The Health Status of Londoners

A comparative perspective

The Health Status of Londoners

A comparative perspective

Michaela Benzeval

Ken Judge

Michael Solomon

King's Fund Institute

for the King's Fund Commission
on the Future of Acute Services in London

ISBN 0 9518892 1 4

Published by the
King's Fund London Initiative
2 Palace Court,
London W2 4HS
(telephone 071-727 0581)

Cover photograph by
Judy Harrison/Format

Design and print by Intertype

The Health Status of Londoners
A comparative perspective

Contents

BOXES, FIGURES AND TABLES

THE AUTHORS

Michaela Benzeval is a Senior Research Officer at the King's Fund Institute. Some of her current research interests are the determinants of health and their public policy implications, the utilisation of health services and resource allocation. She has published in a number of different areas, including health finance, comparative health policy, resource allocation and deprivation and health.

Ken Judge has been the Director of the King's Fund Institute since it was established in 1986. Prior to that, he was Deputy Director of the Personal Social Services Research Unit at the University of Kent and a lecturer in social policy at the University of Bristol.

Michael Solomon is a Research Officer at the King's Fund Institute. Previously he was an Assistant Psychologist at the University College and Middlesex School of Medicine, London. In addition to working on health and health care in London, his other interests at the Institute include the investigation of public opinion concerning the NHS and the analysis of health issues relating to black and ethnic minorities.

Acknowledgements

This paper would not have been possible without the help and support of the individuals and organisations who supplied, collected and helped to interpret the data on which it is based.

In particular, we would like to thank the following people and organisations. Professor Balarajan and colleagues at the University of Surrey for providing the *Public Health Common Data Set*. The ESRC data archive for supplying the *Health and Lifestyle Survey*, and Mildred Blaxter and Judith Nickson for their help and advice in using it. Professor Peter Townsend and his colleagues at the University of Bristol for providing the *Survey of Londoners' Living Standards*.

We would also like to thank Mel Bartley, Virginia Beardshaw, Mildred Blaxter, Sean Boyle, Tony Harrison, Richard Himsworth, Bobbie Jacobson, John James, Linda Marks, Mark McCarthy, Ray Robinson and Chris Smaje for providing us with helpful comments and suggestions.

Last, but far from least, we are particularly grateful to Moira Doherty and Kim Stirling for the excellent assistance they have given us in coping with successive drafts and tight deadlines.

Any errors of interpretation or fact remain, of course, our own.

EXECUTIVE SUMMARY

This paper examines the relative health status of Londoners in the light of the current attention being given to the provision of health care in the capital. It has three aims:

- to compare the health of residents of London with that of people living in comparable areas elsewhere;
- to investigate the factors associated with health;
- and to discuss the findings and some of their implications for future health and health care policy.

The paper is very much focused on a comparative assessment of the health status of Londoners. Chapter 1 begins, therefore, by outlining both the multidimensional approach to the definition of health which is adopted and the basis on which distinct areas of London are compared with other parts of England.

Mortality

Chapter 2 investigates the comparative mortality experience of Londoners. It is found that:

- mortality due to all causes within the capital is better than elsewhere;
- different parts of London have a better record of avoidable and premature mortality than comparable districts;
- London districts have consistently and significantly lower levels of mortality due to circulatory diseases, lung cancer, cervical cancer and motor vehicle traffic accidents;
- London districts have significantly worse records of mortality due to avoidable breast cancer and suicide;
- there is a clear and consistent relationship with deprivation, both in London and in the country as a whole.

Morbidity

Chapter 3 analyses comparative morbidity data from a national survey of health and lifestyles. It shows that:

- Londoners as a whole experience significantly fewer illness symptoms than residents in comparable areas;

- people in high-status areas of London experience significantly better psycho-social health than those in other comparable areas;
- overall, the health of Londoners is no worse, and may indeed be better, than that of people in similar parts of the country;
- as for mortality, there is a consistent and significant relationship between deprivation and health.

Deprivation and health

Chapters 4 and 5 investigate the relationship between deprivation and health, using both a national and a London-based survey. A conceptual framework is adopted in which material and social circumstances, lifestyles and demographic factors all impact on health. Multivariate analyses are used to investigate the relative importance of these factors in determining health. The following findings are identified across a range of health measures.

- All measures of poor health are consistently and significantly related to adverse material circumstances, such as low income, inadequate diet, not having a car, poor housing and environmental factors.
- The vast majority of measures of poor health are also related to social deprivation, as assessed by poor social support and integration, having few social roles, social isolation and discrimination.
- Lifestyle and demographic characteristics such as age, gender, ethnicity and smoking are also important factors.
- Living in London only features as an independently significant factor in one model – residents of high-status areas in the capital are less likely to report symptoms of physical illness.

Conclusions

One of the principal findings of the paper is that Londoners experience no worse, and may have better, health than their counterparts in other areas of England. Two possible explanations for this are considered. The first is that better than average health care provision in London produces better outcomes. The evidence is slightly contradictory, but on the whole it does not support this view. The other possibility is that the relative prosperity of Londoners accounts for their better than average health status. The comparative data which we review are much more supportive of this explanation.

The second main finding of the paper is that deprivation in most of its manifestations is closely associated with many different indicators of ill health, both in London and elsewhere in the country. The paper considers how this longstanding problem might be tackled. It endorses the view put forward in the government's consultation document, *The Health of the Nation,* that the responsibility for promoting health extends beyond the boundaries of the NHS. But it criticises the failure

to discuss, let alone develop, a programme of action in relation to health inequalities. Two different ways in which deprivation-related ill health might be tackled are advocated. The first is to develop a comprehensive strategy to reverse the recent trend of a massive increase in the numbers of people living in poverty. The second is to strengthen the public health function within the NHS.

Abbreviations

DHA	district health authority
DoH	Department of Health
FHS	Family Health Services
GDP	Gross Domestic Product
GLC	Greater London Council
HALS	Health and Lifestyle Survey
HBAI	households with incomes below average
HCHS	Hospital and Community Health Services
ILEA	Inner London Education Authority
LIF	low income family statistics
OPCS	Office of Population Censuses and Surveys
PHCDS	Public Health Common Data Set
RTA	road traffic accidents
SID	sudden infant death
SLLS	Survey of Londoners' Living Standards
SMR	Standardised Mortality (or Morbidity) Ratio
SPSSX	Statistical Package for the Social Sciences – Version X
YPLL	years of potential life lost
WHO	World Health Organisation

CHAPTER 1

Introduction

London's health care system faces an enormous challenge in the 1990s. It is widely believed that the capital city has always been over-endowed with resources – especially acute hospitals and medical personnel. Pressure for rationalisation, therefore, has been growing throughout the 1980s. This has been brought into sharper relief by the reforms of the NHS which were presaged by the white paper *Working for Patients*.

Universal access to health care on the basis of need, largely free at the point of delivery, remains the central principle of the NHS. The new split between purchasing and providing, however, will produce severe shock waves for health care in London. First, it is widely assumed that on any relative assessment of needs the capital should lose resources to other parts of the country. Second, the loss of purchasing power will be exacerbated by the relative inability of many providers of health care in the capital to compete for business from elsewhere because of the high costs of delivering services in London.

There can be no doubt that the NHS in London faces a turbulent future in the first half of the 1990s. It may be that the excess of resources in the capital relative to other metropolitan areas has been exaggerated (Boyle and Smaje, 1992), but some degree of readjustment is inevitable. The rational management of change, however, will be made that much more difficult by the heightened political visibility of London and the absence of any authority with strategic responsibility for it.

It was for these kinds of reasons that in 1990 the King's Fund decided to establish a commission to make recommendations about the future of acute health services in the capital. Subsequently, the government announced its own enquiry in October 1991. Sir Bernard Tomlinson, assisted by a small team of experts, has been appointed to examine London's health care, medical education and research in the 1990s. The terms of reference of the enquiry are set out in Box 1.1.

Against this background, it is our contention that any attempt to rethink London's health care system should be informed by careful analysis of what is provided, how it is used and to what extent it is needed. The focus of this report is on the last of these issues. We propose to investigate how the health of Londoners compares with that of other communities on the assumption that this will inform any relative assessment of needs.

It is important to emphasise, however, that we are not attempting to produce a comprehensive assessment of the health needs of Londoners. To do that requires a specific focus on all of the circumstances of London and its residents, paying particular attention to those which are

Box 1.1

THE FUTURE OF HEALTH CARE IN LONDON

In October 1991 the Secretary of State for Health, William Waldegrave, announced a new initiative to tackle the difficult health challenge facing London in the 1990s. Sir Bernard Tomlinson, supported by a team of experts, was appointed as special adviser to the Departments of Health and Education on London's health services.

His terms of reference are:

To advise the Secretaries of State for Health and Education and Science on how the relevant statutory authorities are addressing the provision of health care in inner London, working within the framework of the reformed NHS, including the balance between acute and primary health services; and the organisation and provision of undergraduate medical teaching, postgraduate medical education and research and development; taking account of:

- **the health needs of London's resident and day-time population;**
- **the emerging purchasing plans of the health authorities and their likely impact on inner London hospitals;**
- **future developments in the provision of acute and primary care;**
- **the need to maintain high-quality patient care and, as a foundation for this, high standards of medical teaching and research and development.**

Source: **DoH, 1991**

unique or peculiarly significant to the capital. Rather, the objective of this report is an important but more limited one. It is to compare the health status of Londoners with that of people in other parts of England using relatively easily available sources of data. Given the size, visibility and importance of London, combined with a widespread suspicion about its historic ability to obtain and consume more than its fair share of available resources, a comparative assessment of the health status of the capital's residents should help to establish a firmer foundation for health planning in the 1990s.

As the central purpose of this report is to compare the health status of Londoners with that of non-Londoners, it is important to begin by addressing two sets of questions:

- How can health status be defined and measured?
- What is London and with whom can Londoners be compared?

Health status

The purpose of this section is threefold. First, various definitions of health are examined, and the rich array of interpretations and perceptions which exist are highlighted. Second, some of the issues associated with the measurement of health are discussed. Third, the data sets on which the assessment of the health status of Londoners is based are discussed.

Defining health

The most ambitious attempt at defining health has been promulgated by the World Health Organisation, which has stated that health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1948, p. 100). In practice, however, such a definition is of limited use.

The WHO definition illustrates that health is an elusive notion which does not lend itself to precise definition. Perhaps the best approach is to think of it as a relative concept. An absolute, universal essence of health does not exist, since "conceptions of health and illness vary among different groups within a single society and between societies, as well as in any single society over time" (Black, 1980, p. 7). Individuals' definitions of health cover a wide and rich variety of concepts, some of which are discussed in Box 1.2. These include:

- health as not ill;
- health as absence of disease;
- health as a reserve;
- health as behaviour;
- health as physical fitness;
- health as energy, vitality;
- health as social relationships;

Box 1.2

LAY CONCEPTS OF HEALTH

An investigation into lay concepts of health produced a far wider range of ideas than would be considered strictly medical, falling into a number of categories, as outlined below:

- **Negative answers indicated a lack of thought about health. The concept of *Health as not ill* is sometimes seen as a negative concept, in opposition to the positive concept of fitness. One is healthy if one never experiences symptoms or if one never uses medical services.**
- ***Health as absence of disease/ health despite disease* is when health is conceived as overcoming or coping with disease and/or misfortune.**
- ***Health as a reserve* is determined by one's (largely inherited) temperament and constitution.**
- ***Health as behaviour – the healthy life* is seen as choosing a healthy life, with no "bad habits". This concept is more common among those with less education or in lower social classes.**
- **The concept of *Health as physical fitness* is particularly common among men and the young. This is different from the idea of *Health as energy, vitality,* namely being lively, alert and enthusiastic. Needless to say, this is a very positive concept of health.**
- **The concept of *Health as social relationships* was revealed when relationships with others were mentioned when defining one's own health. This was more common among females, especially older women.**
- **The view of *Health as function* is held by those for whom health is not something taken for granted, but is seen more as a restricting factor. It is more common among older people.**
- **The final category was *Health as psycho-social well-being.* Health is conceived as a state of mind, being confident, proud, relaxed, happy. This was mentioned particularly when defining one's own health, and was more common among the middle-aged, women and those with more education.**

Source: **Blaxter, 1990**

- health as function;
- health as psycho-social well-being.

Consequently, "our understanding of 'health' will always be evolving" (Black, 1980, p. 7).

One controversial feature of the WHO definition of health is the inclusion of a social component. This is crucial to a discussion about measuring health, since the debate is effectively about defining its boundaries. Social factors are undoubtedly related to health, but if they form a constituent part of health itself, then any change in social circumstances would mean a change in health status. The inclusion of social factors in a definition of health, therefore, would prevent the investigation of their effect on health status. "If the purpose of the health indicators ... is to provide a tool for the measurement of the effects of social and other circumstances upon health, then this is not very useful" (Blaxter, 1990, p. 41).

Instead, it is preferable to acknowledge that social circumstances may directly affect health rather than to define personal health status in such terms.

> *A model of health status that defines social factors ... as external but related to an individual's health status explains empirical results better than one that includes social factors as an integral component of individual health.*
>
> (Ware *et al.*, 1981, p. 621)

In this way a clear distinction is drawn between health and quality of life, a boundary given almost corporeal reality by the argument that health "ends at the skin" (Ware *et al.*, 1981, p. 621).

The WHO definition also suggests that health is a positive concept emphasising social and personal resources – "not merely the absence of disease or infirmity". At any one time between 20 and 30 per cent of the general population will suffer from substantial physical or mental ill health. Reliance on negative definitions therefore "tells little or nothing about the health of the remaining 70% to 80% of general populations" (Ware *et al.*, 1981, p. 621). Unfortunately, data are not readily available on positive aspects of health. The only practical approach which can be adopted, therefore, is to measure health in terms of deviations from normative standards.

An additional complication is that health is both a stable and in another sense an erratic property – for both individuals and populations. This has prompted an explicit distinction to be made between the present health state of the individual, which obviously can be erratic, and health status, a "longer-term attribute" (Blaxter, 1985, p. 134) which, while subject to temporary fluctuations, is a more constant characteristic. Our main purpose here is to examine the health status of populations by investigating a number of different indicators which cover a variety of time spans.

Measuring health

Given that health can only be assessed by using proxies, any selection of indicators must emerge from a consideration of what is most desirable and the purpose for which they are required, tempered by the pragmatic constraints of the type of information which is available. The desirability of indicators must be considered in the context of the fact that "no such thing as a perfect health status indicator exists" (Hansluwka, 1985, p. 1209).

The most commonly used indicators for assessing the health status of populations are derived from mortality data. These enable a picture to be built up of what is likely to kill people and when, but say little about the health and ill health of the living. It is important, therefore, to obtain information about morbidity and, if possible, more positive aspects of health. Mortality and morbidity data are available at a population and individual level. This suggests four different ways of examining health status. Unfortunately, with the data easily available it is only possible to investigate two of them, namely population mortality and individual morbidity.

While there have been attempts to measure and use individual mortality as an indicator of health – such as the Office of Population Censuses and Surveys (OPCS) Longitudinal Survey and the American Human Population Laboratory (Berkman and Breslow, 1983) – which have greatly increased knowledge of the determinants of health, these data sets are very complex and not readily available. Similarly, data concerning population morbidity are not easily adapted to our purpose and are frequently limited to medically defined conditions, such as the notification of infectious diseases or cancer registration. The focus of

this report, therefore, is on indicators of the mortality of populations and the morbidity of individuals aggregated to small areas for comparative purposes.

Population mortality

"The most severe consequence of bad health is to be deprived of life" (Blaxter, 1981, p. 2).

Population mortality is a relatively straightforward indicator of the health of a community. It has certainly been widely used, and it is useful for both historical and international comparisons, since all countries collect some form of population mortality statistics. For example:

> *infant mortality and the mean expectation of life at birth have been widely accepted ... as a valid and at any rate, comparatively readily available reflection of the level of health of a population.*
>
> (Hansluwka, 1985, p. 1207)

Although mortality data are commonly accepted as the most objective measures of the health status of the population, they are inadequate for many purposes. Their use is based on the assumption that comparative mortality indicators adequately reflect the general level of health of different communities. More commonly, it might be argued that death should be regarded as the tip of the iceberg, the most extreme indicator of the health of the community. For this reason our report also focuses on individual health and morbidity.

Individual morbidity

In contrast to mortality, there is a "lack of generally agreed definitions, of measurement techniques and of pertinent data" (Hansluwka, 1985, p. 1209) from which to derive meaningful indicators in other dimensions of health. Nevertheless, in the richer, more industrialised world, mortality rates are of decreasing policy relevance. Changing patterns of disease and success in reducing premature death have meant a change in emphasis to encompass areas of morbidity as well as death.

> *The growing awareness within the health sector that as a consequence of the impressive success against most of the traditional killers in what constitutes nowadays the developed world such mortality-based measures have lost much of their information value and can no longer be viewed as adequate measures of the health status of a population.*
>
> (Hansluwka, 1985, p. 1207)

It is clear, therefore, that the increased interest in measuring the health status of living people must be accommodated in this report. Unfortunately, any attempt to do this in a convincing way raises a number of methodological issues which must be addressed. In particular, we focus on the type of measurement used and the multidimensional nature of health.

Types of measurement

The measurement of health status ranges from relatively objective physiological assessments to individuals' own subjective perceptions of

their health. Objective indicators include clinically identified disease, physical development and the functioning of bodily systems. Examples of subjective perceptions include individuals' assessments of their health or illness which may reflect a rich array of interpretations and beliefs, as illustrated in Box 1.2 above.

At the level of individual morbidity, objective measures tend to be based on physiological tests such as blood pressure, body mass index, cholesterol or glucose levels, lung and muscle function, pulse rates and cardio-respiratory assessments. These are heavily relied upon by the medical profession and provide important information about individuals' physical fitness.

In recent years, however, there has been growing support for the use of more personal assessments of health. Evidence has begun to emerge which demonstrates that self-assessment of health status is a good measure of current physical health and a significant predictor of mortality for some sub-groups of the population (Wannamethee and Shaper, 1991; Mossey and Shapiro, 1982). This evidence supports the suggestion that, since health is essentially subjective, the only valid measure to accept is people's own assessment of whether they are healthy or not. For example, a recent review in the *New England Journal of Medicine* acknowledged that:

> *There is growing appreciation in the medical community that, although they are still imperfect, instruments based on subjective data from patients can provide important information that may not be evident from physiologic measurements and may be as reliable as – or more reliable than – many of the clinical, biochemical, or physiologic indexes on which doctors have traditionally relied.*
>
> (Epstein, 1990, p. 267)

It is useful that such views are gaining ground, but we do not wish to suggest that one type of measurement is better than another. Each has a role to play in increasing our understanding of the health status of Londoners.

A multidimensional phenomenon

Particular attention was paid in the previous section to the distinction between objective and subjective indicators of health status. It is also important, however, to emphasise the multidimensional nature of health. Attempts to measure health status, therefore, should capture the variety and richness of perceptions of what constitutes health. At the same time, it is often very convenient to have a summary measure of health status which reflects multiple dimensions. Can this be done?

It is clear, for example that a comprehensive assessment of health status ought to include *inter alia* physiological indicators, measurements of illness and disability, and psycho-social perceptions. Capturing reasonable data about each dimension is not that difficult, but the challenge lies in combining them into a single global indicator of health.

There appears to be a trade-off between the simplicity of a single indicator of health and the loss of information that results from the

aggregation of different health status variables. Thus the main argument against the use of global indicators is that they are:

> *an imperfect way to summarise the state of a person's health ... Health status is like fruit in a bowl. What is the average fruit? How can we add and subtract apples and oranges?*
>
> (Ware *et al.*, 1981, p. 624)

Despite this argument, a number of researchers have constructed single indicators of health. We remain agnostic about whether a range of summary measures of different dimensions of health or a composite indicator is the best way of assessing comparative health status. In this report, therefore, both are presented.

Data sources

The purpose of this introductory discussion has been to highlight the complex nature of health and hence the difficulty in measuring it. To assess the health status of Londoners requires a range of indicators of mortality and morbidity as well as information about more positive approaches to health. The indicators chosen should be both objective and subjective and cover as many of the different dimensions and perceptions of health as possible. Given this, our analysis concentrates on three data sets. Two of these facilitate comparisons between Londoners and non-Londoners and the third allows a closer examination of the determinants of health status within the capital.

The first comprehensive national data set analysed in this paper is the Department of Health's *Public Health Common Data Set* (DoH, 1990), which consists of mortality statistics for all English district health authorities (DHAs). Currently the best available data on national morbidity are found in the *Health and Lifestyle Survey,* summarised by Blaxter (1990). This is a national survey of 9003 individuals, and includes information about fitness, disease and disability, illness and psycho-social health. Finally, the *Survey of Londoners' Living Standards* is used to investigate the relationship between material and social deprivation and health within the capital.

These three sources of data provide a picture of the comparative health status of Londoners and also illustrate the variations in health within the capital.

London in context

The previous section outlined an approach to the measurement and definition of health status. But to make a comparative assessment of the health status of Londoners it is necessary to consider which areas are the most appropriate comparators for the capital. In order to do this, it is helpful to begin by considering some basic facts about London in a national context.

What is London?

The capital city of England can be defined as the area previously covered by the Greater London Council (GLC) before its demise. In

1990, this area contained 33 boroughs and 29 district health authorities. There is not quite total correspondence, since three of the DHAs extend slightly beyond the GLC boundary.

Demography

In 1989 the total population of Greater London was estimated to be 6.75 million. Table 1.2 on p. 29 shows the population of the 29 district health authorities in London which is slightly greater than this, at 6.9 million, because health districts, as a group, are not quite coterminous with boroughs. Of these residents, approximately one-third live in "inner London" (defined as the area of the former Inner London Education Authority (ILEA)) and two-thirds in "outer London" (comprising the 20 boroughs outside ILEA). Together, the population of Greater London constitutes 39 per cent of the population of the whole of the South East region and 14 per cent of the total English population.

A breakdown of the age structure of the London population in 1989 shows that approximately 19 per cent were under the age of 15 years, 64 per cent were of working age, and 17 per cent were over pensionable age. This was very similar to the country as a whole. Differences in average household size were also quite small. In 1988 there was an average of 2.4 people per household in London, compared with 2.53 in England as a whole.

However, differences in relation to other demographic characteristics such as ethnic origin are rather more pronounced in the capital. In 1981, 15 per cent of households in London were headed by someone born in the New Commonwealth or Pakistan. This was twice the proportion in the whole of the South East, and three times the average proportion in the country as a whole (5 per cent).

Population density is also substantially higher in the capital than elsewhere. In 1989, there were 366 persons per square km in England. However, in Greater London there were 4278 persons per square km; density varied from less than 2000 in Bromley to more than 11,000 in Islington. Outside Greater London the highest population densities were in Portsmouth (4917) and Liverpool (4126).

Socio-economic characteristics

London has a rather different social class structure from England as a whole. In 1981, there were an equal number of Londoners in manual and non-manual occupations, whereas there were 27 per cent more manual than non-manual workers in the country generally. This difference mainly reflects the balance between manual and non-manual workers in social class III rather than substantial differences across the whole distribution.

However, social class tells only part of the story, since many people who are unoccupied remain unclassified. This is particularly true for some single-parent families. In 1988, London had an estimated 308,560 lone-parent households, of which approximately half were in inner London. London as a whole accounted for 47.6 per cent of all lone-parent households in the South East and 7.7 per cent of all such

households in England. Lone-parent households represented 11.2 per cent of all households in Greater London in 1988, a higher proportion than the national figure of 9.4 per cent.

The economic structure of an area is closely related to its employment and industrial base. In this respect, London's strength and the principal source of its relative prosperity is linked to the concentration of financial and business services. Over 80 per cent of London's employment is in the service sector, whereas the average for the country as a whole is 67 per cent. Moreover, the 22 per cent of London workers employed in financial services is double the national average. In contrast, only 13 per cent of the capital's employment is in manufacturing, compared with 23 per cent for England as a whole.

The contribution which a region makes to the country's economic performance is sometimes based on estimates of GDP per head. In 1987, Greater London's contribution was 45 per cent greater than the regional average in England. However, only a relatively small part of this difference went directly to individuals in the capital. In 1987, Greater London had a household disposable income per head which was only 8 per cent higher than the average in England. One reason for the large difference between the two sets of estimates is that GDP generated by commuters is allocated to the area in which it is earned rather than to their area of residence.

Unemployment in the capital in 1991 was estimated at 5.9 per cent of the population, with the rate in inner London being more than double the rate in outer London. The rate in London as a whole is higher than the average in the South East but less than the English rate of 6.5 per cent.

A much lower proportion of Londoners are owner-occupiers (57 per cent) than nationally (66 per cent), while, conversely, a higher proportion rent privately (15 per cent) than in the country as a whole (10 per cent).

If overcrowding is defined as there being more than 1.5 people per room, the 1981 Census found 1.3 per cent of households in Greater London to be overcrowded; 2.1 per cent of inner London and 0.8 per cent of outer London households. Overcrowding is more than twice as prevalent in the capital than nationally.

Summary

The statistics outlined above highlight the extent to which there are important differences between London and England as a whole. The most striking of these – in relative terms – are the large number of members of ethnic minority groups, the high level of population density, the pattern of employment and the low rate of owner-occupation. The extent of such differences has important implications for a comparative assessment of the health status of Londoners. In principle, one ought to try to compare areas which are reasonably similar to one another. This means that a simple reliance on London versus England comparisons is an unsatisfactory way of proceeding.

On balance, our view is that it would be far more valuable to compare London with similar areas elsewhere rather than with broad

national averages. For this to be possible, a technique is required for classifying different areas into a number of relatively homogeneous groups.

Comparative considerations

A number of methods for comparing small areas have been developed. The most well-regarded taxonomy in Britain was produced by making use of the 1971 and 1981 census data to classify administrative areas – including local and health authorities – into a number of clusters,

Box 1.3

CRAIG'S CLASSIFICATION OF BRITISH AREAS

The main purpose of John Craig's socio-economic classification of local and health authorities in Great Britain is to "provide groupings which help highlight some of the most general broad differences between areas" (1985, p. 1). The statistical technique employed to do this is known as cluster analysis.

Basically this compares areas by calculating a measure of the overall difference between them on all the variables deemed to be relevant. Groups ... are formed by identifying areas between which the measure of overall differences is small.

(1985, p. 3)

It is important to note that there is no theoretical basis on which the selection of variables to perform the calculations can be made. It is generally advisable to make use of data which has a degree of face validity; it should be intuitively plausible to the intended audience. Nevertheless, there can be no getting away from the fact that:

the choice of variables is, in the last resort, a pragmatic one – that is the crucial test of the variables chosen is whether the resulting groupings are sensible and useful.

(Craig, 1985, p. 3)

For his analysis, Craig used 35 variables, derived from the 1981 Census, covering demographic and socio-economic structure, household composition, employment and housing. Data on each of the variables were analysed for 459 local authorities in Great Britain so as to produce a hierarchy of three kinds of groups. First, 28 "clusters" of areas were identified. These were then reduced to ten larger "families", and finally the ten families were reduced to six "groups" by amalgamating some of the families. This local authority based classification was then used to allocate health authorities to the same clusters, families and groups. Such an approach has the disadvantage that the classification of health authorities is almost certainly different from one which would emerge if they themselves were the primary focus of the analysis. On the other hand, Craig claims that his method:

has the considerable advantage that there is only one classification to interpret and that health areas and local authority areas can be interrelated.

(1985, p. 3)

A simplified version of Craig's classification which highlights the distribution of London health districts is shown in the table below. All of the London districts are categorised into three of the six groups – established high-status areas, major urban areas, and inner London.

CRAIG'S SIMPLIFIED CLASSIFICATION OF ENGLISH HEALTH AUTHORITIES*

Craig group No.	Name	London	Non-London	England
1A	Established high-status	12	23	35
1B	Higher-status growth	0	17	17
2	Rural, resort & retirement	0	36	36
3	Mixed, town and country	0	44	44
4/5	Major urban areas	4	41	45
6	Inner London	13	0	13
TOTAL		29	161	190

*Bloomsbury and Islington are included as separate authorities.

families and sub-families (Craig, 1985). Unfortunately, this is not ideal for our purposes, but it does provide a very useful starting point because "the groupings can be used as an aid for a more detailed investigation" (1985, p. 1). Box 1.3 briefly summarises the essence of the approach developed by Craig.

Craig's taxonomy has certain useful features for anyone interested in undertaking comparative analyses of London. First, group 1A (established high-status areas) provides a very useful framework for comparing the experiences of many of the outer London districts with similar authorities outside the capital. Second, by identifying some health districts in London which do not fit the conventional inner/outer dichotomy, it draws attention to the need to think more carefully about the way in which London health districts themselves are classified.

Whatever its other merits, however, Craig's approach has serious limitations for the London-focused analyst seeking to make use of it for comparative purposes. The most important problem is that Craig identifies no other areas in Great Britain with which to compare the London districts in group 6. An additional problem is that all except one of the areas with which to compare Tower Hamlets are in Scotland, whereas most of the easily available comparative data are for England only.

It is perhaps worthwhile emphasising why these difficulties represent such a problem for analytical purposes. The most convenient way of undertaking comparative analyses of health and health care in London is to classify the capital's health districts into meaningfully distinct categories which form part of larger groupings of homogeneous areas in the country as a whole. Given the way that administrative statistics are collected this usually means England rather than Great Britain.

It would be perfectly possible to analyse a selection of data for all English health districts and to produce a completely different classification from Craig's which would facilitate the kind of comparative analysis described above. We have taken the view, though, that there is some merit in retaining Craig's taxonomy where it is appropriate because it is so familiar, and that it makes sense to modify it only when that is essential for our purposes. In the vast majority of cases, Craig's classification of English health districts is perfectly adaptable for our purposes. The table in Box 1.3 illustrates that groups 1A to 3 – which account for almost 70 per cent of the total – are unproblematical. It is the remaining 58 (or so, depending on the time period to which the data relate) health districts in groups 4 to 6 which do not easily lend themselves to the kinds of comparative analyses which we want to conduct. It is in relation to this minority of health districts – 17 in London and 41 outside the capital – that we propose to modify Craig's taxonomy.

This can only be done in a very simple way for analysis of morbidity based on the *Health and Lifestyle Survey*. Here the only possibility is to aggregate Craig's categories 4–6 so as to facilitate some kind of comparative analysis. The small area analysis of the HALS data,

therefore, compares two groups of Londoners with broadly similar groups in other parts of England. People living in the twelve districts in the capital classified as "established high-status" areas are directly compared with those in the 23 similar non-London districts. Less satisfactorily, the people living in the 17 London districts spread across Craig's groups 4–6 are compared with those in the 41 districts in groups 4 and 5 which we refer to as "metropolitan" areas. In the case of mortality, however, we can adopt a more sophisticated form of modified approach.

A modified approach

Two key assumptions guide the development of a revised approach. First, there is a small group of hybrid authorities in the capital which straddle the conventional distinction between inner and outer London. Second, in contrast to Craig we can identify reasonably homogeneous comparators for all London districts.

Our approach involves making use of the same statistical technique as Craig – cluster analysis – and similar kinds of census data. We have chosen to rely on a smaller range of variables, however, which are widely used for existing health planning purposes; the component parts of the deprivation indices developed by Carstairs, Jarman and Townsend. This set of data consists of 16 variables rather than Craig's total of 35, but the broad coverage is very similar.

Using the cluster facility available within SPSSX allowed the method of clustering as well as the array of variables to be varied. Two new distinct groupings were identified, each involving some of the London districts plus districts from other parts of England. This allows us to present an alternative classification of district health authorities (Table 1.1) which differs from Craig's classification in that the inner London districts are divided into two groups, each of which contains non-London as well as London districts.

The London districts are divided between groups 1A, 4 and 5,

Table 1.1

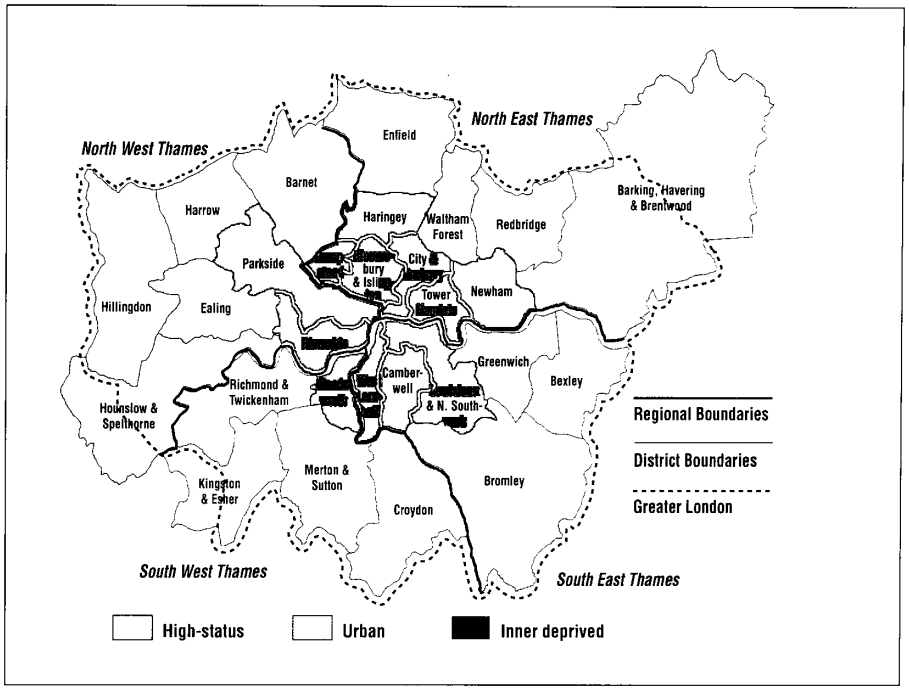
Modified KFI/ Craig classification of English health authorities*

KFI/Craig group				
No.	**Name**	**London**	**Non-London**	**England**
1A	Established high-status	12	23	35
1B	Higher-status growth	0	17	17
2	Rural, resort and retirement	0	36	36
3	Mixed, town and country	0	44	44
4	Major urban areas	4	34	38
5	Inner deprived areas	13	7	20
TOTAL		29	161	190

* Bloomsbury and Islington are included as separate authorities.

Figure 1.1

Map of KFI/ Craig modified clusters in London



which we have termed established high-status areas, urban areas and inner deprived areas, as shown in Figure 1.1.

The modified classification results in a set of non-London districts which can be used for the purpose of comparison in each case. The distribution of the populations in and out of London for each cluster is shown in Table 1.2.

Table 1.2

Modified KFI/ Craig classification population mid-year estimates, 1989

	London		Non-London comparable areas	
KFI/Craig group	**No.**	**%**	**No.**	**%**
High-status	3,244,316	46.9	5,083,728	31.1
Urban	997,958	14.4	9,731,334	59.5
Inner deprived	2,675,205	38.7	1,549,317	9.5
Total	6,917,479	100.0	16,364,379	100.0

Although we have followed Craig's well-established methodology, two advantages over his taxonomy can be identified. First, this approach has a clear health perspective in clustering health districts rather than building those up from local authority areas. Second, there is a breakdown of what has traditionally been regarded as inner London into two distinct groups, which are no longer isolated, for comparative purposes, from the rest of England. At the same time this approach has retained one of the great advantages of Craig's classifications; it

produces groupings of areas which are broadly homogeneous. Table 1.3 shows some of the key differences between the three clusters containing London districts.

As Table 1.3 shows, high-status areas would appear to be more advantaged than England as a whole, while urban and – to an even greater extent – inner deprived areas are more disadvantaged. Box 1.4 describes in more detail the key characteristics of these three clusters.

Table 1.3

Characteristics of the modified KFI/Craig clusters, 1981

	High-status			Urban			Inner deprived			
Census variables	**London**	**Non-London**	**Total**	**London**	**Non-London**	**Total**	**London**	**Non-London**	**Total**	**England**
Ratio of social class I&II: IV&V	2.6	2.7	2.7	1.4	1.1	1.1	1.0	0.5	0.8	1.5
Households not owner-occupied, %	35.0	35.6	35.3	47.0	45.2	45.4	70.5	56.0	65.3	42.4
Population changed address in last year, %	8.8	8.9	8.9	9.7	9.4	9.4	12.8	9.0	11.3	9.5
Population in households with head from New Commonwealth and Pakistan, %	8.1	3.1	5.1	16.3	4.7	5.8	21.0	12.7	17.8	4.7
Population unemployed, %	6.0	6.5	6.3	8.2	11.7	11.4	11.7	18.3	14.1	9.4
Households without car, %	33.2	28.0	30.1	40.5	45.7	45.2	57.9	57.3	57.7	38.6
Households with more than 1 person per room, %	3.3	2.4	2.8	5.5	4.0	4.1	7.2	6.5	7.0	3.4
Households without exclusive use of amenities, %	3.7	2.9	3.2	7.0	4.6	4.8	10.7	7.4	9.5	4.6

As both Table 1.3 and Box 1.4 demonstrate, the increase in disadvantage as one moves from high-status to urban to inner deprived clusters is steep and consistent. The ratio of high to low social class declines from high-status to inner deprived areas. Similarly, there is a higher proportion of home and car ownership in high-status than urban and more especially inner deprived areas. For example, almost double the proportion of households are not owner-occupied in inner deprived compared with high-status areas. Unemployment, poor-quality housing, population mobility and the numbers of ethnic minority households all increase in a similar direction. For example, the unemployment rate is 80 per cent higher in urban areas than in high-status, and a further 24 per cent higher in inner deprived areas than in urban. There are also more than three times as many households with a head from the New Commonwealth and Pakistan in inner deprived as in high-status areas.

It is difficult to judge the London/non-London differences across the three status areas. Generally, London has less unemployment and a higher ratio of people in high to low social classes. Yet it has much higher levels of non-home ownership, ethnic minority households, poorer-quality housing and a more mobile population. The balance between these different factors makes it difficult to assess whether or not London is more or less disadvantaged than "comparable" areas.

Box 1.4

CHARACTERISTICS OF KFI MODIFIED CRAIG CLUSTERS

A description of some of the key characteristics of the three clusters which we focus on for comparative analysis is set out below.

Established high-status areas

Nearly 18 per cent of the English population lived in established high-status areas in 1989. They contain the more advantaged sections of the population and are generally located in the more desirable outskirts of urban areas.

In these areas in 1981, there were almost three times as many people in social classes I and II as IV and V. Nearly 65 per cent of households were owner-occupiers and 70 per cent owned cars. Unemployment was 30 per cent lower in high-status areas than in England as a whole. There were lower rates of overcrowded houses, homes which lacked exclusive use of amenities and population mobility.

The characteristics of districts in and out of London in this status group are remarkably similar with only a few exceptions. More than double the proportion of the population in London districts had a head of household from the New Commonwealth or Pakistan compared with equivalent areas outside London. London districts also had slightly higher rates of overcrowded households and houses lacking amenities. On the other hand, unemployment was slightly lower in London than non-London districts and car ownership slightly higher.

Urban areas

Twenty-four per cent of the population in England lived in major urban areas in 1989. These districts tend to be slightly more disadvantaged than England as a whole and high-status areas in particular.

In 1981, there were only slightly more people in social class I and II than IV and V, and the ratio was lower than in England as a whole. There were higher levels of unemployment, overcrowding and households without cars or amenities than the average rate for England. More urban households – 5.8 per cent – had heads born in the New Commonwealth and Pakistan, particularly in London – 16.3 per cent – than in the country as a whole.

As in high-status areas, urban London had higher rates of overcrowded and poor-amenity households than non-London, although unemployment was again substantially lower in London than non-London areas. The proportion of households without cars in urban London was lower than in non-London and the ratio of high to low social classes was greater.

Inner deprived areas

Approximately 9 per cent of the English population lived in inner deprived areas in 1989. They are clearly much more disadvantaged than residents in the other clusters. In 1981, there were substantial proportions of the population who did not own their own houses (65 per cent) or their own cars (56 per cent). Nearly 18 per cent of heads of households were born in the New Commonwealth or Pakistan. Over twice the proportion of households in inner deprived areas were overcrowded or lacked amenities than in England as a whole.

Unemployment was substantially higher in inner deprived areas than the average national rate in 1981, while the ratio of high to low social classes was approximately half.

Residents in inner deprived areas were more mobile than elsewhere, especially Londoners, 13 per cent of whom had moved in the year before the 1981 Census.

There are some major differences between London and non-London inner deprived areas. The proportion of households not owning their own homes is 25 per cent higher in London than non-London. Households which are overcrowded or lack amenities are also more prevalent in inner deprived London than comparable areas elsewhere. The proportion of households with a head from the New Commonwealth or Pakistan was 60 per cent higher in London than comparable areas.

However, unemployment was again substantially lower in London than non-London areas. Also the class structure was different in and out of London. Within the capital the ratio of people in social classes I and II to IV and V was approximately 1:1, whereas outside London there were relatively more people in classes IV and V and the ratio was closer to 1:2.

Perhaps the key point to note for our purposes, however, is that the modified KFI/Craig classification is a reasonably good proxy for the degree of advantage or disadvantage in a group of areas. For example, it is possible to demonstrate the close association between the KFI/Craig classification and measures of deprivation. The relationship with three census-based deprivation indices – Jarman, Townsend and Carstairs – is illustrated in Box 1.5.

Box 1.5

MODIFIED KFI/CRAIG CLUSTERS AND DEPRIVATION INDICES

The Craig classification correlates well with various census-based indices of deprivation which have been developed by such people as Carstairs, Jarman and Townsend and which can also be used to differentiate and categorise health authorities.

The table above shows the distribution of health authorities using the KFI/Craig clusters and a categorisation of the Jarman index. It illustrates the clear relationship between the different probabilities of the extent of advantage or deprivation amongst different types of health authority as categorised by Craig. For example, all of the thirty-five DHAs in the established high-status areas are in the two lowest deprivation categories. In contrast, all of the twenty authorities in the inner deprived areas are in the two most deprived categories, whilst 84 per cent of the thirty-eight DHAs in urban areas are also in the two highest deprivation categories. A very similar relationship can be shown to exist between the Carstairs and Townsend deprivation indices and the modified Craig classification of DHAs. In other words, different categories of health authority have been classified as advantaged or disadvantaged in a number of ways and there is considerable overlap between each method.

CATEGORISATION OF ENGLISH DISTRICT HEALTH AUTHORITIES BY JARMAN DEPRIVATION INDEX AND KFI MODIFIED CRAIG CLUSTERS

KFI/Craig group	Jarman deprivation categories				
	1	2	3	4	N=
High-status	15	20	–	–	35
Urban	–	6	21	11	38
Inner deprived	–	–	1	19	20
Other	6	73	18	0	97
TOTAL	21	99	40	30	190

Summary

The method of comparing the health status of Londoners with non-Londoners in this report varies slightly depending on whether variations in mortality or morbidity are being investigated. In both cases, however, we have adopted a modified form of Craig's classification of health authorities. Table 1.4 summarises the differences between the two approaches. In each case, Craig's original classification of groups 1A, 1B, 2 and 3 is maintained. The differences arise in the treatment of Craig's groups 4, 5 and 6. In the case of mortality, which is discussed in Chapter 2, the cluster analysis outlined above is used to reclassify these three groups into two new ones which are referred to as "urban" (4) and "inner deprived" (5) areas. This means that there are three distinct clusters in London (1A, 4 and 5) which can be compared with broadly homogeneous areas in other parts of England. As far as morbidity is concerned, which is discussed in Chapter 3, the data available only enable the same comparisons to be made for group 1A,

the "established high-status" areas in outer London. Therefore Craig's groups 4, 5 and 6 have been combined to form a new category which is referred to as "metropolitan" (4).

Table 1.4

Classifying English health authorities

Mortality			Morbidity		
KFI/ Craig	**Craig**	**Area name**	**KFI/ Craig**	**Craig**	**Area name**
1A	1A	Established high-status	1A	1A	Established high-status
1B	1B	Higher-status growth	1B	1B	Higher-status growth
2	2	Rural, resort and retirement	2	2	Rural, resort and retirement
3	3	Mixed, town and country	3	3	Mixed, town and country
4	4,5,6	Major urban	4	4,5,6	Metropolitan
5	4,5,6	Inner deprived			

Outline of the report

Having described the way in which we propose both to define health status and to compare the experience of people living in the capital with those in broadly homogeneous areas elsewhere in England, we present the substantive analyses in the rest of this paper. The next chapter uses data from the *Public Health Common Data Set* to analyse mortality rates within the comparative perspective of the modified approach to Craig's taxonomy of areas described in the previous section. Chapters 3 and 4 focus on morbidity, using data from the *Health and Lifestyle Survey*. Chapter 3 presents comparative descriptive statistics of various measures of health status – including illness, psycho-social health, disability and fitness – derived from the most comprehensive national survey of health and lifestyles yet available. The following chapter introduces and tests a multivariate model of the determinants of health status which enables an assessment to be made of the relative significance of regional factors such as living in London. One of the features of this analysis is that it emphasises the association of adverse social and economic circumstances with indicators of poor health. Chapter 5, therefore, presents a more detailed picture of the relationship between deprivation and health in the capital which is obtained from the *Survey of Londoners' Living Standards*. The final chapter of the paper summarises the key findings and briefly reviews their implications for policy.

CHAPTER 2

Mortality

The only indicator of health that is certainly defined is mortality, and indeed this is the most commonly used indicator.

(BMA, 1987, p. 8)

The aim of this chapter is to assess the mortality experience of Londoners in comparison with the inhabitants of the rest of England in general, and similar urban areas in particular. To do this, the adapted Craig clusters discussed in the previous chapter are employed to analyse the *Public Health Common Data Set* (DoH, 1990) in a number of different ways. First, however, the chapter briefly sets the analysis of Londoners in context by focusing attention on the different patterns of, and socio-economic variations in, mortality across the country.

Patterns of mortality

There has been a substantial decline in mortality rates for all ages over the last 150 years. This is particularly true for infants, children and young adults. Much of this reduction has been due to improvements in nutrition and hygiene (Swerdlow, 1987). These developments have drastically changed the pattern of causes of death, with infectious diseases being replaced by chronic conditions, such as heart disease and cancer.

The experience of mortality in different parts of the country, however, is not uniform. There are substantial geographical variations within England and Wales. The most recent review of area mortality by OPCS (Britton, 1990) described regional patterns which are briefly reported below.

Regions in the North and West have higher levels of all-cause mortality than those in the South and East for both genders and for all ages. For all-cause mortality, Greater London had the highest standardised mortality ratios (SMRs) in all of the South East, South West and East Anglia regions (1979–83). When broken down, inner London had an all-cause SMR for males of 108, compared with 93 for outer London (1979–83; England = 100). This pattern is consistent for most causes of mortality, with only one or two exceptions. For example, mortality from hypertensive disease is lower in the North and North West, and mortality from breast cancer and leukaemia is higher in the South.

While the extent of geographical variations in mortality by region has remained roughly constant over the last twenty-five years, it has been argued that spatial inequalities in mortality between smaller areas may have been widening. Some research has sought to go beyond

broad regionally-based data and has examined statistics for small areas. For example, in his investigation of variations in mortality in London boroughs, Congdon found that:

> *compared to England and Wales, London as a whole has mortality below average (a standard mortality ratio of 95 in 1986). However, deprived boroughs in London have mortality above the average.*
>
> (1988, p. 452)

These observed differentials widen when mortality is examined at the ward level. For example, in a study of 755 wards in London, mortality rates in the most deprived wards were nearly double those of the least deprived wards (Townsend *et al.*, 1986). Upon closer examination:

> *Concern about the spatial distribution of mortality in small areas and about the trends in such mortality reflects the close association known to exist between mortality and various types of deprivation. This association reflects a wider correlation between health and social conditions.*
>
> (Congdon, 1988, p. 452)

In statistical analyses of borough and ward level mortality in the capital, Congdon found that the significant explanatory factors were social class, marital status, housing tenure and overcrowding. He concluded that "increases in mortality are higher in small areas in inner London and with many low skill workers" (1988, p. 471). His analysis made the link between mortality and deprivation in the capital clear.

Inequalities in mortality can be demonstrated with a variety of measures of socio-economic characteristics. Thus, for social class:

> *The risk of death for lower occupational classes in the 1980s was much higher than that of the highest occupational classes at every stage of life.*
>
> (Whitehead, 1988, p. 236)

When examined by tenure, it was found that in 35 out of 36 types of local authority ward, owner-occupiers had lower SMRs than local authority tenants (Fox *et al.*, 1984). Similarly, the OPCS Longitudinal Survey provides evidence of excess mortality among the unemployed.

More than ten years after the first publication of the Black Report in 1980 – which emphasised the extent of health inequalities – the associations between deprivation and mortality are still as clear.

> *It has been shown that not being a home owner, not having access to a car, having a lower educational level, and being in a lower social class group are all related to higher mortality, and these effects are partially independent of each other.*
>
> (Davey Smith *et al.*, 1990, p. 373)

It is apparent that there are large variations in the mortality experience of different areas which are clearly linked to degrees of deprivation.

Public health common data set

The previous section has emphasised the importance of spatial variations in mortality. The objective of the rest of this chapter is to examine

these in more detail by focusing on how mortality varies between different parts of London and broadly comparable communities in other parts of England.

The data are drawn from the *Public Health Common Data Set 1990* (PHCDS), based on information for the five years up to and including 1989. The PHCDS was developed in response to a recommendation by the Acheson Enquiry which was established in 1986 to "consider the future development of the public health function" (Cmnd 289, 1988, p. 1). The final report defined the public health responsibility of health authorities and argued that they should be required to:

> *commission an annual report from their Directors of Public Health on the health of the population ... which will provide the basic epidemiological assessment on which they can base their decisions.*
>
> (1988, p. 20)

Subsequent work by the Department of Health and Faculty of Public Health Medicine defined the minimum data set (PHCDS) which all of the English health authorities should include as part of their annual report on public health. To date, this is based mainly on mortality data and covers a variety of indicators, such as:

- all-cause mortality;
- infant and child mortality rates;
- avoidable mortality rates;
- rates of years of life lost;
- cause-specific death rates.

In this chapter, these indicators are used within the comparative framework described in the previous chapter to investigate the mortality experience within London and to compare parts of the capital with other areas of England. First, data for all-cause mortality are examined. This is traditionally the most common general indicator of the levels of health in an area. Second, data for avoidable and premature mortality are analysed. These provide a slightly different focus, examining those causes of death which are deemed to be avoidable in the context of existing health care services. Data which estimate the loss of potential life are also investigated. Third, the most important specific causes of mortality – circulatory diseases, cancers and violent deaths – are identified so as to explore area differences in greater detail.

Before proceeding, however, it is necessary to make a few points about the presentation of the data. Each table follows the framework outlined in Chapter 1. A distinction is made between London, non-London and England as a whole, and within these categories, between "inner deprived", "urban" and "high-status" areas. Much of the data contained within the tables are expressed in the form of standardised mortality ratios which adjust for differences in the age and sex structures of different areas (see Box 2.1). Finally, although not reported in the text, 95 per cent confidence intervals for all of the estimates contained within the tables have been calculated. All of the

BOX 2.1

STANDARDISED MORTALITY RATIOS

The most basic pieces of information about mortality in an area are the crude mortality rates which express the number of deaths for an entire population. However, while these are useful as summary statistics for estimating the size of a problem, they do not allow comparisons to be made between areas, since they take no account of underlying characteristics – such as the age, sex or ethnic distribution of the population. For example, a higher crude death rate may actually reflect an older population structure rather than a higher level of mortality. To overcome this problem, standardised mortality rates are calculated which "remove the effect of differences in composition of various populations" and enable comparisons to be made.

Most commonly, the indirect method of standardisation is used. Age-specific death rates from a "standard population" – in this case, England and Wales – are applied to the population in the area of interest. This yields a total expected number of deaths, which can then be compared with the actual number of deaths in the area to calculate a standardised mortality ratio (SMR).

$$\text{SMR} = \frac{\text{Observed deaths}}{\text{Expected deaths}} \times 100$$

Interpretation of an SMR is simple and straightforward. If the SMR is greater than 100, the area has a larger number of deaths than expected on the basis of the rates in the standard population.

It should be noted that, in theory, an SMR for a particular area should only be contrasted with the standard population, i.e. England and Wales. In practice, however, SMRs are a convenient way of indicating – albeit somewhat imprecisely – the relative mortality experiences of different areas.

differences stated are statistically significant at that level unless specifically stated to the contrary.

All-cause mortality

Mortality from all causes can be examined either for the population as a whole or for different age-groups. In this section, data presented are about infant and child deaths, as well as all-age mortality.

All-age mortality

All-cause, all-age mortality is widely used to compare the level of health between areas. In England, throughout the 1980s, there were approximately 11 deaths per 1000 population each year. But, after adjusting for changes in the age and sex structure of the population during this period, standardised mortality rates actually fell. If the SMR for 1950-52 is taken to equal 100, then in 1980 the SMR for England was 78; by 1989 it had declined to 68. Underlying this reduction, however, there are wide variations between areas.

Table 2.1 sets out the standard form of presentation adopted for illustrating the differences in mortality rates between different areas. The columns in the table distinguish between London, other comparable parts of the country and England as a whole. The rows are based on the modified classification of areas described in Chapter 1. Particular attention is paid to the three types of area – inner deprived, urban and high-status – to be found in London. Summary statistics for London as a whole and the broadly comparable combination of areas in the rest of the country are also shown. Finally, the SMR for other areas of England which are not directly comparable with any part of

Table 2.1

Area variations in all-cause mortality, all ages, 1985–89 (SMRs)

Area categories	London	Non-London	England
Inner deprived	100	113	105
Urban	96	106	105
High-status	90	95	93
Weighted sum	94	103	101
Other			99
England			100

London is reported. Various comparisons can be made. For example, the SMR for London as a whole, which is shown as 94, can be compared with the figure of 103 for broadly comparable areas and 100 for England.

As a general rule, the area categories are good proxies for the general level of deprivation of different areas. In particular, as the labels imply, inner deprived areas are more deprived than urban areas, which are similarly more disadvantaged than high-status ones.

More generally, Table 2.1 shows interacting relationships between deprivation, location and (all-cause, all-age) mortality. Districts in London have consistently and significantly lower SMRs than England as a whole and comparable non-London districts. In both London and non-London districts, there is an upward gradient in mortality from high-status to urban and then inner deprived areas.

The much higher SMRs in inner deprived districts outside London are due to consistent absolute differences in SMRs rather than different distributions or outliers. While the SMRs in London range from 90 (Hampstead) to 111 (Tower Hamlets), the equivalent non-London extremes are 101 (Central Birmingham) and 132 (North Manchester).

Similar patterns can be seen for males and females examined separately. London has consistently lower SMRs than comparable areas and there is an upward gradient in SMRs from high-status to inner deprived. However, for females, urban districts have an overall average SMR which is actually higher than that for all inner deprived districts. This is due to the relatively high SMRs in non-London urban districts.

Breaking down the population into those aged under and over 65 reveals an interesting pattern of mortality in London and comparable areas. For people under 65, the SMR for London as a whole is equal to that for England and slightly lower than that for comparable areas. However, for both London and non-London, there is a steep gradient across the clusters from high-status to inner deprived areas. For the under-65s, inner deprived London has an SMR which is 17 per cent higher than England as a whole, while non-London inner deprived areas have an SMR which is 28 per cent higher.

For over-65s, however, London has a lower SMR than England

as a whole, while comparable non-London areas are still greater than 100. The gradient across the clusters is much shallower for the over-65s than the under-65s, although still higher in non-London than London areas. In fact, even inner deprived London has an SMR less than 100 for the over-65s, while it is 109 for comparable non-London areas.

Childhood mortality

There were approximately 2100 deaths amongst children aged 1–14 in England and Wales during 1989. Accidents are the biggest cause of child deaths, accounting for 29 per cent of the total. Table 2.2 shows the mortality rates for children under 14.

Table 2.2

Area variations in childhood mortality rates, 1–14 years, 1989 (number of deaths per 100,000 resident children)

Area categories	London	Non-London	England
Inner deprived	27	34	30
Urban	31	27	27
High-status	18	21	20
Weighted sum	23	26	25
Other			24
England			25

London has a slightly lower childhood mortality rate than England as a whole and comparable areas in particular. It is apparent from Table 2.2 that there is systematic variation around the national average mortality rate, such that inner deprived districts have higher rates than urban districts, which are in turn greater than those of high-status districts. This national pattern is reflected in non-London areas, but within London urban districts have a higher mortality rate for children under 14 than inner deprived. DHAs in the capital have slightly lower childhood mortality rates than their equivalent comparison districts outside London, although again urban London is the exception to this. The inequality is widest among inner deprived districts. While those in London have rates between 13 (Hampstead) and 43 (Newham) per 100,000 children, equivalent non-London rates range from 22 (Wolverhampton) to 54 (Central Manchester).

Among urban districts, the rates of non-London districts are distributed far more widely than the London equivalents. London rates lie between 27 (Waltham Forest) and 33 (Ealing and Hounslow) per 100,000 children, while those outside the capital range from 13 (Leeds Eastern) to 44 (Burnley).

The lowest childhood mortality rates in the country are found in high-status districts. The rates range from 5 (Bexley) to 27 (Croydon) per 100,000 children in Greater London, while those outside the capital lie between 5 (Southport) and 39 (South West Surrey).

Infant mortality

There has been a steep decline in infant deaths throughout the twentieth century, from about 150 per 1000 live births at the turn of the century, to 8.4 per 1000 live births in 1989.

Approximately 6000 deaths occurred under the age of one in 1989. Of these, just over 40 per cent occurred in the first six days of life and a further 43 per cent in the post-neonatal period, i.e. 28 days to one year. Nearly one-half of infant deaths were classifed as sudden infant deaths (SIDS). Congenital abnormalities and respiratory diseases together accounted for a further 25 per cent.

Table 2.3

Area variations in infant mortality, 1989 (number of deaths under 1 per 1000 live births)

Area categories	London	Non-London	England
Inner deprived	9.3	10.2	9.6
Urban	9.5	9.3	9.3
High-status	7.7	8.0	7.9
Weighted sum	8.7	9.0	8.9
Other			7.9
England			8.4

Table 2.3 shows the infant mortality rates for each cluster. London has a higher death rate for children under one than the English average. However, it has a lower infant mortality rate than comparable areas outside the capital. In non-London areas, there is an increase in infant mortality from high-status to inner deprived areas. Whilst the general trend is the same for London, urban areas stand out as having the highest infant mortality rate within London. In general, perinatal, neonatal and post-neonatal mortality rates all confirm the patterns identified for infant deaths.

In contrast to mortality during infancy, the percentage of babies born with low birthweight is higher in London than comparable areas, as Table 2.4 shows. This is somewhat surprising because low birthweight

Table 2.4

Area variations in low birthweight, 1989 (percentage of babies born under 2500 grammes)

Area categories	London	Non-London	England
Inner deprived	8.0	7.9	8.0
Urban	8.0	7.3	7.3
High-status	6.7	6.0	6.3
Weighted sum	7.5	7.0	7.1
Other			6.5
England			6.8

is the single most important factor contributing to perinatal mortality, accounting for between 50 and 85 per cent of all deaths (Oakley, 1988). This would suggest that perinatal mortality rates should be higher in London than comparable areas, whereas the opposite is the case. One interesting area of future investigation, therefore, might be to ask whether the contrast between the two rates has something to do with differential access to paediatric care.

Summary

Certain patterns clearly emerge from the data on all-cause mortality, both for the population in general, and for children and infants in particular. Comparisons of groups of London districts with their equivalents show that the experience of mortality due to all causes within the capital is better than elsewhere. In a small number of instances there are no significant differences, but it is more commonly the case that residents of London districts have a more favourable experience of all-cause mortality.

The relationship between area proxies of deprivation and mortality has also been illustrated. Again, there are a few minor exceptions, but the general pattern to emerge is one of increasing mortality as the extent of deprivation rises. For both mortality at all ages as well as infant and child mortality, figures for inner deprived districts are consistently worse than those for high-status areas.

Avoidable and premature mortality

Indicators of overall mortality are based on the numbers of deaths occurring in a population, whether in a geographical area, a specific age-group or any other demographic category. However, other indicators of mortality exist which take account either of the inevitability of deaths occurring or the age at which they occur. Examples of the former are indicators of avoidable mortality, while one instance of the latter is the measure of years of potential life lost (YPLL).

Avoidable mortality

An alternative to overall indicators of mortality is the concept of avoidable deaths. This measure emphasises the importance of deaths

Table 2.5

Area variations in avoidable mortality, 1985–89 (SMRs)

Area categories	London	Non-London	England
Inner deprived	116	131	122
Urban	104	107	107
High-status	88	89	89
Weighted sum	100	104	103
Other			96
England			99

Box 2.2

AVOIDABLE MORTALITY

Possibly the first attempt to operationalise the concept of avoidable mortality was the inclusion by Rutstein *et al.* (1976; 1980), among indicators of health service provision in the USA, of a series of diseases from which most deaths are believed to be avoidable through medical intervention. In Britain, the use of the concept has been advocated mainly by Charlton and colleagues (Charlton *et al.*, 1983; 1984). Fourteen causes of mortality were selected as being avoidable, namely hypertensive disease, cervical cancer, pneumonia, tuberculosis, asthma, chronic rheumatic heart disease, acute respiratory infection, bacterial infection, Hodgkin's disease, abdominal hernia, cholecystitis, appendicitis, maternal deaths, anaemia and perinatal mortality. They argue that "a series of outcome indicators based on mortality data have been proposed for measuring the effectiveness of medical treatment over a wide range of curative services. The indicators are intended to provide warning signals of possible shortcomings in health care delivery" (1984, p. 306). It is argued that variations in avoidable mortality may be due to the incidence of disease, caused by genetic, social, economic and environmental factors, the fatality of cases and diagnostic errors.

However, criticisms of this work have been raised, notably by Carr-Hill *et al.* (1987). They argue that for avoidable mortality to be a valid indicator of health care outcome, there needs to be a direct analysis of the relationship between health care resources and avoidable mortality. The fact that there was no such analysis leaves the interpretation of avoidable mortality data open to some degree of doubt. In addition, it is suggested that the coding of cause of death may be less than completely reliable, since the quality of medical records may be correlated with the quality of corresponding medical care. These reservations must be borne in mind when examining data on avoidable mortality.

which ought to be preventable by appropriate and timely medical interventions and is explained in more detail in Box 2.2.

Table 2.5 shows that there is no real difference in avoidable mortality between London as a whole and England, although the rate in the capital is significantly lower than that in comparable areas at the 90 per cent level. There is also a clear, significant relationship between type of area and the experience of avoidable mortality. Inner deprived districts as a whole have an average SMR of 122, while the average for all high-status districts is 89. There is a significant difference between districts in and out of London only for those which are classed as inner deprived. London districts in that category tend to have lower SMRs, ranging from 97 (Haringey) to 144 (Tower Hamlets), while non-London inner deprived districts range from 114 (Central Birmingham) to 149 (North Manchester and West Birmingham). One other finding possibly worthy of attention is the SMR of 106 in Croydon, a high-status London district, which is substantially greater than the other values in that category.

Although not reported in detail here, it seems that the differences observed are more marked among males than among females.

Years of potential life lost

Another way of examining area variations in mortality is to make use of information about the ages at which deaths occur by calculating years of potential life lost (YPLL). This concept, which is explained in Box 2.3, attaches greater weight to deaths which occur at younger ages.

Box 2.3

YEARS OF POTENTIAL LIFE LOST

Years of potential life lost (YPLL) is a measure which takes account of the age at death and attaches greater weight to mortality at younger ages.

The concept was introduced by Dempsey (1947) to compare mortality due to tuberculosis with heart diseases and cancer. The author calculated, for each death, the years of life remaining until the current life expectancy. Dickinson and Welker (1948) modified the concept of "life years lost", using life expectancy at different ages rather than life expectancy at birth. The Office of Population Censuses and Surveys (OPCS) now produces rates of years of life lost per 10,000 of the total population.

The concept of YPLL:

is essentially designed to give a broad view of the relative importance of major causes of premature mortality ... it summarises most of the premature mortality, taking into account the number of deaths, the age at death and incorporating the actual age structure of the population considered.

(Romeder and McWhinnie, 1977, p. 150)

It represents:

an attempt to emphasise specific causes of death in proportion to their burden on society ... and focuses on the social and economic consequences of mortality.

(Gardner and Sanborn, 1990, p. 322)

It is calculated on the basis of three assumptions, namely that deaths are evenly distributed across ten-year age-groups, that the early deceased would otherwise have lived until the end of the age range, and finally that the current selection of age 75 is presently a realistic minimum expectation of life.

Table 2.6

Area variations in years of potential life lost per 10,000 population, 1985–89

Area categories	London	Non-London	England
Inner deprived	799	870	826
Urban	700	751	746
High-status	610	623	618
Weighted sum	696	723	715
Other			671
England			693

As Table 2.6 shows, there are slightly more years of potential life lost per 10,000 people in London than in England as a whole. However, the rate for comparable non-London districts is substantially higher than both of these. There is a steady increase in the number of years of potential life lost as area deprivation increases. The rate for all inner deprived districts is approximately 30 per cent higher than that for all high-status DHAs. This confirms previous findings that years of potential life lost are related to deprivation (Blane *et al.*, 1990). The experience of London districts is, on average, consistently better than non-London equivalents, with the gap widening as deprivation increases.

While there is little difference in the distributions of values for high-status districts, among urban districts those outside London have a very wide range, extending from 581 (Milton Keynes) to 914 (Salford) YPLL per 10,000 population. The values for inner deprived

districts in the capital range from 732 (Wandsworth) to 927 (Camberwell), while those out of London lie between 803 (Central Birmingham) and 1007 (North Manchester).

Tables 2.7 and 2.8 illustrate the substantial gender differences in years of potential life lost. For England as a whole, the mean value for females is 518 (YPLL per 10,000 women), while for males it is 877 (YPLL per 10,000 men). For both males and females there is a consistent difference between London and non-London districts, both

Table 2.7

Area variations in years of potential life lost per 10,000 males, 1985–89

Area categories	London	Non-London	England
Inner deprived	1,053	1,106	1,073
Urban	889	952	946
High-status	769	772	771
Weighted sum	896	911	907
Other			848
England			877

Table 2.8

Area variations in years of potential life lost per 10,000 females, 1985–89

Area categories	London	Non-London	England
Inner deprived	563	641	591
Urban	520	560	556
High-status	460	481	473
Weighted sum	509	543	533
Other			503
England			518

at the aggregate and individual category levels. But at each level there are substantially more years of potential life lost among males than among females.

Summary

Taken together, indicators of avoidable mortality and years of potential life lost describe a broadly similar pattern to that which emerged from the statistics for all-cause mortality. It should be noted that London districts' avoidable mortality is significantly less than comparable non-London mortality only at the 90 per cent level. Nevertheless, when this finding is combined with the figures for potential life lost, the suggestion that the different parts of London have a better record of avoidable and premature mortality than those comparable districts outside the capital is compelling. This difference is particularly marked

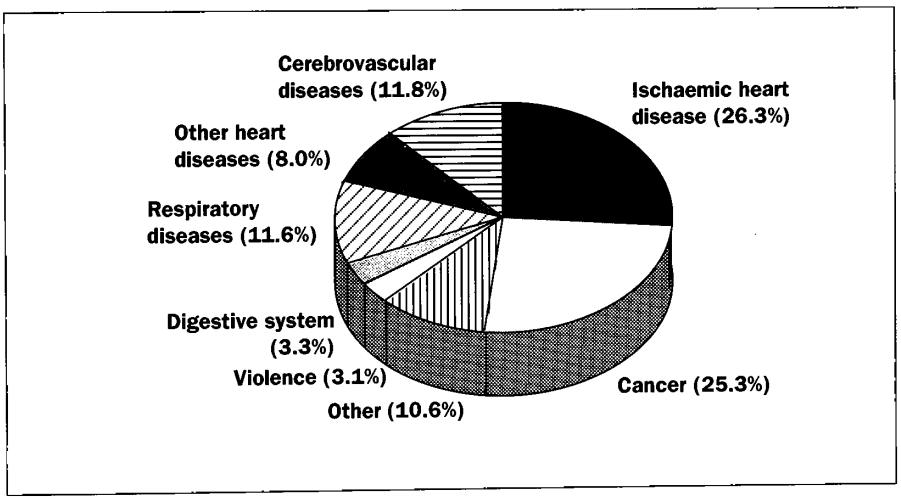
between inner deprived districts. In addition, there is a clear and consistent association with deprivation, both at the local and national level. Avoidable and premature mortality are consistently worse in inner deprived than urban districts, which in turn have consistently worse figures than high-status districts.

Specific causes of mortality

So far, the analysis has been based on general measures of mortality. But such overall statistics may disguise variations between specific causes of death.

Figure 2.1

Main causes of death, 1989

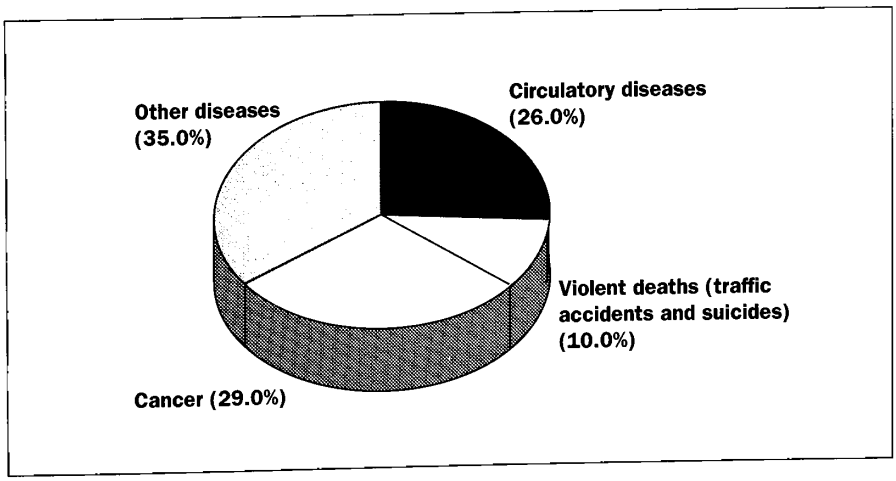


The importance of different causes of death has changed dramatically during the twentieth century. At the beginning of the century, infectious diseases were a significant cause of mortality. They have now been replaced by more chronic conditions, such as coronary heart disease, strokes and cancer. Figure 2.1 illustrates the main causes of death in England in 1989.

Circulatory diseases accounted for 46 per cent of all deaths in

Figure 2.2

Distribution of years of life lost (by cause of death. Up to age 75 years), 1985–89



1989. The two biggest killers in this category are ischaemic heart disease and cerebrovascular disease, the former accounting for approximately one quarter of all deaths. Mortality from all forms of cancer is the other major category, also accounting for one in four deaths.

Figure 2.2 tells a slightly different story. It illustrates the significance of different causes of death when the age of death is taken into account. Cancers account for a slightly higher proportion of years of potential life lost than they did the number of deaths. However, circulatory diseases account for only 26 per cent of years of life lost, despite representing nearly half of all deaths, reflecting the later age at which these diseases kill people. In contrast, accidents and violence, which account for only 3 per cent of all deaths, represent 10 per cent of all years of potential life lost under 75. This illustrates the excessive burden placed on society as a result of the early ages at which many of these accidents occur.

The focus in this section is on circulatory diseases, cancers and accidents and violence; together, they account for 75 per cent of all deaths and 65 per cent of all years of life lost under the age of 75.

Circulatory diseases

Ischaemic heart disease

Ischaemic heart disease accounted for 26 per cent of all deaths in 1989 and is the single main cause of premature death (Cmnd 1523, 1991). Although the mortality rate for ischaemic heart disease has been declining since the 1970s, England still has one of the highest rates in the industrialised world (Cmnd 1523, 1991). Mortality due to coronary heart disease is five times higher in men than women during middle age, and it is much higher amongst lower social classes and people of Asian origin (Jacobson *et al.*, 1991). The known risk factors are cigarette smoking, high cholesterol and high blood pressure, while obesity, diabetes and physical inactivity have also been implicated (see Jacobson *et al.*, 1991, for a fuller discussion).

Table 2.9 indicates that there is consistently lower mortality due to ischaemic heart disease in London, regardless of the type of category considered. Indeed, only one London district – Newham – has an SMR (101) which is greater than the national average (99).

Table 2.9

Area variations in mortality from ischaemic heart disease, all ages, 1985–89 (SMRs)

Area categories	London	Non-London	England
Inner deprived	87	114	97
Urban	88	111	109
High-status	85	92	89
Weighted sum	86	105	100
Other			99
England			99

In contrast to the capital, SMRs in non-London districts are higher than in England as a whole, except for high-status areas, and vary according to area deprivation. For inner deprived districts, even the lowest value (102 in Central Birmingham) is greater than the highest London value, while the maximum SMR is 132 (North Manchester). Similarly, the maximum SMR for non-London urban districts is 138 (in Dewsbury and Sunderland), and for non-London high-status districts it is 116 (Southport). For each category of comparison London has a consistently and significantly better experience of mortality due to ischaemic heart disease than equivalent non-London districts. The difference is greatest where comparable areas are most deprived.

Cerebrovascular disease

In 1989, over 63,000 people died of strokes in England (Cmnd 1523, 1991). Although mortality from this cause has fallen by 50 per cent since 1969, it still accounts for 12 per cent of all deaths. Strokes are also a major cause of disability.

Table 2.10

Area variations in mortality from cerebrovascular disease, all ages, 1985–89 (SMRs)

Area categories	**London**	**Non-London**	**England**
Inner deprived	79	105	89
Urban	86	106	104
High-status	82	95	90
Weighted sum	82	102	96
Other			103
England			100

Table 2.10 shows an interesting pattern of SMRs for strokes. Urban districts have significantly raised ratios, while those for inner deprived districts, particularly in London, are relatively low. Indeed, amongst the inner deprived London districts Riverside has the lowest SMR in England (70), while even the highest ratio of those DHAs (93 in Haringey) is still below the national average.

Outside London, urban districts also have the highest SMRs, headed by Bolton (135) and Oldham (129). Their ratios are substantially higher than the comparable London urban districts.

The SMRs of high-status London districts are grouped relatively tightly around the mean, apart from Croydon (106). The distribution for high-status districts outside London is also fairly narrow, though with slightly greater values, reaching a maximum of 116 in Stockport.

The pattern for all deaths from cerebrovascular disease, however, is in contrast to those deaths from strokes which are thought to be avoidable, i.e. those occurring between 35 and 64 years of age, as shown in Table 2.11. Whilst London is still lower than comparable areas, it is much closer to the national average. However, there is now a marked increase in the SMR as deprivation increases. Indeed, inner deprived London has 20 per

Table 2.11

Area variations in mortality from avoidable cerebrovascular disease*, (35–64 years) 1985–89 (SMRs)

* Figures are available only for the aggregated diagnosis of hypertensive and cerebrovascular disease.

Area categories	London	Non-London	England
Inner deprived	121	147	131
Urban	101	113	112
High-status	81	81	81
Weighted sum	98	106	104
Other			95
England			99

cent more mortality from avoidable cerebrovascular disease than England as a whole, and comparable non-London areas 47 per cent more.

Inequalities between London and non-London inner deprived are even more marked when individual authorities' SMRs are examined. The highest SMR in London is 165 in City and Hackney, but this is close to the median value for non-London districts, which have SMRs ranging from 127 (Central Birmingham) to 175 (West Birmingham and North Manchester). The increased SMRs for avoidable mortality due to cerebrovascular disease in inner deprived districts illustrate the association between premature deaths and disadvantaged areas.

Summary

Overall, residents of London districts have consistently and significantly less mortality due to circulatory diseases than residents living in England as a whole and comparable districts outside London. This is apparent for all comparisons of districts with comparable degrees of deprivation, with only one exception – avoidable cerebrovascular mortality in high-status districts – which shows no significant difference between London and non-London areas.

Cancers

Malignant neoplasms are the second most common cause of mortality, accounting for 25 per cent of all deaths. Lung cancer is the most common cancer in men, accounting for 22 per cent of all male cancer registrations, and the third most common for women, accounting for 10 per cent of registrations. Breast cancer is the most common cancer amongst women, accounting for 22 per cent of registrations. Skin cancer, other than melanoma, accounts for 13 per cent of men's and 12 per cent of women's cancer registrations (Cmnd 1523, 1991).

In general, Londoners' mortality from all cancers is similar to that in England as a whole, but it is significantly lower than that in comparable areas. Table 2.12 shows the slight, but nevertheless consistent and significant, difference between districts in and out of London, suggesting that Londoners experience relatively less mortality due to cancers than comparable non-Londoners. The table also shows clearly the relationship between SMRs for cancer and districts'

Table 2.12

Area variations in mortality from all cancers, 1985–89 (SMRs)

Area categories	London	Non-London	England
Inner deprived	106	115	109
Urban	98	105	104
High-status	94	96	95
Weighted sum	99	103	102
Other			98
England			100

category of deprivation. The mean SMRs for inner deprived districts are significantly greater than those for urban districts, which in turn significantly exceed those for high-status districts.

Lung cancer

Lung cancer accounts for 33 per cent of all male and 15 per cent of all female cancer deaths (Jacobson *et al.*, 1991). Although rates have been falling amongst men since 1963, particularly middle-aged men, death from lung cancer is increasing amongst women. Between 1974 and 1988, mortality increased by 60 per cent for all women, although it did decrease slightly for women under 50. It is estimated that 90 per cent of lung cancer is attributable to cigarette smoking (Jacobson *et al.*, 1991). Current mortality rates, therefore, reflect past smoking trends.

Table 2.13

Area variations in mortality from lung cancer, 1985–89 (SMRs)

Area categories	London	Non-London	England
Inner deprived	122	136	127
Urban	108	113	113
High-status	96	91	93
Weighted sum	107	108	108
Other			93
England			100

London has higher mortality due to lung cancer than England as a whole. Although London has slightly lower mortality than comparable areas, this difference is not significant. Table 2.13 clearly shows that mortality from lung cancer is strongly and significantly related to area proxies for levels of deprivation. However, the differences between districts in and out of London is more complex. Inner deprived and urban districts in London have significantly lower mean SMRs than those out of London, while this finding is reversed for high-status districts.

The complexity of the underlying relationships can be examined

more closely by separating the mortality experiences of each gender, as illustrated in Tables 2.14 and 2.15. First, it is worth noting that, for both males and females, the weighted sums for both London and comparable non-London districts are all above the national average. This would indicate that cities as a whole have a worse experience of mortality due to lung cancer than the rest of the country, and reflects "long-standing evidence of an urban-rural gradient in the risk of lung cancer" (Britton, 1990, p. 20). Second, there is an interesting difference between the mortality experience of the genders. For males, the weighted sum of SMRs in London is less than that for comparable non-London districts, whereas this inequality is reversed for females. It is possible to explain this finding in terms of the large difference between high-status districts, since females in those areas in London have higher SMRs than their counterparts out of London. In addition, there is little

Table 2.14

Area variations in mortality from lung cancer, males, 1985–89 (SMRs)

Area categories	London	Non-London	England
Inner deprived	118	135	125
Urban	107	114	113
High-status	94	90	92
Weighted sum	105	108	107
Other			94
England			100

Table 2.15

Area variations in mortality from lung cancer, females, 1985–89 (SMRs)

Area categories	London	Non-London	England
Inner deprived	131	137	133
Urban	110	112	112
High-status	100	93	96
Weighted sum	113	109	110
Other			92
England			101

mortality difference between females in inner deprived London and non-London districts, whereas males in inner deprived non-London districts have substantially higher SMRs than their London counterparts.

Breast cancer

Each year, approximately 24,000 women develop breast cancer and 15,000 women die of it (Forrest, 1986). Since 1950, the mortality rate

for breast cancer in England and Wales has risen by 25 per cent, and in 1980–84 it was the highest mortality rate in the world, 52 per cent higher than Sweden and 532 per cent higher than Japan (Kalache, 1990). The causes of breast cancer are unknown. It is far more common in women than men, and incidence increases with age. Evidence from the Longitudinal Survey has shown a weak positive relationship between breast cancer and socio-economic circumstances (Leon, 1988). This reflects what is known about risk factors, which are generally associated with women's reproductive history – early menarche, age at first full-term pregnancy and late menopause.

Table 2.16

Area variations in mortality from breast cancer among women, all ages, 1985–89 (SMRs)

Area categories	London	Non-London	England
Inner deprived	99	98	99
Urban	99	95	95
High-status	101	106	104
Weighted sum	100	99	99
Other			101
England			100

Table 2.16 shows a complex pattern of mortality due to breast cancer. Perhaps the most important aspect to note is that none of the category means differs very much from the national average. Thus inter-group differences are less than for other mortality indicators. Given this caveat, however, it appears that high-status districts have the worst experience of mortality. This is not surprising, given the risk factors described above, and it is true mainly for non-London districts, which have the highest SMRs in the country, 123 in North Birmingham and 122 in North Hertfordshire.

Table 2.17

Area variations in mortality from breast cancer among women, avoidable (50–64 years), 1985–89 (SMRs)

Area categories	London	Non-London	England
Inner deprived	106	96	102
Urban	107	95	96
High-status	104	104	104
Weighted sum	105	98	100
Other			99
England			100

There is some evidence to suggest that mortality from breast cancer could be reduced for women between 50 and 64 by thorough screening and appropriate treatment. Examining mortality for this

age-group only shows a rather different pattern from that outlined above. Table 2.17 suggests that London has a worse mortality experience overall, and in urban and inner deprived areas in particular, than comparable non-London areas, although these differences are not statistically significant at the 90 per cent level. This may reflect a worse provision of preventive services (or subsequent treatment) in these areas of London, and/or a reluctance on the part of women in London to attend screening.

Most noteworthy are the maximum SMRs for inner deprived London districts, 136 in Hampstead, as contrasted with a comparable non-London maximum of 108 in Central Manchester.

Cervical cancer

One thousand seven hundred women die of cervical cancer in Britain each year. Overall, the mortality rate has remained reasonably constant over the last decade. But a worrying trend is the steady increase in deaths from cervical cancer amongst women under 45. The main risk factors associated with cervical cancer are the early age of first intercourse and multiple sexual partners, although intercourse in the presence of sexually transmitted diseases, as well as smoking and the use of oral contraceptives, are also implicated (Jacobson *et al.*, 1991). There is a strong negative relationship between cervical cancer and socio-economic circumstances (Leon, 1988). Cervical cancer is generally preventable through the early detection and treatment of cells which may progress to cancer. Most women who die from this disease have not been screened (Cmnd 1523, 1991).

Table 2.18

Area variations in mortality from cervical cancer, all ages, 1985–89 (SMRs)

Area categories	**London**	**Non-London**	**England**
Inner deprived	96	145	114
Urban	89	113	110
High-status	73	83	79
Weighted sum	83	106	99
Other			98
England			99

London has significantly lower SMRs for cervical cancer than the English average and comparable non-London areas. Table 2.18 shows a clear relationship between the experience of mortality due to cervical cancer and deprivation. There is a systematic decline from an SMR of 114 for all inner deprived districts to 79 for all high-status districts, although the figures for overall high-status and urban districts are not significantly different. London has consistently lower SMRs than comparable areas, although the difference between high-status districts is not statistically significant.

For inner deprived districts, the lowest SMR in London (67 in

Haringey) is less than the non-London minimum (109 in Central Manchester), while the highest SMR in London (127 in Tower Hamlets) is well below the extremely high non-London maximum (206 in North Manchester).

Similarly, the maximum values of SMRs for urban non-London districts are extremely high (185 in St Helens and 177 in Blackburn), and far in excess of the urban London values. All high-status London districts have SMRs below the national average, while the range of equivalent non-London values is greater, from the nation's lowest (52 in North West Surrey) up to 114 (Trafford).

Summary

The broad pattern to emerge from a comparative analysis of deaths from cancer is similar to that for circulatory diseases. First, mortality due to cancer appears to be significantly associated with deprivation. Second, non-Londoners, on average, have a worse experience of mortality than their counterparts in the capital. This is most conclusively seen in the figures for mortality due to all cancers, in which the figures for London are consistently lower than those for comparable districts outside the capital. In both cases, however, the figures increase as the extent of deprivation rises. This broad picture is largely consistent for the specific examples of lung cancer and cervical cancer. The only contrary finding is the figures for lung cancer in high-status districts, where the London rate significantly exceeds that of non-London.

The exception to this broad pattern is female mortality due to breast cancer, where for both all-age mortality and deaths amongst 50–64-year-olds the highest SMRs are for high-status districts. For all-age mortality, high-status districts have significantly worse figures than other categories. In comparing London with non-London districts, the comparisons by separate deprivation status categories revealed no significant differences. However, when totalled to produce an overall picture, while there was still no significant difference for all-age mortality, the figures for "avoidable" mortality due to breast cancer showed that London districts were significantly worse than comparable non-London districts. This was the only finding which ran contrary to the broad pattern of higher mortality outside the capital.

Violent deaths

Violent deaths account for one-tenth of years of potential life lost. A distinction is made here between suicides and self-inflicted injuries on the one hand, and road traffic accidents on the other.

Suicide and self-inflicted injury

In the second half of the 1980s, there were approximately 5700 suicides per year in England. Suicide, as the third leading cause of death among 15–34-year-olds, is an important cause of premature death. Since the mid-1970s, while there has been a small decline in suicide rates for women, there has been a steady increase among men of working age, particularly among those aged 15–24. Parasuicide (deliberate self-harm) is the second most common reason for emergency admission to hospital.

Table 2.19

Area variations in mortality from suicide and self-inflicted injury, and injury undetermined whether accidentally or purposely inflicted, 1985–89 (SMRs)

Area categories	**London**	**Non-London**	**England**
Inner deprived	149	110	135
Urban	102	101	101
High-status	88	93	91
Weighted sum	114	100	104
Other			97
England			100

Evidence suggests that:

> *Both suicide and parasuicide are much more common among the unemployed living in areas of multiple deprivation.*
>
> (Jacobson *et al.*, 1991, p. 145)

London has a higher mortality due to suicide than England as a whole. The major finding shown in Table 2.19 is the very high average SMR for suicide and self-inflicted injury in inner deprived London districts. The lowest SMR is in Newham (90), while the highest values are in Bloomsbury (202) and West Lambeth (189). There is also a wide range of SMRs for inner deprived non-London districts, but at a lower level (from 69 in East Birmingham to 163 in Central Manchester). All urban districts have SMRs close to the national average, while high-status areas have averages which are well below. These data, therefore, show a strong relationship between deprivation and the experience of suicide in an area.

These results remain valid for each gender examined separately, particularly the very high SMRs in inner deprived London. The only difference is that for women variation between the average SMRs for non-London districts is small (i.e. the relationship between deprivation and SMRs for suicide does not appear to hold for females in non-London districts).

Overall, there is a significantly higher level of suicide in London districts than in comparable districts outside the capital. This is due to the large, significant difference between inner deprived districts in and out of London.

Road traffic accidents

Although deaths from road traffic accidents (RTAs) account for only one per cent of all deaths, they are a major cause of death amongst young people, accounting for 36 per cent of all deaths under 25 in 1988. In addition, 60,000 people are seriously injured in RTAs in Britain each year and 220,000 slightly injured (Cmnd 1523, 1991). However, the number of people killed and injured on the road has been declining over the last decade, particularly among car users. Much of this decline occurred after the introduction of seat belt legislation (Jacobson *et al.*, 1991).

Table 2.20

Area variations in mortality from motor vehicle traffic accidents, all ages, 1985–89 (SMRs)

Area categories	London	Non-London	England
Inner deprived	93	106	98
Urban	102	95	96
High-status	85	96	92
Weighted sum	91	96	95
Other			106
England			101

London has a significantly lower SMR due to RTAs than England as a whole. Table 2.20 illustrates that the differences between deprivation categories are not systematic. The difference between London and non-London districts is statistically significant for inner deprived and high- status areas. This results in London overall having a significantly lower figure for mortality due to motor vehicle traffic accidents than comparable areas.

Summary

Combining mortality due to suicide and motor vehicle traffic accidents under the heading violent deaths does not mean that a consistent pattern emerges for them both. While the statistics for suicide show clearly and unambiguously the relationship with deprivation, at both a local and national level, the data for RTAs show no significant differences between the different types of area. The two causes also show opposite patterns in comparing London districts with others. While there is significantly higher mortality due to RTAs in districts outside London, the opposite is true of mortality due to suicide. This latter finding appears to be due almost solely to the extremely high SMR for suicide for inner deprived London districts.

Conclusion

Two general conclusions can be drawn from the mortality data reported in this chapter. The first is that mortality is generally higher in areas with greater deprivation. This general finding is fairly consistent for both London in particular and the country as a whole. The only exceptions to this picture are mortality due to motor vehicle traffic accidents, which does not appear to be significantly associated with deprivation, and mortality due to breast cancer which, while its pattern is complex, appears to be highest in those districts which are least deprived.

The second broad conclusion is that London districts have lower levels of mortality than comparable districts elsewhere in the country. With two notable exceptions, London districts as a whole have significantly lower SMRs than equivalent areas outside the capital. The two exceptions are suicide, for which the SMR in inner deprived

Box 3.1

REPRESENTATIVENESS OF THE SAMPLE OF LONDONERS IN HALS

The extent of representativeness of any survey sample is likely to be less for smaller areas. Therefore, it is important to examine the characteristics of the sub-sample of Londoners, together with those living in specific parts of London. This can be done at a relatively crude level by comparing the HALS London sample, both as a whole and when broken down into smaller areas, with information on Greater London, outer and inner London from the 1981 Census. As can be seen from Table A1.1 in Appendix 1, for London as a whole, the HALS sample would seem reasonably representative. It has an over-representation of people over 75 and an under-representation of the youngest age-group, and fewer people from ethnic minorities.

However, when the HALS London sample is broken down into inner areas (Appendix 1, Table A1.2) and outer areas (Appendix 1, Table A1.3), as explained in more detail below, differences with the census become slightly more pronounced. As Table A1.2 in Appendix 1 shows, inner London has a smaller proportion of the lower social class, for both the whole and the measured sample, than was present at the census. Ethnic minorities are under-represented in both areas of London, but particularly in outer London. Both inner and outer London have similar disparities in their age distributions to London as a whole, with fewer young people, slightly more middle-aged and much higher levels of over-75s than were counted five years earlier in the census.

been constructed; and how issues of statistical significance are dealt with. Finally, evidence is presented about the comparative health status of Londoners across a number of dimensions, including:

- illness;
- psycho-social health;
- disability;
- fitness.

Also reported are more general findings based on an overall subjective health assessment and composite data about the distribution of survey respondents with extremes of health.

The *Health and Lifestyle Survey*

This section provides a brief description of the *Health and Lifestyle Survey* (HALS) design and assesses the representativeness of the survey sample and, in particular, the sub-sample of Londoners.

The *Health and Lifestyle Survey* was a national survey of adults in England, Wales and Scotland, funded by the Health Promotion Research Trust and conducted by the Office of the Regius Professor of Physic and the Department of Psychiatry, University of Cambridge School of Clinical Medicine.

Information was collected at two home visits. The first consisted of an interview lasting approximately one hour, in which individuals were asked about their experience of physical and psycho-social health, disease and disability, various health-related behaviours, personal, social and economic circumstances and their beliefs about health and health promotion. The second was carried out by a nurse who collected physiological and cognitive measurements and who left respondents with a self-completion questionnaire to be returned by post subsequently. The fieldwork began in the autumn of 1984 and was completed in July 1985.

Initially, 12,254 addresses in Great Britain were randomly selected, from which 9003 individuals were interviewed, a response rate of 73.5 per cent. Measurements were obtained for 7414 individuals, representing 82.4 per cent of those interviewed. Of those, 88.6 per cent (6572 people) returned the self-completed questionnaire.

A preliminary report was made available by the Health Promotion Research Trust in 1987 (Cox *et al.*), and a book based on the survey findings has also been published (Blaxter, 1990).

In order to maintain comparability with the other data used in this report, Welsh and Scottish respondents have been excluded. There were interviews with 7578 individuals living in England, and physiological measurements were obtained from 82.8 per cent (6275) of these. Most of the analysis is based on the full sample of English respondents. However, for the indicators that are derived from the physiological measures – including the overall health index described later – the analysis is restricted to the 6275 individuals who were

measured. Table 3.1 reports the response rates obtained in the different parts of England.

Table 3.1

Response rates for interviews and measurements by English region

		Interview		Measurements		
English region	**Population**	**Number**	**% of population**	**Number**	**% of population**	**% of those interviewed**
North	681	542	79.6	452	66.4	83.4
North West	1,498	1,098	73.3	900	60.1	82.0
Yorks/Humber	1,106	812	73.4	673	60.9	82.9
West Midlands	1,112	827	74.4	662	59.6	80.0
East Midlands	877	685	78.1	574	65.4	83.8
East Anglia	433	333	76.9	289	66.7	86.8
South West	987	721	73.0	588	59.6	81.6
South East	2,303	1,615	70.1	1,389	60.4	86.0
Greater London	1,471	945	64.2	748	51.0	79.2
Total	10,468	7,578	72.4	6,275	59.9	82.8

Source: Cox *et al.*, 1987

It is clear that the response rate in Greater London (64 per cent) was relatively poor. This finding necessitates a more detailed examination of the representativeness of the HALS sample in general, and of the sub-sample of Londoners in particular.

Representativeness of the survey

The analysis of the survey by Blaxter (1990) suggested that the final national sample of individuals was reasonably representative when compared with the social and economic data available from the 1981 Census. However, there was a slight excess of women for all ages, except in the youngest and eldest age-groups, where they were under-represented. There was also a shortfall in young men. This level of representativeness was maintained at each stage of the study, although "those with the least education and lowest income were a little less likely to complete all three stages of the study" (Blaxter, 1990, p. 10). The representativeness of the sample of Londoners in particular is discussed in Box 3.1 on p. 58.

Despite the fact that there are some weaknesses as far as the representativeness of HALS is concerned, the view has been taken that the quality of information available is so superior to anything else that it outweighs these considerations. We are convinced that HALS is the most comprehensive survey yet available for any comparative assessment of the health status of Londoners. The survey is doubly attractive because attempts are being made to re-interview all the surviving

respondents who were first surveyed in 1985. It will be possible in due course, therefore, to compare changes in health status between 1985 and 1991 (including mortality) with the baseline data about circumstances and lifestyles collected in 1985.

Nevertheless, for present purposes, the relatively small subsamples of respondents available do mean that all of the findings based on HALS presented in this report should be interpreted with care. Much greater weight should be attached to multiple findings which report the same broad pattern than to any single result, which might well be particularly aberrant.

Methodology

Before proceeding to a discussion of the statistical findings from HALS, it is necessary to mention one or two technical aspects of the way in which data will be presented. The first issue to address is how best to compare the health status of the 945 HALS respondents living in

Box 3.2

MODIFIED CRAIG CLASSIFICATION IN HALS

Unfortunately, the Craig classification cannot be modified to facilitate better comparisons between London and broadly homogeneous areas. Rather, the original Craig families have been combined in a way which enables the most appropriate comparisons to be made.

The table shows the distribution of HALS respondents in England, distinguishing between London and non-London, by the ten area families identified by Craig. The 370 London respondents in outer London all fall within Craig's family 1A and can be easily and directly compared with the 934 people in the same family who live outside the capital. Unfortunately, there are too few people in London in families 4A and 4B to compare on any sensible basis with the 1695 respondents in similar areas in the rest of England. Similarly, there are no respondents outside London to compare with the 486 people in families 6A and 6B which are unique to the capital. What has been done, therefore, is to amalgamate Craig families 4A, 4B, 5, 6A and 6B into a new single family which is referred to as "metropolitan". This then enables a comparison of the 575 London respondents with a reasonably similar group of 1832 people in major urban areas and conurbations outside the capital. One point to note about this compromise is that the non-London areas are more heterogeneous than inner London and this should be borne in mind when interpreting the data which are presented later in this chapter.

DISTRIBUTION OF HALS RESPONDENTS BY CRAIG FAMILIES

Craig family No.	Name	Non-London	London	England
1A	Estimated high-status	934	370	1,304
1B	High-status growth	735	0	735
2A	More rural	925	0	925
2B	Resort and retired	622	0	622
3	Mixed town and country	1,585	0	1,585
4A	Trade manufacturing	640	47	687
4B	Service centres	1,055	42	1,097
5	Local authority housing	137	0	137
6A	Inner London	0	392	392
6B	Central London	0	94	94
Total		6,633	945	7,578

London with that of the 6633 people living outside the capital. This is done by making use of one of the variables available in HALS, namely the Craig area classification described in Chapter 1. The way in which this has been modified for the analysis of morbidity data is explained in Box 3.2.

Table 3.2 shows the distribution of respondents between the simplified form of Craig classification adopted for comparative analyses. In the remainder of this chapter, we focus attention on the differences between the 3711 HALS respondents living in "high-status" and "metropolitan" areas. This is reduced to 3049 when the analysis is limited to those who completed the measurement section.

Table 3.2

Distribution of HALS respondents by Craig families

Craig Family	Label	London N =	Non-London N =	England N =
1A	"High-status"	370	934	1,304
4/6	"Metropolitan"	575	1,832	2,407
Total		945	2,766	3,711

Making comparisons between areas using different measures of health status can be difficult, however, unless they are standardised to take account of variations in such factors as age and gender. A similar procedure is adopted, therefore, to that described in the previous chapter in relation to standardised mortality ratios. For any particular measure of morbidity, as described below, the observed age and sex specific rates for England as a whole are applied to the population distributions within any smaller area under consideration, in order to calculate the expected number of people with a given health status. The expected rate is then compared with the observed rate to form a ratio, in which a number greater than 100 implies that the area has worse health status than the average experienced in England.

The same caveat applies to standardised morbidity ratios as standardised mortality ratios. In theory, each area's SMR should only be compared with the standard population. However, as high-status and metropolitan areas have very similar age and sex structures, comparisons between the SMRs are reasonably indicative of their relative morbidity and health experience.

Confidence intervals have been calculated for all of the estimates contained within the analysis of HALS. It is noted in the discussion of the results if the differences are statistically significant. Unfortunately, many of the observed differences are not significant even at the 90-percent level, largely because of the small numbers of respondents within some of the clusters. Nevertheless, it was decided to report and discuss differences in those point estimates which seem interesting, even if they are not statistically significant.

London districts is extremely high, and breast cancer, for which London districts have significantly higher SMRs for avoidable mortality, namely among women aged 50–64. Otherwise, London districts consistently have significantly lower figures for mortality due to other specific causes, as well as for all-cause mortality and the most general measures of avoidable and premature mortality.

It is perhaps worth speculating about why the residents of London might have better mortality rates than their peers in comparable areas. One reason is that they may have better access to health care. Boyle and Smaje (1992) have shown, for example, that the supply of hospital resources in the capital is greater than in other areas. One might conjecture, therefore, that higher than average levels of investment in health care produce better health outcomes.

Some of the findings reported in this chapter might be thought to support this view. For example, perinatal mortality rates in London are not as high as might be predicted from the rates of low birthweight. This difference is consistent with the possibility that the greater availability of intensive paediatric care in London means that more high-risk babies survive than outside the capital.

There is rather more evidence, however, that contradicts this somewhat sanguine view. If a higher than average level of health care in London was the main reason for the seemingly better health of Londoners, then one would expect data about avoidable mortality to show bigger differences, to the advantage of residents of the capital, than overall mortality rates. In fact, quite the opposite is true. The overall mortality record for London, shown in Table 2.1, is 8.7 per cent better than comparable areas elsewhere, but the avoidable mortality rate shown in Table 2.5 is only 3.8 per cent better. Similar patterns can be observed for specific causes of death, such as cerebrovascular disease and breast cancer. Such data do not support the view that the better health of Londoners is attributable to the greater availability of health care in the capital.

CHAPTER 3

Morbidity

The analysis of variations in mortality presented in the previous chapter was relatively straightforward. The investigation of differences between Londoners and non-Londoners was greatly aided by the fact that death is an unambiguous indicator of the absence of good health, and there is a large amount of data about the mortality experience of different communities. An examination of similar variations in morbidity, or ill health, is much more problematic.

> *Measuring ill-health is ... much more difficult than measuring mortality. Whereas one death can be compared with another, morbidity covers a wide spectrum of physical and mental health, and from severe, but short-term pain, to life-long disability.*
>
> (Cmnd 1523, 1991, p. 29)

First, as explained in Chapter 1, defining health among the living is highly complex. Second, given the need for multidimensional indicators of health status, there is a paucity of data available with which to compare the experiences of different communities. There are data sets which can be used for this purpose, one of which is described below, but the relatively small numbers of people for whom detailed data can be obtained means that the confidence intervals surrounding estimates of the average experience of different communities are very wide. As a result, it is very difficult to identify statistically significant differences between them.

Despite these difficulties, it is essential to explore differences in morbidity if one is to gain any real insight into the relative health status of Londoners. The aims of the next three chapters, therefore, are threefold. First, this chapter presents comparative descriptive statistics of the health status of Londoners and non-Londoners derived from the most comprehensive national survey of health and lifestyles. Second, Chapter 4 outlines and tests a multivariate model to account for observed differences in health status which makes it possible to determine whether regional factors are statistically significant. Finally, Chapter 5 examines the determinants of a number of crucial indicators of health status in more detail by making use of survey data which specifically relate to London.

This chapter has three principal aims. First, the *Health and Lifestyle Survey* is introduced. This is the data set used for the comparative analyses of morbidity. Second, certain aspects of methodology are explained: which parts of London will be compared with which communities elsewhere; how standardised ratios of morbidity have

Box 3.3

PHYSICAL ILLNESS SYMPTOMS

Respondents were asked whether, within the last month, they had suffered from:

- **headaches;**
- **hay fever;**
- **constipation;**
- **trouble with eyes;**
- **a bad back;**
- **colds and flu;**
- **trouble with feet;**
- **kidney or bladder trouble;**
- **painful joints;**
- **palpitations or breathlessness;**
- **trouble with ears;**
- **indigestion or other stomach trouble;**
- **sinus trouble or catarrh;**
- **persistent cough;**
- **faints or dizziness; or**
- **trouble with periods or the menopause (for women under 60 only).**

Dimensions of health status

The framework used by Blaxter in the analysis of the HALS survey takes account of the multidimensional nature of health, and identifies four components which, while not necessarily exhaustive, are nevertheless aspects of health "which can be experienced independently from the others and can (within the information available in the survey) be measured separately" (Blaxter, 1990, p. 42). While the aim is to follow Blaxter's methodology closely in this paper, her analysis is not replicated in all aspects. Deviations from Blaxter's methodology are explained subsequently. Nevertheless, the focus is on the same four components of health, which are:

- experience of illness or freedom from illness;
- psycho-social "malaise" or well-being;
- disease and disability or their absence;
- levels of physiological fitness.

These dimensions can be measured by examining individual questions or by calculating scales of severity, which can then be categorised into different levels of health and illness which individuals experience. These can be combined to form an overall index of health. The majority of the population are likely to be located somewhere in the middle of such an index. What is of particular interest, however, are the groups of people located at either extremes, namely those with excellent or very poor health.

In addition to the four dimensions of health outlined above and the overall index, individuals' own evaluation of their health was examined.

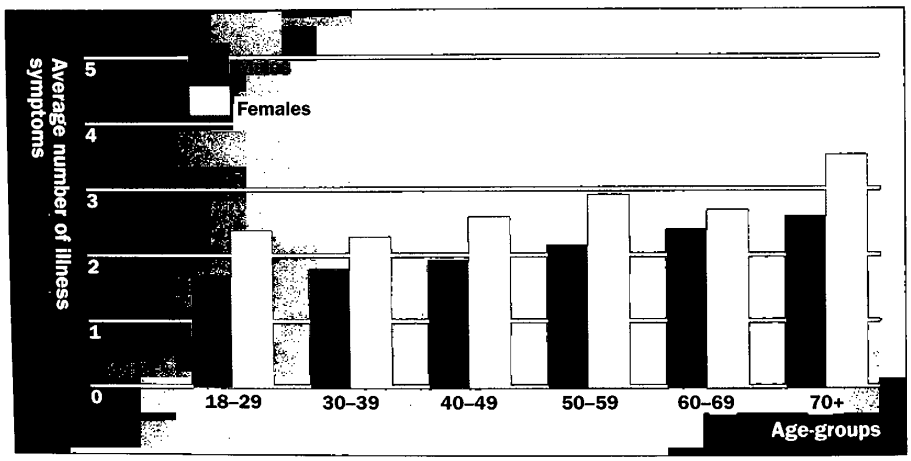
Illness

Illness was measured by means of a checklist of 16 symptoms, which is shown in Box 3.3.

The illness data can be examined in two ways: first, by calculating

Figure 3.1

Illness symptoms



an average of the number of symptoms experienced by the inhabitants of a certain area: second, by focusing on those who have excessive levels of illness. Blaxter (1990) classifies people who experience at least five symptoms as "poor" on an index of illness. The proportion of such people in that category is a good indicator of the pattern of the experience of illness in different areas.

Table 3.3

Area variations in the average number of physical illness symptoms (standardised rates, England = 100)

Area categories	London	Non-London	Total
High-status	87.9	102.5	98.4
Metropolitan	103.5	106.5	105.8
Total	97.4	105.2	103.2
Actual value	2.3	2.5	2.5

The average number of symptoms experienced by English respondents was 2.4, with 2.7 symptoms per woman and 2.0 per man (although it should be noted that women under 60 were asked one more question). As shown in Figure 3.1, the number of symptoms increased with age for both gender groups. Men aged 18–29 experienced an average of 1.6 symptoms, whereas those aged 70 and over suffered from 2.7. For women, those aged 18–29 experienced an average of 2.3 symptoms, while the figure for those aged 70 and over was 3.5.

A similar pattern is true for individuals with poor levels of illness. Overally, 10 per cent of men and 18 per cent of women experienced five or more physical symptoms. However, amongst those over 70, this increased to 17 per cent of men and 32 per cent of women.

Table 3.3 illustrates that, within London, residents of high-status areas experience significantly less illness than those of metropolitan areas ($p<.05$). While there is little difference between the figures for metropolitan areas, there is a significant excess of illness in non-London high-status areas over comparable areas in the capital ($p<.05$). Thus, Londoners as a whole experience significantly less illness than residents in comparable areas outside the capital ($p<.05$). This pattern is reflected in the distribution of individuals who report having more than five symptoms.

Psycho-social health

Psycho-social health, or "malaise", was measured in a similar way to illness, with a checklist of eight symptoms, three of which were weighted according to the frequency with which they occurred, as shown in Box 3.4.

This section examines the average scores of inhabitants in each area under investigation, as well as the distribution of people who suffer from extreme "malaise". These are respondents with a score of at least four (out of a maximum of 14), who are classified as experiencing "poor" psycho-social health.

As a whole, English respondents had an average score of 2.7 (out

BOX 3.4

PSYCHO-SOCIAL SYMPTOMS

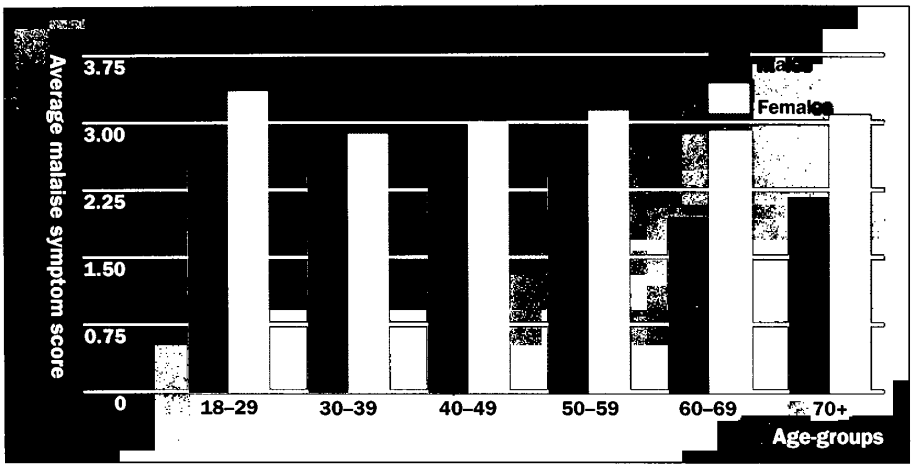
Respondents were asked whether, within the last month, they had suffered from:

- **difficulty sleeping;**
- **nerves;**
- **always feeling tired;**
- **difficulty concentrating;**
- **worrying over every little thing;**
- **feeling under so much strain that one's health is likely to suffer;**
- **feeling bored;**
- **feeling lonely.**

The last three items were weighted by Blaxter (1990) according to the frequency with which they were experienced, with a score of 0 for "never", 1 for "sometimes", 2 for "often" and a maximum of 3 for "always", while the others were simply scored 0 or 1.

Figure 3.2

Malaise scores



of 14), based on eight symptoms of psycho-social health. There was a large difference between the gender groups, with average scores of 2.3 for men and 3.1 for women. As is shown in Figure 3.2, the relationship between psycho-social health and age is less clear. Overall, 23 per cent of men and 35 per cent of women scored more than four.

Table 3.4

Area variations in average levels of psycho-social morbidity (standardised rates, England = 100)

Area categories	London	Non-London	Total
High-status	83.9	98.4	94.3
Metropolitan	113.6	107.2	108.7
Total	102.1	104.2	103.7
Actual value	2.8	2.9	2.9

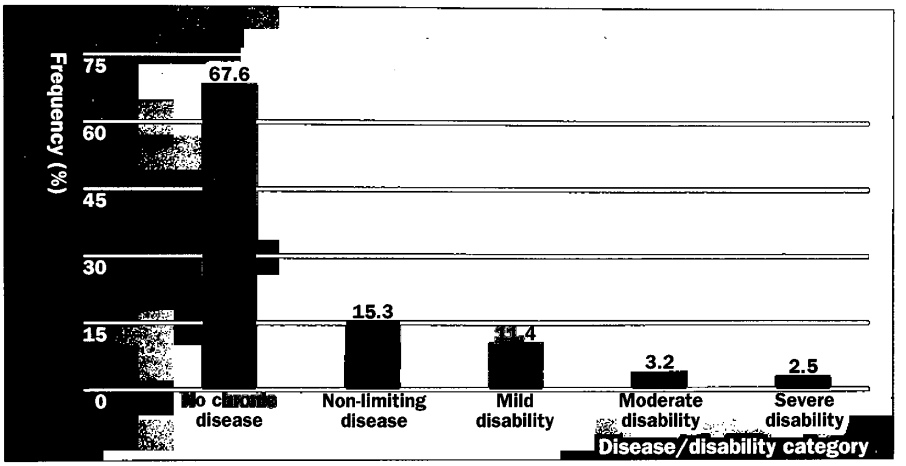
Table 3.4 clearly demonstrates that there are consistent and significantly higher levels of psycho-social health in metropolitan than high-status areas ($p<.05$). Respondents from the former areas have approximately 9 per cent more symptoms, and the latter 6 per cent fewer symptoms than the national average. The relationship between different parts of London and comparable areas is mixed. While inhabitants of high-status areas in London have a significantly better experience of psycho-social health than those in comparable non-London areas ($p<.05$), those in metropolitan London areas have a slightly worse experience than those in other equivalent areas, although the difference is not statistically significant.

Disease/disability

Any attempt to measure disability in a general interview survey is highly problematic. The questions in HALS attempted to screen individuals as to whether they had a non-limiting or limiting disability and then establish the severity of any handicap which they experienced. Figure 3.3

Figure 3.3

Distribution of disease/ disability



shows the distribution of disability amongst the respondents. Not surprisingly, the majority of respondents – 68 per cent – did not experience any chronic disease or disability. Only 2.5 per cent of respondents were classified as severely disabled, i.e. housebound, chairfast or bedfast. For simplicity, however, the categories of mild, moderate and severe disability set out in Cox *et al.* (1987, Table 2.1) were amalgamated so as to produce a simpler three-way division: those with no chronic disease; those individuals who have a disease but stated that it has no effect on their daily life; and those who are limited in some way.

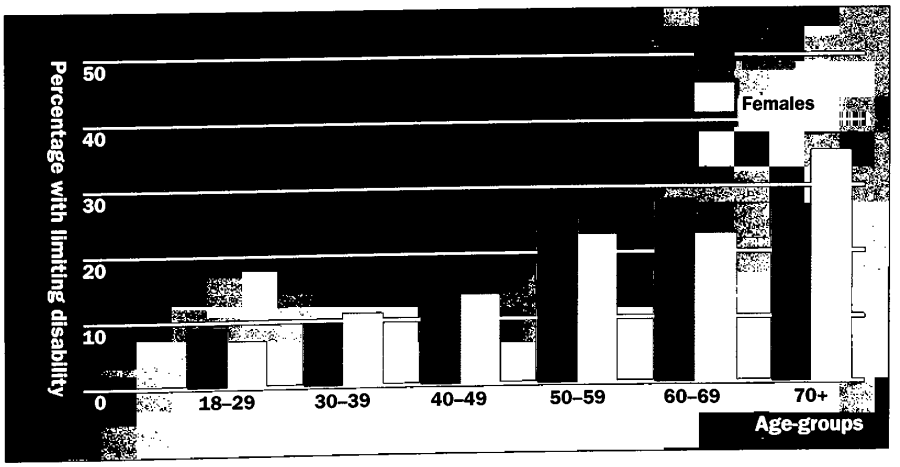
Limiting

Seventeen per cent of the English sample experienced limiting disability. As can be seen from Figure 3.4, the proportion of men experiencing limiting disease rose with age, peaking at 28 per cent of those aged 60–69. For women, the prevalence of limiting disability increases with age throughout their lifespan, reaching a peak of 36 per cent of those aged 70 and over.

However, any findings concerning disability must be treated cautiously, because the most severely disabled people are more likely

Figure 3.4

Limiting disease/ disability



to be living in communal establishments rather than private households and were, therefore, less likely to be available for this survey. As the recent OPCS survey on disability reports, 51 per cent of those most severely disabled live in communal establishments. In general, the proportion of all disabled people not in private households increases with age, such that 3 per cent of disabled people aged 60–69, 6 per cent of those aged 70–79 and 17 per cent of those aged 80 and over would not have been available for the survey (Martin *et al.*, 1988, p. 18).

Table 3.5

Area variations in the proportion of people reporting limiting disability (standardised rates, England = 100)

Area category	London	Non-London	Total
High-status	117.6	87.6	96.3
Metropolitan	112.3	111.3	111.5
Total	114.4	103.4	106.2
Actual value	19.4	17.5	18.0

Table 3.5 shows significant variation by area status outside London ($p<.05$), with metropolitan areas having higher levels of limiting disability than high-status. The relatively high rate for high-status London areas may be a result of the small numbers of disabled people interviewed in this sub-sample, rather than higher levels of disability. This highlights one of the potential dangers when analysing data based on small sample sizes, and hence this figure should be treated with caution.

Non-limiting

As Figure 3.5 demonstrates, just over 15 per cent of the sample of respondents living in England reported non-limiting disease. The distribution by age was similar for the two gender groups, with the prevalence rising with age, peaking at ages 60–69, and then decreasing slightly into old age.

Figure 3.5

Non-limiting disease/ disability

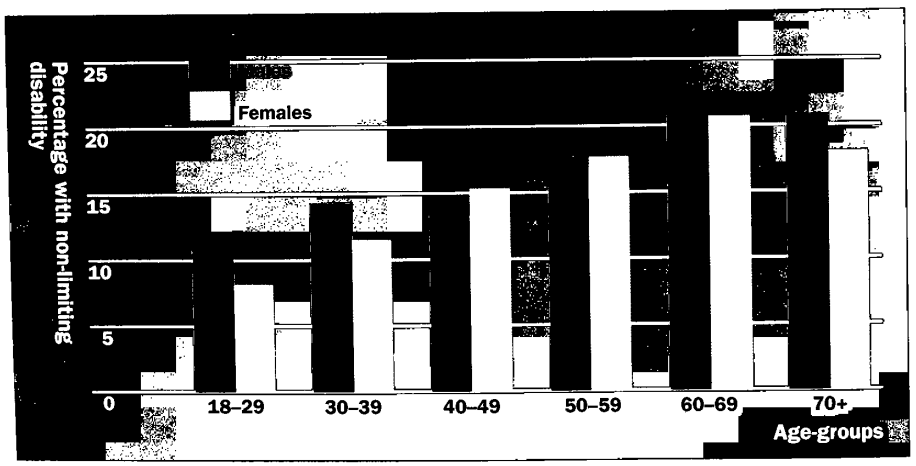


Table 3.6

Area variations in the proportion of people reporting non-limiting disability (standardised rates, England = 100)

Area category	London	Non-London	Total
High-status	90.2	108.8	103.5
Metropolitan	99.9	97.3	97.9
Total	96.1	101.2	99.9
Actual value	14.6	15.4	15.2

Table 3.6 shows relatively little variation in standardised rates of non-limiting disease across the country as a whole. London has a slightly lower rate than comparable areas because of the relatively low rate in high-status London. There is little variation overall by area status. None of the observed differences is significant at the 90 per cent level.

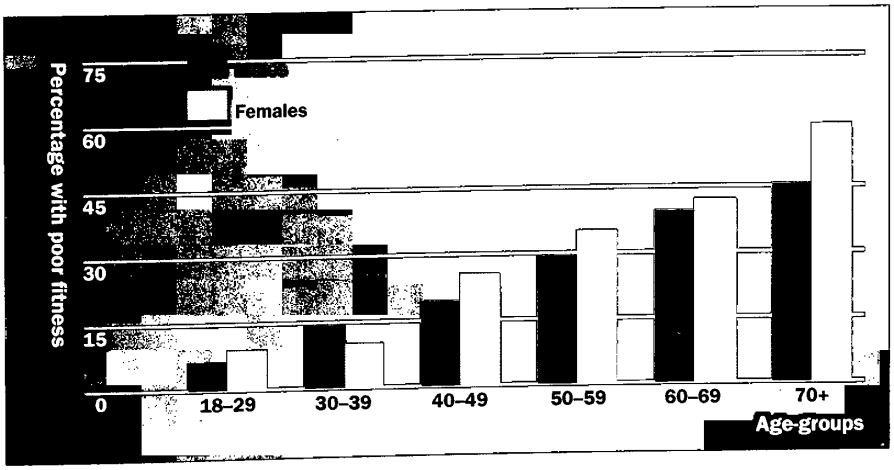
Fitness

"Fitness" is the term used in HALS to summarise the physical measures of health that were taken by a nurse at a second stage of the survey. The measures taken were of blood pressure, body mass index (weight/height^2) and respiratory function. Owing to an inability to replicate the original results for lung function, only the first two measures have been used in this report. An index of fitness was constructed, such that acceptable body mass index and normal blood pressure meant no impairment of fitness, being either underweight or mildly overweight or having borderline hypertension meant mild impairment of fitness and, in accordance with Blaxter (1990), anyone who was either hypertensive or obese was classified as "unfit", i.e. having severely impaired fitness.

Overall, 23 per cent of the English sample were classified as "unfit". As Figure 3.6 shows, the substantial increase in the proportion of people with poor fitness as age increased was similar for each gender. For those aged 18–29, 5 per cent of men and 7 per cent of women were

Figure 3.6

Poor fitness*



*Only includes individuals who completed the measurement section of the survey.

Table 3.7

Area variations in the proportion of people assessed as unfit* (standardised rates, England = 100)

Area category	London	Non-London	Total
High-status	94.9	86.0	88.4
Metropolitan	94.1	102.1	100.3
Total	94.4	96.6	96.1
Actual value	21.8	22.4	22.3

*Only includes individuals who completed the measurement section of the survey.

"unfit", while for those aged 70 and over, the proportions were 45 per cent and 57.5 per cent respectively.

Table 3.7 shows the distribution of standardised rates of "poor" fitness between the clusters. On inspection, it was clear that none of the differences between cells reached even the 90 per cent level of significance. London appears to have slightly lower rates of poor fitness from the rest of the country, although the difference is very slight when compared with other city areas. There is no real variation within London itself, while in other cities there are lower standardised rates in high-status areas, together with slightly higher rates in metropolitan areas.

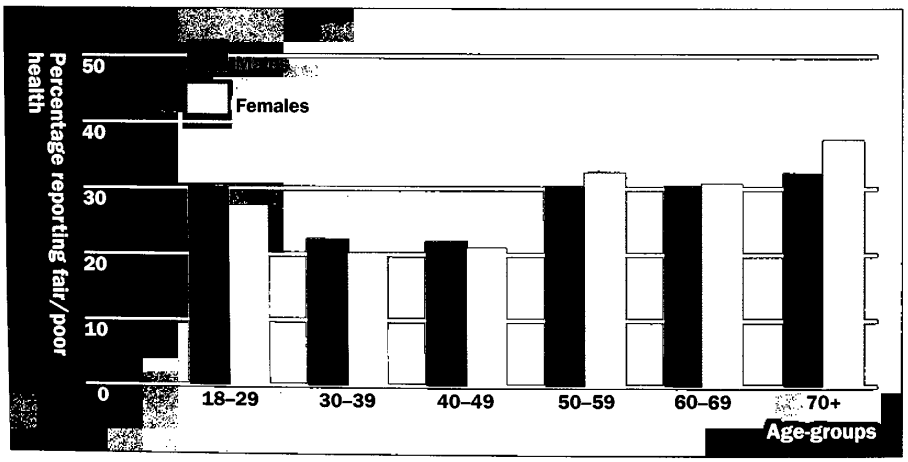
Subjective health assessment

Subjective health was assessed by the well-validated question asking respondents for their own view of their general health status. Respondents were asked to assess their own health over the previous twelve months as excellent, good, fair or poor, compared with someone of their own age. It is important to examine the distribution of those who replied "fair" or "poor", not least because it has been found to be a significant predictor of mortality in some instances.

In England as a whole, 28 per cent of respondents reported that their health was either fair or poor. This proportion was exactly the same for men and women, with each group having a J-shaped distribution of fair/poor health by age, as shown in Figure 3.7. The

Figure 3.7

Fair/poor subjective health



proportions were lowest among those aged 30–49, being slightly higher at younger ages, and increasing from the age of 50 onwards, reaching a peak in old age.

Perhaps the most surprising finding is that roughly 10 per cent more 18–29-year-olds report fair or poor health than do 30–49-year-olds. This may be explained by age related differences in standards of "good" and "poor" health: "the norm of what it is to experience excellent health is obviously less stringent as age increases" (Blaxter, 1990, p. 57). On the other hand, it may reflect the relatively high incidence of poor psycho-social health among the young, which may well affect their subjective assessment of health. For example, Blaxter reports that "low psycho-social well-being, even among those without physical symptoms or disease conditions, was readily defined as poor health" (1990, p. 57).

Table 3.8

Area variations in the proportion of people assessing their own health as fair or poor (standardised rates, England = 100)

Area category	London	Non-London	Total
High-status	82.0	92.4	89.4
Metropolitan	114.2	112.2	112.7
Total	101.6	105.6	104.5
Actual value	28.7	30.0	29.7

It can be seen from Table 3.8 that London does not have significantly different standardised rates of reporting fair or poor subjective health than the rest of the country. However, high-status areas consistently have significantly lower rates of fair/poor subjective health than metropolitan areas both in London ($p<.10$) and outside London ($p<.10$), as well as in England as a whole ($p<.05$). The rates in high-status areas are substantially below, and those in metropolitan areas are substantially above, the national rate. Thus subjective health assessment appears to be better in high-status areas, and worse in metropolitan areas, regardless of whether such areas lie in or out of London.

Overall health index

One message to emerge from the previously published findings from the *Health and Lifestyle Survey* (Blaxter, 1990) is that the majority of the population has average, functionally-adequate health status. Thus "normal" health is not symptom-free or without any impairment; such "excellent" health is relatively rare. Similarly, "poor" health is only found among a minority of the population. It is, therefore, interesting to investigate the reasons for some people's excellent health, and others' poor health, and to examine the distribution of these extremes of health status across the country. One way to identify such people is to use an overall index of health status based on the four components of health (i.e. illness, psycho-social health, disease/disability and

fitness), including only those who were assessed on all four dimensions.

It should be noted that there is a departure from Blaxter at this stage. In her analysis of the HALS data, she identifies eight summary health categories (1990, pp. 44–54). We have proceeded in a slightly

BOX 3.5

CONSTRUCTION OF OVERALL HEALTH INDEX

An index of overall health status was constructed in two stages. First, individual indices were constructed for each of illness, psycho-social health, disease/disability and fitness. Second, an overall health index was created by categorising the aggregate scores from the four individual indices. These two stages are explained below.

Illness

Respondents were asked to report symptoms listed on a checklist (see Box 3.3). Total scores ranged from 0 to a possible maximum of 16. Each score was categorised in an index of illness according to the schema shown in Table A.

TABLE A INDEX OF ILLNESS

Number of symptoms	Category	
0–1	1	Good
2–4	2	Average
5–16	3	Poor

Psycho-social health

A checklist of eight symptoms was given to each respondent. Three of the items were weighted 0–3 according to the frequency with which they were experienced (see Box 3.4). Thus the range of scores was from 0 to a maximum of 14. Each score was categorised according to the schema shown in Table B.

TABLE B INDEX OF PSYCHO-SOCIAL HEALTH

Symptom score	Category	
0–1	1	Good
2–3	2	Average
4–14	3	Poor

Disease/disability

Respondents were asked whether they experienced a chronic disease and, if so, to what extent it affected their daily lives. These reports were checked by the nurse who made the second visit and who asked what, if any, medication was being taken by each respondent. Each respondent's experience of disease/disability was classified according to the schema shown in Table C.

TABLE C INDEX OF DISEASE/DISABILITY

Reported disease/disability	Category	Label
No chronic disease	1	No chronic disease
Non-limiting	2	Non-limiting disease/disability
Mild disability Moderate disability Severe disability	3	Limiting disease/disability

different way by constructing a three-category index which differentiates between those with good, average or poor health. The detailed methods are set out in Box 3.5. In the remainder of this section, those categorised as having poor or good health are focused upon.

Fitness

Measures of height, weight and blood pressure were taken for each respondent who received a second visit. Following Blaxter (1990), measures of body mass index (kg/m^2) and blood pressure were categorised as shown in Table D.

TABLE D BODY MASS INDEX AND BLOOD PRESSURE

Body mass index	Score	Blood pressure	Score
Normal weight	0	Normal	0
Mildly overweight	1	Borderline hypertension	1
Underweight	2	Hypertensive	6
Obese	4		

By aggregration, a total fitness score was obtained for each respondent ranging between 0 and a possible maximum of 10, and was then classified according to the schema shown in Table E.

TABLE E INDEX OF FITNESS

Total score	Category	
0	1	No impairment of fitness
1–2	2	Mild impairment of fitness
3–10	3	Severe impairment of fitness

It should be noted that, partly because of the absence of lung function measurements, our index of fitness differs from that reported by Blaxter (1990).

Overall health

The overall index of health was constructed from the four indices described above. As each of the four indices had a minimum score of 1 and a maximum of 3, aggregating them produced a summary total ranging from 4 to 12, as shown in the figure. Those respondents with scores less than or equal to 5 (i.e. 23 per cent of the English population) were deemed to have good health, those with scores ranging from 6 to 8 were classified as having average health status, and those with scores of at least 9 (i.e. 21 per cent) were classed as having poor health.

DISTRIBUTION OF OVERALL HEALTH INDEX SCORE

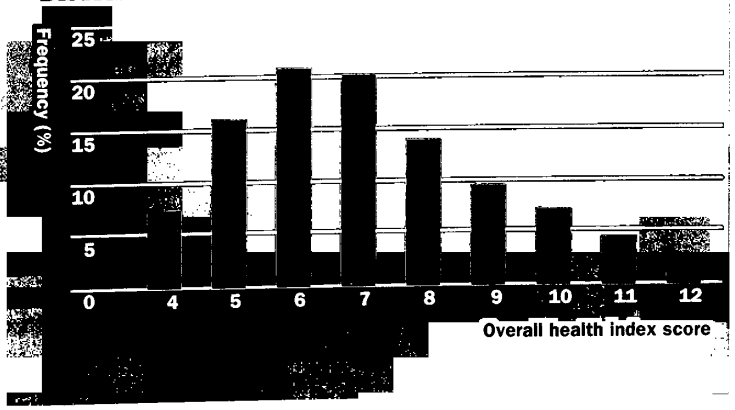
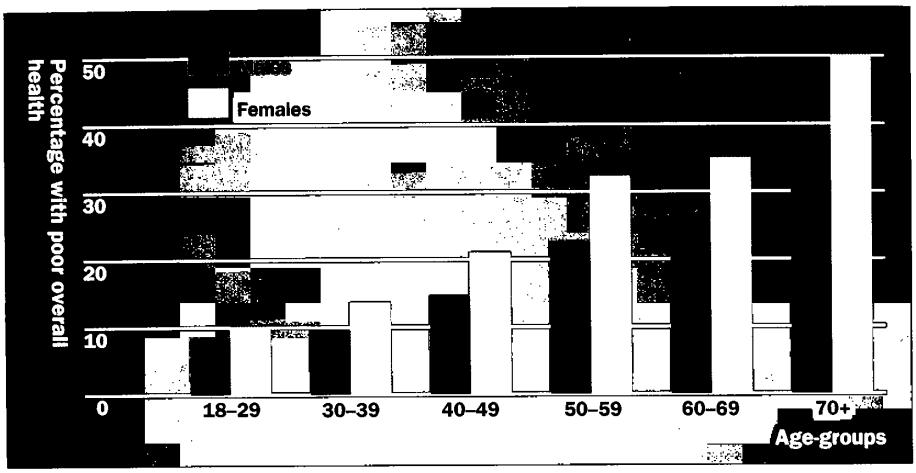


Figure 3.8

Poor overall health



Poor health

Twenty-one per cent of respondents living in England were classified as having poor health. As Figure 3.8 shows, women were more likely to be classified in this category than men, as 24.5 per cent of women and only 17.5 per cent of men had poor health. For both groups, there was a steady increase in the prevalence of poor health as age increased.

Table 3.9

Area variations in the proportion of people assessed as having poor overall health* (standardised rates, England = 100)

Area categories	London	Non-London	Total
High-status	97.6	93.6	94.7
Metropolitan	122.2	109.1	112.1
Total	112.5	103.8	105.9
Actual value	23.8	22.4	22.8

* Only includes individuals who completed the measurement section of the survey.

As might be expected in the light of findings reported so far, Table 3.9 shows that metropolitan areas have relatively high standardised rates of poor health, and high-status areas have relatively low rates. Metropolitan areas have consistently higher rates, irrespective of whether they are in or out of London, although none of the differences is statistically significant at the 10 per cent level. London has a higher rate of those with poor health than other cities. Both high-status and metropolitan London have higher rates than their comparable areas, although neither of these differences is statistically significant.

Good health

The distribution of good health between the clusters is the mirror image of the pattern of poor health. Considering the two extremes of health together reinforces the emerging picture that health status is significantly better in high-status areas than in metropolitan areas. London would appear to contain slightly more people at both ends of the spectrum of health status than the rest of the country, although none of these differences is statistically significant.

Conclusion

The picture of morbidity presented in this chapter does not fundamentally alter the perception of the comparative health status of Londoners outlined in the previous chapter. As already explained, it is difficult to be as certain in relation to morbidity as it was for mortality because the relatively small amounts of data reduce the likelihood of identifying statistically significant differences between areas. Overall, however, the data presented are consistent with the view that the health of Londoners is no worse, and may indeed be better, than that of people in other comparable parts of the country.

Table 3.10

Summary of statistically significant differences in health status between areas

Dimensions of health	London v. non-London	High-status v. metropolitan areas
Illness	**	**
Psycho-social	** (high-status only)	**
Disease/disability	-	* (non-London only)
Fitness	-	-
Subjective fair/poor health	-	**
Extreme poor health	-	-

* – p<.10. ** – p<.05.

Table 3.10 illustrates whether or not there are significant differences between London and non-London and between high-status and metropolitan areas for a number of dimensions of health. In most cases, there are no statistically significant differences between the health status of Londoners and non-Londoners among the sample of HALS respondents. There are just two exceptions, both of which suggest that Londoners have better health status than comparable non-Londoners. First, the average number of self-reported illness symptoms is greater outside the capital than within it. Second, people in high-status areas of London have a significantly better average experience of psychosocial health than respondents in comparable areas.

Perhaps the most important set of findings reported in this chapter relates to the consistent and significantly better health status of respondents in high-status areas compared with those in metropolitan areas. There is a strong suggestion that this difference is attributable to variations between areas in the extent of deprivation. This possibility is investigated in more detail in the next chapter.

CHAPTER 4

Multivariate analysis of health and lifestyles

The previous chapter examined a number of measures of health status and showed that there is little descriptive evidence to support the notion that Londoners have poorer health than their counterparts in broadly similar communities. In this respect, therefore, it confirmed the analysis of variations in mortality rates presented in Chapter 2. We now propose to explore whether living in London is a statistically significant determinant of health status in a different way – through multivariate analysis. This method has the added advantage of helping to inform thinking about the factors which impact on health within London.

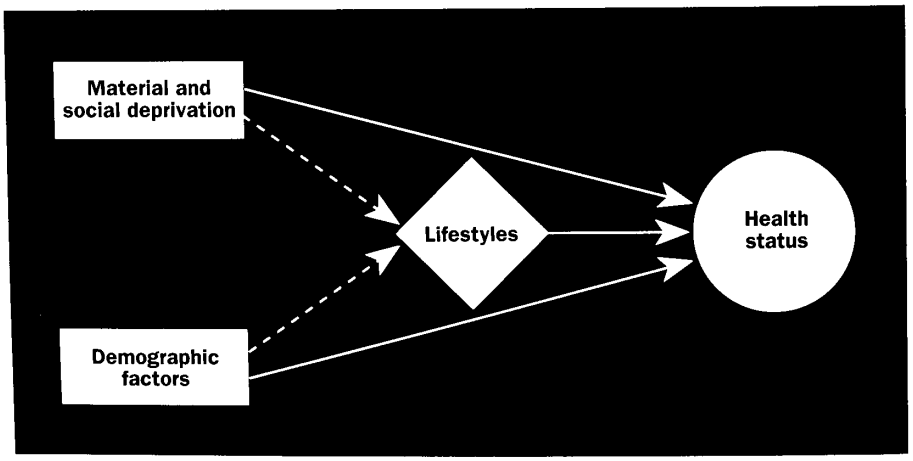
Conceptual framework

The primary aim of this chapter is to introduce and test a model of the determinants of health status using the data from the *Health and Lifestyle Survey* outlined in the previous chapter. The model follows Marmot *et al.* (1987) who "suggest that it is appropriate to focus on the following path of causation: social forces ➡ lifestyle and exposure differences ➡ health differences" (p. 115). However, "social forces" have been disaggregated so that as well as lifestyles the impact of demographic, material and social factors can be examined separately. Figure 4.1 provides a schematic illustration of the model. It suggests that demographic, material and social factors have both a direct and indirect – through their impact on lifestyle – influence on health status.

In the final section of this chapter, logistic regression analysis is

Figure 4.1

Factors affecting health



employed to establish the relative importance of the component parts of the groups of factors shown in Figure 4.1 in relation to the measures of health status described in Chapter 3. Before presenting the results of complex statistical models, however, some of the literature which emphasises the importance of the different factors is reviewed. Descriptive statistical data about the relationship of each of the factors with the overall index of health status described in the previous chapter are also presented.

The four groups of factors which are hypothesised to account for observed variations in health status are:

- demographic and personal characteristics;
- material and physical deprivation;
- social deprivation;
- lifestyles and behaviour.

Each of these factors is discussed below. Subsequently, we incorporate representative indicators into multivariate models. It is at this stage that a variable reflecting area of residence is included to test whether residence in London is an independently significant factor.

Demographic and personal characteristics

This section illustrates how health varies with gender, age and ethnic group.

Gender

It is well known that women live longer than men. In 1989, life expectancy at birth was 78 for women compared with 73 for men (OPCS, 1991). At all ages mortality rates for men are higher than those for women. In particular, in 1989 men aged between 15 and 24 were twice as likely to die as women of the same age.

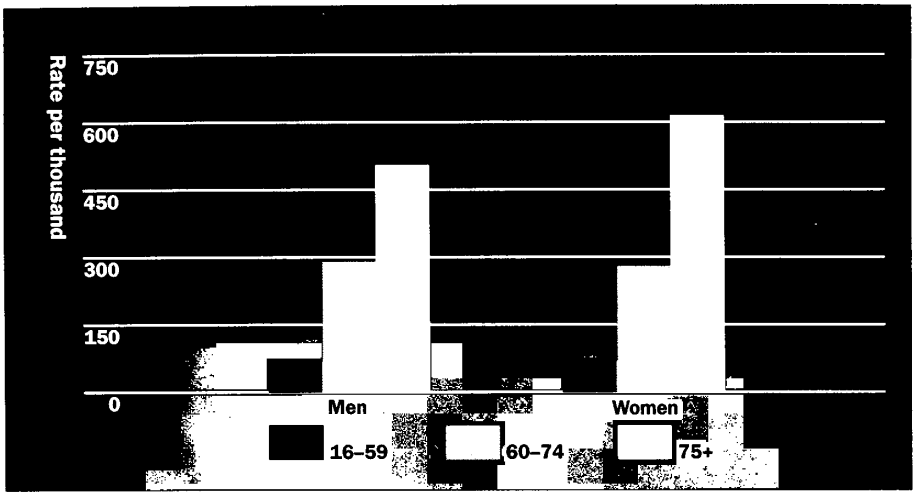
In contrast, however, women tend to report higher levels of morbidity than men, although some of this is simply due to the increased longevity of women. Figure 4.2, obtained from the OPCS disability survey, shows the prevalence of disability by age and gender for adults. Under the age of 75, the prevalence for men and women at different levels of severity was similar, whilst over 75 women had consistently higher prevalence rates (Martin *et al.*, 1988). Evidence from the *General Household Survey* shows that higher percentages of women reported limiting longstanding illness and acute illness than men throughout the period from 1972 to 1988 (Foster *et al.*, 1990).

Blaxter, in her analysis of the *Health and Lifestyle Survey*, also found some differences between men's and women's experience of morbidity:

> *At all ages women experienced, or were ready to describe, more illness and higher levels of psycho-social malaise than men. This is, of course, an invariable finding in health surveys. It is commonly suggested that women's socialization and cultural identity make it easier for them to admit to symptoms. It is certainly possible, however, that physiological*

Figure 4.2

Prevalence of disability among adults



Source: Martin *et al.*, *1988*

differences do mean that women are genuinely more likely to suffer from more minor pain and dysfunction ... Fitness and the absence or presence of disease, on the other hand, did not differ greatly between the sexes.
(1990, p. 50, 52)

Table 4.1 presents simple cross-tabular data about the relationship between gender and health status. The health indicator illustrated is the overall health index described in the previous chapter, but the relationship is similar for many of the individual health variables. More men than women have an overall good level of health and more women than men have poor health.

Table 4.1

Gender and overall health index*

* Only includes individuals who completed the measurement section of the survey.

Overall health index	**Male**	**Female**	**N =**
	%	%	
Good	26.6	20.6	1,432
Average	55.9	54.9	3,404
Poor	17.5	24.5	1,314
N =	2,778	3,372	6,150

Age

Average life expectancy has increased by twenty years since the beginning of the twentieth century (OPCS, 1991). This has led to large increases in the numbers of people over pensionable age. Currently 18 per cent of the population are pensioners, and this is projected to increase to 23 per cent – 12.8 million people – by the year 2029. Perhaps of greater significance is the increase in the number of people over the age of 80, from 1.8 million in 1989 to 3 million in 2029. These population trends are likely to have a profound impact on the health status of a community, since the prevalence of illness and disability

tends to increase with age, with the very elderly having particularly high rates. Figure 4.2 graphically illustrates this point. Women over 75 have more than double the prevalence rate for disability of those aged between 60 and 74, and nine times that of those aged 16 to 59. A similar pattern is true for men, although the increase is not so marked.

Evidence from the *General Household Survey* for 1988 shows a similar pattern. Although not as steep as the gradient for disability, the percentages of people reporting longstanding illness, limiting longstanding and acute illness increase with age. This is particularly true for limiting longstanding illness, where over half of the people over 75 reported an illness against 19 per cent in the whole population.

The data from the *Health and Lifestyle Survey* also show similar patterns of illness by age. Of the four dimensions of health described in the previous chapter, Blaxter (1990) demonstrates that all but psycho-social malaise increase with age.

Table 4.2

Age and the overall health index*

Overall health index	**Age**							
	18–24	**25–34**	**35–44**	**45–54**	**55–64**	**65–74**	**75+**	**N =**
	%	**%**	**%**	**%**	**%**	**%**	**%**	
Good	31.4	30.3	29.1	20.4	14.8	13.5	11.7	1,432
Average	59.3	59.6	56.9	56.5	51.9	49.2	45.5	3,404
Poor	9.4	10.1	14.0	23.2	33.3	37.3	42.9	1,314
N =	727	1,175	1,296	967	961	681	343	6,150

* Only includes individuals who completed the measurement section of the survey.

Table 4.2 shows the relationship between the overall health index and age. As expected, the number of people whose health is good decreases with age, from 31 per cent of individuals aged 18–24 to 11.7 per cent of those over 75, whilst people over 75 are four times as likely to report poor health as those under 24.

Ethnicity

Evidence about the health status of ethnic minorities living in Britain is sparse. Members of black and ethnic minority groups may be expected to have worse than average health experiences for two reasons. First, there are a number of genetically determined diseases which appear to be more prevalent amongst minority groups, for example sickle cell anaemia amongst Afro-Caribbeans or thalassaemia amongst individuals of Cypriot origin (Donovan, 1984). Second, members of ethnic minority populations may experience greater problems with asthma and diabetes as well as suffering from the

> *direct and indirect effects of racial discrimination. Hostile or discriminatory behaviour or attitudes cause distress, loss of confidence, and alienation.*
> (BMA, 1987, p.19)

At a general level of health, studies tend to focus on individuals' country of origin and mortality. Marmot *et al.* (1984) investigated the mortality of individuals who were resident in England and Wales at the time of their death but had not been born there. Generally, with the exception of individuals from Ireland, immigrants had lower death rates than those in their country of birth and very different patterns of mortality from people born in England and Wales.

There are some grounds, therefore, for believing that ethnicity is associated with health status. But the relationship is a complex one. Members of black and ethnic minority groups tend to be materially and/or socially disadvantaged. They also experience discrimination and alienation. These confounding relationships make it difficult to unravel the underlying nature of the relationship between ethnicity and health.

In the HALS data set a proxy for ethnicity was rather unsatisfactorily classified by the interviewer's observation. It has been noted in a number of other analyses (e.g. Howlett *et al.*, 1991) how problematic this is. Nevertheless, in England as a whole 96 per cent of respondents were classified as white, 1.7 per cent as Indian, 1.2 per cent as African and 0.8 per cent as other non-white. Metropolitan London had the highest percentage of non-whites – 17.7 per cent – four times more than other metropolitan areas.

Table 4.3

"Ethnicity" and subjective health assessment

Subjective health assessment	White	Non-white	N=
	%	%	
Excellent	20.5	19.4	1,546
Good	51.6	46.3	3,881
Fair/poor	27.8	34.3	2,121
Total	7,224	324	7,548

Despite its unsatisfactory nature, an ethnic minority variable will be included in the multivariate analyses in an attempt to test whether it has an effect on health independently of other factors. It should be noted, however, that even at a bivariate level significant relationships between this measure of "ethnicity" and indicators of health status can be identified only for subjective health assessment, malaise and the fitness measures. Table 4.3 illustrates the relationship between the crude proxy for "ethnicity" group and subjective health. Slightly more white people assess their health as excellent than non-white, and 34 per cent of non-white individuals assess their health as only fair or poor, against 28 per cent of white people.

Material and physical deprivation

The second set of factors to consider are those related to material and physical deprivation. It has been well established for more than a century that poor material and physical environments generate avoidable

mortality and morbidity. For example, income, housing and the quality of the residential environment, and levels of educational attainment can all be shown to be associated with different measures of health status.

This section begins with a review of some of the literature which has suggested a relationship between these factors and health. Then the computation of an index of material deprivation from the limited data available in HALS is described. Finally, the relationship between the index of material deprivation and the overall index of health is illustrated.

Poverty and unemployment

The most commonly cited source of material disadvantage associated with adverse health outcomes is poverty. Unfortunately, income is rarely measured adequately for comparative purposes and hence evidence is scant. Nevertheless, it is widely believed that income must have a direct relationship with material living standards in the home and hence health status. As Graham points out, "income provides the raw materials for health: it buys shelter, warmth and food" (1984, p. 106). Detailed studies have shown that it is spending on food and fuel which is most vulnerable for families in poverty, who cut back on the amount they purchase and/or use cheaper substitutes which are not as healthy or efficient.

In the HALS questionnaire individuals were asked about their average monthly household income. Unfortunately, as we discuss later, this question has a number of drawbacks, but it does provide a rough indication of the material resources available to the family. In England as a whole, 28 per cent of households had a monthly income of less than £340, while 16 per cent had an income of more than £996 per month. The most noticeable area differences in the income distribution were between London and non-London. While in high-status areas more respondents both in and out of London fall into the highest income group, only in London high-status areas is the proportion in the poorest income group significantly lower than for England as a whole. In metropolitan areas, London has a higher, and non-London a lower, proportion of individuals in high-income households than the English average. Metropolitan non-London has a higher proportion of people in the lowest income-group than similar London areas.

Although direct evidence relating income to health may be sparse, there is substantial support for the proposition that unemployment causes excess mortality and both physical and psychological morbidity. Prior to the availability of longitudinal data, "associations between unemployment and raised mortality were often dismissed as being due to socio-economic and health characteristics of those who became unemployed rather than the consequences of unemployment" (Fox and Shewry, 1988, p. 11). However, evidence from the Longitudinal Study, which links census and mortality information at an individual level, shows that this is not the case. Mortality rates were 23 per cent higher than average between 1971 and 1981 for men who

classified themselves as seeking work at the 1971 Census, when standardised for social class (Moser *et al.*, 1990). A similar picture is true of women whose husbands were seeking work at the 1971 Census. During 1971 to 1981, they had a SMR of 119 against 100 for all married women when adjusted for housing tenure. For both unemployed men and their wives, the highest SMRs were for accidental deaths, suicide and lung cancer.

Unemployment has also been found to significantly affect individuals' psychological health. Warr (1985) reviewed 28 cross-sectional studies published since 1960 and found a strong association between unemployment and poor psychological health on 13 different measures. Similarly, eight longitudinal studies showed that unemployment preceded a deterioration in psychological health. Warr has suggested that this may happen for nine different reasons:

- financial worries;
- restricted behaviours and environments;
- loss of structure to day;
- smaller scope for making decisions;
- loss of satisfaction from developing and using skills;
- increase in threatening and humiliating experiences;
- feeling anxious about the future;
- reduction in quality of interpersonal contacts;
- decline in social position.

Compelling evidence about the causal links between unemployment and physical morbidity is more difficult to find. There is no doubt that "unemployed people have poorer health than those employed" (Moylan *et al.*, 1984, p. 133), but the direction of causality is not clear. In contrast, there are stronger grounds for believing that "men who become unemployed are more likely to use the health services than the population as a whole" (Moylan *et al.*, 1984, p. 140). For example, a number of studies have found higher rates of GP consultations amongst the unemployed. Yuen and Balarajan examined the relationship between unemployment and GP consultations using the 1983 and 1984 *General Household Survey*, and found that:

> *after adjustment for age, housing tenure, socio-economic group, and region of residence men who were unemployed but seeking work had a significantly higher odds ratio than those in employment for consultation with a general practitioner.*
>
> (1989, p. 1213)

Within HALS 5 per cent of respondents reported themselves as being unemployed at the time of the survey. Unemployment rates were highest in metropolitan areas, particularly outside London, where 6.9 per cent of HALS respondents were out of work.

Housing

Housing and area of residence have both been shown to impact directly and indirectly on physical and mental well-being. The direct relationship between damp housing, respiratory diseases and chest conditions, especially amongst children, has been well established. This has implications not only for illness in childhood but also leads to longer-term effects on adult morbidity and mortality. Various modes of transmission have been examined – including dust mites, airborne mould spores and humidity – and there can be no doubt about the link between poor housing and ill health. One of the most important recent studies has demonstrated that:

> *For children, living in damp and mouldy dwellings was associated with a greater prevalence of wheeze, sore throat, runny nose, cough, headaches, and fever compared with those living in dry dwellings ... A dose-response relation was particularly noted with respect to wheeze, sore throat, runny nose, irritability, persistent headache, and fever and high temperature.*
>
> (Platt *et al.*, 1989, p. 1678)

There was also a statistically significant relationship between housing conditions and adults reporting bad nerves, aching joints, nausea and vomiting, backache, blocked nose, constipation and breathlessness in the previous two weeks, after controlling for economic status and cigarette smoking. As with children, there was a significant dose-response relationship between the severity of damp mould and air spores and the prevalence of symptoms (Platt *et al.*, 1989).

Overcrowded housing conditions have also been linked to respiratory diseases and digestive tract infections (BMA, 1987). The clearest manifestation of these problems can be found amongst homeless families in bed and breakfast accommodation; high rates of infectious diseases, childhood accidents, gastroenteritis, skin disorders and chest infections are common. In addition, the lack of privacy and stresses associated with living in crowded homes can result in poorer mental health and a reduction of the coping abilities of families.

The impact of poor housing conditions on psychological, as well as physical, well-being has been investigated in a number of studies. A survey in Edinburgh, Glasgow and London (Hunt, 1990) found that respondents who reported their housing conditions to be either noisy, cold, overcrowded or of poor repair were more likely to report that their children wet the bed, had temper tantrums or were unhappy and irritable, and that they themselves had been tired, had "bad nerves", headaches or felt low in the last two weeks. There were significant dose-response relationships for both adults and children between the prevalence of symptoms and the level and number of adverse conditions.

No detailed information was obtained in HALS on the quality of respondents' houses. However, respondents were asked about amenities and it is possible to ascertain the number of people per room. Approximately one-quarter of respondents did not have exclusive use of a toilet or bath or lived in overcrowded accommodation (more than one person per room). This did not vary greatly between different areas.

The environment

The design of modern housing estates has also been linked to ill health. A study of "difficult to let" housing in Liverpool reported that the inadequate housing conditions had contributed to high rates of infectious diseases, respiratory disease and mental illness. In a study of flats in London, Coleman (1985) concluded that badly designed blocks "made it difficult for normal people to cope" (Whitehead, 1988, p. 298) and hence increased the incidence of poor psycho-social health or malaise. Keithley *et al.* (1984), in their evaluation of eight council estates in Gateshead, found that:

> *People from "bad" housing areas reported poorer health, more long standing illness, more recent illness and more symptoms of depression than those living in "good" housing areas ... location, poor environment and low quality of construction were the important factors.*
>
> (Whitehead, 1988, p. 297)

A large number of studies have investigated the effect of living in flats on individuals' health. For example, Fanning (1967) compared two similar groups of non-commissioned army families living in houses and low-rise flats. Families in flats were 57 per cent more likely to attend a GP than those in houses. The greatest differences were for respiratory diseases for women and children, and psychoneurotic disorders for women, both of which increased within the blocks of flats with the height of residence. Fanning argued that this was due to lower levels of social contact for women and a reluctance to let children out to play.

Disadvantaged people have less choice about where they live and many find themselves in high-rise blocks, inner-city areas or large housing estates, all of which may suffer from poor environments which impact on health. Typically, these types of housing suffer from inadequate local facilities, lack of space for children to play, poor public transport, vandalism, pollution and the fear, particularly amongst women and the elderly, of criminal attack.

Another environmental factor which is increasingly a cause for public concern is the effect of air pollution on health. The most important environmental pollutants are nitrogen dioxide, ozone, sulphur dioxide, particulate matter, carbon monoxide, hydrocarbons and lead (Read, 1991). Most of these pollutants are produced by vehicle emissions and industrial processes, and hence are highly concentrated in urban areas. There have been few studies in Britain which show the impact of air pollution on the health of communities. However, there is a growing body of evidence which demonstrates the effect of different types of air pollution on health. This is briefly summarised in Box 4.1.

Within HALS, the only information about the environment in which individuals lived was based on the interviewer's assessment of the type of locality. One-third of respondents lived in high-rise blocks or built-up areas. Not surprisingly, this proportion was much higher in London, where 60 per cent of respondents living in high-status and metropolitan areas were resident in built-up areas or high-rise blocks. In contrast, outside the capital, only 23 per cent of respondents from

Box 4.1

AIR POLLUTION AND HEALTH

High concentrations of sulphur dioxide can cause breathing problems; sulphur dioxide and airborne particulates created the London smogs during the 1950s which were associated with increased morbidity and mortality (Holman *et al.*, 1991). Nitrogen dioxide increases susceptibility to bacterial and viral infections, irritates the lungs and increases other respiratory symptoms. Ozone can cause inflammatory reactions in the lungs (Koren *et al.*, 1989). It irritates the eyes, nose, throat and respiratory system. Carbon monoxide may reduce the blood's efficiency to carry oxygen, which may strain the heart and aggravate respiratory and cardiac disorders. It has been suggested that it results in higher levels of these diseases amongst traffic police and parking attendants (Adams, 1990). Low-level lead exposure has been shown to impair the mental development of children (Read, 1991). Hydrocarbons, particularly benzene, have been associated with urban lung cancer.

Air pollution can be particularly dangerous for children, whose lungs are not completely developed, the elderly, pregnant women, athletes, outdoor workers and individuals with existing disorders such as asthma, bronchitis, emphysema and heart disease.

high-status, and 43 per cent from metropolitan, areas lived in built-up areas or high- rise blocks.

Education

There is some dispute in the literature about whether poor education is best thought of as a form of material or social deprivation. We do not have a strong view either way, but for convenience we consider it here. The key point to note is that it is an aspect of disadvantage which is frequently noted for its association with poor health – especially in the health economics literature. For example, Drummond reports that of all of the environmental influences on health, "one of the most consistent findings is a positive association between education and improved health status" (1990, p. 10). The basic explanation is that educated people are more efficient producers of their own health.

> *One might reasonably suppose that the better educated are in a better position to assimilate information about health matters from the mass-media and their physician than the poorly educated, thereby being better equipped to produce a healthy diet from a given outlay on food, to acquaint themselves with the most efficient ways to heat their homes, and to digest information about possible health hazards in their workplace.*
>
> (Wagstaff, 1986, p. 4)

The association between education – usually measured by years of schooling – and health is not in doubt, but whether or not the relationship is a causal one is much more open to question. There is a lack of convincing explanations about the links between schooling and health, especially at high levels of education. It is frequently suggested that education is actually a surrogate for other factors which are difficult to measure directly. Differences in personal time preferences are most commonly mentioned, but others "might include motivation, a sense of purpose, and a host of other characteristics that reflect psychological and social adjustment" (Garber, 1989, p. 285). As Marmot has remarked:

> *Years of education might, for example, show the strongest association with health status simply because it is measured more precisely than social characteristics of residence or occupational status. Education may be a precise marker of social position, but may not be in itself a determinant of health status.*
>
> (1989, p. 247)

It is important, however, to acknowledge that education can affect health "indirectly by providing a passport to other advantages" (BMA, 1987, p. 19). Well-educated individuals are more likely to have better jobs and higher levels of income which enable them to have higher standards of living. As the previous discussion has shown, individuals' material circumstances are strongly associated with their health. Education, therefore, may be indirectly associated with poor health or act as a proxy for socio-economic circumstances rather than provide individuals with the skills to maximise their ability to control their health.

Respondents in HALS were asked about both the age at which they left school and the qualifications which they gained. Approximately

one-half of the respondents did not have any educational qualifications and 55 per cent left school under the age of 16. Neither of these measures varied greatly between areas.

Material deprivation and health

As the discussion above suggests, material deprivation is a complex phenomenon and therefore very difficult to measure. The most direct measurement of individuals' material resources is their income, but unfortunately income data were only collected for approximately 80 per cent of respondents in HALS. More significantly, it has not yet been possible to develop a measure of equivalent household income, to take account of differences in household structure, from the HALS data. This would be the most appropriate indicator for comparative purposes.

Despite these drawbacks the income variable does appear to be a good discriminator of different levels of health. Table 4.4 shows the relationship between household income and the overall health index. Double the proportion of respondents in the highest income-group compared with those in the lowest report good health, and over three times as many individuals in the lowest income-group as opposed to the highest have poor health. It should be noted, however, that age may be a confounding factor in this relationship, since over half the people in the poorest income-group are pensioners.

Table 4.4

Household income and the overall health index*

Overall health index	Household income per month				
	Less than £340	£341 – £750	£751 – £995	More than £995	N =
	%	%	%	%	
Good	12.2	24.9	28.1	30.9	1,165
Average	48.7	57.3	59.6	57.7	2,806
Poor	39.1	17.7	12.3	11.4	1,087
N =	1,322	2,159	764	813	5,058

* Only includes individuals who completed the measurement section of the survey.

Occupational class is frequently used as a proxy for individuals' socio-economic circumstances. However, there is an increasing belief that it is an inadequate measure of people's material circumstances. The British Medical Association (BMA) has suggested that:

> *Social class is probably becoming a poorer measure of socio-economic status than in the past, as home ownership, second incomes, single parenthood and unemployment cut across the traditional relationship between husband's occupation and family resources.*
>
> (BMA, 1987, p. 7)

This is particularly true for sub-groups of the population where there are large numbers of individuals who do not participate in the labour

force, such as women or the retired. Consequently, although fewer respondents are lost owing to inadequate information on this variable than income, relevant data are still not available for the full sample. Table 4.5 shows the relationship between social class and the overall health index.

A higher proportion of respondents in social classes I and II than social classes IV and V have good health, and vice versa for poor levels of health. However, this does not appear to be as good a discriminator as income. For example, 40 per cent of those in the lowest income-group have poor health against 26 per cent of those in social classes IV and V. This reflects Blaxter's own findings from HALS:

> *At all ages and for both men and women ... the health of those in low-income households was clearly poorer than the population average ... for most age-gender groups, income carried more weight than social class.*
>
> (1990, p. 71)

Table 4.5

Social class and the overall health index*

Overall health index	**Social class**			
	I and II	**III**	**IV and V**	**N =**
	%	**%**	**%**	
Good	26.0	22.7	20.2	1,399
Average	57.5	55.0	53.3	3,343
Poor	16.5	22.3	26.4	1,297
N =	1,794	2,951	1,294	6,039

* Only includes individuals who completed the measurement section of the survey.

Given the frequent absence of good data about income and the growing unease about social class, housing tenure has become increasingly important as a means of restratifying the British population. Saunders argues that:

> *social and economic divisions arising out of ownership of key means of consumption such as housing are now coming to represent a new major fault line in British society.*
>
> (1984, p. 203)

In addition, as Arber (1991) points out, measures of consumption such as tenure and car ownership are more reliable and easier to collect than occupational class. Two-thirds of respondents to HALS owned their own homes. Not surprisingly, the level of owner-occupation is lower in metropolitan areas, particularly in London. In addition, metropolitan London has over twice the proportion of people renting houses privately than the rest of the country.

However, housing tenure – which can only distinguish between a small number of groups – cannot adequately reflect all the dimensions of material deprivation. We have, therefore, drawn together all of the

Box 4.2

INDEX OF MATERIAL DEPRIVATION

The index of material deprivation was constructed from the unweighted sum of the following indicators:

- **not an owner-occupier;**
- **unemployed;**
- **household has more than one person per room or does not have exclusive use of a bath or WC;**
- **live in built-up area or high-rise block;**
- **no formal educational qualifications.**

The minimum score is 0 and the maximum, for those most materially deprived, is 5. The average score in England was 1.46.

relevant and available information within HALS to construct an index of material deprivation. The details are shown in Box 4.2. Unfortunately, the HALS questionnaire did not ask about car ownership, so it was not possible to include this important factor.

Table 4.6 shows the material deprivation score in each area standardised to the English average. Both London and comparable areas have higher levels of material deprivation than the rest of the country. However, the average score is clearly greater in London than in comparable areas, and particularly so in high-status areas of the capital. It should be noted, however, that the relatively low level of owner-occupation and the high proportion of respondents who live in built-up areas are the main reasons for the higher scores in the capital.

For convenience the material deprivation score was compressed into a four-category index which is illustrated in Figure 4.3. Almost nineteen per cent of respondents have material deprivation scores of 3 or more and are placed in the highest category.

The relationship between material deprivation and the overall health index can be seen in Table 4.7. Over double the number of people who score more than 3 on the material deprivation index have poor health compared with those who do not experience any material deprivation, as measured in the way described above. This relationship is very highly statistically significant and reflects the relationship between material deprivation and all of the other health status variables described in the previous chapter.

Table 4.6

Area variations in average material deprivation score (England = 100)

Areas	London	Non-London	Total
High-status	105	89	94
Metropolitan	126	121	123
Total	118	110	112
Actual value	1.72	1.61	1.64

Figure 4.3

Material deprivation index

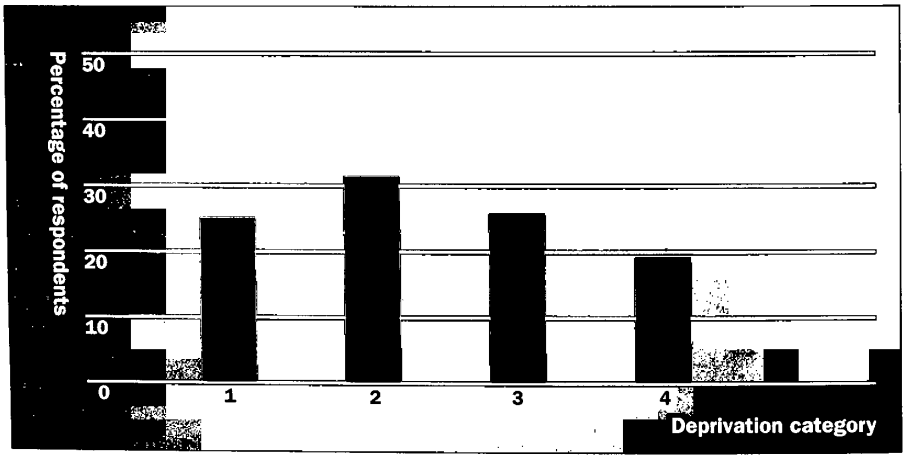


Table 4.7

Material deprivation and the overall health index*

Overall health index	Material deprivation score				
	0	1	2	3+	N =
	%	%	%	%	
Good	29.2	25.1	20.2	16.7	1,432
Fair	57.8	55.8	54.6	52.4	3,404
Poor	13.0	19.1	25.2	30.9	1,314
N =	1,495	1,946	1,574	1,135	6,150

* Only includes individuals who completed the measurement section of the survey.

Conclusion

The discussion in this section provides considerable evidence about the adverse effects of different dimensions of material deprivation on health. It is difficult to know which of the indicators discussed is the best proxy for material deprivation. The index described in Box 4.2 is available for more respondents than either income or social class. However, income appears to be at least as good a discriminator of different health indicators as the material deprivation index, and both are better than social class. In the multivariate analysis, however, we use the material deprivation score wherever possible so as to maximise the number of respondents.

It is clear that Londoners, particularly those living in high-status areas, experience higher levels of material deprivation – as defined by us – than respondents from comparable areas. However, this is not reflected by the distribution of income, as there are fewer Londoners in low income-groups and more Londoners in high income-groups than in comparable areas.

Social deprivation

> *There is much evidence that variables which are more "social" or personal than socio-economic – social support, integration or isolation, social networks, social roles and activities – are closely associated with health.*
> (Blaxter, 1990, p. 102)

The absence of any of these factors is defined as social deprivation, but it is useful to distinguish between social support and social integration.

Perceived social support

There is a large body of literature outlining a number of effects on health of social support. It can buffer the effect of a threatening life event (Brown and Harris, 1978), improve recovery time for heart attack victims (Finlayson, 1976), decrease rates of pregnancy complications (Nuckolls *et al.*, 1972) and influence help-seeking behaviour (McKinlay, 1973). With respect to mental health, "social support defined as perceptions that one is cared for and loved or has a confidante

Box 4.3

PERCEIVED SOCIAL SUPPORT

This measure of perceived social support follows Blaxter's methodology (1990). Respondents were asked whether there were family members or friends who:

- **made them feel loved;**
- **did things to make them feel happy;**
- **could be relied on no matter what happens;**
- **would see that they were taken care of if they needed to be;**
- **who accepted them just as they are;**
- **who made them feel an important part of their lives and who gave them support and encouragement.**

For each of the seven statements respondents scored 3 if it was certainly true, 2 if it was partly true and 1 if it was not true. A respondent scoring the maximum – 21 – was classified as having no lack of social support.

or intimate friend has been related to lower levels of distress and depression" (Bloom, 1990, p. 636).

Blaxter (1990), in her analysis of HALS, found a relationship between perceived social support and health. "Degrees of a felt lack of personal support were related to illness and to psycho-social health in a very regular way" (p. 112). Similarly, social support was found to be "obviously protective against illness as well as against psycho-social malaise" (p. 228).

Blaxter (1990) calculated a score for perceived social support as set out in Box 4.3. Among the sample of respondents living in England, 60 per cent felt no lack of social support, and 40 per cent felt some lack. A higher proportion of men (44 per cent) than women (37 per cent) reported some lack of social support. For both men and women the proportion of people reporting any lack of support fell with age. The decline was steeper for men (53 per cent of 18–29-year-olds to 38 per cent of those over 70) than for women (40 per cent to 35 per cent respectively), but the pattern was consistent. It is the relatively high proportion of young men experiencing a lack of social support which stands out among these findings.

There is substantial variation within London in the proportion of respondents reporting low levels of social support. Forty-seven per cent of those in metropolitan, as opposed to 36 per cent of those in high-status, areas are "deprived" in this way. Overall, London has a slightly higher proportion of people in this category than comparable areas.

Social integration

The importance of social integration for health has been recognised ever since Durkheim's (1897) classic study of suicide found an association with excessive social isolation.

Blaxter (1990) has used the HALS data to construct a score of social integration based on three elements: the number of social roles which a person has; the extent of social contacts with both family and friends; and one's integration into the community. First, these three elements are considered separately. They are then combined into an overall index of social integration.

Social roles

The number of social roles which people have in their lives has been shown to be associated with health status. While there have been suggestions that having too many roles (so-called role overload) can be harmful to health, especially for women, most evidence suggests that the number of roles is positively associated with health status. For example, Berkman and Syme's study (1979) revealed that people who were married had lower mortality rates than those who were single, widowed or divorced. In an examination of a wider range of social roles among adults in Detroit, Verbrugge (1983) found that employment, marriage and parenthood were associated with good physical health for both women and men. Employed, married parents tended to have the best health profile, while people with none of these roles tended to experience lower levels of health. It was found that having multiple

roles had no negative effects and there was no evidence of role overload among women.

In HALS, respondents were asked whether they:

- were living with at least one other person;
- were married or cohabiting;
- were employed;
- had children;
- had at least one surviving parent.

Following Blaxter's (1990) weighting, respondents were given a score of 2 for being married or cohabiting and for not living alone. Each other positive answer scored 1. This produced a scale with a maximum score of 7. Those respondents who scored 3 or less were categorised as having few social roles.

Nationally, 18 per cent of the sample were seen to have few social roles (a score of 3 or less). This was true for 16 per cent of men and 20 per cent of women. For both genders, there was a similar distribution with age. Not surprisingly, the highest proportions of people having few social roles were amongst the young (18–29) and the very old (over 70).

On average 8 per cent more respondents in metropolitan than in high-status areas reported having fewer than three social roles. Consistently higher proportions of Londoners reported having few social roles than people in comparable areas.

Social contacts

Kaplan *et al.* (1977) suggest that social contact provides three main functions:

- tangible support – fulfilment of practical needs;
- appraisal support – helping to evaluate and confirm role expectations;
- emotional support – fulfilling people's needs for intimacy, love, affection and nurturance.

This third function has been recognised explicitly by the British Medical Association.

> *Relationships with other people provide emotional support and practical assistance in coping with the difficulties of life. Human society is based on the assumption that cooperative sharing of resources and effort is more productive of most forms of advantage than the isolated striving of individuals.*
>
> (BMA, 1987, p. 27)

One of the earliest longitudinal studies of social networks and relationships was Berkman and Syme's Alameda County study (1979). They found that after controlling for self-reported physical health status, the year of death, socio-economic status and lifestyle behaviours, the

absence of social and community ties was related to premature mortality. Thus they concluded that "social circumstances such as social isolation may have pervasive health consequences" (p. 203). Their findings have been repeatedly confirmed by a number of other studies (e.g. House *et al.*, 1982).

The HALS questionnaire contained a number of questions about individuals' level and frequency of social contact with their family and friends. Box 4.4 shows the method of calculating a score for social contacts. The highest score for contact with both family and friends is 15, making a maximum possible total score of 30. After examining the distribution of the scores, low social contact was defined as a score below 6.

Box 4.4

MEASURING SOCIAL CONTACTS

Blaxter (1990) constructed two social contact scores, one for friends and one for family. Each score was based on weighting the answers to three questions:

Respondents were asked how often in the last two weeks they had:

- **gone out to visit family/ friends;**
- **had family/friends to visit them;**
- **had contact with family/ friends by phone or letter.**

Unfortunately, although Blaxter reports that she gave different weights to each type of contact, she does not report their value. We have, therefore, arbitrarily decided to weight a visit twice the value of a letter or phone call for both friends and family. The potential score for each contact index is set out in the table below according to the frequency of contact.

	Weight		
Frequency of contact during last two weeks	**Phone/letter**	**Visited**	**Had a visit**
Not at all	**0**	**0**	**0**
Once or twice	**1**	**2**	**2**
3 to 6 times	**2**	**4**	**4**
More than 6 times	**3**	**6**	**6**

It can be seen from the table that the maximum score for each contact index is 15.

In England as a whole, 20 per cent of the sample scored less than 6 when the two indices of contacts – for friends and family – were combined. The proportion of men who fell into this category (23 per cent) was higher than that of women (18 per cent). The proportions of each age-group with few social contacts increased in a linear fashion. Among those aged 18–29, 13 per cent of men and 9 per cent of women had few social contacts, while 33 per cent of both men and women aged 70 and over fell into this category.

There are consistent differences in the proportion of respondents who experience social isolation between London and non-London areas. Overall, one-quarter of Londoners experienced social isolation, as opposed to one-fifth of respondents elsewhere.

Community integration

The final element of Blaxter's index of social integration was based on the answers to a variety of questions about individuals' attachment to

the area in which they live and participation in community events. Individuals were asked whether they:

- were born in the area;
- had lived there more than two years;
- felt a part of the area;
- attended a church or other place of worship;
- undertook community, social or voluntary work.

The responses to these questions varied little between areas. Approximately 68 per cent of people were not born where they now live, but only 8 per cent had lived there for less than two years. Ninety per cent of people did not undertake community work and 83 per cent did not attend church. However, only 25 per cent of people reported that they did not feel part of the community. This was true for a higher proportion of Londoners than other people in England.

Index of social integration

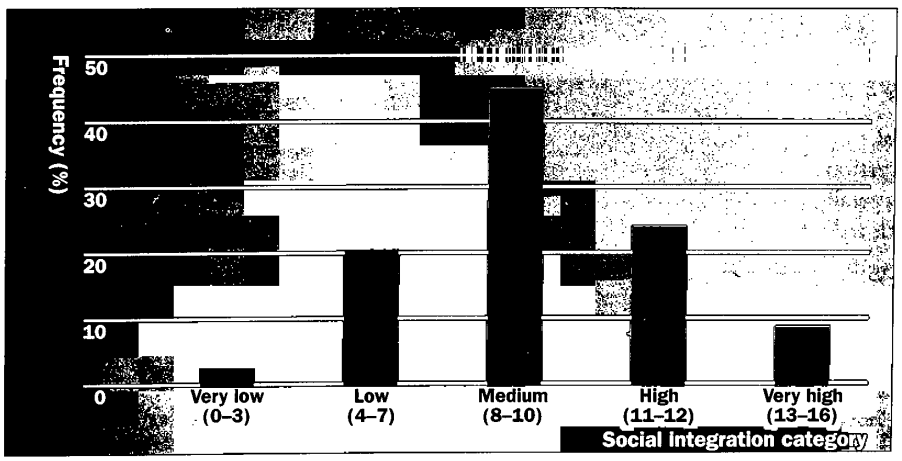
Blaxter constructed an index of social integration by combining the three elements discussed above, namely:

- social roles;
- social contact;
- community integration.

As discussed earlier, after weightings had been applied, respondents could score a minimum of 0 for social roles and a maximum of 7. The social contact score was categorised separately for friends and family, such that in each case low contacts (fewer than four) scored 0, medium (4–8) scored 1, and high (greater than eight) scored 2. Finally, individuals scored one for each of the five questions about community integration answered positively. These three sets of scores were added together to give a score for social integration which ranged from 0 to 16. Blaxter then arbitrarily categorised this as shown in Figure 4.4. As

Figure 4.4

Social integration index



can be seen, only 2 per cent of respondents scored less than 3 and were identified as having very low social integration, while a further 21 per cent scored between 4 and 7 and had low social integration.

The only area which varied from this distribution of very low and low social integration was metropolitan London, where 4 per cent of respondents had very low and 28 per cent low levels of social integration. The proportion of respondents who were assessed as having high and very high levels of social integration was lower in London than in comparable areas.

Social deprivation and health

Given the complexity of the two indices of social support and integration, no attempt has been made to combine them into a single index of social deprivation. Table 4.8 shows the relationship between perceived social support and the overall health index. As expected, individuals with the maximum social support score were more likely to have good health and less likely to have poor health than those who were assessed as having a considerable lack of social support (i.e. had a score below 17).

Table 4.9 paints a similar picture. Low scores on the index of social integration are associated with poor health and high scores with

Table 4.8

Perceived social support and the overall health index*

Overall health index	Perceived social support score			
	21	20–18	17 or less	N =
	%	%	%	
Good	26.0	20.7	15.6	1,430
Average	54.1	58.3	53.8	3,396
Poor	19.8	20.9	30.7	1,312
N =	3,636	1,814	688	6,138

* Only includes individuals who completed the measurement section of the survey.

Table 4.9

Social integration and the overall health index*

Overall health index	Social integration score					
	16–13	12–11	10–8	7–4	3 or less	N =
	%	%	%	%	%	
Good	30.3	26.5	23.6	16.9	8.8	1432
Average	58.2	58.6	55.9	50.3	41.6	3404
Poor	11.5	14.9	20.5	32.8	49.6	1314
N =	521	1506	2803	1195	125	6150

* Only includes individuals who completed the measurement section of the survey.

good health. Individuals classified as having very low social integration were over four times as likely to have poor health as those classified as having very high social integration (i.e. a score in excess of 13).

Once again, it should be noted that age may be a confounding factor in this relationship. The relative importance of age and social deprivation cannot be determined, however, until multivariate analyses are introduced in the final section of this chapter.

Conclusion

The evidence presented above from HALS supports the hypothesis that social deprivation is associated with poor health. This is true for both perceived social support and social integration.

Londoners would appear to experience slightly lower levels of social support and social integration. All other things being equal, therefore, this ought to result in relatively poor experiences of health in the capital.

Lifestyle and behaviour

Having considered various aspects of material and social deprivation we now turn our attention to lifestyle. Four areas of behaviour were considered in the HALS survey.

> *Smoking, the consumption of alcohol, exercise and diet were chosen for detailed enquiry because they are the elements of lifestyle usually thought of as most clearly "voluntary", and undoubtedly associated with health.*
>
> (Blaxter, 1990, p. 113)

While there is room for debate about how voluntary these behaviours may be, they clearly reflect a degree of individual responsibility. In the remainder of this section, the latest evidence about the links between lifestyles and health is summarised, and area variations in behaviour observed within the HALS data set are examined. The association between some of the lifestyle indicators derived from HALS and the overall index of health is then examined.

Smoking

In *The Health of the Nation,* smoking is described as the largest single preventable cause of death (Cmnd 1523, 1991, p. 36). It accounts for a third of all deaths in middle age. In a study of excess deaths from nine chronic diseases in the United States in 1986, Hahn *et al.* found that "of the nine risk factors examined singly for their contribution to deaths from the nine diseases, the largest proportion, 33 per cent, was attributable to cigarette smoking" (1990, p. 2656).

In the HALS survey, respondents were asked whether they regularly smoked cigarettes, that is whether they smoked at least one cigarette a day. This question alone was used to distinguish smokers from non-smokers, on the premise that all smoking is harmful.

Nationally, 32 per cent of people reported smoking regularly. A higher proportion of men (34 per cent) than women (30 per cent) were regular smokers. Apart from those over 70, between 30 and 40 per cent

of men in each age-group were regular smokers, while for women there was similar consistency across the age-groups until 70, albeit at a slightly lower level.

The most obvious distinction between localities in patterns of regular smoking is to be made between below average levels in high-status and above average levels in metropolitan areas.

Alcohol consumption

It has been estimated that alcohol is responsible for at least 25,000 premature deaths each year and that the figure may be as high as 40,000 (Jacobson *et al.*, 1991, p.56). There are strong relationships between heavy alcohol consumption and cirrhosis of the liver, cancer (mainly digestive), fatal road traffic accidents and high blood pressure.

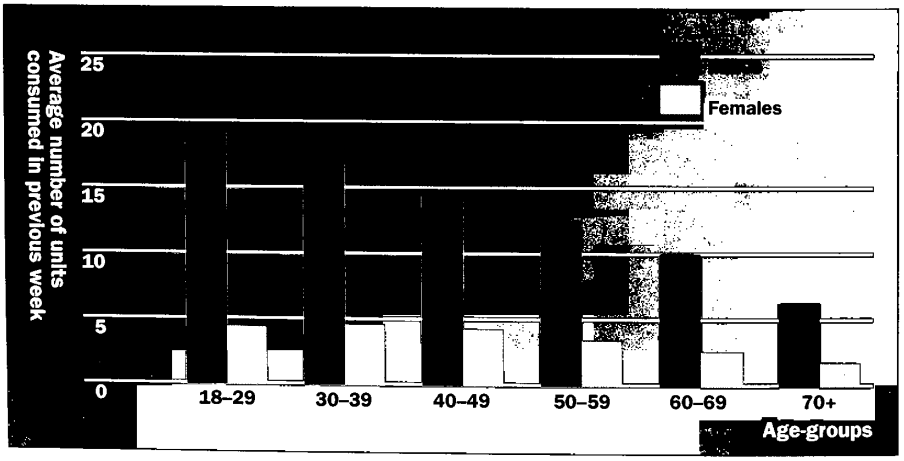
There are a number of ways of measuring alcohol consumption which would facilitate comparative analysis. One indicator of alcohol consumption was based on a question which asked about the number of units of alcohol consumed by the respondent in the previous week.

Using this, it is possible to calculate the mean number of units consumed in the week by respondents in different areas. Alternatively, it may be more appropriate to examine in detail the distribution of those people who report having drunk more than the recommended weekly limit of alcohol in the previous week. The medical Royal Colleges have suggested sensible limits of 21 units of alcohol per week for men, and 14 units for women.

An average of approximately eight units of alcohol was reported as being consumed in one week by each survey respondent. Figure 4.5 illustrates that drinking clearly varies with age and sex in particular. On average the men in the HALS sample consumed almost four times as much alcohol (14.1 units in one week) as the women did (3.6 units in one week). For men there was a steady decline in the average amount of alcohol consumed as age increased, such that men aged 18–29 consumed on average in excess of three times the amount drunk by men over 70 years old. There was also an inverse relationship with age for women.

Figure 4.5

Alcohol consumption



In the week before being interviewed, 13.5 per cent of the respondents living in England had consumed more units of alcohol than the recommended weekly limit. Men were far more likely to have done so than women, since 23 per cent of men, compared with 6 per cent of women, fell into this category. For both groups, the proportions consuming excessive amounts of alcohol fell as age increased. Thus for those aged 18–29, 34 per cent of men and 8 per cent of women consumed units over the recommended limit, whereas of those over 70 years old only 7 per cent of men and 2 per cent of women did so.

On average, people in metropolitan areas consume 17 per cent more units of alcohol per week than residents of high-status areas. This difference is consistent both inside and outside London. Residents of the capital consistently consume slightly less alcohol than people in other comparable areas.

Exercise

The third aspect of health-related behaviour to be investigated is physical activity or exercise.

> *Appropriate physical activity or exercise ... is a necessity for health living. It also helps to prevent heart attack, to maintain a healthy weight, to strengthen the bones, and to preserve independence in the elderly and people with a disability.*
>
> (Cmnd 1523, 1991, p. 71)

It has been suggested that a sedentary lifestyle (i.e. a lack of regular exercise) contributed to 23 per cent of deaths from nine chronic diseases in the USA (Hahn *et al.*, 1990). There is widespread consensus that exercise has benefits for physical health: in increasing the length of life, reducing the likelihood of coronary heart disease (Powell *et al.*, 1987), and reducing blood pressure, obesity, diabetes, osteoporosis and bone fractures in old age. Regular physical exercise also enhances psychological health, by improving self-confidence and self-esteem and reducing levels of anxiety and depression (Stephens, 1988).

Asserting that physical activity can be a form of health-promoting behaviour is one thing. It is quite a different matter to obtain a good measure of activity from a household survey. The most easily available information in HALS is not very satisfactory, but it is arguably better than nothing. It is based on a question asking whether, in the previous fortnight, respondents had done any of the activities listed on a card shown to them. These activities included keep-fit or yoga, cycling, golf, jogging or running, swimming, table tennis, basketball, football, rugby, badminton, tennis, squash or fives or rackets, cricket, windsurfing or sailing, self-defence or boxing or wrestling, back-packing or hiking, and dancing.

Throughout England, 62 per cent of the sample were assessed as not having done any exercise in the two weeks prior to being interviewed. This was fairly consistent for both gender groups, with 61 per cent of men and 63 per cent of women reporting no exercise. Not surprisingly perhaps, the proportion of non-exercisers increased with age; from 34 per cent of men and 44 per cent of women aged 18–29

up to 89 per cent of men and 92 per cent of women aged 70 and over.

In contrast to the wide variation in rates of non-exercise by age, there appears to be relatively little variation by area. There is a small difference between the proportions in high-status and metropolitan areas, but it is interesting to note that this is due solely to the distribution outside London. There is no variation within London, as the proportion is consistently close to the national figure. There is some slight variation within cities outside London, with the proportions for high-status areas slightly below, and for inner city areas slightly above, the national figure.

Diet

The impact of diet on health has been the subject of much research and investigation. For example, it is estimated that 35 per cent of cancer deaths may be due to diet (Jacobson *et al.*, 1991, p. 45), while heart disease is thought to be affected by dietary cholesterol.

> *The higher the cholesterol level in the blood the greater the risk of heart disease ... There is good evidence to suggest that the amount of saturated fat (derived mostly from animal fats) in the diet is an important determinant of cholesterol levels.*
>
> (Jacobson *et al.*, 1991, p. 33)

There is a broad consensus among experts that recommendations for dietary change should include the reduction of total dietary fats, saturated fat, sugar and salt, and an increase in dietary fibre.

Measuring diet is problematic. The information in HALS does not include a measure of the quantity of food intake, but rather more qualitative descriptions of the "usual" diet. Following Blaxter, a measure of diet was constructed on the basis of dietary items which were selected on the grounds that they "would represent dietary habits currently approved by nutritionists" (1990, p. 123). Blaxter's index of diet was replicated exactly, such that seven items were selected which "were found to be, together, an efficient indicator of a nutritionally approved diet" (1990, p. 123). These were:

- eating predominantly wholemeal/brown bread;
- eating low-fat or polyunsaturated spreads;
- eating fresh fruit at least once a day in summer;
- eating salads or raw vegetables at least once a week in winter;
- eating chips not more than twice a week;
- eating other fried food not more than twice a week;
- not eating sweets/biscuits every day.

The overall index was constructed such that five or more bad dietary habits constituted a poor diet, three or four bad habits meant an "average" diet and less than three bad habits implied a good diet.

Fifty-five per cent of respondents in England have a good diet – by this definition – and 8 per cent are thought to have a poor diet. The proportions do not vary greatly by areas.

Lifestyle and health

The association between the four indicators of lifestyle described above and the overall health index has been investigated. There is no difference between the proportion of people with good and poor diets who experienced each category of overall health. The association between both regular smoking and taking exercise and the overall health index are as expected – more people who smoke or do not exercise are less likely to have good health and more likely to have poor health. For example, Table 4.10 shows that over double the proportion of people who do not exercise, as opposed to those who are physically active, have poor health. However, this needs to be interpreted with care since older people are less likely to exercise and more likely to have poor health. Multivariate models of health status must be estimated before establishing whether exercise has an independent effect on health.

Table 4.10

Exercise and the overall health index*

Overall health index	Exercise in last two weeks		
	Yes	No	N =
	%	%	
Good	29.6	19.1	1,432
Average	57.6	53.9	3,404
Poor	12.8	27.0	1,314
N =	2,439	3,711	6,150

* Only includes individuals who completed the measurement section of the survey.

The relationship between alcohol consumption and health is at first sight counter-intuitive, as Table 4.11 shows. A higher proportion of people who drink more than the weekly recommended limit have good health than those people who do not drink at all. Similarly, nearly double the proportion of people who do not drink have poor health compared with those who consume more than the recommended number of units.

Table 4.11

Alcohol consumption and the overall health index*

Overall health index	Alcohol consumption			
	Does not drink	Drinks no more than recommended no. of units	Drinks more than recommended no. of units	N =
	%	%	%	
Good	19.6	25.2	27.2	1,432
Average	52.3	57.2	57.6	3,404
Poor	28.1	17.6	15.2	1,314
N =	2,417	2,863	870	6,150

* Only includes individuals who completed the measurement section of the survey.

Once again, though, this relationship is complicated by age. Older women, in particular, are much more likely not to drink at all, yet they are more likely to have poor health. A further problem in interpreting these associations is that of the direction of causation. It has been assumed that poor lifestyle results in poor health outcomes; it may well be that some people have amended their behaviour because of their poor health.

Conclusion

The evidence presented in this section shows that the relationship between different lifestyles and health is complex. There appears to be no difference in the health of people with good and bad diets, whereas smokers and those who do not exercise have poorer health than others, and individuals who drink more than the recommended limit actually have better health than those do not drink at all. This last finding may be due to confounding factors – such as age – or reverse causation. We will investigate this further in the next section.

It is worth noting, however, that no evidence was found to suggest that the lifestyles of Londoners were significantly worse than those of other people in England.

Multivariate analysis

The previous sections of this chapter have elaborated the nature of the relationships between various measures of health status and the explanatory components of the conceptual model outlined above. We now propose to investigate the relative importance of the different components. In particular, two questions are of interest:

- having adjusted for demographic and lifestyle factors, do indicators of material and social deprivation continue to be significantly associated with health status?
- does living in London have any independent association with health status after taking account of all of the components specified in the conceptual model?

The multivariate statistical technique known as logistic regression (Aldrich and Nelson, 1984) is used to address these questions. This procedure is particularly suitable for teasing out the nature of the relationships between explanatory factors and dichotomous measures of health status (i.e. ones which take the value 0 or 1). Like other multivariate statistical techniques, logistic regression facilitates investigation of a large number of independent or explanatory variables. Careful judgement is required, however, in interpreting the results of logistic regression models, particularly when many of the independent variables are correlated with each other. In the modelling, therefore, we have investigated various combinations of material deprivation or household income, social integration and support and the four indicators of lifestyle outlined above.

Multivariate analyses of six different indicators of health status, as set out below, have been investigated:

- poor psycho-social health;
- high number of illness symptoms;
- poor fitness;
- poor overall health;
- good overall health;
- fair/poor subjective health.

The detailed results for all six models are complex. The intention, therefore, is to highlight a selection of the most interesting findings. First, a summary of the results of all of the models is presented before discussing three of them in a little more detail. The full statistical results for the remaining three models are provided in Appendix 2.

Table 4.12 provides a convenient summary of the overall results of all six multivariate models which are shown in each of the columns. On the left-hand side of the table is a selected list of some of the most interesting and important independent variables which are associated

Table 4.12

Summary of multivariate analyses

	Dependent variables*					
Independent variables	**1**	**2**	**3**	**4**	**5**	**6**
Material deprivation	+	+	+	+	-	+
Social support	-	-		-	+	-
Social integration		-		-	+	-
Poor lifestyles	+	+	✳	+	-	+
Age	+	-	+	+	-	NL
Housewife	+		+	+	-	+
Woman	+	+		+	-	
Non-white		+				+
Middle-class areas	-	-	-	-	+	-
London						
outer	-					
inner						

Key

*1	High number of illness symptoms	✳	positive and negative associations
2	Poor psycho-social health		
3	Poor fitness	+	positive association
4	Poor health		
5	Good health	-	negative association
6	Poor subjective health	NL	non-linear relationship

with the different indicators of health status. This table does not attempt to report the strength of the various relationships. Instead, a positive (+) or negative (-) sign is shown to indicate the existence and the direction of a statistically significant relationship at the 90 per cent level. In row 1, for example, Table 4.12 shows that material deprivation is positively associated with poor assessments of illness, psycho-social health, fitness, subjective health and overall poor health and negatively associated with overall good health.

Table 4.12 shows that age is associated with all of the health status indicators. Interestingly, however, the relationship is not always either a linear one or in the expected direction. The material deprivation score is associated with all of the models. Social support is associated with five models, and social integration with four. Indicators of poor lifestyle are significant in every model, although as discussed later these are not always in the expected direction. It is these factors, therefore, together with gender, being a housewife and living in middle-class localities – Craig's high-status or rural/resort areas – which account for most of the variation in these measures of health status.

It is also interesting to note that being non-white is linked with two indicators strongly associated with psycho-social health. This finding is investigated in more detail in the next chapter. In only one of the models, however, having adjusted for all of the other factors, is there any evidence of a link between living in London and health status. People living in outer London are less likely to be assessed as having a poor experience of physical illness.

Having summarised the overall results of the multivariate modelling, three of the health status indicators are discussed in a little more detail. We focus on three contrasting measures: a relatively high number of illness symptoms; good overall health; and fair or poor subjective health. In each case, the probabilities of being in one of the selected health categories are associated with different characteristics of respondents. Strictly speaking, the confidence intervals for these probabilities should be presented. But for illustrative purposes, their calculation helps to make the logistic regression estimates more meaningful to the less statistically-minded reader. It is important to note, however, that whilst the probabilities do convey important information, the individual estimates are susceptible to problems of measurement error. The way in which the probabilities are calculated is illustrated in Box 4.5.

Illness symptoms

Table 4.13 reports the results of the model which best accounts for HALS respondents reporting poor levels of illness as assessed by the number of adverse symptoms suffered. Leaving the constant to one side, the Wald statistic and the odds ratio can be interpreted as indicators of the relative importance of the various independent variables included in the model. On this basis, it can be seen that age and gender are the most important determinants of high levels of illness. But material and social deprivation are also important factors.

Box 4.5

CALCULATING PROBABILITIES

Logistic regression is the most appropriate multivariate statistical technique to use when the dependent variable is a categorical one. This procedure is particularly appropriate when the dependent variable has only two categories, i.e. it is a dichotomy. All of the models analysed in this report are based on dichotomous health status variables. A typical example is whether or not a respondent experiences a symptom or perceives themselves to have poor health. In these kinds of cases, logistic regression is used to estimate the probability of the event in question occurring, given certain characteristics or circumstances of the respondent.

The probability of an event occurring is a function of the coefficients produced from the regression analysis and the values of the independent variables such that:

$$\text{Prob (event)} = \frac{e^{(b_0 + B_1X)}}{1 + e^{(b_0 + B_1X)}}$$

where b_0 is the constant, B_1 is the set of coefficients estimated from the data, X is the set of independent variables and e is the base of the natural logarithm.

The simplest way of explaining how the formula set out above can be used in practice is to present a worked example. This is done by using the results from Table 4.13, which reports the selected model for estimating the probability of having a high number of illness symptoms.

To calculate the probability of a specific individual having poor levels of illness, assumptions must be made about their characteristics and hence the values of the independent variables.

Assumptions about respondent	Value of independent variable (X)	Coefficient x independent variable (B_1X)
Scores 2 on material deprivation	2	0.44
Scores 21 on social support	21	-1.47
Does not smoke	0	0
Not aged 45–64	0	0
Aged 65–74	1	0.91
Not aged 75+	0	0
Lives in high-status area of London	1	-0.42
Does not live in rural/resort area	0	0
Woman	1	0.79
Housewife	1	0.32
TOTAL		0.57

Using the formula set out above, the probability of the individual described having a high number of illness symptoms is:

$$= \frac{e^{(-1.69 + 0.57)}}{1 + e^{(-1.69 + 0.57)}}$$

$$= \frac{0.326}{1.326}$$

$$= 0.246$$

Therefore, the probability of a woman aged between 65 and 74, living in a high-status London area, who is a housewife, does not smoke, has a social support score of 21 and a material deprivation score of 2, having poor levels of illness is 24.6 per cent.

Being a regular smoker and/or being a housewife are also positively associated with poor illness. Finally, being resident either in a high-status area of London or a rural/resort area outside the capital have an independently negative impact on the probability of having a high number of illness symptoms.

Table 4.14 illustrates how the probability of reporting a high number of illness symptoms is associated with age, gender and deprivation. Using the coefficients from Table 4.13 in the way described in Box 4.5, the probabilities of illness are calculated – on the basis of certain core assumptions – for respondents with minimum and maximum scores on the material deprivation and social support variables, and distinguish between men and women who are either under the age of 45 or older

Table 4.13

Multivariate analysis of high levels of illness symptoms

Independent variables	Parameter estimates	Wald	Significance	Odds ratio
Constant	-1.69	31.67	***	
Material deprivation score	0.22	46.69	***	1.24
Social support score	-0.07	27.25	***	0.93
Regular smoker	0.27	12.80	***	1.31
Aged 45–64	0.52	40.24	***	1.68
Aged 65–74	0.91	71.72	***	2.48
Aged 75+	1.38	127.40	***	3.95
Woman	0.79	98.11	***	2.21
High-status London	-0.42	5.16	**	0.66
Rural/resort areas	-0.21	5.35	**	0.81
Housewife	0.32	10.73	***	1.38

*** significant at 99% level ** significant at 95% level

Change in scaled deviance: 423.8 with 10 degrees of freedom

Table 4.14

Probability of reporting a high number of illness symptoms*

* Assumes respondent is not a smoker nor a housewife and does not live in high-status or rural/resort areas.

	Men		Women	
Deprivation scores	**<45**	**75+**	**<45**	**75+**
	%	%	%	%
Minimum	4.1	14.4	8.5	27.1
Maximum	25.4	57.4	42.8	74.8

than 75. The probability of reporting a high number of symptoms can be seen to increase from 4 per cent for a minimally-deprived young man to 75 per cent for an elderly, very deprived woman.

Good overall health

Table 4.15 focuses attention on those HALS respondents who were assessed as having a good overall level of health. Once again, the most important factor is age. Not surprisingly, respondents are less likely to have good health as they become older. Being a woman and/or a housewife is also associated with reduced probabilities of good health. High material deprivation scores are also inversely associated with good health, whilst high scores for social support and integration are positively associated with good health, as are exercise and living in high-status areas. Living in London, however, has no special statistical significance.

Table 4.16 illustrates the relative importance of factors associated

Table 4.15

Multivariate analysis of good overall health†

Independent variables	Parameter estimates	Wald	Significance	Odds ratio Exp (B)
Constant	-2.98	58.84	***	
Material deprivation score	-0.14	24.89	***	0.87
Social support score	0.10	28.01	***	1.11
Social integration score	0.04	6.07	**	1.04
Exercise	0.25	14.10	***	1.28
Aged 45–64	-0.58	61.00	***	0.56
Aged 65–74	-0.85	45.48	***	0.43
Aged 75+	-0.90	24.42	***	0.40
Woman	-0.34	25.15	***	0.71
High-status areas	0.16	5.30	**	1.17
Housewife	-0.23	5.08	**	0.79

*** significant at 99% level ** significant at 95% level

Change in scaled deviance: 327.7 with 10 degrees of freedom

† Only includes individuals who completed the measurement section of the survey.

Table 4.16

Probability of having good overall level of health*†

Aged	No adverse factors	Material deprivation	Social deprivation	Lack of exercise	All adverse factors
18–44	0.53	0.35	0.13	0.46	0.06
45–64	0.38	0.23	0.08	0.33	0.03
65–74	0.32	0.19	0.06	0.27	0.02
75+	0.31	0.18	0.06	0.26	0.02

* Assumes respondent is a man living in a high-status area with the maximum deprivation score and the minimum value for the social support and social integration indices where appropriate.

† Only includes individuals who completed the measurement section of the survey.

with good health in a different way by reporting the probabilities associated with different combinations of circumstances. To do this it is necessary to make certain baseline assumptions. These can be changed quite easily, and the assumptions made do not affect the interpretation of the results. The assumption to begin with, therefore, is that we are seeking to calculate the probability of a male living in a high-status area having good health in a range of different personal circumstances. Each column shows how this probability decreases with advancing age. The first row shows how the probability of having good health is lower if the assumed 18–44-year-old employed male is either seriously materially or socially deprived or does not exercise. The final column shows the consequences at different ages if the person concerned happened to be materially and socially deprived and have a poor lifestyle.

Fair or poor subjective health

Table 4.17 shows the results of the statistical model which best estimates the probability of HALS respondents reporting themselves as having fair or poor health. The most important single variable is the material deprivation score, and this is closely followed by social deprivation, smoking and not exercising.

The relationship with indicators of age is a non-linear one. The coefficient is higher for the young and old as opposed to the middle-aged, suggesting a U-shaped relationship with reporting poor/fair health. The stronger link with younger people appears to reflect the fact that subjective assessments of health are closely associated with psycho-social perceptions. The same appears to be true of being "non-white".

The other factors included in the model are being a housewife, which is positively associated with poor health, and living in middle-class – high-status and rural/resort – areas, which are associated with a lower risk of poor health. Once again, no statistically significant links with London can be identified after those factors already mentioned have been taken into account.

Table 4.18 shows the relative and cumulative importance of material and social deprivation and poor lifestyles. As before, it is necessary to make certain baseline assumptions in order to calculate specific probabilities. In this case we start with a young, white housewife who does not live in a middle-class area. If such a respondent were to have the lowest possible scores on the three components of the model she would have a 16 per cent probability of reporting fair or poor health. In contrast, with the highest possible scores the probability would increase to 92 per cent.

Conclusion

This chapter has illustrated the complex and varied nature of the factors associated with health status. Nevertheless, two findings stand out. First, there is no basis for believing that there is anything special about living in London which cannot be explained by reference to factors which apply throughout the country. Second, health status appears to be clearly related to indicators of material and social deprivation even when full allowance is made for demographic and lifestyle factors.

There is some evidence to suggest that average material and social deprivation scores – as measured in this chapter – are higher in London than in the comparator areas. Given the importance of deprivation as a determinant of health status, it might be expected that the higher than average levels of deprivation would result in worse levels of health in London. Certain calculations can be done to lend support to this view, but none of the differences is statistically significant. It is safer to conclude, therefore, that there are no real differences in the health status of Londoners and non-Londoners on the basis of the HALS analysis.

In fact, given that it is necessary to compare people in inner and central London (Craig's family 6) with a very heterogeneous group from a wide range of localities (Craig's families 4 and 5), it is somewhat surprising that the observed differences in health status are not greater.

Table 4.17

Multivariate analysis of subjective health assessment

Independent variables	Parameter estimates	Wald	Significance	Odds ratio
Constant	0.86	10.51	***	
Material deprivation score	0.23	83.24	***	1.26
Social support score	-0.10	61.32	***	0.91
Social integration score	-0.04	13.01	***	0.96
Regular smoker	0.38	42.41	***	1.47
Exercise	-0.47	54.96	***	0.63
Aged 18–24	0.48	28.71	***	1.61
Aged 45–64	0.18	6.49	**	1.20
Aged 65–74	0.39	16.15	***	1.48
Aged 75+	0.36	8.38	***	1.43
Non-white	0.26	3.94	**	1.29
High-status areas	-0.23	11.40	***	0.80
Rural/resort areas	-0.13	3.23	*	0.88
Housewife	0.21	7.18	***	1.24

*** significant at 99% level ** significant at 95% level

* significant at 90% level

Change in scaled deviance: 520.99 with 13 degrees of freedom

Table 4.18

Probability of assessing health as poor or fair*

	Score on each index				
	Material deprivation	Social deprivation†	No. of bad lifestyles		All adverse factors
Score	*Probability*	*Probability*	*Number*	*Probability*	*Probability*
Min.	0.16	0.16	0	0.16	0.16
Mean.	0.21	0.22	1	0.21	0.37
Max.	0.37	0.60	2	0.30	0.92

† The maximum social deprivation score is achieved when there is the lowest possible value on both the social support and social integration scores.

* Assumes respondent is white, young housewife who does not live in high-status or rural/resort area.

It might have been expected that the health of Londoners would have been shown to be worse than the chosen comparators. The fact that this is not the case suggests that, if it was possible to compare morbidity data on the same basis as the mortality analyses presented in Chapter 2, the

health status of Londoners might be seen to be better than in other directly comparable areas. For the time being, however, such judgements can only be speculative.

What is much more certain, on the basis of the findings presented in this chapter, is that the distribution of health care resources both within London and in the remainder of the country ought to reflect variations in social and economic circumstances in different areas. The links between deprivation and poor health have been clearly demonstrated. But it is important to note that they may have been understated.

It is essential to recognise that while HALS contains a comprehensive analysis of individuals' social circumstances, the information available on material deprivation is limited. Other studies have tried to measure both forms of deprivation in a more comprehensive way. In the next chapter, we analyse data from one such survey to emphasise the importance of material and social circumstances in determining health status in the capital.

CHAPTER 5

Deprivation and health in London

The most important conclusion of the analysis presented in the previous chapter is that material and social circumstances – even when measured in a very imprecise way – are important determinants of health status. The purpose of this chapter is to explore this finding in more detail using a data set specific to London which is much richer than HALS in information about the material circumstances of survey respondents. Unfortunately, the price to be paid for better data about deprivation is less comprehensive information about health and lifestyles. Sufficient data are available, however, to advance thinking about the determinants of the relative health status of the resident population of London. Such information should provide a useful input into future attempts to allocate resources which are more proportionate to the distribution of health needs within the capital.

The primary aim of this chapter is to replicate the multivariate analysis presented in Chapter 4 using London-specific data. First, we introduce the *Survey of Londoners' Living Standards* (SLLS) and explain the definition and measurement of deprivation which is a central part of it. Next, the relationship between deprivation and various measures of health status is illustrated. Then, the lifestyle, demographic and other factors available in the SLLS are introduced. Finally, the results of logistic regression models which seek to confirm the importance of material and social deprivation as determinants of the health status of Londoners are presented.

Survey of Londoners' Living Standards

The *Survey of Londoners' Living Standards* was conducted in 1985–86. It was financed shortly before its demise by the Greater London Council, and its design was greatly influenced by Peter Townsend's monumental study of poverty (1979). Data was collected from 1716 households and 2703 adult respondents, broadly representative of the population of London. Further information about the design of the survey is set out in Box 5.1.

Information was collected about a variety of aspects of the work, household and personal circumstances of respondents, including a number of measures of health status. Where the SLLS is unique, however, is in the richness of the data collected about adverse socio-economic circumstances.

Measuring deprivation

The conceptual approach to the measurement of deprivation within

Box 5.1

SURVEY OF LONDONERS' LIVING STANDARDS: SAMPLE AND RESEARCH DESIGN

The *Survey of Londoners' Living Standards* was based on stratified random sampling. First, all 755 electoral wards in London were ranked according to their scores on an index of material deprivation derived from the 1981 Census. From this ranking, 30 wards were selected so as to reflect the full range of socio-economic circumstances in the capital. Second, within each of the 30 wards, approximately 120 addresses were selected at random from the Postcode Address File. Attempts were then made to interview all adults in each eligible household.

It is commonly the case that survey response rates in London are lower than in other parts of the country, and the SLLS was no exception. Interviews were completed with 56 per cent of those households thought to be eligible, and within these 73 per cent of individual adults were interviewed.

The survey consisted of two questionnaires. The first covered housing, locational and general household information. The second was an individual questionnaire in which a wide range of questions about personal circumstances, experiences and attitudes was asked.

The sample data from the SLLS is thought to conform reasonably well with information about the Greater London population obtained from the 1981 Census with respect to age, sex, economic activity, occupational class and ethnic status.

***Source:* Townsend and Gordon, 1989, Appendix 4**

the SLLS has been outlined by Townsend.

> *Deprivation may be defined as a state of ... disadvantage relative to the local community or the wider society or nation to which an individual, family or group belongs ... People can be said to be deprived if they lack the material standards of diet, clothing, housing, household facilities, working, environmental and locational conditions and facilities which are ordinarily available to their society, and do not participate in or have access to the forms of employment, occupation, education, recreation, family and social activities and relationships which are commonly experienced or accepted.*
>
> (1987, pp. 125, 140)

Townsend and his collaborators identified 13 separate components of material and social deprivation. Detailed data were collected about 77 items which were thought at the design stage of the survey to best capture respondents' experiences of deprivation. After the data had been collected, and the survey responses had been analysed, certain modifications had to be made to the original set of indicators (Townsend and Gordon, 1989, Appendix 3). Following this example, we have made further adjustments so as to create an index of deprivation using 68 of the indicators covering the original 13 components of material and social deprivation. The principles we have followed in modifying the original set specified by Townsend (1987) are (a) to exclude indicators which suggest that approximately half or more of the respondents are deprived, (b) to ensure that each indicator has the same weight in the overall index and (c) to prevent any double counting of particular indicators.

The discussion in Chapter 4 emphasised that many features of the material and physical environment impact on health, and seven distinct aspects of this are contained in SLLS:

- diet;
- clothing;
- housing;
- consumer durables;
- environmental hazards;
- local facilities;
- working conditions.

Within these seven groups are included 48 individual components of material and physical deprivation. The full details are shown in Appendix 3, Box A3.1, and include measures of malnourishment, inadequate protection against the weather, poor living space, access to local services, safety and pollution.

It has been argued that many aspects of social deprivation might plausibly be associated with poor health. Some of these are included in the modified Townsend index, which contains six distinct components:

- employment rights;
- recreation;
- integration into the community;
- family activity;
- formal participation in social institutions;
- educational attainment.

The 20 individual indicators are shown in Appendix 3, Box A3.2, and include measures of social isolation, racial harassment, discrimination at work, poor education and restricted social activities.

The maximum score on the deprivation index for each respondent is 68. The actual observed range was from 0 to 42, with a mean of 10.6 and a standard deviation of 6.1. For ease of exposition, these data were used to construct a four-category deprivation index.

Table 5.1

Four-category deprivation index

Deprivation category	Range of scores	Mean score	Frequency
1	0–4	3.00	15.3
2	5–10	7.58	39.9
3	11–17	13.44	31.1
4	18 +	21.92	13.7
Total N =			2703

Table 5.1 shows the proportion of respondents in each of the deprivation categories; the 15.3 per cent of people in category 1 are the most advantaged group and the 13.7 per cent in category 4 are the most deprived. Box 5.2 describes the links between the index of deprivation and social class.

Box 5.2

DEPRIVATION AND SOCIAL CLASS

The index of deprivation is closely related to conventional measures of social class, and the table shows that the extent of deprivation increases as one moves down the social scale.

Social class	Deprivation categories 1	2	3	4	N =
	%	%	%	%	
I	30.5	48.3	20.3	0.8	118
II	22.6	45.1	24.5	7.8	628
III non-manual	17.6	43.3	28.5	10.6	811
III manual	9.1	37.9	35.4	17.6	494
IV	5.5	30.2	42.7	21.6	384
V	4.1	24.4	42.3	29.3	123
N =	392	1024	800	342	2558

However, it was suggested in Chapter 4 that social class is not a very precise indicator of relative deprivation. The direct measurement and categorisation of the material and social conditions in which people actually live is a more precise way of identifying those who suffer from multiple deprivation. For example, the table shows that there are 178 per cent more multiply deprived people in London than the total membership of social class V. Moreover, although people in social class V have the highest probability of being multiply deprived, it is such a small category that those who are comprise only 10.5 per cent of all respondents in deprivation category 4. There are also other reasons why the deprivation index is preferable to social class for exploring differences in people's health and well-being. For example, there are 5 per cent more responses to questions about deprivation than about class.

Deprivation and health

The *Survey of Londoners' Living Standards* contains a number of measures of self-reported health status, experiences of illnesses and care episodes and utilization of services. We focus on subjective health status, an illness episode during the previous two weeks and experience of a major health problem over the last year.

Table 5.2

Deprivation and subjective health

	Deprivation categories				
Subjective health	**1**	**2**	**3**	**4**	**N =**
	%	**%**	**%**	**%**	
Good	86.6	76.7	68.1	51.4	1,941
Fair	11.4	18.9	25.9	30.3	579
Poor	1.9	4.5	6.0	18.4	174
N =	411	1,076	837	370	2,694

Q: "Generally, is your health good for your age, fair or poor? I mean during the past 12 months, not just at the moment."

Table 5.3

Deprivation and recent illness

	Deprivation categories				
Recent illness	**1**	**2**	**3**	**4**	**N =**
	%	**%**	**%**	**%**	
Yes	20.0	23.9	28.9	39.1	726
No	80.0	76.1	71.1	60.9	1,970
N =	411	1,076	838	371	2,696

Q: "During the past two weeks have you been ill or unwell at all?"

Table 5.4

Deprivation and major health problems

	Deprivation categories				
Health as a major problem	**1**	**2**	**3**	**4**	**N =**
	%	**%**	**%**	**%**	
Yes	8.8	14.5	17.8	28.9	448
No	91.2	85.5	82.2	71.1	2,242
N =	411	1,073	836	370	2,696

Q: "Here are some problems people have told us they face. Which, if any, of these are major problems faced by you ... in the last 12 months? ... Your own health."

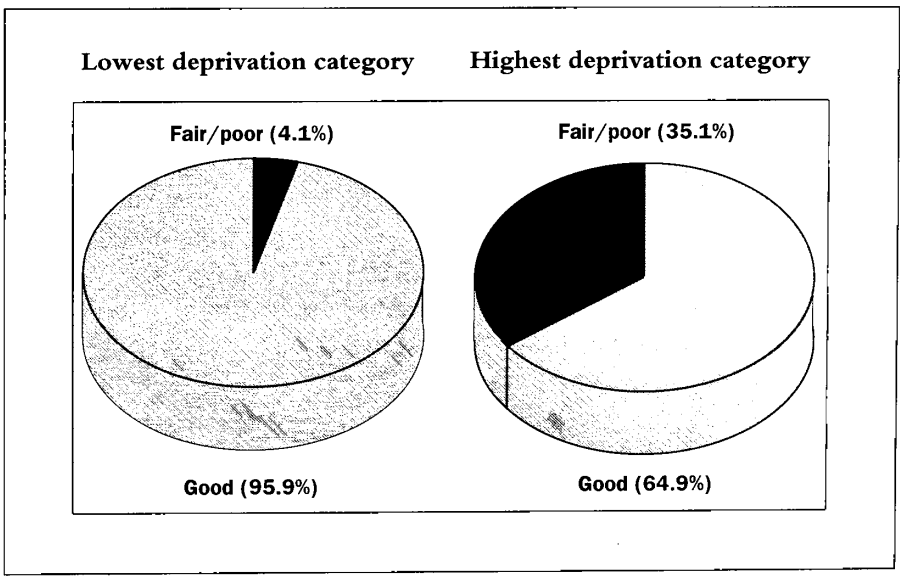
The relationship between deprivation and subjective health status is illustrated in Table 5.2. Only one-half of the most deprived of the survey respondents report themselves as being in good health, compared with almost 90 per cent of the least deprived. The contrast between levels of deprivation and self-reported poor health is even more marked; the multiply deprived are almost ten times as likely to have poor health as the least deprived. Less dramatic but significant examples of the association between deprivation and recent illness and health as a major problem are shown in Tables 5.3 and 5.4. The most deprived are twice as likely to report having been unwell during the previous two weeks, and more than three times as likely to have had major health problems during the past year, compared with their more advantaged counterparts.

Children

One interesting feature of the *Survey of Londoners' Living Standards* is that it also contains information about the health of the children in the family. The main adult respondent in each household was asked whether they felt that each child's health had been good, fair or poor over the last 12 months. In all, health information was gathered for 930 children in 524 families.

Figure 5.1

Deprivation and child health



The relationship between deprivation and parental assessments of child health is illustrated in Figure 5.1. Ninety-six per cent of children whose parents were least deprived were reported as having good health, as opposed to 65 per cent of children whose parents were in the most deprived category. In other words, children whose parents experience high levels of deprivation are nearly nine times as likely to have only fair or poor health as the least deprived children.

Multivariate analysis

In Chapter 4, we investigated the relative importance of different determinants of health status by using the multivariate statistical procedure logistic regression. It is proposed to do exactly the same using the SLLS. Adopting the same conceptual framework which guided the analysis in Chapter 4, the aim now is to establish the significance of social and material deprivation in determining the health status of Londoners. Before reporting the findings from the logistic regression models, however, there are a number of conceptual and methodological issues to consider.

Conceptual and methodological issues

This section has three aims. First, to explain how demographic, lifestyle and other potentially relevant factors are included in the statistical analyses, in addition to the material and social deprivation indices outlined above. Second, to consider the possibility that the relationship between deprivation and health is a non-linear one. Finally, to set specific objectives for the analysis.

Conceptual framework

In many studies of disadvantage and health there is a danger of exaggerating the importance of socio-economic factors by failing to take account of other potentially significant relationships. Many of these have already been described in Chapter 4. Perhaps the best examples are personal characteristics such as age, gender and ethnicity or conventional lifestyle risks such as smoking. As with the analysis of HALS, attempts have been made to minimise these dangers by including the following factors in our modelling of the SLLS:

- age;
- gender;
- ethnicity;
- smoking;
- alcohol.

Unfortunately, the lifestyle factors we have included are not entirely satisfactory, because information is available only where the respondent indicated that the behaviour in question might be affecting their health. This almost certainly implies some under-reporting of conventional risk factors. For example, only 19.2 per cent of the sample reported that smoking has an impact on their health, whereas the number of respondents who actually do smoke would be expected to be in excess of 30 per cent (see Box 5.3). Nevertheless, the inclusion of these variables does provide a useful counter-balance to the potential danger of exaggerating the significance of socio-economic factors.

In addition, a number of other social and economic variables have been included which were not contained in Townsend's index of material and social circumstances, such as:

Box 5.3

PREVALENCE OF SMOKING AND DRINKING IN SLLS

Smoking

The London survey reports that 19.2 per cent of respondents felt that smoking was currently having a bad effect on their health. This clearly under-reports the prevalence of smoking in Britain, which is between 35 and 40 per cent. However, the *Health and Lifestyle Survey* shows that the London estimate is much closer to numbers who report moderate to heavy smoking, i.e. those who are more likely to fear they are damaging their health.

Type of smoker	Definition: cigarettes per day	Per cent of respondents
Regular	At least one	35
Moderate	6–19	18
Heavy	20+	5

Drinking

The London survey shows that 6.6 per cent of respondents believe drinking is damaging their health. Prevalence of drinking in Britain is again an unhelpful comparison as approximately 60 per cent of women and 80 per cent of men define themselves as regular drinkers. A breakdown of the respondents into moderate and heavy drinkers shows much lower prevalences in the *Health and Lifestyle Survey*.

Type of drinker	Consumption in previous week (units)		Per cent of respondents
	Men	Women	
Moderate	11–50	6–35	29
Heavy	50+	35+	3

However, it is difficult to judge how many of these people would consider the amount they drink to be bad for their health. *The Nation's Health* suggests that the number of individuals who are at most risk of harm due to alcohol abuse is more consistent with the estimates derived from the London survey.

Types of problem drinking	Estimate of number at risk in England and Wales	Per cent of drinking population
Heavy drinking	3 million	8
Problem drinking	700,000	2
Alcohol dependence	150,000	0.4

Sources: Cox *et al.*, 1987; Blaxter, 1990; Smith and Jacobson, 1988; OHE, 1981

- housing tenure;
- social class;
- social roles;
- index of area characteristics;
- financial difficulties.

Most of these variables and the rationale for their inclusion in our models are self-explanatory, but two of them probably require a brief explanation.

First, the area index is a census-based indicator developed by Townsend (1987) to reflect relative levels of material deprivation at ward level and is available for individual survey respondents. It has been included as a way of testing the hypotheses developed by Haan *et al.* (1987) about the additive significance of neighbourhood factors after

taking account of individual characteristics. In a prospective study they examined the nine-year mortality pattern of residents of Oakland, California, and found that:

> *The increased risk of mortality associated with residence in a poverty area was not affected by adjustment for age, sex, race, baseline health status, low income, lack of medical care, unemployment, education, health practices, social isolation or psychologic uncertainty or depression ... That adjustment for these risk factors does not substantially affect the association between poverty area residence and all-cause mortality suggests that this association may be due to other socioenvironmental factors present in the poverty area ... Residents of poverty areas may be exposed to higher crime rates, poorer housing, lack of transportation and higher levels of environmental contaminants.*
>
> (1987, p. 995)

Second, the financial variables are substitutes for more detailed measures of income for which there was a poor response in SLLS. They are based on answers to three questions:

- Do you find it especially difficult to manage on your income?
- Compared with other people round here of your age, would you say you are: Better off, about the same or worse off?
- Have there been any periods (in the past) of your life when you have been below the kind of "poverty line" that you have just defined? Never, one short period, one long period, two or more periods, most or all of life.

Non-linearity

Notwithstanding the importance of demographic, lifestyle and other factors, one must guard against inappropriately understating the significance of deprivation. From this perspective, a critical question is whether or not the relationship with health is a linear and additive one. The answer is important for guiding approaches to issues such as the targeting of resources and the development of positive discrimination programmes. Evans and Stoddart imply that the relationship is linear, and that there is nothing qualitatively different about multiply deprived sections of the community. They argue that:

> *mortality and morbidity (when measurable) follow a gradient across socioeconomic classes. Lower income and/or lower social status are associated with poorer health. This relationship is not, however, an indication of deprivation at the lower end of the scale ... the relationship is a gradient, not a step function ... It follows that the variously interpreted determinants of health which lie outside the health care system are not just a problem of some poor, deprived minority whose situation can be deplored and ignored by the rest of us.*
>
> (1990, p. 1355)

Of course, in many ways, Evans and Stoddart are right to point to the importance of social factors affecting the whole population. But they

ought not to neglect the possibility that the most disadvantaged groups might suffer disproportionately from the cumulative impact of different forms of relative deprivation. This is the view taken by other commentators such as Dutton and Levine, who argue that:

> *If the multiple hardships of poverty result in a cumulative overload situation with which individuals are unable to cope, as we propose, then each additional hardship may have a disproportionate impact on physical or psychological well-being. Because such cumulative effects would be dependent on the overall level and number of other burdens borne, they would not be captured in the standard linear additive regression model ... Uncritical assumptions of linearity and additivity too often thwart the search for more complex nonlinear or synergistic affects.*
>
> (1989, p.48)

To examine this issue, the following approach to the statistical modelling has been adopted. All continuous variables have been examined for evidence of non-linearity and where appropriate the use of transformations has been explored. For dichotomous variables, various interactions suggested in the literature have been investigated. These are mainly associated with gender and social roles.

Objectives

The principal aim of the analysis is to identify which, if any, components of material and social deprivation are associated with different measures of health status. Some more specific propositions are set out below.

- The relationship between deprivation and health may be non-linear; i.e. multiple deprivation or extreme levels of deprivation will have a disproportionate effect on poor health.
- Lifestyle factors will also impact on the health of individuals but will not eliminate the effect of deprivation variables.
- Other characteristics of individuals – such as age, gender, household composition and employment status – may be associated with health status but they will not suppress the effect of deprivation.
- The index of area characteristics will have an additional effect on health over and above the individual social and economic circumstances of respondents.

Results

The statistical analyses were conducted in the following way. Separate statistical models were estimated for each of the three health variables: subjective health status; acute illness; and experience of a major health problem. In each case, the statistical significance of the 68 individual components of the index of deprivation has been evaluated in comparison with the demographic, lifestyle and other potentially important variables described above.

The final models for each of the dichotomous dependent variables were selected on the basis of *a priori* reasoning, statistical significance and parsimony. The initial stages of modelling were performed using

the forward stepwise logistic regression technique in SPSS. In the final stages of modelling both the changes in scaled deviance and the Wald statistic at significance levels of 90 per cent or more were used to select variables for the model.

In addition to the analysis of a general model including all of the survey respondents, separate models for men and women alone have been produced so as to explore the possible differences between them in the relative determinants of health status.

The overall results certainly support some of the principal propositions. As expected, lifestyle factors such as smoking and personal characteristics such as age are associated with poor health but do not suppress the importance of material and social deprivation. However, there is no evidence of non-linear relationships between deprivation and health, and the census-based indicator of area characteristics is not significant. This latter result is perhaps not entirely surprising because a number of aspects of environmental deprivation were included in the London survey and some of these are included in the final models.

The detailed results for each of the models associated with the three indicators of health status are set out in Appendix 4. It can be seen that the exact combination of independent variables included in the three models varies for each of the dependent variables, but a number of broadly common clusters can be identified.

Within the material deprivation cluster, the direct significance of poverty is the most difficult to substantiate because of the absence of a satisfactory measure of equivalent income for a sufficient number of the respondents. Nevertheless, the significance of measures of inadequate diet, non-car ownership and having spent at least one period of life in poverty are strongly suggestive that low income is associated with poor health. As the literature reviewed in Chapter 4 suggests, poor housing is also consistently associated with each of the measures of health status. The final significant aspect of material deprivation relates to environmental factors – covering both the availability of local facilities and pollution – which are significant in two of the models.

The two most important aspects of social deprivation are being isolated and alone and discrimination at work, although concern about another member of the family is also significant in two of the models. Social roles are important in the two models relating to assessments of health over time, as is age. Interestingly it is in this area that evidence of significant non-linear relationships was identified. Age was categorised into five groups and some evidence (illustrated by the negative coefficient in Appendix 4, Table A4.3) was found to support a positive relationship between good health and lower age. More generally, the association with poor health tends to increase disproportionately with increasing age. In addition, one of the models includes a significant interaction term – being a housewife with children – which supports the notion that multiple roles are beneficial for women's health.

The most consistently significant lifestyle influence on self-reported health status is smoking. The variables most noted for their relative absence given the frequency with which they are mentioned

in the literature are those related to educational attainment and years of schooling. However, when combined, these factors are significant for the subjective health model only. It may well be, as Marmot (1989) suggests, that when data sets become available which have more precise information about social and material circumstances than crude proxies of socio-economic status, such as social class, then the assumed importance of education will be widely seen to be diminished. Finally there is some evidence of gender and ethnic differences in reporting recent ill health.

Table 5.5

Probability of having poor or fair health in the last twelve months*

Age	No adverse factors	"Bad lifestyle" only	Materially deprived only	Socially deprived only	Lived in poverty most of life only	All adverse factors
16–44	0.07	0.19	0.48	0.36	0.18	0.97
45–59	0.09	0.23	0.55	0.43	0.23	0.98
60–74	0.18	0.40	0.62	0.50	0.28	0.98
75 +	0.21	0.45	0.68	0.54	0.32	0.98

* It is assumed, where appropriate, that respondents are employed until the age of 59, are not housewives with children and have never been in poverty.

The model for subjective health has been selected to illustrate the relative significance for various age-groups of different combinations of factors on the probability of reporting poor or fair health in the previous 12 months. Table 5.5 shows that probabilities increase with age and the number and type of adverse factors experienced. Material deprivation appears to have a slightly greater impact on poor health than social but both forms of deprivation appear to be more important than the lifestyle factors.

Gender differences

Given the growing interest in the importance of differential social roles, gender has been investigated in more detail for subjective health. Tables A4.4 and A4.5 in Appendix 4 report the results of separate models for men and women for subjective health only, and serve to illustrate both similarities and differences in the gender-related production of health.

Similarities between men and women include poverty experiences, discrimination at work, smoking, poor education and anxieties about other family members. The main differences, however, appear to be related to the relative importance of material and social deprivation. Men suffer more ill health as a result of poor material circumstances and excessive drinking, whereas for women social deprivation is more important. Positive social roles appear to be more protective of health for women than for men. There are also subtle differences in relation to social isolation. Men are more likely to report poor health if they live alone whereas it is perceptions of loneliness regardless of household circumstances which seem to be important for women. Finally, Arber has reported that "there may be worse health

consequences of local authority tenure for women than men" (1991, p. 434), and this proposition is supported by the results.

The principal differences between men and women in the probability of reporting poor health are illustrated in Table 5.6. For example, between the ages of 16 and 59, men living in materially deprived circumstances have a 59 per cent probability of poor health compared with 17 per cent for women. In contrast, socially deprived men have a 39 per cent chance of poor health, whereas for women the probability is 74 per cent.

Table 5.6

Probability of having poor or fair health in last twelve months

	Men*		Women**	
Age	**Material deprivation**	**Social deprivation**	**Material deprivation**	**Social deprivation**
16–59	0.59	0.39	0.17	0.74
60–74	0.70	0.52	0.24	0.81
75 +	0.81	0.66	0.24	0.82

* Assumes not living alone, does not believe smoking or drinking harms health, and has never lived in poverty.

** Assumes not employed, nor a council tenant, nor a housewife with children, does not think smoking affects health and has never lived in poverty.

Conclusion

It is important not to exaggerate the importance of the findings reported in this chapter. The analysis is based on one relatively small cross-sectional survey, and the phenomena are both highly complex and very difficult to measure with any precision. There is a real danger, therefore, that estimates could be seriously biased. Nevertheless, it would be quite wrong to dismiss them out of hand because the findings are strongly suggestive and consistent with those of other studies.

Given these caveats, perhaps the key point to emphasise about the results is that the most important aspects of material and social deprivation suggested by the literature – with the single and important exception of education – are confirmed in their association with three different measures of poor health status. The most important question for policy analysts to address, therefore, is what can actually be done to improve the health of people who are deprived in various ways, with particular attention being focused on those who are the most disadvantaged.

First, there is the need for better prospective research which disentangles the relative importance and complexities of the multiple determinants of health. What is needed is a much clearer understanding of what aspects of material and social deprivation are most damaging for different dimensions of health for specific sub-groups of the population. In addition, we need to know what can be done about it.

What kinds of social welfare interventions work in what circumstances for which people? Second, much more attention should be given to the development of effective public health policies. We suggest that a start must be made in building a new political consensus which emphasises the relatively limited role of health care in health promotion and disease prevention. A much wider approach to the development of healthy public policy is essential if the health-related aspirations of the community are to be taken seriously. Finally, the evidence in this chapter demonstrates the wide variations in material and social circumstances and their impact on health. It is time that health care resources within London should be allocated to take account of these factors.

Further consideration is given in the next chapter to the wider implications of promoting health gain arising from the analysis contained in this paper. All of those who are responsible for the capital's health care system would be well advised to consider a new approach to health promotion in London. They should also consider how best to ensure that the allocation of purchasing power in the new NHS is informed by the growing body of evidence about the relationship between deprivation and health.

CHAPTER 6

Conclusions

There are two main conclusions to this paper. The first is that Londoners appear to be more likely than their counterparts in other parts of the country to have good health. Certainly, there is no compelling evidence to support the proposition that Londoners have worse health. The second main finding is that a number of different measures of deprivation are strongly associated with indicators of health throughout England, including the capital.

Two questions arise from these findings. Why does London have a better health record than its counterpart areas? What kinds of policies might best deal with deprivation-related ill health? Both questions will be considered in turn.

Why is London's health better?

Before addressing possible reasons why London might experience better health than comparable areas, it is worth repeating the main results which have a bearing on this question.

The comparatively good health experience of Londoners has been illustrated in two ways. First, the different parts of London have a better record of mortality due to all causes, as well as avoidable and premature mortality, than comparable districts elsewhere. London districts have consistently and significantly lower levels of mortality due to circulatory diseases, lung cancer, cervical cancer and motor vehicle traffic accidents. On the other hand, Londoners appear to have significantly worse records of mortality due to suicide. However, while it is clear that Londoners do not have a worse mortality experience than people living elsewhere, it is equally apparent that individuals living in deprived areas – in and out of the capital – are more likely to die prematurely than their more affluent neighbours.

Second, using a national survey of health and lifestyles, comparative descriptive statistics about the morbidity of London residents were examined. It was found that Londoners experience significantly fewer illness symptoms than residents in comparable areas. This was particularly true of psycho-social health in high-status areas. Overall, the descriptive results support the view that the health of Londoners is no worse, and may indeed be better, than that of people in similar parts of the country. Again, a far more striking result was the consistent and significant relationship between deprivation and health across the sample as a whole.

The observed differences between London and comparable areas might be explained in two ways. One possibility is that Londoners have

better access to health care and that this leads to improvements in their health. The other is that some of the most important determinants of health which lie outside the health care system are more favourable in London than elsewhere.

Any assessment of the relationship between health care interventions and health outcomes requires much more detailed evidence than is usually available. One of the biggest weaknesses of the NHS is the lack of good-quality information about the health outcomes associated with different levels and forms of intervention. It is unlikely, therefore, that it will be possible to reach any firm judgement about this question.

Nevertheless, it is possible to cite some evidence which tends to discourage the view that better access to health care in the capital leads to better outcomes. As explained in Chapter 2, if a higher than average level of health care in London was the principal reason for the seemingly better health of the residents, one would expect to see relatively better indicators of avoidable than overall mortality in the capital. It should be in relation to those kinds of deaths thought to be most preventable by medical intervention that Londoners should experience the greatest relative advantage.

Unfortunately the evidence does not all point in the same direction. For example, there is some suggestion that perinatal outcomes in London are better than would be predicted from the incidence of low birthweight and that this might be explained by the availability of better access to specialist paediatric care in the capital. On the other hand, mortality from breast cancer amongst London women aged 50–64 is greater than might be expected from the overall breast cancer rate. This finding is consistent with the possibility that residents in the capital experience either worse provision of preventive services or treatment or both.

The most compelling statistic is that the indicator of total avoidable mortality in the capital is relatively worse than the overall measure of all-cause all-age mortality. This finding on its own represents a major obstacle to those who might assert that the better health of Londoners is a direct consequence of higher levels of investment in health care in the capital.

But if the relatively better health of Londoners cannot easily be explained by differential access to the NHS, then what is the reason? The most likely explanation is a very familiar one. Londoners are beneficiaries of the traditional north/south gradient in material circumstances across the country. People living in the southern part of England – including London – are more likely to be employed in better jobs with higher incomes.

The prosperity of London relative to the rest of the country is clear. In 1987, London's household disposable income per head was 8 per cent higher than the national average. In 1991, the estimated unemployment rate in London was 5.9 per cent, below the figure of 6.5 per cent for England as a whole. In addition, the numbers of London workers in manual and non-manual occupations were equal, whereas in the whole country there were 27 per cent more manual than non-manual workers.

Such evidence illustrates the differential access to prosperity in

London relative to the rest of the country. The kinds of factors described above are likely to be the most important determinants of better health outcomes in London. For the first time for many decades, the current economic recession is biting hard in the South East. But during the 1980s, when the data which we have analysed were collected, there was no doubt that unemployment was lower and average incomes were higher in London than in the country as a whole.

Although we have emphasised the fact that Londoners appear to have better health than their counterparts in other areas, two notes of caution must be introduced. First, it is important to remember that the differences are not very large, and certainly should not be exaggerated.

A second, even more important, caveat is that the differences identified should not be misinterpreted. They do not necessarily mean that London has fewer health needs. Any detailed investigation of such needs within the capital would have to take account of London's special circumstances. For instance, London is host to a large number of tourists (approximately 19 million visitors per year) and commuters (approximately 1.3 million per day). In addition, particular attention should be given to the circumstances of specific sub-groups of London's population – such as the homeless, people with HIV and AIDS, refugees and travellers – in any detailed examination of the health care requirements of Londoners.

Inequalities and health gain

Notwithstanding the fact that Londoners on average have a relatively good health record, the second main conclusion of this report is that deprivation-related ill health is a serious problem throughout the country, including within the capital. The main aim of this section is to consider some of the ways in which the health of those who are most disadvantaged can be improved. But before doing that we review briefly the way in which the findings were established.

A conceptual framework was adopted in which health is assumed to be determined by a range of factors, including material and social deprivation, lifestyle and demographic characteristics. Then, using data from two surveys, multivariate analyses were employed to investigate the relative importance of these factors in determining health status and to examine whether living in London was an additionally significant factor.

Statistical models were computed for a range of health indicators derived from national and London-specific household surveys. There are a number of detailed differences between the two data sets, but the overall conclusion is unambiguous. Material and social deprivation are clearly and strongly associated with health status even when a wide range of demographic and lifestyle factors are included in the statistical models.

The remainder of this chapter considers some of the principal implications for policy which merit attention given the impact that material and social deprivation have on health. First, we argue that

attempts at promoting the health of Londoners cannot be taken seriously unless the central issue of health inequalities is addressed. This requires action on a broad range of social and other public policy fronts. It is vital, therefore, that all government departments recognise the role they can play in policies for health gain. At the same time, local health authorities need to be more vigorous in their efforts to tackle inequalities.

The Health of the Nation

This report has documented at some length the inequalities in health associated with disadvantage, and any serious attempt to improve the health of Londoners must address this issue.

Somewhat belatedly the government has woken up to the fact that, despite the major improvements in the health of British people during the twentieth century, many people "still die prematurely or have the quality of their lives ... impaired by avoidable ill-health" (Cmnd 1523, 1991, p. 1).

One of the key themes of the consultative document, *The Health of the Nation,* is that responsibility for health extends well beyond the work of the NHS.

> *The Government believes that the time is now right to take a strategic approach to improving health; what needs to be done can best be secured by concerted action within a common strategic framework.*
>
> (Cmnd 1523, 1991, pp. 1–2)

Despite this commitment, however, it is not at all apparent that the government has fully recognised the broader social policy implications of its approach. The publication of *The Health of the Nation* has been warmly welcomed by many observers because it represents an attempt to move health to the centre of the policy agenda after more than a decade when the financing, management and organisation of the health care delivery system have dominated debate. At the same time the consultative document has been widely criticised for failing to address the very substantial and well-documented social inequalities in health. One of the few references to equity in health is tucked away in the final appendix, which reviews progress towards the European targets of the World Health Organisation's Health For All strategy. Without further comment it is simply acknowledged that:

> *There is a persistent gap between death rates among manual and non-manual classes, and the Regional Target of reducing the actual differences in health status between groups within countries by at least 25% by the year 2000 does not seem likely on present evidence to be achieved.*
>
> (Cmnd 1523, 1991, p. 105)

But can any government's claim to be addressing the most urgent aspects of premature mortality and avoidable ill health be taken seriously if it does not demonstrate a real commitment to tackling the inequalities associated with the kinds of material and social deprivation outlined in this paper? One should not underestimate the size of the task this implies, but a more convincing start could be made.

Ideally, a concerted and imaginative approach to healthy public policy would be a central strand of all governmental activity.

> *Policies conceived within the perspective may range from attempts to address health-related issues such as social deprivation and disadvantage, to attempts to bring more health considerations into policy areas such as housing, transport, energy and agriculture, in order to make social and economic development more in tune with the promotion of health. In relation to policy-making strategies this perspective includes health advocacy initiatives which would attempt to influence political and legislative reforms; community development actions to promote social change; and intersectoral decision-making in the formulation of public policy.*
>
> (RUHBC, 1989, p. 144)

We acknowledge that this is a long-term and uphill task, but a start could be made by introducing and/or encouraging more convincing health and social policies. This is not the place to set out a detailed charter for tackling health inequalities, but it does seem appropriate to suggest a couple of examples. We begin by suggesting that it is time to address the growing problem of poverty.

Tackling poverty

> *Poverty blights the lives of a fifth of Britain's population and around a quarter of its children ... endangering their homes and their health.*
>
> (Oppenheim, 1990, p. 136)

Poverty is inextricably linked to material and social deprivation, which are themselves directly associated with a wide range of indicators of poor health for both adults and children. In fact, poverty is so closely linked with indicators of multiple deprivation that many people believe the concept should be defined in such terms rather than as a percentage of some rather arbitrary level of income. For example, in a review of the prospects for poverty policy in the 1990s, published by the Child Poverty Action Group, Becker argues that "poverty means powerlessness".

> *Poor people are denied access to many of the activities and services which are widely taken for granted. They experience the poverty of restricted opportunities and inhibited life chances for themselves and their children. In addition, the living standards of poor people are often so low that they are forced to go without the most basic of essentials, such as adequate housing, clothing and nutrition.*
>
> (Becker, 1991a, p. 2)

There is very little dispute amongst experts that this quotation captures the spirit of what poverty means in a modern society. In practice, however, to obtain a broad picture of patterns and trends in poverty one must rely on income-based indicators. There are two leading contenders.

One is the number of people dependent on incomes at or below 140 per cent of the government's income support level: the so-called low income family statistics (LIF) which were produced by the

government until 1988. Since that year, LIF statistics have been replaced by estimates of the average numbers of people living in households with incomes below average (HBAI). One commonly used poverty line which is derived from these statistics and which is widely used in other parts of the European Community is 50 per cent of average income.

In 1987, whichever poverty measure is used, the number of poor people in Britain was about 10 million. This dramatically high figure had increased rapidly throughout the 1980s. Between 1979 and 1987, the numbers in poverty increased by two-thirds according to the LIF standard and more than doubled as measured by HBAI.

Given the huge increase in the numbers of people living in poverty, what can be done about it? The best way to begin is to understand the basic causes. Millar suggests that they are:

> *to be found in the labour market, and in the fact that growing numbers of people cannot get access to secure employment with adequate wages. However, rather than providing protection against these changes, government policy has exacerbated their effects. Unemployment, a deregulated labour market, lower social security benefits – which are harder to access, and less reliable when they are received – have all contributed to the rise of poverty and insecurity.*
>
> (1991, p. 34)

There is a growing consensus that decent employment opportunities for those of working age and adequate social security benefits for those with no other means of support should be the essential ingredients of any anti-poverty strategy.

Full employment in one form or another is the stated goal of all of the major political parties in Britain, although many different means of achieving it are advocated. We do not claim, however, to have any competence to choose between competing economic policies. But the choice in relation to social security benefits is more clear-cut. It is true that economic growth would make it easier to finance more generous benefits, but within present resource constraints there are political choices to be made about the extent and nature of taxation and their implications for benefit levels.

Once again, we cannot claim to have any special insight into what choices should be made by the British people, but there is greater merit here in highlighting some of the options. Perhaps the most important judgement to be made is whether the tax system would be fairer if it were more progressive. Certainly, if benefits are to be increased then they will have to be financed by a net increase in some part of the tax system.

The extent to which the reductions in the level of direct taxes throughout the 1980s have been at the expense of the relative deterioration of social security payments such as retirement pensions, child benefit and income support is not widely known. But Hills has compared the net effects of the 1988–89 tax and social security system with the 1978–79 system uprated in line with changes in national income. His results show that "the cuts in direct taxes have been

entirely paid for by the cuts in the generosity of benefits", and that as far as the distribution of income is concerned most of the bottom half have lost ground whereas the great majority of the top 30 per cent have gained (Hills, 1988, p. 13).

It seems extremely unlikely that any substantial progress in tackling poverty can be made without reversing some of the structural changes introduced during the 1980s and making the tax system more progressive. A large number of ways of doing this have been suggested. These include:

- removing the ceiling on employees' national insurance contributions;
- restricting all tax reliefs to the basic rate of tax;
- abolishing tax relief on mortgage interest;
- introducing more graduated steps in the rates of taxation above the basic rate.

In listing these possibilities, it has to be acknowledged that "fairer" and "progressive" can be interpreted in a number of ways. Different groups will advocate a wide range of policies and priorities about the precise mix and level of taxes which might be necessary to finance improved benefits. It seems inappropriate for us to attempt to choose between them. We feel on much safer ground, however, in advocating that the King's Fund should add its voice to those of respected groups such as the Child Poverty Action Group in calling:

> *to politicians of all major parties, and to the public as a whole, to develop a comprehensive strategy to bring about freedom from poverty, and freedom from the fear of poverty, for all families. As we move forward to the twenty-first century, we have to think of leaving poverty behind, rather than leaving poor people behind.*
>
> (Becker and Bennett, 1991, p. 115)

Speaking only for ourselves we are certainly persuaded that policies seeking to promote health gain will lack conviction unless they embrace radical anti-poverty strategies. But even if progress is made on this front, the NHS still has much to do to achieve its own principal equity goal of distributing resources on the basis of needs. We now turn, therefore, to consider how local health authorities could do more to focus attention on the health needs of those who are most disadvantaged.

Local initiatives

In 1988 the government published the report of the Acheson enquiry into the development of the public health function. The report contained recommendations about the role of different levels of the NHS in "the science and art of preventing disease, prolonging life and promoting health through the organised efforts of society" (Cmnd 289, 1988). One of these was that district health authorities should appoint a Director of Public Health who would "prepare an annual report on the health of the population" (Cmnd 289, 1988). DHAs

should then identify problems, define objectives and set targets to address them. Decisions about the investment of resources should be related to these objectives and their impact on health. In addition Acheson argued that public health departments could make a major contribution to setting and achieving WHO Health For All targets by the year 2000.

The Acheson Report on public health offers some greater hope for the future. But is there any real prospect of health authorities taking their wider responsibilities sufficiently seriously? At the present time, the energies and talents of managers and members appear to be fully extended in implementing the NHS and community care reforms. For example, an analysis of public health reports by the Faculty of Community Medicine does not suggest that much more than lip-service is being made to the need to tackle inequalities. It reports that:

> *there are disappointingly few Reports that combine epidemiology with social research techniques to pin-point the population groups with the greatest needs ... Still fewer Reports give information about the implementation of health promotion initiatives in specific social priority areas.*
>
> (FCM, 1990, p. 4)

It is only fair to point out that this statement was written early in the new life of public health departments, and some of them are now involved in wider initiatives to tackle inequalities in health at a local level, such as the European Healthy Cities initiative. The principal aim of this development is to change the local environment to one which promotes rather than harms health.

> *The emphasis ... is on the provision of enabling mechanisms for health promotion to be developed through healthy public policy and increased public accountability.*
>
> (Ashton, 1992, p. 9)

The initiative is based on the need for:

- multisectoral collaboration;
- community participation;
- the dissemination of good practice.

A number of cities across Britain – including parts of London – are involved in the healthy city initiative, and its proponents argue that Directors of Public Health can play a central role by helping to establish multisectoral groups whose aim is to open up the health debate to the city itself. Their declared intention is to enable the community to participate and choose from the huge variety of initiatives which could make the city a healthier place to live – such as cycle ways, safe green areas for play and recreation, positive employment schemes, people friendly housing developments and adequate public transport systems, to name but a few.

For example, in Oxford the local authority has taken the lead in developing a "Healthy City Strategy" which is supported by the health

authority and voluntary and community groups. The strategy has two objectives (Fryer, 1991, p. 186).

- To offset local health inequalities through housing, planning, recreation, environmental health and other local authority responsibilities.
- To develop a radical programme of community involvement in a wide range of health factors: food policies, non-smoking, occupational health and recreation, AIDS prevention, cervical cancer checks and health information and research.

To achieve these targets the local authority has employed new staff with a health promotion role, such as an energy and heating officer, community fitness officer and a dietician. In addition, other parts of the authority have developed health promotion projects such as "safe routes to school" and safe cycle routes.

The adoption of specific services which are sensitive to the needs and problems of multiply deprived members of our community has been shown to improve their health chances. In a recent review of policies to tackle inequalities in health in Europe, Whitehead and Dahlgren (1991) suggest a number of starting points for action. They argue that if the health sector made a concentrated effort to ensure universal access to essential services, it could make a valuable contribution to reducing inequalities. For example, it has been suggested that if all antenatal screening tests of proven value were fully implemented, perinatal mortality could be decreased by 20 per cent. This could also reduce inequalities in health.

> *Several of the tests seek disorders with strong social gradients, and uptake of antenatal care is lower in less advantaged social groups; action to improve implementation, access, and uptake would therefore have a positive effect not only on the overall perinatal mortality but also on the gap between social groups.*
>
> (Whitehead and Dahlgren, 1991, p. 1061)

Similar action should be taken in other areas of preventive health: family planning and abortion services, immunisation and other childhood surveillance activities. Griffiths and Adams (1991) argue that to be effective these services need to be:

- sensitive to the social and cultural context in which they are delivered;
- convenient and accessible;
- responsive to the emotional and information needs of the people receiving them;
- in close collaboration with all health workers involved;
- continuously monitored against achievable targets;
- diligent to involve users in all parts of planning and evaluation.

This may involve only small changes to existing patterns of service

delivery. Whitehead and Dahlgren (1991) quote an example from the Netherlands where immunisation rates among babies of Moroccan and Turkish immigrants have been increased by changing clinic times and schedules to take account of cultural barriers to service use.

More generally, however, the key point to emphasise is that services need to be much more flexible and sensitive to the different needs of sub-groups of the population. The most disadvantaged families need extra help to make effective use of health and other services.

Conclusion

This paper has two main findings. The first is that London as a whole does not have a worse health experience than other comparable parts of England. The second is that, throughout London as in the country as a whole, deprivation is strongly associated with poor health.

It is impossible not to conclude that marked variations in the extent of disadvantage lie at the heart of observed inequalities in health between different communities. Any attempt to reduce mortality and morbidity, in London as well as elsewhere, means that the causes of these inequalities – poor material and physical circumstances, inadequate social support and integration and bad lifestyles – must all be tackled. The most effective way to do this lies outside the health service, by promoting healthy public policy across all areas of government policy and commercial activity. However, we must also ensure that health services are available in the most appropriate form in the areas where they are most needed. In part, this means that a new approach to allocating purchasing power must be devised for both HCHS and FHS to reflect best the health care needs of different areas.

Whatever resources are made available to local health authorities, however, should be used in new and imaginative ways to tackle inequalities in health. Many different people and groups in London are already working hard to do this, but their efforts need more strategic co-ordination and support. What is badly needed as part of any review of the capital's health care system is a much greater emphasis on the importance of the public health function. London may not have unique health needs, but many of its citizens do suffer from deprivation-related ill health. While it is true that not all of their problems can be tackled by conventional forms of health care, deprived Londoners have every right to look to those professionals working within the NHS to take whatever steps are possible to promote their health.

Appendix 1

Table A1.1

Comparison of the characteristics of the London respondents in HALS with the 1981 Census results for Greater London

Characteristics	1981 Census	HALS – whole sample	HALS – measured sample
	%	%	%
Men	48.16	46.90	47.60
Women	51.84	53.10	52.40
Head New Commonwealth	14.56	12.60	12.50
Unemployed men	10.34	8.70	4.70
Age 16–24 (HALS 18–24)	18.89	12.70	12.83
25–34	19.41	19.80	19.92
35–44	14.67	18.20	18.58
45–pension age	24.69	27.20	26.56
Pensioners	22.34	22.10	22.10
75+ men	2.27	6.10	5.90
75+ women	4.98	8.60	7.65
Social class			
1	6.52	7.38	7.63
2	26.48	25.52	26.70
3 manual	16.81	19.11	17.85
3 non-manual	29.67	29.86	30.25
4	14.98	13.36	12.26
5	5.55	4.78	5.31

Table A1.2

Comparison of the characteristics of the metropolitan London respondents in HALS with the 1981 Census results for inner London

Characteristics	1981 Census	HALS – whole sample	HALS – measured sample
	%	%	%
Men	47.87	44.90	45.50
Women	52.13	55.10	54.50
Head New Commonwealth	19.37	17.50	17.70
Unemployed men	14.40	10.10	5.30
Age 16–24 (HALS 18–24)	20.56	12.20	12.31
25–34	20.06	21.60	21.32
35–44	13.73	17.40	17.58
45–pension age	23.70	26.70	27.69
Pensioners	21.94	22.10	21.10
75+ men	2.17	5.80	5.31
75+ women	5.02	7.60	5.65
Social class			
1	5.39	8.30	8.37
2	22.51	26.90	27.83
3 manual	15.80	16.97	16.52
3 non-manual	29.05	28.52	28.05
4	18.97	14.08	13.35
5	8.28	5.23	5.88

Table A1.3

Comparison of the characteristics of the high-status London respondents in HALS with the 1981 Census results for outer London

Characteristics	1981 Census	HALS – whole sample	HALS – measured sample
	%	%	%
Men	48.33	50.00	50.90
Women	51.67	50.00	49.10
Head New Commonwealth	11.81	5.10	4.40
Unemployed men	7.98	6.60	3.80
Age 16–24 (HALS 18–24)	17.90	13.50	13.65
25–34	19.02	17.00	17.75
35–44	15.23	19.50	20.14
45–pension age	25.27	27.80	27.26
Pensioners	22.58	22.20	21.20
75+ men	2.33	6.50	6.71
75+ women	4.96	10.30	11.11
Social class			
1	7.11	5.99	6.51
2	28.57	23.43	25.00
3 manual	17.34	22.34	19.86
3 non-manual	30.00	31.88	33.56
4	12.88	12.26	10.62
5	4.11	4.09	4.45

APPENDIX 2

Table A2.1

Multivariate analysis of poor psycho-social health

Independent variables	Parameter estimates	WALD	Significance	Odds ratio
Constant	1.31	25.80	***	
Material deprivation score	0.18	50.35	***	1.19
Social support score	-0.14	131.56	***	0.87
Social integration score	-0.05	22.13	***	0.95
Poor diet score	0.07	13.10	***	1.07
Regular smoker	0.38	42.17	***	1.46
Aged 18–24	0.18	5.17	**	1.20
Woman	0.73	140.76	***	2.07
Non-white	0.46	13.33	***	1.58
Metropolitan areas	0.11	3.42	*	1.12

*** significant at 99% level
** significant at 95% level
* significant at 90% level

Change in scaled deviance: 632.4 with 10 degrees of freedom

Table A2.2

Multivariate analysis of poor fitness†

Independent variables	Parameter estimates	WALD	Significance	Odds ratio
Constant	-1.99	422.65	***	
Material deprivation score	0.14	20.73	***	1.15
Drinks over rec. limit	0.19	3.31	*	1.21
Regular smoker	-0.36	22.11	***	0.70
Exercise	-0.34	18.90	***	0.71
Aged 18–24	-0.96	25.32	***	0.38
Aged 45–64	1.17	195.21	***	3.21
Aged 65–74	1.77	274.16	***	5.86
Aged 75+	1.84	186.56	***	6.27
High-status areas	-0.15	4.01	**	0.86
Housewife	0.24	5.37	**	1.27

*** significant at 99% level
** significant at 95% level
* significant at 90% level

Change in scaled deviance: 815.8 with 10 degrees of freedom

†Only includes individuals who completed the measurement section of the survey.

Table A2.3

Multivariate analysis of poor overall health†

Independent variables	Parameter estimates	WALD	Significance	Odds ratio
Constant	-0.33	1.01		
Material deprivation score	0.21	45.19	***	1.24
Social support score	-0.05	11.99	***	0.95
Social integration score	-0.09	35.55	***	0.91
Exercise	-0.35	19.25	***	0.70
Aged 18–24	-0.34	5.25	**	0.71
Aged 45–64	0.85	94.30	***	2.34
Aged 65–74	1.25	115.76	***	3.51
Aged 75+	1.31	79.19	***	3.70
Woman	0.47	39.18	***	1.60
High-status areas	-0.32	10.65	***	0.73
Metropolitan areas	-0.17	3.45	*	0.84
Rural/resort areas	-0.41	14.91	***	0.66
Housewife	0.40	14.99	***	1.49

*** significant at 99% level
** significant at 95% level
* significant at 90% level

Change in scaled deviance: 678.0 with 13 degrees of freedom

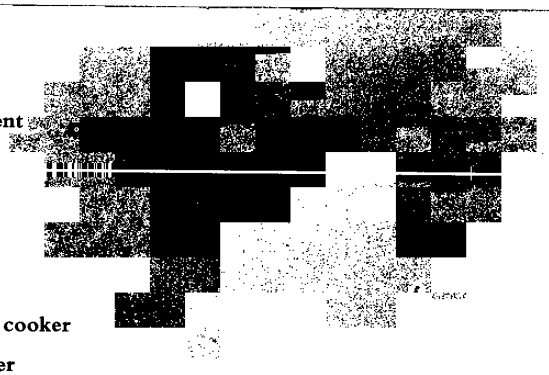
† Only includes individuals who completed the measurement section of the survey.

APPENDIX 3

Box A3.1

INDEX OF MATERIAL DEPRIVATION IN SLLS

Deprivation component	Maximum score	Per cent deprived
1 DIETARY DEPRIVATION	5	
(a) At least one day in last fortnight with insufficient to eat	1	6.9
(b) Short of food on at least one occasion in last 12 months to meet needs of family	1	4.4
(c) No fresh meat or fish most days of week (alternative formulation for vegetarians)	1	13.2
(d) No special meal or roast most weeks	1	26.0
(e) No fresh fruit most days	1	32.8
2 CLOTHING DEPRIVATION	6	
(a) Inadequate footwear for all weathers	1	7.9
(b) Inadequate protection against heavy rain	1	14.1
(c) Inadequate protection against severe cold	1	5.6
(d) Fewer than three pairs socks/stockings in good repair	1	3.5
(e) No dressing gown	1	13.4
(f) Bought second-hand clothing in last 12 months	1	20.2
3 HOUSING DEPRIVATION	10	
(a) No exclusive use of indoor WC and bath	1	3.4
(b) No electricity	1	0.1
(c) Housing not free of damp	1	26.4
(d) Housing not free of infestation	1	8.6
(e) Poor access to accommodation	1	12.3
(f) Overcrowded (fewer rooms – excluding kitchen and bathroom – than persons)	1	9.2
(g) External structural defects	1	24.3
(h) Internal structural defects	1	12.6
(i) All rooms not heated winter evenings	1	33.5
(j) Poor state of internal and/or external paintwork and decoration	1	20.4
4 DEPRIVATION OF HOME FACILITIES	12	
(a) No car	1	37.7
(b) No television	1	2.5
(c) No radio	1	3.6
(d) No washing machine	1	24.4



Deprivation component	Maximum score	Per cent deprived
(e) No refrigerator	1	1.3
(f) No freezer	1	32.3
(g) No electric iron	1	2.5
(h) No gas or electric cooker	1	0.8
(i) No vacuum cleaner	1	6.3
(j) No central heating	1	32.1
(k) No telephone	1	11.7
(l) Lack of carpeting in main rooms	1	6.2
5 DEPRIVATION OF ENVIRONMENT	7	
(a) Nowhere for children under 5 to play safely outside	1	39.1
(b) Nowhere for children aged 5–10 to play safely nearby	1	37.2
(c) Risk of road accidents around home	1	32.0
(d) No garden	1	22.0
(e) Industrial air pollution	1	6.7
(f) Other forms of air pollution	1	11.6
(g) Problem of noise from traffic, aircraft, building works	1	13.8
6 DEPRIVATION OF LOCATION	5	
(a) No open space (like park or heath) within easy walking distance	1	11.0
(b) No shops for ordinary household goods within 10 minutes' journey	1	4.1
(c) Problem of litter in local streets	1	36.6
(d) Doctor's surgery or hospital outpatients department not within 10 minutes' journey	1	8.5
(e) No recreational facilities for young people or older adults nearby	1	27.0
7 DEPRIVATION AT WORK	3	
(a) Poor working environment (polluted air, dust, noise, vibration and high or low temperature etc.) score 5 or more, with maximum score of 9	1	24.9
(b) Stands or walks about more than three-quarters of the working day	1	38.6
(c) Either poor outdoor amenities of work or poor indoor amenities at work, score 3 or more with max. score 10	1	21.4

Source: Townsend and Gordon (1989), Appendix 3

Box A3.2

INDEX OF SOCIAL DEPRIVATION IN SLLS

Deprivation component	Maximum score	Per cent deprived
1 LACK OF RIGHTS IN EMPLOYMENT	6	
(a) Unemployed for two weeks or more during previous 12 months	1	5.5
(b) Subject to one week's termination of employment or less	1	26.7
(c) No paid holiday	1	17.4
(d) Not entitled to full pay in first six months of sickness	1	28.8
(e) Worked 50 or more hours previous week	1	14.1
(f) Experiences discrimination at work on grounds of race, sex, age, disability or sexual orientation	1	8.6
2 DEPRIVATION OF FAMILY ACTIVITY	5	
(a) Difficulties indoors for child to play	1	39.5
(b) If has children, child has not had holiday away from home in the last 12 months	1	36.5
(c) If has children, child has not had outing during the last 12 months	1	26.1
(d) Problem of the health of someone in family	1	43.3
(e) Has care of disabled or elderly relative	1	12.9
3 LACK OF INTEGRATION INTO COMMUNITY	4	
(a) Being alone and isolated from people	1	9.4
(b) Relatively unsafe in surrounding streets	1	9.7
(c) Racial harassment	1	3.6
(d) Moved house three or more times in last five years	1	25.0
4 LACK OF FORMAL PARTICIPATION IN SOCIAL INSTITUTIONS	1	
(a) Did not vote at last election	1	23.7
5 RECREATIONAL DEPRIVATION	2	
(a) No holiday away from home in last 12 months	1	29.8
(b) Fewer than three hours a week of specified range of leisure activities	1	21.8
6 EDUCATIONAL DEPRIVATION	2	
(a) Fewer than 10 years' education (people under 60 years of age)	1	8.0
(b) No formal qualifications from school or subsequent educational courses or apprenticeships	1	31.9

Source: Townsend and Gordon (1989), Appendix 3

APPENDIX 4

Table A4.1

Multivariate analysis of subjective health assessment as fair or poor

Independent variables†	Parameter estimates	WALD	Significance	Odds ratio
Constant	-2.2718	203.97	***	
Dietary (a)	0.4655	6.63	***	1.59
Dietary (c)	0.1784	3.00	*	1.20
Housing (h)	0.4382	14.65	***	1.55
Location (c)	0.6215	7.61	***	1.86
Location (d)	0.3145	10.17	***	1.37
Family (d)	0.3271	11.25	***	1.39
Community (a)	0.7210	21.65	***	2.06
Recreation (a)	0.4575	18.95	***	1.58
Employment rights (f)	0.7151	14.68	***	2.04
Education (a or b)	0.3061	8.02	***	1.36
Aged 45–59	0.2822	4.28	**	1.33
Aged 60–74	0.5583	13.90	***	1.75
Aged 75+	0.7431	14.07	***	2.10
Employed	-0.5032	17.23	***	0.60
Poverty	0.1899	15.64	***	1.21
Smoke	0.5470	19.96	***	1.73
Drink	0.5724	9.65	***	1.77
Housewife with child	-0.4988	5.41	**	0.61

*** significant at 99% level
** significant at 95% level
* significant at 90% level

Change in scaled deviance: 386.0 with 18 degrees of freedom

†See Boxes A3.1 and A3.2 for explanation of the independent variables with lower-case letters in parentheses.

Table A4.2

Multivariate analysis of being ill or unwell in the last two weeks

Independent variables†	Parameter estimates	WALD	Significance	Odds ratio
Constant	-1.9234	284.65	***	
Dietary (a)	0.6659	15.99	***	1.95
Housing (f)	0.3284	10.50	***	1.39
Home facilities (a)	0.2632	7.58	***	1.30
Community (a)	0.4897	10.74	***	1.63
Community (c)	0.5524	5.35	**	1.74
Employment rights (f)	0.5480	9.18	***	1.73
Woman	0.3058	10.58	***	1.36
Ethnicity	-0.3405	5.06	**	0.71
Poverty	0.2195	22.93	***	1.25
Smoke	0.2039	3.21	*	1.23

*** significant at 99% level
** significant at 95% level
* significant at 90% level

Change in scale deviance: 137.0 with 10 degrees of freedom

†See Boxes A3.1 and A3.2 for explanation of the independent variables with lower-case letters in parentheses.

Table A4.3

Multivariate analysis of reporting that health has been a major problem in the last twelve months

Independent variables†	Parameter estimates	WALD	Significance	Odds ratio
Constant	-2.9975	221.41	***	
Housing (g)	0.6872	14.50	***	1.99
Environment (g)	0.2791	3.15	*	1.32
Family (d)	0.7134	35.51	***	2.04
Community (a)	0.9365	32.63	***	2.55
Community (b)	0.5798	11.06	***	1.76
Recreational (a)	0.3997	10.22	***	1.49
Employment rights (f)	0.9179	19.62	***	2.50
Aged 16–29	-0.3236	3.34	*	0.72
Aged 45–59	0.3720	4.39	**	1.45
Aged 60–74	0.8308	21.13	***	2.30
Aged 75+	1.0295	20.78	***	2.80
Employed	-0.5507	15.54	***	0.58
Poverty	0.2110	14.47	***	1.23
Smoke	0.2836	3.81	*	1.33

*** significant at 99% level
** significant at 95% level
* significant at 90% level

Change in scaled deviance: 310.8 with 14 degrees of freedom

†See Boxes A3.1 and A3.2 for explanation of the independent variables with lower-case letters in parentheses.

Table A4.4

Multivariate analysis of subjective health assessment as fair or poor, men only

Independent variables†	Parameter estimates	WALD	Significance	Odds ratio
Constant	-2.6578	210.37	***	
Dietary (a)	0.6956	7.36	***	2.01
Housing (h)	0.7155	18.62	***	2.05
Location (c)	0.9963	8.06	***	2.71
Location (d)	0.3659	6.28	**	1.44
Family (d)	0.3325	5.22	**	1.39
Recreation (a)	0.3363	4.80	**	1.40
Employment rights (f)	0.9586	9.49	***	2.61
Education (a or b)	0.3528	5.03	**	1.42
Aged 60–74	0.5177	7.28	***	1.27
Aged 75 +	1.0946	15.15	***	2.99
Living alone	0.3669	3.93	**	1.44
Poverty	0.2358	11.49	***	1.27
Smoke	0.4432	6.81	***	1.56
Drink	0.7220	9.24	***	2.06

*** significant at 99% level
** significant at 95% level
* significant at 90% level

Change in scaled deviance: 162.5 with 14 degrees of freedom

†See Boxes A3.1 and A3.2 for explanation of the independent variables with lower-case letters in parentheses.

Table A4.5

Multivariate analysis of subjective health assessment as fair or poor, women only

Independent variables†	Parameter estimates	WALD	Significance	Odds ratio
Constant	-2.0697	105.21	***	
Location (d)	0.2800	4.33	**	1.32
Family (d)	0.3815	8.40	***	1.46
Community (a)	0.8918	21.47	***	2.12
Recreation (a)	0.6349	19.51	***	1.89
Employment rights (f)	0.7096	8.71	***	2.03
Education (a or b)	0.2883	3.87	**	1.33
Aged 60–74	0.4315	4.89	**	1.54
Aged 75+	0.4577	3.42	*	1.58
Employed	-0.6867	16.17	***	0.50
Council tenant	0.3573	5.37	***	1.43
Poverty	0.1950	8.51	***	1.22
Smoke	0.7536	20.05	***	2.12
Housewife with child	-0.7208	9.60	***	0.49

*** significant at 99% level
** significant at 95% level
* significant at 90% level

Change in scaled deviance: 228.3 with 13 degrees of freedom

†See Boxes A3.1 and A3.2 for explanation of the independent variables with lower-case letters in parentheses.

References

M. Adams (1990), *Capital Killer: Air pollution from road vehicles*, a London Boroughs Association report, LBA, London.

J. H. Aldrich and F. D. Nelson (1984), *Linear Probability, Logit and Probit Models*, Sage Publications, London.

S. Arber (1991), "Class, Paid Employment and Family Roles: Making sense of structural disadvantage, gender and health status", *Social Science and Medicine*, Vol. 32, No. 4, pp. 425–436.

J. Ashton (1992), "The Origins of Healthy Cities", in J. Ashton (ed.), *Healthy Cities*, Open University Press, Milton Keynes.

S. Becker (1991a), "Introduction: from enterprise to opportunity", in Becker (1991b), pp. 1–8.

S. Becker (1991b), *Windows of Opportunity: Public policy and the poor*, Child Poverty Action Group, London.

S. Becker and F. Bennett (1991), "Conclusions: a new agenda", in Becker (1991b), pp.103–116.

L. F. Berkman, and L. Breslow (1983), *Health and Ways of Living: the Alameda County Study*, Oxford University Press, Oxford.

L. F. Berkman and S. L. Syme (1979), "Social networks, host resistance and mortality: A nine year follow-up study of Alameda County residents", *American Journal of Epidemiology*, Vol. 190, No. 2, pp. 186–204.

Black (1980), *Inequalities in Health: Report of a Research Working Group Chaired by Sir Douglas Black*, DHSS, London.

D. Blane, G. Davey Smith and M. Bartley (1990), "Social class differences in years of potential life lost: size, trends and principal causes", *British Medical Journal*, Vol. 301, pp. 429–432.

M. Blaxter (1981), *The Health of the Children: A review of research on the place of health in cycles of disadvantage*, Studies in Deprivation and Disadvantage 3, Heinemann Educational Books, London.

M. Blaxter (1985), "Self-definition of health status and consulting rates in primary care", *The Quarterly Journal of Social Affairs 1985*, Vol. 1 (2), pp. 131–171.

M. Blaxter (1990), *Health and Lifestyles*, Tavistock/Routledge, London.

J. R. Bloom (1990), "The relationship of social support and health", *Social Science and Medicine*, Vol. 30, No. 5, pp. 635–637.

S. Boyle and C. Smaje (1992), *Acute Health Services in London: An analysis*, King's Fund Commission on the Future of Acute Services in London.

British Medical Association (BMA) (1987), *Deprivation and Ill-health*, BMA, London.

M. Britton (ed.) (1990), *Mortality and Geography: A review in the mid-1980s*, Series DS No. 9, HMSO, London.

G. Brown and T. Harris (1978), *The Social Origins of Depression*, Tavistock, London.

J. P. Bunker, D. S. Gomby and B. H. Kehrer (eds), (1989), *Pathways to Health: The role of social factors*, The Henry J.Kaiser Family Foundation, California.

R. A. Carr-Hill, G. F. Hardman and I. T. Russell (1987), "Variations in avoidable mortality and variations in health care resources", *The Lancet*, April 4, pp. 789–792.

J. R. H. Charlton, R. Bauer and A. Lakhani (1984), "Outcome measures for district and regional health care planners", *Community Medicine*, Vol. 6, pp. 306–315.

J. R. H. Charlton, R. M. Hartley, R. Silver and W. W. Holland (1983), "Geographical variation in mortality from conditions amenable to medical intervention in England and Wales", *The Lancet*, March 26, pp. 691–696.

Cmnd 289 (1988), *Public Health in England: The report of the Committee of enquiry into the future development of the Public Health Function*, Chaired by Sir Donald Acheson, HMSO, London.

Cmnd 1523 (1991), *The Health of the Nation. A consultative document for health in England*, HMSO, London.

A. Coleman (1985), *Utopia on Trial: Vision and reality in planned housing*, Hilary Shipman.

P. Congdon (1988), "Deprivation in London wards: mortality and unemployment trends in the 1980s", *The Statistician*, 1988, Vol. 37, pp. 451–472.

B. Cox, M. Blaxter, A. Buckle, N. Fenner, J. Golding, M. Gore, F. Huppert, J. Nickson, M. Roth, J. Stark, M. Wadsworth and M. Whichelow (1987), *The Health and Lifestyle Survey: Preliminary report of a nationwide survey of the physical and mental health, attitudes and lifestyle of a random sample of 9,003 British adults*, Health Promotion Research Trust, London.

J. Craig (1985), *A 1981 Socio-economic Classification of Local and Health Authorities of Great Britain*, Studies on Medical and Population Subjects No. 48, HMSO, London.

G. Davey Smith, M. Bartley and D. Blane (1990), "The Black report on socio-economic inequalities in health 10 years on", *British Medical Journal*, Vol. 301, pp. 373–377.

M. Dempsey (1947), "Decline in Tuberculosis: the death rate fails to tell the entire story", *American Review of Tuberculosis*, Vol. 56, pp. 57–64.

Department of Health (DoH) (1990), *Public Health Common Data Set 1990*, Epidemiology and Public Health Research Unit, University of Surrey.

Department of Health (DoH) (1991), "Special Adviser for London's Health Service", *DoH Press Release, H91/464*, October 10, London.

F. G. Dickinson and E. L. Welker (1948), "What is the leading cause of death?", *American Medical Association Bulletin*, 1948, Vol. 64, No. 1.

J. Donovan (1984), "Ethnicity and Health: A research review", *Social Science and Medicine*, Vol. 19, No. 7, pp. 663–670.

P. Draper (ed.) (1991), *Health through Public Policy: The greening of public health*, Green Print, London.

M. Drummond (1990), "Investing for health – what does economic analysis tell us?", a paper prepared for the Centre for Health Economics and Policy Analysis 3rd Annual Health Policy Conference on *Producing Health: Implications for Social Policy*, May 24–25, 1990, Ontario.

E. Durkheim (1897), *Suicide*, Routledge & Kegan Paul, London, 1952 edition.

D. B. Dutton and S. Levine (1989), "Overview, Methodological Critique and Reformulation", in Bunker *et al.* (1989), pp. 29–69.

A. M. Epstein (1990), "The outcomes movement – will it get us where we want to go?", *New England Journal of Medicine*, Vol. 323, No. 4, pp. 266–270.

R. G. Evans and G. L. Stoddart (1990), "Producing health, consuming health care", *Social Science and Medicine*, Vol. 31, No. 12, pp. 1347–1363.

Faculty of Community Medicine of the Royal College of Physicians (FCM) (1990), *HFA 2000 News*, No. 12 (May).

D. M. Fanning (1967), "Families in Flats", *British Medical Journal*, Vol. 4, pp. 382–386.

A. Finlayson (1976), "Social networks as coping resources", *Social Science and Medicine*, Vol. 10, p. 97.

Forrest (1986), Breast Cancer Screening: *Report to the Health Ministers of England, Wales, Scotland and Northern Ireland by a working party chaired by Professor P. Forrest*, HMSO, London.

K. Foster, A. Wilmot and J. Dodds (1990), *General Household Survey, 1988*, Series GHS No. 19, OPCS, HMSO, London.

A. J. Fox, P. Goldblatt and D. Jones (1990), "Social Class Mortality Differentials: Artifact, Selection or Life Circumstances?", in Goldblatt (1990), pp. 99–108.

A. J. Fox, D. R. Jones and P. O. Goldblatt (1984), "Approaches to studying the effect of socio-economic circumstances on geographic differences in mortality in England and Wales", *British Medical Bulletin*, Vol. 40 (4), pp. 309–14.

A. J. Fox and M. Shewry (1988), "New longitudinal insights into relationships between unemployment and mortality", *Stress Medicine*, 1988, Vol. 4, pp. 11–19.

S. Frankel (1991), "Health needs, health-care requirements, and the myth of infinite demand", *The Lancet*, Vol. 337, pp. 1588–1590.

P. Fryer (1991), "Healthy Cities", in Draper (1991), pp. 185–190.

A. Garber (1989), "Pursuing the Links between Socio-economic Factors and Health: Critique, Policy Implications and Directions for Future Research", in Bunker *et al.* (1989), pp. 271–315.

J. W. Gardner and J. S. Sanborn (1990), "Years of Potential Life Lost (YPLL) – what does it measure?", *Epidemiology*, July Vol. 1, No. 4, pp. 322–329.

P. Goldblatt (ed.) (1990), *Longitudinal Study: Mortality and social organisation*, Series LS No. 6, HMSO, London.

H. Graham (1984), *Women, Health and the Family*, Wheatsheaf Books, Sussex.

J. Griffiths and L. Adams (1991), "The new health promotion", in Draper (1991), pp. 219–227.

M. Grossman and T. J. Joyce (1989), "A Personal Research Perspective", in J. P. Bunker, D. S. Gomby and B. H. Kehrer (eds), *Pathways to Health: The role of social factors*, the Henry J. Kaiser Family Foundation, California, pp. 139–163.

M. Haan, G. Kaplan and T. Camacho (1987), "Poverty and Health: Prospective Evidence from the Alameda County Study", *American Journal of Epidemiology*, Vol. 125, No. 6, pp. 989–998.

R. Hahn, S. Teutsch, R. Rothenburg and J. Marks (1990), "Excess deaths from nine chronic diseases in the United States, 1986", *Journal of the American Medical Association*, Vol. 264, No. 20, pp. 2654–2659.

H. E. Hansluwka (1985), "Measuring the health of populations, indicators and interpretations", *Social Science and Medicine*, Vol. 20, No. 12, pp. 1207–1224.

J. Hills (1988), *Changing Tax: How the tax system works and how to change it*, Child Poverty Action Group, London.

C. Holman, S. Festing and F. Weir (eds) (1991), *Air Quality and Health*, Report by Friends of the Earth, FoE, London.

J. House, C. Robbins and H. Metzner (1982), "The association of social relationships and activities with mortality: perspective evidence from the Techumseh community health study", *American Journal of Epidemiology*, Vol. 116, pp. 123–140.

B. Howlett, W. I.-U. Ahmad and R. Murray (1991), *An Examination of White, Asian and Afro-Caribbean Peoples' Concepts of Health and Illness Causation*, Paper presented at the annual conference of the British Sociological Assocation, Manchester, March 25–28 1991.

S. M. Hunt (1990), "Emotional distress and bad housing", *Health and Hygiene*, Vol. 11, pp. 72–79.

B. Jacobson, A. Smith and M. Whitehead (eds) (1991), *The Nation's Health: A strategy for the 1990s*, King Edward's Hospital Fund for London, London.

K. Judge and M. Benzeval (1991), *Limiting Longstanding Illness and the 1991 Census: Implications for health planning in the 1990s*, A paper presented to the Society for Social Medicine, 35th Annual Scientific Meeting, September 11–13, unpublished.

A. Kalache (1990), "Risk factors for breast cancer with special reference to developing countries", *Health Policy and Planning*, Vol. 5 (i), pp. 1–22.

B. H. Kaplan, J. C. Cassel and S. Gore (1977), "Social support and health", *Medical Care*, supplement, Vol. 15 (5), pp. 47–58.

J. Keithley, D. Byrne, S. Harrison and P. McCarthy (1984), "Health and Housing Conditions in Public Sector Housing Estates", *Public Health*, Vol. 98, pp. 344–353.

H. S. Koren *et al.* (1989), "Ozone induced inflammation in the lower airways of human subjects", *American Review of Respiratory Diseases*, Vol. 139, pp. 4077–4115, quoted in Read (1991).

D. A. Leon (1988), *Longitudinal Study: Social distribution of cancer*, Series LS No. 3, HMSO, London.

S. Macintyre (1986), "The Patterning of Health by Social Position in Contemporary Britain: Directions for Sociological Research", *Social Science and Medicine*, Vol. 23, No. 4, pp. 393–415.

M. Marmot (1989), "General comments", in Bunker *et al.* (1989), pp. 242–250.

M. G. Marmot, A. M. Adelstein and L. Bullisu (1984), *Immigrant Mortality in England and Wales 1970-1978*, Studies in Medical and Population Subjects No. 47, OPCS, HMSO, London.

M. G. Marmot, M. Kogevunas and M. A. Elston (1987), "Social/Economic Status and Disease", *Annual Review Public Health*, Vol. 8, pp. 111–135.

J. Martin, M. Howard and D. Elliot (1988), *The Prevalence of Disability among Adults*, OPCS Surveys of Disability in Great Britain, Report 1, HMSO, London.

J. B. McKinlay (1973), "Social networks, lay consultation and help-seeking behaviours", *Social Forces*, Vol. 51, pp. 275–292.

J. Millar (1991), "Bearing the Cost", in Becker (1991b), pp. 23–37.

K. Moser, P. Goldblatt, J. Fox and D. Jones (1990), "Unemployment and mortality", in Goldblatt (1990), pp. 81–97.

J. Mossey and E. Shapiro (1982), "Self-rated health: a predictor of mortality among the elderly", *American Journal of Public Health*, Vol. 72, pp. 800–808.

S. Moylan, J. Millar and R. Davies (1984), *For Richer, for Poorer? DHSS Cohort Study of Unemployed Men*, DHSS Research Report No. 11, HMSO, London.

C. B. Nuckolls, J. C. Cassel and G. H. Kaplan (1972), "Psycho-social assets, life crisis and prognosis of pregnancy", *American Journal of Epidemiology*, Vol. 95, pp. 431–441.

A. Oakley (1988), *Perinatal Mortality: Problems of social and health care policy*, unpublished paper for King's Fund meeting on the 40th anniversary of the National Health Service.

Office of Health Economics (OHE) (1981), *Alcohol: Reducing the harm*, OHE, London.

OPCS (1990), "A review of the 1980s", *Population Trends*, Vol. 62, pp. 1–18.

OPCS (1991), *Mortality Statistics: Cause Review of the Registrar General on death by cause, sex and age, in England and Wales, 1989*, Series DH2 No. 16, HMSO, London.

C. Oppenheim (1990), *Poverty: The facts*, Child Poverty Action Group, London.

S. D. Platt, C. J. Martin, S. M. Hunt and C. W. Lewis (1989), "Damp housing, mould growth and symptomatic health state", *British Medical Journal*, Vol. 298, pp. 1673–1678.

K. E. Powell, P. D. Thompson, C. J. Caspersen and J. S. Kendrick (1987), "Physical activity and the incidence of coronary heart disease", *Annual Review of Public Health*, Vol. 8, pp. 253–87.

C. Read (1991), *Air Pollution and Child Health*, Greenpeace, London.

Research Unit in Health and Behavioural Change (RUHBC) (1989), *Changing the Public Health*, John Wiley & Sons, Chichester.

J.-M. Romeder and J. R. McWhinnie (1977), "Potential years of life lost between ages 1 and 70: An indicator of premature mortality for health planning", *International Journal of Epidemiology*, Vol. 6, pp. 143–161.

D. D. Rutstein, W. Berenberg and T. C. Chalmers (1976), "Measuring the quality of medical care", *New England Journal of Medicine*, Vol. 294, pp. 582–88.

D. D. Rutstein, W. Berenberg and T. C. Chalmers (1980), "Measuring the quality of medical care: second revision of tables of indexes", *New England Journal of Medicine*, Vol. 302, p. 1146.

P. Saunders (1984), "Beyond housing classes: the sociological significance of private property rights in means of consumption", *International Journal of Urban and Regional Research*, Vol. 8, No. 2, pp. 202–227.

A. Smith and B. Jacobson (eds) (1988), *The Nation's Health: A strategy for the 1990s*, King Edward"s Hospital Fund for London, London.

T. Stephens (1988), "Physical activity and mental health in the U.S. and Canada: Evidence from four population surveys", *Preventive Medicine*, 17, pp. 35–47.

A. J. Swerdlow (1987), "150 Years of Registrar Generals' Medical Statistics", *Population Trends*, Vol. 48, pp. 20–26.

P. Townsend (1979), *Poverty in the United Kingdom*, Allen Lane and Penguin Books, Harmondsworth, Middlesex.

P. Townsend (1987), "Deprivation", *Journal of Social Policy*, Vol. 16, Part 2, pp. 125–146.

P. Townsend, P. Corrigan and O. Kowarzik (1986), *Poverty and the London Labour Market: An Interim Report*, Low Pay Unit.

P. Townsend and D. Gordon (1989), "What is enough? New evidence on poverty in Greater London allowing the definition of a minimum benefit", *Memorandum of Evidence to the House of Commons Social Services Committee*, August 1989.

L. M. Verbrugge (1983), "Multiple roles and physical health of women and men", *Journal of Health and Social Behaviour*, Vol. 24, pp. 16–30.

A. Wagstaff (1986), "The demand for health: Theory and applications", *Journal of Epidemiology and Community Health*, Vol. 40, pp. 1–11.

G. Wannamethee and A. G. Shaper (1991), "Self-assessment of Health Status and Mortality in Middle-Aged British Men", *International Journal of Epidemiology*, Vol. 20, No. 1, pp. 239–245.

J. E. Ware, R. H. Brook, A. R. Davies and K. N. Lohr (1981), "Choosing Measures of Health Status for Individuals in General Populations", *American Journal of Public Health*, Vol. 71, No. 6, pp. 620–625.

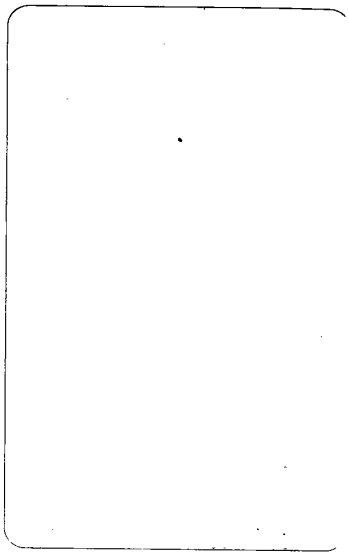
P. Warr (1985), "Twelve questions about unemployment and health", in R. Roberts, R. Finnegan and D. Gallie (eds), *New Approaches to Economic Life*, Manchester University Press, Manchester.

M. Whitehead (1988), *Inequalities in Health: The health divide*, Penguin, London.

M. Whitehead and G. Dahlgren (1991), "What can be done about inequalities in health?", *The Lancet*, Vol. 338, pp. 1059–1063.

World Health Organisation (WHO) (1948), *Official Records of the World Health Organisation*, No. 2, p. 100, United Nations, WHO, Geneva, Interim Commission.

P. Yuen and R. Balarajan (1989), "Unemployment and patterns of consultation with the general practitioner", *British Medical Journal*, Vol. 298, pp. 1212–1214.



King's Fund London Initiative

Working Paper No. 1

The Health Status of Londoners: a comparative perspective was prepared to inform the work of the King's Fund Commission on the Future of Acute Services in London. It is being published in advance of the Commission's strategy for London in order to inform debate about the future of health care in the capital. This paper should not, however, be interpreted as in any way anticipating the recommendations of the Commission's final report.

The King's Fund Commission on the Future of London's Acute Health Services' terms of reference require it to "develop a broad vision of the pattern of acute services that would make sense for London in the coming decade and the early years of the next century". With this in mind, the Fund's London Acute Services Initiative has undertaken a wide-ranging programme of research and information gathering on the Commission's behalf, of which this working paper represents one part.

£12.00
ISBN 0 9518892 1 4