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Alastair H Leyland, Ruth Dundas, Philip McLoone, F Andrew Boddy
MRC Social and Public Health Sciences Unit, 4 Lilybank Gardens, Glasgow G12 8RZ

Executive summary

Methods
The report combines death records from 1980-1982 with population data from the 1981, 1991 and 2001 Censuses to analyse changes in the pattern of mortality by social class and area-based social deprivation. Both measures of social position have weaknesses, so using the two provides a more detailed and robust picture of changes in inequalities in mortality than either would provide on its own.

Population
There was a pronounced "bulge" in the Scottish population structure at ages 10-34 in 1981. This bulge has aged with the population – occurring at ages 30-54 in 2001 – and will disappear in about 60 years. The regional share of the total population changed little from 1981 to 2001 with the exception of a 3% fall in the population of the Clydeside conurbation attributable to a 19% fall in the population of Glasgow.

Overall mortality
Both the crude death rate and the age standardised mortality rate are declining. Age standardised mortality fell by 30% for men and 25% for women between 1981 and 2001. Mortality fell by 55% for people under 15 and by about 35% at ages 45-59 in this period; however, there were increases among men aged 15-29 from 1981-2001, among men aged 30-44 from 1991-2001 and among women aged 15-29 from 1991-2001.

Regional differences in mortality persisted or grew between 1981 and 2001. Male mortality rates in Clydeside (nearly one third of Scotland's population) were 9% above the Scottish average in 1981 and 17% higher in 2001. Male life expectancy at birth in Glasgow was 3.5 years lower than in Edinburgh in 1981, but 5.4 years lower in 2001.

Causes of death
The 32% decline in male mortality at ages 0-64 between 1981 and 2001 is largely due to a 62% fall in deaths from Ischaemic Heart Disease (IHD) and reductions of about one half in deaths due to each of lung cancer, cerebrovascular disease, chronic respiratory disease and accidents. However, a 43% increase in suicides and a substantial increase in deaths from chronic liver disease saw rates from these two causes at the same level as lung cancer in this age group by 2001. There were also marked increases in deaths linked to mental and behavioural disorders due to the use of drugs and alcohol; by 2001, the death rate from each of these was about the same as for colorectal cancer.

Female mortality under 65 declined by 33%; this reflected falls of 62% for IHD, 32% for breast cancer and just 15% for lung cancer. Mortality rates due to cerebrovascular disease and accidents both fell by about one half and there were falls of about 20% for deaths from chronic lower respiratory disease and for suicide. As for men there was a substantial increase in deaths from chronic liver disease.

Changes in mortality from each of the causes were patterned by age and differed for men and women. Mortality rates from IHD fell by 64% (males) and 65% (females) at ages 45-59 but only by 36% and 31% at ages greater than 74. Male lung cancer mortality rates fell by 53% at ages 45-59 but only by 19% over 74; female rates at these ages fell by 23% and increased by 135% respectively.

Social class inequalities in mortality
Difficulties in attributing social class to older people and to women mean that analysis of deaths by social class is restricted to men aged 20-64. Analysing trends in social class inequalities is further complicated by changes in the system of classification between 1991 and 2001, but some features are clear.

For men aged 20-59, mortality gradients were evident in both old and new classifications. In 1991 mortality rates in partly and unskilled occupations (22% of the relevant population) were 2.9 times the rate in professional, managerial and technical occupations (29%). In 2001, mortality rates in routine and semi-routine occupations (25%) were 3.7 times those in professional and managerial occupations (32%).

Increasing differentials in mortality from suicide and chronic liver disease between manual or routine occupations and professional or managerial occupations appear to be driving the increase in social class inequalities in mortality.

In 2001, the male mortality rate in each social class was higher in Glasgow than in Clydeside as a whole, and was higher in Clydeside than in the whole of Scotland. Differences in the social structure of the population clearly cannot explain the region's higher mortality rate.

Inequalities in mortality by small area deprivation
The report uses two measures of small area deprivation: Carstairs scores which allow comparisons between 1981, 1991 and 2001, and the income domain of the Scottish Index of Multiple Deprivation, which allows detailed comparisons between very small areas in 2001.

The increases in male mortality already mentioned were restricted to the more deprived areas. A general pattern of greater decreases in the more affluent areas led to increasing inequalities for males aged under 75 and for women aged 30-74. Increasing inequalities were evident in most of the major causes of death, either because mortality was falling faster in the more affluent areas, as in the case of IHD, or was rising faster in the more deprived areas, as in the case of chronic liver disease.

Deprivation accounts for most but not all of the regional differences in mortality rates. In Glasgow and the Clydeside conurbation, male mortality rates tend to be comparable to those in the rest of Scotland in the more affluent areas but, in more deprived areas, they are higher than the Scottish rates at a given level of deprivation. Aberdeen City stands out as having, for the most part, mortality rates that are higher than in areas of comparable deprivation in Glasgow.

European comparisons
High mortality concentrated in deprived areas, particularly in the West of Scotland, has a substantial impact on national mortality rates. Scotland as a whole has higher mortality than other Western European countries with the exception of Portugal, yet 24 of the 32 local council areas in Scotland have male mortality rates within the range of those of other European countries. The remaining eight (comprising about 30% of the Scottish population) have rates above this range, with Glasgow City having a rate 60% higher than that of the country with the highest death rate.

For the full report see http://www.inequalitiesinhealth.com

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Acknowledgement

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Chapter 1
Report Overview

Introduction

The reporting of measures of the Public Health based on information from the decennial Census and birth and death records in Britain began in the middle of the nineteenth century and provide a continuing account of the ways in which the mortality experience of the population has changed over time. Following the Census of 1911, the Registrars General introduced a system of social classification based on occupation which afforded additional measures of inequalities between different social groups. Occupational death rates depend on information from both death records (for the numerator) and Census returns (for the denominator) and are thus limited to the years around each Census. For many years the Registrar General for England and Wales and then the Office for National Statistics has published a decennial supplement[1] describing these rates in some detail; this information has until now not been available in Scotland at this level of detail.

The advantage of the decennial supplements is that it is possible to bring four main groups of variables together. These are the ways in which death rates are changing over time; the ways in which they vary with regard to age and sex; the ways in which they differ between geographical localities of varying size; and the ways in which they are influenced by measures of the social circumstances or status of individuals. A fifth question of interest concerns causes of death and the frequency with which they occur in different parts of the whole population. Inequalities are, of course, essentially a measure of the relative difference between one population group and another; they are important because they provide insights into the patterns of health of the population as a whole and, when social circumstances are taken into account, at least part of the explanation for the national experience. This Report provides an account of continuing inequalities in health in Scotland and of the ways in which they changed between 1981 and 2001. A large part of the report focuses on mortality and inequalities among people of normal working age or before usual retirement and, as such, draws the reader's attention to the inequalities that exist in premature mortality.

Chapter 2 begins this analysis by considering the demography and mortality of the Scottish population during these two decades with an emphasis on changes in such factors as age and sex both nationally and in geographical regions. Life expectancy (and differences in this measure between regions and the major cities) is also considered. The chapter includes a detailed analysis of causes of death and the ways in which death rates from specific causes have changed in recent years. Trends in mortality from selected causes were considered in the Registrar General for Scotland's Annual Review;[2] this chapter takes this work further by exploring the ways in which these different causes have contributed to geographical inequalities. The chapter concludes by drawing comparisons between the death rates of different parts of Scotland and those of European countries.

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[1] Drever F, Whitehead M (eds). *Health Inequalities: Decennial Supplement*. Series DS No. 15. London: The Stationery Office, 1997.

[2] Registrar General for Scotland. *The Registrar General's Annual Review of Demographic Trends. Scotland's Population 2005.* Edinburgh: GRO(S), 2006.

The Report's third chapter describes patterns of mortality as these are related to measures of individual socio-economic status in 1991 and 2001. Changes to the scheme used to classify individuals based on their occupation between the two Censuses mean that is has been difficult to make direct comparisons over time, but there is sufficient similarity to provide some analysis of the ways that these patterns have changed. Using the two classifications separately, it has also been possible to consider how both age at death and causes of death differ according to occupational category and contribute to the regional differences identified in the preceding chapter.

Beginning in the 1970s, and as an alternative to socio-economic classifications based on individuals, a number of classifications based on the characteristics of small areas were devised. The method most commonly used in Scotland is the Carstairs score[1] which employs Census data to categorise postcode sectors. These categories have been robust over three Censuses (1981, 1991 and 2001) and provide the basis for the comparative analysis in chapter 4 of the ways in which the mortality experience of the populations of small areas has changed over this period. As support for this analysis, the chapter also employs the income domain of the Scottish Index of Multiple Deprivation; this later approach categorises smaller localities based on data from the Department of Work and Pensions relating to the receipt of benefits and tax credits. This Index can be linked to deaths around 2001 and provides a relative ranking of death rates for each quintile of the income domain.

Health and mortality vary between groups defined by social and economic conditions largely due to the different exposures to health damaging and health promoting physical environments throughout the life course. This Report utilises both individual socio-economic position and small area deprivation as axes along which inequalities may be measured. To a large extent the two are very different measures. The former attempts to group individuals based upon the type of work that they undertake. As such to some extent it encompasses – but does not directly measure – factors such as relative social standing, income and education. Small area deprivation measures, on the other hand, are a way of aggregating individuals based upon area of residence. They do not directly measure any individual characteristics but rather those of the population of an area. The areas used are not meaningful in a social context as neighbourhoods, for example, but rather reflect the administrative areas over which such data are recorded. However, there is a sense in which areas also reflect some individual traits in terms of the areas in which individuals choose to live or which they are unable to choose to leave. The two measures therefore offer rather different insights into social inequalities.

Because the Report focuses on comparisons between the Census years 1981, 1991 and 2001, it is possible that transient (short-term) differences can lead to spurious conclusions or that longer-term trends are overlooked. Using these years, on the other hand, has the important advantage of providing denominator populations for small areas thus providing a measure of the health effects of social disadvantage assessed in this way; measures of mortality at other times must necessarily depend on estimates of larger population groupings with the consequence of obscuring more local differences. A particular caution with the use of these methods, however, is that individual localities may change over time in regard to both the demographic characteristics of their populations, their socio-economic features, and their size. At the same time, the observation that correlations between the Carstairs scores for postcode sectors for each

[1] Carstairs V, Morris R. *Deprivation and Health in Scotland.* Aberdeen: Aberdeen University Press, 1991.

of the three Census periods was greater than 95%[1] supports the view that this is a robust measure of social disadvantage and that it is surprisingly stable within Scotland.

The analyses are based around the time of the Censuses because these are required for population estimates. The Census is the only source for populations broken down by occupational class and provides the basis for variables used to estimate the Carstairs score of deprivation. Moreover, the Census is used as a base for all small area population estimates including those made between Censuses. Large sections of the Report deal with relatively rare events – mortality from specific causes or groups of causes – in small populations defined by factors such as age, sex, social class based on occupation and area deprivation. To overcome potential instability in the estimates associated with small numbers we have grouped years around each Census and so, where possible, the data presented in this Report are drawn from the years 1980-82, 1990-92 and 2000-02. For brevity, these are usually referred to in the text as 1981, 1991 and 2001.

Chapter 3 of the Report is concerned with measures of the socio-economic status of individuals as this is expressed by occupation. This approach has the merit of long-standing application but can be criticised on two main grounds: firstly, that it confounds occupation itself (which may have implicit health risks) with education and income (which may be linked to other aspects of lifestyle and risks to health). Secondly, there have been questions concerning the continuing utility of the traditional "social class" model and its relevance to contemporary patterns of employment; these concerns led to the adoption of the National Statistics Socioeconomic Classification (NS-SEC) for the 2001 Census and death records from that time. For this Report, the change raised the immediate difficulty of comparisons between Census periods together with deficiencies in the availability of data around 2001; both problems are linked to a lack of experience with the new classification so that traditional assumptions about "social class" and mortality can no longer be certain. For these reasons, the chapter presents data relating to 1991 and 2001 separately; in terms of the broad objectives of the Report, however, the analyses reported in this chapter suggest that the relative mortality experience of different occupational groups reported in the past continue to be valid.

Earlier research has demonstrated the relationship between Scottish death rates and local areas of residence in Scotland.[2] The objectives of this Report are an attempt to clarify the three main threads that contribute to this pattern. Firstly, there is the question of how death rates vary geographically and of whether – against the background of a falling death rate – these changes in the numbers and causes of death have been experienced equally in different regions. Secondly, there is the question of the extent to which regional, or more local, variation can be explained by differences in the socio-economic mix of these populations when this is measured by individual – occupational – characteristics and, thirdly, whether regional death rates can be explained by the social structure of different regions. Further questions, of course, concern the changing pattern of causes of death, the ages at which they occur, and the extent to which they may have changed – or be changing – over time.

[1] McLoone P. *Carstairs scores for Scottish postcode sectors from the 2001 Census.* Glasgow: MRC Social and Public Health Sciences Unit, 2004.
[2] McLoone P, Boddy FA. Deprivation and mortality in Scotland, 1981 and 1991. *British Medical Journal* 1994; **309**:1465-70.

Chapter 2
Mortality in Scotland 1980-2002

Introduction

This chapter describes the way in which death rates have changed for men and women in Scotland. It explores trends at different ages, differences between the major regions of Scotland, and differences in the trends in specific causes of death. The chapter initially considers the way in which the age structure of the population of Scotland has changed. The denominator populations used throughout this chapter are the General Register Office for Scotland mid year population estimates, available on a yearly basis by District Council and Health Board in 5 year age groups for men and women.

Crude death rates

The overall death rate among the Scottish population has declined steadily over the main period considered by this Report.

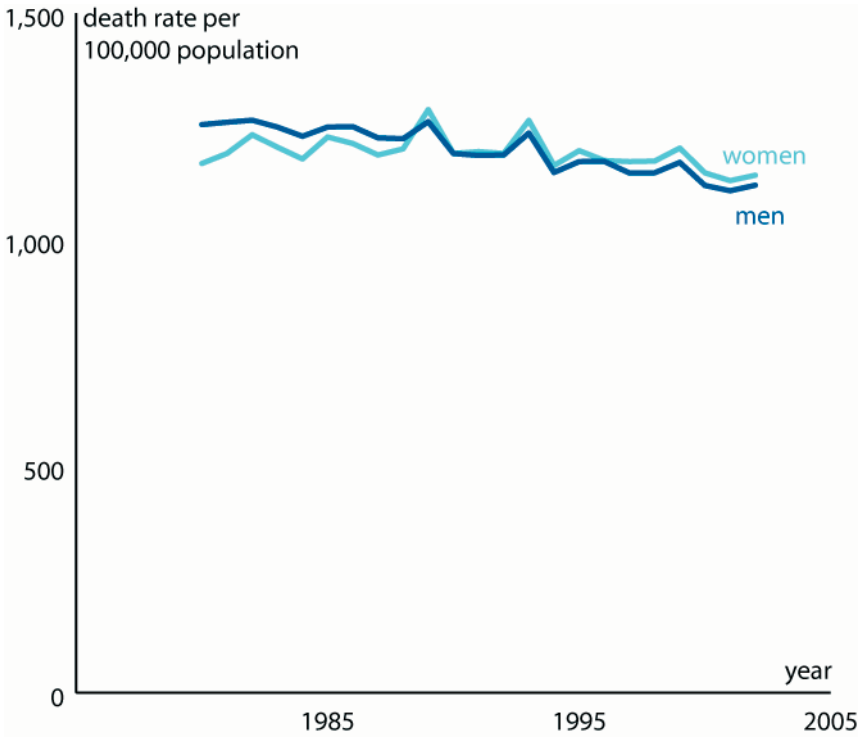
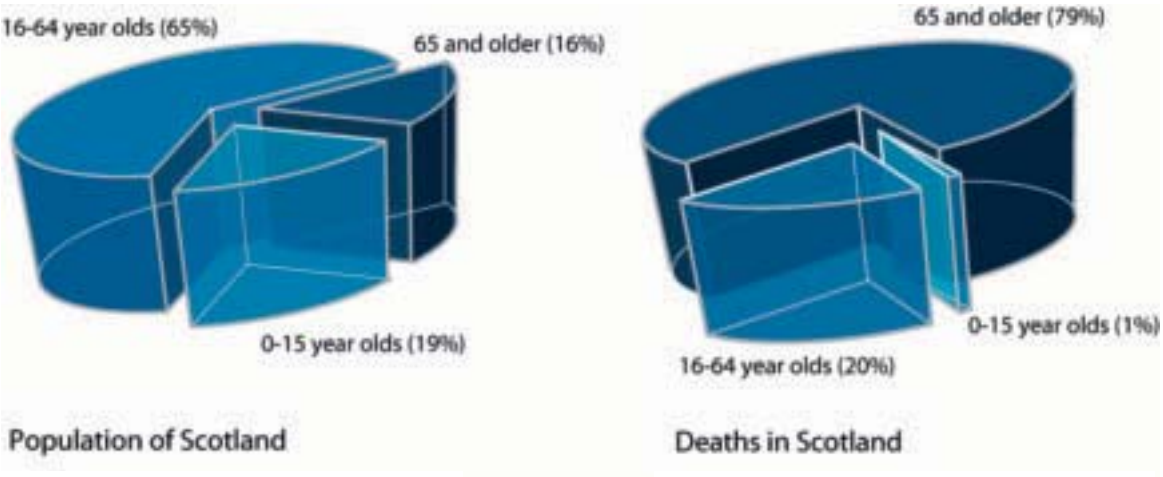


Figure 2.1 Crude death rates Scotland 1980 to 2002.

Figure 2.1 illustrates the crude all-cause death rate for men and women between 1980 and 2002. For men, there has been a fairly steady decline (of 11%) throughout the period. For women the crude rate shows a smaller reduction (2%). This meant that while in 1980 the crude male rate was 7% greater than the female rate, the male rate became 2% smaller than the female rate by 2002.

It is fairly obvious that changes in the age structure of a population can influence its crude death rate. This is demonstrated in the two pie charts which make up figure 2.2. In

2001, two thirds of the Scottish population were aged between 16 and 64. A further one in five were aged less than 16, and fewer than one in six were aged more than 65. The chart for deaths, on the other hand, provides a very different picture. Four out of every five deaths were among people aged more than 65, 1% were amongst under 16 year olds whilst only one in five were in the age groups 16 to 64. Although a seemingly small proportion, the significance of this last category will become evident later.



Estimated population was 5,064,200 persons June 2001

Total number of deaths during 2001 was 56,703

Figure 2.2 Age distribution of Scottish population and deaths.

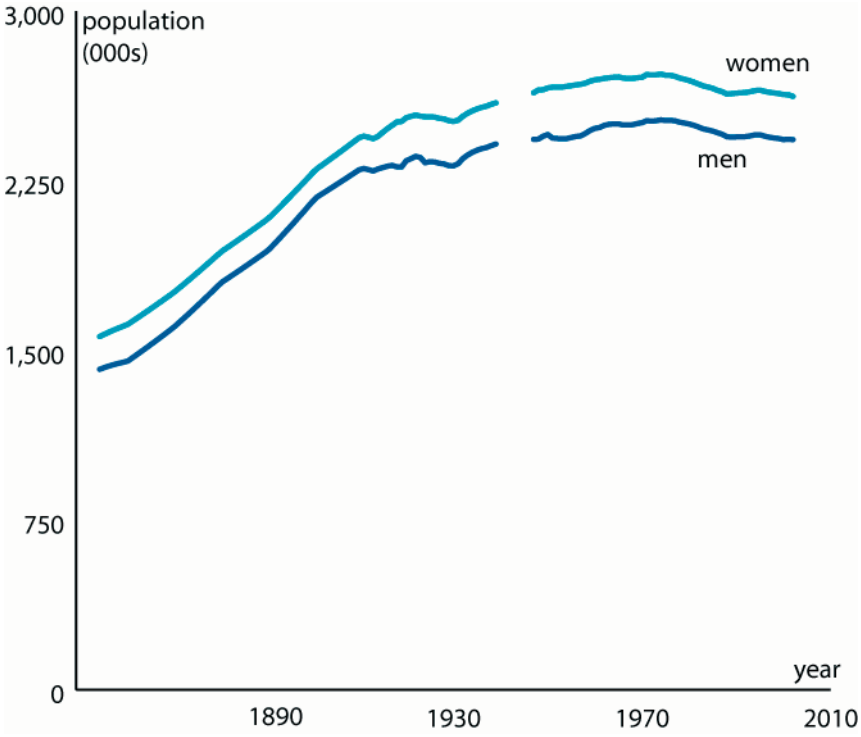


Figure 2.3 Mid-year population estimates Scotland 1885 to 2002.

The Scottish population

Historical perspective

In common with most western European countries, the recent history of Scotland's population was one of rapid and steady population growth throughout the late nineteenth and early twentieth centuries.

In 1855 the population of Scotland was 3.0 million. By the end of the nineteenth century it had reached 4.4 million (figure 2.3). The population continued to grow during the twentieth century although more slowly. It reached 5.0 million by the mid 1930s and by the mid 1970s reached a peak of just over 5.2 million. Since 1975 there has been a slow but steady decline in the overall population. This was most marked in the period 1980-90.

Women have consistently outnumbered men. At the time of the 2001 Census there were 108 women to 100 men in the population.

Fertility

Part of the decline in population can be attributed to a reduction in numbers of births. Patterns of fertility among women of different ages have become more similar over the last 30 years (figure 2.4). As a consequence the fertility of the population as a whole has declined and numbers of births in the population have fallen. There were 86,728 live births in 1971, 69,054 in 1981 and 67,024 in 1991. By 2001 there were only 52,527.

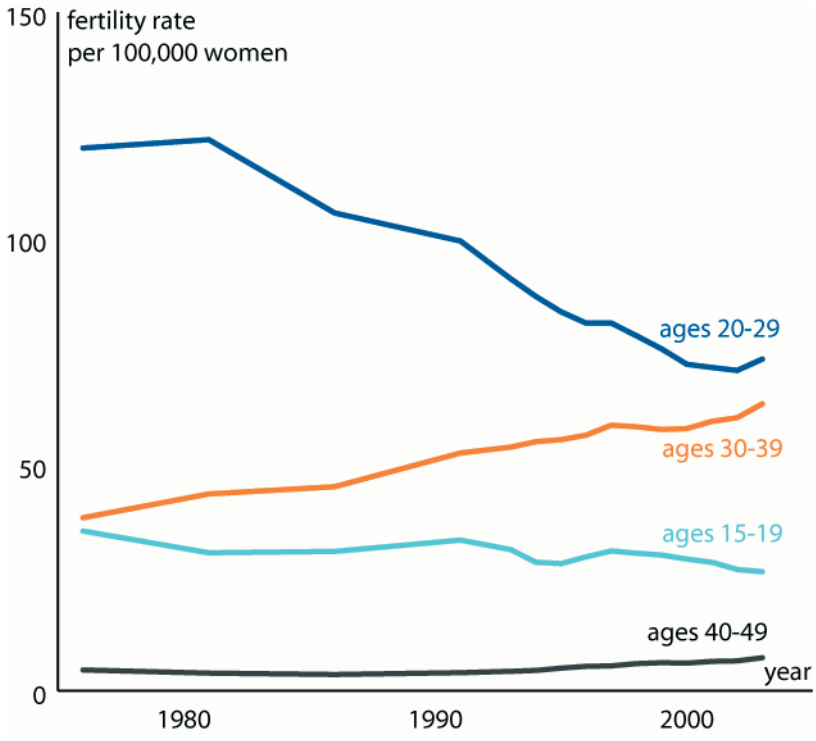


Figure 2.4 Age specific fertility rates (per 100,000 women) 1975 to 2003.

Recent population change

When differences in the population between 1981 and 2001 are examined in detail the evolving nature of longitudinal population change in Scotland becomes clearer. This is illustrated in figure 2.5 which shows the age structure of the population at the three Census years 1981, 1991 and 2001. The population structure in 1981 shows a fairly pronounced 'bulge' across ages 10-34. It also indicates the beginnings of a decline in fertility. This is shown by the smaller numbers aged less than 10. The 1991 population maintains this trend by continuing to display smaller numbers at young ages (this time less than 30 years old). This trend is still evident in 2001.

Figure 2.5 also highlights an aging cohort. The 1981 population 'bulge' of young adults becomes older with time so that by 1991 they are aged 20-44 years, and then aged 30-54 years in 2001. This pattern is also accompanied by increasing numbers of people at older ages. In 1981, the number of men aged more than 70 years comprised 7.0% of the male population; the number of women at these ages was 11.9% of the female population. By 2001, these proportions were 9.1% and 13.5% respectively.

Regional differences

A distinctive feature of the population of Scotland is its diverse geographical distribution. Larger numbers live in urban than in rural areas and in cities than in large burghs. For administrative purposes the population of Scotland is divided into 32 districts called council areas. Figure 2.6 is a map of Scotland with council area boundaries highlighted. To simplify the reporting of geographical comparisons in this Report a number of analyses compare seven major regions of Scotland. These regions are simple groupings of council areas, whose composition is described in table 2.1.

Region	Council area
Highlands and islands	Argyll & Bute, Eilean Siar, Highland, Orkney, Shetland
North East	Aberdeen City, Aberdeenshire, Moray
Clydeside conurbation	East Dunbartonshire, East Renfrewshire, Glasgow City, Inverclyde, North Lanarkshire, Renfrewshire, West Dunbartonshire
Central	Clackmannanshire, Falkirk, Stirling, West Lothian
East	Angus, Dundee City, Fife, Perth & Kinross
South West	Dumfries & Galloway, East Ayrshire, North Ayrshire, South Ayrshire, South Lanarkshire
South East	City of Edinburgh, East Lothian, Midlothian, Scottish Borders

Table 2.1 Composition of regions used for geographical comparisons.

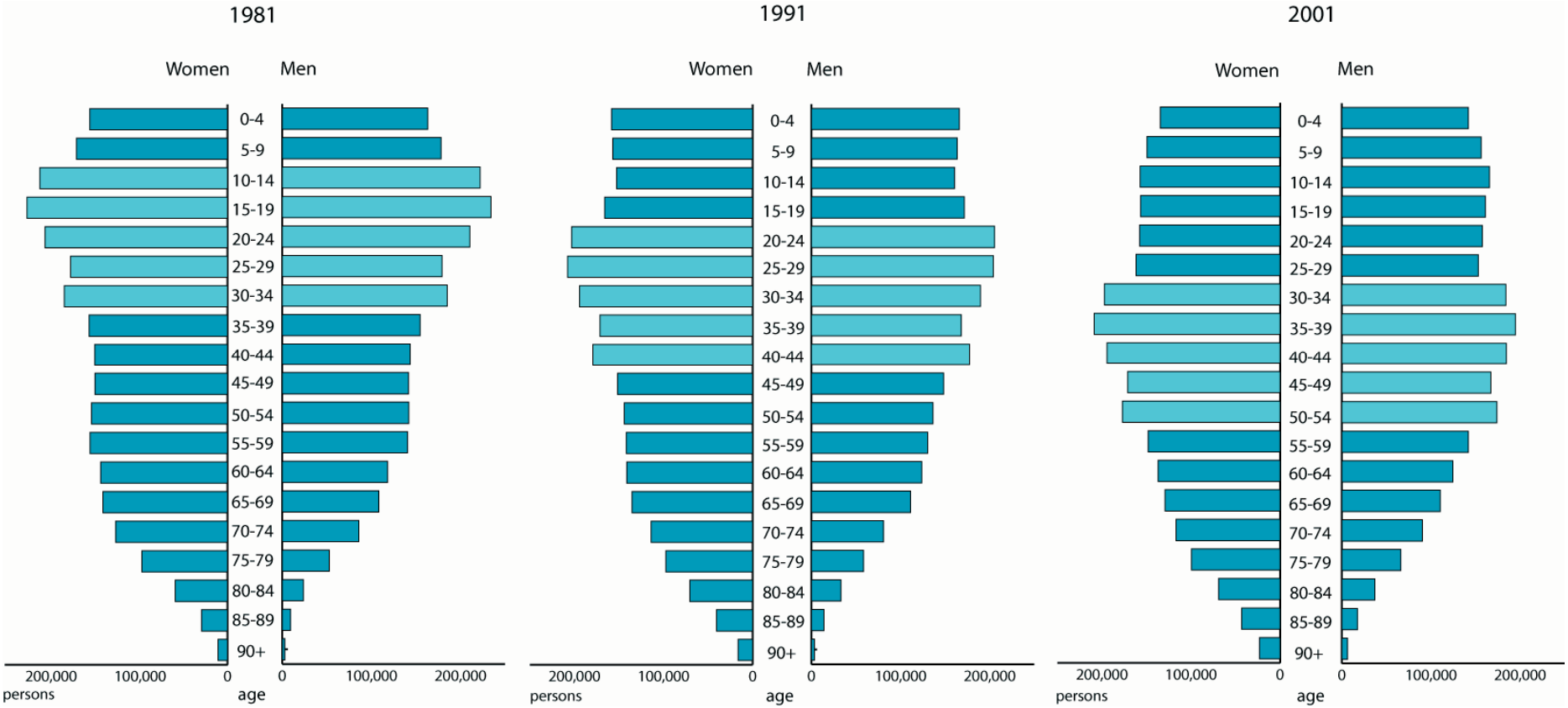


Figure 2.5 Age and sex structure of the Scottish population in 1981, 1991 and 2001

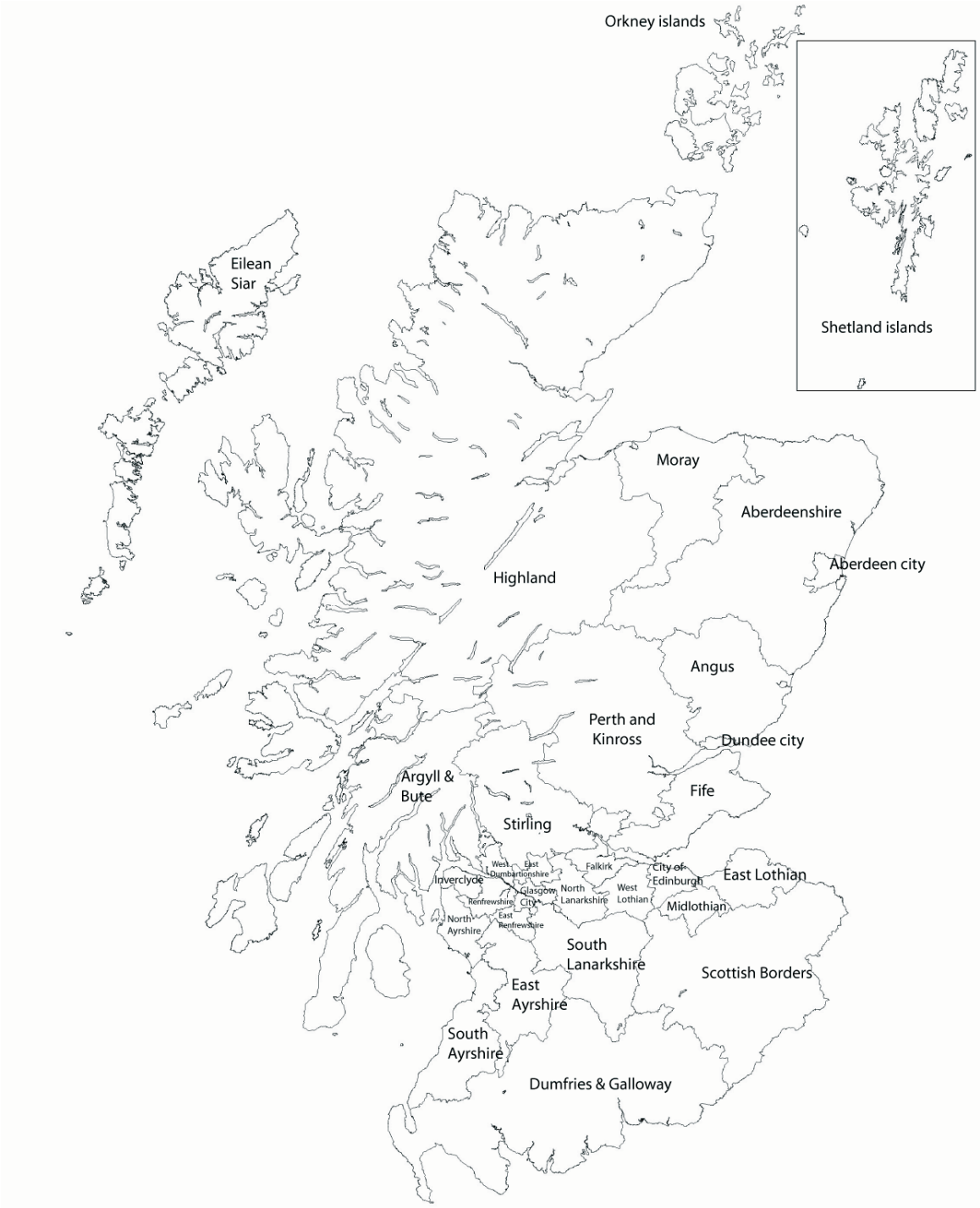


Figure 2.6 Map of Scotland showing council area boundaries.

Table 2.2 reports both the population size and the percentage of the whole population in different regions of Scotland. The table shows relatively little change between the three Censuses in the distribution of the whole population across these regions. There has,

however, been substantial movement in the size of the population resident within each region.

The most significant change occurred within the Clydeside region. By 2001, the proportion of the Scottish population resident in the Clydeside conurbation had fallen to 29%, from 32% in 1981. This was mainly due to a 12% decline in the population of this region. The fall in the population of Clydeside was accompanied by an increase in the populations in other regions. The most notable increases included an 8% rise in the North East, 6% in the Central region, and 2% in the South East.

The large reduction in the Clydeside population was mainly observed within the Glasgow area. Within Clydeside, Glasgow's population declined by 19% and that for the rest of the region by only 6%. Even with these changes the Clydeside conurbation still represents almost a third of the Scottish population so that the social and environmental characteristics of this region are likely to exert a substantial influence on patterns of mortality for Scotland as a whole.

	Population count			**% of the population**		
	1981	1991	2001	1981	1991	2001
Region						
Highlands and islands	362,928	368,690	367,850	7	7	7
North East	484,899	513,980	525,850	9	10	10
Clydeside conurbation	1,636,053	1,516,390	1,447,870	32	30	29
Central	412,829	416,570	438,570	8	8	9
East	738,644	738,680	738,550	14	15	15
South West	833,314	824,900	818,410	16	16	16
South East	711,533	704,120	727,100	14	14	14
Major Cities						
Aberdeen	212,494	214,120	211,910	4	4	4
Dundee	169,581	155,550	145,460	3	3	3
Edinburgh	445,985	436,320	449,020	9	9	9
Glasgow	712,368	629,220	578,710	14	12	11
All Scotland	5,180,200	5,083,330	5,064,200	100	100	100

Table 2.2 Population of major geographical regions of Scotland 1981, 1991 and 2001.

Age and dependency

The change in the age structure of the population mentioned in connection with figure 2.5 is described in greater detail in the different parts of figure 2.7. This figure illustrates changes at different age groups as a proportion of the whole population. The decline in the proportion aged less than 20 years is seen in the first of the four graphs. For both men and women, the main part of this reduction took place in the period between 1980 and 1990 with a suggestion that the proportions began to level off after 1995. Between 1980 and 1990 the percentage of people aged less than 20 resident in Scotland reduced from 32% to 27% for men and from 28% to 24% for women. By 2001 these proportions were 25% and 22% for men and women respectively.

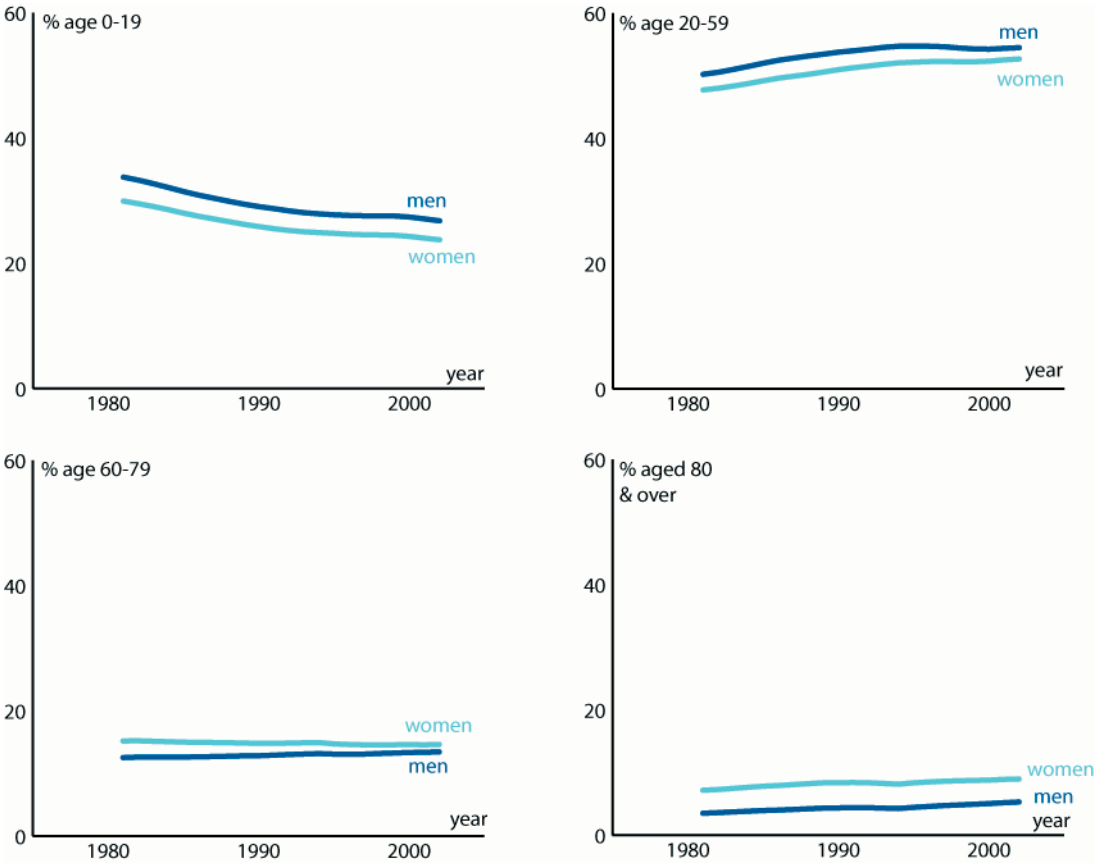


Figure 2.7 Age distribution of the Scottish population 1981 to 2002.

The population aged between 20 and 59 years rose over the period between the three Censuses. This reflects the aging population 'bulge' described in figure 2.5. Again, there was a slight increase during the 1980s with a levelling off after 1995. By 2001, 54% of men and 53% of women were in this broad age band.

The proportion of women aged 60-79 remained steady at about 15% of all women. The proportion of men at these ages increased slightly from 12.5% in 1980 to 13.4% in 2001.

By contrast, the proportion of men and women aged 80 and over showed a steady increase over the twenty year period. The absolute increase was 1.8% for both men and women. By 2001, men and women aged more than 79 years comprised 5% and 9% of the Scottish male and female population.

Given the changing age distribution of Scotland's population, the ratios between different age divisions are of interest in terms of the 'dependency' of the youngest and oldest age groups on those of working age. Table 2.3 reports the ratios between numbers in these age groups and the number of the population aged between 16 and 64 years at different periods. For children (ages 0-15), this ratio has reduced steadily over the past twenty years from 37 in 1981 to 30 in 2001. By way of explanation, this means that in 1981 there were 37 children aged less than 15 years for every 100 aged between 16 and 64. By 2001, this ratio had fallen to 30:100. For people aged between 65 and 74, the ratios remained steady at about 14:100 but increased from 9:100 to 11:100 in those aged 75 or more years. Although some of these changes may appear to be relatively small, the bottom line of table 2.3 draws attention to a more significant shift in the ratio. In 1981, the ratio for the total of these age groups (at 59:100) was greater than in 2001 (54:100) but the make up of this total has changed with the elderly making up a greater part. In 1981, the elderly contributed 23/59 – or 38% – of the overall ratio; in 2001 their contribution was 25/54 or 46% of the total.

	1981	1986	1991	1996	2001
Ages 0-15	37	32	31	31	30
Ages 65 -74	14	13	13	14	14
Ages 75+	9	9	10	10	11
ages 0-15, ages 65+	59	55	55	55	54

Table 2.3 Dependency ratios. Ratio (x100) of the population aged 0-15, 65-74 and over 75 to the population aged 16 to 64.

Table 2.4 describes the dependency ratios for different regions and for the four major cities. The right-hand side of the table summarises them as combined ratios for age groups 0-15 and more than 64. While there are regional differences, the overall pattern is one of considerable similarity. Exceptions to this conclusion are the South East (especially Edinburgh) and Aberdeen where the low combined ratios are explained by low ratios for the age group 0-15 years. In the cities, and for the oldest ages, the highest ratio (13:100) is that for Dundee which, in 2001, also had the highest ratio for combined 'dependent' ages (55:100). Although seemingly fairly small, differences of this kind may have significant implications for the provision of health and other community support services.

	Age group											
	age 0-15			age 65-74			age 75+			ages 0-15, 65+		
Year	1981	1991	2001	1981	1991	2001	1981	1991	2001	1981	1991	2001
Region												
North East	36	31	29	14	12	13	9	10	10	59	53	52
Highlands & islands	40	34	31	15	14	15	10	11	12	65	59	58
South East	32	27	27	15	14	13	10	11	11	57	52	51
South West	38	32	30	14	14	15	8	10	12	60	56	57
Clydeside conurbation	37	31	30	14	13	13	8	10	10	58	54	53
East	36	31	30	15	15	15	10	11	12	61	57	57
Central	39	32	31	12	12	12	7	8	9	59	52	53
Major Cities												
Aberdeen	30	26	24	14	12	12	9	10	10	53	48	46
Dundee	34	29	27	15	14	15	10	11	13	58	55	55
Edinburgh	29	25	24	15	13	12	11	11	11	55	49	46
Glasgow	33	29	28	16	14	13	10	11	11	58	55	52

Table 2.4 Dependency ratios. Ratio (x100) of population in each age group to the population aged 16 to 64. Men and women combined.

Death Rates

Age-standardised death rates

Figure 2.8 describes the Scottish death rate at all ages for men and women between 1980 and 2002. The rates included in this graph and in all subsequent tables and figures have been standardised to the European Standard Population. Doing this controls for differences in the age structure of the population in different time periods or different geographical areas. It thus helps prevent distortions to the overall rate that may arise for this reason. Figure 2.8 therefore provides a more informative account of trends in death rates in Scotland than that provided in figure 2.1.

For men, there has been a fairly steady decline (33%) throughout this period; for women the rate shows a similar but rather smaller reduction (26%) so that, while in 1980 the male rate was 66% greater than the female rate, the difference had fallen to about 51% by 2002. The graph shows short lived increases during 1989, 1993, and 1999. These were the result of influenza epidemics.

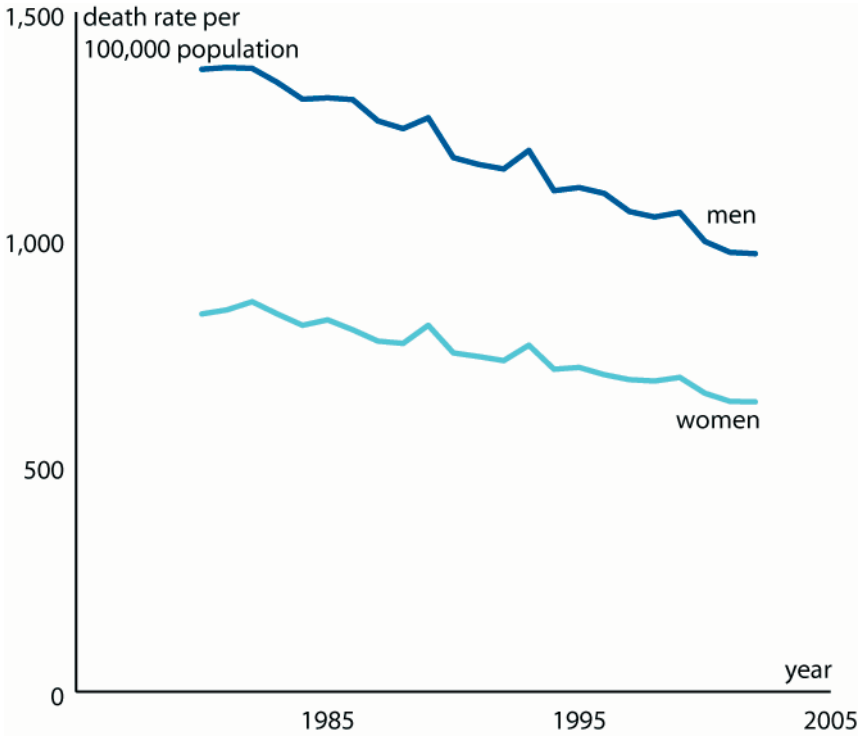


Figure 2.8 Age-standardised all cause death rates Scotland 1980 to 2002.

Age specific mortality

Table 2.5 describes the change in death rates for specific age groups. In the decade between each Census, and for each sex, the death rate for children aged less than 15 years reduced consistently by about 30% between each Census. Overall, death rates for both sexes at these ages in 2001 were only 45% of those for 1981.

At older ages, major reductions were experienced between the ages of 45 to 74. For men aged 45-59 the rate declined by 37% between 1981 and 2001. At ages 60-74 men experienced a similar fall of 34%. The difference between these two age groups was that the decline was greater in the earlier period 1981 to 1991 for men aged 45-59 (26% compared to 15%) but was then greater in the later period for those aged 60-74 (22% compared to 15%).

Women at these ages experienced comparable reductions – 34% at ages 45-59 and 28% at ages 60-74. Women, in common with men, experienced the greater falls at ages 45-59 between 1981 and 1991. Between 1991 and 2001 the greater falls were amongst those aged 60-74.

		Death rate per 100,000 population			Percentage change (%)	
	Age	**1980-82**	**1990-92**	**2000-02**	**1981 to 1991**	**1991 to 2001**
Men	**0-14**	135	89	60	-34	-33
	15-29	97	101	111	5	10
	30-44	208	175	202	-16	15
	45-59	1,072	795	672	-26	-15
	60-74	4,138	3,501	2,737	-15	-22
	75+	14,786	12,719	10,863	-14	-15
	All ages	1,396	1,166	976	-17	-16
Women	**0-14**	102	63	46	-38	-27
	15-29	38	36	38	-4	6
	30-44	129	106	101	-18	-4
	45-59	617	488	407	-21	-17
	60-74	2,282	2,056	1,639	-10	-20
	75+	10,025	8,797	8,214	-12	-7
	All ages	856	740	646	-14	-13

Table 2.5 Age specific death rates per 100,000 population. Scotland 1980 to 2002.

While a continuous decline in mortality between 1981 and 2001 was experienced among most age groups a more complex pattern was evident for those aged between 15 and 44

years. At ages 15-29, the rate among men increased by 5% between 1981 and 1991 and by a further 10% between 1991 and 2001. For women at these ages, the rate for the earlier period declined slightly (by 4%) but then increased by 6% in the later decade. For men aged 30-44, the rate fell by 16% in the earlier decade but then increased by a similar proportion between 1991 and 2001 so that the rate at the end of this period was the same as that in 1981. For women, the reduction for the earlier decade was 18% but only 4% in the second period. When considered alongside the changes for 15-29 year old women, the pattern mirrors that for men.

Regional differences

Death rates for the different regions of Scotland and the changes that have occurred in them over the period 1981 to 2001 are reported in table 2.6. The important feature of this table is the difference in rates between regions and the persistence of these differences over the two decades. As an illustration, the male rate for the South East region in 1981 was 9% below that for Scotland and 9% lower in 2001; the male rates for the Clydeside conurbation were 9% greater in 1981 and 17% greater in 2001. For women, the rate in the South East was 10% less than that for Scotland in 1981 and 7% less in 2001; the rates for the Clydeside conurbation were 8% greater in the first decade and 11% greater in the second period.

The underlying differences in regional rates must be set alongside the changes that have taken place since 1981. There have been major reductions in all regions and, despite different starting rates, the reduction has been similar to the overall Scottish picture with only minor differences when the twenty year period is taken as a whole; that is, the regional reduction for men has been of the order 28-32% and that for women in the range 22-27%. The exception is for males in the Clydeside conurbation where the reduction between 1981 and 2001 was only 25%.

Tables 2.7 to 2.10 show age and sex specific rates for the regions and the four major cities. Although there are differences from one region to another, the overall pattern for men aged 0-14 and for ages over 45 is broadly similar to that already described for Scotland. A more complex pattern is evident for ages 15-44, however; table 2.5 noted a 15% increase in the death rate for men aged between 15 and 29, but this increase has not been uniformly experienced across Scotland and, for some regions, has taken place in the later decade (table 2.7). As illustrations, the death rate for this age group in the North East fell by 13% between 1981 and 1991 but then increased by 20% between 1991 and 2001; similarly, the rate in the East reduced by 3% in the first decade and increased by 34% in the second period. These changes are more striking in the rates for the cities within these regions (table 2.9). In Aberdeen, the rate fell by 30% in the first period and increased by 44% in the second; in Edinburgh and Dundee, the rates increased in the earlier period and then fell by about a quarter in the second. The exception was Glasgow which experienced a 52% increase in the rate of deaths in this age group between 1981 and 2001. Death rates for males in the age group 30-44 show a broadly similar pattern of reductions across the regions of about 20% in the earlier decade and increases of about 20% in the second (table 2.7). The exceptions are the Highlands and Islands and the South Eastern regions. There was little overall change in mortality in the South East over the two decades and a decline of 18% in the Highlands and Islands.

The Scottish reduction in death rates for women at all ages was less than that for men at 24%, but the decline was not uniformly distributed across different age groups (tables 2.8 and 2.10). The greatest decline was for children (ages 0-14) where the death rate for most regions in 2001 was at least 50% less than that in 1981. As was the case for male deaths, reductions of about one third occurred at ages 45-74, again in most regions. The

Clydeside conurbation was an exception to this summary – at ages 45-59, the rate reduced by 33%, but by only 23% at ages 60-74. In the South East death rates fell by just 25% at ages 45-59. Death rates at ages over 74 (covering a wide range of ages) also reduced in an approximately similar way. Across the regions, the decline for this oldest age group was between 14% and 19% over the two decades of this analysis.

As a general comment, the decline in female rates for the four cities in the age bands 45-59 and 60-74 were less than those for the regions in which they are located. For males in the Eastern region, for example, the reductions at these ages were 34% and 35% respectively whereas those for Dundee were only 19% and 25%. In the Clydeside conurbation, the reductions were 32% and 28%; in Glasgow, they were 27% and 18%. At younger ages (15-29 and 30-44) the pattern is less clear with rates rising slightly in Aberdeen, Dundee and Glasgow and changing little in Edinburgh.

		Death rate (all ages)			Percentage change	
		1980-82	1990-92	2000-02	81 to 91	91 to 01
Men	**Highlands & islands**	1,323	1,105	904	-16	-18
	North East	1,227	1,040	880	-15	-15
	Clydeside conurbation	1,526	1,314	1,138	-14	-13
	Central	1,353	1,177	978	-13	-17
	East	1,290	1,098	911	-15	-17
	South West	1,386	1,125	952	-19	-15
	South East	1,274	1,098	885	-14	-19
	All Scotland	1,396	1,166	976	-17	-16
Women	**Highlands & islands**	814	672	596	-17	-11
	North East	773	666	578	-14	-13
	Clydeside conurbation	922	805	714	-13	-11
	Central	859	742	670	-14	-10
	East	791	720	612	-9	-15
	South West	871	750	657	-14	-12
	South East	774	696	599	-10	-14
	All Scotland	856	740	646	-14	-13

Table 2.6 Age standardised death rates per 100,000 population. All ages, men and women in the major regions of Scotland.

		Male death rate per 100,000 population			% change	
Age group	Region	1980-82	1990-92	2000-02	81 to 91	91 to 01
0-14	Highlands & islands	132	85	39	-36	-54
	North East	118	78	48	-34	-39
	Clydeside conurbation	136	91	70	-33	-22
	Central	153	98	43	-36	-56
	East	118	90	60	-24	-33
	South West	149	88	67	-41	-24
	South East	140	89	61	-37	-31
15-29	Highlands & islands	139	115	123	-17	8
	North East	105	91	109	-13	20
	Clydeside conurbation	91	108	128	19	18
	Central	93	105	96	13	-9
	East	86	84	112	-3	34
	South West	99	105	118	7	12
	South East	91	97	77	7	-21
30-44	Highlands & islands	218	176	177	-19	1
	North East	177	146	179	-17	22
	Clydeside conurbation	256	216	259	-16	20
	Central	186	140	172	-25	23
	East	188	156	183	-17	18
	South West	183	153	182	-17	19
	South East	174	184	176	6	-4
45-59	Highlands & islands	980	734	611	-25	-17
	North East	828	632	542	-24	-14
	Clydeside conurbation	1,312	1,005	894	-23	-11
	Central	1,005	763	633	-24	-17
	East	903	704	596	-22	-15
	South West	1,106	724	600	-35	-17
	South East	900	703	580	-22	-17
60-74	Highlands & islands	3,877	3,144	2,440	-19	-22
	North East	3,545	2,979	2,345	-16	-21
	Clydeside conurbation	4,638	4,071	3,349	-12	-18
	Central	4,095	3,519	2,710	-14	-23
	East	3,816	3,260	2,488	-15	-24
	South West	4,058	3,438	2,641	-15	-23
	South East	3,812	3,182	2,413	-17	-24
75+	Highlands & islands	13,941	12,519	10,434	-10	-17
	North East	13,767	12,217	10,478	-11	-14
	Clydeside conurbation	15,106	13,399	11,523	-11	-14
	Central	14,213	13,236	11,507	-7	-13
	East	14,197	12,408	10,439	-13	-16
	South West	14,646	12,359	10,933	-16	-12
	South East	13,741	12,422	10,319	-10	-17

Table 2.7 Male age specific death rates per 100,000 population for major regions of Scotland. 1980-82, 1990-92 & 2000-02.

		Female death rate per 100,000 population			% change	
Age group	Region	1980-82	1990-92	2000-02	81 to 91	91 to 01
0-14	Highlands & islands	89	56	44	-36	-22
	North East	91	54	41	-41	-23
	Clydeside conurbation	110	67	53	-39	-21
	Central	114	64	44	-44	-31
	East	88	61	40	-30	-34
	South West	101	65	48	-36	-26
	South East	112	64	41	-43	-35
15-29	Highlands & islands	40	37	39	-7	6
	North East	33	38	40	17	4
	Clydeside conurbation	39	39	44	0	13
	Central	46	26	25	-44	-3
	East	41	41	36	1	-12
	South West	36	36	44	-1	23
	South East	31	30	30	-4	0
30-44	Highlands & islands	128	110	108	-14	-1
	North East	107	87	86	-19	-1
	Clydeside conurbation	158	113	116	-28	3
	Central	122	95	85	-22	-11
	East	112	110	99	-1	-10
	South West	128	97	100	-25	4
	South East	103	115	91	13	-21
45-59	Highlands & islands	576	412	373	-28	-10
	North East	508	408	327	-20	-20
	Clydeside conurbation	715	592	477	-17	-20
	Central	620	456	403	-26	-12
	East	575	451	371	-22	-18
	South West	619	486	404	-21	-17
	South East	533	415	398	-22	-4
60-74	Highlands & islands	2,020	1,716	1,356	-15	-21
	North East	2,015	1,764	1,398	-12	-21
	Clydeside conurbation	2,511	2,320	1,920	-8	-17
	Central	2,351	2,112	1,774	-10	-16
	East	2,097	1,955	1,515	-7	-23
	South West	2,373	2,113	1,641	-11	-22
	South East	2,090	1,867	1,436	-11	-23
75+	Highlands & islands	10,035	8,504	7,946	-15	-7
	North East	9,502	8,375	7,728	-12	-8
	Clydeside conurbation	10,307	9,044	8,570	-12	-5
	Central	9,818	8,955	8,602	-9	-4
	East	9,316	8,737	7,967	-6	-9
	South West	10,128	8,936	8,461	-12	-5
	South East	9,091	8,605	7,821	-5	-9

Table 2.8 Female age specific death rates per 100,000 population for major regions of Scotland. 1980-82, 1990-92 & 2000-02.

		Male death rate per 100,000 population			% change	
Age	**City**	**1980-82**	**1990-92**	**2000-02**	**81 to 91**	**91 to 01**
0-14	**Aberdeen**	117	82	50	-30	-39
	Dundee	95	86	92	-9	7
	Edinburgh	150	97	65	-35	-33
	Glasgow	147	92	73	-37	-21
15-29	**Aberdeen**	88	62	89	-30	44
	Dundee	83	114	92	38	-19
	Edinburgh	72	95	70	32	-26
	Glasgow	99	128	150	29	18
30-44	**Aberdeen**	187	159	230	-15	44
	Dundee	207	227	281	10	24
	Edinburgh	193	204	196	6	-4
	Glasgow	317	278	343	-12	23
45-59	**Aberdeen**	857	714	663	-17	-7
	Dundee	970	890	785	-8	-12
	Edinburgh	925	767	637	-17	-17
	Glasgow	1,527	1,214	1,113	-20	-8
60-74	**Aberdeen**	3,829	3,178	2,562	-17	-19
	Dundee	4,043	3,429	3,032	-15	-12
	Edinburgh	3,940	3,282	2,498	-17	-24
	Glasgow	4,907	4,453	4,046	-9	-9
75+	**Aberdeen**	15,277	12,785	10,718	-16	-16
	Dundee	13,848	12,824	10,537	-7	-18
	Edinburgh	13,728	12,507	10,135	-9	-19
	Glasgow	15,953	13,484	11,824	-15	-12
All ages	**Aberdeen**	1,326	1,100	947	-17	-14
	Dundee	1,315	1,193	1,041	-9	-13
	Edinburgh	1,296	1,132	903	-13	-20
	Glasgow	1,652	1,422	1,301	-14	-9

Table 2.9 Male age specific death rates per 100,000 population for major cities of Scotland. 1980-82, 1990-92 & 2000-02.

		Female death rate per 100,000 population			% change	
Age	**City**	**1980-82**	**1990-92**	**2000-02**	**81 to 91**	**91 to 01**
0-14	**Aberdeen**	98	59	34	-40	-43
	Dundee	94	73	56	-23	-22
	Edinburgh	122	71	52	-42	-27
	Glasgow	130	83	64	-36	-23
15-29	**Aberdeen**	23	37	43	63	16
	Dundee	37	39	39	7	0
	Edinburgh	29	30	29	5	-5
	Glasgow	43	49	51	14	5
30-44	**Aberdeen**	115	95	106	-18	12
	Dundee	124	130	146	5	12
	Edinburgh	112	132	99	18	-25
	Glasgow	191	129	135	-32	5
45-59	**Aberdeen**	540	425	378	-21	-11
	Dundee	608	509	524	-16	3
	Edinburgh	547	433	418	-21	-4
	Glasgow	772	703	586	-9	-17
60-74	**Aberdeen**	2,158	1,828	1,508	-15	-18
	Dundee	2,162	2,007	1,736	-7	-14
	Edinburgh	2,060	1,862	1,420	-10	-24
	Glasgow	2,599	2,533	2,182	-3	-14
75+	**Aberdeen**	9,747	8,128	7,793	-17	-4
	Dundee	9,330	8,358	7,892	-10	-6
	Edinburgh	8,958	8,619	7,557	-4	-12
	Glasgow	10,159	8,987	8,656	-12	-4
All ages	**Aberdeen**	807	670	607	-17	-9
	Dundee	809	728	680	-10	-7
	Edinburgh	771	704	595	-9	-16
	Glasgow	950	860	778	-10	-9

Table 2.10 Female age specific death rates per 100,000 population for major cities of Scotland. 1980-82, 1990-92 & 2000-02.

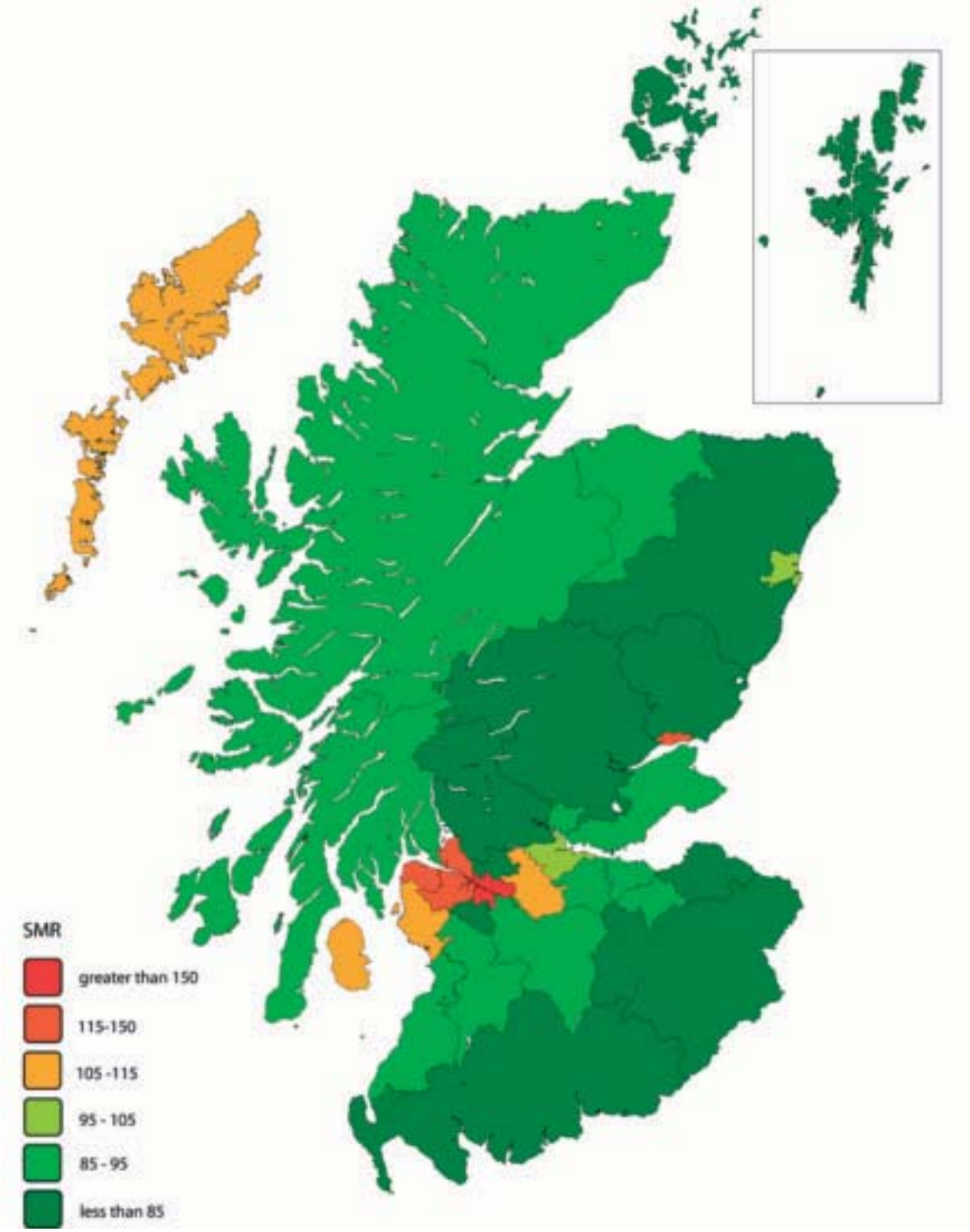


Figure 2.9 All-cause standardised mortality ratios (SMRS) in council areas. Men aged 0-64 Scotland 2000-02.

Deaths at young ages

Earlier in this chapter, figure 2.2 described the age distribution of deaths in Scotland in 2001. Despite substantial reductions in Scottish death rates over last 20 years and an expectation of life at birth that has increased to almost 74 years, it is still the case that

one in five deaths in 2001 were at ages less than 65. Figure 2.9 provides an illustration of how this excess of 'premature mortality' is largely concentrated in the Clydeside conurbation and in Dundee city which has many of the social characteristics of its western counterpart. The remainder of this chapter focuses on deaths at these younger ages.

Male deaths in council areas

Age standardised death rates and standardised mortality ratios (SMRs) for the population aged under 65 for each of the council area populations in Scotland are set out in Appendix tables A.10 and A.11. (The SMR is the ratio of the number of observed deaths to the number of deaths that would have been expected in a council area had the Scottish age-specific death rates for that year applied to that areas population. These are expressed such that an SMR of 100 indicates mortality in line with the Scottish experience, an SMR of 110 suggests that age standardised mortality is 10% above average and an SMR of 90 corresponds to a mortality rate 10% below average.) The map in figure 2.9 and the graphs in figure 2.10 are based on these tables. The range of SMRs (and thus variations in mortality) for male deaths across the list of council areas in 2001 is substantial. At the lower end, the SMR for Aberdeenshire is 69 when compared to the Scottish reference of 100 as is that for East Dunbartonshire (to the north of Glasgow); East Renfrewshire (to the south of Glasgow) is 25 points below the Scottish reference. Essentially rural areas such as Scottish Borders (77), Dumfries and Galloway (80), and Stirling (78) have a similarly favourable experience. A further feature of the SMRs for these areas (and those like them) is that their position relative to Scotland has improved over the two decades of this analysis, while other regions have deteriorated.

Most of the council areas making up the Clydeside conurbation, for example, have had a strikingly unfavourable experience which has continued to deteriorate over the period 1981 to 2001. At 164, Glasgow has the highest SMR in Scotland during 200; the SMR was 132 in 1981 (that is 32% greater than “Scotland”) and 145 in 1991. Although some council areas in the Clydeside region (such as Renfrewshire) have maintained their relative position, they do not appear to have shared the overall improvement in Scottish mortality rates described in earlier tables. Although its SMRs are rather lower than those for Glasgow, Inverclyde illustrates a similar pattern. In 1981, its standardised death rate was 25% greater than the Scottish average, but by 2001 this difference had increased to 43%. The SMR for Dundee has also deteriorated over the period between the three Censuses. In 1981, Dundee’s SMR (92) was close to the all Scotland rate; by 2001, the Dundee SMR had increased to 119.

The deteriorating situation of Glasgow is given further emphasis in comparisons with its largely suburban neighbours. In 1981, the SMR for Glasgow was about 55% greater than that for either East Dunbartonshire or East Renfrewshire: by 2001, this difference had become 87% for East Renfrewshire and 95% for East Dunbartonshire.

Female deaths in council areas

As one might anticipate, the pattern described above for male SMRs is largely replicated for women. SMRs for Aberdeenshire (76), the Borders (81), Dumfries and Galloway (85) and Stirling (84) are all below the Scottish reference in 2001 and those for councils in the Clydeside conurbation are disproportionately higher (again with the exception of East Dunbartonshire and East Renfrewshire). The Glasgow SMR (143) is again the highest in Scotland and, as with the male SMR, has deteriorated since 1981. The SMR for women in Inverclyde (121), on the other hand, has maintained its relative position. The changing experience of Dundee is also evident in its death rates for women: the female SMR in 1981 was 94 in 1981 and 124 in 2001.

The comparison between Glasgow and its neighbouring councils described for men is also evident in the SMRs for women although perhaps not as dramatic as the male comparisons. In 1981, the Glasgow female SMR was 43 points greater than that for East Dunbartonshire and 46 points greater than that for East Renfrewshire. By 2001, these differences had increased to 65 and 69 points respectively.

Figure 2.10 shows SMRs for women plotted against the SMRs for men for each of the Census years 1981, 1991 and 2001 for each council area. Whilst there is a strong correlation between SMRs for women and men the graphs do display differences between SMRs for men and women in some council areas. The graphs also indicate the increasing differentials in mortality rates for both men and women over the time period. This is shown by the greater range of SMRs exhibited by districts along the horizontal and vertical axes.

The effects of unequal death rates

Earlier tables illustrated inequalities in both the death rate and the extent of its decline in different regions of Scotland over the twenty year period considered by this Report. High death rates in the Clydeside conurbation and increasing differentials with the rest of Scotland are features of this pattern. Table 2.11 describes the effect of this increasing inequality by illustrating what the Scottish death rate might be if different populations were excluded from its calculation.

For male deaths, the effect of excluding the Clydeside conurbation in 1981 was to reduce the death rate of Scotland by 9%; by 2001 this percentage had become 11%. When considering this observation, it is important to bear in mind that Clydeside comprised a third of the Scottish population in 1981 and that its population has declined by 12% between 1981 and 2001. Nevertheless this region had an increasing influence on the national death rate as a whole. An alternative view is to consider the Scottish rate after excluding the four major cities. Again, the difference increased, with a 4% reduction in 1981 compared to an 8% reduction in 2001 when the cities were excluded. Most of this difference can be attributed to Glasgow City. Although the population of Glasgow City declined by almost 20% between 1981 and 2001 its influence on the Scottish death rate at ages 0 to 64 rose from 5% to 7%. In contrast, the exclusion of the City of Edinburgh made little difference to the overall Scottish rate, increasing it by around 1%.

The pattern for women in table 2.11 was essentially similar although the proportionate differences were marginally smaller. Excluding Clydeside had the effect of reducing the rate for the remainder of Scotland by 7%; this proportion did not change from 1981. On the other hand, reductions resulting from the exclusion of the major cities increased from 3% to 6% with Glasgow again contributing the major part of this difference.

Life expectancy

An alternative way of assessing the effects of falling death rates is to consider changes in life expectancy at different ages. The changing pattern for the whole of Scotland is set out in table 2.12 which – on the basis of 2001 death rates – reports years of expected future life for men at different ages, and (in the right hand columns of the table) what this expectation might be if different patterns of mortality had applied in 2001.

		Scottish death rate per 100,000 (ages 0-64)			Resultant difference from the All Scotland rate (%)		
		1980-82	1990-92	2000-02	1980-82	1990-92	2000-02
Men	**All Scotland**	495	388	339			
	Scotland excluding						
	Clydeside conurbation	452	352	301	-9	-9	-11
	Major cities	473	362	310	-4	-7	-8
	Glasgow	466	365	314	-6	-6	-7
	Edinburgh	497	389	341	0	0	1
Women	**All Scotland**	286	232	192			
	Scotland excluding						
	Clydeside conurbation	265	216	178	-7	-7	-7
	Major cities	277	220	181	-3	-5	-6
	Glasgow	273	220	183	-4	-5	-5
	Edinburgh	287	233	193	0	1	0

Table 2.11 Comparison of the effect on the Scottish death rate of excluding specific geographical areas from its calculation.

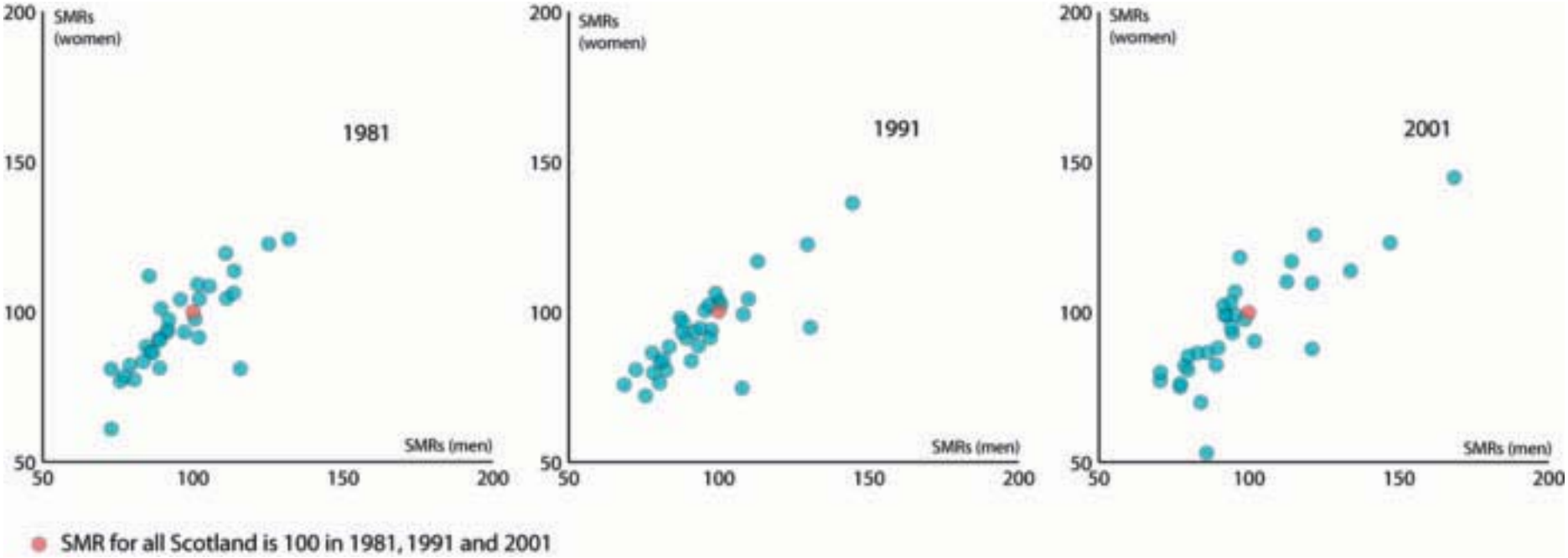


Figure 2.10 Council area all cause SMRs (ages 0-64). SMRs for women plotted against SMRs for men.

	All Scotland			Life expectancy in 2001 if				
	Year			20%		zero deaths from		
	1981	1991	2001	increase in rates	decrease in rates	IHD	cancers	suicide
Life expectancy at								
birth	69.3	71.6	73.6	71.4	76.3	76.4	77.3	74.2
20-24	50.8	52.7	54.4	52.3	57.0	57.3	58.1	55.0
40-44	31.8	33.7	35.7	33.9	38.1	38.7	39.5	35.9
60-64	15.5	16.8	18.6	17.0	20.6	21.1	21.8	18.6

Table 2.12 Comparison of life expectancy estimates for men in Scotland in 1981, 1991 and 2001.

Between 1981 and 2001, life expectancy at birth in Scotland increased by 4.3 years – from 69.3 years to 73.6. Gains at older ages were of a similar order: for ages 40-44 the gain was from a further 31.8 to 35.7 years, and at ages 60-64 from 15.5 to 18.6 further years. The impact of increasing or decreasing mortality, deaths from ischaemic heart disease (IHD), all cancers and suicides on life expectancy are shown on the right of the table. A 20% increase in all age-specific death rates would decrease life expectancy at birth by 2.2 years from 73.6 to 71.4. A 20% decrease in death rates would increase life expectancy at birth by 2.7 years. Excluding mortality due to IHD and cancers resulted in larger gains: 2.8 years for IHD and 3.7 years for all cancers. If suicides were removed then the improvement in life expectancy would be of the order of 0.6 years. As one would anticipate, these exclusions result in rather smaller increases in life expectancy at older ages. Excluding IHD had the effect of increasing life expectancy in 2001 by an additional 2.5 years at ages 60-64; excluding all cancers resulted in an additional increase of 3.2 years.

Against this background, table 2.13 compares expectation of life at birth for both men and women in the different regions of Scotland and the four major cities. In 1981, male life expectancy in the Scottish regions ranged between 67.9 years in Clydeside and 71.0 years in the North East – that is, a regional range of 3.1 years. In 2001, life expectancy for the Scottish regions was still greatest in the North East (75.0 years) and lowest in Clydeside at 71.3 years – a difference of 3.7 years. Other regions reflect the average improvement for Scotland; in the South East, the increase is 4.6 years and 4.5 years in the Central region.

	Men			Women		
	Year			Year		
	1981	1991	2001	1981	1991	2001
Region						
North East	71.0	73.2	75.0	76.7	78.6	80.2
Highlands & Islands	69.6	72.2	74.6	76.1	78.5	79.8
South East	70.4	72.4	75.0	76.5	78.0	79.8
South West	69.2	72.0	73.9	75.2	77.2	78.7
Clydeside conurbation	67.9	69.9	71.3	74.3	76.2	77.7
East	70.5	72.5	74.4	76.3	77.6	79.6
Central	69.5	71.7	74.0	75.2	77.4	78.7
City						
Aberdeen	70.4	72.7	74.1	76.3	78.5	79.7
Dundee	70.3	71.1	72.2	76.1	77.3	78.1
Edinburgh	70.2	71.8	74.6	76.5	77.8	79.8
Glasgow	66.7	68.5	69.2	73.7	75.2	76.5
Scotland	69.3	71.6	73.6	75.5	77.3	78.9

Table 2.13 Comparison of life expectancy in different regions of Scotland.

These contrasts are greater when male life expectancy for the four cities is considered. In Aberdeen, the change at birth between 1981 and 2001 was an increase of 3.7 years; in Edinburgh this difference was 4.4 years. In Glasgow and Dundee, on the other hand, the increases were 2.5 and 1.9 years respectively. For Glasgow city, and for both men and women, life expectancy at birth in 2001 was comparable to that for Scotland as a whole in 1981.

Life expectancy for women is, of course, rather greater than that for men, but increases in life expectancy between 1981 and 2001 were less than those for men over the same period. In 1981 the difference between men and women was 6.2 years but reduced to 5.3 years by 2001. The regional range for women in 1981 was between 74.3 years (Clydeside) and 76.7 in the North East – a difference of 2.4 years. Overall, female life expectancy at birth increased by 3.4 years by 2001 with very similar changes in each of

the regions. In 2001, the range of regional increases was 2.5 years with Clydeside still the lowest (at 77.7) and the North East with the greatest life expectancy at 80.2 years. Over this twenty-year period, the male-female difference in the South East reduced from 6.1 years in 1981 to 4.8 years in 2001, while the male-female difference in Clydeside was unchanged at 6.4 years.

Causes of death

Tables 2.14 and 2.15 set out changes in age-standardised death rates for men and women aged 0 to 64 in 1981, 1991 and 2001. The 31% overall decline over these twenty years reflects substantial reductions in male deaths from most major causes: in 2001, the rate for IHD was 62% lower than the rate in 1981 and that for lung cancer was 47% lower, whereas the rate for all cancers apart from lung, colorectal and stomach cancer increased by 9%. Male deaths from cerebrovascular disease reduced by about half, as did those from chronic respiratory disease.

These improvements need to be set against increases from other causes. Deaths from chronic liver disease, formerly a relatively uncommon cause, have increased steadily since about the mid-1990s with an age standardised rate (at ages 0-64) about the same as that for lung cancer in 2001 (figure 2.11).

Suicide as a cause of death increased steadily over the twenty-year period (by 43%) and, by 2001, was as important a cause of death as lung cancer (as measured by age standardised death rates at ages 0-64). Mental and behavioural disorders due to the use of drugs or alcohol (although with low rates) also demonstrated rising rates from the early 1990s. There is a suggestion (figure 2.12) that part of this increase may be a result of change in coding practice in the mid-1990s with a consequent “step change” in the rate about 1994.

Nonetheless, these rates have continued to rise since then. One further feature of table 2.14 is that death rates from the catch-all category of “all other causes” showed a decline that was slightly smaller than those from other major categories; these deaths were 23% fewer in 2001 than in 1981.

Death rates for women (table 2.15) show a comparable reduction to those for men (33%) between 1981 and 2001 but with a rather different pattern of causes. Deaths from IHD were 62% fewer but those from lung cancer only 15% fewer; this observation is in line with known differences in the pattern of the lung cancer epidemic in Scotland. The rate for cancer of the breast was a third less in 2001 and, in contrast to male rates, the rate for all other cancers (excluding lung, breast, colorectal and stomach cancer) reduced by 22%. Cerebrovascular disease was about half as frequent and “all other causes” reduced by a third.

Although still lower than comparable rate for males, the death rate from chronic liver disease doubled during the 1990s. The rate of suicide, on the other hand, declined by 20% and was only a third of that for men in 2001. Again in contrast to male deaths, mental and behavioural disorders due to the use of drugs or alcohol remained low and showed only small absolute increases over the period.

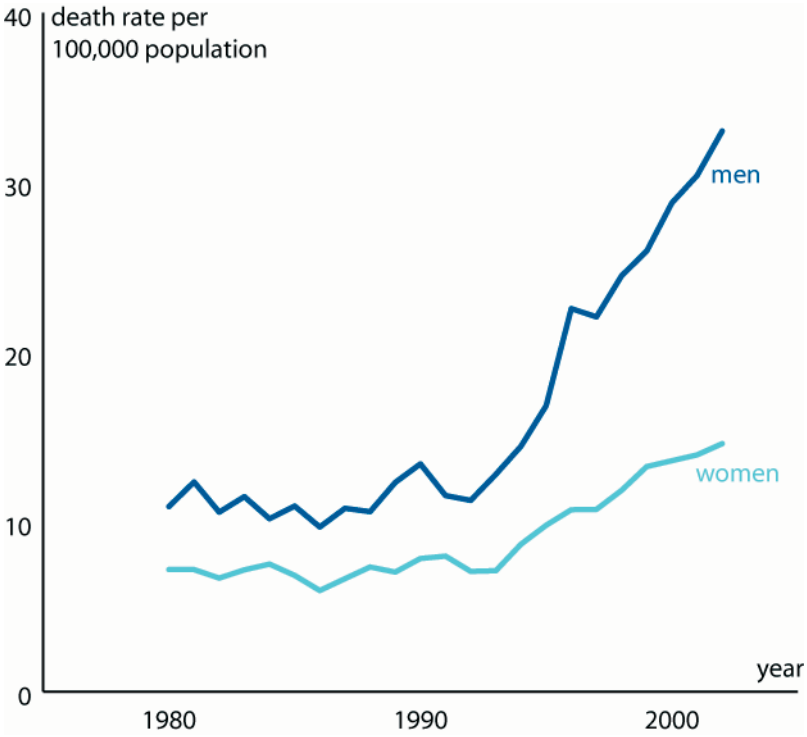


Figure 2.11 Age standardised death rates (ages 15 to 64) from chronic liver disease (ICD9 571; ICD10 K70, K73-74).

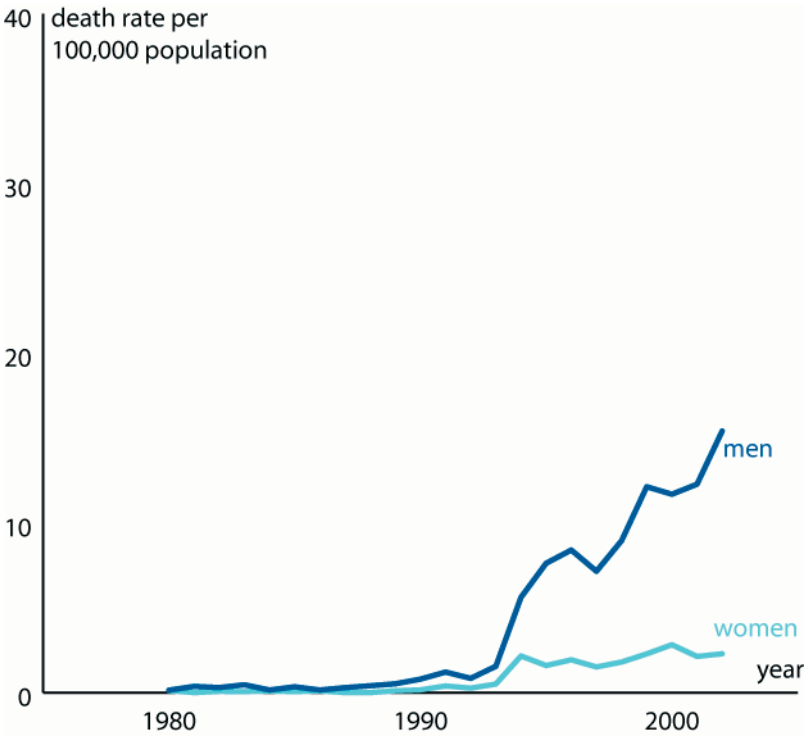


Figure 2.12 Age standardised death rates (ages 15 to 64) from mental & behavioural disorders due to use of drugs (ICD9 304, 305.2-.9; ICD10 F11-16, F18-19).

	Death rates per 100,000			% change	
	1980-82	1990-92	2000-02	81 to 91	91 to 01
IHD (ICD9 410-414; ICD10 I20-I25)	167	115	64	-32	-44
Malignant neoplasm (ICD9 140-208; ICD10 C00-97)	118	107	92	-10	-14
Malignant neoplasm of the trachea, bronchus and lung (ICD9 162; ICD10 C33-34)	49	37	26	-25	-30
Malignant neoplasm of the colon and rectum (ICD9 153, 154.0-154.1; ICD10 C18-20)	11	11	9	1	-14
Malignant neoplasm of the stomach (ICD9 151; ICD10 C16)	10	6	4	-37	-31
Other malignant neoplasm	48	53	52	10	-1
Cerebrovascular disease (ICD9 430-438; ICD10 I60-69, G45)	29	19	13	-33	-31
Chronic lower respiratory disease (ICD9 490-494, 496; ICD10 J40-47)	17	11	9	-38	-18
Suicide (ICD9 E950-959, E980-989; ICD10 X60-84, Y87.0, Y10-Y34, Y87.2)	18	21	26	15	24
Chronic liver disease (ICD9 571; ICD10 K70, K73-74)	9	9	23	6	155
Mental & behavioural disorders due to use of drugs (ICD9 304, 305.2-.9; ICD10 F11-16, F18-19)	0	1	10		
Mental & behavioural disorders due to use of alcohol (ICD9 291, 303, 305.0; ICD10 F10)	5	4	9		
Accidents (ICD9 E800-929; ICD10 V01-X59, Y85, Y86)	37	25	18	-32	-27
Assault (E960-969; ICD10 X85-Y09, Y87.1)	2	3	3	55	3
All other	93	73	71	-21	-2
All	495	388	339	-22	-13

Table 2.14 Age standardised cause specific death rates per 100,000 population. Men aged 0-64 during 1980-82, 1990-92 and 2000-02.

	Death rates per 100,000			% change	
	1980-82	1990-92	2000-02	81 to 91	91 to 01
IHD (ICD9 410-414; ICD10 I20-I25)	51	39	19	-24	-50
Malignant neoplasm (ICD9 140-208; ICD10 C00-97)	101	95	77	-5	-19
Malignant neoplasm of the trachea, bronchus and lung (ICD9 162; ICD10 C33-34)	19	19	16	-4	-12
Breast cancer (ICD9 174-175; C50)	27	24	18	-12	-23
Malignant neoplasm of the colon and rectum (ICD9 153, 154.0-154.1; ICD10 C18-20)	9	8	5	-6	-36
Malignant neoplasm of the stomach (ICD9 151; ICD10 C16)	4	3	2	-20	-35
Other malignant neoplasm	69	66	54	-5	-18
Cerebrovascular disease (ICD9 430-438; ICD10 I60-69, G45)	25	16	11	-36	-31
Chronic lower respiratory disease (ICD9 490-494, 496; ICD10 J40-47)	9	9	7	-7	-15
Suicide (ICD9 E950-959, E980-989; ICD10 X60-84, Y87.0, Y10-Y34, Y87.2)	10	7	8	-32	21
Chronic liver disease (ICD9 571; ICD10 K70, K73-74)	5	6	11	8	84
Mental & behavioural disorders due to use of drugs (ICD9 304, 305.2-.9; ICD10 F11-16, F18-19)	0	0	2		
Mental & behavioural disorders due to use of alcohol (ICD9 291, 303, 305.0; ICD10 F10)	2	2	3		
Accidents (ICD9 E800-929; ICD10 V01-X59, Y85, Y86)	12	9	6	-25	-36
Assault (E960-969; ICD10 X85-Y09, Y87.1)	1	1	1	-27	10
All other	71	49	47	-31	-4
All	286	232	192	-19	-17

Table 2.15 Age standardised cause specific death rates per 100,000 population. Women aged 0-64 during 1980-82, 1990-92 and 2000-02.

Cause and age-specific death rates

Death rates for different causes and for men and women in 5-year age groups are shown in tables 2.16 to 2.19 and obviously vary from cause to cause. For both males and females, between 1981 and 2001, the decline in the rate for IHD is clearly age-related with reductions of 64% and 65% in the rates at ages 45-59 but only 36% and 31% and ages over 74. Uncertainties over coding are a possible influence on the rates at these higher ages. Rates of IHD at ages 30-44 are low – especially in women - but reduced less over this period than those aged 45-74.

Lung cancer rates in males showed a similar pattern; this rate fell by 53% at ages between 45 and 59, by 35% between ages 60 and 74 and by only 19% at age 75 or greater. There was a different pattern for women, however; while the rate at ages 45-59 was 23% lower in 2001 than in 1981, it was 34% greater at ages 60-74 and 135% greater in the oldest age group.

Rates for *cancer of the colon and rectum* demonstrate a rather opposite pattern. The rate for men aged 45-59 reduced by 22% and those at ages 60-74 and 75+ by 4% and 14% respectively. Amongst women, however, the rate at the younger age group (45-59) declined by 36%, that at ages 60-74 by 33% and that in the oldest age group by 26%. In combination, these changes meant that the all-age rate fell by only 11% in males but by 31% in women. An age gradient is also evident in rates of female deaths from *breast cancer*. At ages 30-44, this rate was 42% lower in 2001 than in 1981; the reduction was 33% at ages 45-59 but only 18% at ages 60-74. In the age group 75+, the rate increased by 9%.

Changes in the overall death rate obviously result from both increases and decreases in the rate for particular causes at specific ages and from differences between males and females. Figures 2.13 to 2.16 illustrate the implications of changes in selected causes of death for the overall rate.

In these figures, the gray shaded area describes the percentage change in all-cause mortality for five-year age-bands and for two time periods – between 1981 and 1991 and then between 1991 and 2001. Percentage changes for selected causes are superimposed as coloured lines, thus providing a measure of the extent to which age-specific rates have changed and the ways in which particular causes of death have contributed to the rate at given ages.

		Death rate per 100,000 population					
		men			Women		
	Age	1980-82	1990-92	2000-02	1980-82	1990-92	2000-02
All causes	**0-14**	135	89	60	102	63	46
	15-29	97	101	111	38	36	38
	30-44	208	175	202	129	106	101
	45-59	1,072	795	672	617	488	407
	60-74	4,138	3,501	2,737	2,282	2,056	1,639
	75+	14,786	12,719	10,863	10,025	8,797	8,214
	0-64	495	388	339	286	232	192
	all ages	1,396	1,166	976	856	740	646
Ischaemic Heart Disease (ICD9 410-414; ICD10 I20-25)	**0-14**	0	0	0	0	0	0
	15-29	1	1	1	0	0	0
	30-44	45	29	20	9	7	5
	45-59	433	280	156	114	82	40
	60-74	1,504	1,236	695	691	567	305
	75+	3,926	3,460	2,519	2,432	2,233	1,671
	0-64	167	115	64	51	39	19
	all ages	434	349	220	205	175	113
Cerebrovascular Disease (ICD9 430-438; ICD10 I60-69, G45)	**0-14**	0	0	0	1	0	0
	15-29	3	1	1	2	1	1
	30-44	10	6	5	11	7	5
	45-59	62	41	29	55	36	24
	60-74	429	296	187	314	216	139
	75+	2,319	1,771	1,418	2,159	1,714	1,390
	0-64	29	19	13	25	16	11
	all ages	159	116	86	138	103	78
All malignant neoplasms (ICD9 140-208; C00-97)	**0-14**	6	3	3	4	3	2
	15-29	9	7	6	8	6	5
	30-44	37	31	25	51	45	33
	45-59	281	247	203	254	235	191
	60-74	1,145	1,129	990	651	712	644
	75+	2,523	2,648	2,568	1,274	1,370	1,505
	0-64	118	107	92	101	95	77
	all ages	305	300	269	193	199	184

Table 2.16 Age and cause specific death rates (per 100,000 population) for men and women 1980-82, 1990-92 and 2000-02.

		Death rate per 100,000 population					
		men			Women		
	Age	1980-82	1990-92	2000-02	1980-82	1990-92	2000-02
Malignant neoplasm of trachea bronchus and lung (ICD9 162; ICD10 C33-34)	**0-14**	0	0	0	0	0	0
	15-29	0	0	0	0	0	0
	30-44	8	5	3	4	4	3
	45-59	122	83	57	52	44	40
	60-74	514	455	333	140	195	187
	75+	838	804	677	131	222	308
	0-64	49	37	26	19	19	16
	all ages	121	104	79	33	42	44
Malignant neoplasm of female breast (ICD9 175; ICD10 C50)	**0-14**				0	0	0
	15-29				0	1	0
	30-44				19	15	11
	45-59				75	66	51
	60-74				108	108	88
	75+				171	200	186
	0-64				27	24	18
	all ages				39	38	30
Malignant neoplasm of colon and rectum (ICD9 153, 154.0-154.1; ICD10 C18-20)	**0-14**	0	0	0	0	0	0
	15-29	0	0	0	0	0	0
	30-44	3	4	2	3	3	2
	45-59	28	27	21	21	21	13
	60-74	112	113	107	80	75	54
	75+	340	325	294	253	208	187
	0-64	11	11	9	9	8	5
	all ages	33	33	29	25	22	17
Malignant neoplasm of stomach (ICD9 151; ICD10 C16)	**0-14**	0	0	0	0	0	0
	15-29	0	0	0	0	0	0
	30-44	2	2	1	1	1	2
	45-59	26	14	9	9	6	4
	60-74	98	73	47	41	32	20
	75+	204	172	130	130	87	69
	0-64	10	6	4	4	3	2
	all ages	26	19	13	12	9	6

Table 2.17 Age and cause specific death rates (per 100,000 population) for men and women 1980-82, 1990-92 and 2000-02.

		Death rate per 100,000 population					
		men			Women		
	Age	1980-82	1990-92	2000-02	1980-82	1990-92	2000-02
All other malignant neoplasms*	**0-14**	6	3	3	4	3	2
	15-29	8	7	6	7	5	4
	30-44	23	21	18	43	38	26
	45-59	106	122	116	172	163	134
	60-74	421	488	502	390	410	383
	75+	1141	1347	1467	760	853	941
	0-64	48	53	52	69	66	54
	all ages	125	144	148	123	126	117
Chronic lower respiratory diseases (ICD9 490-494, 496; ICD10 J40-47)	**0-14**	1	0	0	1	0	0
	15-29	1	1	1	1	1	1
	30-44	3	1	1	2	2	1
	45-59	37	20	17	24	16	16
	60-74	243	182	159	83	115	121
	75+	893	810	707	165	219	377
	0-64	17	11	9	9	9	7
	all ages	73	59	51	22	26	33
Chronic liver disease (ICD9 571; ICD10 K70, K73-74)	**0-14**	0	0	0	0	0	0
	15-29	0	0	1	0	0	0
	30-44	6	7	19	5	5	8
	45-59	23	24	62	13	15	30
	60-74	31	33	74	18	21	29
	75+	19	16	31	13	12	18
	0-64	9	9	23	5	6	11
	all ages	10	11	27	6	7	12
Accidents ICD9 (E800-929, ICD10 V01-X59, Y85, Y86)	**0-14**	17	10	5	9	7	3
	15-29	46	36	21	10	9	6
	30-44	36	24	21	8	7	4
	45-59	46	30	23	17	11	8
	60-74	68	48	39	38	27	17
	75+	305	227	169	335	205	170
	0-64	37	25	18	12	9	6
	all ages	51	35	26	27	18	13

* excluding lung, colorectal, stomach and breast

Table 2.18 Age and cause specific death rates (per 100,000 population) for men and women 1980-82, 1990-92 and 2000-02.

		Death rate per 100,000 population					
		men			Women		
	Age	1980-82	1990-92	2000-02	1980-82	1990-92	2000-02
Intentional self harm & events of undetermined intent (ICD9 E950-959, 980-989; ICD10 X60-84, Y87.0 , Y10-Y34, Y87.2)	**0-14**	0	0	1	0	0	1
	15-29	17	28	37	5	7	9
	30-44	26	30	41	12	8	12
	45-59	30	27	28	21	10	10
	60-74	26	22	23	15	10	9
	75+	25	25	20	12	9	7
	0-64	18	21	26	10	7	8
	all ages	19	21	26	10	7	8
Mental and behavioural disorders due to use of drugs (ICD9 304, 305.2-.9; ICD10 F11-16, F18-19)	**0-14**	0	0	0	0	0	0
	15-29	1	2	22	0	1	5
	30-44	0	1	18	0	0	3
	45-59	0	0	3	0	0	0
	60-74	0	0	0	0	0	0
	75+	0	0	0	0	0	0
	0-64	0	1	10	0	0	2
	all ages	0	1	9	0	0	2
Mental and behavioural disorders due to use of alcohol (ICD9 291, 303, 305.0; ICD10 F10)	**0-14**	0	0	0	0	0	0
	15-29	1	1	1	0	0	0
	30-44	5	6	7	2	3	3
	45-59	11	10	23	5	4	8
	60-74	11	9	22	5	3	7
	75+	4	6	8	1	2	2
	0-64	5	4	9	2	2	3
	all ages	5	5	9	2	2	3
Assault (ICD9 E960-969; ICD10 X85-Y09, Y87.1)	**0-14**	1	1	1	1	0	1
	15-29	3	5	5	1	1	1
	30-44	2	4	5	1	1	1
	45-59	2	3	3	1	1	1
	60-74	2	2	1	1	1	0
	75+	2	2	2	1	1	1
	0-64	2	3	3	1	1	1
	all ages	2	3	3	1	1	1

Table 2.19 Age and cause specific death rates (per 100,000 population) for men and women 1980-82, 1990-92 and 2000-02.

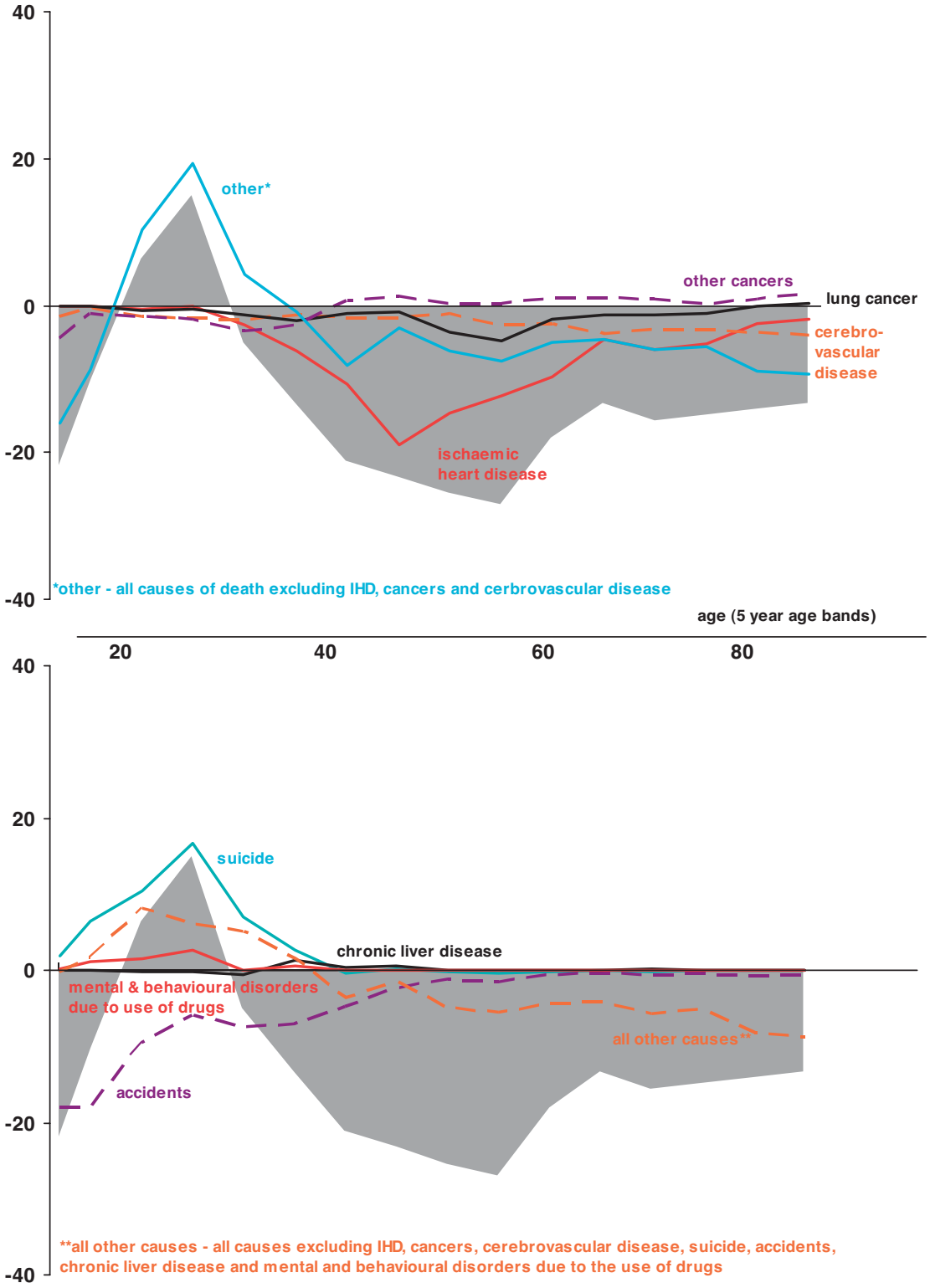
Figure 2.13 describes this pattern for male deaths for two groups of causes between 1981 and 1991. In the upper graph, the reduction in the overall death rate after the age of 40 years is largely attributable to the sum of reductions in lung cancer, cerebrovascular disease and – especially – IHD. The increase at younger ages, attributed to 'other causes' in the upper graph, is then explained in the lower graph as resulting from increases in the rate of suicides, the use of drugs and further 'other causes' although (at the youngest ages) the overall change is offset by a reduction in deaths from accidents.

A similar – although exaggerated – pattern is seen in figure 2.14 which describes changes in male deaths between 1991 and 2001. The reduction in death rates at ages between 40 and 64 receives its main contribution from the reduction in IHD deaths and from smaller reductions in deaths from lung cancer, cerebrovascular disease and other cancers. In the earlier period (the upper graph in figure 2.13), the percentage increase in five-year specific rates peaked at about 20% at age 25; between 1991 and 2001, the peak in the increase at younger ages from these “other causes” was 40% at age 30 with the added feature of smaller increases at older ages.

The lower graph in figure 2.14 explains these “other causes” in more specific terms. The major part of the percentage increase at younger ages comprises a combination of suicide and the use of drugs. At the youngest ages, reductions in deaths from accidents again offset these changes to some degree. Chronic liver disease emerges as the explanation for the increase in “other causes” at ages 40-60 in the upper graph although (as figure 2.11 also suggests) the change in this rate is also apparent at much earlier ages.

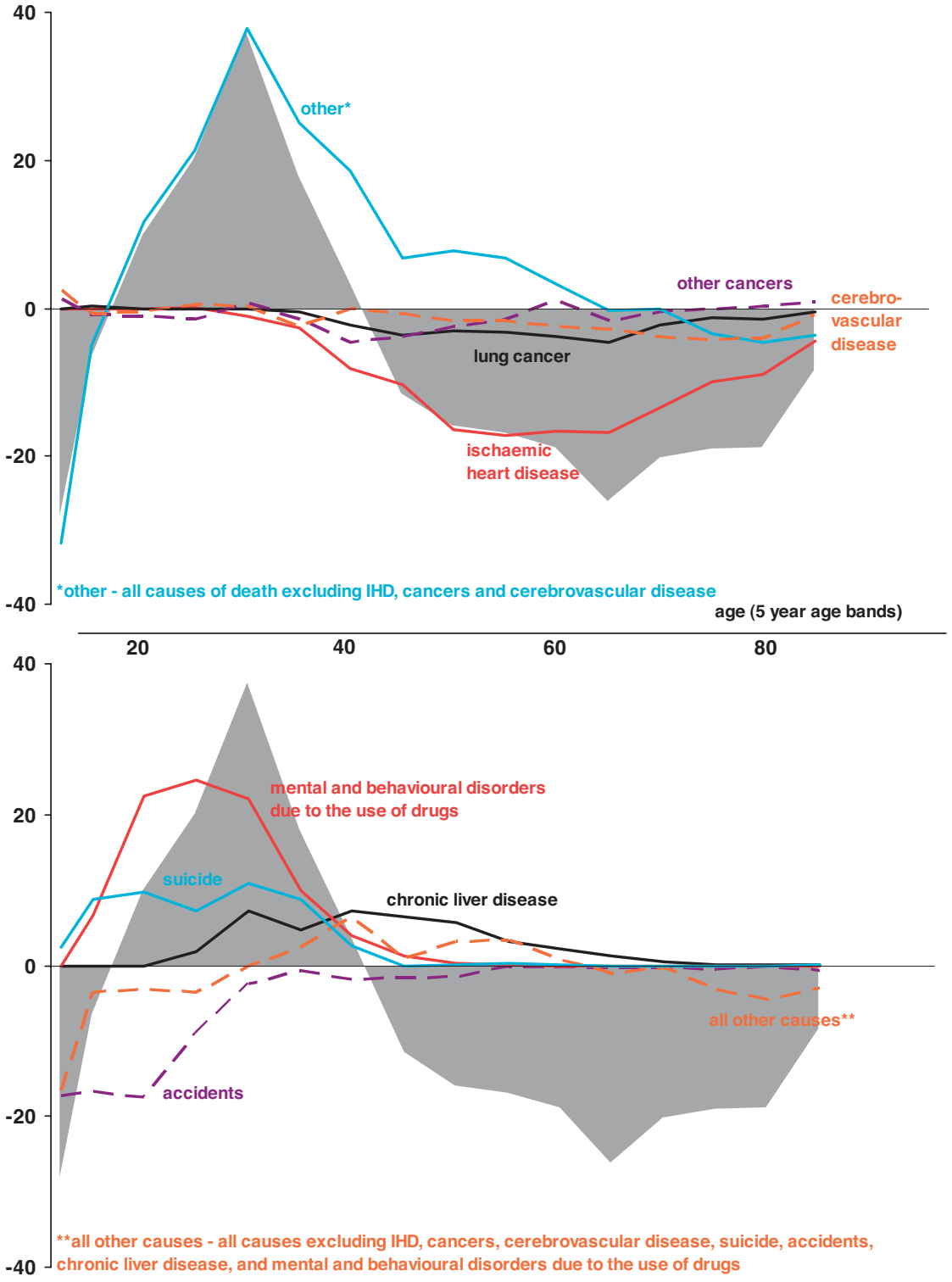
Figures 2.15 and 2.16 describe changes in female death rates in the same way. Between 1981 and 1991, female death rates reduced in most age groups. The largest fall was between ages 40 and 60 with IHD, cerebrovascular disease, breast and other cancers providing the explanation for them at ages over about 25 years. A difference, however, is that “other causes” increased slightly at ages between 20 and 30 and then provided the main contribution to the decline in female rates between ages 25 and 60. The lower graph in figure 2.15 does not provide a complete explanation for this observation. At younger ages, the increase is mainly attributable to changes in suicide rates but chronic liver disease and deaths relating to drug use did not contribute significantly to changing female rates in this earlier period.

This pattern is not replicated in figure 2.16 which describes changes in female deaths between 1991 and 2001. Overall, the reductions in age-specific death rates occurred at rather higher ages than those in 1981-91 with reductions in IHD and cerebrovascular disease deaths again providing the main part of this change. Breast cancer and “other” cancers reduced at younger ages with lung cancer rates remaining fairly constant across the age groups. “Other causes” were proportionately greater in age groups between 20 and 60 in this second period with some explanation being provided by the lower graph in this figure. As with male deaths, mental and behavioural causes due to the use of drugs and suicide were important contributors to the overall increase at the youngest ages; the increase in deaths from chronic liver disease between ages 25 and 60 seen in the graphs for males is also evident although less pronounced. The improvement in death rates from accidents at younger ages, also seen in the male graphs, is a further feature of this pattern.



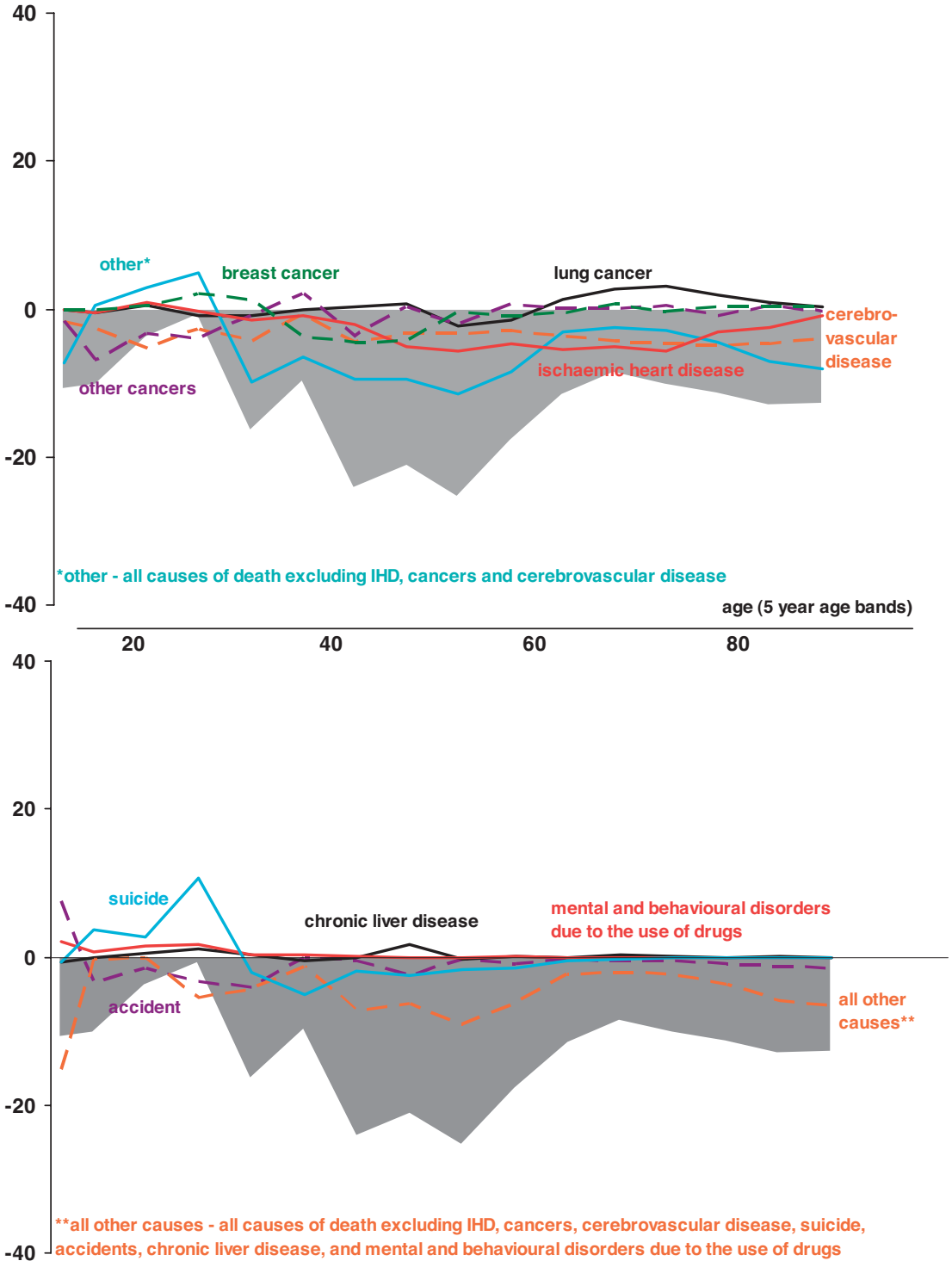
The grey region illustrates the percentage change in all cause mortality. The change in the rate for each cause is expressed as a percentage of the all-cause mortality rate during 1981. This provides a comparison of the contribution of each cause to the overall percentage change in all-cause mortality at each age between 1981 and 1991. For a specific cause of death this also indicates how the all-cause mortality rate would have changed had all other causes shown no change.

Figure 2.13 Percentage change in age- and cause-specific mortality rates among men between 1981 and 1991.



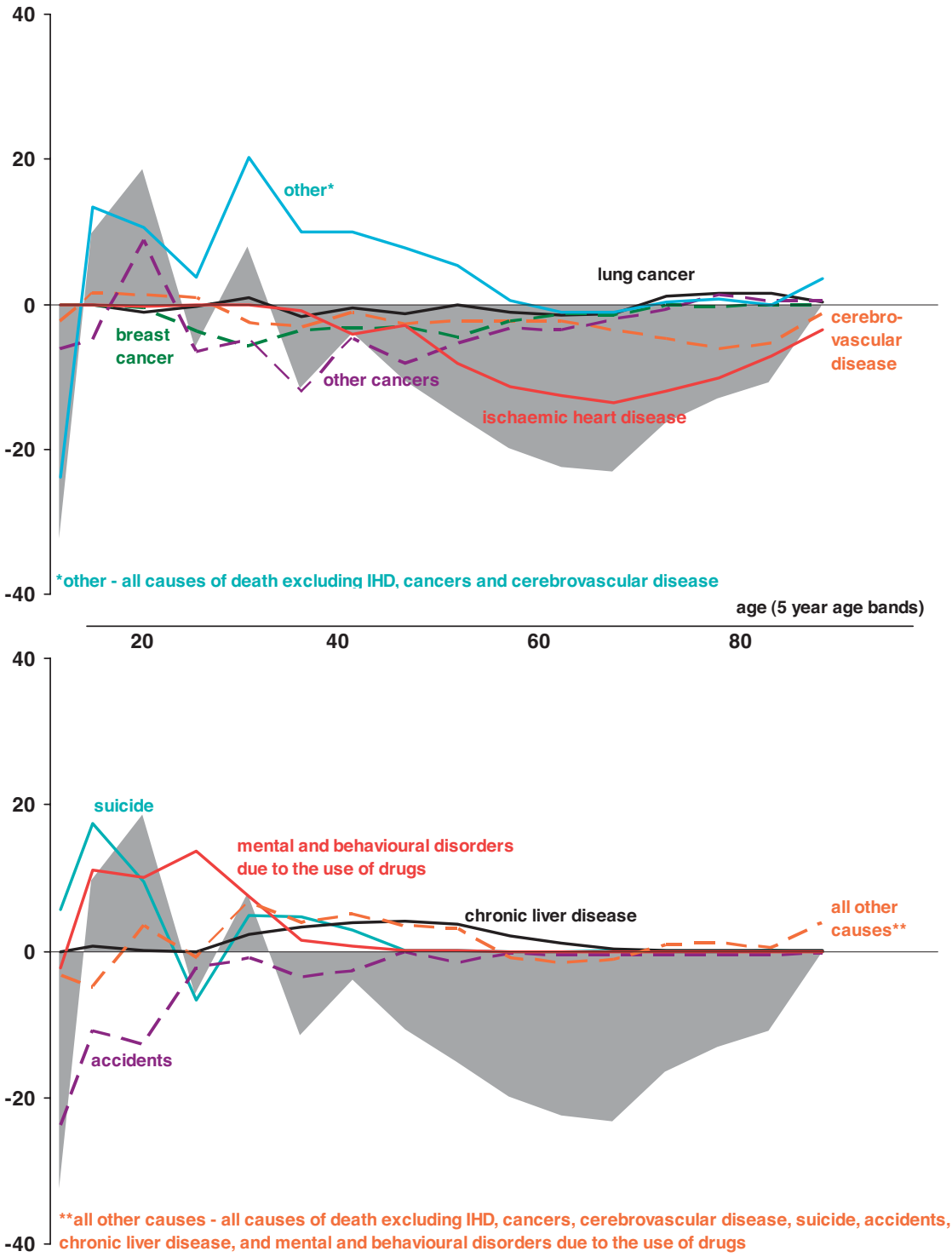
The grey region illustrates the percentage change in all cause mortality. The change in the rate for each cause is expressed as a percentage of the all-cause mortality rate during 1981. This provides a comparison of the contribution of each cause to the overall percentage change in all-cause mortality at each age between 1981 and 1991. For a specific cause of death this also indicates how the all-cause mortality rate would have changed had all other causes shown no change.

Figure 2.14 Percentage change in age- and cause-specific mortality rates among men between 1991 and 2001.



The grey region illustrates the percentage change in all cause mortality. The change in the rate for each cause is expressed as a percentage of the all-cause mortality rate during 1981. This provides a comparison of the contribution of each cause to the overall percentage change in all-cause mortality at each age between 1981 and 1991. For a specific cause of death this also indicates how the all-cause mortality rate would have changed had all other causes shown no change.

Figure 2.15 Percentage change in age- and cause-specific mortality rates among women between 1981 and 1991.



The grey region illustrates the percentage change in all cause mortality. The change in the rate for each cause is expressed as a percentage of the all-cause mortality rate during 1981. This provides a comparison of the contribution of each cause to the overall percentage change in all-cause mortality at each age between 1981 and 1991. For a specific cause of death this also indicates how the all-cause mortality rate would have changed had all other causes shown no change.

Figure 2.16 Percentage change in age- and cause-specific mortality rates among women between 1991 and 2001.

Cause-specific inequalities

The maps comprising figures 2.17 to 2.19 illustrate standardised mortality ratios (SMRs) for local government districts in Scotland and for selected causes of death. As before, the SMRs reflect the death rates of particular areas relative to that for Scotland as a whole which is taken as 100. Figure 2.17 describes the geographical pattern for IHD and lung cancer among men and emphasises the significance of these two conditions for the central belt and the Scottish cities (where, it is worth recalling, the large majority of the Scottish population lives). With the proviso that Eilean Siar is an exception, the two maps appear to suggest a distinction between "urban" Scotland – where SMRs are greater than the Scottish average – and "rural" Scotland where SMRs are generally below the Scottish average.

Different patterns are apparent for other causes of death. Figure 2.18 describes breast cancer and chronic liver disease. For breast cancer, SMRs for the Highland council area, for Perth and Kinross and Angus, and for East and Midlothian are at least 50% greater than that for Scotland as a whole with contrasting low rates in Aberdeenshire and East Ayrshire. Chronic liver disease, on the other hand, is essentially a feature of the central belt and, particularly the Clydeside conurbation where SMRs are similarly 50% greater than the Scottish average.

There is a mixed pattern for suicide (figure 2.19) with higher SMRs in the Highlands, Eilean Siar, and Clydeside although the SMRs for the Borders and Perth and Kinross are also higher than the average for Scotland. An interesting contrast is between the SMR in Highland (137) and that for Argyll and Bute (103) – a difference of 34%. The second map in figure 2.19 concerns deaths from assault; although the actual rates for this group of causes are very low, the excess (districts with SMRs that are at least 50% greater than the Scottish rate) is almost entirely in the Clydeside conurbation. As a consequence, most other Scottish districts have SMRs that are at least 15% below the overall Scottish expectation.

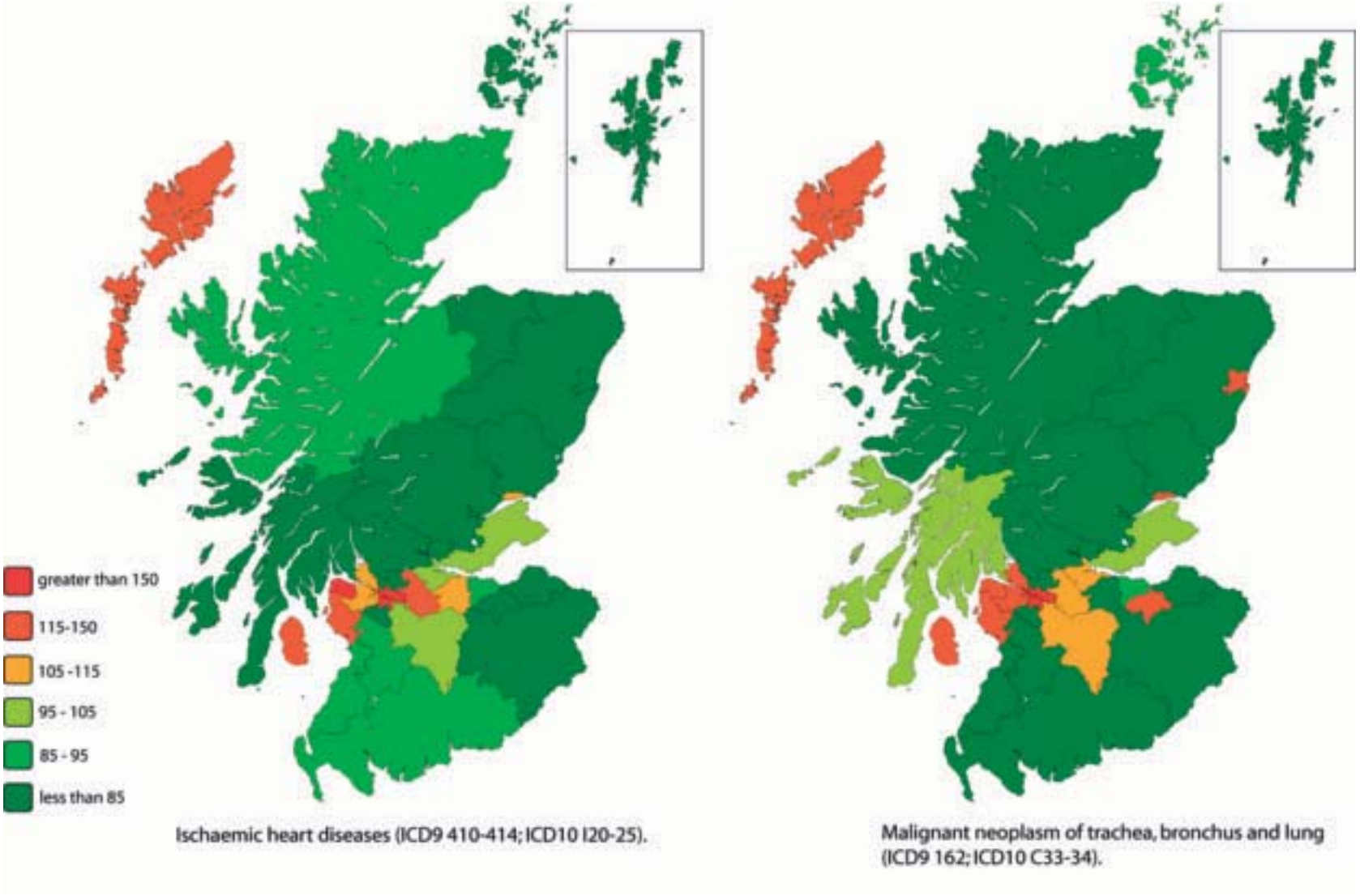


Figure 2.17 Standardised mortality ratios in local council areas for deaths from ischaemic heart disease and lung cancer. Men aged 0-64.

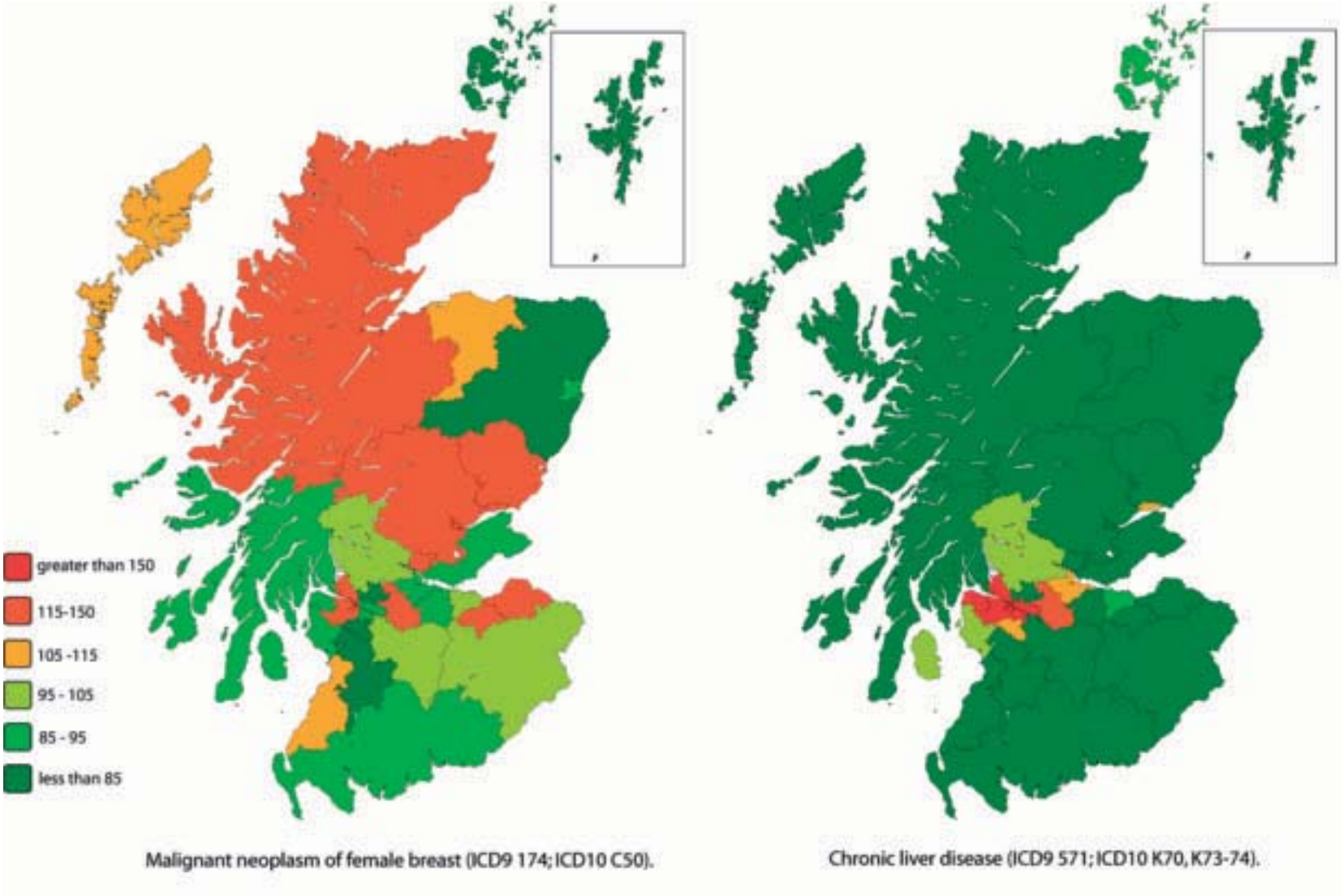


Figure 2.18 Standardised mortality ratios in council areas for deaths from breast cancer among women and liver disease among men.

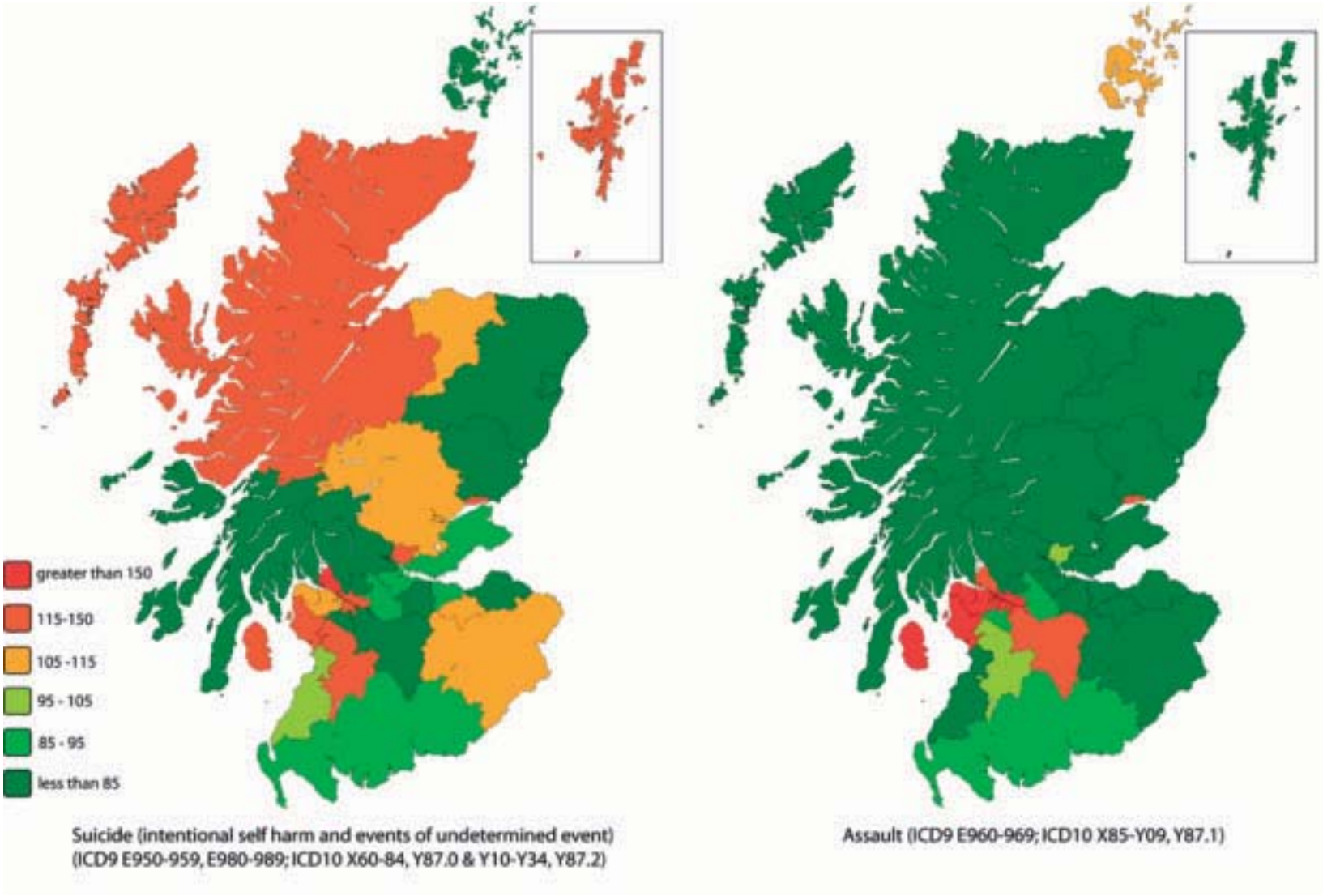


Figure 2.19 Standardised mortality ratios in council areas for deaths from suicide and assault. Men aged 0-64.

Scotland in Europe

In recent years, much attention has been directed towards the popular proposition that Scotland's mortality experience is one of the worst in Western Europe. Tables 2.20 shows the age standardised death rate (where available) for 17 selected European countries (including Scotland) for the years 2000 to 2002.

	Death rates per 100,000 population. Ages 0-64					
	Men			Women		
	2000	2001	2002	2000	2001	2002
Scotland	339	342	338	195	194	190
Austria	287	275	275	142	137	132
Denmark	289			187		
Finland	326	311	301	143	134	133
France	316			136		
Germany	292	283		145	142	
Ireland	292	277		169	159	
Italy	236	234		119	117	
Luxembourg	291	284	296	157	153	146
Netherlands	245			158		
Norway	245	236		143	140	
Portugal	360	353	342	156	152	149
Spain	284	276		115	112	
Sweden	208	207		132	127	
Switzerland	232	222		127	121	
England and Wales		258	256	.	159	156
Northern Ireland	251	250	246	158	156	152

Table 2.20 Comparison of age standardised death rates (per 100,000 population) in 17 selected European countries.

Figure 2.20 explores these differences in greater detail by illustrating age standardised death rates for the same 17 countries in Europe and for local council areas within Scotland. The figure locates Scotland (the red circle) within the group of European countries and does indeed demonstrate that Scotland's death rate is the second highest with only Portugal having a less favourable rate. The right hand part of figure 2.20 provides some explanation of why this is so by showing the 32 local council areas stacked in order of their death rates with Scotland again represented by a red circle. In

this representation, eight local council areas have rates greater than that for Scotland as a whole; the remainder have rates that are less than the Scottish rate. These lower regional rates are approximately comparable with those of other European countries. Countries with lower rates than Scotland have rates that largely fall in the range 200 to 300 per 100,000 population: 18 of the local council areas also fall within this range. The picture is more pessimistic for the eight districts at the upper end of this column. Eight local government districts have death rates that are worse than that of Portugal with the highest district – Glasgow City – having a rate that is almost 60% greater than that of the European country with the highest death rate.

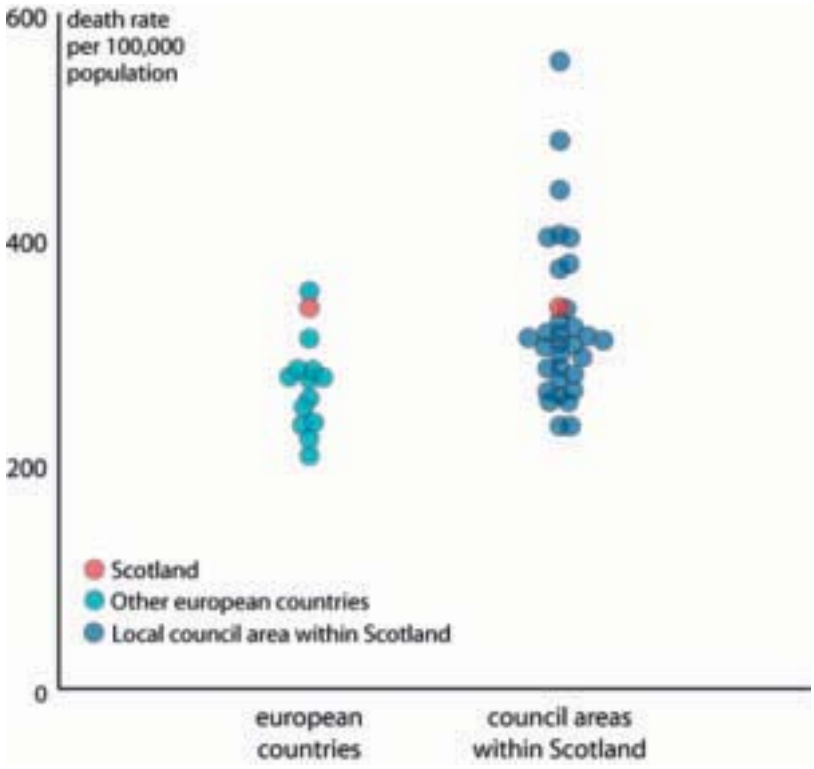


Figure 2.20 Comparison of all-cause death rates in selected European countries*, Scotland and local council areas of Scotland. Men aged 0-64 during 2001.

*Austria, Finland, Germany, Ireland, Italy, Luxembourg, Norway, Portugal, Spain, Sweden, Switzerland, UK: England & Wales, UK: Northern Ireland.

While this analysis might be seen as a less pessimistic picture of mortality rates in Scotland than is sometimes painted, it is worth keeping three important considerations in mind. The first is that these rates apply to men aged 0-64 – that is, to a measure of mortality at young ages which makes a significant contribution to the pattern of mortality in Scotland as a whole. Secondly, the council areas lying above the overall Scottish rate provide a measure of the extent of inequalities not simply in regard to Scotland but, by implication, within Europe. Thirdly, that in terms of population, these districts are not "outliers"; they take in 30% of the Scottish population.

Summary

The overview of Scottish death rates in the period from 1981 to 2001 described in this chapter reflects a pattern of overall improvement although with a deterioration at some ages and for some causes of death. Geographical differences in death rates have persisted and, in some cases, have become greater. The main features of this account may be summarised as follows.

- *Crude death rates:* between 1980 and 2002, the crude all-cause death rate of men declined by 11% in men but by only 2% in women so that the male death rate was 2% lower than that of women by 2002 (figure 2.1); four-fifths of all deaths in 2001 were of people aged 65 years or more; 20% of deaths were at ages 16-64 (figure 2.2).

- *Population*: in 1981, the population structure of Scotland included a fairly pronounced "bulge" across ages 10-34; this continued in the following two decades so that it is evident in the population aged 30-54 in 2001. This population bulge is transient and will disappear in about 60 years. In 1981 males over the age of 70 comprised 7% of the population with the corresponding proportion for women being 12%; by 2001, these proportions had increased to 9% and 14% (figure 2.5). The proportions of the population in the seven regions described in table 2.1 was much the same in each of the three Censuses with the exception of the Clydeside conurbation whose share of the population declined by 3% between 1981 and 2001; this reduction is explained by a fall of 19% in the population of Glasgow (table 2.2). The Clydeside conurbation still includes almost a third of Scotland's population.

- *Dependency:* given the changing demography of Scotland, the ratios between different age groups provide a rough measure of the "dependency" of younger and older age groups on those aged between 16 and 64. In 1981, there were 37 children aged less than 15 years for every 100 aged 16-64; by 2001, this ratio was 30:100. For people aged between 65 and 74, the ratio remained stable at 14:100 but increased from 9:100 to 11:100 in those aged 75 or more years (table 2.3). These ratios are broadly similar in the different Scottish regions (table 2.4).

- *Age specific death rates:* in each inter-Censal decade the death rate for children aged less than 15 fell by about 30% so that the rate in 2001 was only 45% of that for 1981. At older ages, the major reductions were between ages 45 to 74. For men, the rate at ages 45-59 declined by 37% between 1981 and 2001 and by 34% at ages 60-74. Women at these ages experienced similar reductions; these were 34% between ages 45-59 and 28% between ages 60 and 74 (table 2.5). At ages 15-29, the rate for males *increased* by 5% between 1981 and 1991 and by a further 10% between 1991 and 2001. For women at these ages the rate for the earlier period declined by 4% but then increased by 6% in the second decade. The male rate at ages 30-44 fell by 16% in the period 1981 to 1991 but then increased by a similar proportion between 1991 to 2001 so the rate at the end of the period was little changed from that at the beginning. For women, the reduction in the earlier period was 18% but only 4% in the second decade (table 2.5).

- *Regional differences in death rates:* the important features of differences in regional death rates are, firstly, the extent of these differences and, secondly, their persistence over the two decades (table 2.6). As examples, the age-standardised male death rate for the South-East region was 9% below that for Scotland in 1981 and 9% lower in 2001; comparable rates for the Clydeside conurbation were 9% greater than the Scottish rate in 1981 and 17% greater in 2001. For women, the South East rate was 10% less than the Scottish rate in 1981 and 7% less in 2001; in Clydeside, the rates were 10% greater in the first decade and 11% greater in the second period. These underlying differences must be set alongside the reductions that have occurred: there have been major reductions in all regions and, despite different initial rates, these reductions have been of a similar size.

- *Age and sex specific rates in the regions: males:* although there are differences from one region to another, the pattern for males aged 0-14 and for ages 45 and over are broadly similar to the overall Scottish picture (tables 2.7-2.10). The increase in death rates for males aged 15-44, however, was not uniform and occurred later in some regions than in others. As examples, the rate in the North East fell by 13% in the first decade but increased by 20% between 1991 and 2001; in the Eastern region, there was a reduction of 3% in the earlier decade and an increase of 34% in the second. These changes are more striking in the cities within these regions: the death rate in Glasgow for males at these ages was 52% greater in 2001 than in 1981 (table 2.9). Death rates for males aged 30-44 show a similar pattern to that for the younger age group: these rates fell by about 20% in the first decade and then increased by about 20% in the second period (table 2.7).

- *Age and sex specific rates in the regions: females:* the decline in death rates in women was similarly not uniformly distributed across different age groups: as was the case for male children, the death rate for most regions in 2001 at ages under 15 was at least 50% less than that for 1981. Again, as was the case for male deaths, the reduction at ages 45-74 was about a third. An exception to this summary is the Clydeside conurbation where the rate for ages 45-59 reduced by 33% but by only 24% at ages 60-74. The decline in female death rates in the four cities was less than that for the regions in which they are situated: at ages 45-59 and 60-74, the reductions in the Eastern region were 36% and 30% respectively; those for Dundee were 14% and 20%. In the Clydeside conurbation, the reductions in each age group were 33% and 23%; in Glasgow they were 24% and 16%.

- *Deaths in local council areas:* the extent of inequality between local council areas is illustrated in figure 2.9 which describes Standardised Mortality Ratios (SMRs) for male deaths aged less than 65 years. Council areas in most of Scotland in 2001 had SMRs similar to, or less than, that for Scotland as whole; the exceptions were council areas in the Clydeside conurbation and Dundee city where the SMR for some council areas was 50% greater than the Scottish average (Appendix tables A.11). Over time, some council areas had a relatively less favourable experience and do not appear to have shared the overall improvement in Scottish mortality rates: in 1981, the SMR for Glasgow was 132, 145 in 1991 and 164 in 2001. The deteriorating situation in Glasgow is emphasised by comparison with its suburban neighbours. In 1981, the Glasgow SMR was about 55% greater than that for either East Dunbartonshire or East Renfrewshire; by 2001, the

differences had become – respectively – 87% and 95%. SMRs for women were strongly correlated with those for men in each local council area (figure 2.10).

- *Life expectancy:* life expectancy at birth increased by just over 4 years between 1981 and 2001 and by a little over 3 years at ages 60-64 (table 2.12). The differences in death rates noted earlier also found expression in changes in life expectancy in different regions (table 2.13): as illustrations, life expectancy at birth for men in the North East increased from 71 to 75 years and that for women from 77 to 80 years over the period 1981-2001. In contrast, life expectancy in the Clydeside conurbation increased from 68 years to 71 years for men and from 74 years to 77 years for women.

- *Causes of death: males:* the 32% decline in male death rates at ages 0-64 in the period 1981 to 2001 reflects a substantial reduction in deaths from IHD (62%) and from carcinoma of the lung and bronchus (47%); deaths from all other cancers increased by 9%. Male deaths from cerebrovascular disease and those from chronic respiratory disease both reduced by about half (tables 2.14 and 2.15). These improvements need to be set against increases from other causes: deaths from chronic liver disease increased steadily from the mid-1990s so that the age-standardised rate at ages 0-64 was about the same as that of lung cancer in 2001; a similar observation applies to deaths from suicide which increased by 43% over the two decades and also had an age-standardised rate (0-64) similar to that of lung cancer in 2001.

- *Causes of death: females:* death rates for women show a comparable reduction to those for men (33%) although with a rather different pattern of causes (table 2.15). Deaths from IHD were 62% fewer but deaths from lung cancer only decreased by 16%; the death rate for breast cancer was a third less in 2001 than in 1981 and, in contrast to male rates, the death rate for all other cancers reduced by 20%. Although lower than male rates, deaths from chronic liver disease doubled during the 1990s; on the other hand, the rate for suicide declined slightly and was only a third of that for men in 2001.

- *Drugs and alcohol:* one other feature of tables 2.14 and 2.15 concerns changes in the rate of deaths linked to drugs and alcohol; although relatively low (and, perhaps, confused by changes in coding practice in the mid-1990s), deaths from mental and behavioural disorders from these causes rose in the second decade of this Report to become a significant cause in males during the 1990s. Death rates from these causes in women, by contrast, remained low and showed only a small increase during the period.

- *Death rates by age and cause:* tables 2.16-2.19 detail death rates by age and cause which obviously vary. Reductions in deaths from IHD were clearly age-related with reductions of 64% (males) and 65% (females) at ages 45-59 but only 36% and 31% at ages greater than 74. A similar pattern was evident for male lung cancer deaths where the rate fell by 53% at ages 45-59, by 35% between ages 60 and 74 but only 19% at older ages. The pattern for women was different, however: at ages 45-59, the rate was 23% lower in 2001 than in 1981 but 35% greater at ages 60-74 and 135% greater in the oldest age group. The contribution of these – and

other – changes to the overall Scottish rate are illustrated in figures 2.13-2.16 which also illustrate the ways in which improvements at older ages are to some extent offset by increases in such causes as suicide and chronic liver disease at younger ages.

- *Cause specific inequalities:* standardised mortality ratios (SMRs) for selected causes and local council areas in 2001 are described in figures 2.17-2.19. The pattern is a familiar one for IHD, lung cancer and chronic liver disease with higher SMRs in the Clydeside conurbation and the other cities, but with the addition of Eilean Siar. There is a different pattern for breast cancer, however, with greater than average SMRs in the Highlands and Islands and in the Eastern region. Suicide was also more frequent than average in these regions as it was in Clydeside and the Borders. Assault as a cause of death, although with a low overall death rate, was again greater than average in the Clydeside region.

- *Scotland in Europe:* the Scottish death rate is often unfavourably compared with those of other European countries: table 2.20 details the age-standardised rates for men and women for 17 countries demonstrating that the Scottish rate is second only to that for Portugal as the least favourable. Given this observation, figure 2.20 also ranks male death rates for Scottish council areas alongside those for selected European countries. In the main, the rates for council areas fall within the range of European countries (roughly, 200-340 per 100,000 population) with the exception of eight council areas whose rates are approximately twice what might be regarded as a “European norm”. These areas are not outliers; taken together they comprise about 30% of the Scottish population.

Chapter 3
Socio-economic status and mortality

Introduction

For most of the last century, the Registrars General employed a categorisation of social status based on an individual's stated occupation and summarised in various ways; the most succinct summary – the five "social classes" – has been employed as a measure of socio-economic status for many years and has had general currency as an indicator of its influence on mortality. In more recent years, this traditional approach was the subject of different kinds of criticism partly because the nature and character of occupations had changed (for example, the proportion of people in social class V was considerably less than a few decades earlier), partly because of the increasing participation of women in employment, and partly because the skill content of many jobs had changed. A new classification – the National Statistics Socio-economic Classification (NS-SEC) – was introduced at the time of the 2001 Census as a response to these changes. The two classifications are superficially similar but are different in their application and do not "read across" from one to the other. As examples, NS-SEC introduces a new category of "small employers and own account workers" and more generally allocates the earlier social class III (which comprised two fifths of the Scottish population in 1991) to other groupings. Moreover, unlike social class, NS-SEC is not supposed to be a hierarchical classification (although it is often used as such). It cannot be assumed that seemingly similar summary categories are equivalent between one classification and the other.

This change has had important implications for the analysis described in this Report because the differences in death rates evident at the time of the 1991 Census cannot be directly compared with those described for the 2001 Census. For this reason, analyses based on the two Censuses are presented separately. There are, however, other difficulties. The relationship between death rates and individual socio-economic status depends on data collected from two sources and in different contexts: firstly, on reports of current or recent occupation as part of the Census and, secondly, on the recording of occupation at the time of registering a death. In aggregate, the former provide the denominator and the latter the numerator of the death rates reported in this chapter; their utility clearly depends on the completeness of these two sources of data.

The solid circles in figure 3.1 describe the proportions of men who were allocated to one of the Registrar General's social classes at the 1991 Census while the open circles show the proportions of death records with an assigned social class for each age group. In the Census data, about 40% of the 16-19 age group had no recorded social class in either the Census or death records. For ages greater than 65, the proportion with no assigned social class in the Census records rose from about 30% in the 65-69 age group to 54% at ages 70-74. Between ages 20-64, the proportion with an assigned social class from death records ranged between 74% to 97% whilst the proportion of the population classified varied between 83% and 93%. The proportion with no assigned social class in the Census data began to increase at ages greater than 50.

Figure 3.2 compares the allocation of social class to deaths in men and women and demonstrates the reduced likelihood of a record of social class in female deaths: the proportion of death records with an allocated social class was most complete between the ages of 30 and 54 but, even at these ages, social class is not provided in about 20% of deaths.

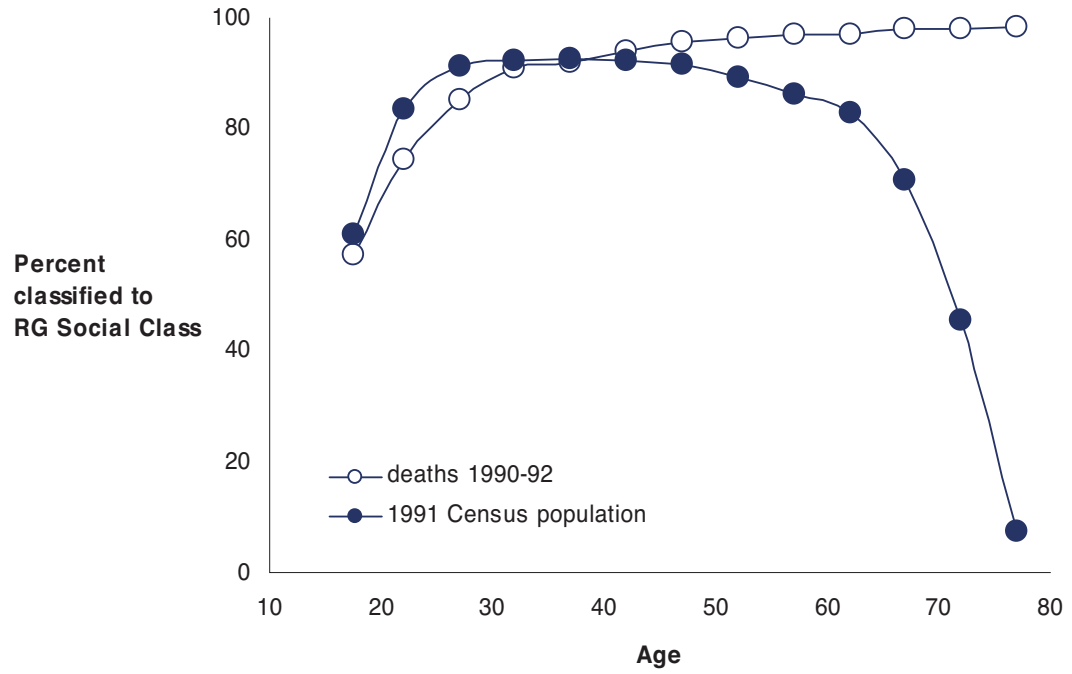


Figure 3.1 Percentage of men who had a social class allocated at the 1991 Census, and the percent that had a social class allocated on death records during 1990-92.

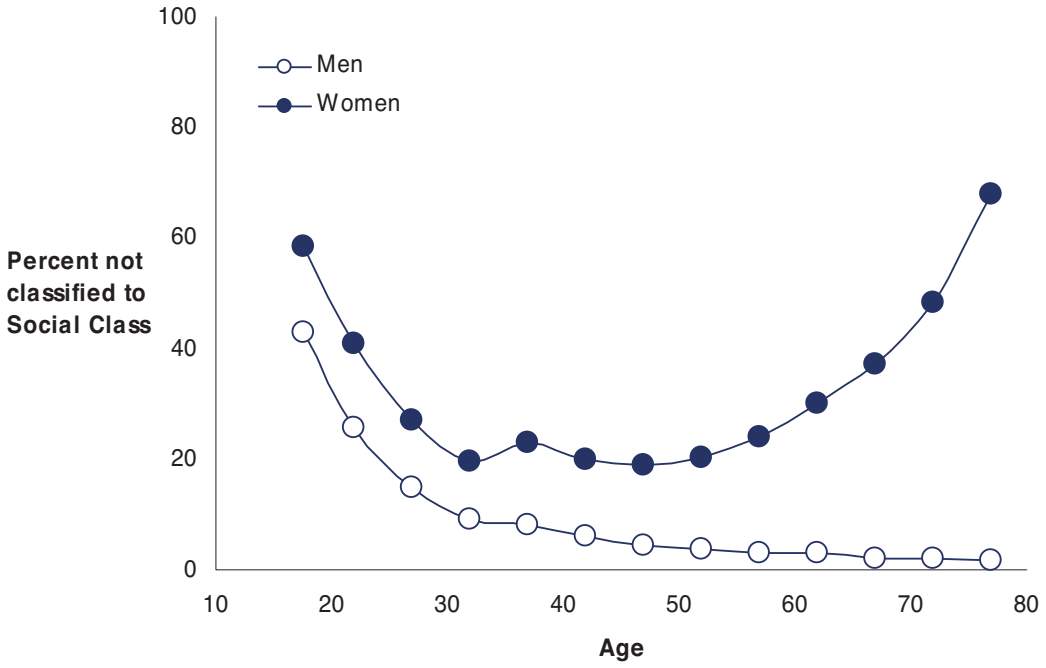


Figure 3.2 Percentage of deaths among men and women which were not classified to a social class. 1990-92.

In order to reduce the biases that the mismatch between classification based on Census records and death records may imply, the description of the relationship between social class and mortality based on the 1991 Census that follows has been restricted to male deaths between the ages of 20 and 59. This restriction does not fully overcome the discrepancies between Census and death records and it is at least possible that unknown biases related to age, place of residence and cause of death will apply to the rates reported in the following tables.

Similar difficulties apply to the allocation of occupation in the new NS-SEC classification used in the 2001 Census. Figure 3.3 describes the proportion of the 2001 male population who were classified to NS-SEC at the 2001 Census and the proportions of male deaths similarly classified in 2001. The proportion of the Census population aged 16-24 classified to NS-SEC in 2001 was considerably less than that allocated to RG classes in 1991: 61% of 16-19 year-olds and 84% of 20-24 year-olds were allocated to a social class in 1991 but these proportions were only 47% and 76% respectively in 2001. It seems likely that this discrepancy is because students are allocated to the "not classified" category of NS-SEC. The other important feature of figure 3.3 is the difference between the assignment of an NS-SEC classification in the Census and in death records. As an illustration, only 4% of the Census population aged 30-34 were not allocated an NS-SEC classification but 22% of deaths in this age group were not classified.

Figure 3.4 reports the percentage of male and female deaths in 2001 that were not classified to NS-SEC. As in 1991, the proportion of unclassified female deaths was higher than the proportion of male deaths at every age and – as in 1991 – this proportion was generally greater than 20%. For these reasons, and with the same cautions as those set out above, the analyses of NS-SEC data for 2001 are similarly restricted to male deaths between the ages of 20 and 59. The mismatch between the two sources may arise in part because of differences between self-report (on the Census) and report by proxy (on the death certificate). In the case of NS-SEC such differences are exacerbated by differences in the detail of the information collected.

Comparisons between the two periods are beset with uncertainties; it is not possible to know, for example, the extent to which changes in the proportions of the population or deaths which could not be classified are a consequence of temporal changes in patterns of working and occupation or a result of changes in the systems of classification. Although they are different in their underlying methods, the Office of National Statistics has provided a "look-up" table which allows an aggregation of the NS-SEC categories to permit an approximation of the RG social classification. It is claimed that these approximations achieve a continuity level of 87%[1] but what is not clear is whether they are sufficiently robust to permit comparisons between the two periods.

If, however, one sets these reservations aside, the following analyses do provide an insight into the social distribution of the Scottish population and of differences in the mortality experience of different social groups. This is particularly true for some causes of death – such as those due to suicide or drug and alcohol use. The previous chapter drew attention to substantial variation in the death rate of different parts of Scotland: this chapter also provides some explanation of the reasons for this variation.

[1] See http://www.statistics.gov.uk/methods_quality/ns_sec/continuity.asp for details regarding the approximate aggregation of NS-SEC categories to social classes.

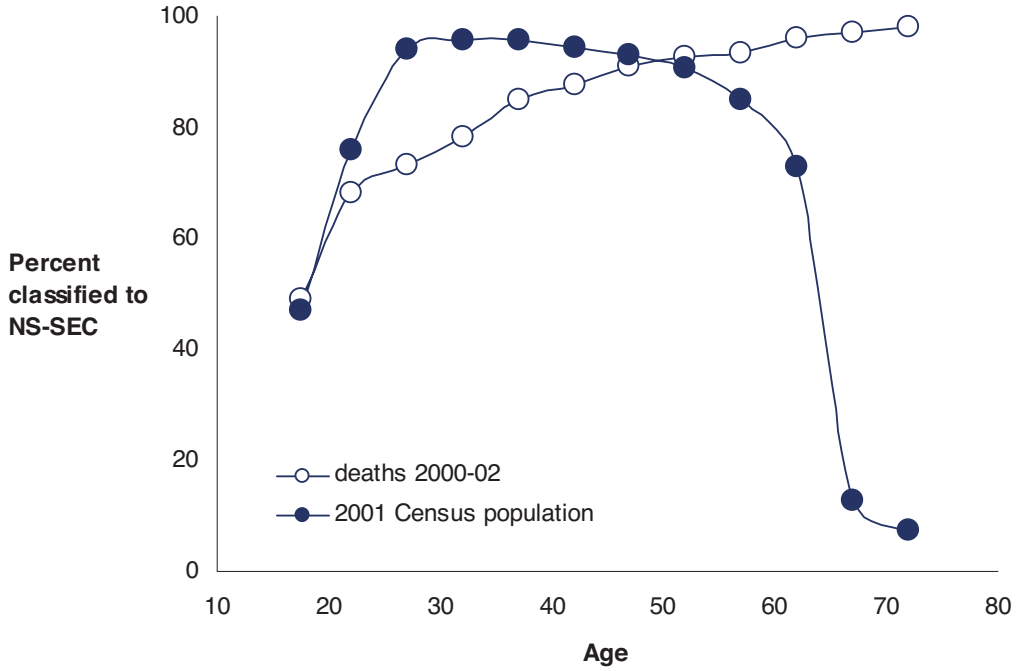


Figure 3.3 Percentage of men who had NS-SEC allocated at the 2001 Census, and the percent that had NS-SEC allocated on death records during 2000-02.

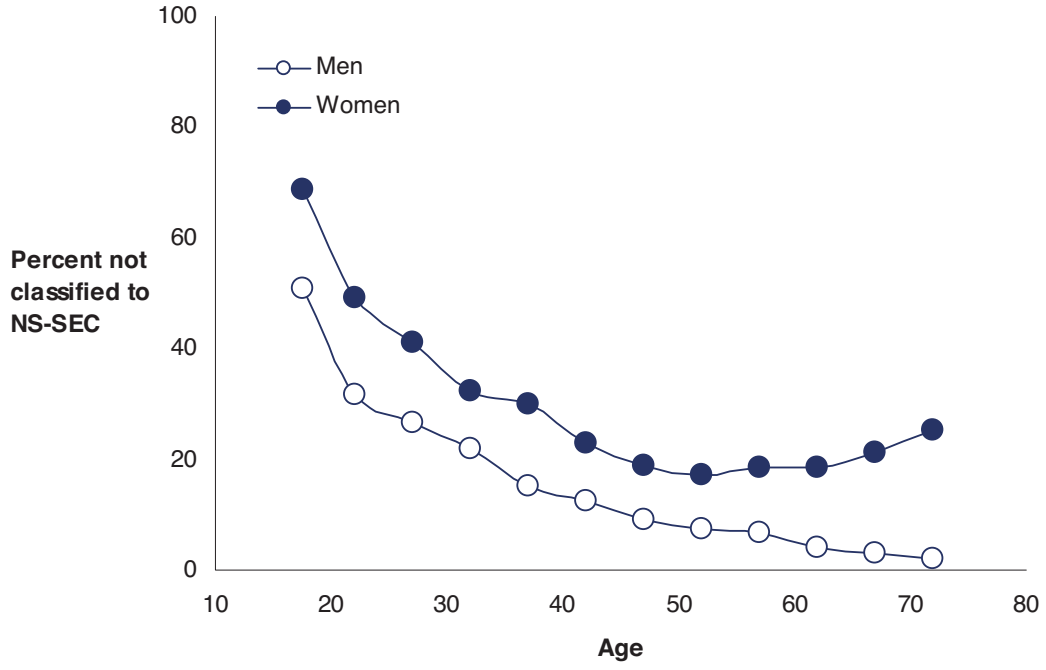


Figure 3.4 Percentage of deaths among men and women which were not classified to NS-SEC. 2000-02.

Mortality in 1991 and Social Class Based on Occupation (Registrar General's Social Classes)

Population composition by social class

Table 3.1 sets out the proportions of the male Scottish population aged between 20 and 59 years in each of the Registrar General's social classes at the time of the 1991 Census. In this Census a 10% sample of records had their recorded occupations coded to a social class. Of the males in this sample, 10% were not classified but the proportion was higher at ages 20-24 (16%) and 55-59 (14%). Of those who were classified, rather less than a third were in professional or managerial occupations (social classes I and II), two fifths were in skilled occupations (30% in skilled manual jobs) and about one fifth in partly skilled or unskilled activities (social classes IV and V). Throughout this section the Census populations, available by 5 year age bands, have been weighted to the GROS population estimates for 1991, and these form the denominators for subsequent analyses.

Social class composition of deaths

Table 3.2 is a comparable table setting out the proportions of male deaths in different age groups and social classes. Fewer deaths were not classified (7%) but this proportion varied strikingly by age group: only 3% of deaths at ages 55-59 were not allocated to a social class but this proportion was 28% at ages 20-24. In this table, 33% of deaths were allocated to social classes IV and V compared to 22% of the population; at ages 20-29, about two fifths (39%) of deaths were classified to partly skilled and unskilled occupations. Although 29% of men aged between 20 and 59 were assigned to social classes I and II, only 17% of deaths were to men in this group of occupations.

All cause mortality rates

Differences of this kind are set out in a more structured way in table 3.3 as age specific death rates. The social class gradients in this table are both consistent and considerable. In 1990-92, at ages 20-29 the death rate for social class V – 276 per 100,000 – was five times that for social class I (55 per 100,000) and nearly three times those for skilled manual occupations (social class IIIM – 97 per 100,000). These ratios reduced somewhat at older ages to 3.8 times those for social class I and 1.9 times those for skilled manual occupations at ages 50-59. This pattern of differences is displayed graphically in figure 3.5 where the distinct experience of unskilled workers is evident. One feature of this graph is the *relatively* comparable experience of other social classes at younger ages: for these categories, a social class influence on death rates only becomes pronounced at ages greater than 39 although a gradient in death rates is present at all ages. In contrast, death rates for social class V are markedly higher at all ages and increasingly diverge with age even from those for social class IV.

		Age								
Social Class based on Occupation		**20-24**	**25-29**	**30-34**	**35-39**	**40-45**	**45-49**	**50-54**	**55-59**	**20-59**
I	**Professional occupations**	4	7	8	8	7	7	6	5	6
II	**Managerial and technical occupations**	12	19	23	28	29	27	24	22	23
IIIN	**Skilled occupations - non-manual**	13	11	10	9	8	7	7	8	9
IIIM	**Skilled occupations - manual**	27	30	32	30	30	31	31	30	30
IV	**Partly Skilled occupations**	20	18	15	13	14	14	15	16	16
V	**Unskilled occupations**	8	7	6	5	4	5	6	6	6
	Not classified*	16	9	8	7	8	9	11	14	10
	All	100	100	100	100	100	100	100	100	100

* includes armed forces, inadequately described, not stated, no occupation

Table 3.1 The percentage distribution of Social Class categories among men. Figures are percentages within each 5 year age group. Scotland 1991.

		Age								
Social Class based on Occupation		**20-24**	**25-29**	**30-34**	**35-39**	**40-45**	**45-49**	**50-54**	**55-59**	**20-59**
I	**Professional occupations**	2	4	4	3	4	4	4	4	4
II	**Managerial and technical occupations**	6	10	15	16	19	17	14	14	14
IIIN	**Skilled occupations - non-manual**	5	5	7	7	8	7	7	7	7
IIIM	**Skilled occupations - manual**	22	26	31	32	33	35	39	38	35
IV	**Partly Skilled occupations**	18	17	15	17	17	17	18	19	18
V	**Unskilled occupations**	18	21	17	16	14	14	14	14	15
	Not classified*	28	16	11	8	6	5	4	3	7
	All	100	100	100	100	100	100	100	100	100

* includes armed forces, inadequately described, not stated, no occupation

Table 3.2 The percentage distribution of social class categories among male deaths. Figures are percentages within each 5 year age group. Scotland 1990-92.

Age group	Social Class based on Occupation		Death rate per 100,000 population Men 1990-92
20-29	I	Professional occupations	55
	II	Managerial and technical occupations	69
	IIIN	Skilled occupations - non-manual	66
	IIIM	Skilled occupations - manual	97
	IV	Partly skilled occupations	109
	V	Unskilled occupations	276
		Not classified*	182
	All		113
30-39	I	Professional occupations	69
	II	Managerial and technical occupations	74
	IIIN	Skilled occupations - non-manual	120
	IIIM	Skilled occupations - manual	155
	IV	Partly skilled occupations	140
	V	Unskilled occupations	408
		Not classified*	154
	All		136
40-49	I	Professional occupations	200
	II	Managerial and technical occupations	210
	IIIN	Skilled occupations - non-manual	318
	IIIM	Skilled occupations - manual	408
	IV	Partly skilled occupations	425
	V	Unskilled occupations	998
		Not classified*	215
	All		348
50-59	I	Professional occupations	615
	II	Managerial and technical occupations	605
	IIIN	Skilled occupations - non-manual	944
	IIIM	Skilled occupations - manual	1,248
	IV	Partly skilled occupations	1,242
	V	Unskilled occupations	2,362
		Not classified*	274
	All		987
20-59	I	Professional occupations	228
	II	Managerial and technical occupations	233
	IIIN	Skilled occupations - non-manual	352
	IIIM	Skilled occupations - manual	463
	IV	Partly skilled occupations	465
	V	Unskilled occupations	987
		Not classified*	205
	All		385

* includes armed forces, inadequately described, not stated, no occupation

Table 3.3 Male age specific death rates per 100,000 population for each social class. Derived for each social class category by combining Registrar General's death counts and Census population counts. Scotland 1990-92.

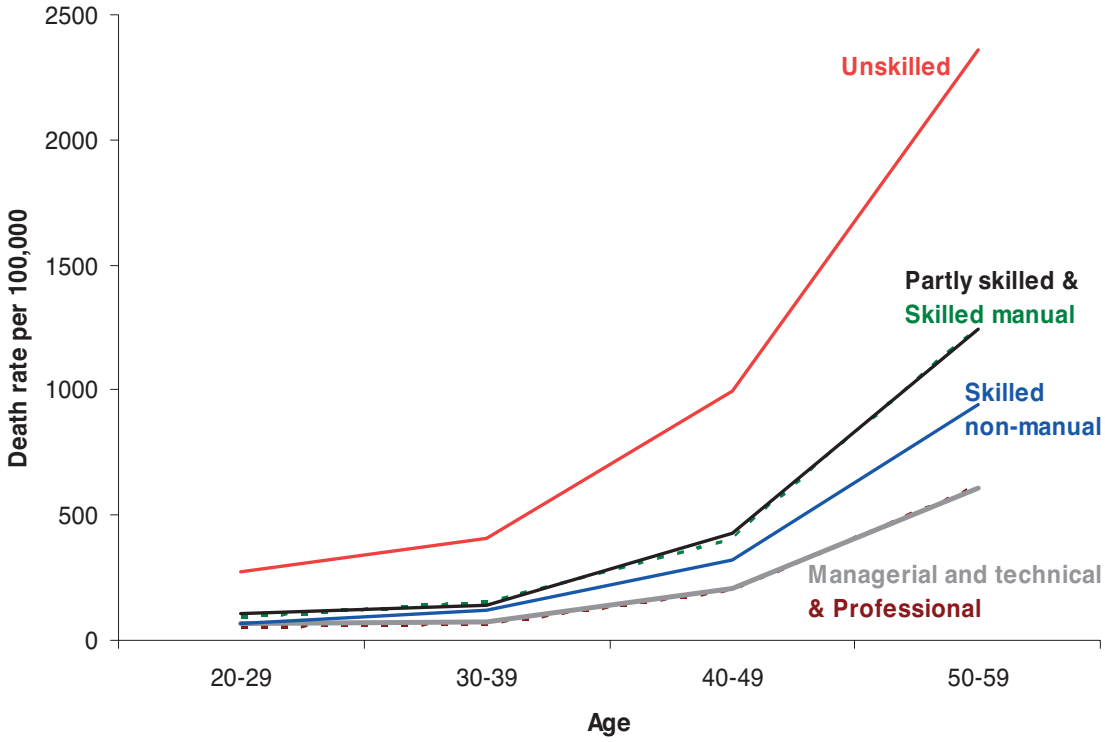


Figure 3.5 Male age specific mortality rates by occupational social class. Scotland 1990-92.

Cause specific mortality rates

Social class specific mortality rates for selected causes of death and standardised for age are set out in tables 3.4 to 3.6 for men aged 20-59. "Not classified" rates are included in these tables for the sake of completeness but it is worth repeating that uncertainties as to the content of this category mean that these rates cannot be interpreted.

The all cause mortality rate among those in unskilled occupations was more than four times that in professional, managerial and technical occupations, nearly three times that of non-manual skilled occupations and more than twice that of those in manual skilled occupations or partly skilled occupations. Class gradients were evident for each cause presented although with differences from one cause to another. In table 3.4, the rate for IHD amongst skilled and partly skilled manual workers (IIIM and IV) was rather more than twice that for social class I but that for social class V was almost five times as great (1:4.6). The IHD mortality rate in social class V (288 per 100,000) was greater than the all-cause rate for social class I and II. A similar gradient was seen for deaths from cerebrovascular disease where the rate for skilled and partly skilled workers was almost three times that of social class I; that for social class V was again five times as great as the rate for professional workers (1:5.4). The class gradients for malignant neoplasms showed comparable patterns: the similar rates for skilled and partly skilled occupations were nearly twice those of professional occupations and the rate for unskilled workers was three times as great. As in the example of IHD, the mortality rate due to malignant neoplasms for unskilled workers was about equal to the all-cause rate for professional occupations.

Social class based on occupation		Cause of death			
		All cause	Ischaemic heart disease (410-414)	Cerebro-vascular disease (430-438)	Malignant neoplasms (140-208)
I	**Professional occupations**	228	63	8	73
II	**Managerial and technical occupations**	233	68	10	68
IIIN	**Skilled occupations - non-manual**	352	106	18	93
IIIM	**Skilled occupations - manual**	463	144	22	131
IV	**Partly skilled occupations**	465	144	23	133
V	**Unskilled occupations**	987	288	43	222
	Not classified	205	31	9	31
	All	385	113	18	104

Table 3.4 Cause specific age standardised mortality (per 100,000 population) within each social class. Men aged 20-59, Scotland 1990-92.

Age-standardised rates for specific neoplasms are set out in table 3.5. The greatest difference is that for malignant neoplasms of the lung and bronchus where the social class V rate was more than five times that for professional occupations and that for skilled and partly skilled occupations almost three times (2.8) that of professional occupations. Rates for malignant neoplasms of the colon and rectum were very similar across most social classes but in social class V deaths from this cause were twice as frequent. The mortality rate for stomach cancer in social class V was about twice that in social classes I and II. Rates for other neoplasms (excluding lung, colorectal and stomach cancers) demonstrated a rather similar gradient to all neoplasms: the rate for skilled and partly skilled occupations was about 75% greater that that for the professions but that for unskilled workers was 160% greater.

Another way of interpreting the rates in table 3.5 is to consider the contribution of different neoplasms to the “all-malignancy” rate for each social class. For social class I, deaths from neoplasms of the lung and bronchus contributed 20% of the rate for all neoplasms; for social classes IIIM and IV this proportion was 34% and was 46% for social class V. It is worth noting, however, that the “other neoplasms” category for social class V in table 3.5 was still 43% greater than the rate for all malignancies in social class I and only 22% less than the rate for all neoplasms for social class IV.

Social class based on occupation		Cause of death				
		Malignant neoplasms (140-208)	Malignant neoplasm of trachea bronchus and lung (162)	Malignant neoplasm of colon and rectum (153, 154.0-154.1)	Malignant neoplasm of stomach (151)	All other malignant neoplasms*
I	**Professional occupations**	73	16	12	5	40
II	**Managerial and technical occupations**	68	15	10	5	38
IIIN	**Skilled occupations - non-manual**	93	22	11	8	52
IIIM	**Skilled occupations - manual**	131	44	13	6	68
IV	**Partly skilled occupations**	133	44	11	8	70
V	**Unskilled occupations**	222	86	22	10	104
	Not classified	31	7	5	1	18
	All	104	32	11	6	54

* excluding lung, colorectal and stomach

Table 3.5 Age standardised mortality (per 100,000 population) from malignant neoplasms within each social class. Men aged 20-59, Scotland 1990-92.

Appendix tables A.29 and A.30 provide the rates for other malignant neoplasms in greater detail, again broken down by social class. The most frequent overall contributors are malignant neoplasms of the oesophagus (7 per 100,000), kidney, renal pelvis, ureter and bladder (6 per 100,000), brain (6 per 100,000), and pancreas (5 per 100,000).

Other age-standardised causes of death are set out in table 3.6 and again show substantial gradients in social class related mortality. Chronic lower respiratory disease was two and a half times more frequent in social class V than in social class IIIM and accounted for 3% of all deaths; chronic liver disease was similarly twice as common as a cause of death in social class V than in social class IIIM with a rate about four times greater than the rate for social classes I and II. Similar patterns are evident for the other causes in this table; the mortality rate from accidents was 55% greater amongst skilled and partly skilled than the rate for non-manual occupations but 300% greater (at 82 per 100,000) in people with unskilled occupations. Chapter 2 drew attention to the increasing importance of suicide and intentional self-harm as a cause of death in Scotland: the relationship of such events to social class in 1991 is highlighted in this table where similar differences to those for accidents are evident. In this table, the suicide rate for social class V is nearly five times as high as that for social classes I and II and two and a half times that for skilled manual workers.

Mental and behavioural disorders attributed to the use of drugs was an uncommon cause of death in 1991 with an overall death rate of less than 1 per 100,000; these deaths were almost entirely confined to people in unskilled occupations where the rate was 5 per 100,000. On the other hand, deaths due to the use of alcohol comprised about 2% of all male deaths between the ages of 20 and 59 with an eight-fold difference between those in professional managerial and technical occupations (3 per 100,000) and unskilled occupations whose rate was 26 per 100,000. Although the death rate as a consequence of assault was generally low at 4 per 100,000, this cause of death accounted for more than 2% of all deaths among unskilled occupations and, with a rate of 21 per 100,000, was as common a cause of death at these ages as colorectal cancers.

Social class based on occupation		Cause of death						
		Chronic lower respiratory diseases (490-494, 496)	Chronic liver disease (571)	Accidents (E800-929)	Intentional self harm & events of undetermined intent (E950-959, E980-989)	Mental and behavioural disorders due to use of drugs (304, 305.2-305.9)	Mental and behavioural disorders due to use of alcohol (291, 303, 305.0)	Assault (E960-969)
I	**Professional occupations**	0	8	20	17	0	3	2
II	**Managerial and technical occupatons**	3	6	20	18	0	3	1
IIIN	**Skilled occupations - non-manual**	7	15	20	24	0	6	2
IIIM	**Skilled occupations – manual**	10	16	32	32	1	7	4
IV	**Partly skilled occupations**	13	12	34	35	0	6	4
V	**Unskilled occupations**	25	33	82	80	5	26	21
	Not classified	3	3	19	29	2	5	3
	All	8	12	29	30	1	6	4

Table 3.6 Age standardised mortality (per 100,000 population) from selected causes within each social class group. Men aged 20-59, Scotland 1990-92.

Mortality in 2001 and the National Statistics Socioeconomic Classification (NS-SEC)

Interpretation of NS-SEC

The NS-SEC, introduced for the 2001 Census, is an occupation-based classification, but it was designed to take in the whole adult population. There are a number of versions of this classification; this Report employs the "analytic" version which has eight classes or categories together with an additional "not classified" category which takes in three main groups: students, occupations not stated or inadequately described, and those that are not classifiable for other reasons. The NS-SEC categories are not hierarchical or ordered in the way that social class based on occupation is and are thus not directly comparable to the social class tables for 1991 presented in the first part of this chapter; rather, they are designed to measure employment relations and positions. This also means that mortality rates cannot be expected to increase from one category to the next in the table.

Population composition by NS-SEC

Table 3.7 describes the distribution of the Scottish male population aged 20-59 at the 2001 Census by age and NS-SEC category. Given the inclusion of students in the "not classified" category it is perhaps not surprising that one quarter of those aged 20-24 were included in this group; at older ages, this proportion was much smaller (4-7%) but rose to 9% at ages 50-54 and 15% at ages 55-59. About 4% in all age groups were classified as having never worked or being long-term unemployed with the consequence that almost a third (29%) of men aged 20-24 and almost a fifth (18%) of men aged 55-59 did not have an occupational category. At intermediate ages, this proportion was of the order of 10%. A further third of the population was employed in managerial or professional occupations and a quarter was described as having semi-routine or routine employment. The proportion described as small employers or own-account workers was low at younger ages but increased to one in eight of the population at later ages. The denominator populations used in the remainder of this chapter are the 2001 Census population estimates, available in 5 year age groups.

NS-SEC composition of deaths

The percentage distribution of deaths in 2001 by age group and NS-SEC category is set out in table 3.8. Overall, 11% of deaths in this period were not classified but this proportion was disproportionately higher at younger ages: 32% of deaths compared to 24% of the population at ages 20-24 and 27% of deaths compared to 6% of the population at ages 25-29. In contrast, at ages 55-59 15% of the population but just 7% of the deaths were not classified. There were other differences, however; 18% of deaths (but 36% of the population) were classified as having managerial or professional occupations whereas 51% of deaths but only 28% of the population were allocated to semi-routine or routine occupations.

All cause mortality rates

These discrepancies are explored in greater detail in table 3.9 which sets out death rates (per 100,000) for 10-year age groups. The rates for small employers and own-account workers are similar to those for professional and managerial occupations (ranging from 171 to 191 per 100,000) whereas those for intermediate, lower supervisory and technical occupations were just over twice as great (411-414 per 100,000). The rate for those in semi-routine occupations, at 567 per 100,000, was 38% greater than that for lower supervisory occupations; that for routine occupations (747 per 100,000) was 80% greater than the lower supervisory rate.

National Statistics - Socioeconomic classification	Age group								
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	20-59
Higher managerial and professional occupations	5	12	13	14	14	14	13	11	12
Lower managerial and professional occupations	11	20	22	23	22	23	21	18	20
Intermediate occupations	9	9	7	6	6	5	5	4	6
Small employers and own account workers	2	5	8	11	12	12	13	13	10
Lower supervisory and technical occupations	13	15	14	14	14	14	13	12	14
Semi-routine occupations	15	12	11	10	9	9	9	10	11
Routine occupations	16	15	14	14	13	13	14	14	14
Never worked and long-term unemployed	5	5	5	4	4	3	3	3	4
Not classified*	24	6	4	4	6	7	9	15	9
All	100	100	100	100	100	100	100	100	100

*Students, occupations not stated or inadequately described, and not classifiable for other reasons are added as 'Not classified'

Table 3.7 The percentage distribution of NS-SEC categories among men. Figures are percentages within each 5 year age group. Scotland 2001.

National Statistics - Socioeconomic classification	Age group								
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	20-59
Higher managerial and professional occupations	3	3	4	5	6	5	7	6	6
Lower managerial and professional occupations	5	7	8	8	10	12	12	11	11
Intermediate occupations	4	6	7	6	6	6	6	5	6
Small employers and own account workers	2	2	4	4	5	6	7	7	6
Lower supervisory and technical occupations	11	12	10	14	14	15	16	16	15
Semi-routine occupations	19	17	14	14	15	16	16	17	16
Routine occupations	23	25	29	33	29	30	29	30	29
Never worked and long-term unemployed	2	2	2	1	1	1	1	0	1
Not classified	32	27	22	15	13	9	7	7	11
All	100	100	100	100	100	100	100	100	100

Table 3.8 The percentage distribution of NS-SEC categories among male deaths. Figures are percentages within each 5 year age group. Scotland 2000-02.

	Age group				
National Statistics - Socioeconomic classification	**20-29**	**30-39**	**40-49**	**50-59**	**20-59**
Higher managerial and professional occupations	49	60	134	456	170
Lower managerial and professional occupations	53	59	163	512	191
Intermediate occupations	69	159	361	1,119	414
Small employers and own account workers	74	73	164	459	188
Lower supervisory and technical occupations	105	144	355	1,087	411
Semi-routine occupations	171	234	553	1,367	567
Routine occupations	203	372	747	1,738	747
Never worked and long-term unemployed	55	64	65	112	73
Not classified	384	705	531	481	526
All	130	170	328	829	356

Table 3.9 Age specific death rates (per 100,000 population) for each NS-SEC category for men. Derived for each NS-SEC category by combining Registrar General's death counts and Census population counts. Scotland 2000-02.

The gradient between these occupational categories, and the proportionate differences between them, is evident in all age groups although more pronounced at ages 30-39. In this age group, the death rate for the semi-routine category was four times that of the higher managerial and professional group; the rate for routine occupations was six times the professional rate.

The rates in table 3.9 are displayed graphically in figure 3.6. The rates for the higher managerial, small employer, and lower managerial categories are parallel and low, beginning to rise with a little divergence from the 40-49 age group. The rates for the remaining categories are distinct from the first group and begin to diverge from each other by about age 30 to create the substantial discrepancies described in table 3.9.

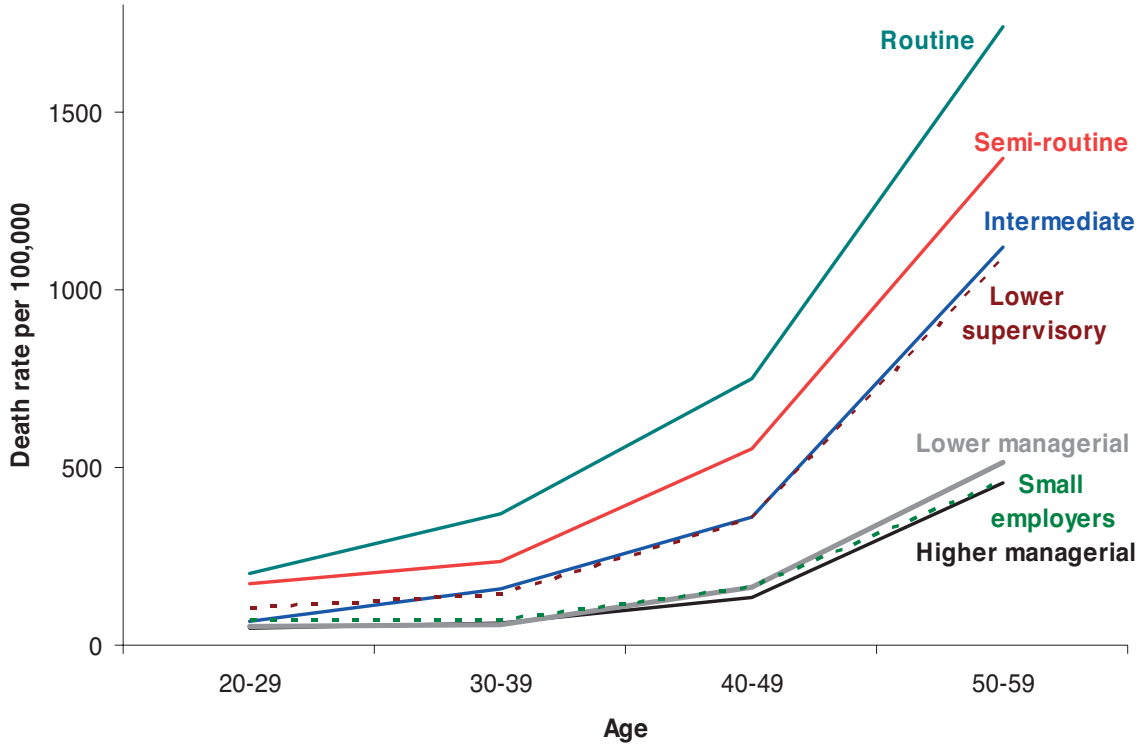


Figure 3.6 Male age specific mortality rates by NS-SEC. Scotland 2000-02.

Cause specific mortality rates

Tables 3.10-3.12 comprise age-standardised rates (per 100,000) for selected causes of death for men aged 20-59 in 2001 and the NS-SEC categories.

Ischaemic heart disease (IHD) was the cause of 18% of deaths in this period; the occupational category rates in table 3.10 show a gradient that is similar to that for all cause deaths as do those for cerebrovascular disease. For IHD, the rate for routine occupations was five times that for professional occupations; the rate for routine occupations for cerebrovascular disease was about four times as high. The pattern for malignant neoplasms (which contributed 24% of deaths) was less clear but still evident; the rate in semi-routine occupations was about two and a half times the professional rate and that for routine occupations almost three times. As in earlier examples, the death rate from malignant neoplasms in the routine occupations category was close to the all-cause rate for managerial and professional occupations. Within every NS-SEC category the IHD mortality rate was lower than that for malignant neoplasms; this is in line with the steep decline in IHD mortality under the age of 65 noted in chapter 2.

Death rates for selected malignant neoplasms are described in table 3.11 where the gradient for all malignancies described continued to be apparent. The gradient for neoplasms of the trachea, bronchus and lung was most pronounced with the rate for routine occupations being almost five times that for higher managerial and professional occupations. At 53 per 100,000 the mortality rate for lung cancer among routine occupations was close to that for all malignant neoplasms in higher managerial and professional occupations (58 per 100,000). Although only about half that for routine occupations, the rate for lower supervisory and technical occupations was still two and a half times that of professional occupations. In an alternative view, lung cancer

contributed 19% to the overall malignancy rate for the professional category; 24% to the overall rate for lower supervisory or technical occupations and 33% of the rate for routine occupations.

The occupational gradients for the other three malignancies in table 3.11 were less pronounced but it was still the case that the rate for neoplasms of the colon and rectum in the routine occupations category was twice that of the professional group and that malignancies of the stomach were four times as frequent in the former group than in the latter. For all other malignancies, the death rates in the routine and semi-routine groups were about twice those in both the higher managerial and lower managerial categories. Perhaps reflecting the high rate of lung cancer in the routine occupational category, all other malignancies contribute only 53% of cancer deaths in this group but 66% of those in the managerial categories.

	Cause of death			
National Statistics - Socioeconomic classification	All cause	Ischaemic heart disease (I20-25)	Cerebro-vascular disease (I60-69, G45)	Malignant neoplasms (C00-97)
Higher managerial and professional occupations	170	30	6	58
Lower managerial and professional occupations	191	37	9	61
Intermediate occupations	414	86	15	116
Small employers and own account workers	188	31	9	57
Lower supervisory and technical occupations	411	78	14	113
Semi-routine occupations	567	114	20	139
Routine occupations	747	148	26	163
Never worked and long-term unemployed	73	8	2	8
Not classified	526	50	16	37
All	356	65	13	85

Table 3.10 Cause specific age standardised mortality (per 100,000 population) within each NS-SEC category. Men aged 20-59, Scotland 2000-02.

	Cause of death				
National Statistics - Socioeconomic classification	Malignant neoplasms (C00-97)	Malignant neoplasm of trachea bronchus and lung (C33-34)	Malignant neoplasm of colon and rectum (C18-20)	Malignant neoplasm of stomach (C16)	All other malignant neoplasms*
Higher managerial and professional occupations	58	11	7	2	38
Lower managerial and professional occupations	61	12	7	3	40
Intermediate occupations	116	25	19	6	66
Small employers and own account workers	57	13	4	3	36
Lower supervisory and technical occupations	113	27	11	5	70
Semi-routine occupations	139	38	16	5	80
Routine occupations	163	53	15	9	87
Never worked and long-term unemployed	8	4	0	1	3
Not classified	37	9	4	1	23
All	85	22	9	4	51

* excluding lung, colorectal and stomach

Table 3.11 Age standardised mortality (per 100,000 population) from malignant neoplasms within each NS-SEC category. Men aged 20-59, Scotland 2000-02.

Age standardised death rates for these other malignancies and for each of the NS-SEC categories are detailed in Appendix tables A.34-A.35. The major contributors are carcinomas of the oesophagus (7 per 100,000), kidney (5 per 100,000) and brain (5 per 100,000).

Age standardised mortality rates for other causes are set out in table 3.12. Chronic lower respiratory disease accounted for just under 2% of deaths in 2001 but displays a very steep gradient in this table; the rate for routine occupations was almost ten times that for both managerial/professional categories and twice that of lower supervisory occupations. Similarly steep gradients are evident for the other causes included in this table: the rate for chronic liver disease rose from 9 per 100,000 in the higher managerial/professional category to 74 per 100,000 for the routine occupation category – a ratio of 1:8.2. In the higher managerial group, this cause contributed 5% to the overall death rate but 10% of a very much higher death rate in the routine occupations group. A very similar pattern is evident for deaths from intentional self-harm (or suicide) in men aged 20-59; the rate for routine occupations was five times that for higher managerial occupations and twice that for lower supervisory and technical occupations. In terms of its contribution to the overall death rate, this cause accounted for 8% of higher managerial deaths, 9% of lower supervisory deaths and 11% of routine occupation deaths; by way of comparison, the corresponding proportions for lung cancer were 6%, 7% and 7% respectively.

Although of little significance in 1991, deaths from mental disorders due to drugs or alcohol assumed greater importance in 2001, again with a strong occupational gradient. Deaths related to drug use were three times as common in males with routine occupations as in those in the supervisory or technical category whilst deaths related to alcohol use were twice as common. Similarly, deaths attributed to assault were very low in all occupational categories (in the range 1-6 per 100,000) except for the routine occupational category where the rate was 13 per 100,000 – equivalent, that is, to the Scottish rate for malignant neoplasms of the colon and rectum. Assault accounted for nearly 2% of mortality in this group.

	Cause of death						
National Statistics - Socioeconomic classification	Chronic lower respiratory disease (J40-47)	Chronic liver disease (K70, K73-74)	Accidents (V01-X59, Y85, Y86)	Intentional self harm & events of undetermined intent (X60-84, Y87.0, Y10-Y34, Y87.2)	Mental and behavioural disorders due to use of drugs (F11-16, F18-19)	Mental and behavioural disorders due to use of alcohol (F10)	Assault (X85-Y09, Y87.1)
Higher managerial and professional occupations	1	9	14	15	1	3	1
Lower managerial and professional occupations	3	14	11	17	2	3	1
Intermediate occupations	8	41	22	30	7	10	1
Small employers and own account workers	4	12	13	20	5	5	2
Lower supervisory and technical occupations	9	35	29	37	10	16	3
Semi-routine occupations	12	46	32	56	18	22	6
Routine occupations	18	74	42	79	30	27	13
Never worked and long-term unemployed	1	6	5	7	14	2	3
Not classified	7	48	26	82	80	22	13
All	7	30	22	37	15	12	5

Table 3.12 Cause specific age standardised mortality (per 100,000 population) within each NS-SEC category. Men aged 20-59, Scotland 2000-02.

Regional Differences in Mortality by the National Statistics Socioeconomic Classification

Chapter 2 of this Report described quite striking differences in death rates in different parts of Scotland, particularly in regard to the Clydeside Conurbation and the cities of Dundee and Glasgow. Given the differences in the death rates of different occupation groups described above, the question of the extent to which regional or city differences can be attributed to the social (occupational) characteristics of their populations or to other factors is an important one for developing an understanding of the pattern of deaths in Scotland. This is a large question which will be considered in greater detail in later chapters; the analyses in the remaining part of this chapter focus on the distribution of NS-SEC categories in different Scottish regions or cities and the death rates associated with them. An alternative perspective, that of area-based measures of social disadvantage, is considered in the next chapter.

Regional population composition by NS-SEC

Differences in the social composition of the regions and cities of Scotland at the 2001 Census are described in tables 3.13 and 3.14. As with earlier tables, this analysis is restricted to males aged between 20 and 59 years. Although with small differences, the distribution of categories within each is broadly similar: the South East and the North East had a greater proportion of managerial and professional occupations (40% and 36%). Conversely the East, Central and South West regions had higher percentages of males employed in semi-routine or routine occupations (27%). The Clydeside Conurbation is distinct in having a higher proportion in the “not classified” category (12%) together with more who had never worked or were long-term unemployed (6%) when compared to other regions. In Clydeside, 30% of the population were occupied in the two professional or managerial groups and 25% were employed in semi-routine or routine occupations.

Differences of this kind are more pronounced in the populations of the four main cities. In table 3.14, the proportion employed in managerial or professional occupations is 44% in Edinburgh and 37% in Aberdeen compared to only 27% in Glasgow and 26% in Dundee. Only 17% of the Edinburgh population was employed in semi-routine or routine occupations; these percentages were 23%, 27% and 24% respectively in Aberdeen, Dundee and Glasgow. The “unclassified” proportion was especially high at 17% in both Glasgow and Dundee when compared to 9% for the whole of Scotland and 11% and 13% for Aberdeen and Edinburgh. The percentage who had never worked or were long-term unemployed was similarly high in Dundee and Glasgow (7% and 8%). One implication of this last observation is that almost a quarter of the male populations of Dundee and Glasgow are excluded from the occupational analyses that follow.

Regional mortality differences by NS-SEC

All cause mortality rates for males aged 20-59 in 2001 for the seven Scottish regions are set out in table 3.15. Some aspects of this table suggest that there may have been variation in the use of the NS-SEC classification in different regions: as examples, the rate for those not classified in the Central Region (338 per 100,000) was 36% below the Scottish rate for this category and almost 40% below that for the South East. The rate for those who were long-term unemployed or had never worked in Clydeside was two and a half times that for Scotland, and almost four times that for the Eastern region.

	Region						
National Statistics - Socioeconomic classification	Highlands and Islands	North East	Clydeside conurbation	Central	East	South West	South East
Higher managerial and professional occupations	10	15	11	12	11	10	17
Lower managerial and professional occupations	20	21	19	21	20	19	22
Intermediate occupations	6	5	7	6	6	6	7
Small employers and own account workers	16	10	8	9	10	11	9
Lower supervisory and technical occupations	16	16	12	15	14	15	10
Semi-routine occupations	10	10	11	11	12	11	10
Routine occupations	15	14	14	16	15	16	11
Never worked and long-term unemployed	3	2	6	3	4	4	3
Not classified	5	7	12	7	9	8	10

Table 3.13 The distribution of NS-SEC categories across major regions of Scotland. Figures are percentage of male area population aged 20-59, 2001.

	City				
National Statistics - Socioeconomic classification	Aberdeen	Dundee	Edinburgh	Glasgow	All Scotland
Higher managerial and professional occupations	17	9	20	10	12
Lower managerial and professional occupations	20	16	23	17	20
Intermediate occupations	6	6	8	6	6
Small employers and own account workers	6	7	8	7	10
Lower supervisory and technical occupations	14	12	8	10	14
Semi-routine occupations	10	13	8	11	11
Routine occupations	13	14	8	13	14
Never worked and long-term unemployed	2	7	3	8	4
Not classified	11	17	13	17	9

Table 3.14 The distribution of NS-SEC categories across major cities of Scotland. Figures are percentage of male area population aged 20-59, 2001.

National Statistics - Socioeconomic classification	Region						
	Highlands and Islands	North East	Clydeside conurbation	Central	East	South West	South East
Higher managerial and professional occupations	200	167	180	159	181	178	140
Lower managerial and professional occupations	217	168	212	161	191	190	180
Intermediate occupations	476	376	453	462	379	389	378
Small employers and own account workers	186	215	200	213	158	201	158
Lower supervisory and technical occupations	429	326	553	387	361	359	350
Semi-routine occupations	483	452	737	536	466	515	545
Routine occupations	569	551	1,104	638	617	624	665
Never worked and long-term unemployed	8	11	146	63	38	20	0
Not classified	516	500	610	338	529	496	540
All	324	297	465	328	321	324	302

Table 3.15 Age standardised death rates per 100,000 population by NS-SEC categories in the major regions of Scotland. Men aged 20-59, 2000-02.

	City				
National Statistics - Socioeconomic classification	Aberdeen	Dundee	Edinburgh	Glasgow	All Scotland
Higher managerial and professional occupations	154	189	145	232	170
Lower managerial and professional occupations	163	210	196	249	191
Intermediate occupations	409	504	417	527	414
Small employers and own account workers	303	119	127	246	188
Lower supervisory and technical occupations	375	432	427	703	411
Semi-routine occupations	570	488	663	884	567
Routine occupations	736	1,032	807	1,398	747
Never worked and long-term unemployed	22	98	0	245	73
Not classified	449	560	579	688	526
All	357	420	328	582	356

Table 3.16 Age standardised death rates per 100,000 population by NS-SEC categories in the major cities of Scotland. Men aged 20-59, 2000-02.

These reservations are pertinent to the occupational category rates in table 3.15, but even then the particular circumstances of the Clydeside conurbation are apparent. When considered in comparison with the mortality rates for Scotland as a whole, the rates for Clydeside are higher in each of the occupational categories and especially so in the supervisory, semi-routine and routine groups: respectively, these rates were 34%, 30% and 48% greater than the all-Scotland rate. In the North East, death rates were lower in all NS-SEC categories except that for small employers and own-account workers where the rates were higher than that for Scotland; Central Scotland had a similar differential from Scotland with the exception that the rate was also higher among intermediate occupations. Rates for managerial, professional and intermediate occupations were higher in the Highlands and Islands region. In the Eastern region, the rates for semi-routine and routine occupations were 18% lower than the overall Scottish rate which is, of course, increased by the high rates observed in Clydeside coupled with the large number of people in these occupational groups that live in the region.

Table 3.16 describes death rates for the four major cities. The striking feature of this table is the higher rates in each occupational category in Glasgow: the overall rate for Glasgow was 63% greater than the all-Scottish rate. An excess of 27-36% was seen for the managerial/professional categories, for intermediate occupations and for small employers. The rates for lower supervisory and technical occupations, semi-routine occupations and routine occupations diverged further from the Scottish rate at 71%, 56% and 87% respectively. In each occupational category the death rate for Glasgow was of the order of 20-30% greater than that for the Clydeside conurbation. At the same time, the proportions of the population in different occupational categories in Glasgow and Clydeside in those groups with the highest rates do not differ substantially between Clydeside and Glasgow or from the whole of Scotland (tables 3.13 and 3.14). A general interpretation of the higher rates in either Clydeside or, particularly, Glasgow is that of a greater risk of death in these populations rather than the simpler explanation of differences in the distribution of population groups.

Occupational category rates in the other three main Scottish cities show much smaller discrepancies. In Aberdeen, the rates for managerial and professional occupations were between 9 and 15% lower than the over-all Scottish rate with those for other groups being very close to the corresponding over-all rates. The exception in Aberdeen was the rate for small employers and own-account workers which was 61% greater than that for Scotland. This observation differs from the rates for Dundee and Edinburgh, and – as in earlier examples – may reflect differences in the way the classification has been used or in the mix of occupations included in this category in different localities. Mortality in Dundee was generally above average with the rate for intermediate occupations being 22% greater than the Scottish rate and that for routine occupations 38% greater. Among the higher managerial and professional occupations in Edinburgh, the rate was 15% lower than the Scottish rate and that for small employers 32% lower. The rate for semi-routine occupations was 17% higher and that for routine occupations 8% greater than that for Scotland; given the greater proportion of managerial and professional occupation in Edinburgh (43% compared to 27% in Glasgow and 23% in Dundee), these differences explain the lower overall death rate for Edinburgh at 8% below that for Scotland.

Summary

This chapter has set out patterns of mortality alongside measures of individual social class or socio-economic status separately for 1991 and 2001. The use of such measures was problematic; however, it has still been possible to provide an insight into some aspects of mortality and changes in death rates. The main points raised in the chapter can be summarised as follows:

- *Incomplete nature of the data:* low rates of classification for populations and deaths, and especially for women, led to the restriction of the analysis to males aged between 20 and 59 years. When interpreting the data described above, it would have been helpful – for example – to have included information about deaths between the ages of 60 and 70 and to have included information about the experience of women.

- *Comparisons over time:* it has not been possible to make direct comparisons between the earlier "social class" based analysis based on the 1991 Census and the NS-SEC approach employed in the Census of 2001. It is evident that gradients in the risk of death are as evident in the newer approach as in the earlier one but it is difficult to go further with a direct comparison between (say) the former social classes IV and V (comprising 33% of the male population aged 20-59 in 1991) and the semi-routine and routine occupations categories of NS-SEC which comprised only 25% of the comparable population in 2001.

- *Changing inequalities by occupational class:* given the above qualifications, the long-standing inequalities in the death rates of different social classes persisted in the second period of this analysis. In 1991, the ratio between the death rates for social classes I and II those for social classes IV and V was 1:2.9 and that between social class III and the two lower classes was almost 1:2. Although not directly comparable, the ratio between the rates for managerial and professional categories and the semi-routine and routine categories of NS-SEC in 2001 was 1:3.7; the ratio between these categories and the lower supervisory and technical group was 1:2.2. Even with the appropriate caveats, it is difficult to avoid the conclusion that inequalities in the risk of death continue and may have worsened.

- *Changing patterns of causes of death by occupational class:* overall, death rates from IHD at ages 20-59 declined from 113 per 100,000 in 1991 to 65 per 100,000 in 2001 (a reduction of 42%) and those from malignant neoplasms from 104 per 100,000 to 85 per 100,000 (a reduction of 18%). Decreases of this order are apparent in the different occupational groups used in the two periods. In contrast, deaths from chronic liver disease, suicide and drug use increased substantially in the decade between the two Censuses and resulted in substantial gradients across the occupation groups. As examples, in 2001 the ratio between the rate for managerial and professional occupations and that for semi-routine and routine occupations for chronic liver disease was 1:5.3, that for suicide was 1:4.3, that for drug use was 1:16 and that for assault 1:8. Of these the gradients for chronic liver disease and suicide showed marked increases over the ratios between the rates for social classes I and II and social classes IV and V from 1991 (1:2.9 for chronic liver disease, 1:2.7 for suicide). If one accepts continuing inequalities linked to social status, then it also appears to be the case that the underlying reasons for these differences are changing.

- *Regional differences by socio-economic status:* another feature of the foregoing analysis is the particular circumstances of the Clydeside conurbation and

especially Glasgow. Although there are differences in the underlying social structure of the region's population, these do not provide a satisfactory explanation for the excess death rates described in chapter 2; it will be evident from tables 3.13 to 3.16 that the disproportionately high death rates in almost all occupational categories but especially those of the semi-routine and routine occupation groups provide an important part of the explanation of the regional differences identified in chapter 2.

Chapter 4
Small area deprivation and mortality

Introduction

The previous chapter described variations in death rates between individuals classified by socio-economic status based on occupation. This chapter examines variation in the death rates among populations resident in small areas in Scotland and describes how this variation is associated with small area measures of disadvantage. Two measures are considered; the Carstairs score is used to make comparisons between mortality rates in 1981, 1991 and 2001, and the income domain of the Scottish Index of Multiple Deprivation (SIMD) is explored as an alternative measure of area deprivation in 2001. Part of this chapter is an extension of the work set out in *Carstairs scores for Scottish postcode sectors from the 2001 Census*[1]. Both measures describe the characteristics of local populations rather than those of individuals and so the interpretation of these analyses is different to that of the previous chapter. In particular, socially disadvantaged individuals will not be found exclusively in localities described as "deprived" areas and individuals who are not themselves disadvantaged in conventional terms may live in deprived areas. An important advantage of area-based measures of social deprivation, however, is the comparative ease by which populations may be classified on the basis of their area of residence. Area of residence (postcode) is recorded on death certificates; in this manner the problems associated with the coding of individual social class encountered in chapter 3 are avoided.

Carstairs scores

Carstairs scores are derived by combining selected variables taken from small area Census data. The scores are described as a measure which reflects access to *"those goods and services, resources and amenities and of a physical environment which are customary in society"*[2]. The scores are not a measure of the extent of *individual* material wellbeing or relative disadvantage but are rather a summary measure applied to *populations* contained within small geographic localities. The scores have generally been applied to the populations of postcode sectors in Scotland. A postcode sector is the set of unit postcodes that are the same apart from the last two characters (for example, G12 8xx). The scores are derived by manipulating selected Census variables in order to create a composite score. By this means the scores quantify levels of relative deprivation or affluence in different localities.

The Carstairs score was originally created from data collected during the 1981 Census, and has been replicated using data from the 1991 and 2001 Censuses. The four variables used were: *overcrowding* (the proportion of all persons living in private households with a density of more than one person per room), *male unemployment* (the proportion of economically active males seeking or waiting to start work), *households without a car* (the proportion of all persons in private households which do not own a car), and *low social class* (the proportion of all persons in private households with an economically active head with head of household in social class IV or V). Although there have been slight changes to the definition of the variables used over the course of 20

[1] McLoone P. *Carstairs scores for Scottish postcode sectors from the 2001 Census*. Glasgow: MRC Social and Public Health Sciences Unit, 2004. Available from http://www.msoc-mrc.gla.ac.uk/Publications/pub/Carstairs_MAIN.html

[2] Carstairs V, Morris R. *Deprivation and Health in Scotland*. Aberdeen: Aberdeen University Press, 1991.

years, including the change from Registrar General's Social Class to the National Statistics Socioeconomic Classification (NS-SEC), they remain essentially the same in terms of what they measure at the small area level. The association between Carstairs scores for the same postcode sectors has been high from one Census to another; the correlation coefficient between 1981 and 1991 was 0.958 and between 1991 and 2001 was 0.955.

Carstairs scores were calculated for every postcode sector in Scotland; when a postcode sector was divided between different council area boundaries, a score was calculated for the separate parts of the sector. In 2001, this resulted in the creation of scores for 1010 postcode sectors or part postcode sectors with an average population of 5012 people. These scores were then divided into deprivation categories (DEPCATs) ranging from the least deprived in DEPCAT 1 to the most deprived in DEPCAT 7. The categorisation in 1981 was created to maintain the differential power of the overall distribution and was performed on an arbitrary basis; the designation of DEPCATs in 1991 and 2001 ensured that the same proportion of the total population as in 1981 was included in each DEPCAT.

Analyses based on DEPCATs require populations estimates for each postcode sector for men and women and by 5 year age groups. The basis for these estimates were the Censuses of 1981, 1991 and 2001. Due to under-enumeration in 1981, however, the Census population estimates were weighted to the 1981 mid-year estimate provided by the General Register Office for Scotland. The 1991 and 2001 Census estimates by postcode sector – aggregated over the whole of Scotland – were close to the GROS mid-year estimates and no weighting was required.

Scottish Index of Multiple Deprivation (SIMD)

The Scottish Index of Multiple Deprivation 2004 is based on methods developed by the Social Disadvantage Research Centre at the University of Oxford and employs a framework which conceives multiple deprivation as a composite of different underlying dimensions or domains, with the added requirement that the data used in such a measure can be updated between Censuses.[1]

The SIMD 2004 combines 31 indicators across six domains: current income; employment; health; education, skills and training; housing; and geographical access and telecommunications. It thus provides a more comprehensive picture of material deprivation in small areas within Scotland. The index ranks 6505 areas from the most deprived (given a ranking of 1) to the least deprived (given a ranking of 6505) and is, therefore, a *relative* measure indicating the degree of deprivation of an area relative to that of other areas.

The areas employed by the SIMD are data zones and are small: in 2001, the 6505 data zones had a mean population of just 778 people. The reason for employing small area geography at this scale is to permit identification of relatively small pockets of deprivation. Part of this argument is that each data zone is more likely to be homogeneous with regard to the socioeconomic characteristics of its population than larger areas such as the postcode sectors on which Carstairs scores are based. This large number of areas was then divided into quintiles with approximately 20% of the population in each group; these are numbered from 5 (the least deprived) to 1 (the most deprived).

[1] Scottish Executive. *Scottish Index of Multiple Deprivation 2004: summary technical report.* Edinburgh: Scottish Executive, 2004. Available from http://www.scotland.gov.uk/Publications/2004/06/19429/

The health domain of the SIMD includes an indicator of the Comparative Mortality Factor (CMF) for 1998-2002 and so includes deaths in the period 2000-02 which are also considered in this Report. Describing deprivation by a measure that included this domain would thus be tautological. Even though the CMF is only one part of the health domain, and the health domain is just one of the domains used to construct the SIMD, we have preferred to focus on the current income domain as an indicator of deprivation.

The current income domain of SIMD 2004 is made up of 8 indicators from 2001 and 2002 provided by the Department of Work and Pensions relating to receipt of benefits and tax credits. The indicators used are:

- adults in Income Support households (2002)
- children in Income Support households (2002)
- adults in Income Based Jobseekers Allowance households (2001)
- children in Income Based Jobseekers Allowance households (2001)
- adults in Working Families Tax Credit households below a low income threshold (2002)
- children in Working Families Tax Credit households below a low income threshold (2002)
- adults in Disability Tax Credit households below a low income threshold (2002)
- children in Disability Tax Credit households below a low income threshold (2002)

Since the indicators are mutually exclusive – there is no overlap between people in receipt of the different benefits – the domain score is calculated by adding up the numbers in each category and converting this into a rate for each area.

Limitations of the analysis

The SIMD was first developed in 2004 and was built upon the Scottish Index of Deprivation (SID) for 2003, although the latter was based on a different geography using wards instead of data zones. There was no SIMD prior to 2004 and so it is not possible to use this measure to describe areas at earlier times; this means that temporal trends in area based deprivation must be made using Carstairs scores which are derived from larger areas – the mean population of a postcode sector in 2001 was 5012 compared to 788 in an SIMD data zone. On the other hand, Carstairs scores have been calculated for each Census since 1981.

In August 1990 the Royal Mail updated certain postcodes in the Grampian region beginning with the letters AB; as a result of this change, it was not possible to assign death records between January and August 1990 to these new sectors and this meant that 1230 deaths (out of 60,481) in 1990 could not be allocated a Carstairs score. For this reason, comparisons with 1980-82 and 2000-02 are based on deaths in 1991-92 and this restriction may mean that the estimates for 1991-92 presented in this chapter are slightly more prone to random fluctuations than those for the other two periods. In addition, the interval between 1980-82 and 1991-92 is slightly longer than that between 1991-92 and 2000-02. These are minor considerations, however, and should not detract from comparisons of the area-based inequalities over time.

Mortality rates and Carstairs scores

Population composition by DEPCAT

Deprivation categories are distributed fairly evenly across age groups. Table 4.1 shows the distribution across DEPCATs of men of different ages in 2001. Overall 6.2% of men lived in the least deprived areas (DEPCAT 1); this proportion ranged from

5.2% at ages 15-29 to 7.1% aged 45-59. Whilst 6.6% of men lived in the most deprived areas (DEPCAT 7), this proportion was somewhat higher at younger ages (7.4% aged 0-29) with just 5.6% of men aged 45-59 or aged over 74 living in this DEPCAT. Higher proportions were resident in DEPCATs 5 and 6; in each age group, about a quarter of men in Scotland lived in localities with this degree of social deprivation.

		Age						
Deprivation category (DEPCAT)		0-14	15-29	30-44	45-59	60-74	75+	All
Least deprived	1	7	5	6	7	6	6	6
	2	13	13	14	15	14	15	14
	3	21	21	22	23	23	23	22
	4	25	26	26	25	25	25	25
	5	14	16	15	14	15	14	15
	6	12	12	11	10	11	11	11
Most deprived	7	7	7	6	6	7	6	7

Table 4.1 The percentage distribution of deprivation categories among men. Figures are percentages within each age group. Scotland 2001.

The pattern of male deaths across deprivation categories differs substantially from the distribution of the population (table 4.2), particularly in regard to deaths at younger ages. DEPCATS 1-3 comprise over 40% of the population aged less than 60 but contribute fewer than a third of the deaths at these ages; conversely, DEPCATS 5-7 at these ages make up about a third of the population but more than 40% of the deaths. At ages 30-44, the male residents of these three DEPCATS comprised 32% of the population but experienced 50% of the deaths at these ages. It is only at ages greater than 75 that a balance between the proportions of population and deaths is reached.

Table 4.3 describes the age distribution for male deaths in each deprivation category and emphasises the comment made above. Nearly 60% of deaths in DEPCAT 1 occur over the age of 74 but just one third of deaths are at these ages in DEPCAT 7 with a clear gradient across the intermediate categories. In Scotland in 2001, 19% of male deaths occurred at ages less than 60; the proportions for DEPCAT 1 and DEPCAT 7 were 13% and 27% respectively. Whilst 7% of male deaths occurred before the age of 45, this percentage varied from a little over 4% in DEPCAT 1 to 11% in DEPCAT 7.

		Age						
Deprivation category (DEPCAT)		0-14	15-29	30-44	45-59	60-74	75+	All
Least deprived	1	4	2	3	3	4	5	4
	2	8	7	8	9	10	13	11
	3	20	18	16	18	19	23	21
	4	23	26	24	25	25	25	25
	5	19	17	18	18	17	15	16
	6	16	17	17	15	14	12	13
Most deprived	7	11	13	15	12	11	6	9

Table 4.2 The percentage distribution of deprivation categories among male deaths. Figures are percentages within each age group. Scotland 2000-02.

		Age						
Deprivation category (DEPCAT)		0-14	15-29	30-44	45-59	60-74	75+	All
Least deprived	1	1	1	3	8	28	59	100
	2	1	1	3	10	30	56	100
	3	1	2	3	11	32	52	100
	4	1	2	4	12	34	48	100
	5	1	2	5	13	35	45	100
	6	1	3	5	13	36	41	100
Most deprived	7	1	3	7	16	40	33	100
All Scotland		1	2	4	12	34	47	100

Table 4.3 The percentage of male deaths in each age group. Figures are percentages within each deprivation category. Scotland 2000-02.

The distribution of women across DEPCATs (shown in Appendix table A.41) was not substantially different from that for men, although there was a slightly higher proportion of women living in the most deprived areas (6.9% for women compared to 6.6% for men) with a correspondingly lower proportion of women living in the least deprived areas (6.0% of women compared to 6.2% of men). The difference is most pronounced for women aged 15-29; at these ages 4.6% of women live in DEPCAT 1 and 8.2% in DEPCAT 7.

Table 4.4 demonstrates a mortality gradient across DEPCATs for female deaths, although not as steep as that for male deaths. The disproportionate number of deaths at younger ages noted for male deaths is also evident in this table; 42% of female deaths at ages 0-14 were resident in DEPCATs 5-7 compared to 30% in DEPCATs 1-3. Similar – or rather greater – differences are seen at age groups up to age 75. As a reflection of this pattern, table 4.5 illustrates differences in the age of death for each DEPCAT; only 8% of female deaths in DEPCAT 1 were at ages less than 60 compared to 15% of deaths in DEPCAT 7. A further difference is that only 15% of female deaths in DEPCAT 1 were at ages between 60 and 74 in contrast to 30% in DEPCAT 7. As a consequence, 76% of female DEPCAT 1 deaths were at aged 75 or more but only 55% of DEPCAT 7 deaths were at these ages.

		Age						
Deprivation category (DEPCAT)		0-14	15-29	30-44	45-59	60-74	75+	All
Least deprived	1	5	4	4	4	4	6	5
	2	9	7	8	11	10	14	13
	3	16	17	18	19	19	22	21
	4	27	26	24	26	26	25	25
	5	17	18	18	16	17	15	16
	6	14	16	15	13	15	12	13
Most deprived	7	12	13	13	11	10	6	8

Table 4.4 The percentage distribution of deprivation categories among female deaths. Figures are percentages within each age group. Scotland 2000-02.

		Age						
Deprivation category (DEPCAT)		0-14	15-29	30-44	45-59	60-74	75+	All
Least deprived	1	1	0	1	6	15	76	100
	2	0	0	1	6	17	75	100
	3	0	0	2	6	20	71	100
	4	1	1	2	7	22	67	100
	5	1	1	2	7	24	65	100
	6	1	1	2	7	26	63	100
Most deprived	7	1	1	3	10	30	55	100
All Scotland		1	1	2	7	22	68	100

Table 4.5 The percentage of female deaths in each age group. Figures are percentages within each deprivation category. Scotland 2000-02.

All cause mortality rates

The previous tables have provided a crude measure of the mortality gradient across areas categorised by their levels of social disadvantage in 2001. All-cause mortality rates in different age groups for the three time periods around the years 1981, 1991 and 2001 are shown for males in table 4.6 and for females in table 4.7. Given the decline in Scottish death rates over these two decades, the extent to which these reductions have been shared by different DEPCAT categories is a question of particular interest.

It is clear from table 4.6 that there were mortality gradients across DEPCATs for men in all age groups and in all three periods. The ratio of the mortality rate in DEPCAT 1 to that in DEPCAT 7 showed the greatest differential among men aged 30-44 and lowest over the age of 74: at ages 30-44, the ratio increased from 1:3.5 in 1981 to 1:5.5 in 2001. At ages greater than 74, the ratio was 1:1.3 in all three periods. Declining male death rates were not experienced equally at ages 60-74, however; the ratio between DEPCAT 1 rates and DEPCAT 7 rates worsened from 1:1.7 in 1981 to 1:1.9 in 1991 and to 1:2.7 in 2001.

		Male death rate per 100,000 population			% change	
Age group	**Deprivation category (DEPCAT)**	**1980-82**	**1991-92**	**2000-02**	**81 to 91**	**91 to 01**
0-14	**1**	107	59	33	-45	-45
	2	109	60	35	-45	-42
	3	134	69	55	-48	-20
	4	139	85	54	-39	-37
	5	146	113	79	-22	-30
	6	142	95	80	-33	-17
	7	172	133	90	-22	-33
15-29	**1**	68	72	54	7	-25
	2	85	73	60	-14	-19
	3	99	86	94	-13	10
	4	104	90	111	-13	23
	5	95	112	116	17	4
	6	97	105	157	8	49
	7	130	166	200	29	20
30-44	**1**	110	69	87	-37	27
	2	144	109	110	-24	1
	3	183	149	144	-18	-3
	4	208	171	189	-18	11
	5	228	214	248	-6	16
	6	287	241	311	-16	29
	7	380	357	477	-6	34
45-59	**1**	633	430	287	-32	-33
	2	775	556	424	-28	-24
	3	942	682	529	-28	-22
	4	1,017	788	672	-23	-15
	5	1,196	914	870	-24	-5
	6	1,392	1,108	955	-20	-14
	7	1,567	1,326	1,446	-15	9
60-74	**1**	3,249	2,516	1,663	-23	-34
	2	3,535	2,814	2,012	-20	-29
	3	3,781	3,140	2,352	-17	-25
	4	4,116	3,483	2,734	-15	-22
	5	4,366	3,712	3,124	-15	-16
	6	4,842	4,309	3,455	-11	-20
	7	5,349	4,813	4,547	-10	-6
75+	**1**	13,110	11,204	9,620	-15	-14
	2	13,568	12,161	9,848	-10	-19
	3	14,297	12,357	10,411	-14	-16
	4	15,171	12,958	11,152	-15	-14
	5	15,527	13,534	11,872	-13	-12
	6	15,844	13,660	11,730	-14	-14
	7	17,427	14,753	12,092	-15	-18

Table 4.6 Male age specific death rates per 100,000 population for each deprivation category. Scotland 1980-82, 1991-92 & 2000-02.

The two right-hand columns of table 4.6 report the percentage change in mortality rates between 1981 and 1991 and between 1991 and 2001 and provide some explanation for the age specific trends in all-cause mortality described in table 2.5. The 10% increase in mortality rates between 1991 and 2001 at ages 15-29 (table 2.5) was not experienced by all population groups; these rates reduced by 25% and 19% respectively in DEPCATs 1 and 2 but increased in all other categories – notably by 49% in DEPCAT 6. The 5% increase in mortality rates in the same age group between 1981 and 1991 was largely due to increases of between 8% and 29% in DEPCATs 5, 6 and 7. The overall changes in mortality between 1981 and 2001 were decreases of 20% and 30% in DEPCATs 1 and 2 respectively but increases of 22%, 62% and 55% in DEPCATs 5, 6 and 7. The 15% increase in mortality experienced by the 30-44 age group between 1991 and 2001 (table 2.5) was exceeded at each end of the distribution, with increases of 27% in DEPCAT 1, 29% in DEPCAT 6 and 34% in DEPCAT 7. Most other deprivation categories experienced smaller increases at these ages although changes between 1991 and 2001 followed reductions between 1981 and 1991 that were very strongly patterned by deprivation, with more pronounced declines in the less deprived areas. The overall outcome was that between 1981 and 2001 mortality rates in DEPCATs 1, 2 and 3 reduced by between 21% and 24% between 1981 and 2001; those in DEPCATs 5 and 6 increased by 8%, and those in DEPCAT 7 increased by 25%.

In those aged under 15, the excess mortality of DEPCAT 7 over DEPCAT 1 increased from 61% in 1981 to 127% in 1991 and 175% in 2001; in other words, the mortality rate of DEPCAT 7 in 2001 (90 per 100,000) was almost three times that of DEPCAT 1 (33 per 100,000). The excess mortality of DEPCAT 7 at ages 15-29 increased from 92% in 1981 to 272% in 2001; for those aged 30-44, the excess mortality of DEPCAT 7 was 247% in 1981. By 2001, and despite a 27% increase in the mortality rate for DEPCAT 1 over the previous decade, this excess had increased to 448%. By 2001 the excess mortality in DEPCAT 7 had increased to 404% amongst those aged 45-59 and 173% at ages 60-74.

The analysis of Carstairs scores for 2001 provides a picture of widening disparities between deprivation categories with substantial overlaps across age groups. The mortality rate of men aged 15-29 living in DEPCAT 7 (200 per 100,000) was the same as the overall death rate for all men aged 30-44 (202 per 100,000). The mortality rate of men aged 30-44 living in DEPCAT 7 was 66% greater than that of men 15 years older (ages 45-59) living in DEPCAT 1 localities.

Gradients across deprivation categories and for all years for women are set out in table 4.7. This table also provides insights into the changes in all-cause female mortality described in table 2.5. Death rates declined among women aged 45 and over across both periods and in all deprivation categories. In the oldest age group smaller declines in the most affluent areas have led to a narrowing of the relative mortality gap. Mortality rates between 1981 and 2001 fell by 18% in DEPCAT 1 and 17% in DEPCAT 2 compared to 21% in DEPCAT 6 and 26% in DEPCAT 7. For women aged 45-74, however, mortality rates fell fastest in the less deprived areas: over the 20-year period, death rates in the 45-59 age group reduced by 32% in DEPCAT 1 compared to only 8% in DEPCAT 7; in the 60-74 age group the comparable declines were 40% and 15% respectively.

		Female death rate per 100,000 population			% change	
Age group	Deprivation category (DEPCAT)	1980-82	1991-92	2000-02	81 to 91	91 to 01
0-14	1	67	38	36	-43	-6
	2	92	60	31	-34	-49
	3	95	45	36	-52	-21
	4	103	65	49	-37	-24
	5	114	68	52	-40	-24
	6	115	71	55	-39	-22
	7	138	93	76	-32	-19
15-29	1	22	30	36	35	19
	2	40	35	21	-11	-40
	3	33	32	32	-2	-1
	4	33	35	39	7	9
	5	46	29	42	-37	42
	6	46	43	47	-6	10
	7	56	70	60	25	-14
30-44	1	85	62	60	-27	-2
	2	99	77	57	-22	-26
	3	115	86	85	-25	-1
	4	126	108	96	-14	-11
	5	140	130	125	-7	-4
	6	170	137	138	-19	1
	7	215	160	187	-26	17
45-59	1	382	316	261	-17	-17
	2	449	394	302	-12	-23
	3	563	394	330	-30	-16
	4	620	464	416	-25	-10
	5	658	538	478	-18	-11
	6	778	636	525	-18	-17
	7	844	833	776	-1	-7
60-74	1	1,733	1,373	1,038	-21	-24
	2	1,975	1,656	1,244	-16	-25
	3	2,129	1,787	1,396	-16	-22
	4	2,274	2,043	1,648	-10	-19
	5	2,518	2,242	1,860	-11	-17
	6	2,698	2,459	2,043	-9	-17
	7	2,926	2,918	2,484	0	-15
75+	1	9,317	7,971	7,613	-14	-4
	2	9,360	8,688	7,807	-7	-10
	3	9,973	8,831	7,849	-11	-11
	4	10,208	8,796	8,314	-14	-5
	5	10,905	8,973	8,629	-18	-4
	6	10,764	9,103	8,533	-15	-6
	7	11,754	9,730	8,755	-17	-10

Table 4.7 Female age specific death rates per 100,000 population for each deprivation category. Scotland 1980-82, 1991-92 & 2000-02.

At all ages under 60 the decline in mortality in DEPCAT 2 was greater than that in DEPCAT 1 between 1991 and 2001. This difference was particularly pronounced at younger ages and resulted in mortality rates in 2001 being higher in DEPCAT 1 than in DEPCAT 2 at all ages under 45. At ages 15-29 the mortality rate increased between 1981 and 2001 in DEPCATs 1, 4, 6 and 7, and DEPCAT 5 also saw a substantial increase (42%) between 1991 and 2001. At ages 30-44 mortality rates increased between 1991 and 2001 in DEPCAT 6 and 7 with only marginal reductions in DEPCATs 1, 3 and 5.

These changing rates have had differential effects on the mortality gradient as measured by the excess mortality rate in DEPCAT 7 over that in DEPCAT 1. The excess fell among women aged over 74 from 26% in 1981 to 15% in 2001. Despite an overall increase in mortality of 7% between 1981 and 2001 among females aged 15-29 living in DEPCAT 7, the 60% increase in mortality rates among women living in DEPCAT 1 resulted in the excess mortality in this age group decreasing from 152% to 69%. Among females aged under 15 the excess increased slightly from 104% to 111%. At all ages between 30 and 74 the relative differential between the most and least deprived areas increased. At ages 60-74 the excess increased from 69% in 1981 to 139% in 2001. Between the ages of 30 and 59 mortality rates in DEPCAT 7 were approximately three times those in DEPCAT 1. Although these are considerable inequalities, the relative excesses for male mortality were higher in all age groups.

Cause specific mortality rates

Death rates from selected causes for men and women under the age of 65 for the three periods around the years 1981, 1991 and 2001 are set out by deprivation category in tables 4.8 to 4.11. For the whole of Scotland (table 4.8) all-cause mortality rates among men fell by 22% between 1981 and 1991 and by a further 12% between 1991 and 2001. These reductions were consistently exceeded in DEPCATs 1, 2 and 3 with more modest falls in DEPCATs 5, 6 and 7 so that, between 1981 and 2001, a 49% decrease in mortality in DEPCAT 1 comfortably exceeded the 31% fall across all deprivation categories. This outcome compares with a fall of just 2% in DEPCAT 7 where mortality rates among men aged under 65 increased by 11% from 1991 to 2001. These changes mean that there has been a marked increase in the excess mortality seen in DEPCAT 7 over that in DEPCAT 1; in 1981, the ratio of the two rates was 1:2.3 but this increased to 1:2.8 in 1991 and to 1:4.4 by 2001. Mortality rates at these ages among men living in DEPCATs 4, 5, 6 and 7 in 2001 – about 60% of the male population – were higher than those for men living in DEPCAT 1 20 years earlier. Despite overall mortality rates falling by 31% over 20 years, for men under 65 living in DEPCAT 7 in 2001 the mortality rate was 44% higher than the Scottish rate in 1981 and more than twice that of men living in DEPCAT 1 in at that time.

All cause mortality among women aged under 65 fell by 20% between 1981 and 1991 and again by 16% between 1991 and 2001. Falls were fairly consistent across deprivation categories with the exception of DEPCAT 7 which saw an overall decline of just 12% between 1981 and 2001 compared with a national fall of 32%. This resulted in an increase in the relative differential, with the excess mortality in DEPCAT 7 over that in DEPCAT 1 increasing from 112% in 1981 to 176% in DEPCAT 7.

		Death rate per 100,000 population					
		men			Women		
	Deprivation	1980-82	1991-92	2000-02	1980-82	1991-92	2000-02
All causes	1	316	226	161	185	144	124
	2	383	273	210	225	184	134
	3	443	331	272	261	188	159
	4	484	379	329	282	225	192
	5	543	440	413	314	255	224
	6	618	506	479	358	288	253
	7	719	634	705	393	380	344
	All Scotland	491	384	340	285	229	193
Ischaemic Heart Disease	1	115	68	26	28	16	8
(ICD9 410-414;	2	127	73	38	34	20	9
ICD10 I20-25)	3	156	97	52	46	27	14
	4	166	117	66	48	38	18
	5	186	134	81	60	46	26
	6	209	151	88	69	56	29
	7	202	181	128	72	72	45
	All Scotland	166	114	65	51	38	19
Cerebrovascular Disease	1	16	11	7	14	9	5
(ICD9 430-438;	2	25	14	10	17	12	8
ICD10 I60-69 & G45)	3	24	16	10	23	12	9
	4	29	18	13	24	17	12
	5	32	21	16	28	17	12
	6	33	25	17	33	22	16
	7	38	27	24	32	32	17
	All Scotland	28	18	13	25	16	11
All malignant neoplasms	1	82	66	59	80	75	61
(ICD9 140-208;	2	96	83	68	87	89	66
ICD10 C00-97)	3	101	94	82	96	86	72
	4	116	102	89	103	93	79
	5	129	117	106	103	104	81
	6	143	142	119	116	104	91
	7	170	157	151	114	124	108
	All Scotland	117	106	92	100	95	78

Table 4.8 Cause specific age standardised mortality (per 100,000 population) from major causes within each deprivation category. Men and women aged 0-64, Scotland 1980-82, 1991-92 & 2000-02.

In 1981, deaths from ischaemic heart disease (IHD) made up 34% of the all-cause mortality rate among men under the age of 65; following a 61% decline in IHD mortality between 1981 and 2001 this proportion reduced to 19%. This overall reduction was exceeded in DEPCAT 1 (77%) but not in DEPCAT 7 where the reduction was only 37%. When rates in the two DEPCATs are compared, the excess in IHD mortality in DEPCAT 7 over DEPCAT 1 was 76% in 1981 but 392% greater in 2001. Among women, IHD contributed 18% of mortality in 1981 but 10% in 2001. The reduction in the IHD death rate was again greater than the all-cause rate, falling by 25% between 1981 and 1991 and by 49% between 1991 and 2001. As with male deaths, these reductions were much greater in DEPCAT 1 (73%) than DEPCAT 7 (37%). In 1981 the female mortality rate from IHD in DEPCAT 7 was 156% greater than that for DEPCAT 1 but was 486% higher in 2001. This gradient in IHD deaths was greater for women than men in all three periods.

Cerebrovascular disease declined as a cause among men from 6% of mortality in 1981 to 4% in 2001. The overall decline in mortality of 54% was not matched by the 37% decline in DEPCAT 7 – caused mostly by a fall of just 11% in that DEPCAT between 1991 and 2001 compared to a 29% fall across Scotland – resulting in an increase in the excess mortality. In 1981 cerebrovascular disease mortality in DEPCAT 7 was 139% higher than in DEPCAT 1, but by 2001 it was 230% higher. Among women cerebrovascular disease accounted for 9% of mortality under 65 in 1981 and 6% in 2001. The decline in mortality in DEPCAT 7 of 47% was less than the 55% overall fall. In 1981 mortality in DEPCAT 7 was 132% higher than in DEPCAT 1; by 2001 mortality was 272% higher.

All neoplasms comprised 24% of male mortality in 1981; following a 21% decline in this cause between 1981 and 2001 (somewhat less than the 31% decline in all cause mortality) malignant neoplasms represented 27% of all mortality in 2001. There were substantial differences across DEPCATs; in 2001 malignant neoplasms accounted for 37% of deaths in DEPCAT 1 but just 21% in DEPCAT 7. Between 1981 and 2001, death rates from neoplasms declined by 28% in DEPCAT 1 but by just 11% in DEPCAT 7; this meant that the excess mortality increased from 107% in 1981 to 156% in 2001. The mortality rate from malignant neoplasms among men in DEPCAT 7 in 2001 (151 per 100,000) was close to the all-cause mortality in DEPCAT 1 (161 per 100,000). Malignant neoplasms also increased in importance among women, from 35% of mortality in 1981 to 40% in 2001. Mortality fell by only 5% in DEPCAT 7 compared to a national fall of 23%. These differential falls resulted in a substantial increase in the excess mortality in DEPCAT 7 from 44% in 1981 to 77% in 2001. Although these are large excesses, it is worth noting that the gradient across deprivation categories for neoplasms is less marked than for all cause mortality, and that this is particularly so for women.

Table 4.9 breaks down mortality from malignant neoplasms into four common neoplasms – cancers of the lung, breast, colon and rectum, and stomach. Lung cancer comprised 42% of mortality from malignant neoplasms among men aged under 65 in 1981; falls of 25% between 1981 and 1991 and 29% between 1991 and 2001 meant that by 2001 this figure had fallen to 28%. In DEPCAT 1 lung cancer fell from 33% of all deaths from malignant neoplasms to just 15%; in DEPCAT 7 the fall was from 53% to 39%: these proportions represent reductions in mortality of 67% in DEPCAT 1 but only 34% in DEPCAT 7. As a consequence, the mortality ratio from lung cancer in DEPCAT 1 relative to DEPCAT 7 nearly doubled from 1:3.3 in 1981 to 1:6.5 in 2001. Lung cancer accounted for 19% of all mortality from malignant neoplasms in 1981 in women; by 2001 this figure had increased to 21%, ranging between 26% in DEPCAT 7 and 15% in DEPCAT 1. The fall in lung cancer mortality between 1981 and 2001 was just 14% and was less marked in DEPCAT 7 than DEPCAT 1. In 1981, lung cancer mortality in DEPCAT 7 was 159% higher than in DEPCAT 1, but was 219% greater in 2001. For both male and female

deaths, lung cancer was the only one of the specific cancers considered for which the excess of death rates in DEPCAT 1 over DEPCAT 7 was greater than that for all cause mortality. By 2001 mortality from this cause in DEPCAT 7 was twice the rate in DEPCAT 1 20 years earlier for men and women.

Breast cancer accounted for a fairly constant 9%-10% of all cause mortality between 1981 and 2001 but its relative importance as a cause of death from malignant neoplasms reduced from 27% to 24% over the two decades. Between 1981 and 2001 the death rate declined by 32%; the fall in DEPCAT 1 (33%) was greater than in DEPCAT 7 (26%). There was, however, no clear gradient across DEPCATs in breast cancer mortality rates. This meant that breast cancer contributed more to all female deaths from malignant neoplasms in DEPCAT 1 (27%) than in DEPCAT 7 (16%).

Between 1981 and 1991 mortality from colorectal cancer in men increased by 8%, with an increase evident in most deprivation categories. Between 1991 and 2001, mortality decreased by 18%; this reduction occurred in most deprivation categories, but there was an increase of 11% in DEPCAT 7 and a decrease of 44% in DEPCAT 1. These changes led to the emergence of a differential between DEPCATs 1 and 7; in 1981 colon cancer mortality in DEPCAT 7 was approximately the same as in DEPCAT 1, but by 2001 it was nearly double. The 36% reduction in the colorectal cancer death rate in women between 1991 and 2001 was not seen in DEPCAT 7 where rates rose by 10%. This meant that the 40% overall fall in colorectal cancer mortality over the whole two decades of this Report was considerably more pronounced in DEPCAT 1 (54%) than in DEPCAT 7 (2%). An inverse gradient across deprivation categories in 1981, with mortality from colorectal cancer in DEPCAT 7 10% lower than in DEPCAT 1, was reversed by 2001 by which time there was a 90% excess in DEPCAT 7.

Stomach cancer mortality declined from 8% of male deaths from malignant neoplasms in 1981 to 5% in 2001. The reduction in the rate (56%) was exceeded in DEPCAT 1 (69%) but was lower in DEPCAT 7 (44%) and led to the emergence a gradient which increased from an excess 77% in DEPCAT 7 over DEPCAT 1 in 1981 to an excess of 213% by 2001. Despite the decline in mortality from stomach cancer among women between 1981 and 2001 in DEPCAT 7 (32%) being lower than the overall fall (48%), there was virtually no change in DEPCAT 1 and this led to a decline in the excess mortality. In 1981 there was an excess of mortality from stomach cancer of 142% among women in DEPCAT 7 over women in DEPCAT 1; by 2001 this excess had fallen to 63%.

Table 4.10 shows that all malignant neoplasms excluding lung, colorectal and stomach cancers increased in significance among men. In 1981 this group accounted for 41% of deaths from malignant neoplasms, but by 2001 this had increased to 57%. These causes were relatively more important in DEPCAT 1 (46% of all malignant neoplasm mortality in 1981, rising to 70% by 2001) than in DEPCAT 7 where the comparable figures were 34% and 48%. Mortality from these causes increased by 9% between 1981 and 1991 and then changed little between 1991 and 2001; an overall increase of 24% in DEPCAT 7 was more than double the 10% increase seen in DEPCAT 1. In 1981 mortality from all other malignant neoplasms was 56% higher in DEPCAT 7 than in DEPCAT 1; by 2001 this difference had grown to 76%. This divergence was, however, lower than those seen for the other neoplasms listed in table 4.9.

		Death rate per 100,000 population					
		men			Women		
	Deprivation	1980-82	1991-92	2000-02	1980-82	1991-92	2000-02
Malignant neoplasm of trachea, bronchus and lung (ICD9 162; ICD10 C33-34)	1	27	13	9	14	7	9
	2	35	23	13	14	13	12
	3	36	27	19	15	14	14
	4	51	36	26	18	17	16
	5	54	45	34	20	22	19
	6	65	56	41	29	23	24
	7	90	68	59	35	42	28
	All Scotland	49	37	26	19	18	17
Malignant neoplasm of female breast (ICD9 175; ICD10 C50)	1	0	0	0	24	28	16
	2	0	0	0	26	24	18
	3	0	0	0	28	24	19
	4	0	0	0	28	26	18
	5	0	0	0	25	26	18
	6	0	0	0	28	20	19
	7	0	0	0	24	20	18
	All Scotland	0	0	0	27	24	18
Malignant neoplasm of colon and rectum (ICD9 153, 154.0-154.1; ICD10 C18-20)	1	11	12	7	10	7	4
	2	10	12	10	9	9	6
	3	10	11	10	8	8	5
	4	10	12	9	10	9	5
	5	12	11	9	9	9	5
	6	12	14	10	8	7	5
	7	11	11	13	9	8	8
	All Scotland	11	12	9	9	8	5
Malignant neoplasm of stomach (ICD9 151; ICD10 C16)	1	7	2	2	2	1	2
	2	7	4	3	3	2	2
	3	8	5	4	3	2	1
	4	8	6	4	4	3	2
	5	13	7	5	4	4	2
	6	13	8	6	5	4	3
	7	12	7	7	4	4	3
	All Scotland	10	6	4	4	3	2

Table 4.9 Cause specific age standardised mortality (per 100,000 population) from selected causes within each deprivation category. Men and women aged 0-64, Scotland 1980-82, 1991-92 & 2000-02.

		Death rate per 100,000 population					
		men			Women		
	Deprivation	1980-82	1991-92	2000-02	1980-82	1991-92	2000-02
Other malignant neoplasms*	1	37	39	41	31	31	30
	2	43	44	41	36	42	29
	3	47	51	50	42	38	32
	4	47	48	50	43	39	38
	5	49	55	59	45	44	37
	6	52	63	62	47	49	40
	7	58	70	72	43	51	51
	All Scotland	47	52	52	42	41	36
Chronic lower respiratory diseases (ICD9 490-494, 496; ICD10 J40-47)	1	6	5	3	3	4	2
	2	10	4	4	4	5	4
	3	12	7	6	7	6	4
	4	16	11	9	8	7	7
	5	23	12	11	10	9	11
	6	22	16	14	16	13	14
	7	38	26	23	23	17	18
	All Scotland	17	10	9	9	8	7
Chronic liver disease (ICD9 571; ICD10 K70, K73-74)	1	4	3	5	3	2	4
	2	6	5	8	4	2	4
	3	7	7	13	4	4	7
	4	8	8	19	5	5	11
	5	8	10	33	7	9	15
	6	14	15	42	10	10	16
	7	19	16	80	9	12	27
	All Scotland	8	9	23	5	6	11
Accidents (ICD9 E800-929; ICD10 V01-X59, Y85, Y86)	1	24	18	15	6	7	4
	2	31	18	12	11	7	4
	3	35	24	18	12	7	6
	4	37	25	19	12	9	5
	5	37	27	21	11	10	6
	6	44	28	21	12	11	7
	7	53	31	25	14	15	8
	All Scotland	37	24	18	12	9	6

*excluding lung, breast, colorectal and stomach

Table 4.10 Cause specific age standardised mortality (per 100,000 population) from selected causes within each deprivation category. Men and women aged 0-64, Scotland 1980-82, 1991-92 & 2000-02.

Other malignant neoplasms also increased in importance among women; they contributed 42% to all malignant neoplasms in 1981 rising to 46% by 2001. The 14% overall fall in mortality from other malignant neoplasms was seen neither in DEPCAT 1 (a fall of 3%) nor DEPCAT 7 (an increase of 19%). The 40% excess mortality in DEPCAT 7 over DEPCAT 1 seen in 1981 became 72% by 2001 and was greater than the excesses for breast cancer or stomach cancer, and comparable to the 77% excess for all malignant neoplasms. The other major cancers not included in table 4.9 and which contribute most to the category of other malignant neoplasms were oesophageal cancer (8% of all male cancer mortality under 65 in 2001), renal cancer (6%), brain cancer (5%), and pancreatic cancer (5%). Among women the largest other contributors were ovarian cancer (7%) and brain cancer (4%). Details of these other cancers are provided in Appendix tables A.42-A.45.

For men, between 1981 and 2001 deaths from chronic lower respiratory disease fell by 48%; this decline was not quite met in DEPCAT 7 (41%) but was exceeded in DEPCAT 1 (54%), which resulted in an increase of an already steep deprivation gradient. In 1981 the mortality ration in DEPCAT 1 to DEPCAT 7 was 1:5.9 but by 2001 this ratio had increased to 1:7.7. As for men, the decrease in mortality among women in DEPCAT 7 (24%) was less than that in DEPCAT 1 (34%). The ratio of mortality in DEPCAT 1 to DEPCAT 7 increased from 1:7.7 in 1981 to 1:8.8 in 2001.

In 1981 chronic liver disease was a rare cause of death, accounting for just 2% of all cause mortality among men; a 167% increase in the rate meant that by 2001 this had increased to 7%. In DEPCAT 1 the relative importance of the disease increased from just over 1% of all mortality to just under 3%; in DEPCAT 7 its contribution increased from 3% to 11%. These differences arose because the increase of 14% in DEPCAT 1 was much less pronounced than the increase of over 300% in DEPCAT 7. Between 1981 and 2001 the ratio of deaths in DEPCAT 1 to DEPCAT 7 grew from 1:4.8 to 1:17.5. Among women chronic liver disease accounted for under 2% of all cause mortality in 1981 but nearly 6% by 2001; by 2001 this cause represented 3% of all mortality in DEPCAT 1 but 8% in DEPCAT 7. An 8% increase in mortality from this cause between 1981 and 1991 was followed by an 86% increase between 1991 and 2001. The overall increase of 26% in DEPCAT 1 was much lower than the increase of 197% in DEPCAT 7. In 1981 there was an excess mortality of 178% in DEPCAT 7 over that in DEPCAT 1, but by 2001 this excess had increased to 556%. In 2001 mortality from chronic liver disease in DEPCAT 7 was higher than the Scottish rates for IHD for both men and women.

Accidents contributed 8% to all cause mortality among men in 1981 but this had fallen to 5% in 2001. By 2001 the relative importance of accidents was much greater in DEPCAT 1 (9% of deaths) than in DEPCAT 7 (4%). The overall decline of 50% between 1981 and 2001 was matched in DEPCAT 7 but not in DEPCAT 1 (40%). As a result the excess mortality in DEPCAT 7 over DEPCAT 1 declined from 117% in 1981 to 74% in 2001. Among women the decrease in mortality in DEPCAT 7 (46%) was again greater than in DEPCAT 1 (35%). This meant that the excess mortality from accidents in DEPCAT 7 over DEPCAT 1 also fell among women from 153% in 1981 to 113% in 2001.

Table 4.11 describes changes in death rates by deprivation categories for suicide, mental and behavioural disorders due to the use of drugs and alcohol, and assault. These four causes combined accounted for 5% of male deaths in 1981; by 2001, following increases for each cause, this had increased to 14%. For suicide the deprivation gradient evident in 1981 – the ratio of mortality in DEPCAT 1 to DEPCAT 7 was 1:4.2 – was unchanged by 2001. Suicide rates increased by 29% in the extreme categories over this period; this was somewhat less than the 43% increase seen across Scotland. Above average increases in DEPCATs 4 to 6 meant that high suicide rates were no longer exclusively seen in areas of high deprivation. For example, in 1981 the

ratio of the rate in DEPCAT 1 to DEPCAT 5 was 1:2.1 and the rate in DEPCAT 5 was in line with the Scottish rate; by 2001 the ratio was 1:2.9 and the rate in DEPCAT 5 was 22% higher than the Scottish rate. Whilst female suicide rates declined by 28% nationally between 1981 and 1991, they rose by 14% between 1991 and 2001. The overall decline of 17% was exceeded in DEPCAT 1 (28%) but rates in DEPCAT 7 fell by just 1%. In 1981 mortality in DEPCAT 7 was 176% higher than in DEPCAT 1; by 2001 the excess was 280%.

For each of the other causes listed in table 4.11 the deprivation gradient evident in 1981 became more exaggerated by 2001 due to greater increases in the more deprived areas than in less deprived areas. Although the overall rates remained low relative to mortality from other causes in Scotland, high rates in DEPCAT 7 showed the association of such causes with deprivation. As examples of this, the combined mortality rates from mental and behavioural disorders due to the use of drugs and alcohol in DEPCAT 7 in 2001 was approximately equal to the mortality rate due to IHD among both men and women aged under 65. Assault stands out as a cause of death that particularly affects those living in the most deprived areas; at 15 per 100,000, the death rate from assault in men aged under 65 was higher in 2001 than the Scottish mortality rate from cerebrovascular disease in this age group (13 per 100,000).

Although tables 4.8 to 4.11 indicate increasing inequalities for most causes of death, this judgement is based on comparisons between the two extremes of the Carstairs categories (DEPCATs 1 and 7). As such, changes over time may reflect change in one or other of the deprivation categories rather than a more fundamental change in the relationship between social deprivation and mortality. Table 4.12 addresses this issue by comparing ratios of the mortality rates for (a) the most deprived localities (DEPCATs 6 and 7 which take in 18% of the Scottish population) and (b) those for the least deprived areas (DEPCATs 1 and 2 or 20% of the Scottish population) with the intermediate DEPCATS 3-5 which comprise three fifths of the population. The comparisons are made for each of the three periods, so that a ratio of one indicates that the death rate for DEPCATs 1 and 2 (or 6 and 7) was the same as that for in DEPCATs 3, 4 and 5 at that period.

For men, all cause mortality in 1981 in DEPCATs 1 and 2 was 25% below that in DEPCATs 3 to 5 whilst in DEPCATs 6 and 7 it was 35% higher. Both mortality differentials increased over time; by 2001 all cause mortality in DEPCATs 1 and 2 was 41% lower than in DEPCATs 3 to 5 and in DEPCATs 6 and 7 it was 71% higher. The same pattern was seen for ischaemic heart disease, although the excess mortality in DEPCATs 6 and 7 was somewhat lower – 23% in 1981 increasing to 59% in 2001. The gap between DEPCATs 1&2 and DEPCATs 3 to 5 changed little for cerebrovascular disease, being 27% lower in 2001, although the gap between DEPCATs 6 and 7 and DEPCATs 3 to 5 widened from 24% in 1981 to 53% in 2001.

There were slight increases in the gradients for all malignant neoplasms; these increases were most marked for lung cancer for which mortality in DEPCATs 1 and 2 was 30% lower than for DEPCATs 3 to 5 in 1981 and 53% lower in 2001. In DEPCATs 6 and 7 the mortality rate was 57% higher than for DEPCATs 3 to 5 in 1981 but 90% higher by 2001. For colorectal cancer the widening inequalities were due to increases in the ratio of mortality in DEPCATs 6 and 7 relative to DEPCATs 3 to 5; an 11% excess in 1981 became 22% by 2001. Gradients also increased for stomach cancer and for all other cancers.

		Death rate per 100,000 population					
		men			Women		
	Deprivation	1980-82	1991-92	2000-02	1980-82	1991-92	2000-02
Intentional self harm & events of undetermined intent (ICD9 E950-959, 980-989; ICD10 X60-84, Y87.0, Y10-Y34, Y87.2)	1	8	10	11	6	4	4
	2	15	18	17	9	5	5
	3	16	19	21	8	5	6
	4	18	18	26	10	7	8
	5	17	21	32	10	8	10
	6	24	27	37	10	7	11
	7	35	44	45	17	17	16
	All Scotland	18	21	26	10	7	8
Mental and behavioural disorders due to use of drugs (ICD9 304, 305.2-.9; ICD10 F11-16, F18-19)	1	0	0	2	0	0	1
	2	0	0	4	0	0	0
	3	0	0	4	0	0	1
	4	0	0	8	0	0	1
	5	0	1	10	0	0	1
	6	0	1	19	0	0	4
	7	1	2	40	0	2	8
	All Scotland	0	1	10	0	0	2
Mental and behavioural disorders due to use of alcohol (ICD9 291, 303, 305.0; ICD10 F10)	1	1	1	1	3	1	2
	2	2	1	3	1	1	2
	3	3	4	6	1	2	2
	4	3	5	8	1	2	3
	5	4	7	13	2	3	3
	6	9	8	14	3	1	4
	7	16	4	22	7	2	8
	All Scotland	5	4	9	2	2	3
Assault (ICD9 E960-969; ICD10 X85-Y09, Y87.1)	1	0	0	0	0	0	0
	2	1	1	1	0	0	0
	3	1	2	1	0	0	0
	4	1	4	2	1	1	1
	5	2	4	5	2	1	1
	6	3	4	5	1	1	2
	7	10	14	15	4	3	1
	All Scotland	2	3	3	1	1	1

Table 4.11 Cause specific age standardised mortality (per 100,000 population) from selected causes within each deprivation category. Men and women aged 0-64, Scotland 1980-82, 1991-92 & 2000-02.

The gradients steepened for chronic lower respiratory disease and chronic liver disease but decreased slightly for accidents. For intentional self-harm the mortality rate in DEPCATs 6 and 7 changed little relative to that in DEPCATs 3 to 5, being 56% higher in 2001, whilst the mortality rate in DEPCATs 1 and 2 was 24% below that in DEPCATs 3 to 5 in 1981 and 41% lower in 2001. The differential between DEPCATs 6 and 7 and DEPCATs 3 to 5 increased for mental and behavioural disorders due to the use of drugs, as did that with DEPCATs 1 and 2 (there having been an inverse gradient in 1981). Whilst the mortality rate from disorders due to mental and behavioural disorders due to the use of alcohol in DEPCATs 1 and 2 decreased relative to DEPCATs 3 to 5, the relative mortality rate in DEPCATs 6 and 7 also decreased from being 244% higher in 1981 to 98% higher in 2001. The relative differential for mortality due to assault increased for DEPCATs 1 and 2 but the change was less marked for DEPCATs 6 and 7.

Among women in 1981 the ratios of mortality in DEPCATs 1 and 2 and in DEPCATs 6 and 7 relative to that in DEPCATs 3 to 5 were approximately the same as those for men. However, by 2001 the relative mortality in DEPCATs 1 and 2 changed little – decreasing from 25% below that for DEPCATs 3 to 5 to 30% below – whilst the relative increase in DEPCATs 6 and 7 to a 53% excess was smaller than the increase seen for men over the same period. The net result was that although inequalities in female all-cause mortality increased, the increase was not as great as that seen for men. Steep increases were seen for IHD; in DEPCATs 1 and 2 mortality was 36% lower than in DEPCATs 3 to 5 in 1981, but was 52% lower in 2001. Over the same period the excess mortality in DEPCATs 6 and 7 over DEPCATs 3 to 5 increased from 38% to 88%. The difference between DEPCATs 1 and 2 and DEPCATs 3 to 5 changed little for cerebrovascular disease, but increased slightly between DEPCATs 6 and 7 and DEPCATs 3 to 5. IHD and cerebrovascular disease were notable for having steeper deprivation gradients for women than for men in all years.

For malignant neoplasms female mortality in DEPCATs 1 and 2 in 2001 was 17% lower than in DEPCATs 3 to 5, virtually unchanged from 1981, but in DEPCATs 6 and 7 the excess increased from 14% to 26%. There were strong gradients for lung cancer mortality which increased slightly for DEPCATs 1 and 2 and decreased slightly in DEPCATs 6 and 7 relative to DEPCATs 3 to 5. There was no clear gradient for breast cancer. There was the suggestion of an emerging gradient for colorectal cancer, with mortality in DEPCATs 6 and 7 being 25% higher than that in DEPCATs 3 to 5 in 2001. The excess mortality in DEPCATs 6 and 7 for stomach cancer increased from 29% in 1981 to 80% in 2001; a gradient in DEPCATs 1 and 2, present in 1981 and 1991, had become inverted by 2001. Women in DEPCATs 1 and 2 had 19% lower mortality in 2001 from other malignant neoplasms than women in DEPCATs 3 to 5, little changed from 1981. In DEPCATs 6 and 7 the excess mortality increased from just 5% to 23%.

		Rate ratio relative to deprivation categories 3-5					
		men			Women		
	Deprivation categories	1980-82	1991-92	2000-02	1980-82	1991-92	2000-02
All causes	1-2	0.75	0.69	0.59	0.75	0.78	0.70
	6-7	1.35	1.47	1.71	1.31	1.47	1.53
Ischaemic heart disease	1-2	0.74	0.63	0.53	0.64	0.51	0.48
	6-7	1.23	1.42	1.59	1.38	1.70	1.88
Cerebrovascular disease	1-2	0.79	0.72	0.73	0.65	0.75	0.67
	6-7	1.24	1.41	1.53	1.33	1.71	1.55
All malignant neoplasms	1-2	0.80	0.75	0.72	0.84	0.91	0.83
	6-7	1.34	1.43	1.44	1.14	1.20	1.26
Malignant neoplasm of trachea, bronchus and lung	1-2	0.70	0.56	0.47	0.77	0.65	0.69
	6-7	1.57	1.74	1.90	1.76	1.79	1.60
Malignant neoplasm of female breast	1-2				0.92	1.00	0.92
	6-7				0.95	0.79	1.00
Malignant neoplasm of colon and rectum	1-2	0.99	1.04	0.97	1.00	0.99	1.05
	6-7	1.11	1.17	1.22	0.91	0.83	1.25
Malignant neoplasm of stomach	1-2	0.75	0.58	0.67	0.73	0.55	1.13
	6-7	1.36	1.24	1.44	1.29	1.38	1.80
All other malignant neoplasms	1-2	0.87	0.84	0.79	0.79	0.96	0.81
	6-7	1.15	1.30	1.26	1.05	1.27	1.23
Chronic lower respiratory diseases	1-2	0.54	0.42	0.42	0.75	0.64	0.46
	6-7	1.71	2.00	2.08	1.98	2.01	2.25
Chronic liver disease	1-2	0.69	0.54	0.34	0.75	0.33	0.41
	6-7	2.11	1.80	2.75	1.98	1.86	1.95
Accidents	1-2	0.79	0.71	0.67	0.78	0.79	0.65
	6-7	1.31	1.14	1.19	1.08	1.51	1.22
Intentional self harm & events of undetermined intent	1-2	0.76	0.82	0.59	0.87	0.73	0.63
	6-7	1.64	1.76	1.56	1.32	1.63	1.69
Mental and behavioural disorders due to use of drugs	1-2	1.26	0.50	0.43	0.00	0.00	0.42
	6-7	2.79	2.35	3.82	5.89	6.22	4.76
Mental and behavioural disorders due to use of alcohol	1-2	0.47	0.27	0.30	1.28	0.58	0.68
	6-7	3.44	1.31	1.98	2.81	0.73	1.71
Assault	1-2	0.67	0.21	0.24	0.33	0.35	0.44
	6-7	3.80	2.68	3.30	2.36	2.93	1.83

Table 4.12 Mortality rate ratios for deprivation category groups relative to categories 3-5. Men and women aged 0-64, Scotland 1980-82, 1991-92 & 2000-02.

Both gradients increased for chronic lower respiratory disease. The mortality rate in DEPCATs 1 and 2 was 25% below that in DEPCATs 3 to 5 in 1981 and 54% below in 2001, whilst the excess in DEPCATs 6 and 7 increased from 98% to 125%. For chronic liver disease mortality in DEPCATs 1 and 2 was 25% lower than in DEPCATs 3 to 5 in 1981 but 59% lower in 2001. In DEPCATs 6 and 7 the excess remained unchanged at about 95%. Unlike male deaths, both gradients increased for accidents; the female mortality rate in DEPCATs 1 and 2 was 22% below that in DEPCATs 3 to 5 in 1981 and 35% below in 2001, and a modest excess of 8% in DEPCATs 6 and 7 in 1981 increased to 22% in 2001. The mortality differentials increased for intentional self harm. In 1981 the mortality rate in DEPCATs 1 and 2 was 13% below that in DEPCATs 3 to 5, whilst that in DEPCATs 6 and 7 was 32% higher; by 2001 rates in these areas were 37% lower and 69% higher than DEPCATs 3 to 5 respectively. Trends for mental and behavioural disorders due to the use of drugs and alcohol and for assault were unclear, but all showed steep gradients by 2001 (particularly mental and behavioural disorders due to the use of drugs).

Regional differences in mortality rates

Table 4.13 shows the age standardised all cause mortality rates for men aged 0-64 among the major regions and cities of Scotland in 1981, 1991 and 2001. Between 1981 and 1991 mortality rates fell by 24-28% in the Highlands and Islands, the North East and the South West, by 22% in Central Scotland and by just 17-19% in the Clydeside conurbation, the East and South East. Between 1991 and 2001 rates fell by 13-17% in most regions but by just 6-7% in the North East and Clydeside conurbation. These declines meant that the 24% fall in mortality rates over 20 years in the Clydeside conurbation was substantially below a 31% fall seen throughout the whole country. By 2001 the Clydeside conurbation was the only region with an above average mortality rate; the excess mortality over the national level increased from 17% in 1981 to 29% in 2001. By contrast the Highlands and islands, Central and South West regions all had mortality rates close to the national average in 1981 that had fallen 8-10% below average by 2001.

The mortality rate in Edinburgh fell by 28% between 1981 and 2001 but the fall was substantially below average in the other cities. This was largely due to there being little or no decline in mortality rates between 1991 and 2001 in Aberdeen, Dundee and Glasgow. By 2001 the mortality rate in Edinburgh was slightly below average whilst the rate in Aberdeen was close to that for Scotland. In Dundee the mortality rate was 10% below average in 1981 but by 2001 was 19% above average; in Glasgow, a mortality rate 28% above average in 1981 was 64% above average in 2001. Another way to think about the mortality rates for the cities is to make comparisons to the regions in which they are located. The mortality rate for Edinburgh was slightly higher than that for the South East at all times. The rates for Aberdeen and Dundee were close to those for the North East and East of Scotland respectively in 1981, but were 20% and 32% above the regional rates by 2001. Mortality in Glasgow was 11% above that for the Clydeside conurbation in 1981; by 2001 the rate was 27% higher.

Comparable rates for women are shown in table 4.14. Decreases in mortality rates were slightly below the Scottish average of 33% between 1981 and 2001 in the Clydeside conurbation and the South East (which fell by under 30%). By 2001 the mortality rate in the South East was still 8% below average, however, whilst that in the Clydeside conurbation was 19% above average. Female mortality rates fell in line with national rates in Aberdeen and by 28% in Edinburgh but by 21% in Glasgow and just 12% in Dundee. As a result the mortality rate at these ages in Aberdeen remained at 11% below the national average and that in Edinburgh was just 2% below average in 2001. The mortality rate in Dundee was 6% below average in 1981 but 23% above average in 2001;

in Glasgow a mortality rate 21% above average in 1981 was 43% above average by 2001. As for men the death rate in Edinburgh was just a little higher than that for the region. The rates for Aberdeen were closer to the regional rates than was the case for men, with a gradual increase to a 9% excess by 2001. Much larger increases in the differential between city and region were seen in Glasgow (which increased from a 6% excess in 1981 to 20% in 2001) and, particularly, in Dundee (where a rate in line with the East of Scotland in 1981 was 35% higher by 2001).

	Male death rate per 100,000 population			% change	
Region	**1980-82**	**1991-92**	**2000-02**	**81 to 91**	**91 to 01**
Highlands & islands	478	363	309	-24	-15
North East	401	303	282	-25	-7
Clydeside conurbation	577	467	439	-19	-6
Central	476	369	306	-22	-17
East	431	353	306	-18	-13
South West	498	357	312	-28	-13
South East	427	354	299	-17	-16
Major cities					
Aberdeen	418	339	338	-19	0
Dundee	447	406	402	-9	-1
Edinburgh	438	381	317	-13	-17
Glasgow	634	545	557	-14	2
All Scotland	495	384	340	-22	-12

Table 4.13 Age standardised death rates per 100,000 population in the major regions and cities of Scotland. Men aged 0-64, Scotland 1980-82, 1991-92 and 2000-02.

Given the strong and increasing gradient of mortality rates across deprivation categories seen in tables 4.7 and 4.8 it is possible that a differential distribution of deprivation across the regions and cities of Scotland might explain some or all of the mortality patterns seen in tables 4.13 and 4.14. Table 4.15 begins to explore this possibility by showing how the distribution of 2001 deprivation categories varied across Scotland. It is clear that there were high levels of deprivation in Dundee and Glasgow with 56% and 66% of their populations living in DEPCATs 6 and 7 respectively compared with just 18% nationally. These differences were also evident across regions with 40% of the Clydeside conurbation living in DEPCATs 6 and 7 compared to 3% of the population of Central and under 1% of the Highlands and Islands. The differences are more extreme when only the

most deprived areas are considered; for example, one fifth of the population of the Clydeside conurbation and 44% of that of Glasgow lived in DEPCAT 7 compared to just 7% nationally.

	Female death rate per 100,000 population			% change	
Region	**1980-82**	**1991-92**	**2000-02**	**81 to 91**	**91 to 01**
Highlands & islands	257	193	178	-25	-8
North East	235	193	158	-18	-18
Clydeside conurbation	326	267	229	-18	-14
Central	292	214	186	-27	-13
East	261	220	176	-16	-20
South West	288	233	193	-19	-17
South East	250	204	178	-19	-13
Major cities					
Aberdeen	253	208	172	-18	-17
Dundee	269	243	237	-9	-3
Edinburgh	262	215	189	-18	-12
Glasgow	346	308	275	-11	-11
All Scotland	286	229	193	-20	-16

Table 4.14 Age standardised death rates per 100,000 population in the major regions and cities of Scotland. Women aged 0-64, Scotland 1980-82, 1991-92 and 2000-02.

Just as the most deprived postcode sectors tend to cluster within certain regions and cities, so do the least deprived areas. Nearly two fifths of the population of Aberdeen and 29% of the population of Edinburgh lived in DEPCATs 1 and 2 compared to 20% nationally. This difference was even more pronounced at a regional level with 43% of the North East population living in DEPCATs 1 and 2 compared to 9% in the South West and 10% in the Highlands and Islands. In addition to the high proportion of their populations living in deprived areas, 5% of the population of Glasgow and 14% of the Clydeside conurbation lived in DEPCATs 1 and 2.

	Deprivation category (DEPCAT)						
Region	1	2	3	4	5	6	7
Highlands and Islands	1	9	45	36	8	1	0
North East	18	26	26	22	4	6	0
Clydeside conurbation	5	10	10	16	19	20	20
Central	5	18	12	46	16	3	0
East	6	17	27	21	14	11	4
South West	1	8	27	33	16	15	0
South East	9	16	26	25	16	4	3
Major cities							
Aberdeen	16	22	14	24	10	14	0
Dundee	6	8	11	7	12	37	18
Edinburgh	11	18	21	19	20	6	5
Glasgow	0	5	5	15	9	22	44
All Scotland	6	14	22	25	15	11	7

Table 4.15 The distribution of 2001 deprivation categories across major regions and cities of Scotland. Figures are percentage of area population.

The deprivation categories used in this chapter are based on the 1981, 1991 and 2001 Censuses. Any particular area may change deprivation categories between Censuses and, as a consequence, so may the distribution of the population of regions and cities. The equivalent of table 4.15 is shown in Appendix tables A.47 and A.48 for 1981 and 1991 respectively. The proportion of the population of the Highlands and islands living in DEPCAT 1 and 2 decreased markedly from 19% in 1981 to 13% in 1991 and 10% in 2001. The increases in these least deprived areas were largely seen in Central and the North East. In particular there has been a substantial increase in the proportion of the population living in DEPCAT 1 in Aberdeen (from 5% in 1981 to 16% in 2001) and indeed throughout the North East (from 4% in 1981 to 18% in 2001). The change in the proportion of the population living in DEPCATs 6 and 7 in the cities is shown in figure 4.1. The most noticeable feature of this figure is the increase in the proportion of the Dundee population living in these areas from 36% in 1981 to 56% in 2001. Not made clear in this figure is the increase in the proportion of the population of Glasgow living in

DEPCAT 7, the most deprived areas, from 37% in 1981 to 41% in 1991 and 44% in 2001.

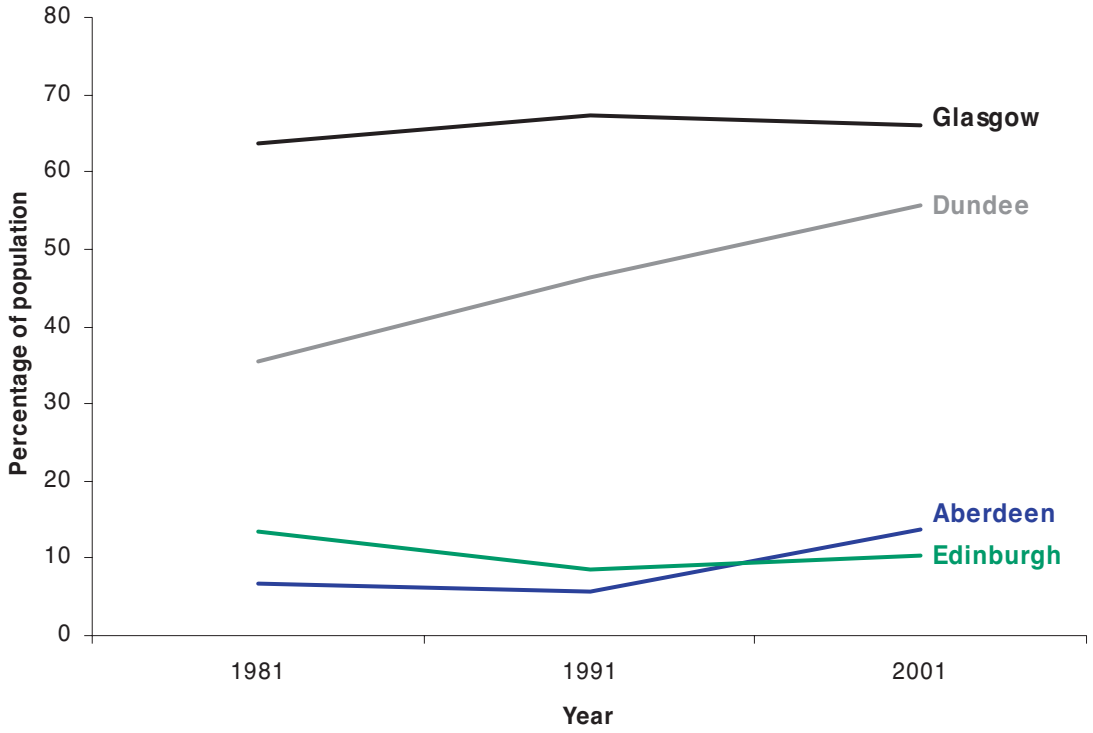


Figure 4.1 Percentage of the population of the major cities in deprivation categories 6 and 7 (most deprived). Scotland 1981, 1991 and 2001.

Table 4.16 presents all cause age standardised death rates for males aged 0-64 in 1981, 1991 and 2001 by deprivation category for the major regions of Scotland. This table should be viewed in the context of table 4.8 which provides figures for all cause mortality for the whole country in this age group broken down by deprivation categories. In the Clydeside conurbation it is clear that mortality rates in the less deprived areas in 2001 were close to the national rates for those deprivation categories; however, in the more deprived areas mortality rates in this region were above average. This gap amounted to excess mortality over the Scottish average of nearly 8% in DEPCATs 5 and 6. Mortality rates in the North East were also above average in 2001 in every deprivation category; the excess was 13% in DEPCAT 4 and 22% in DEPCAT 6. This is in sharp contrast to the below average mortality rates in this region in 1981 in all deprivation categories apart from DEPCAT 5. In the South West, although mortality in DEPCAT 2 was higher than average, the rates in other deprivation categories were 7-11% below average in 2001.

		Male death rate per 100,000 population			% change	
Deprivation category	Region	1980-82	1991-92	2000-02	81 to 91	91 to 01
1	Highlands & islands	342	315	244	-8	-22
	North East	290	217	170	-25	-22
	Clydeside conurbation	330	221	161	-33	-27
	Central	304	309	125	2	-60
	East	318	238	199	-25	-16
	South West	349	198	140	-43	-29
	South East	296	225	132	-24	-41
2	Highlands & islands	425	276	221	-35	-20
	North East	367	247	218	-33	-12
	Clydeside conurbation	386	287	215	-26	-25
	Central	377	288	202	-24	-30
	East	366	289	204	-21	-29
	South West	420	257	240	-39	-7
	South East	365	282	190	-23	-33
3	Highlands & islands	445	334	290	-25	-13
	North East	406	299	272	-26	-9
	Clydeside conurbation	454	374	281	-18	-25
	Central	439	436	265	-1	-39
	East	422	326	259	-23	-20
	South West	479	327	254	-32	-22
	South East	426	288	289	-33	0
4	Highlands & islands	564	403	334	-29	-17
	North East	446	370	371	-17	0
	Clydeside conurbation	534	449	352	-16	-22
	Central	491	329	341	-33	3
	East	462	361	304	-22	-16
	South West	472	344	302	-27	-12
	South East	447	407	329	-9	-19
5	Highlands & islands	661	521	390	-21	-25
	North East	592	416	497	-30	19
	Clydeside conurbation	565	446	445	-21	0
	Central	511	416	412	-19	-1
	East	489	430	386	-12	-10
	South West	554	428	375	-23	-13
	South East	513	462	410	-10	-11
6	Highlands & islands	913	452	846	-51	87
	North East	392	435	583	11	34
	Clydeside conurbation	646	518	515	-20	-1
	Central	628	782	388	25	-50
	East	506	466	445	-8	-5
	South West	591	488	425	-17	-13
	South East	561	411	403	-27	-2
7	Highlands & islands	607	0		-100	
	North East					
	Clydeside conurbation	735	635	717	-14	13
	Central					
	East	557	2547	623	358	-76
	South West	794	544		-32	
	South East	697	666	675	-4	1

Table 4.16 Age standardised death rates per 100,000 population by deprivation categories in the major regions of Scotland. Men aged 0-64, 1980-82, 1991-92 and 2000-02.

Figure 4.2 presents the *declines* in mortality between 1981 and 2001 by deprivation category for each region and for Scotland. Bars are only shown for those regions which had at least 5% of their population in a particular DEPCAT in 2001. The only exception to this was the 49% increase in mortality in the North East in DEPCAT 6 (3% of the region's population in 1981) which has been excluded as such a sharp increase would swamp the other figures. Declines in mortality in the Clydeside conurbation are in line with those seen in the whole of Scotland within each deprivation category. This means that the below average decreases in mortality in this region noted in the commentary on table 4.13 were a consequence of a combination of the high levels of deprivation in the region and the below average declines in mortality experienced by deprived areas. By contrast the North East, with most of its population living in DEPCATs 1 to 4, experienced *below* average declines in mortality within each deprivation category (and a 49% increase in mortality in DEPCAT 6). This was also noticeable in DEPCAT 4 where no change in mortality between 1991 and 2001 in the region contributed to a 17% fall between 1981 and 2001 compared to a national fall of 32% in the same category. However, the high concentration of the population of the region living in less deprived areas and the greater decline in mortality experienced by these areas led to the 30% decline in mortality in the region approximating the national fall. In the South East it is clear that declines in mortality were greater than average in the least deprived areas (DEPCATs 1 and 2) but below average in DEPCATs 3-5.

Table 4.17 presents female age standardised mortality rates in each deprivation category for Scottish regions. In 2001 in the Clydeside conurbation the mortality rate in DEPCAT 1 was slightly below average whilst those in DEPCATs 2-5 were a little higher than average. In the Central region rates tended to be slightly higher than average, the exception being for DEPCAT 1 where rates were 28% below average in 2001. In the East although the rate was 12% above average in DEPCAT 1 and close to the average in DEPCAT 2 it was below average in all other deprivation categories.

Declines in female mortality in the North East between 1981 and 2001 were mostly smaller than average for each deprivation category; this was particularly notable in DEPCAT 1 where a 4% increase between 1981 and 1991 led to a fall of just 21% over the 20 years compared to an average fall of 36%. However, mortality rates in this region generally started from a low base. Overall declines in female mortality in the Clydeside conurbation were in line with or lower than the average for each deprivation category. As for men, in the South East declines in mortality in less deprived areas were above average but those in more deprived areas were below average; this suggests that the region has experienced an increase in mortality differentials between affluent and deprived areas over the past 20 years beyond the increase that has been seen in Scotland as a whole.

Table 4.18 shows how male age standardised all cause mortality rates have changed within the major cities of Scotland for men aged under 65 years. In 1981 mortality rates in Aberdeen were lower than average within every deprivation category with the exception of DEPCAT 5 where they were 9% higher than average. By 2001 rates were higher in every category, most noticeably so in DEPCATs 4-6 (comprising nearly half of Aberdeen's population) where rates were 20-26% above average. Aberdeen's mortality rate in 2001 – close to the national average – appeared high given the relative affluence of the city. In Glasgow the mortality rate was above the average in every deprivation category apart from DEPCAT 3. The high mortality rate in DEPCAT 7 in Glasgow – 735 per 100,000 – was only a little higher than the Scottish average but was notably higher than areas of comparable deprivation in Dundee and Edinburgh. Both Glasgow and Edinburgh experienced an increase in mortality rates in DEPCAT 7 between 1991 and 2001.

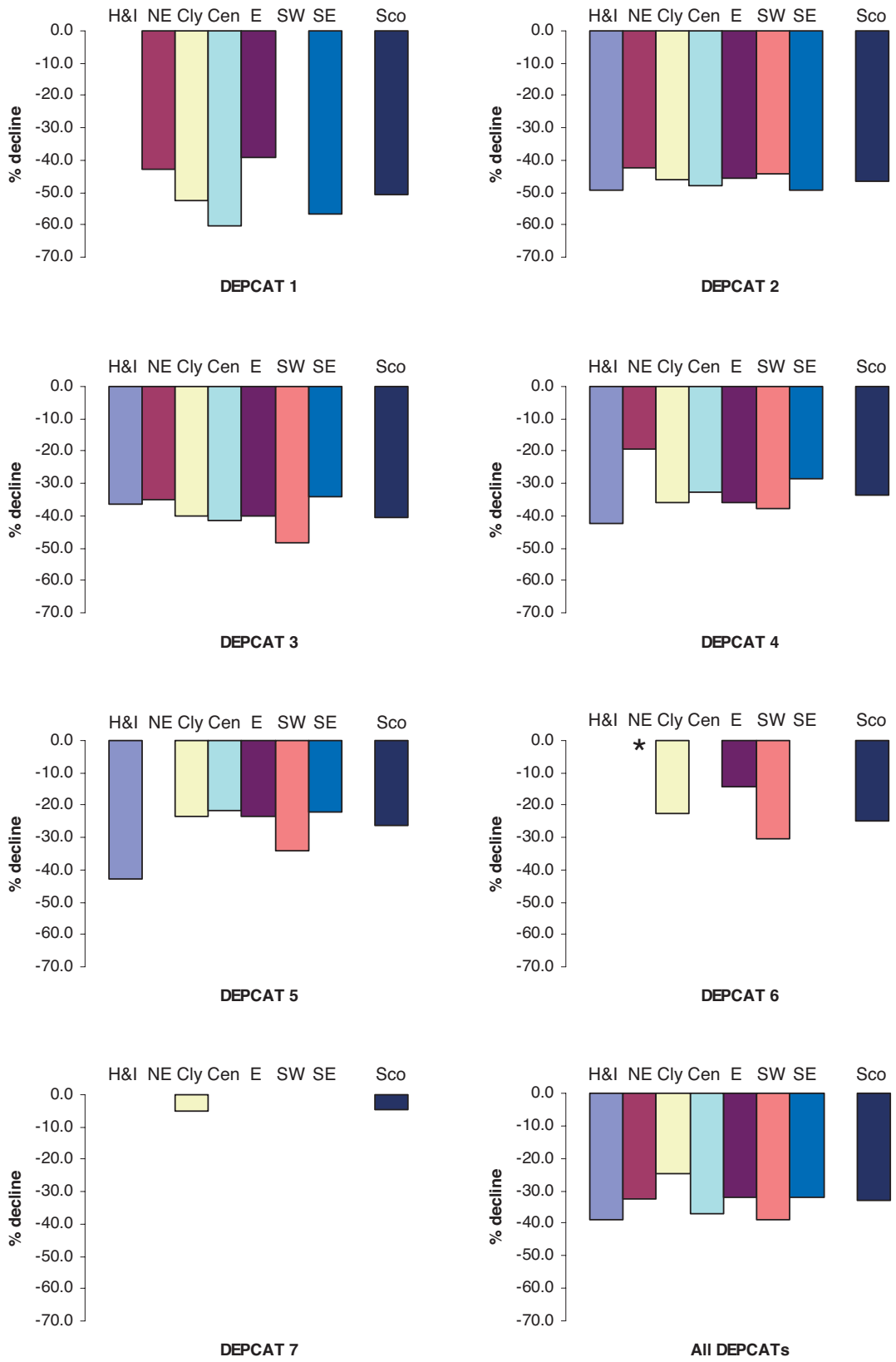


Figure 4.2 Percentage decline in mortality within each deprivation category and across all deprivation categories. Men aged 0-64, Scotland 1980-82 to 2000-02.

Key: H&I Highlands and islands; NE North East; Cly Clydeside conurbation; Cen Central; E East; SW South West; SE South East; Sco Scotland

		Female death rate per 100,000 population			% change	
Deprivation category	Region	1980-82	1991-92	2000-02	81 to 91	91 to 01
1	Highlands & islands	114	172	132	51	-24
	North East	170	177	135	4	-24
	Clydeside conurbation	201	135	119	-33	-12
	Central	150	111	90	-26	-20
	East	162	146	140	-10	-4
	South West	210	76	111	-64	47
	South East	187	145	119	-22	-18
2	Highlands & islands	249	171	145	-31	-15
	North East	217	160	132	-26	-17
	Clydeside conurbation	229	204	140	-11	-31
	Central	226	220	138	-2	-37
	East	202	195	135	-3	-31
	South West	221	194	139	-12	-28
	South East	239	155	116	-35	-25
3	Highlands & islands	265	190	169	-28	-11
	North East	254	171	154	-33	-10
	Clydeside conurbation	277	196	168	-29	-15
	Central	295	196	168	-33	-14
	East	257	197	150	-23	-24
	South West	265	197	155	-26	-21
	South East	232	171	161	-26	-6
4	Highlands & islands	281	199	200	-29	1
	North East	248	223	179	-10	-20
	Clydeside conurbation	297	222	196	-25	-12
	Central	321	215	202	-33	-6
	East	272	232	176	-15	-24
	South West	297	251	190	-15	-24
	South East	267	222	197	-17	-11
5	Highlands & islands	192	312	186	62	-40
	North East	324	262	242	-19	-7
	Clydeside conurbation	315	252	230	-20	-9
	Central	298	228	226	-24	-1
	East	338	238	206	-30	-13
	South West	323	272	234	-16	-14
	South East	287	258	224	-10	-13
6	Highlands & islands	350	100	88	-71	-13
	North East	277	249	260	-10	4
	Clydeside conurbation	368	293	255	-20	-13
	Central	318	338	261	6	-23
	East	369	291	249	-21	-14
	South West	351	276	262	-21	-5
	South East	300	302	220	1	-27
7	Highlands & islands	0	0			
	North East					
	Clydeside conurbation	403	382	340	-5	-11
	Central					
	East	303	0	307	-100	
	South West	206	268		30	
	South East	380	397	455	5	15

Table 4.17 Age standardised death rates per 100,000 population by deprivation categories in the major regions of Scotland. Women aged 0-64, 1980-82, 1991-92 and 2000-02.

		Male death rate per 100,000 population			% change	
Deprivation category	City	1980-82	1991-92	2000-02	81 to 91	91 to 01
1	Aberdeen	265	218	161	-18	-26
	Dundee	318	182	264	-43	45
	Edinburgh	295	229	118	-23	-48
	Glasgow	374	0	655	-100	
2	Aberdeen	368	286	217	-22	-24
	Dundee	360	258	220	-28	-15
	Edinburgh	385	286	204	-26	-28
	Glasgow	348	323	217	-7	-33
3	Aberdeen	366	383	308	5	-20
	Dundee	468	437	203	-7	-54
	Edinburgh	446	279	299	-37	7
	Glasgow	458	329	245	-28	-26
4	Aberdeen	465	353	416	-24	18
	Dundee	464	441	380	-5	-14
	Edinburgh	460	513	351	11	-31
	Glasgow	545	437	350	-20	-20
5	Aberdeen	594	469	497	-21	6
	Dundee	447	427	351	-4	-18
	Edinburgh	494	489	426	-1	-13
	Glasgow	571	483	458	-15	-5
6	Aberdeen	392	435	583	11	34
	Dundee	474	471	428	-1	-9
	Edinburgh	561	371	452	-34	22
	Glasgow	695	548	537	-21	-2
7	Aberdeen					
	Dundee	557	2547	658	358	-74
	Edinburgh	697	666	675	-4	1
	Glasgow	727	647	735	-11	13

Table 4.18 Age standardised death rates per 100,000 population by deprivation categories in the major cities of Scotland. Men aged 0-64, 1980-82, 1991-92 and 2000-02.

The same data are presented for female deaths in table 4.19. The elevated mortality rate among the relatively large proportion of women in Aberdeen living in DEPCAT 1 is notable; in 2001 their mortality rate was 21% higher than the average. Mortality rates in Dundee were higher than average for women living in DEPCATs 1-4 but below average in DEPCATs 5-7. The pattern in Edinburgh was mixed, with below average mortality in DEPCATs 1 and 2 and above average rates in DEPCATs 3-5. For the majority of the Glasgow population, living in DEPCATs 3-7, mortality rates were close to the Scottish average.

		Female death rate per 100,000 population			% change	
Deprivation category	**City**	**1980-82**	**1991-92**	**2000-02**	**81 to 91**	**91 to 01**
1	**Aberdeen**	212	197	150	-7	-24
	Dundee	176	120	218	-32	82
	Edinburgh	192	134	105	-30	-22
	Glasgow	189	0	562	-100	
2	**Aberdeen**	228	170	128	-26	-24
	Dundee	150	179	155	19	-13
	Edinburgh	250	165	113	-34	-31
	Glasgow	220	202	156	-8	-23
3	**Aberdeen**	253	191	159	-25	-17
	Dundee	246	222	171	-10	-23
	Edinburgh	257	185	175	-28	-5
	Glasgow	279	182	162	-34	-11
4	**Aberdeen**	262	205	169	-22	-18
	Dundee	196	258	225	32	-13
	Edinburgh	275	239	210	-13	-12
	Glasgow	268	211	192	-21	-9
5	**Aberdeen**	330	284	242	-14	-15
	Dundee	312	249	216	-20	-13
	Edinburgh	272	260	240	-4	-8
	Glasgow	312	229	219	-27	-4
6	**Aberdeen**	277	249	260	-10	4
	Dundee	375	292	253	-22	-13
	Edinburgh	301	295	240	-2	-19
	Glasgow	381	306	253	-20	-17
7	**Aberdeen**					
	Dundee	303	0	320	-100	
	Edinburgh	380	397	455	5	15
	Glasgow	401	388	350	-3	-10

Table 4.19 Age standardised death rates per 100,000 population by deprivation categories in the major cities of Scotland. Women aged 0-64, 1980-82, 1991-92 and 2000-02.

Mortality rates and the SIMD

Population composition by SIMD income quintile

Table 4.20 provides the percentage distribution of the SIMD income domain among men in each age group. Although broadly comparable across age groups this table does suggest that an above average proportion of men aged 45-59 live in the least deprived areas and a below average proportion aged over 59 live in the same areas, with this proportion decreasing to just 16% of men aged over 74. There is also an above average proportion aged under 15 living in the most deprived areas.

		Age						
SIMD income quintile		**0-14**	**15-29**	**30-44**	**45-59**	**60-74**	**75+**	**All**
Least deprived	**5**	21	20	21	23	18	16	20
	4	19	19	21	22	20	21	20
	3	19	20	20	20	21	23	20
	2	19	20	20	19	21	22	20
Most deprived	**1**	22	21	18	17	20	18	19

Table 4.20 The percentage distribution of SIMD income quintiles among men. Figures are percentages within each age group. Scotland 2001.

The percentage distribution of SIMD income quintiles among male deaths is given in table 4.21. Although one fifth of the population live in each quintile just 12% of male deaths occur in the least deprived quintile increasing to 26% in the most deprived. In the oldest age group the pattern of deaths is not far out of line with the population but a strong gradient is clear at younger ages with 38% of male deaths at ages 15-44 occurring among those living in the most deprived areas.

Table 4.22 shows the percentage of male deaths in each age group within SIMD income quintiles. In the three least deprived quintiles the distribution of deaths is approximately the same, with over half of all deaths occurring at age 75 or over. This pattern shifts in the two most deprived quintiles; in the most deprived fifth of the country 22% of deaths are between the ages of 30 and 59 compared to just 16% nationally and 13-14% in the less deprived areas.

		Age						
SIMD income quintile		**0-14**	**15-29**	**30-44**	**45-59**	**60-74**	**75+**	**All**
Least deprived	**5**	15	8	10	11	11	13	12
	4	13	14	13	15	16	20	18
	3	16	18	16	18	20	23	21
	2	23	23	24	23	24	23	24
Most deprived	**1**	33	37	38	33	28	20	26

Table 4.21 The percentage distribution of SIMD income quintiles among male deaths. Figures are percentages within each age group. Scotland 2000-02.

		Age						
SIMD income quintile		**0-14**	**15-29**	**30-44**	**45-59**	**60-74**	**75+**	**All**
Least deprived	**5**	1	1	3	11	32	52	100
	4	1	2	3	10	31	54	100
	3	1	2	3	10	33	52	100
	2	1	2	4	11	35	47	100
Most deprived	**1**	1	3	6	15	37	37	100
All Scotland		1	2	4	12	34	47	100

Table 4.22 The percentage of male deaths in each age group. Figures are percentages within each SIMD income quintile. Scotland 2000-02.

		Age						
SIMD income quintile		**0-14**	**15-29**	**30-44**	**45-59**	**60-74**	**75+**	**All**
Least deprived	**5**	15	10	11	13	11	12	12
	4	14	13	14	16	16	21	19
	3	18	17	18	19	20	23	22
	2	23	22	22	23	25	23	23
Most deprived	**1**	29	38	35	29	29	21	23

Table 4.23 The percentage distribution of SIMD income quintiles among female deaths. Figures are percentages within each age group. Scotland 2000-02.

		Age						
SIMD income quintile		**0-14**	**15-29**	**30-44**	**45-59**	**60-74**	**75+**	**All**
Least deprived	**5**	1	1	2	7	20	70	100
	4	0	0	1	6	18	74	100
	3	0	0	2	6	20	71	100
	2	1	1	2	7	24	67	100
Most deprived	**1**	1	1	3	8	27	60	100
All Scotland		1	1	2	7	22	68	100

Table 4.24 The percentage of female deaths in each age group. Figures are percentages within each SIMD income quintile. Scotland 2000-02.

The distribution of SIMD income quintiles among women (not shown) is very similar to that for men. The distribution of quintiles among female deaths (table 4.23) shows a strong resemblance to table 4.21 although at younger ages the gradients appear less marked for women than for men. For example, at ages 30-44 10% of male deaths are in the least deprived quintile and 38% in the most deprived whilst for women the corresponding figures are 11% and 35%. Table 4.24 also shows differences across SIMD income quintiles in the percentage of female deaths in each age group. In the three least deprived quintiles over 70% of deaths were at age 75 and over, with this figure dropping to just 60% in the most deprived quintile.

All cause mortality rates

Male and female age specific all cause mortality rates for each SIMD income quintile are shown in table 4.25. The excess mortality in the most deprived quintile over the least deprived quintile was higher for men than for women in every age group. This gradient was steepest among those aged 75 and over; in men the excess in this age group was 36% compared to 26% for women. The greatest excess mortality was seen amongst those aged 30-44 (372% excess for men, 233% excess for women) and aged 15-29 (313% excess for men, 200% excess for women). The male age specific mortality rates are shown graphically in figure 4.3. The greater spread across deprivation quintiles at ages 15-34 illustrate the greater relative inequalities at these ages.

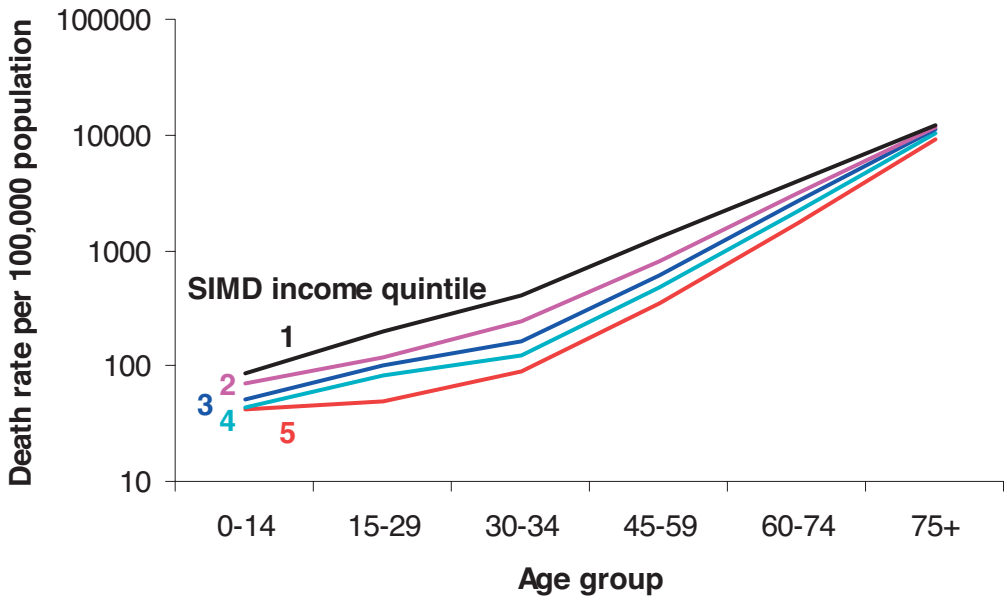


Figure 4.3 Male age specific death rates per 100,000 population for each SIMD 2004 deprivation category. Scotland 2000-02.

		Death rate per 100,000 population	
Age group	**SIMD income quintile**	**Men**	**Women**
0-14	**5**	42	34
	4	43	34
	3	51	47
	2	73	55
	1	85	59
15-29	**5**	48	21
	4	82	27
	3	99	33
	2	121	40
	1	200	64
30-44	**5**	88	54
	4	124	70
	3	164	93
	2	248	115
	1	417	180
45-59	**5**	346	253
	4	474	316
	3	601	379
	2	818	489
	1	1,280	667
60-74	**5**	1,732	1,051
	4	2,156	1,312
	3	2,624	1,557
	2	3,167	1,843
	1	3,967	2,316
75+	**5**	9,033	7,083
	4	10,253	8,129
	3	11,094	8,233
	2	11,623	8,323
	1	12,302	8,910

Table 4.25 Male and female age specific death rates per 100,000 population for each SIMD income quintile. Scotland 2000-02.

Cause specific mortality rates

Tables 4.26 to 4.28 show the mortality gradient across SIMD income quintiles broken down by cause of death among men aged 0-64 in 2001. At these ages all cause mortality in the most deprived quintile was 247% higher than in the least deprived. The excess was a little higher for deaths from IHD (275%) but lower for cerebrovascular disease (198%) and all malignant neoplasms (109%).

SIMD income quintile		Cause of death			
		All cause	Ischaemic heart disease (I20-25)	Cerebro-vascular disease (I60-69, G45)	Malignant neoplasms (C00-C97)
Least deprived	5	176	31	7	64
	4	238	44	11	75
	3	302	62	10	86
	2	407	79	16	107
Most deprived	1	612	115	22	134
All Scotland		340	65	13	92

Table 4.26 Cause specific age standardised mortality (per 100,000 population) within each SIMD income quintile. Men aged 0-64, Scotland 2000-02.

Table 4.26 also offers the opportunity to draw comparisons between the discriminatory power of the SIMD income domain and that of the Carstairs score in conjunction with table 4.12. The earlier table had grouped the most and least deprived DEPCATs; DEPCATs 1 and 2 combined and DEPCATs 6 and 7 combined comprised 20% and 18% of the population respectively (table 4.1) and as such are comparable in size to quintiles 5 and 1 of the SIMD. The ratio of all cause mortality in quintile 1 to that in quintile 5 shown in table 4.26, 3.47, is markedly larger than the ratio of DEPCATs 6 and 7 to DEPCATs 1 and 2, 2.88, which may be obtained from table 4.12. Although the two indicators of small area deprivation have fundamentally different components it is likely that the increased discriminatory power of the SIMD is largely due to the move to a smaller area basis – from postcode sector for the Carstairs score to data zone for the SIMD – with a consequent increase in population homogeneity.

The gradient for lung cancer across SIMD quintiles (shown in table 4.27) was steeper than that for all cancers or indeed than that for IHD, the excess mortality in the most deprived quintile being 312%. The mortality gradient for colorectal cancer was not pronounced whilst that for stomach cancer was in line with that for all cancers. The mortality gradient for other cancers was then lower than that for all cancers; mortality in the most deprived quintile was 70% higher than in the least deprived quintile. The causes listed in table 4.28 once again show steep gradients by area deprivation. The excess mortality in the most deprived quintile was lowest for accidents (146%) and suicide (337%) with substantially higher excesses visible for chronic liver disease, mental and behavioural disorders due to the use of alcohol and drugs and assault.

		Cause of death				
SIMD income quintile		**Malignant neoplasms (C00-97)**	**Malignant neoplasm of trachea bronchus and lung (C33-34)**	**Malignant neoplasm of colon and rectum (C18-20)**	**Malignant neoplasm of stomach (C16)**	**All other malignant neoplasms***
Least deprived	**5**	64	12	9	3	41
	4	75	18	9	3	45
	3	86	22	8	4	51
	2	107	34	11	6	56
Most deprived	**1**	134	48	11	6	70
All Scotland		92	26	9	4	52

* excluding lung, colorectal and stomach

Table 4.27 Age standardised mortality (per 100,000 population) from malignant neoplasms within each SIMD deprivation quintile. Men aged 0-64, Scotland 2000-02.

SIMD income quintile		Cause of death						
		Chronic lower respiratory diseases (J40-47)	Chronic liver disease (K70, K73-74)	Accidents (V01-X59, Y85, Y86)	Intentional self harm & events of undetermined intent (X60-84, Y87.0, Y10-34, Y87.2)	Mental and behavioural disorders due to use of drugs (F11-16, F18-19)	Mental and behavioural disorders due to use of alcohol (F10)	Assault (X85-Y09, Y87.1)
Least deprived	**5**	3	6	11	11	2	2	0
	4	5	11	17	18	4	5	1
	3	7	16	17	24	5	8	1
	2	12	29	21	31	11	11	4
Most deprived	**1**	18	61	27	48	29	20	11
All Scotland		9	23	18	26	10	9	3

Table 4.28 Age standardised mortality (per 100,000 population) from selected causes within each SIMD deprivation quintile. Men aged 0-64, Scotland 2000-02.

Tables 4.29 to 4.31 replicate the cause specific analysis for women aged under 65. The gradient across SIMD income quintiles in all cause mortality was not as steep as for men, with mortality rates in the most deprived areas being 164% higher than in the least deprived. The gradient in IHD mortality was steeper than for men, with an excess mortality in the most deprived areas of 422%. However, IHD contributes just 10% of all mortality at these ages among women as opposed to 19% among men. The gradient in deaths from cerebrovascular disease was comparable to that for men and slightly higher than the gradient in female all cause mortality. For malignant neoplasms, however, the gradient was substantially reduced with mortality in the most deprived quintile being 65% higher than in the least deprived. Whilst table 4.30 indicates that there was a steep gradient for lung cancer – the mortality in the most deprived areas was 231% higher than in the least deprived – there was little clear gradient for breast cancer or colorectal cancer. The mortality gradient due to stomach cancer and other malignant neoplasms was in line with that for all cancers. As was the case for male deaths, the mortality gradients were steepest among women for the causes of death listed in table 4.31.

		Cause of death			
SIMD income quintile		**All cause**	**Ischaemic heart disease (I20-25)**	**Cerebro-vascular disease (I60-69, G45)**	**Malignant neoplasms (C00-C97)**
Least deprived	**5**	117	7	6	62
	4	144	12	7	69
	3	180	18	10	75
	2	224	26	13	84
Most deprived	**1**	310	36	20	102
All Scotland		193	19	11	78

Table 4.29 Cause specific age standardised mortality (per 100,000 population) within each SIMD income quintile. Women aged 0-64, Scotland 2000-02.

SIMD income quintile		Cause of death					
		Malignant neoplasms (C00-97)	Malignant neoplasm of trachea bronchus and lung (C33-34)	Malignant neoplasm of female breast (C50)	Malignant neoplasm of colon and rectum (C18-20)	Malignant neoplasm of stomach (C16)	All other malignant neoplasms*
Least deprived	**5**	62	8	17	6	2	30
	4	69	12	20	5	2	30
	3	75	16	19	5	1	35
	2	84	20	18	5	2	39
Most deprived	**1**	102	27	19	6	3	46
All Scotland		78	17	18	5	2	36

* excluding lung, breast, colorectal and stomach

Table 4.30 Age standardised mortality (per 100,000 population) from malignant neoplasms within each SIMD deprivation quintile. Women aged 0-64, Scotland 2000-02.

		Cause of death						
SIMD income quintile		**Chronic lower respiratory diseases (J40-47)**	**Chronic liver disease (K70, K73-74)**	**Accidents (V01-X59, Y85, Y86)**	**Intentional self harm & events of undetermined intent (X60-84, Y87.0, Y10-34, Y87.2)**	**Mental and behavioural disorders due to use of drugs (F11-16, F18-19)**	**Mental and behavioural disorders due to use of alcohol (F10)**	**Assault (X85-Y09, Y87.1)**
Least deprived	**5**	2	4	3	3	0	1	0
	4	3	5	5	6	1	2	0
	3	7	8	5	7	1	3	1
	2	11	13	7	9	2	3	1
Most deprived	**1**	16	25	8	16	5	7	2
All Scotland		7	11	6	8	2	3	1

Table 4.31 Age standardised mortality (per 100,000 population) from selected causes within each SIMD deprivation quintile. Women aged 0-64, Scotland 2000-02.

Contribution of causes to inequalities in mortality

The preceding tables in this chapter have hinted at the extent to which inequalities in mortality exist at different ages by making simple comparisons between areas at the extreme of the distribution of deprivation. Whilst this is useful in describing the potential excess mortality in the most deprived group over the mortality experience of the least deprived group, it takes no account of mortality in the intermediate categories. When considering SIMD income quintiles, for example, these intermediate deprivation categories form 60% of the country. A measure which utilises all deprivation categories will also use more data and will therefore provide more robust estimates for small age groups broken down by cause of death.

The measure that we have used to describe the extent of inequalities within any given age group is the Slope Index of Inequality (SII). This measure is the difference in mortality rates between the notionally most and least deprived areas obtained by fitting a regression line through the mortality rates in all five quintiles. The SII can be calculated for all cause mortality or for specific individual causes; when the SII of all individual causes are summed the total will equal the SII for all cause mortality. All of the SII measures (all cause and cause specific) are divided by the mean all cause mortality rate in the age group to turn them into relative measures. A value of zero suggests that there is no inequality. Positive values indicate that mortality rates are higher in more deprived areas and negative values indicate a reverse gradient. A value of one suggests that the difference in mortality rates between the most and least deprived areas is equal to the mean mortality rate; in other words, mortality rates in the most deprived areas are about 50% above average and in the least deprived areas are 50% below average. The maximum value for this measure is approximately two.

Figure 4.4 provides a breakdown of the SII divided by the mean rate in five year age bands for men in 2001. The top line illustrates the inequalities for all cause mortality. This takes the value of about one from age 0-14, increases to 1.5 between the ages of 15 and 29 and then increases again to two between 30 and 49. From then there is a steady decrease in inequalities with increasing age. It is not until ages of 70 and above that the inequality measure falls below one. However, inequalities still exist even at the oldest ages; the inequality measure is 0.4 at 80-84 and 0.2 at ages over 84.

The width of the different bands indicates the extent to which inequalities in all cause mortality are attributable to the individual causes. At age 0-4 most of the contribution comes from other causes which include perinatal mortality. Neoplasms have some impact at ages 5-14 and accidents too from ages 5-19. From the 10-14 age group the impact of suicide on inequalities can be seen, with a large impact up to the age of 35-39 and then a decreasing impact up to the 50-54 age group. Mental and behavioural disorders due to the use of drugs produce inequalities in the 15-19 age group which increase to the 25-29 age group and then decrease, although still contributing at ages 40-44. The deprivation gradient in assault is clear at ages 5-9 and again at ages 15-24 before decreasing in importance. Chronic liver disease has an increasing impact on mortality from the 25-29 age group, peaking at 40-49 and then decreasing again. Although small, the effect of mental and behavioural disorders due to the use of alcohol can be seen from the 25-29 age group to ages 55-59. IHD has an increasing contribution from 30-34 to the 45-49 age group which then slowly declines with decreasing age. After the peak in childhood neoplasms contribute again to inequalities from the 35-39 age group, reaching a maximum at about 55-64 and decreasing thereafter. The contribution of both cerebrovascular disease and chronic lower respiratory disease to inequalities is fairly small and is seen mainly at older ages.

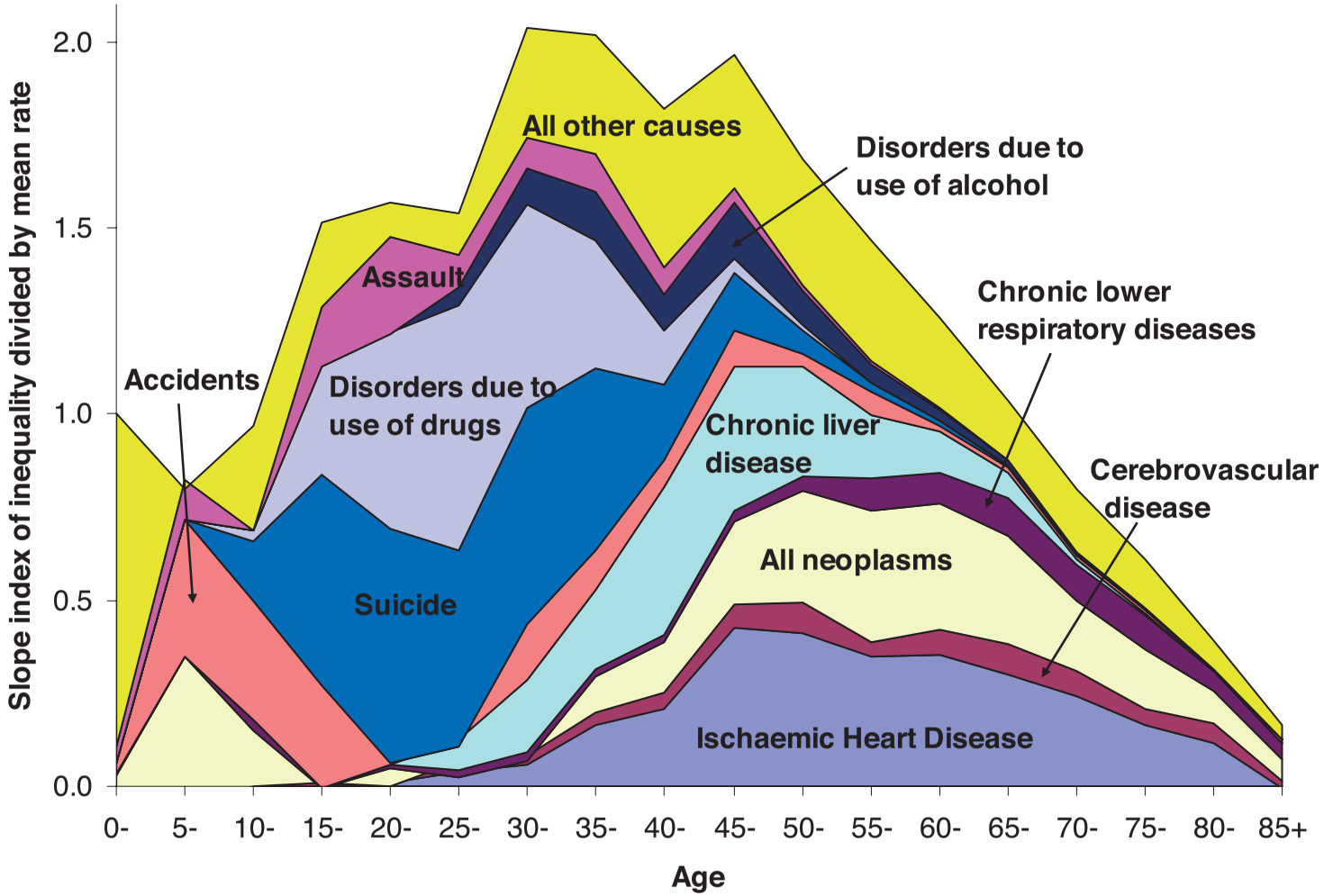


Figure 4.4 Age specific contribution to inequalities of specific causes of death across SIMD income quintiles. Men, Scotland 2000-02.

Figure 4.5 provides the equivalent picture of inequalities by age group and cause for women. There are a lot of similarities with figure 4.4, but also some notable differences. In every five year age group inequalities are equivalent to or less than those for males. Inequalities in the 5-9 age group are considerably lower because there is no contribution from malignant neoplasms to inequalities in female deaths. In the 10-14 age group inequalities fall to practically zero. There is a significant contribution from suicide in this age group but this is cancelled out by an inverse gradient in deaths from other causes. The contributions of suicide and mental and behavioural disorders due to the use of drugs are again pronounced at younger ages but the impact of assault is much smaller. The effect of chronic liver disease is smaller than that seen for men and does not begin until the 30-34 age group. The impact of neoplasms on relative inequalities is larger for females than males at ages 35-49 but is for the most part smaller at older ages. Cerebrovascular disease and chronic lower respiratory disease have a greater impact on inequalities for females than for males, with the contribution of both being seen from the 40-44 age group onwards. The mortality gradient in IHD – despite having been seen to be steeper than that for men – does not result in as large relative inequalities for women as for men.

Regional differences in mortality rates

Table 4.32 shows the distribution of the SIMD income decile across the major regions and cities of Scotland. These deciles are numbered from 10 (least deprived) to 1 (most deprived). This table differs from table 4.15 for two reasons. Firstly, the constituents of the two measures are rather different; the Carstairs index of deprivation combines indicators relating to male unemployment, social class, car ownership and overcrowding whilst the SIMD income domain refers to populations living in households in receipt of means-tested benefits. Secondly, the SIMD is measured on much smaller areas with average population under 800 as opposed to over 5000 for postcode sectors. The SIMD therefore has the ability to identify small pockets of deprivation, surrounded by less deprived areas, which cannot be done at such a fine level of resolution using postcode sectors. The biggest difference between the tables is in the proportion of the populations of the regions and cities that are among the most deprived areas. In 2001 DEPCATs 6 and 7 comprised 18% of the Scottish population and are therefore roughly comparable to the most deprived two deciles of the SIMD income domain. Table 4.15 suggests that 66% of the population of Glasgow and 56% of the population of Dundee lived in DEPCATs 6 and 7, yet from table 4.32 the equivalent proportions living in the most deprived quintile fall to 54% and 38%. So although the two cities do have high levels of deprivation, the use of large areas may be underestimating the extent of small area deprivation in other parts of the country.

Table 4.33 presents the age standardised mortality rates for men and women aged 0-64 by SIMD income quintile and region. Male mortality in the Highlands and Islands was higher than the Scottish average in every quintile apart from the most deprived. This was particularly noticeable in the least deprived quintile (5) in which the mortality rate was 15% higher than the Scottish rate; however, in the most deprived quintile (1), the mortality rate was 10% below average. In the North East mortality was in line with the Scottish average in the most deprived quintile but was above average in all other quintiles. In the Clydeside conurbation mortality rates were higher than average in every quintile. In the most deprived quintile (constituting 37% of the region's population) the rate was 12% above average. In the Central, East and South West regions mortality rates were below average in every quintile. All three regions showed markedly lower rates in the most deprived quintile, ranging from 12% (East) to 21% (Central) below the Scottish average. In the South East rates were below average in the least deprived quintile but 12% above average in the third quintile. The Clydeside conurbation was the only region with a mortality rate above the Scottish rate in the most deprived quintile.

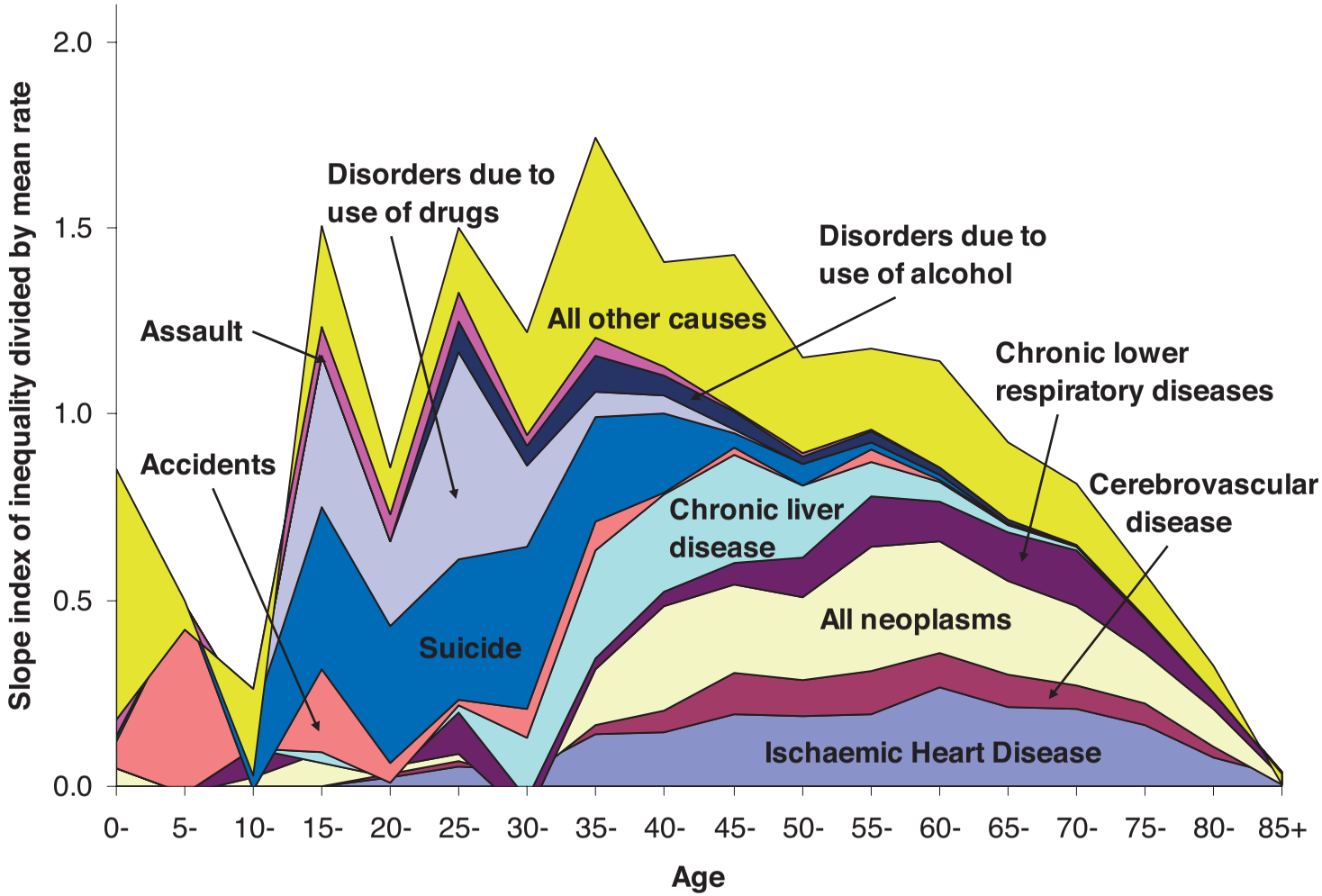


Figure 4.5 Age specific contribution to inequalities of specific causes of death across SIMD income quintiles. Women, Scotland 2000-02.

	SIMD income decile									
	Least deprived									Most deprived
Region	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Highlands and Islands	5	9	11	17	19	14	10	8	4	3
North East	16	16	13	13	13	11	8	6	3	2
Clydeside conurbation	7	9	7	6	6	8	9	12	15	22
Central	13	7	8	11	8	13	12	14	11	3
East	9	11	12	11	12	10	9	10	11	6
South West	6	8	9	9	10	11	13	13	11	9
South East	17	11	15	12	10	9	9	6	5	6
Major cities										
Aberdeen	19	15	8	11	8	11	8	10	6	4
Dundee	6	11	4	7	5	8	8	14	18	20
Edinburgh	24	12	14	9	7	6	7	6	7	8
Glasgow	1	4	5	6	6	7	7	10	14	40
All Scotland	10	10	10	10	10	10	10	10	10	10

Table 4.32 The distribution of SIMD 2004 deprivation categories across major regions and cities of Scotland. Figures are percentages of area population.

SIMD income quintile		Region	Death rate per 100,000 population: Men	Women
Least deprived	5	Highlands & islands	203	123
		North East	190	114
		Clydeside conurbation	182	124
		Central	168	105
		East	171	120
		South West	173	120
		South East	161	113
	4	Highlands & islands	251	176
		North East	250	133
		Clydeside conurbation	246	139
		Central	211	138
		East	235	137
		South West	222	148
		South East	246	146
	3	Highlands & islands	307	163
		North East	310	177
		Clydeside conurbation	326	195
		Central	302	202
		East	288	178
		South West	260	176
		South East	338	171
	2	Highlands & islands	416	218
		North East	454	237
		Clydeside conurbation	436	228
		Central	407	229
		East	379	203
		South West	368	213
		South East	415	259
Most deprived	1	Highlands & islands	554	281
		North East	591	312
		Clydeside conurbation	685	324
		Central	486	270
		East	541	281
		South West	501	287
		South East	600	343
All		Highlands & islands	310	178
		North East	282	158
		Clydeside conurbation	440	229
		Central	306	186
		East	306	176
		South West	312	193
		South East	299	178

Table 4.33 Age standardised death rates per 100,000 population by SIMD income quintile in the major regions of Scotland. Men and women aged 0-64, 2000-02.

There are noticeable differences between the regional patterning of male and female mortality rates. In the Highlands and Islands female mortality rates were substantially below average in the most deprived and third quintiles but were 22% above average in the fourth quintile. In the North East mortality rates were above average in the second quintile, below average in the fourth quintile and close to the average in other areas. In the Clydeside conurbation rates were higher than average in all but the fourth quintile; however, the excess in the most deprived quintile was just 5%. In Central Scotland rates were above average in the second and third quintiles but below average in the others. In the East and South West regions female mortality rates were close to the Scottish average for most deprivation quintiles but were below the Scottish rate in the most deprived two quintiles. Rates in the South East were 11% higher than average in the most deprived quintile and 15% above average in the second quintile.

Mortality rates by SIMD income quintile are given for the cities in table 4.34 for men and women aged 0-64. Male mortality rates in Aberdeen were close to the average in the most deprived quintile but above average in the others. These excesses reached over 30% in the second and fourth quintiles. In Dundee mortality was slightly below average in the most deprived two quintiles, and also in the least deprived quintile, but above average in the third and fourth quintiles. Mortality in Edinburgh was 9% below average in the least deprived quintile and close to average in the most deprived quintile. However, in the areas in between mortality rates were 12-26% above average. In Glasgow mortality in the fourth quintile was 9% below the Scottish average, but it was above average in all other categories. The excess was most marked at the extremes; mortality in the least deprived quintile was 31% above the average for such areas and 21% above average in the most deprived areas.

In Aberdeen, female mortality rates were below average in the most and least deprived quintiles but above average in the remaining quintiles. The mortality rate in Dundee for women living in the least deprived areas was 55% above average and was higher than the rate for men living in the same areas of the city. In all other quintiles rates were also above average in Dundee. In the three least deprived quintiles mortality rates in Edinburgh were close to the Scottish average; however, in the two most deprived quintiles rates were 14-30% higher than average. The female mortality pattern in Glasgow was similar to that for men, with mortality rates in the most and least deprived quintiles being 11% and 17% above the Scottish rate respectively. As for men, the mortality rate in the fourth quintile was below average.

SIMD income quintile		City	Death rate per 100,000 population: Men	Women
Least deprived	5	Aberdeen	189	106
		Dundee	170	182
		Edinburgh	160	115
		Glasgow	231	138
	All Scotland		176	117
	4	Aberdeen	312	147
		Dundee	261	156
		Edinburgh	275	147
		Glasgow	216	124
	All Scotland		238	144
	3	Aberdeen	357	198
		Dundee	322	198
		Edinburgh	381	186
		Glasgow	327	193
	All Scotland		302	180
	2	Aberdeen	546	248
		Dundee	388	231
		Edinburgh	455	291
		Glasgow	455	234
	All Scotland		407	224
Most deprived	1	Aberdeen	596	298
		Dundee	601	319
		Edinburgh	617	354
		Glasgow	743	345
	All Scotland		612	310
All		Aberdeen	338	172
		Dundee	403	239
		Edinburgh	317	189
		Glasgow	557	275
	All Scotland		340	193

Table 4.34 Age standardised death rates per 100,000 population by SIMD income quintile in the major cities of Scotland. Men and women aged 0-64, 2000-02.

Summary

This chapter has set out patterns of mortality by measures of small area deprivation for the periods around the years 1981, 1991 and 2001. In addition to describing trends in the relationship between deprivation and mortality by age group and cause of death, a fairly detailed account has been given of inequalities in 2001. The deprivation measures have also been used to provide insights into the different mortality experiences of the cities and regions of Scotland. The main points raised in the chapter can be summarised as follows:

- *Mortality patterns by deprivation categories:* deaths were strongly patterned by deprivation category, particularly at younger ages. For example, at ages 15-29 the most deprived 20% of the population contributed 30% of male deaths whilst the least deprived 18% only contributed 9% of the deaths (tables 4.1 and 4.2). In the least deprived areas 59% of male deaths occurred over the age of 74, but in the most deprived areas this figure fell to 33%. The patterns of female deaths were similar although the gradients were not as steep.

- *Male all cause mortality:* the increase in mortality rates at ages 15-29 between 1991 and 2001 was confined to the populations of DEPCATs 3 to 7; mortality decreased by 19% in DEPCAT 2 and 25% in DEPCAT 1 (table 4.6). In this age group the 5% increase in mortality rates between 1981 and 1991 could largely be attributed to increases in DEPCATs 5, 6 and 7. At ages 30-44 there were substantial increases in mortality between 1991 and 2001 in the most and least deprived areas. The mortality rate in 2001 among men aged 15-29 living in DEPCAT 7 was the same as the average rate for all men aged 30-44.

- *Female all cause mortality:* between 1991 and 2001 mortality rates among women aged 15-29 fell in DEPCATs 2 and 7, changed little in DEPCAT3 and increased in other deprivation categories (table 4.7). Between 1981 and 1991 mortality rates also rose in this age group in DEPCATs 1, 4 and 7. There was also a 17% increase in mortality among women aged 30-44 in DEPCAT 7 between 1991 and 2001. In every age group there was a steeper decline between 1991 and 2001 in DEPCAT 2 than in DEPCAT 1.

- *Changes in age-specific inequalities: males:* the ratio of mortality rates in DEPCAT 7 to DEPCAT 1 decreased between 1981 and 2001 for men aged over 74; in all other age groups this ratio increased suggesting increasing inequalities. The greatest inequalities were seen in the 30-44 age group; an excess mortality in DEPCAT 7 of 247% in 1981 increased to 448% in 2001.

- *Changes in age-specific inequalities: females:* as for men, inequalities decreased in the oldest age group. For women aged under 30 inequalities also decreased or changed little; but inequalities increased at ages 30-74. At ages between 30 and 59 the inequalities were greatest, with mortality rates in the most deprived areas being about three times those in the least deprived.

- *Cause specific mortality: males:* mortality from IHD under the age of 65 fell by 77% in DEPCAT 1 and 37% in DEPCAT 7 compared to a 61% decline nationally (table 4.8). As a result the death rate in DEPCAT 7 was five times that in DEPCAT 1 in 2001. The differential between DEPCAT 1 and DEPCAT 7 increased for every cause considered in tables 4.8-4.11 with the exceptions of accidents and suicide; a pronounced gradient for suicide remained constant in

the face of rising mortality rates. In the most deprived areas the mortality rate due to assault was higher than the Scottish rate from cerebrovascular disease.

- *Cause specific mortality: females:* following much steeper declines in mortality from IHD in less deprived areas, mortality under 65 from this cause in DEPCAT 7 was six times that in DEPCAT 1 by 2001 (table 4.8). There was no gradient for breast cancer and decreasing (but still present) gradients for deaths from stomach cancer and accidents. For the other causes considered in tables 4.8-4.11 apart from assault the excess mortality in the most deprived areas increased.

- *Regional differences in deprivation:* higher concentrations of deprived areas were evident in certain parts of the country. Notably, DEPCATs 6 and 7 – together comprising 18% of the Scottish population – formed 40% of the Clydeside conurbation and 56% and 66% of the populations of Dundee and Glasgow respectively (table 4.15). At the other end of the deprivation scale 38% of the population of Aberdeen and 29% of the population of Edinburgh lived in the least deprived areas compared to 20% nationally.

- *Regional differences in mortality: males:* in the more deprived areas, male mortality rates in the Clydeside conurbation were higher than the Scottish average for such areas (table 4.16). In other deprivation categories the rates for this region were in line with the Scottish experience. The position of the North East relative to the Scottish average deteriorated such that by 2001 rates were higher than average in every deprivation category. This pattern was exaggerated for Aberdeen, whilst Glasgow also had death rates higher than average within all categories apart from DEPCAT 3 (table 4.18).

- *Regional differences in mortality: females:* female mortality rates for the Clydeside conurbation were close to Scottish average figures within every deprivation category (table 4.17). In Central Scotland mortality was higher than average in all but the least deprived areas, whilst in the Eastern region rates were higher than average in the least deprived areas but below average in other areas. Whilst mortality in Glasgow was in line with the national rates in most deprivation categories, mortality rates were higher than average in Dundee in the less deprived areas and lower than average in the more deprived areas (table 4.19). Mortality rates in Aberdeen in DEPCAT 1 were 21% higher than average.

- *Cause specific contributions to inequalities in mortality: males:* up to the age of 14 the inequality between the most and least deprived areas was equal to the mean mortality rate. This increased and from ages 30-49 inequalities were twice the mean; they then steadily decreased with increasing age but were present at all ages (figure 4.4). At younger ages the impact of suicide, disorders due to the use of drugs and assault were pronounced; as the population aged the impact of IHD, neoplasms and chronic liver disease could be seen.

- *Cause specific contributions to inequalities in mortality: females:* at all ages relative inequalities were less than or equal to those for males (figure 4.5). At ages 10-14 there was no discernable gradient across area deprivation: a gradient for suicide was cancelled out by an inverse gradient for other causes of death. Inequalities again peaked between the ages 25-49 where the difference between the most and least deprived areas was about one and a half times the mean. The contribution of specific causes was similar to that for men but generally smaller;

the exception to this was for all neoplasms which had a larger impact at younger ages (35-49).

Chapter 5
Conclusions

Information about the mortality experience of national populations has important advantages and significant limitations. The advantages are that it provides an account of variation – over time, by geographical region or social status – that allows insights into how patterns of mortality are changing or differ from one population group to another. The limitations are essentially those of the content of routine data and thus the opportunity to propose explanations for the variations that are observed. As an illustration, it is possible to describe differences in death rates from (say) lung cancer or ischaemic heart disease (IHD) but not to estimate the extent to which behavioural determinants such as smoking or diet underlie these outcomes. As became evident in the preamble to chapters 3 and 4, uncertainties about the quality of the data themselves – or the ways in which coding protocols have been employed at different times – also mean that observed differences are largely indicative of the *order* of variation within the Scottish population and of the extent to which social circumstances have an important influence on death rates.

Even with these qualifications, the consistency of these observations makes it clear that inequalities in mortality in Scotland have not only persisted over the last two decades but have increased. To some extent, this growing inequality can be explained by reductions in the death rate which have been greater amongst socially advantaged groups in the population and lower amongst the less advantaged. At the same time, however, one must also take note of the increase in death rates at younger ages from causes that were of much less significance twenty years ago. Equally, regional differences in death rates and the particular circumstances of Glasgow and the west of Scotland (comprising about a third of the Scottish population) are an important influence on the death rates of Scotland as a whole.

The changing pattern of deaths in Scotland

Despite an increase in the proportion of the population of Scotland in the oldest age groups, the crude death rate declined by 11% for men and 2% for women over the period from 1981 to 2001. These reductions were attributable to falls in age-specific deaths in most age groups for both men and women some of which were considerable – for example, the rate for children under the age of 15 decreased by 55%. More precisely, the age-standardised death rate for men declined by 30% and by 25% for women but these overall reductions concealed disturbing increases in specific age groups; male death rates at ages 15-29 increased between 1981 and 1991 and again between 1991 and 2001 and that for men aged 30-44 increased between 1991 and 2001. The rate for women aged 15-29 increased between 1991-2001; the reductions for this group between 1981 and 1991 and for those aged 30-44 between 1991-2001 were much smaller than the reductions experienced by other age groups.

Changing patterns of causes of death provide an important part of the explanation for these findings. The decline in deaths under the age of 65 reflected substantial reductions in deaths from IHD, cerebrovascular disease and accidents in both sexes; in addition, there was a significant decline in deaths from lung cancer and chronic respiratory disease in men and from breast cancer in women. In contrast, deaths from chronic liver disease and from mental and behavioural disorders due to the use of drugs increased for both sexes and suicide and assault increased among men. These causes of death for younger people underlie the more general increases in their death rates and present a very different picture in 2001 to that seen in 1981. There were pronounced regional

patterns for some causes of death with, for example, higher rates for IHD and suicide in the Clydeside conurbation.

Regional differences in death rates were marked and persisted or increased between 1981 and 2001. In the Clydeside conurbation, male death rates were 9% higher than the rate for the whole of Scotland in 1981; although declining between 1981 and 2001, this decrease was less than the all-Scotland reduction so that the Clydeside rate was 17% higher than the Scottish rate by 2001. The regions and the four major cities showed striking differences at ages 15-29; at these ages, male mortality in Glasgow increased by 52% over the two decades but in Edinburgh it decreased slightly. The consequences of these different patterns of death can also be seen in terms of life expectancy; the difference of 3.5 years in life expectancy at birth between Edinburgh and Glasgow in 1981 had become 5.4 years in 2001.

Individual social class

The preamble to chapter 3 explained two problems in analysing the relationship between individual socio-economic status and death rates over the two decades considered in this Report. The first was that the data were incomplete: both the Census data and the death records contained large numbers of people who could not be allocated to a social class. The problem was worst at older and younger ages and included an apparent mismatch of records that could not be coded for inclusion in the analysis. Secondly, different – and not directly comparable – coding systems were used in 1991 and 2001. The consequence of these difficulties was that the analyses of this chapter were restricted to men aged between 20 and 59 and that comparisons between the two time periods were necessarily limited.

Notwithstanding these reservations, it is apparent that there was a clear gradient in the mortality experience of individual social classes in both periods. In 1991, the mortality rate of men in partly-skilled and unskilled occupations (comprising 22% of the population) was 2.9 times greater than that for men in managerial and professional occupations who made up 29% of the population. In 2001, the death rate for men in routine and semi-routine occupations (45% of the population) was 3.7 times greater than that for men in managerial and professional occupations (16% of the population). Despite the change in the coding system, the conclusion that socio-economic gradients are increasing is difficult to avoid.

For some causes of death – notably IHD and malignant neoplasms – the reduction in death rates in different occupational groups was in line with the more general (national) reduction so that the gradients seen in 2001 were much the same as those for 1991. On the other hand, such causes as chronic liver disease and suicide had a greater increase in lower occupational categories leading to steeper gradients for these causes. In 2001, deaths related to drug use were three times as common in males with routine occupations as in those in technical or supervisory occupations and deaths related to alcohol use were twice as common. Deaths attributed to assault were very low in all occupational groups except the routine occupations category where the rate was 13 per 100,000 – approximately equivalent, that is, to the rate for malignant neoplasms of the colon and rectum among these occupations.

The regions and major cities of Scotland differed in terms of their social composition but these differences do not explain the different mortality rates seen in different parts of the country. A notable feature of the Clydeside conurbation – and Glasgow in particular – was that 2001 death rates among those classified as working in lower supervisory and technical, semi-routine and routine occupations were all substantially higher than the rates for the whole of Scotland. As an example, 13% of Glasgow's population were

employed in routine occupations in 2001 and had a mortality rate that was 87% greater than the comparable rate for Scotland.

The alternative of small area deprivation

Indices of the social characteristics of small areas derived provide an alternative to categorising the socio-economic circumstances of individuals and – to some extent – circumvent the problems of social classification noted earlier. The difference, of course, is that small area classifications describe the experience of local populations and not that of the individuals who may be resident within them. Two area-based measures are employed in this Report: firstly, the Carstairs score of deprivation which is a composite indicator of social disadvantage derived from the Census and applied to postcode sectors with (in 2001) an average population of 5012. Secondly, the income domain of the Scottish Index of Multiple Deprivation (SIMD) which is a count of the proportion of the population in receipt of certain means-tested Social Security benefits applied to data zones with an average population of 788. Carstairs scores were used for comparisons of the pattern of inequality over three Censuses; SIMD – which is more recent – was used to describe inequalities in greater detail in 2001. An important advantage of this approach is that it provides a link between social circumstances and the local geography of small population groups.

This view is illustrated by the increase in male death rates in younger age groups which was restricted to the more deprived areas identified by the Carstairs categorisation. Between 1981 and 2001, the 39% of the male population aged between 15 and 29 years living in the three least deprived categories experienced reductions in their death rates ranging between 5% and 30%; in the two most deprived categories, mortality rates increased over this period by 55% to 62%. A similar, though less pronounced, contrast is evident in death rates at ages 30-44; in the upper three Carstairs categories, death rates reduced by nearly a quarter between 1981 and 2002 but increased by 25% in the most deprived category. Changes of this kind led to a widening of the differential between the most and least affluent localities in all male age groups under the age of 75 and all female age groups between the ages of 30 and 75.

This growing difference between the least and most deprived localities was evident for most causes of death in both men and women. As an illustration, the Scottish death rate from IHD in men and women aged less than 65 years decreased by 61% between 1981 and 2001 but by only 37% in the most deprived localities.

There is a heavy concentration of most deprived localities in the Clydeside conurbation, particularly in Glasgow, but the greater prevalence of social deprivation does not adequately explain the high death rates of these parts of Scotland; death rates in Glasgow were above the Scottish rate for all but one of the Carstairs categories. On the other hand, the observation that the standardised mortality ratio for Glasgow was almost twice that of its largely suburban neighbouring councils suggests that social circumstances are an important determinant of early mortality and that small area categories, such as those used in the Carstairs approach, may not be sufficiently precise as a measure of life circumstances. This argument about “internal” differences is illustrated in the example of Aberdeen where deprivation category-specific death rates for males were greater than the comparable Scottish rate in all categories. At the same time, a smaller proportion of Aberdeen’s population live in deprived localities so that the male death rate for the city as a whole was close to that of Scotland.

Inequalities across deprivation levels – for both men and women – were greatest between the ages of 30 and 49. At the younger end of this age range the main contributory causes were suicide, and mental and behavioural disorders due to the use

of drugs or alcohol. At the older end of the range, the principal contributors to inequality in the rates were IHD, neoplasms and chronic liver disease.

A significant feature of the analysis described in chapter 4 is that its findings are supported by data from two separate sources in 2001. The Carstairs scores employ information from the Census linked to larger populations defined by postcode sectors; the SIMD income domain employs data from the Department of Work and Pensions to generate death rates for quintiles of smaller areas with findings that are similar to the Carstairs-based analysis. In this second analysis, the greatest excess mortality was in the age groups 15-44 for both sexes mainly (Figure 4.4) as a consequence of deaths from suicide, drugs and assault. One other relevant feature of this Figure, however, is the contribution of chronic liver disease to the observed excess between ages 30 and 65.

The changing pattern of inequality

It is clear that differences in the death rates of more and less affluent groups in the Scottish population increased between 1981 and 2001. Although there have been improvements in mortality in all social groups, an important element in this growing differential is that reductions in deaths (or later ages at death) have been more pronounced amongst members of socially advantaged population groups and that, rather than a flattening of the traditionally observed gradients across (say) social classes or Carstairs categories, these gradients have persisted and become steeper. In terms of causes of death, these changes have two main components: firstly, although historically important causes of death such as IHD and lung cancer have declined, the reductions have been substantially greater in more affluent areas. While remaining important throughout Scotland, the disproportionate contribution of these causes to socially disadvantaged populations has increased. Secondly, in socially deprived localities, the gain from reduced death rates from more “traditional” causes has been off-set by the emergence of other causes – suicide, drugs, alcohol and assault – where death rates in the younger adult population are rising.

Measures of social circumstance – whether in terms of individual measures such as social class or locality-based measures such as the Carstairs scores – provide some explanation for the differences in death rates seen across the regions and cities of Scotland but it will be evident that they are an insufficient basis for an account of the variation that is observed. The area of particular concern is the Clydeside conurbation which demonstrates mortality rates in excess of the Scottish rate for both measures of social status. It is possible that the heavy concentration of socially disadvantaged localities in this region exerts a bias on the ways in which the measures are constructed and applied across Scotland, but a more probable explanation is that neither measure adequately captures particular features of the lifestyle of the region’s population that are injurious to health.

Whatever the explanation, the impact of higher mortality rates in the west of Scotland on national mortality rates is considerable. In 2001, excluding the third of the population living in Clydeside would have reduced the national mortality rate by 11%; excluding the population of Glasgow alone would have reduced it by 7%. The effect on the Scottish national rate is striking; twenty-two of the 32 District Council areas in Scotland have mortality rates for men under age 65 that are lower than the overall Scottish rate. These districts have death rates that are in line with rates in the rest of Europe. Only eight District Councils have mortality rates for men under the age of 65 greater than the Scottish rate, the worst with a rate that is almost 50% higher. It is relevant, however, that these eight District Councils comprise about 30% of the Scottish population.

Conclusion

The three main conclusions of this Report are, firstly, that rather than declining, social inequalities in mortality rates are increasing and that traditional gradients across social groups have become steeper rather than flatter. Although there have been considerable reductions in overall mortality between 1981 and 2001, these improvements have been differentially experienced by socially advantaged groups in the population and to a much lesser extent by those who are socially deprived. Secondly, part of the explanation for this changing pattern is the emergence of causes of death linked to behaviour – suicide, assault, and those related to drugs and alcohol – which are especially linked to social disadvantage and which represent a growing reason for Public Health concern.

Third is the particular circumstance of the Clydeside conurbation and its disproportionate contribution to the Scottish death rate. Perhaps to a large degree, this excess can be attributed to the concentration (and history) of social disadvantage in this region but – at least in simple comparisons with other parts of Scotland – this does not seem to be a wholly adequate explanation. At a time when Scotland's health record is often unfavourably compared with other European countries, however, the disparity between the eight District Councils which largely fuel this comparison and those with rates similar to those of Europe merits closer analysis.

The health priorities set out in *Our National Health: A plan for action, a plan for change*[1] include the statement that

> "Poverty, poor housing, homelessness and the lack of educational and economic opportunity are the root cause of major inequalities in health in Scotland. We must fight the causes of illness as well as illness itself. The Scottish Executive's commitment to tackling health inequalities is part of our wider commitment to tackling poverty and creating social justice across the whole range of our work, and in partnership with the UK government and others."

This Report provides a measure of the task that needs to be addressed.

[1] Scottish Executive. *Our National Health: A plan for action, a plan for change.* Edinburgh: Scottish Executive, 2000.