5: Health

There is as strong a geographical pattern to inequalities of health as there is to almost any other topic which concerns people's well-being. This suggests that your health is just as strongly influenced by where you live as are other life chances. Such an argument does not necessarily suggest that living in certain places causes good or bad health, more that people in good or bad health tend to end up living in different places. This may largely be because issues of health are so closely connected with other social topics which geographically differentiate the population, and which are discussed in this atlas. Some of these connections are described below.

There is very little information published about the health of groups of people for local areas. However, two recent innovations have improved this situation. The first is that the 1991 census asked all residents in Britain whether they were suffering from a "long-term illness, health problem or handicap", defined as a condition which limits daily activities or work. Earlier censuses had only been concerned with illness which prevented economic activity, although questions on infirmity (deafness and blindness etc.) were asked in British censuses between 1851 and 1911 (Norris and Mounsey 1983). The second improvement in information on British medical geography arose from the postcoding of mortality records which has been routine in England and Wales since 1981. It is now possible to see what people are dying of at particular ages for very local areas. This information is used extensively here because it is indicative of the general health of the population.

Several concepts need to be introduced in this chapter. *Sickness*, *illness* and *handicap* are words which have all been used in censuses to elicit answers about ill heath. Here these words are used to indicate what people feel about the state of their own health. A section on amenities has also been included in this chapter because the presence or absence of these may be linked to people's state of health. *Amenities* means here something conducive to comfort or convenience, and the examples presented later are hospitals, and home washing and heating facilities. The final set of concepts concerns *disease* and *mortality*, words which are used to indicate what medical assessors thought to be the case in defining types of diseases and causes of death. The ninth standard classification of the World Health Organisation is used in these cases (WHO 1977).

The chapter begins by looking at the current distribution of ill health across the country as measured by people's own conception of their health. The distribution is then shown in former years for those groups who were asked (in past censuses) whether they were permanently or temporarily sick. In 1971 only people "intending to seek work" were asked if they were sick. Illness has always been a major reason why some people do not work and in recent years, when more people have not been able to find work, rates of sickness have increased. Particular occupations, for example mining, have also been linked with causing ill health. The economic implications of ill health are important, as are the implications of social and economic circumstances on health.

Having considered what is known of illness for small communities, the chapter then considers some basic factors which can be linked to health. These primarily concern housing amenities. Whether homes can be centrally heated can be determined from the 1991 census (although it is not possible to discover which households can always afford to heat their homes). In past censuses more simple comforts were of issue such as whether a household had access to its own sink or stove. Washing facilities are also a good indicator of the general quality of housing in an area. If households do not have their own baths or showers it is likely that the general quality of their housing is poor and this lack of amenities could be correlated with ill health.

The spatial distribution of hospitals is shown next as hospitals are both an amenity and an indication of where people who are very ill are likely to be located. As with all health care facilities, hospitals follow the distribution of the population and so the patterns shown in the first chapter of this book need to be appreciated if the pattern of hospital provision is to be understood. Demographic factors, principally the ageing of the population, are important in determining the hospitalized population, as are medical decisions over how long patients should stay in hospitals and political factors such as who should run hospitals. Some of the effects of these decisions are shown here.

The last section of this chapter concentrates on life expectancy, mortality rates, causes of death and how these have been changing geographically over the last decade and over the last century. Demographic factors are important here, but it is also evident that social differences in standards of living are reflected by the causes and likelihood of dying. Here the individual postcoded mortality data have been used in different ways to show where different causes of death are most prevalent and how life expectancies are related to illness and other factors geographically (Cliff and Haggett 1988). Unfortunately, the mortality data available for this study do not cover Scotland. The section ends by comparing the current geography of life chances with that of previous periods going back to before the Second World War. The political implications of inequalities in health are stressed at the end of the chapter. How governments choose to organize health provision and to regulate society has an influence which extends quite clearly to how and where and when we are most likely to die.

This chapter demonstrates how issues of health are linked to the geographies of population, demography, economics, housing, society and politics. These in turn are affected by, and have an impact upon the health of the nation (Whitehead, 1987; Townsend *et al*. 1988; Black and Whitehead 1992). When considering these maps, however, it must be remembered that it is not places which are well or ill — but people.

5.1: Residents with Long Term Illness by Age and Location in Britain 1991

5.2: Ill Residents, by Employment, Amenities and Socioeconomic Group in Britain 1991

Proportion of people in each socioeconomic group with long term illness, who are unemployed, have no central heating or lack/share a bath

Socioeconomic Group	With Illness	Unemployed	No Central Heating	Lack or Share Bath
16 Members of armed forces (all ranks and occupations)	2.3%	4.0%	9.6%	0.2%
4 Professional workers (eg solicitor) - employees	2.5%	3.2%	7.3%	0.5%
1 Employers and managers in large establishments	2.5%	1.6%	7.1%	0.2%
2.2 Managers in small establishments	3.0%	7.0%	9.2%	0.3%
5.2 Foremen and supervisors - non-manual (clerk)	3.1%	3.8%	13.5%	0.4%
6 Junior non-manual workers (check-out operator)	3.3%	5.2%	13.2%	0.4%
5.1 Ancillary workers & artists (teacher , nurse)	3.3%	3.4%	10.3%	0.5%
3 Professional workers (architect) self-employed	3.4%	0.7%	3.6%	0.1%
7 Personal service workers (chef , waiter/ess)	3.5%	7.3%	17.9%	0.8%
15 Agricultural workers (forester , fishing worker)	3.8%	9.1%	30.8%	1.3%
9 Skilled manual workers (builder , baker, driver)	4.0%	11.3%	19.6%	0.5%
2.1 Employers in small establishments	4.1%	0.1%	8.3%	0.2%
8 Foremen and supervisors - manual (eg storekeeper)	4.2%	5.7%	16.2%	0.4%
12 Self-employed non-professionals without employees	4.4%	5.7%	15.7%	0.6%
10 Semi-skilled manual workers (care assistant)	5.2%	11.4%	22.0%	0.7%
– Economically active, but not worked in last ten years	5.6%	31.4%	17.7%	1.0%
13 Farmers - employers and managers (who own/rent)	5.8%	1.4%	17.9%	0.1%
17 Inadequately described and not stated occupations	6.1%	14.7%	18.6%	0.8%
11 Unskilled manual workers (road sweeper)	6.4%	13.2%	24.7%	0.8%
14 Farmers - own account (has only family employees)	6.8%	0.5%	30.4%	1.5%
Economically inactive (eg retired, looking after home)	23.0%	-	18.6%	0.6%
Total households with residents in Britain	13.1%	5.7%	16.8%	0.6%

figures shown in red are above the overall average

Illness

Illness is not easily defined. Because of this, illness is not a variable which is often seen in official statistics. Illness is, however, a condition which affects the lives of over seven million people in Britain so badly that they agreed it was having "a long term limiting effect on their daily activities". This response was raised from a question on illness asked by the last census. The distribution of these *ill people* in Britain across wards is shown on the map and cartogram opposite (which both use the same shading categories).

The map emphasizes the coalfields of Wales, Yorkshire and the North East of England where high rates of illness in relatively sparsely populated areas prevail. The population cartogram shows a much sharper divide along very different lines. The high rates of illness in the coalfields are important, but are only part of a pattern which is dominated by the cities of the north and Scotland, within which over one person in six or even five is suffering from a long term illness. In the south high rates of illness are confined to the coast and central London, reflecting the distribution of pensioners in those parts of the country (see page 39).

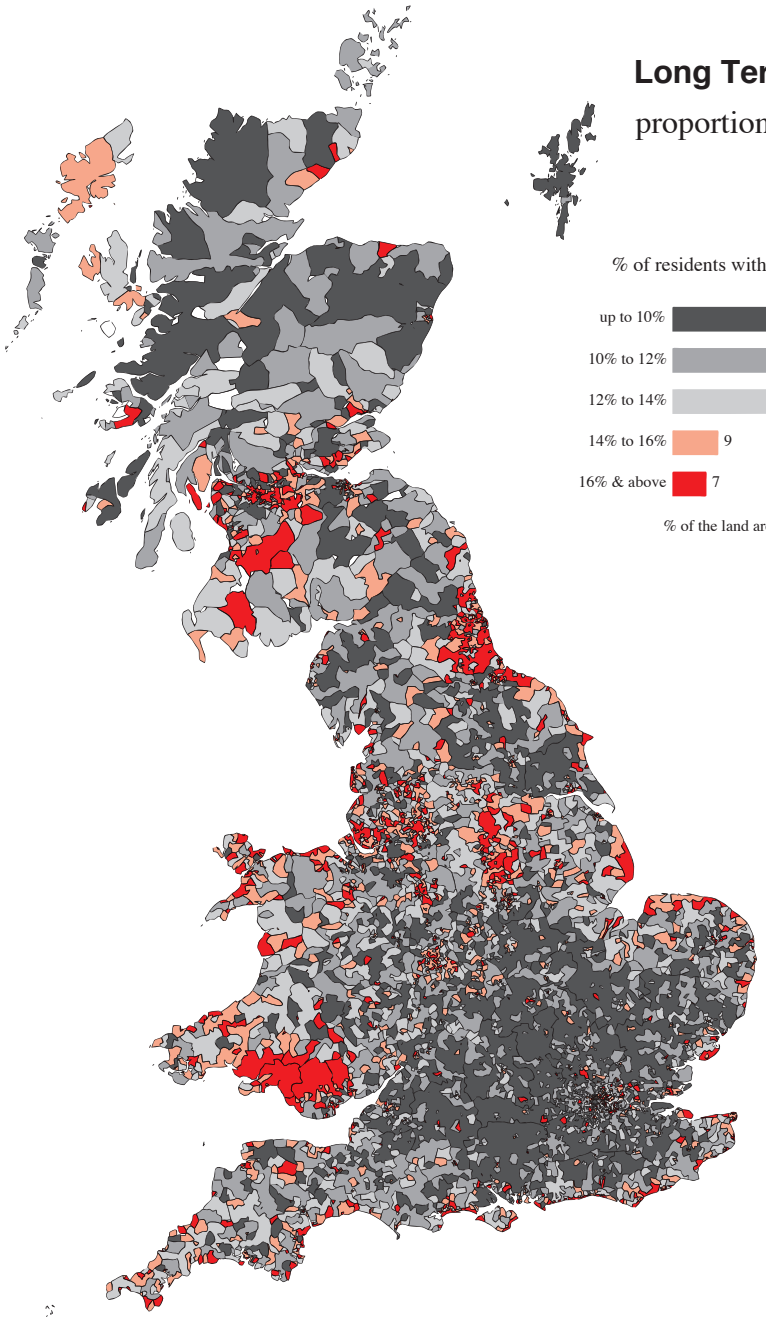
The importance of age on a person's likelihood of suffering from a long term illness is demonstrated by Figure 5.1. Over half of all the people who said they were ill under the census definition were aged over 65. Over two thirds of people aged over 85 were suffering from a long term illness in 1991. At all ages up to 74 men are more likely to consider themselves ill. Thereafter women are more likely to consider themselves ill than are men and, because of the larger numbers of women who survive to old age, women in total are more likely to be ill than are men and ill women occupy more than twice as many places in medical and care establishments as do ill men.

Age and sex are not the only obvious correlates with illness. Figure 5.2 emphasises one social connection where people in certain occupations are less likely to be ill than are people doing other forms of work. The connections run both ways: illness may make getting or holding certain jobs harder, while certain jobs, or the life-styles associated with them, are more likely to lead to higher rates of illness. Demographic factors are still important here, for instance the figure shows that the lowest rates of illness are to be found in the armed forces where youth dominates and fitness is a requirement for getting the job.

Figure 5.2 shows that people in work, regardless of their occupation, are less likely to be ill than are the population as a whole. The figure also shows the likelihood of all people in each group being unemployed, lacking central heating or exclusive access to a bath or shower. These measures are generally higher for occupations in which illness is more common. Farmers with no employees (own account), for instance, have some of the poorest rates of access to amenities and the highest rate of illness of any occupational group — despite being unlikely to be unemployed.

Long Term Illness 1991

proportion of ward populations



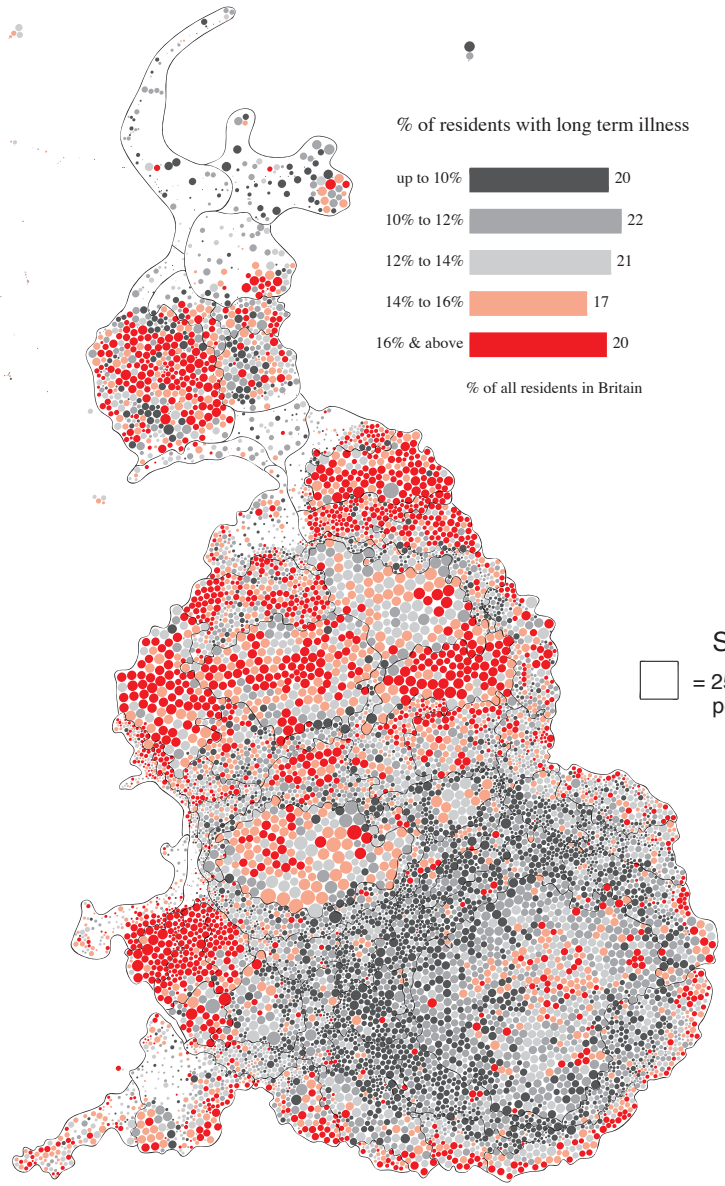
% of residents with long term illness

up to 10%	33
10% to 12%	30
12% to 14%	20
14% to 16%	9
16% & above	7

% of the land area of Britain

Scale

= 1000 km²



% of residents with long term illness

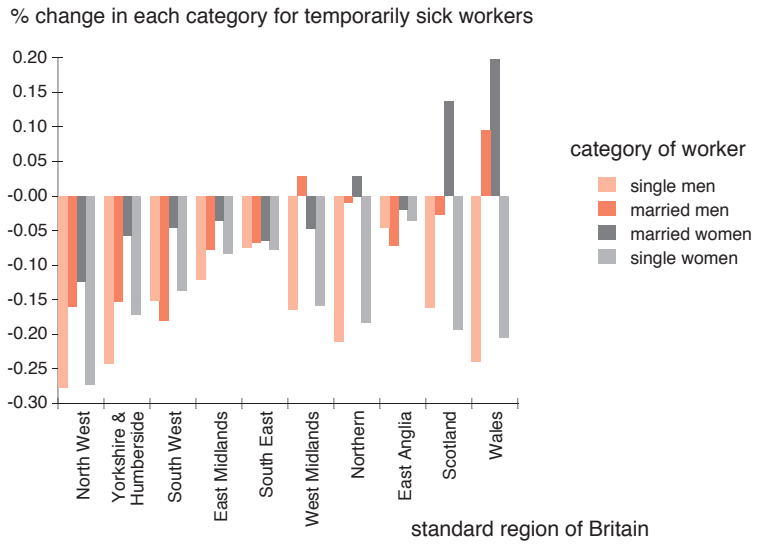
up to 10%	20
10% to 12%	22
12% to 14%	21
14% to 16%	17
16% & above	20

% of all residents in Britain

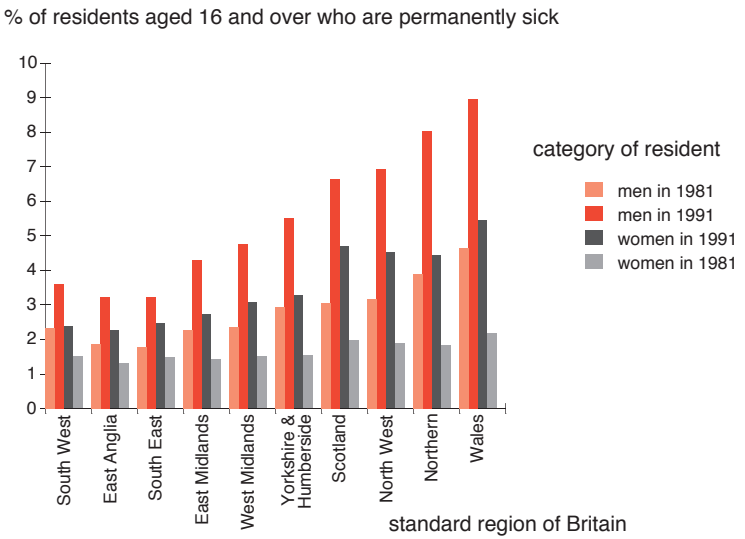
Scale

= 250 000 people

5.3: Temporary Sickness by Marital Status and Region in Britain 1971–1981



5.4: Permanent Sickness by Sex and Region in Britain 1981, 1991



Sickness

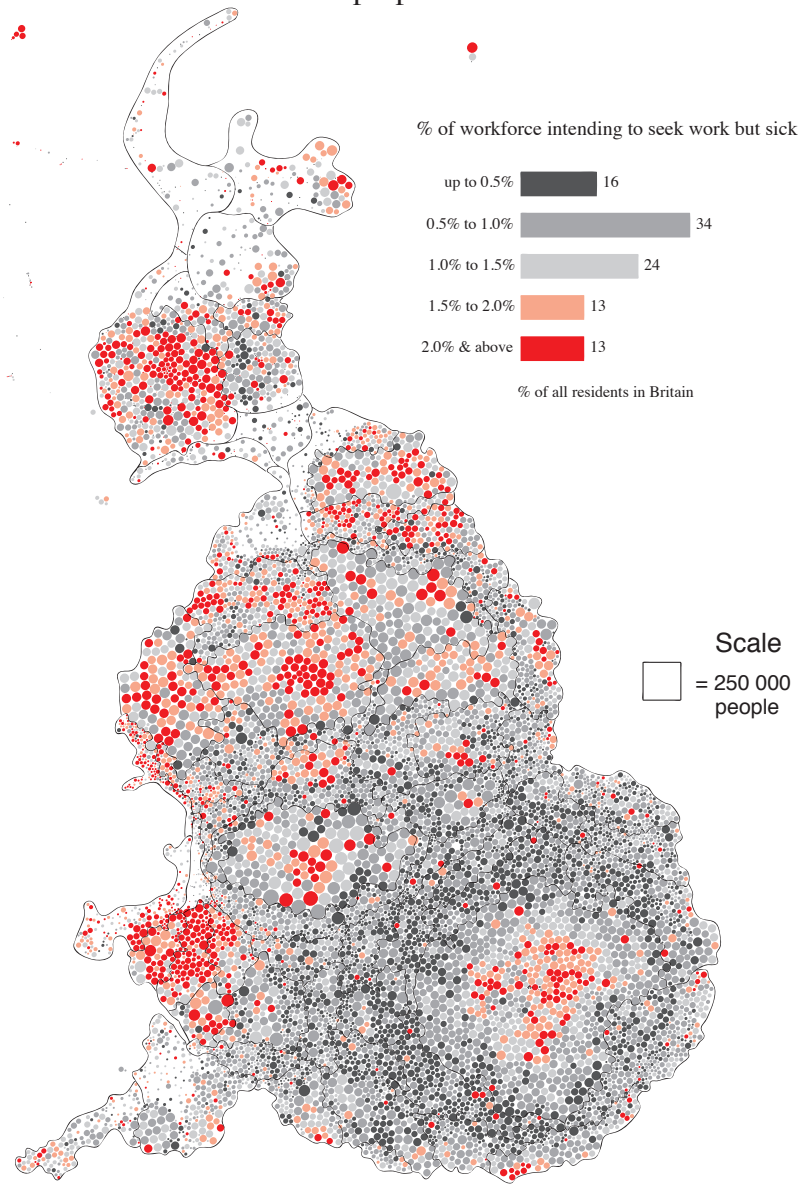
Sickness is a narrower concept than illness and usually refers to the inability to work due to ill health. In 1971 the census tables only distinguished people who were *temporarily sick* meaning sickness that was temporarily preventing them from working. The first map opposite shows where these people tended to live. The pattern is remarkably similar to that of long term illness in 1991, given how different the question, applicable group and the times were. The 1981 census categorized people as either temporarily sick (but in the workforce) or "permanently sick or disabled" and thus not in the workforce. It was not possible to be retired and disabled by this categorization and so the definition of sickness used at that time differed from both those which preceded it and those which came later. Nevertheless, when the geography of permanent sickness is plotted, as it is in the map on the far right, the pattern can again be seen to be very similar to that of previous and future censuses. One notable change between the patterns of 1971 and 1981 is the fall in the proportion of people sick just to the west of central London.

A question on temporary sickness was asked in both the 1971 and 1981 censuses and so a comparison can be made, bearing in mind the problems outlined above. This is done in Figure 5.3 which shows how temporary sickness fell in each region in Britain. In Britain as a whole the proportion of residents aged over 15 who were temporarily sick fell from 0.7% to 0.6% over the decade. This may partly reflect many people choosing to define themselves as permanently sick in 1981, but also the very different economic climate of that time. Intriguingly, the falls in sickness were generally higher for single men and women and lowest for married women (who also accounted for most of the rare rises in temporary sickness which occurred in a minority of regions). The regions in the figure are ordered according to the overall fall in temporary sickness which was lowest in Wales and highest in the North West.

A question on permanent sickness was asked in both 1981 and 1991 although, again, the different questions in each census and the changing times may have influenced their comparability. The absolute rates of permanent sickness for both women and men at both times are shown for each region in Figure 5.4. Again the regions are sorted from that which has seen the lowest rise, the South West, to that which has seen the highest, Wales. Across all of Britain the proportion of men aged over 15 who defined themselves as permanently sick between 1981 and 1991 rose from 2.5% to 5.0% while the proportion of women rose from 1.6% to 3.3%. Thus permanent sickness was seen to double, despite the availability of an alternative census question which allowed people to categorize themselves as ill but otherwise occupied in 1991. Figure 5.4 shows how in only three regions was permanent sickness in men below 4% in 1991, and how only in Wales was it above this level in 1981. This graph should be compared with Figures 3.29 and 3.30 on early retirement and unemployment change during the 1980s.

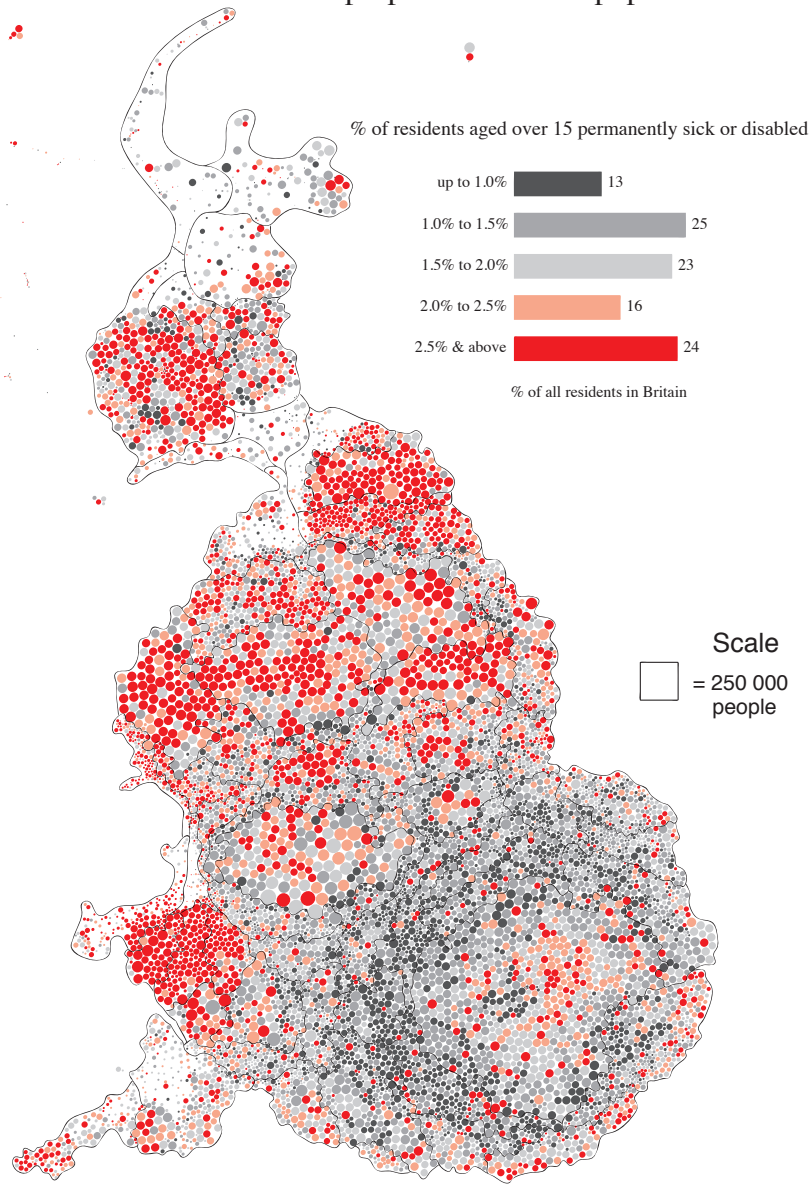
Temporarily Sick 1971

proportion of ward workforces



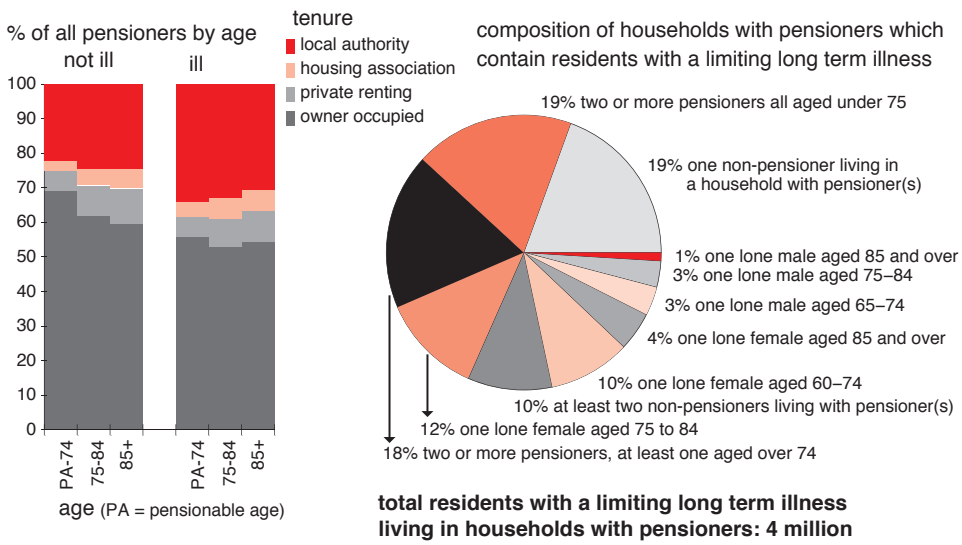
Permanently Sick 1981

proportion of ward populations



5.5: Residents with Illness by Age, Sex and Household Employment in Britain 1991

5.6: Pensioners with Illness by Age, Tenure and Household Composition in Britain 1991



Illness and Age

The brief treatment of illness here ends with two maps illustrating the different geographies of ill health amongst the elderly and the young. Although the overall rates of long term illness for these two groups are very different, as the keys to the two maps opposite illustrate, the importance of factors associated with place in influencing the likelihood of illness are quite similar. Given this, the most striking difference between the two maps is that, although children are more likely to be ill in London than is usual, elderly London residents are relatively unlikely to be ill. Similar examples can be seen for other parts of the country, in Merseyside for instance.

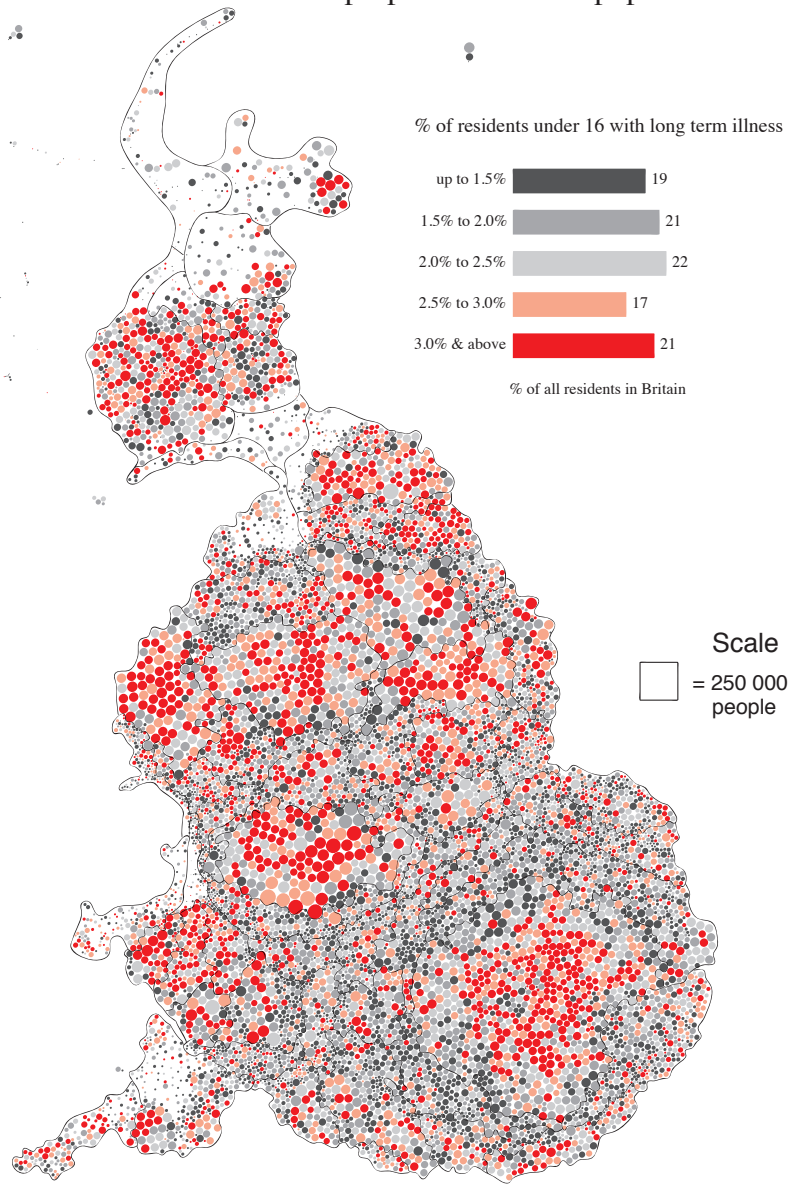
Figure 5.5 gives the absolute numbers of people who were suffering from a long term illness by age and sex in 1991. The figure shows how the two groups which the maps opposite contrast are of a similar size, despite representing very different proportions of their respective age groups. However, the very elderly who are ill are much more likely to be women and probably live in a household in which no one is in the workforce. Most ill children live in households where at least one person is in employment.

The living conditions of the long term ill are explored further in Figure 5.6 which concentrates on the housing and household circumstances of ill pensioners. The bar charts in this figure show that, whereas pensioners who are not ill are increasingly likely to be housed by the public sector as they get older, pensioners who are ill are less likely to have been owner occupiers in the first place. By the time they are aged over 84 the tenure profiles of pensioners are similar regardless of illness. The pie chart in Figure 5.6 shows how a third of pensioners who were ill in 1991 were pensioners living on their own. Only one in five of these pensioners was male. Male pensioners, because they tend to die earlier, are far more likely to be living in households with their partners or other relatives when they are ill. Only 29% of ill residents in households which contain an ill pensioner also contain someone who is not a pensioner. More old ill people live alone than are cared for by people of working age.

With a better understanding of the probable housing circumstances of the old and young who are ill, it is worth returning to the two maps shown opposite. In almost a quarter of the country (by population) over 70% of pensioners aged over 84 are ill. Two thirds of these ill pensioners do not live in medical and care establishments. These are the pensioners who are shown opposite, three quarters of them are women. Of these — three hundred thousand ill women aged over 84 living in the community — almost two in three live alone. The map opposite also includes one hundred thousand men who are ill and aged over 84. Forty percent of these men are living on their own. Thus, whereas the first map of children is of ill people who are almost certainly living in a household with adults of working age at least one of whom is in work, the elderly who are ill are most probably living alone and otherwise rarely with someone in work.

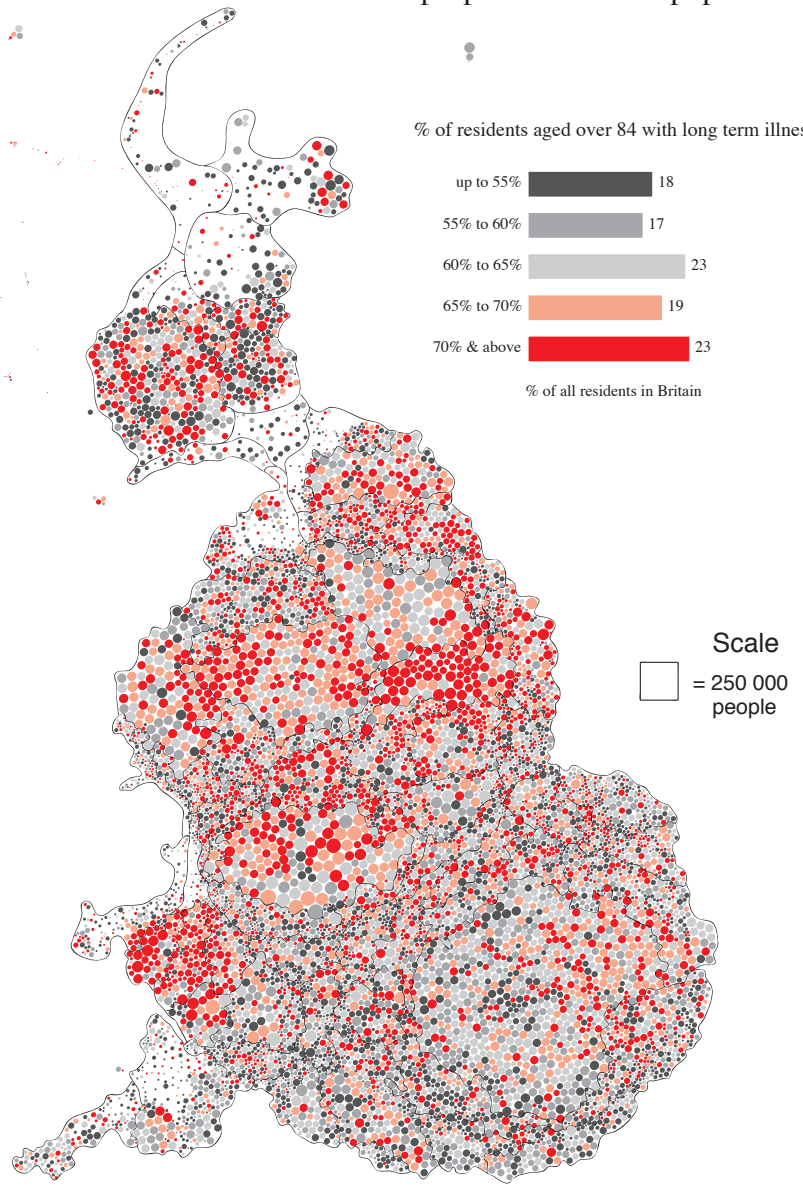
Ill Children 1991

proportion of ward populations



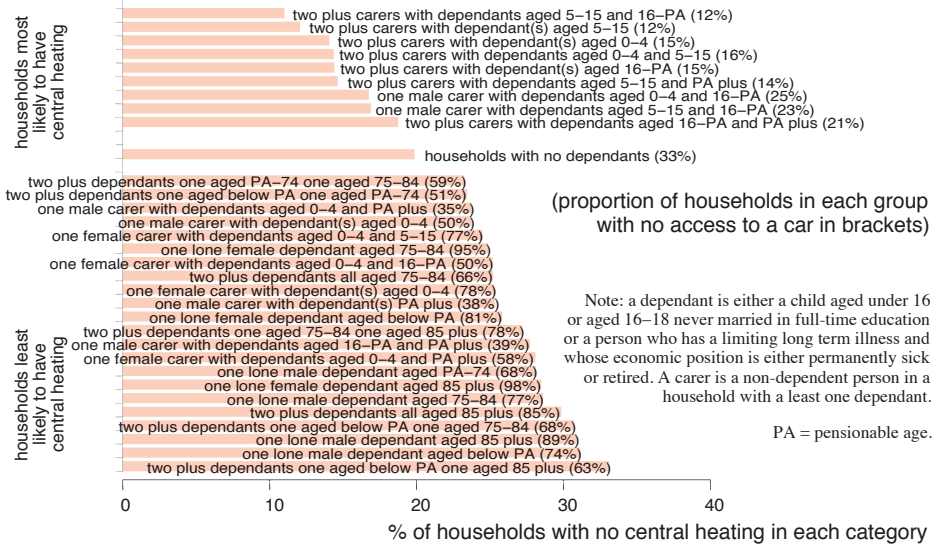
Ill Residents Aged Over 84 1991

proportion of ward populations



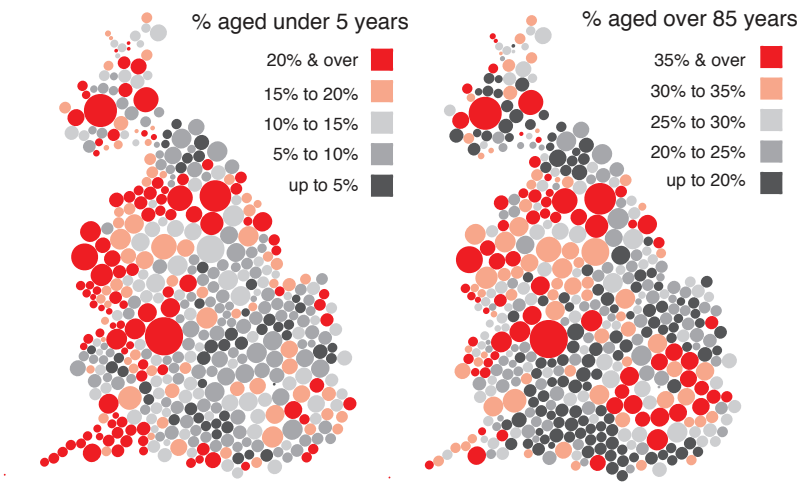
5.7: Availability of Central Heating by Household Type in Britain 1991

selected households categorized by size, carers, dependants and age



5.8: Young and Old Residents with no Central Heating in Britain 1991

proportion of district populations in households with no central heating



Heating

Household amenities have been linked to patterns of ill health since studies of the geographical distribution of poverty and its consequences began in Britain. The amenities considered essential have changed over time as living standards have improved. The 1971 census recorded how many households did not have exclusive access to a stove or sink, for instance — amenities which would now be assumed to be available to practically everyone. The first map opposite shows where these facilities were in shortest supply at that time. The high proportion of residents lacking or having to share a stove or sink in London was due to the housing shortage in that place at that time (see page 107). Nowadays the absence of central heating in a home is seen as an indication of poor housing quality. Not having central heating may contribute to ill health, but even more importantly, for people who are ill and spend a lot of time at home it is obviously particularly undesirable not to have central heating.

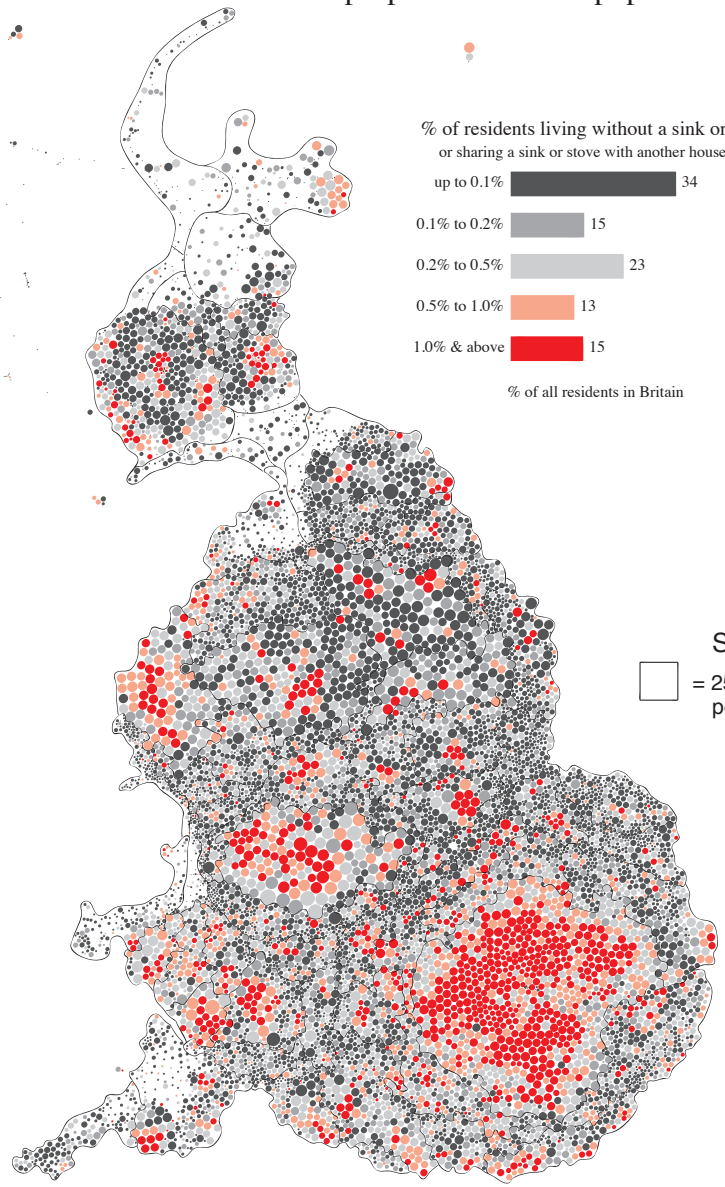
The second map opposite shows those areas where central heating is least common. Large numbers of households without central heating can be seen to dominate most of the West Midlands, Merseyside and West Yorkshire. Few residents lack central heating in the South East and North East of England, reflecting both general affluence and the policy of some local authorities to ensure that as many homes as possible are fully heated. Lack of central heating was considered to be an important variable by a recent "Health of the Nation" study on the health of elderly people, which used figures from the General Household Survey to show that of four types of household, those consisting of a single elderly person were least likely to have central heating (CHMU 1992: 7).

Figure 5.7 identifies thirty two types of households (based on the criteria of dependency) and shows that the nine types of household more likely than the average to have central heating are those containing at least two people who are not dependants or at least one male non-dependant. Households which contain only dependants, one of whom is aged over 84 and another of whom is not a pensioner (but is suffering from a long term illness and is not working) are least likely to have central heating. Thus the types of household which might be thought to be most in need of central heating are least likely to have it. The figure also shows what proportion of these households have access to a car. All the households which are least likely to have central heating are also least likely to have this access to transport and so may spend more time in homes which are less likely to be fully heated than households with many non-dependent adults.

The geographical differences in the availability of central heating for very young and very old residents are shown by two maps in Figure 5.8. For both groups availability of central heating is common in the ring around London, although there are differences in other parts of the country. It is important to remember that just because a household has central heating does not imply that its members can always afford to use it.

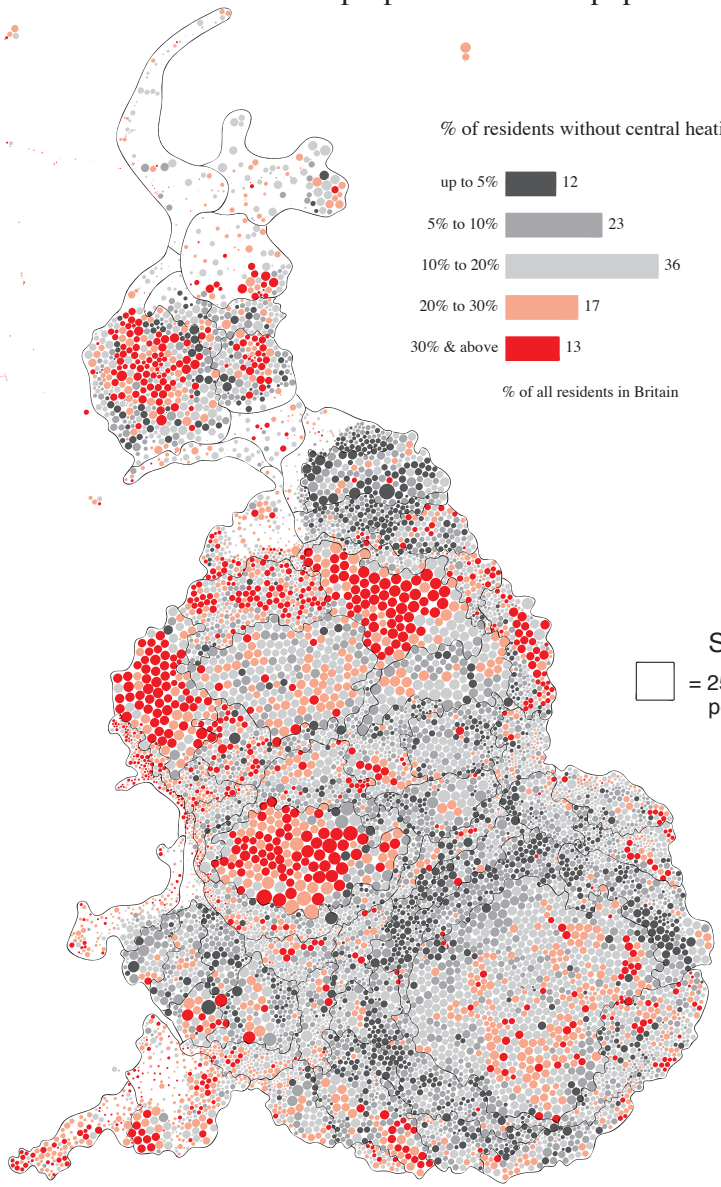
Sink and Stove 1971

proportion of ward populations

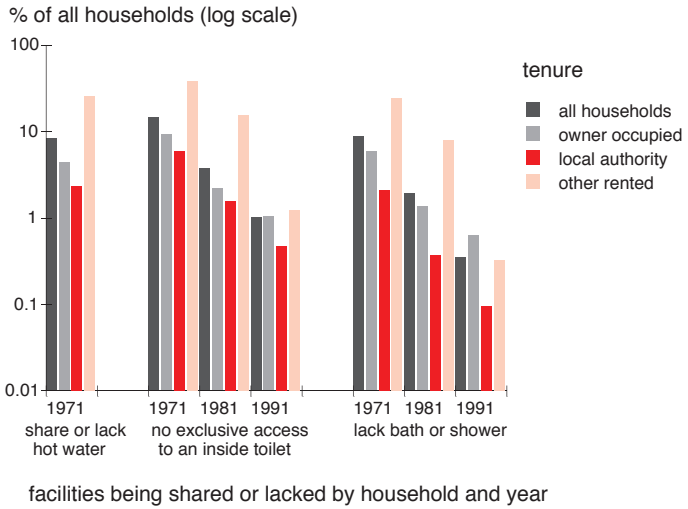


Central Heating 1991

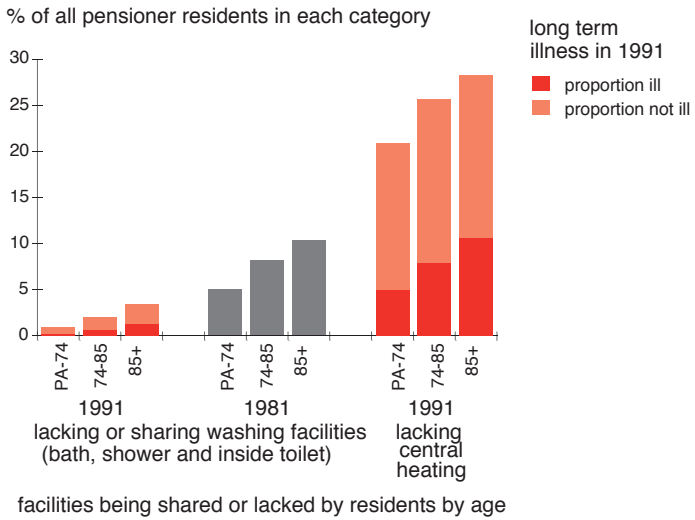
proportion of ward populations



5.9: Households Lacking or Sharing Washing Facilities in Britain 1971, 1981, 1991



5.10: Pensioners Lacking or Sharing Washing and Heating Facilities in Britain 1981, 1991



Washing

Questions concerning washing facilities have been asked at each of the last three censuses. The maps drawn here illustrate the geographical distribution of lack of exclusive access to a bath or shower. In 1971 one household in twelve did not have this facility; by 1981 that proportion had fallen to one household in fifty and by 1991 it was only one household in every three hundred. Nevertheless, the geographical pattern taken from the last census is interesting, identifying particular areas where decent washing facilities are still not universally available.

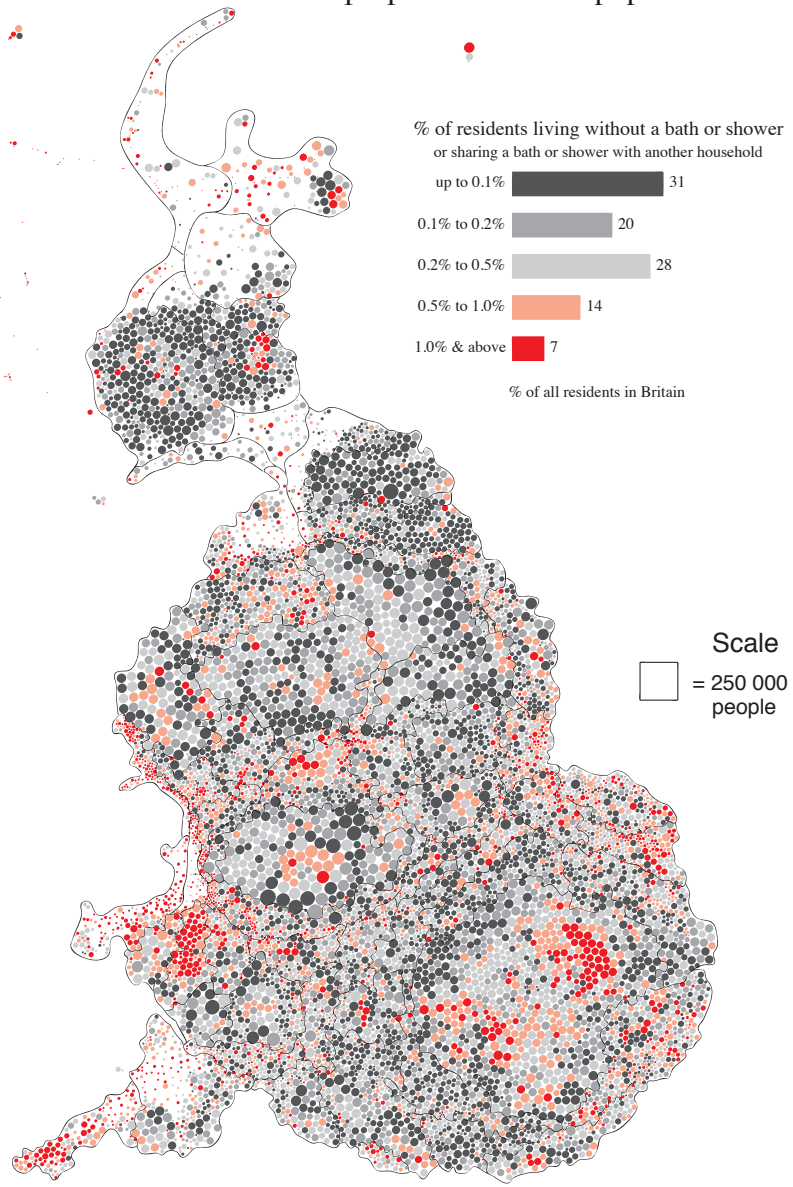
The general improvement in washing facilities has been so great that a log scale is needed to show it in Figure 5.9. This figure illustrates how access has improved for households living in different tenures in different years, and also shows the proportion of households which lacked exclusive access to hot water in 1971 (the last year in which that question was asked) and exclusive access to an inside toilet at each census. The improvement has been remarkable even across each tenure at each period; this trend is broken only by owner occupied households during the 1980s which did not experience the same rate of increase in access to toilets as did the other tenures. Similarly, owner occupied housing experienced a slower improvement in access to washing facilities during the last decade so that it became the worse served tenure by 1991.

The map of the improvement in washing facilities shown on the far right is dominated by two colours because the same areas which saw the most rapid improvements in the 1970s generally experienced them in the 1980s: suburban and rural areas. Urban areas in the north saw significant improvements in the last decade whereas suburban areas in the south underwent most improvement in the 1970s. New home building as well as the renovation of old accommodation was important in influencing these changes.

Part of the relationship between ill health, old age and amenities is shown in Figure 5.10. The proportion of pensioners of various ages lacking washing and heating facilities are shown subdivided by illness. Older pensioners are more likely to lack heating and washing facilities and the proportions who are ill rise similarly. A quarter of all ill pensioners (856 000 ill old people) lived in homes without central heating in 1991. Pensioners who were not ill were more likely to be living in homes with central heating. Of this group of ill pensioners 63 000 also lacked exclusive access to a bath or shower. Ill pensioners were 25% more likely to be in this position than pensioners who were not ill. It is not possible to say from the census whether lack of amenities led to a greater chance of illness, but what the census does show is that people who are ill are less likely than their healthy counterparts to be living with these facilities, facilities which become even more of a necessity with illness. It is the very oldest group who are least likely to have these facilities and who are also most likely to be ill. Of ill people aged over 84, 3.5% had neither central heating nor exclusive washing facilities in 1991.

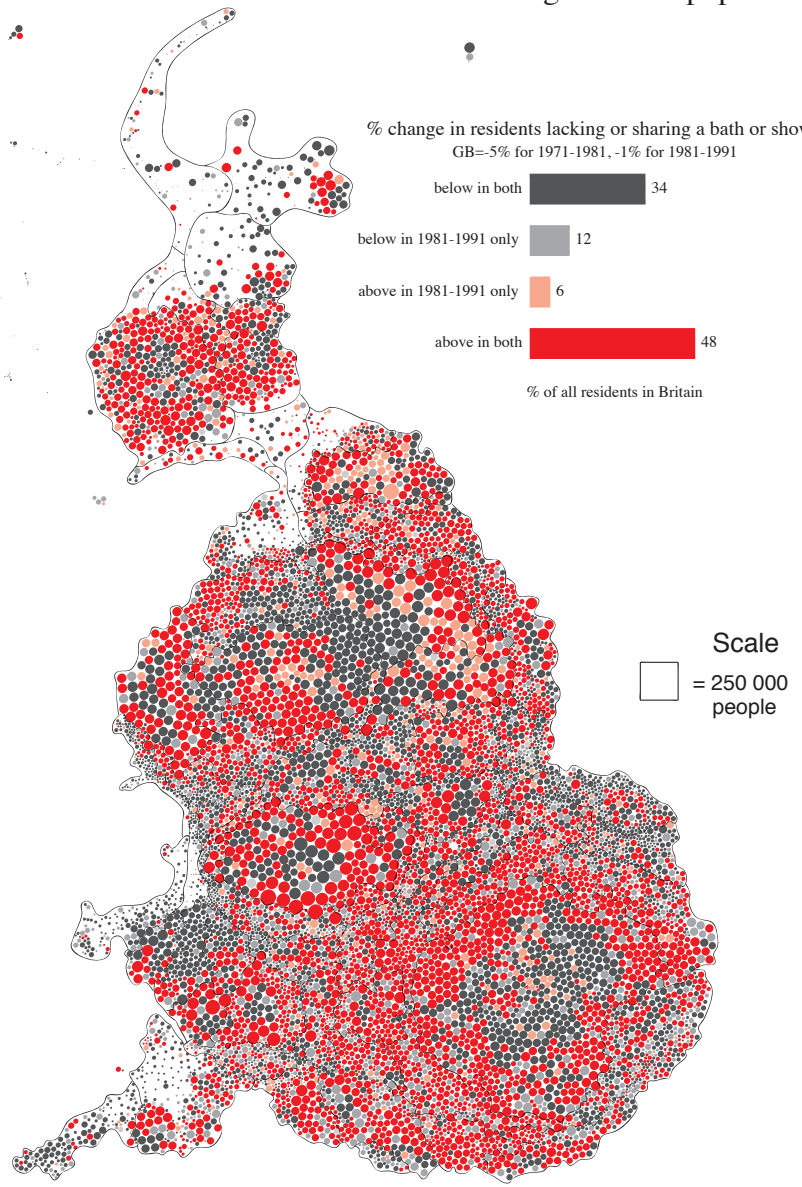
Washing Facilities 1991

proportion of ward populations

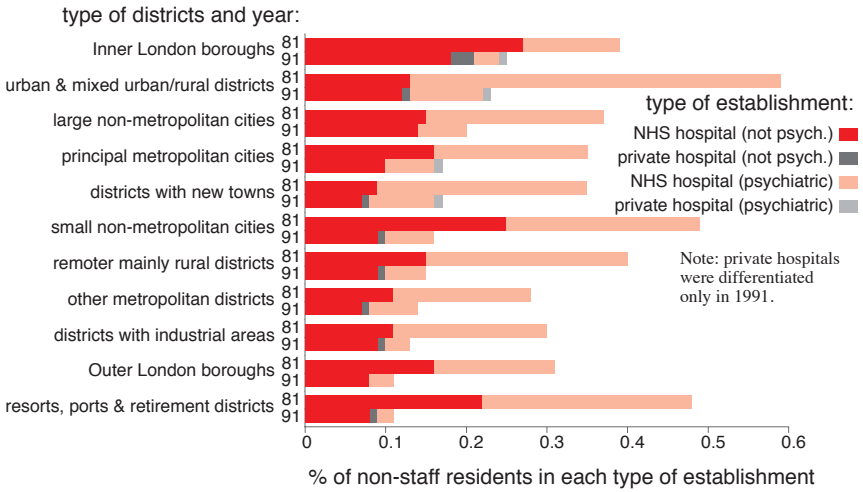


Washing Facilities 1971–1981–1991

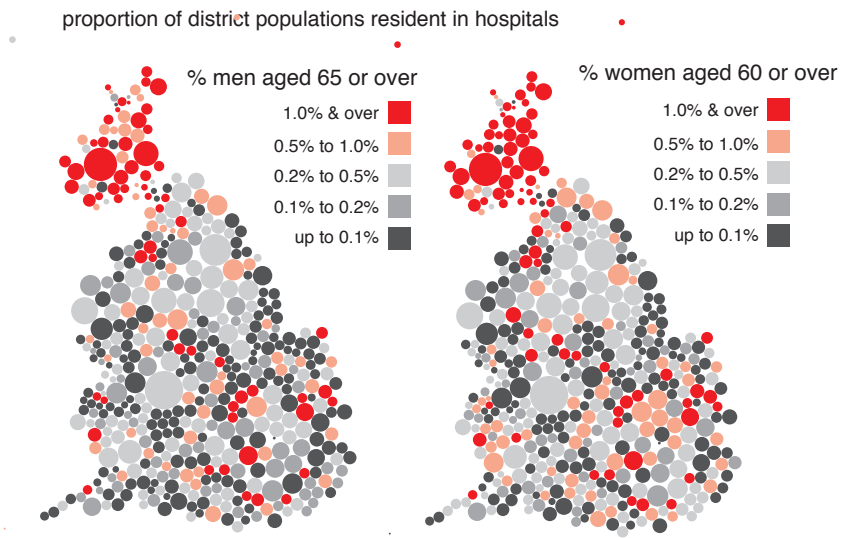
change in ward populations



5.11: Residents in Hospitals by Type and District Type in Britain 1981, 1991



5.12: Pensioners in Hospital by Sex in Britain 1991



Hospitals

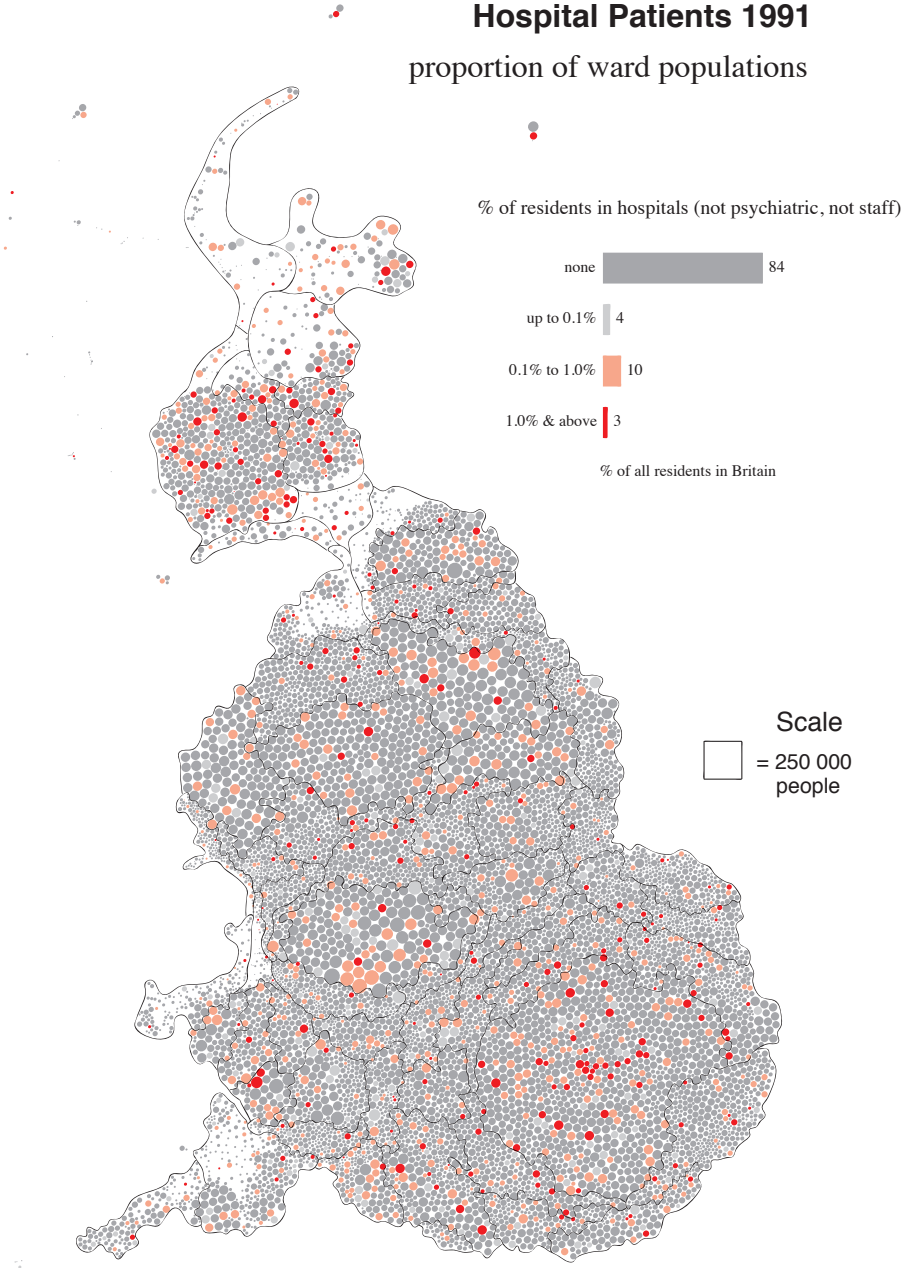
Hospitals provide facilities for people who are seriously ill and are the geographical locations where many people will die from illness. The first map opposite shows where all the 58 000 residents of medical facilities which were not psychiatric hospitals were staying on census night 1991. By plotting this distribution at the ward scale individual hospitals can be identified and by shading the wards according to the proportions of residents in hospital, the relative sizes of each establishment are shown (see page 13 for the district level). Hospitals can be seen to be very evenly spread across the night-time population. Areas with relatively high proportions of their residents in hospital can be seen in Inner London, south Birmingham and parts of Scotland. The second map opposite shows the distribution of residents in psychiatric hospitals. These can be seen to be even more evenly spread over the population as a whole. Only the wards in two counties did not contain any institutions large enough to be identified on this map.

The patterns shown opposite follow a period of falling numbers of patients being allowed to stay long term in hospitals during the 1980s. Figure 5.11 shows the proportion of residents in different types of hospital at two points in time for eleven types of district. The figure also shows where private hospitals are most likely to be found (as these were separately identified in 1991). The biggest falls have been in the proportion of people who were resident in psychiatric hospitals in resorts, ports & retirement districts and in Outer London. Inner London has experienced the slowest fall in the proportion of its residents who are in hospital. Figure 1.12 showed how these changes differed for men and women nationally and compared their experiences to changes for other groups of people living in communal establishments. In 1971 there were 171 000 patients resident in psychiatric hospitals; by 1981 this had fallen by 22% to 133 000; and by 1991 this number had fallen in a decade by 75% to stand at just 33 000 patients.

Most patients in hospital are elderly. Figure 5.12 shows what proportion of pensioners, by sex, were residents in a hospital in each district in 1991. A most striking feature of this figure is that elderly residents of Scotland appear much more likely to be in hospital than are residents of districts in England and Wales. This figure includes the residents of psychiatric hospitals. One reason for these differences may be the different way the changes to the health service have operated in different parts of Britain. In England between 1981 and 1991 the number of beds available in hospitals per day has fallen from 7.5 to 5 per thousand residents, while the number of "cases treated" has risen by 31% and the number of "day cases" has risen by 111% (Department of Health 1994: 37). Thus fewer people are staying in hospitals although more are being treated. There has been an 81% increase in the number of geriatric cases treated — the biggest rise of any group. However, all these figures should be interpreted with caution, particularly as one person can be counted as being treated many times if he or she is sent home between treatments.

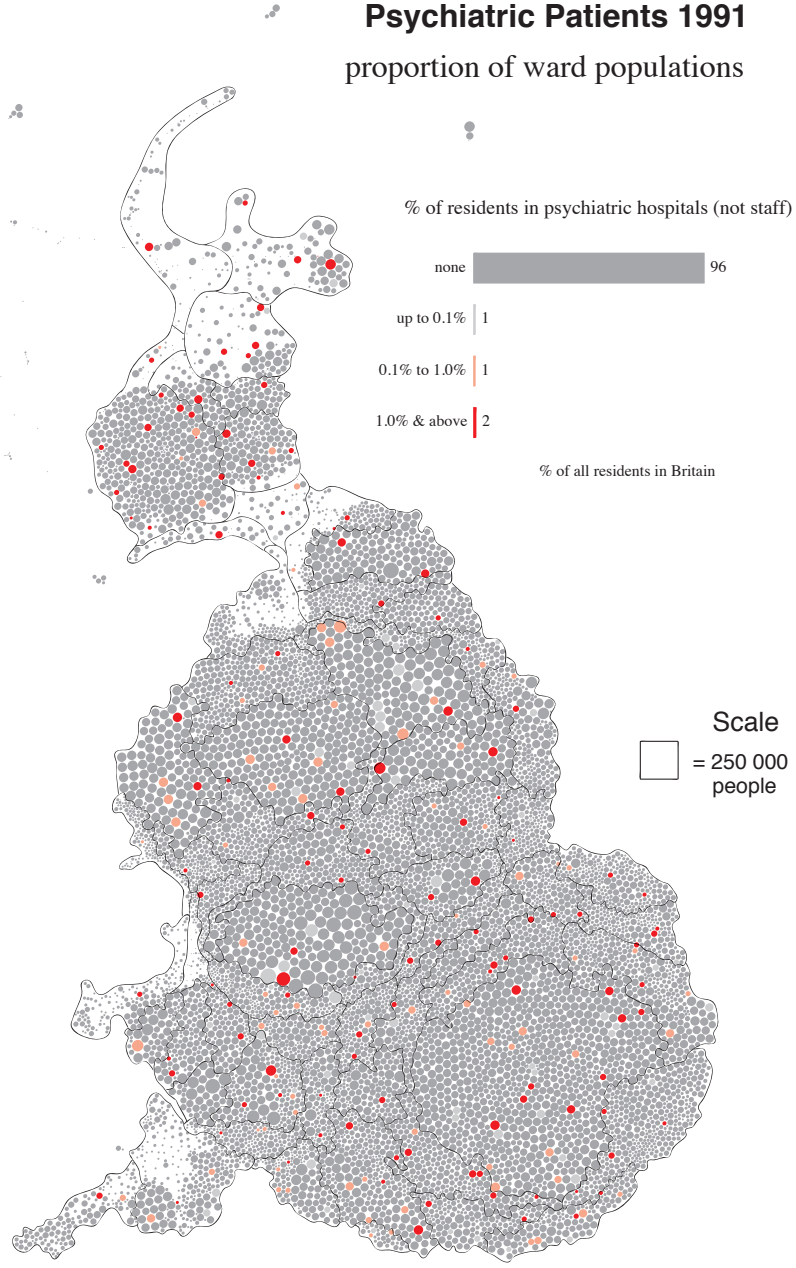
Hospital Patients 1991

proportion of ward populations

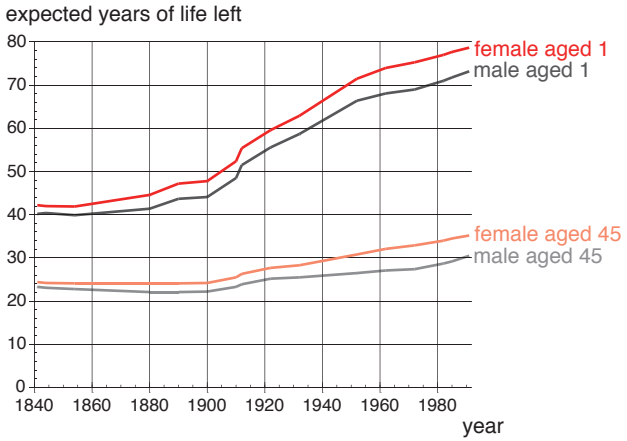


Psychiatric Patients 1991

proportion of ward populations

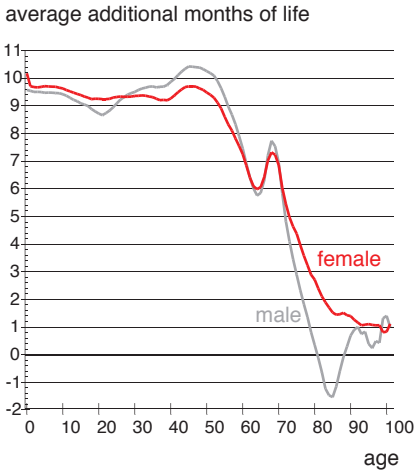


5.13: Life Expectancy by Sex and Age in England and Wales 1841–1990

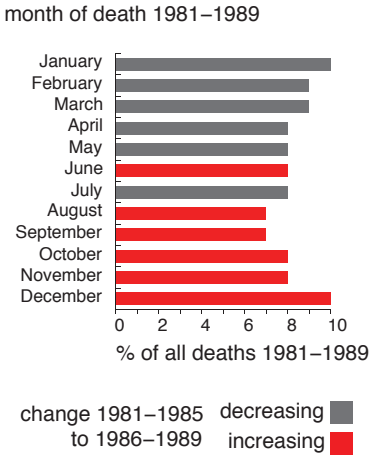


Source: Mortality Statistics Serial Tables, series DH1, no.26,
Review of the Registrar General on deaths in England and Wales 1991

5.14: Increase in Life Expectancy by Sex in England and Wales 1981–1985 to 1986–1989



5.15: Month of Death in England and Wales 1981–1989



Life Expectancy

One of the most basic ways in which quality of life and health can be measured is through how long people can expect to live. The first map drawn opposite shows the *crude mortality rate* in each ward in England and Wales. This is the proportion of residents who died in each place over a given period of time. This measure largely reflects the areas where more older people live (see page 39) and so does not provide a great deal of information about the relative health of different groups of people, although it does show where there is most demand for certain types of health service. Scotland is not shaded because detailed mortality data for Scotland were not available to the author at the time of writing.

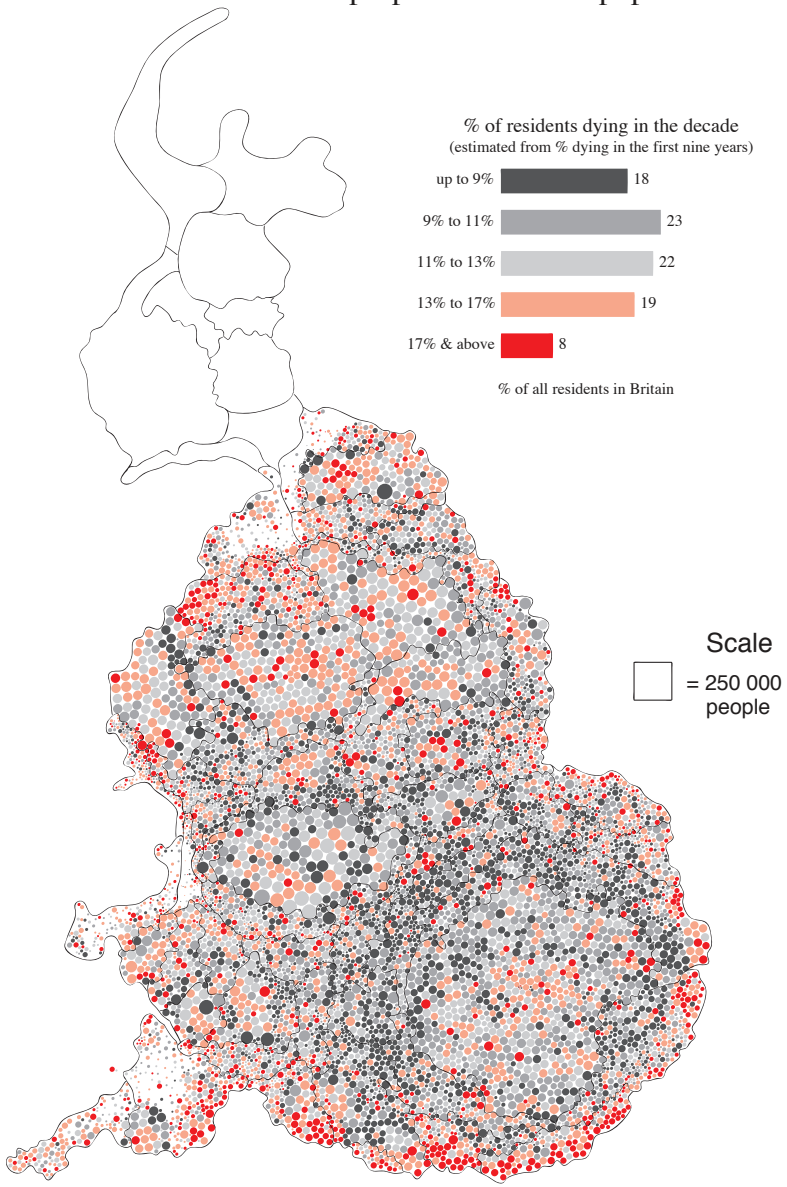
The second map opposite shows a more sophisticated method of illustrating the pattern of mortality. Instead of showing how many people died in each place, the average ages of people who died in each place are shown. This provides an estimate of the life expectancy of people living in each ward which varies from just under 70 years to just over 75 years. This may not seem a great difference, but is seen as a wide margin by demographers, and the geographical patterns of life expectancy shown are consistent with many of the other patterns drawn in this atlas. In strict terms the pattern shown for these wards is the mean age of death which, for all of England and Wales in 1991, was 71.4 years for men and 77.6 years for women. The general difference between men and women is thus greater than that found between very different local areas.

More exact calculations of life expectancy are standardized for the age structure of the local population. For the 1989–1991 period life expectancy in England and Wales was calculated by the government actuaries to be 73.2 years for men and 78.7 years for women. Figure 5.13 shows how life expectancy from age 1 has risen over the last century and a half for each sex and that life expectancy from age 45 has risen less dramatically. Figure 5.14 examines the changes which took place for people by single years of age during the 1980s. For people aged under 50 there was, on average, an improvement in life expectancy of ten months. Improvements around retirement age were much less dramatic, but for people who then lived to age 70 improvements of between seven and eight months were common. The experiences of men and women then differed dramatically, with men aged between 80 and 90 in the latter half of the 1980s living for two months less, on average, than their counterparts in the early 1980s. The group dying earlier were the men who survived the First World War but had had their health damaged by it or had been too unfit to be enlisted. Thus those who suffered but survived that war were less healthy than the generation born a few years before them.

Figure 5.15 shows how death rates vary with time of year. An unusually harsh winter or flu epidemic can increase death rates temporarily. Thus aggregate figures covering deaths over several years are used here.

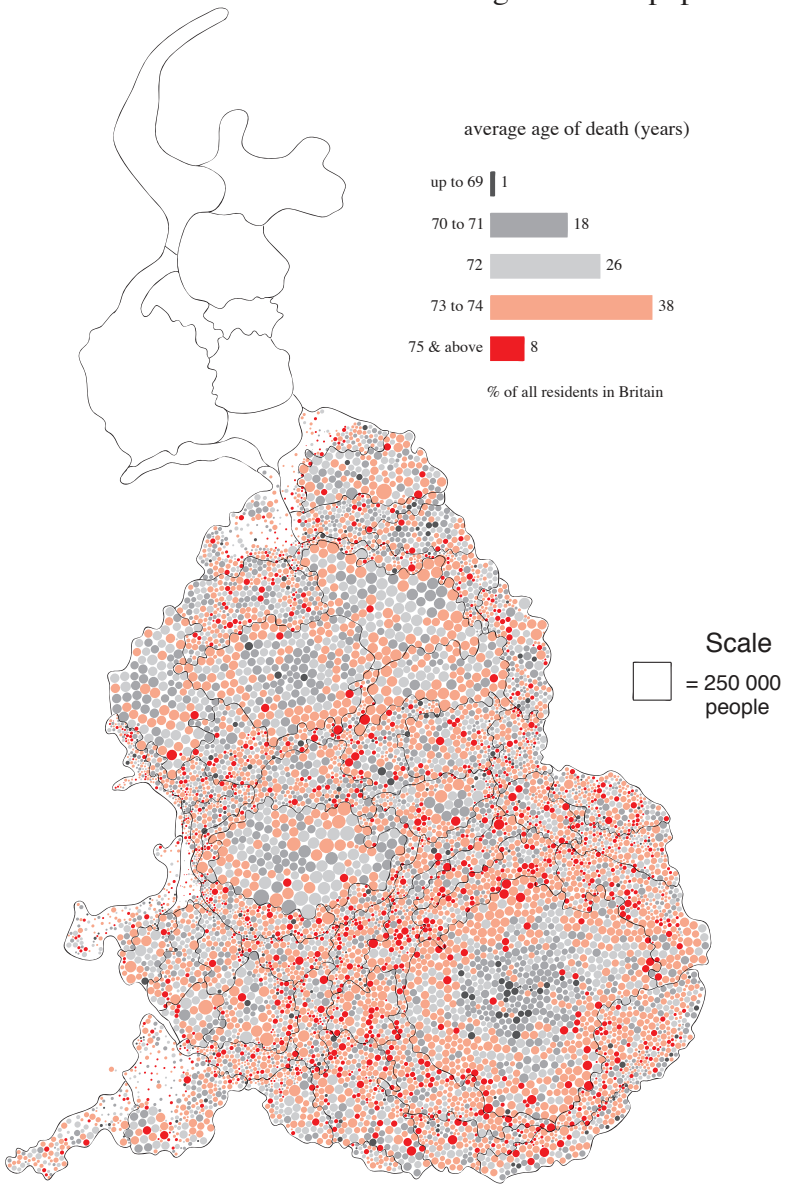
Crude Mortality Rates From 1981–1989 Deaths

proportion of ward populations

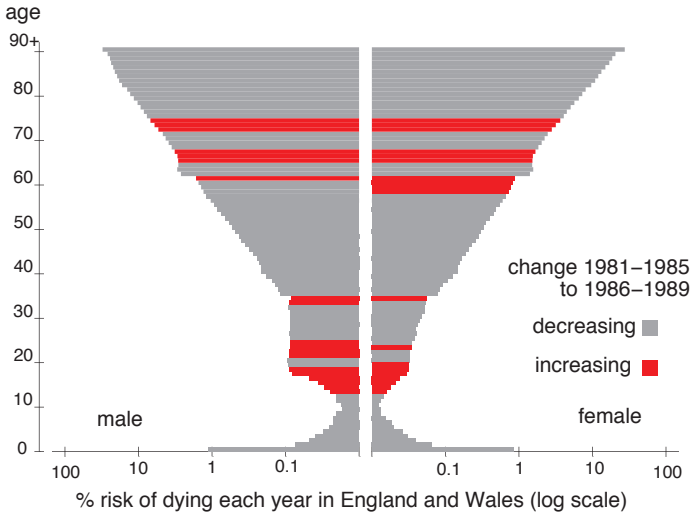


Average Age of Death 1981–1989

average for ward populations

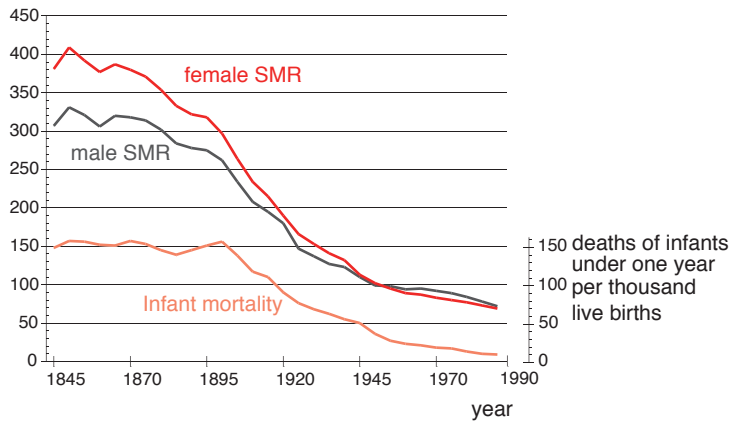


5.16: Mortality Rates by Sex and Age in England and Wales 1981–1989



5.17: Mortality Rates by Sex and Age in England and Wales 1841–1990

standardized mortality ratios (SMRs 1950–1952=100)



Source: Mortality Statistics Serial Tables, series DH1, no.25
Review of the Registrar General on deaths in England and Wales 1841–1990

Standardized Mortality

The usual way in which death rates are expressed is in terms of *standardized mortality ratios* (SMRs). This is the ratio between the number of deaths which occur in an area and the number which could be expected to occur given the age and sex profile of that area and the national rates of mortality for the particular time period. Here the ratio is multiplied by one hundred. Thus, if there were twelve deaths in a ward where six deaths would have been expected (given the ages and sexes of the inhabitants of that ward) then the SMR of that ward would be two hundred. People living there are twice as likely to die as is usual for this country (taking into account the ages and sexes of those people).

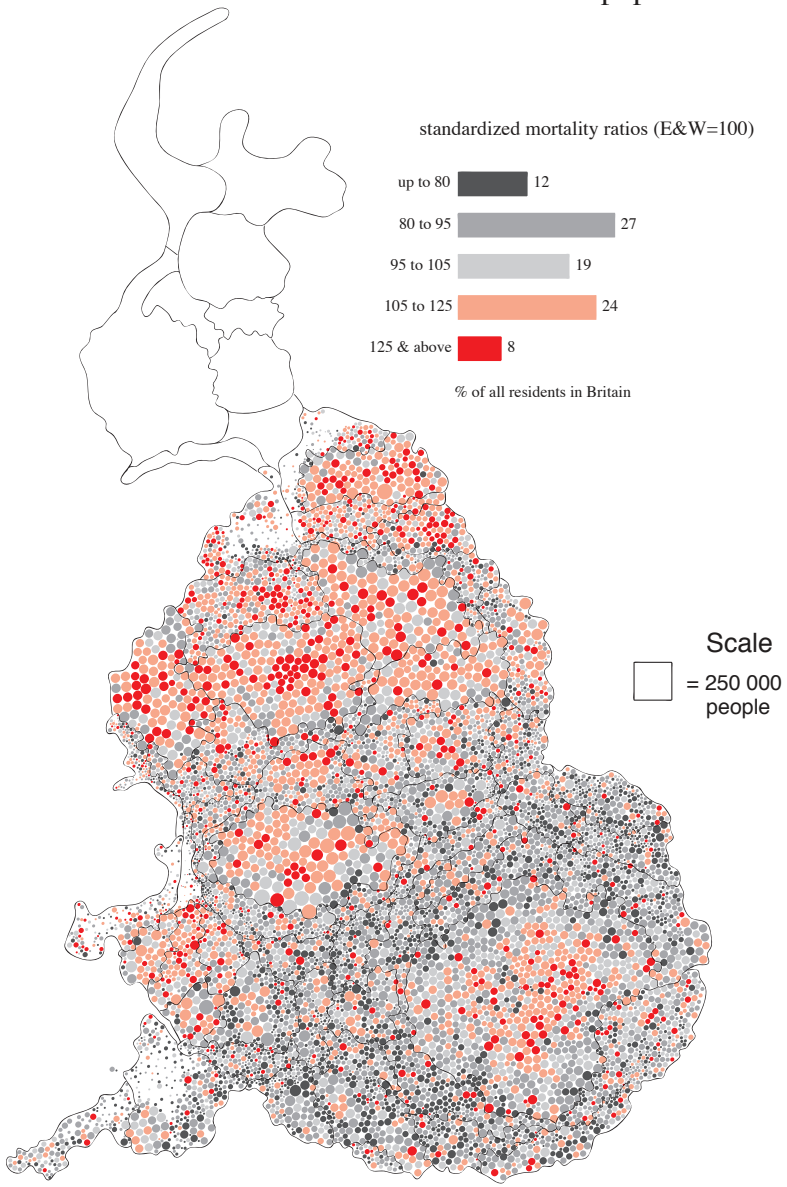
The first map opposite shows the distribution of SMRs across all the wards of England and Wales. In the centres of many northern towns, in Wales and in London, one more person in every five dies per year than would be expected. Conversely, in the south outside London and in other affluent areas, one person less in every five dies a year than would be expected. Seventy percent of the population live in areas between these two extremes as the key to the map shows (and 10% of the population live in Scotland for which no figures are reported here). Figure 5.16 uses the chances of an individual dying each year according to their age and sex to illustrate why SMRs for areas need to be calculated; it also shows for which groups mortality rates were rising in the 1980s. The mortality rates were calculated using the final mid-year estimates of the numbers of people in each age group made for 1981 and 1991. The "hour-glass" shape produced reflects the physiology of human beings as well as the tendency of young men to be much more accident prone than young women.

The second map opposite shows how SMRs have changed over the 1980s. Inner cities show up clearly as experiencing the sharpest rises (Phillimore *et al*. 1994). It should be remembered that population profiles from the 1991 census had to be used to calculate the number of deaths which would be expected in the latter half of the 1980s. Because of under-enumeration in the last census the rise in SMRs may be over-emphasized in some urban areas. However, the calculation of the number of expected deaths is most reliant on estimates of the number of old people and these were relatively reliable (see page 10), so the estimates produced here should not be too misleading.

Standardized mortality ratios have fallen dramatically over the last 150 years and the rate for women has fallen faster than that for men. The figure here uses the mortality rates recorded around 1951 to calculate expected rates for every other period so that the different age profiles of different times have no effect on the statistics, thus both lines pass through 100 at this time. Since then women appeared to improve their relative situation even more, although in recent years this improvement has slowed down. The figure also includes a major cause of the rapid fall in mortality over time — the collapse in infant mortality rates which began at the turn of this century.

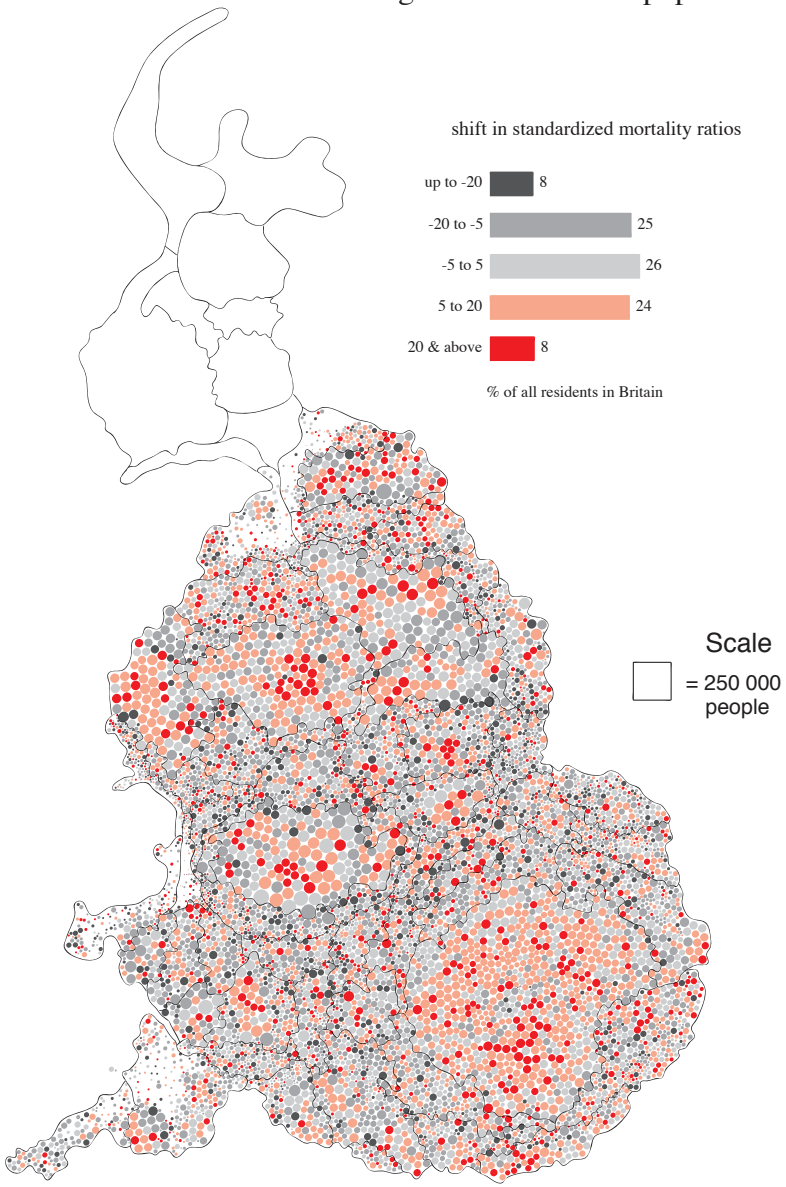
Mortality from All Causes Between 1981 and 1989

relative risks for ward populations

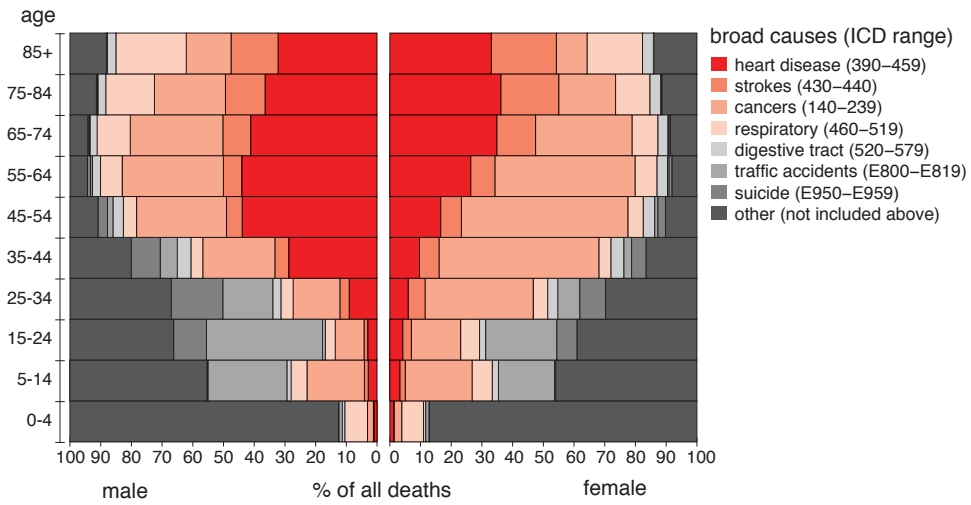


Mortality from All Causes 1981–1985 to 1986–1989

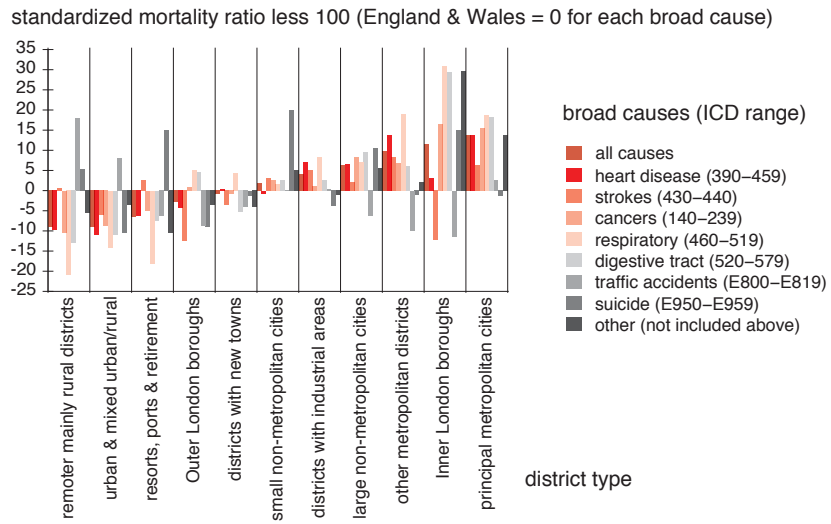
change in risk for ward populations



5.18: Cause of Death by Age Group and Sex in England and Wales 1981–1989



5.19: Cause of Death by District Type in England and Wales 1986–1989



Main Causes of Death

To understand why people in different parts of the country die at different ages it is necessary to consider what people are dying of. Cause of death is also often indicative of life-style and, in aggregate, causes of death are informative about the standards of living of communities. Figure 5.18 shows how eight groups of causes of death account for different proportions of deaths for people by age and sex. Everyday terms have been used to describe the causes, and the precise definitions are indicated by the International Classification of Disease (ICD) numbers in the key to the figure (WHO 1977). Deaths in infancy are both rare and can be due to many obscure causes, whereas well known causes such as heart disease and cancers account for the majority of deaths of older people and thus for the majority of all deaths. There are important differences between the most probable causes of death for men and women, which the figure illustrates.

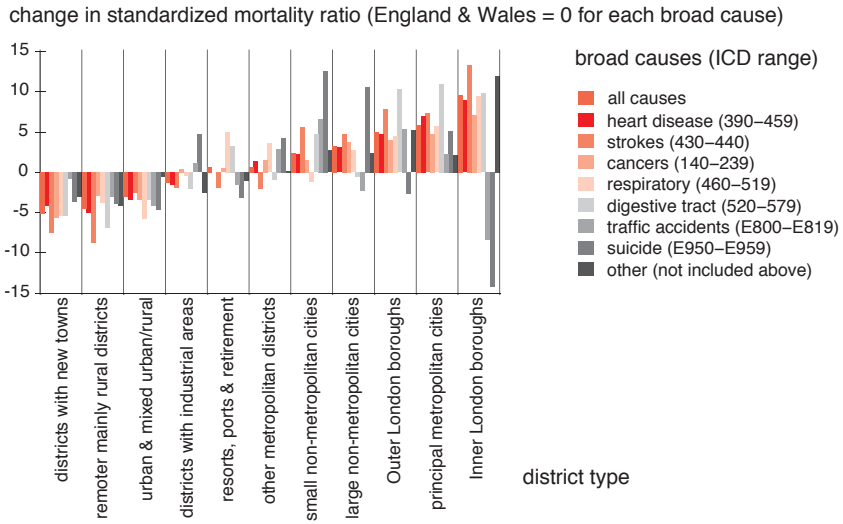
Because these eight sets of causes of death are each more prevalent in particular age and sex groups it is necessary to use standardized mortality ratios in mapping these causes if the maps are not merely to reflect the age and sex structure of the residents of each place. The nine maps opposite show which districts have particularly low and high rates of mortality from each group of causes and for all causes. The map of all causes is dominated by the north/south division of the country (to which central London is the main exception). Only five districts have standardized mortality ratios above 125 for this time period based on the 1991 census age–sex profiles, these are: Castle Morpeth, Manchester, Blackburn, Liverpool and Merthyr Tydfil. Similarly, only six districts had SMRs below 80: the City of London, East Dorset (which was Wimborne), Christchurch, Wealdon, Tewkesbury and the Vale of the White Horse. The differences between areas are much more dramatic for groups of causes of death partly because the numbers of deaths involved are less and so the sensitivity of the ratio statistic is increased.

In summary, the maps show how mortality from heart diseases, strokes, cancers and respiratory diseases is higher in the north and in cities, each set of causes accounting for the majority of the national pattern in different ways. Mortality from digestive diseases is highest in a band running along the Thames in London, whilst traffic accidents are unusually common in small rural districts in the Home Counties. Suicide rates are high in central London and around the coast, while other causes account for a high number of deaths in Inner London and Birmingham. Figure 5.19 provides the same information but using the eleven fold typology of districts to illustrate which causes of death are most prevalent in which types of place after having standardized for age and sex. The district types are ordered from those with the lowest overall rates of mortality to those with the highest. Within this general pattern particular causes can be seen to be over- and under-represented in particular types of places. Fewer strokes or traffic accidents occur in Inner London, for instance, than would be expected given the age and sex of its residents.

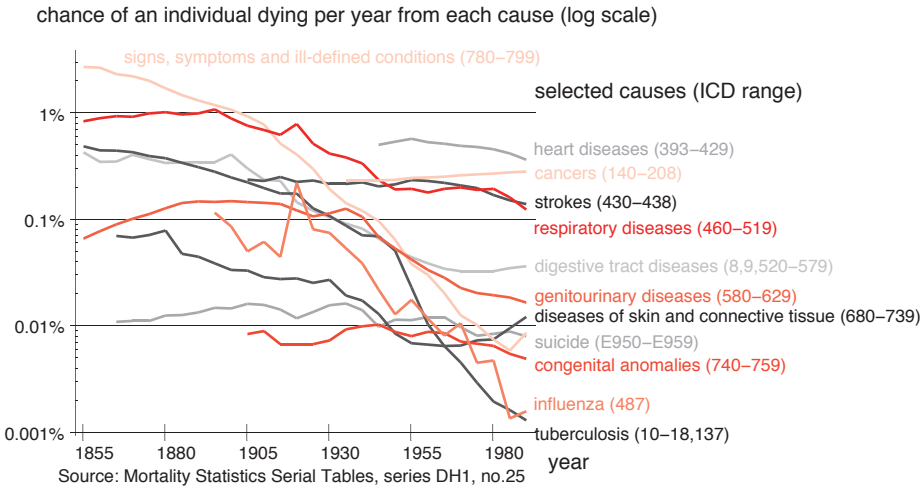
Causes of Mortality 1986–1989

relative risks for district populations

5.20: Change in Cause of Death by District Type in England and Wales 1981–1985 to 1986–1989



5.21: Change in Chance of Dying by Cause of Death in England and Wales 1851–1990



Source: Mortality Statistics Serial Tables, series DH1, no.25
Review of the Registrar General on deaths in England and Wales 1841–1990

Changing Causes of Death

The eight broad groups of cause of death selected and mapped at the district level on the previous page are used here to show the patterns of change over the last decade. Standardized mortality ratios are rising in some places and falling in others. Each of the nine maps opposite shows the difference between the SMR calculated for deaths in the 1986 to 1989 period (based on the 1991 census age and sex profiles) and for deaths in the 1981 to 1985 period (which use the 1981 census denominators). The usual caveats concerning the reliability of information from the 1991 census should be born in mind.

For all causes of death the most obvious increase has been in London, but many northern cities and Bristol have seen rises of between 5 and 20 percentage points, as have a string of southern coastal towns. Rates have fallen by a similar amount in the midlands, coastal Wales and in other rural areas. Changes in heart diseases and cancers have been the main cause of this trend. Strokes have followed a similar pattern although they have risen more sharply in central London (from a low base) and fallen sharply in mid and north Wales (from a high base). Respiratory diseases have seen a more complex pattern of change with rates rising in London and around Manchester quite sharply. The high rates of death through digestive tract diseases in London were mostly the products of a rise in the 1980s which also saw falls in East Anglia and around the principal cities. Traffic accidents, suicides and other less common causes of death do not show any simple geographical trend over this period.

Figure 5.20 shows district aggregate changes in the causes of death in Britain over the 1980s. Again the districts are ordered according to the overall trend, from largest improvement, worsening to the biggest relative deterioration, so that changes in rates which are particularly unusual for particular places stand out. Suicides can be seen to have increased out of line in industrial areas and non-metropolitan cities, and to have decreased dramatically in Inner London, where traffic accidents also fell significantly. Falls in strokes can be seen to be most outstanding in new towns and districts which are mainly rural. Strokes caused increasing numbers of deaths in London.

These recent changes are put in context by Figure 5.21, which shows how an individual's chances of dying each year from each of twelve causes of death have changed since 1855. Some groups of causes were not specified until later and so are not shown for the earlier periods, and a log scale has to be used because of the huge variation in chances over time and between causes. The figure reflects changes in the incidence and effective treatment of different diseases due to public health, medical advances and social change. The falls of influenza and tuberculosis from being major killers in the 1920s to rare causes of death today are striking. So too is the rise of cancer, digestive diseases and diseases of the skin in more recent years. Only heart disease kills more people than cancer, but the gap between these two major groups of causes is narrowing.

MAGENTA

BLACK

5.22: Top Fifty Individual Causes of Death in England and Wales, 1981–1989

Rank	ICD Code	Cause of Death Description	Annual Rate per Million People	Proportion Female	Mean Age at Death	Change in Mean Age in Months*
–	All	all causes of death	11 521	50%	73	10
1	410	heart attacks (acute myocardial infarction)	2040	43%	73	15
2	414	other forms of chronic ischaemic heart disease	1042	46%	75	6
3	162	lung cancer (including trachea and bronchus)	698	28%	70	13
4	485	bronchopneumonia (organism unspecified)	647	63%	83	30
5	174	breast cancer (women)	265	100%	67	15
6	434	thrombotic stroke (occlusion of cerebral arteries)	253	63%	80	6
7	153	cancer of the colon	217	56%	73	10
8	491	chronic bronchitis	216	29%	76	12
9	151	stomach cancer	197	40%	72	11
10	441	aneurism of the aortic artery	147	36%	75	10
11	290	dementia (senile organic psychotic conditions)	146	69%	83	12
12	250	diabetes (mellitus)	130	57%	75	21
13	431	haemorrhage stroke (intracerebral haemorrhage)	130	60%	74	-2
14	185	cancer of the prostrate	129	0%	76	8
15	440	hardening of the arteries (atherosclerosis)	121	67%	84	8
16	157	cancer of the pancreas	117	50%	71	10
17	154	cancer of the rectum	117	45%	72	8
18	188	cancer of the bladder	91	31%	74	13
19	150	cancer of the oesophagus	89	41%	71	8
20	183	cancer of the of the ovaries	75	100%	66	11
21	332	Parkinson's disease	65	48%	79	16
22	402	heart disease from high blood pressure (hypertensive)	65	56%	75	7
23	430	brain haemorrhage (subarachnoid haemorrhage)	60	66%	61	5
24	571	chronic liver disease (including cirrhosis of the liver)	49	47%	61	-1
25	481	pneumonia (due to pneumoccus bacteria)	47	50%	76	11
26	191	brain tumour (malignant neoplasm of the brain)	46	43%	57	12
27	585	chronic kidney failure	43	53%	78	6
28	532	duodenal ulcer	43	49%	76	15
29	189	cancer of the kidney	42	38%	67	15
30	415	right-side heart failure (acute pulmonary heart disease)	41	60%	75	18
31	205	leukaemia (myeloid type)	38	49%	64	22
32	180	cancer of the cervix	38	100%	61	-7
33	492	emphysema of the lungs	38	25%	73	12
34	493	asthma	36	58%	62	28
35	E888	accidental fall (unspecified location and injury)	35	69%	80	-12
36	E812	motor vehicle collision (vehicle occupant)	34	26%	37	11
37	E814	motor vehicle collision (pedestrian)	32	41%	52	15
38	394	diseases of mitral heart valve	32	76%	71	24
39	531	stomach ulcer	32	58%	76	11
40	797	old age (senility without mention of psychosis)	31	82%	90	8
41	798	sudden death of unknown cause	29	38%	6	-16
42	486	pneumonia (organism not stated)	27	53%	74	37
43	562	diverticular disease of the bowel	27	75%	78	13
44	557	ischaemia of the bowel	27	61%	76	12
45	714	rheumatoid arthritis	27	79%	75	22
46	733	bone disease (osteochondropathies)	26	80%	84	4
47	342	stroke, cause not stated (hemiplegia)	25	59%	80	12
48	E953	suicide by hanging or suffocation	24	25%	51	-30
49	204	leukaemia (lymphoid type)	24	43%	65	33
50	155	cancer of the liver	23	41%	68	12
		all other causes of death not included above	3548	55%	71	18

** Note: change is the increase, in months, in the average age of death from each cause between 1981–1985 and 1986–1989.*

Common Fatal Diseases

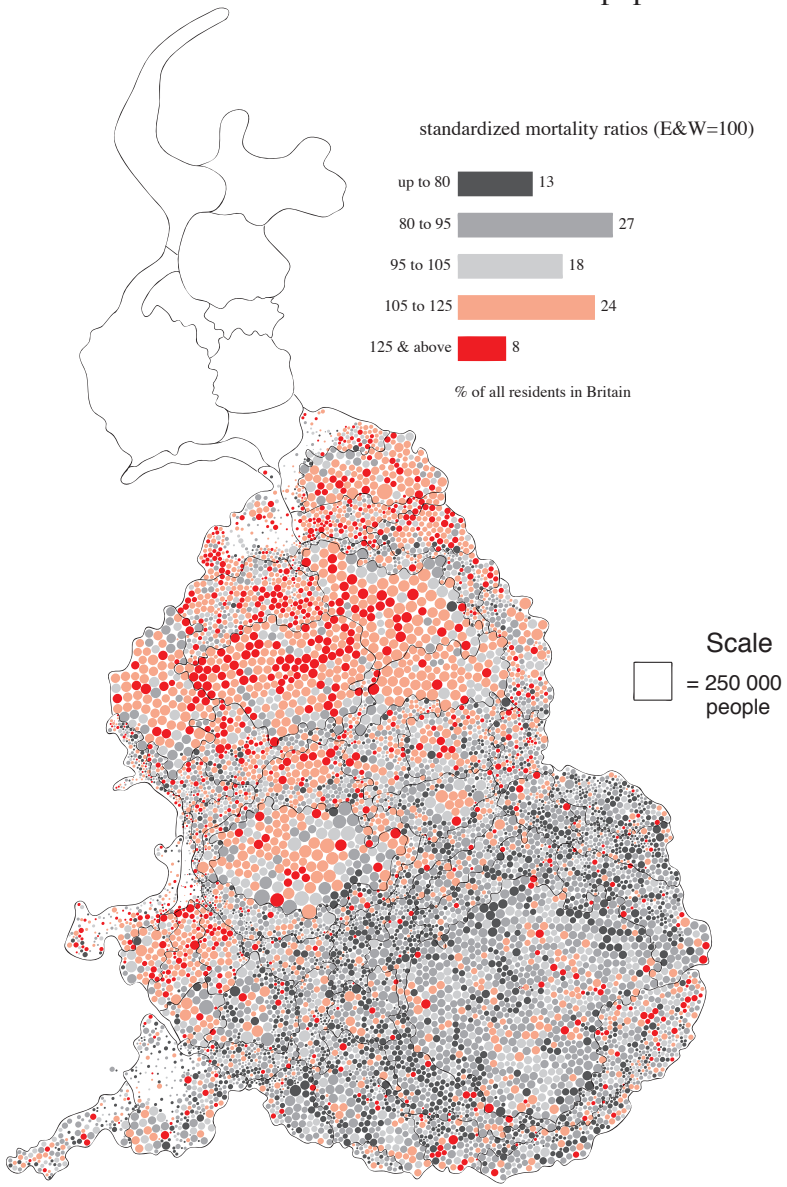
All deaths in this country are classified using the International Classification of Diseases (ICD) codes. Figure 5.22 shows the fifty most common codes used. This is not the same as the fifty most common fatal diseases. Some diseases are subdivided into several codes while some codes include more than one disease. Some codes are less precise definitions of conditions often allocated to other codes. Because of factors such as these, 30% of all deaths are assigned to categories not in the most common fifty — not because many people are dying from rare diseases, but often because their deaths are being assigned to less commonly used categories. For instance "old age" may not be a popular cause of death to record with relatives (the deaths of women are four times more likely than those of men to be assigned to this category — see Figure 5.22). As diagnostic skills change, so too do death rates. The falling mean age of people suffering "sudden death of unknown cause" is due to better diagnosis of these deaths for adults rather than an increase in the incidence of cot deaths. Other illnesses with a falling mean age of death are haemorrhagic stroke, liver disease, cancer of the cervix, accidental falls and suicides by hanging, but only liver disease saw an increase in annual rates of death. The mean age of people dying from suicide by hanging in the 1980s fell by 30 months in effectively five years due mainly to an increase in young men killing themselves in this way.

The incidence of over twenty of the fifty categories shown in Figure 5.22 is known to be increased by smoking. Importantly the most common three causes of death — heart attacks, other heart diseases and lung cancer — which together account for a third of all deaths, have been clearly shown to be hastened by smoking. Changing smoking habits is the single public health measure which, it is thought, would have the greatest impact on mortality rates. Standardized mortality ratios for deaths attributable to all heart diseases (ICD 390 to 459) and cancers (ICD 140 to 239) have been mapped at the ward level opposite. The north/south pattern in heart disease is particularly clear, even at this spatial resolution. Only a very small minority of wards in the north have SMRs for heart disease below the national average whilst very few wards in the south of the country have above average rates for mortality attributed to heart diseases.

The distribution of deaths by cancers shows a different pattern in which northern towns and London dominate. Liverpool, central Manchester, Leeds and the banks of the Tyne, the Tees and the Thames contain most of the wards in which people are 25% more likely to die of cancer, and hence to die younger, than average. Rates of deaths from cancers are low in rural areas, particularly in the south of England. It is not possible to know (from the information which has been used here) whether people are likely to move to or remain in these areas when they get cancer, or whether people are more likely to get cancer if they live in these areas. All that can be discerned from death certificates is that if you die of cancer, these are the places in which you are more likely to last live.

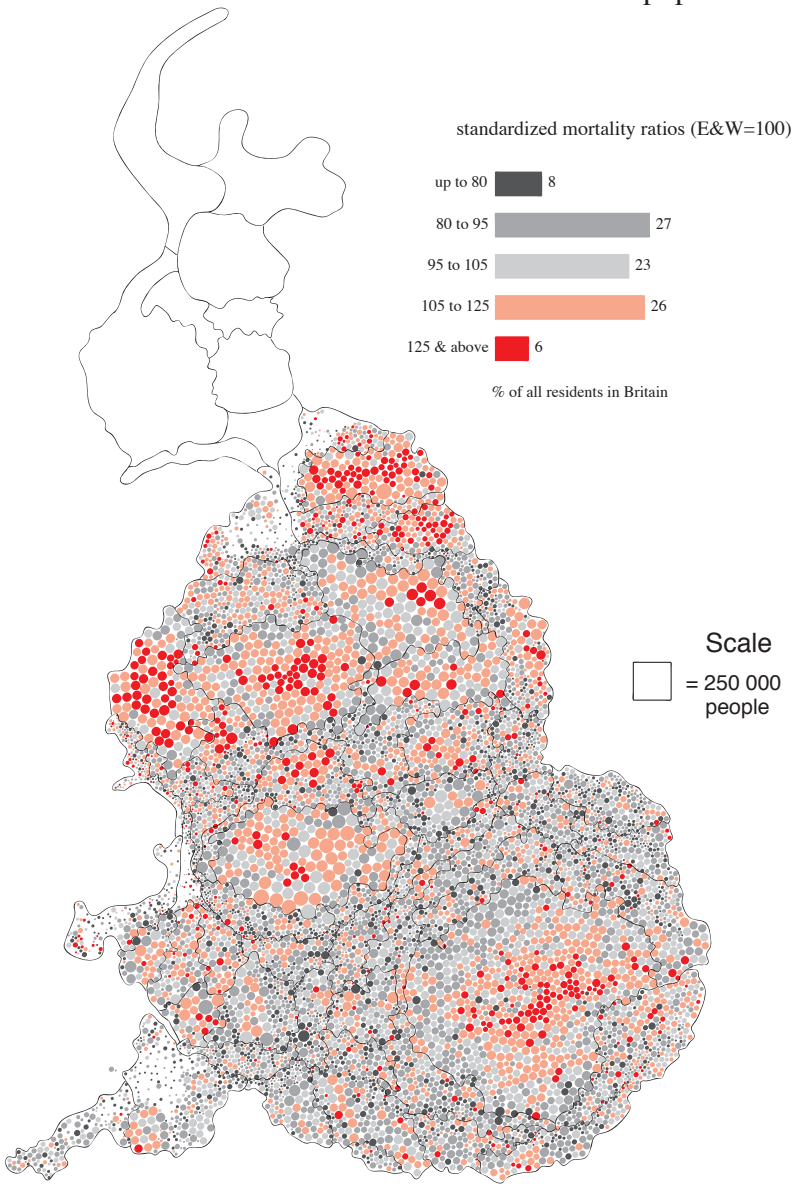
Mortality from Heart Diseases Between 1981 and 1989

relative risks for ward populations

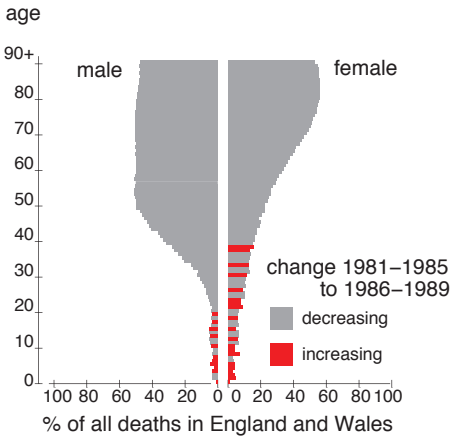


Mortality from Cancers Between 1981 and 1989

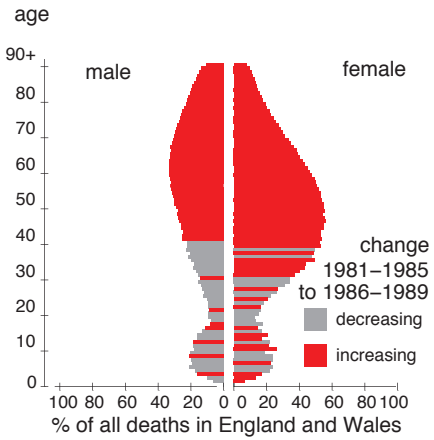
relative risks for ward populations



5.23: Mortality from Heart Diseases by Age and Sex in England and Wales 1981–1989



5.24: Mortality from Cancers by Age and Sex in England and Wales 1981–1989



5.25: Mortality from Traffic Accidents by Age and Sex in England and Wales 1981–1989

5.26: Mortality from Suicide by Age and Sex in England and Wales 1981–1989

Avoidable Deaths

There are other forms of death which are even more obviously avoidable than smoking related diseases and which can be seen to be relatively important because of the young ages at which most people die from them. The two which have been selected here are deaths from traffic accidents (ICD E800 to E819) and suicides (ICD E950 to E959). The two most common individual causes of death from these groups of causes can be seen, from Figure 5.22, to lead to death at an average age of 51 for suicides by hanging and 37 for motor vehicle collisions with other vehicles. Among the top fifty causes shown in that figure, only sudden deaths of unknown cause (which are mainly cot deaths) account for people dying at average ages lower than these (see Figure 5.28). Most people who die of heart diseases or cancers still live to be 70.

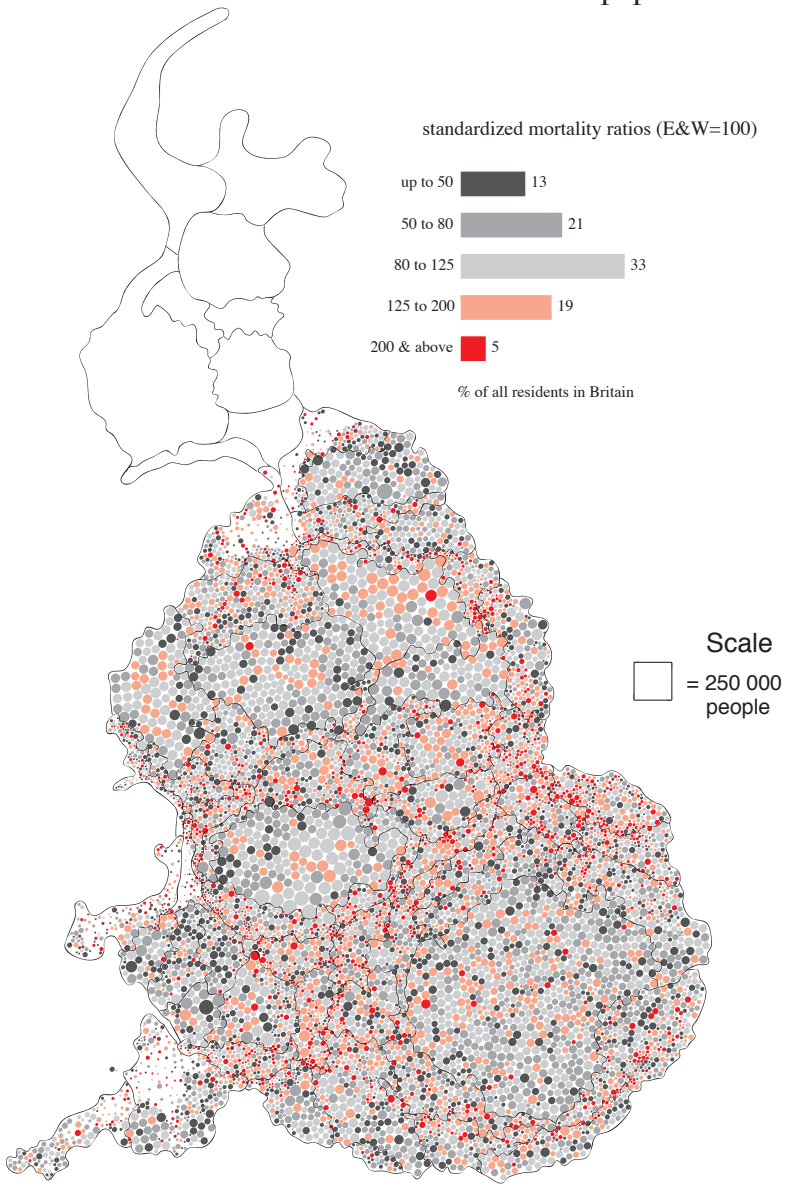
The age and sex profiles of the causes of death which have been mapped at the ward level on this page and the last are shown in Figures 5.23 to 5.26. Heart disease can be seen to kill men earlier than women but appears to be decreasing for most age groups. Cancers, on the other hand, affect more women earlier in life than men and are increasing as a cause of death for most age and sex groups. Traffic accidents affect far fewer people but tend to do so at a much younger age and are much more likely to occur to men than to women. The peak year of death for men from traffic accidents is seventeen, the earliest year in which a provisional driving licence can be granted. Rates of death from traffic accidents are declining for men aged between 16 and 23 and rising for boys aged between 9 and 15. A similar picture is shown for women. Suicide, conversely, is almost unheard of for people aged below 15, but is increasing for men aged between 16 and 26 and for women aged between 18 and 22. Suicide is also an increasingly important cause of death amongst older men. Of all age and sex groups, 24 year old men are the most likely to die from suicide.

The first map opposite shows the geography of deaths attributable to traffic accidents. It is important to bear in mind that this map is based on quite low numbers of deaths in particular wards, so only where a group of wards exhibits the same pattern is there likely to be a reliable trend. However, this map does show a more precise geography to the urban/rural divide described earlier. It also shows that in certain parts of some major cities mortality rates are particularly high from traffic accidents while in some rural areas they are low. Note that the keys use a wider scale than has been used before.

The second map is of the geography of suicide. A large cluster of wards in Inner London, inner Manchester, in the centres of Leicester and Birmingham and strung along the coast show much higher rates than are normal, while in areas like South Yorkshire and the North East suicide rates tend to be unusually low. It is impossible to speculate on the causes of this pattern given only cross-sectional data, but it can be shown that if you take your own life you are more likely to do so when living in certain places.

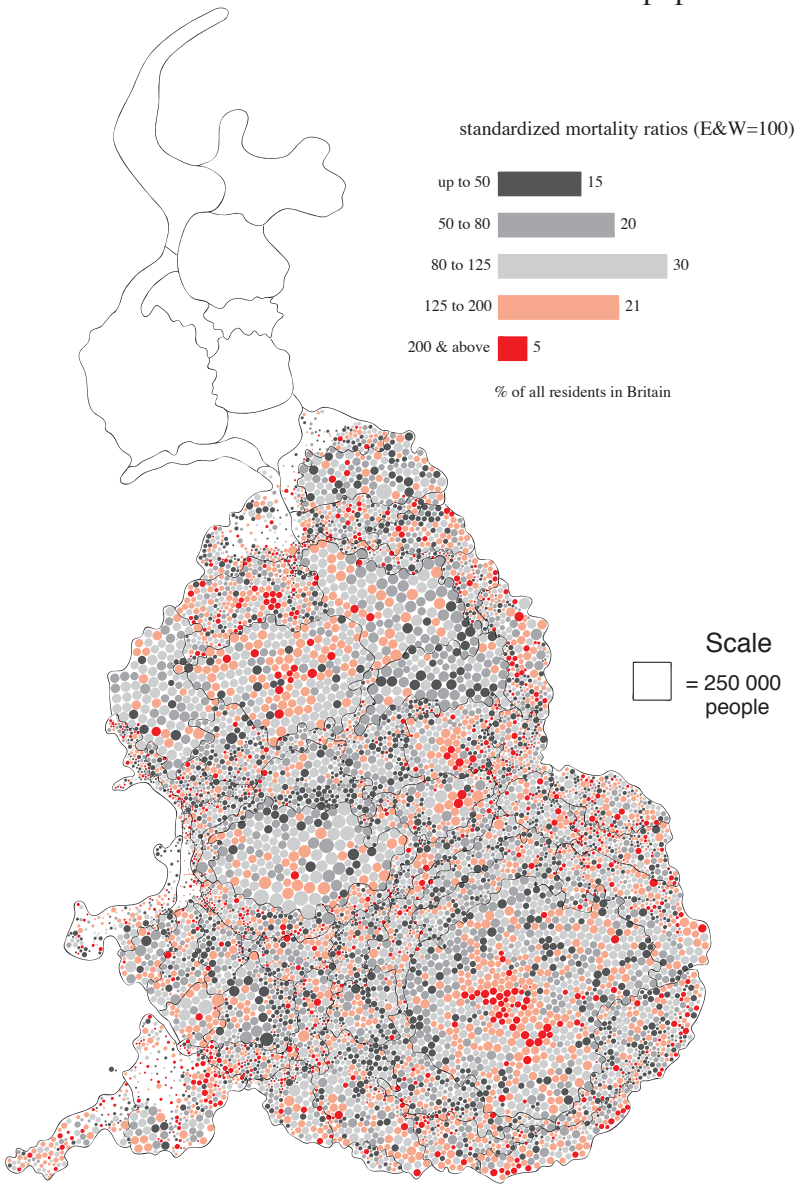
Mortality from Traffic Accidents Between 1981 and 1989

relative risks for ward populations



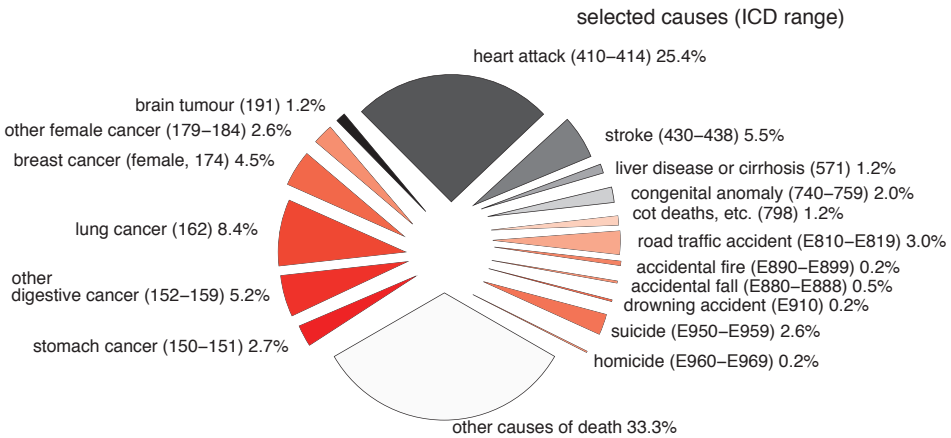
Mortality from Suicide Between 1981 and 1989

relative risks for ward populations



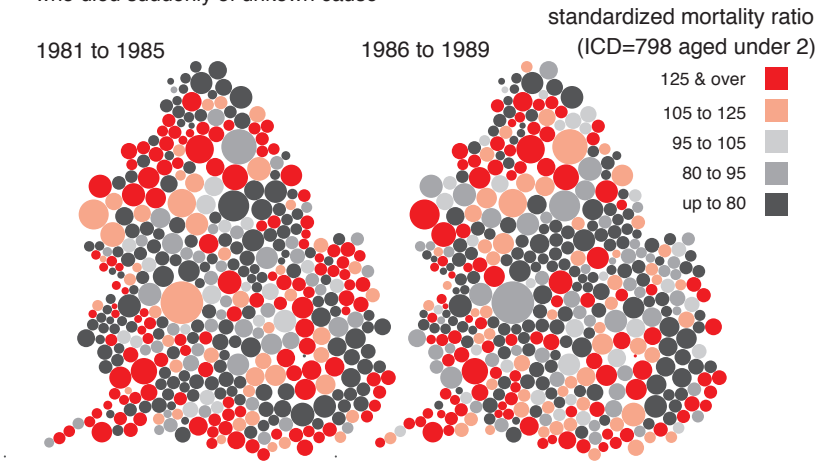
5.27: Selected Causes of Death of People Aged Under 65 in England and Wales 1981–1989

% of deaths of people aged under 65 attributable to each cause



5.28: Cot Deaths in England and Wales 1981–1985 and 1986–1989

standardized mortality ratios for children aged under two years who died suddenly of unkown cause



Premature Deaths

Everyone will die sometime and so the study of mortality from many common causes concentrates mostly on the deaths of the elderly. Most of these people, if their deaths had been prevented or preventable, would have died of something else within a few years, or may only be dying of their recorded causes because of such intervention. From the point of view of health policy, mortality of people below a certain age can provide a clearer picture of where particular causes are resulting in many *premature* deaths.

Figure 5.27 shows what proportions of deaths in people aged below 65 are attributable to eighteen sets of causes. This age limit is an arbitrary one and has been used here because it is the official retirement age for men and also because it is an age to which people can reasonably expect to live regardless of their sex, location or occupation. The eighteen groups of causes have been chosen to include some of the most topical as well as some of the most common causes. Despite this, a third of all people who died aged below 65 during the 1980s died of "other" causes. A quarter died of heart attacks and a quarter died from one of the six types of cancers shown. Strokes accounted for as many deaths as road traffic accidents and suicides combined. Homicide is much less common than might be assumed from watching the news or reading British newspapers. Between 1981 and 1989 a person aged under 65 was seventeen times more likely to kill themselves than to be killed maliciously.

The eighteen maps drawn opposite show the geographical distributions of most of these causes for deaths to people aged under 65. The distributions of stomach cancer, lung cancer, heart attacks and strokes have a similar national pattern. The other cancers exhibit less uniform patterns, perhaps because they are less closely associated with smoking, while the less common forms of death all have their own geographies. Liver disease and accidental falls are particularly acute in London and other major cities, traffic accidents clearly cluster in rural areas. Interestingly, drowning is much more likely to happen to people living in the centre of the country while murders are largely confined to the capital. Districts with no cases of death from a cause are shaded white.

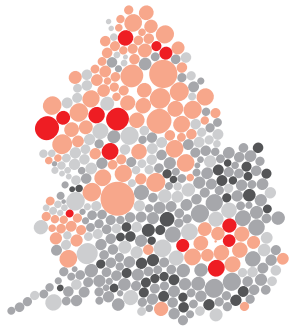
Some of the apparently clearest patterning is seen for the set of causes labelled as "cot deaths", with high rates in London and around the coast and very low rates in some other areas. This category in fact includes all unexplained sudden deaths, 93% of which occur to children aged under two (the stricter definition used here-on). However, the maps opposite are standardized using only fourteen age and sex groups of the population. Because of how narrow the age band of the population at risk from cot death is, more accurate SMRs for the stricter definition of cot deaths are shown in Figure 5.28 for two periods using just the population aged under 2 as the denominator. The basic pattern remains, but it appears to be more volatile than the simple map would suggest. Different areas can show very different mortality ratios at different times.

Causes of Death Before Age 65 1981–1989

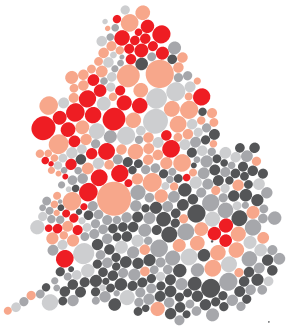
relative risks for district populations in England and Wales

standardized mortality ratios (E&W=100)

- up to 80
- 80 to 95
- 95 to 105
- 105 to 125
- 125 & above

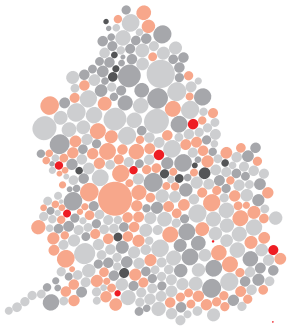


All Causes

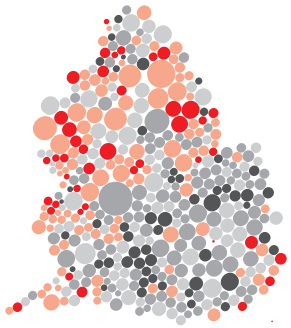


Stomach Cancer

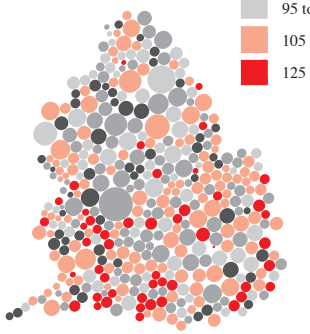
Lung Cancer



Breast Cancer



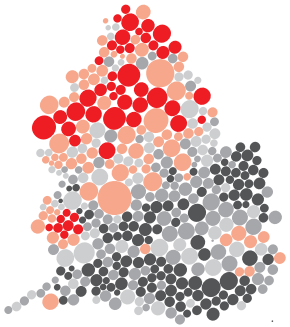
Other Female Cancer



Brain Tumour

Scale

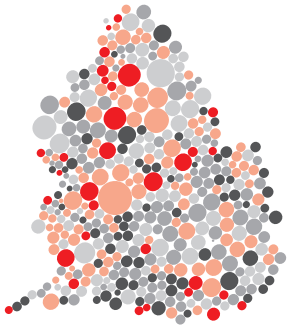
= 1 000 000 people



Heart Attack

Stroke

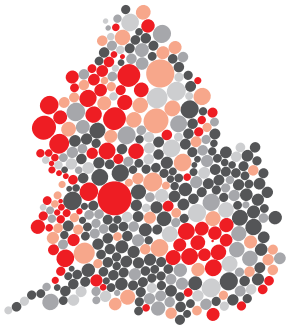
Liver Disease



Congenital Anomoly

Cot Death

Road Traffic Acident



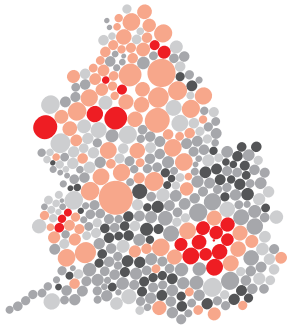
Accidental Fall

Accidental Fire

Drowning Accident

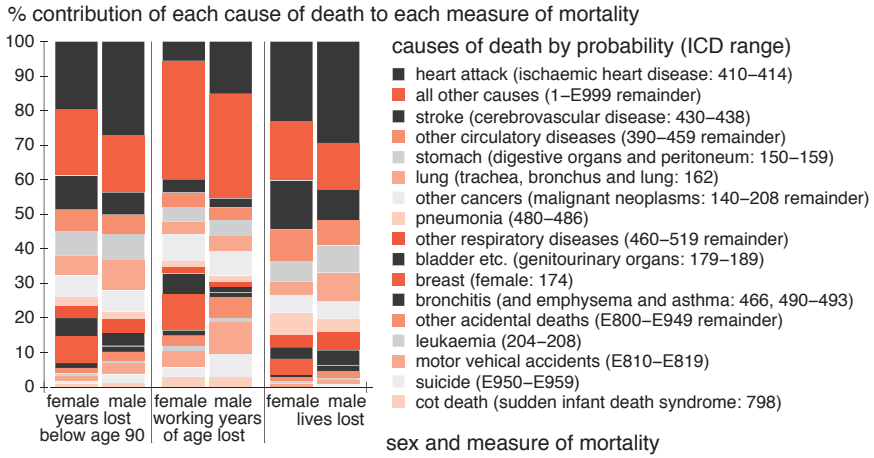
Suicide

Homicide



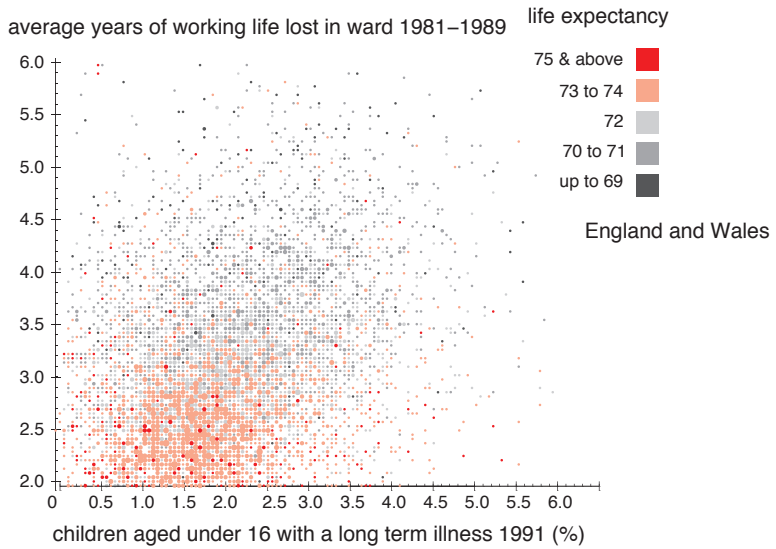
Other Causes

5.29: Years of Life lost and Chance of Life Lost by Cause of Death and Sex in England and Wales 1991



Source: Mortality Statistics Serial Tables, series DH1, no.26, Review of the Registrar General on deaths in England and Wales 1991

5.30: Childhood Illness and Years of Life Lost by 1991 Shaded by Expectancy



Years of Life Lost

Examining only deaths below a certain age is quite a crude method of assessing the premature deaths in an area. A more sophisticated measure is to weight each death by the number of years of life for which that person could have been expected to have lived or, more commonly, for which the government is most concerned that they live. By these definitions individual cot deaths are more important than individual deaths from lung cancers because more potential years of life are lost. Again, however, an arbitrary decision needs to be made — this time concerning how many years of life people might expect to have. Here two measures used in official publications have been adopted: the number of years lost below age 90 and the number of working years of life lost.

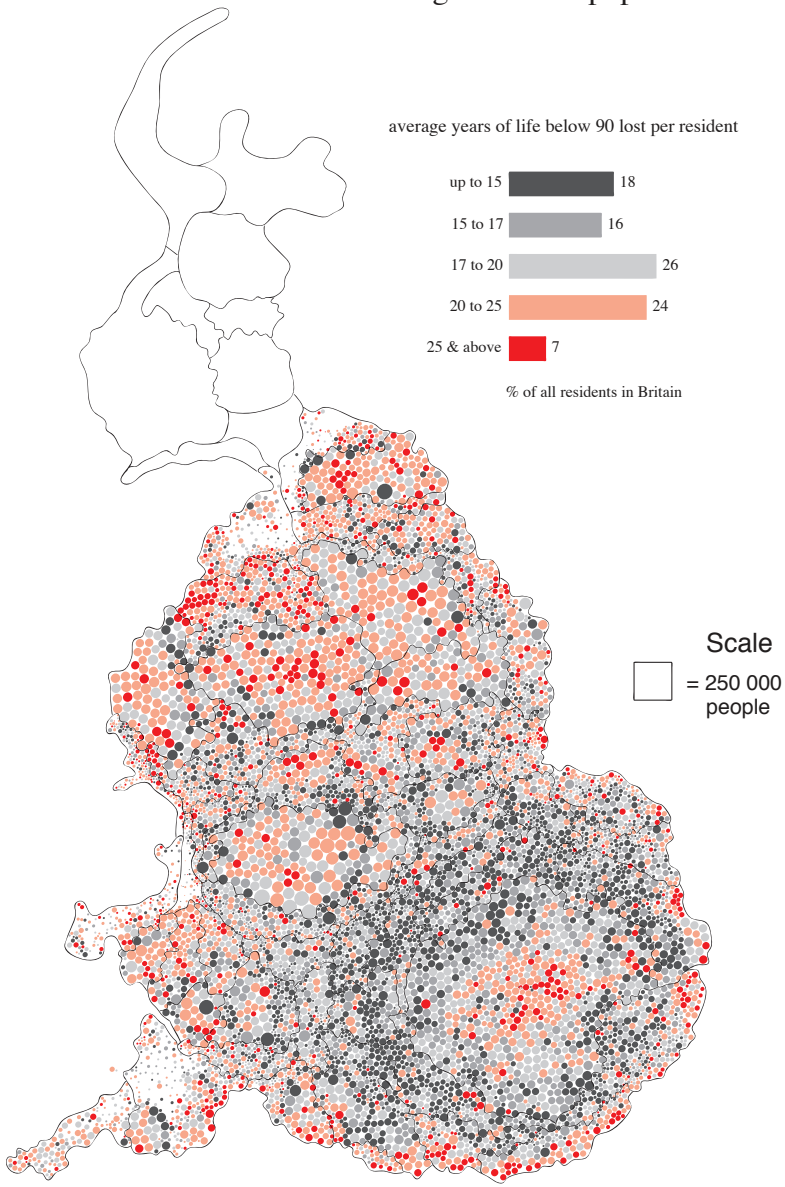
Figure 5.29 illustrates how important the choice of definition of years lost is for various causes of death. On the right the relative importance of different causes of death is shown when each death is weighted equally. By this measure, motor vehicle accidents were only responsible for 0.9% of male and female deaths in England and Wales between 1981 and 1989. When deaths are weighted by the years up to age 90 which are lost by them, as is shown on the left of the figure, motor vehicle accidents account for 3.1% of male mortality and 1.4% of female mortality. Finally, when only years of life lost between ages 15 and 65 are considered, as in the central two bars of the figure, traffic accidents cause 9.0% of male mortality and 4.5% of female mortality. How important different causes of deaths are depends on how life is valued at different ages.

The two maps drawn opposite show the geographical distributions of years of life lost by these two measures. Both produce more stark patterns than do measures of standardized mortality (see page 150). The key to the maps is in terms of the average number of years lost by mortality to each resident in each ward. In England and Wales nationally, in 1991, the chance of a man dying was 1.1%; men on average lost 18.9 years of life to age 90 and 2.9 years of life to age 65. The comparable figures for women were 1.1%, 13.1 years and 1.7 years, respectively. However, as the maps show, there is a great deal of variation about these figures; more than the usual standardized measure of mortality shows. Untimely deaths were most common in central cities in the 1980s.

Years of life lost is also a useful measure of mortality to compare with measures such as long term illness among children. Figure 5.30 does this and shows how a positive relationship exists at the ward level between areas where a high proportion of children are ill and where people tend to die young. The figure also shows how these two measures are related to life expectancy at the ward level. The relationships are not simple, but a general pattern does appear to prevail. The groups of wards where (13% live and) each person, on average, loses at least four years of working life due to early mortality are the areas where the population as a whole can often not expect to live to age 70 and where a higher proportion of children will also be chronically ill.

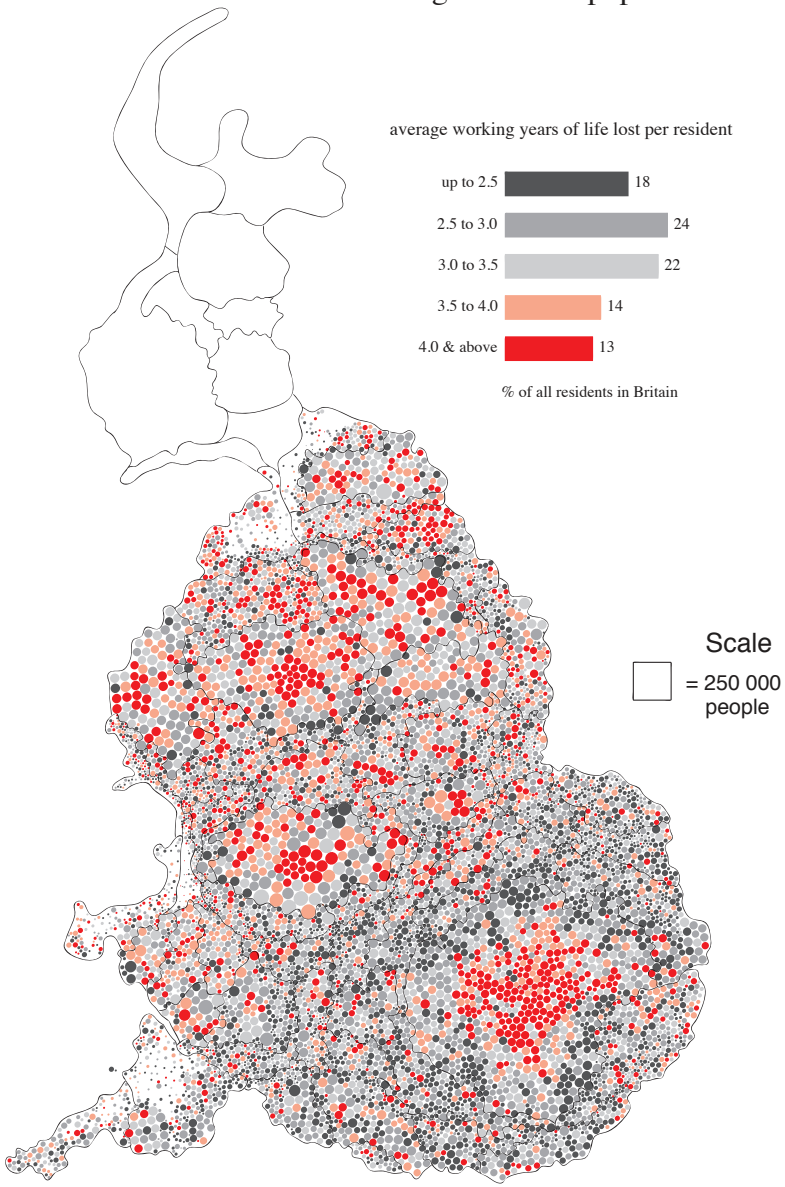
Years of Life Lost 1981–1989

average for ward populations



Working Years Lost 1981–1989

average for ward populations

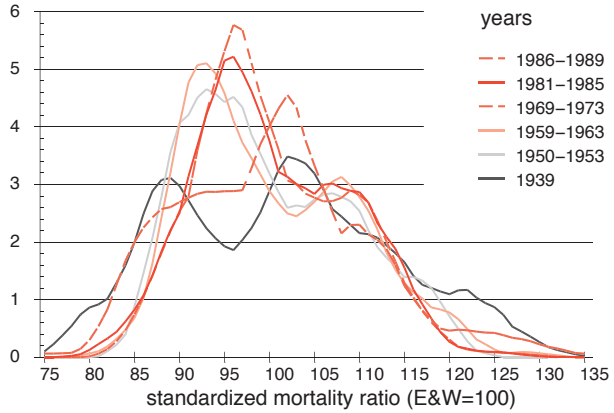


MAGENTA

BLACK

5.31: Standardized Mortality Ratios by Population in England and Wales 1939–1989

population living in old local authority areas (%, smoothed by SMR bands)



Source: Registrar General's Decennial Supplements 1950–1953, 1959–1963, 1969–1973 and the Registrar General's Statistical Review 1939

5.32: Top 22 Highest Standardized Mortality Ratios by Old Local Authority Areas 1939–1989

County Borough	SMR rank for the period of all County Boroughs and Amalgamated Areas in England and Wales (n=234) 1986 to 1989	1981 to 1985	1969 to 1973	1959 to 1963	1950 to 1953	1939
Salford	1	2	2	1	4	1
Oldham	2	5	4	9	1	2
Blackburn	3	9	5	4	21	17
Gateshead	4	13	19	21	12	6
Manchester	5	15	15	8	7	15
St. Helens	6	4	8	18	33	39
Liverpool	7	27	16	14	8	5
Warrington	8	17	11	16	37	63
Merthyr Tydfil	9	10	14	7	2	12
Halifax	10	18	10	12	19	19
Burnley	11	3	6	2	6	9
Wigan	16	22	9	20	3	11
Stoke-on-Trent	20	6	17	13	9	14
Wakefield	22	1	1	19	98	45
Bootle	23	19	7	11	23	8
Bolton	24	38	41	29	10	7
Sunderland	26	28	26	73	29	4
Middlesbrough	35	21	23	10	11	3
Dewsbury	37	7	3	3	14	57
Rochdale	38	31	18	6	5	30
Bury	71	43	13	5	32	10
Cardiganshire (Urban Area)	95	8	65	64	54	68

ranks for years in which areas had one of the ten highest standardized mortality rates are shown in red

Mortality Over Time

It is important to remember in concluding this chapter that mortality rates and the severity of illness for most of the population today are much lower than they were just a few decades ago, while the levels of basic household amenities associated with good health and of health services have increased immensely. Figures 5.13 and 5.17 made some of these points. Despite this, what is often important to policy and politics is not whether the general measures have improved but whether the differences between areas have widened or narrowed: how equitable is the country in terms of good health?

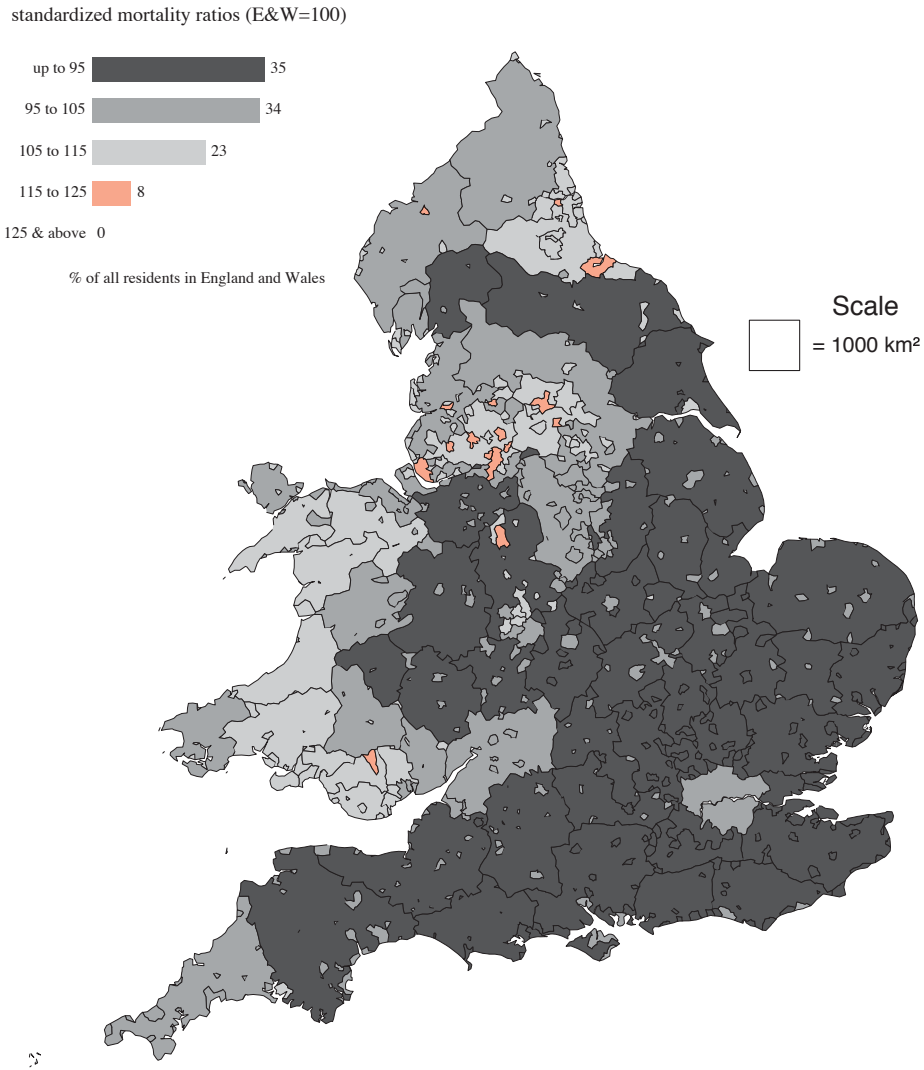
Mortality measures are often the only way in which standards of health can be consistently compared across many areas over time because other records of ill health made in the past are not reliably comparable. One problem with comparing area mortality rates over long periods of time is that different collating areas were often used in the past. It is possible, however, to calculate current SMRs for former administrative areas and this has been done to make the comparison shown on the two maps drawn opposite, which contrast SMRs for the two four-year periods 1986–1989 and 1950–1953 across 234 aggregates of old local authority areas. Conventional maps rather than cartograms have been drawn as these areas may be unfamiliar to the reader. It is thus necessary to bear in mind the visual bias in these depictions (also note that London boroughs are not differentiated on these maps or in Figure 5.32).

The basic spatial pattern to mortality in England and Wales has remained relatively unaltered over at least the last forty years. The north (particularly northern cities) and Wales have had over-average rates of mortality and the south (excluding some urban areas and ignoring some rural northern areas such as North Yorkshire) has had under-average rates of mortality. In the 1950s, however, none of these areas exhibited SMRs of over 125, whereas, by 1989, 3% of the population were living in areas where they were 25% more likely to die each year than the "average" person in the country.

Figure 5.31 shows how this situation has evolved since 1939 when the geographical pattern of mortality was highly polarized, as can be seen from the bimodal structure of the the population distribution by SMR in that year. By 1953 the distribution had become more equal and, although it was still slightly bimodal, nobody lived in an area with an SMR above 125. This remained the case for the early periods of the next three decades, with mortality rates becoming less and less polarized at each period. Then, in the latest period, the distribution was seen to begin to revert back towards that seen at the end of the 1930s. The geographical similarities are even stronger, as Figure 5.32 demonstrates. The two former local authority areas with the highest SMRs in 1939 had the highest two ratios in 1989. It must be noted that the latest figures are susceptible to errors from the latest census, although these do not significantly alter the result: It does appear that where you live is becoming more critical in determining when you are most likely to die.

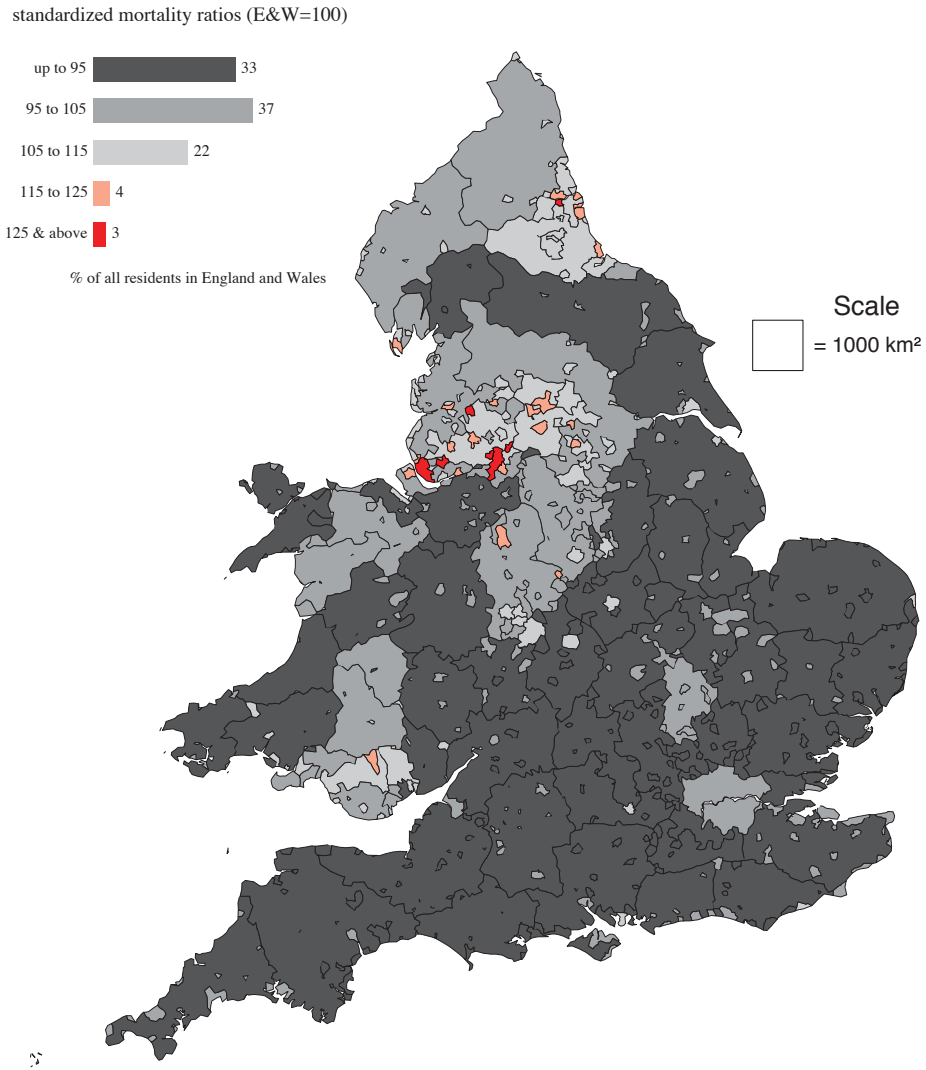
Mortality from All Causes Between 1950 and 1953

relative risks for old local authority populations



Mortality from All Causes Between 1986 and 1989

relative risks for old local authority populations



Conclusion: Sickness and Health

Sick and Ill

Having good health is often considered more important than having a good job or a good home, although all three may, to an extent, be related to each other, as this chapter has indicated. Of course, by far the most important correlate of good health is age, rather than employment or housing status. Self-reported rates of illness are highest amongst the most elderly (Figure 5.1) who have been growing in numbers rapidly (Figure 2.6), and growing most quickly in large northern cities (Figure 2.15). However, the map of illness rates (page 137) is still a poor reflection of the distribution of the elderly (page 39) and so other associations have to be found if illness is to be put in the general context of the social geography of Britain. If workforce sickness rates from previous censuses are compared with the self-reported illness rates which are now available, the patterns look remarkably similar (page 139). Levels of permanent sickness have risen most strongly in the northern regions and in Wales over the last decade (Figure 5.4). It is difficult to distinguish geographically this rise from that seen for early retirement over the same period (page 95). Both of these changes are due to increasing rates of illness in certain areas (see below) as well as to incentives not to register for unemployment benefit (page 98). Perhaps the strongest evidence that levels of illness are strongly correlated with the social geography of an area (and with levels of affluence in particular) is given by plotting the distribution of illness amongst children, which was monitored nationally for the first time in 1991 (page 141). If this map is compared even to a simple social distribution, such as the unemployment rate for adults in 1991 (page 89), the similarity is remarkable. Where adults are least likely to find work, children are most likely to be ill. However, it should not be forgotten that the vast majority of people suffering from illness are pensioners, and that the majority of ill residents aged 85 and over live on their own (Figure 5.6). How the ill are treated *by* our society is as important a question as is asking how many people are "unnecessarily" ill *in* our society.

Health and the Nation: Colour Print F

Because the census provides counts by age and sex of the number of people found to be suffering from a "limiting long term illness" in each ward it is possible to calculate a standardized illness ratio for each area which shows how the proportion of people found to be ill in that place compares with the proportion who could be expected to be ill given the local population profile. Thirteen levels of this ratio are plotted in Colour Print F which shows the detailed variation of levels of health across the country. The illness rate bands used to categorize the wards are reciprocally symmetrical: the high rate of 125 is comparable to the low rate of 80 (as 100÷80=125÷100). The majority of people in Britain live in wards with rates between these two levels, in areas where the prevalence of illness is similar to that found in the nation as a whole, having allowed for age and sex structure. A quarter of the population live in wards where their chance of being ill is at least 20% lower than average and a quarter of these people live in parts of these areas where more than a third fewer people are ill than would be expected. If Colour Print F is compared with Colour Print E it is evident that the people who are least likely to be ill are those who have the highest housing wealth. The most healthy quarter of the population overlaps strongly with the quarter who live in wards where the average household holds more than £45 000 of housing equity. Health and wealth go hand in hand as the advantages of avoiding sickness are reflected in the acquisition of material goods and lifestyles which themselves make ill health less probable (including such basic necessities as good heating, food and holidays). The reverse process, that people in ill health are more likely to get poor (if any) employment and thus cannot afford expensive housing also strengthens the association. One fifth of the population lives in parts of Britain where people are 25% more likely to be ill than the average, irrespective of age. A third of these people are 50% more likely to be ill. These people are most often found in the metropolitan cities and across the coalfields, with the highest rates of illness found in the Welsh valleys, in Strathclyde, County Durham, and South Yorkshire. Although these are similar places to the locations of the wards in which the average household wealth falls below £10 000, the overlap is not so strong. This is particularly true in central London where the housing market crash has significantly reduced levels of personal wealth. Also, households tend to be younger in central London and the estimates of wealth used in Colour Print E are not standardized for age or sex. There are other important reasons for some of these differences, which are related to the kinds of illness people tend to suffer from in different parts of the country, and ultimately in how they die. Because little geographical information is available on the way in which people tend to be ill, disease and death have to be mapped to investigate further (Dorling 1994).

Morbidity and Mortality

Only sixty years ago one baby in every twenty five was stillborn (Figure 2.1) and a further 6% died in the first year of life (Figure 5.17). Chances of not surviving to age one have halved for children of each of the three following generations, so that now less than 1% of infants die in the first year of life and less than 0.5% are stillborn. Over the same period, for those who reached age one, life expectancy has risen by fifteen years. To generalize, between 1935 and 1995, every school-child could expect his or her life to last three months longer than the average life of those children in the year above him or her (Figure 5.13). It is not hard to see how we may have come to view death as relatively unlikely and unimportant, despite its certainty. For the purposes of this atlas, death

certificates provide the detailed national information available on the incidence of potentially fatal diseases. Thus more general patterns of morbidity have to be inferred from seeing how, when and where people die.

The crude mortality rate in Britain reflects the distribution of pensioners, as would be expected — mortality being more closely connected to age than illness. Ninety percent of people live in wards where the average age of death lies between 70 and 74 years (page 149). However, once mortality rates are standardized for age and sex, they can be seen to reflect the standardized distribution of illness shown in Colour Print F. The change in mortality ratios over the last decade (page 151) reflects the regional polarization seen in indicators such as permanent sickness. When the geographical differences between the standardized prevalence of different causes of death is drawn, the importance of heart disease and strokes in the north is emphasized, coupled with above-average rates of lung cancers and respiratory diseases in the cities. Deaths from traffic accidents are highest in remoter mainly rural districts where respiratory diseases are least common. Deaths from respiratory diseases are most concentrated in Inner London boroughs where diseases of the digestive tract are also more likely (Figure 5.19). In terms of geographical change over the 1980s, the biggest falls have been in suicides and traffic accidents in Inner London which has also experienced increases in deaths from strokes and heart disease (which are making the pattern of mortality in the capital more like that found in the north). Nationally, the most remarkable rise for any one cause has been the increased rate and decreasing average age of suicide (Figure 5.22). Suicide, however, still accounts for only one premature death in forty, while a heart attacks is the cause of the death of a quarter of all people who die aged under 65; murder accounting for less than one in six hundred (Figure 5.27). If working years of life are considered, rather than standardized ratios, then for men cot deaths, traffic accidents and suicides are seen as more important than respiratory diseases, strokes and genitourinary disease. For women, breast cancer also becomes more significant while pneumonia and heart attacks become less important because they are unlikely to strike women at an early age.

Health and Society

It is partly the age of incidence and the unpredictability with which different diseases occur, as well as their general prevalence, that dictates the importance with which they are viewed by society. In a similar way, the recent growing unevenness of the distribution of mortality rates across the country is viewed with concern as, for over forty years, standardized mortality rates had been becoming more equal between areas (Figure 5.31). Only in the last ten years have the differences between areas reverted towards the bimodal distribution last seen before the Second World War, with the same parts of the same northern cities faring worst (Figure 5.32). Inclusion of estimates of where people were missing from the census does alter the pattern slightly, but not the overall message (page 217). The geographical distributions of employment (page 67), earnings (page 205), and wealth (page 201) each highlight the same areas within which people are losing out from the growing inequality in the distribution of good health in Britain. Increasingly, people who become ill have had to take up less skilled work if they can work, and ill professionals who keep their jobs are now a very rare phenomenon (Figure 6.19). Ill children are concentrated most in the wards in which adults die youngest (Figure 5.30), while mortality rates are increasing for teenagers (Figure 5.16). The ill are least likely to have adequately heated homes or to have access to a car (Figure 5.7), and most ill people live in households where no one is earning. Far from being indicators of social well-being more appropriate for measuring quality of life in the nineteenth century, morbidity and mortality rates reflect the changing condition of life in Britain today more closely than many more "modern" statistics. In an age where the health of the average person is improving so markedly (Figure 5.21), the current growing divisions in health are an indictment of the extent to which one group in society cares about another. If the cartograms on page 229 are compared with the distribution of working years of life lost (page 163), then the political map of Britain can be seen to be as closely interwoven with health as it is with almost any other aspect of our lives.

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