall II study. *Journal of Epidemiology and Community Medicine* 57:147–153
- Labonte R 1993 Health Promotion and Empowerment: Practice Frameworks. Centre for Health Promotion, University of Toronto. *Issues in Health Promotion* no. 3
- Lindfors P, Lundberg O, Lundberg U 2005 Sense of coherence and biomarkers of health in 43-year-old women. *International Journal of Behavioural Medicine* 12:98–102
- Lyrra TM, Heikkinen RL 2006 Perceived social support and mortality in older people. *Journal of Gerontology* 61:S147–S152
- MacIntyre S, MacIver S, Soomans A 1993 Area, class and health: should we be focusing on places or people? *Journal of Social Policy* 22:213–234
- Marmot M, Madsen N 1987 An epidemiological perspective on stress and health. In: Kasl S, Cooper C (eds) *Stress and health: issues in research methodology*. Wiley, Winchester
- Marmot M, Theorell T 1988 Social class and cardiovascular disease: the contribution of work. *International Journal of Health Services* 18:37–45
- Marmot M, Syme L, Kagan A 1975 Epidemiological studies of heart disease and stroke in Japanese men living in Japan, Hawaii and California. Prevalence of coronary and hypertensive disease and associated risk factors. *American Journal of Epidemiology* 102:514–525
- Marmot M, Siegrist J, Theorell T, Feeney A 1999 Health and the psychosocial environment at work. In: Marmot M, Wilkinson R (eds) *Social determinants of health*. Oxford University Press, Oxford
- Mausner J, Kramer S 1985 *Epidemiology: an introductory text*. W.B. Saunders, Philadelphia
- McKee-Ryan F, Song Z, Wanberg C, Kinicki A 2005 Psychological and physical well-being during unemployment: A meta-analytic study. *Journal of Applied Psychology* 90:53–76

## PART 1 SOCIAL ASPECTS OF DISEASE

- Montgomery S, Cook D, Bartley M, Wadsworth M 1999 Unemployment in young men predates symptoms of depression and anxiety resulting in medical consultation. *International Journal of Epidemiology* 28:95–100
- Morgan M 1980 Marital status, health, illness and service use. *Social Science and Medicine* 14A:633–643
- Naajman J 1980 Theories of disease causation and the concept of general susceptibility: a review. *Social Science and Medicine* 14A:231–237
- Nettleton S, Burrows B 1998 Mortgage debt, insecure home ownership and health: an exploratory analysis. *Social Science & Illness* 20:731–753
- Nicholson A, Fuhrer R, Marmot M 2005 Psychological distress as a predictor of CHD events in men: the effect of persistence and components of risk. *Psychosomatic Medicine* 67:522–530
- Ostberg V, Lennartson C 2007 Getting by with a little help: the importance of various types of social support for health problems. *Scandinavian Journal of Public Health* 35:197–204
- Parkes C, Benjamin B, Fitzgerald R 1969 Broken heart: a statistical survey of increased mortality among widowers. *British Medical Journal* 1:740–744
- Patrick D, Morgan M, Charlton J 1986 Psychosocial support and change in the health status of physically disabled people. *Social Science and Medicine* 22:1347–1354
- Patterson J, Eberly L, Ding Y, Hargreaves M 2004 Associations of smoking prevalence with individual and area level social cohesion. *Journal of Epidemiology and Community Health* 58:692–697
- Pinquart M, Hoffken K, Silbereisen R, Wedding U 2007 Social support and survival in patients with acute myeloid leukaemia. *Care in Cancer* 15:81–87
- Poppius E, Virkkunen H, Hakama M, Tenkanen L 2006 The sense of coherence and the incidence of cancer – role of follow-up time and age at baseline. *Journal of Psychosomatic Research* 61:205–211
- Raphael D 2006 Social determinants of health: present status, unanswered questions and future directions. *International Journal of Health Services* 36:651–677
- Reine I, Novo M, Mammarmstrom A 2004 Does the association between health and unemployment differ between young people and adults? Results from a 14 year follow-up study with a focus on psychological health and smoking. *Public Health* 118:337–345
- Richardson C, Ratner P 2005 Sense of coherence as a moderator of the effects of stressful life events on health. *Journal of Epidemiology and Community Health* 59:979–984
- Royce R, Sena A, Cates W, Cohen M 1997 Sexual transmission of HIV. *New England Journal of Medicine* 336:1072–1078
- Siegrist J, Peter R, Junge A et al 1990 Low status control, high effort at work and ischemic heart disease: prospective evidence from blue collar men. *Social Science and Medicine* 31:1127–1134
- Stafford M, Marmot M 2003 Neighbourhood deprivation and health: does it affect us all equally? *International Journal of Epidemiology* 32:357–366
- Stansfield S 1999 Social support and social cohesion. In: Marmot M, Wilkinson R (eds) *Social determinants of health*. Oxford University Press, Oxford
- Steptoe A, Kunz-Ebrecht S, Owen N et al 2003a Influence of socioeconomic status and job control on plasma fibrinogen responses to acute mental stress. *Psychosomatic Medicine* 65:137–144
- Steptoe A, Kunz-Ebrecht S, Owen N et al 2003b Socioeconomic status and stress-related biological responses over the working day. *Psychosomatic Medicine* 65:461–470
- Steptoe A, Sigerist J, Kirschbaum C, Marmot M 2004 Effort-reward imbalance, overcommitment and measures of cortisol and blood pressure over the working day. *Psychosomatic Medicine* 66:323–329
- Surtees P, Wainwright N, Luben R et al 2006 Mastery, sense of coherence and mortality: evidence of independent associations from the EPIC-Norfolk Prospective Cohort Study. *Health Psychology* 25:102–110
- Syme S 1986 Social determinants of health and disease. In: Last J (ed) *Public health and preventative medicine*. Appleton-Century-Crofts, Norwalk CT
- Syme S, Hyman M, Enterline P 1964 Some social and cultural factors associated with the occurrence of coronary heart disease. *Journal of Chronic Diseases* 17:277–289

- Thomas C, Benzeval M, Stansfeld S 2005 Employment transitions and mental health: an analysis from the British household panel survey. *Journal of Epidemiology and Community Health* 59:243–249
- Thong M, Kaptein A, Krediet R et al 2007 Social support predicts survival in dialysis patients. *Nephrology Dialysis Transplantation* 22:845–850
- Turner JB 1995 Economic context and the impact of unemployment. *Journal of Health and Social Behaviour* 35:213–219
- Vogt T, Mullooly J, Ernst D et al 1992 Social networks as predictors of ischemic heart disease, cancer, stroke and hypertension: incidence, survival and mortality. *Journal of Clinical Epidemiology* 45:659–666
- Wilkinson R 1996 *Unhealthy societies: from inequality to well-being*. Routledge, London
- Wilkinson R, Marmot M (eds) 1998 *Social determinants of health: the solid facts*. WHO Regional Office for Europe
- Williams R, Barefoot J, Califf R 1992 Prognostic importance of social and economic resources among medically treated patients with angiographically documented coronary heart disease. *JAMA* 267:520–524

