# 7

# HEALTH

## … the sedimentation of society

When, and of what, will you die? It's eight in the morning, although my body thinks it's 1 pm. This book is now two years overdue to reach the publishers. I am sitting in a hotel room in Philadelphia in which the windows are sealed. The air conditioning is set to heat the room to 72 degrees Fahrenheit, which I have just realised is identical to the temperature of the tropical fish tank I have at home.

Tropical fish in captivity tend to experience quite a high mortality rate, but set the temperature right, give them the right amount of food and light, and they live longer. What tends to kill them is stress from swimming around in a confined overcrowded environment, diseases when new fish are introduced into their tanks, their own wastes when the filter system in the tanks doesn't work, and the actions of other fish. Their mortality rates reflect all these things. If there has been a power-cut at home and my partner notices it, then she can reset the circuit breaker and their water will continue to be filtered, heated and lit. If she does not, there will be a 'catastrophic event' and I will have to clean out the tank on my return. Tropical fish are not very different from people in the influence that their environment has on their health. They simply have a little less power to alter it, and their lives run out faster.

I have just lit the second cigarette of the day and am drinking the third cup of strong black coffee, wondering whether the hotel will charge me (or rather my university) for the coffee that appeared to be free in the room but is probably not. I am eyeing up the complimentary chocolate bar 'jam packed with even more peanuts', the main constituent of which is chocolate and wondering whether it would make a good substitute for breakfast. I do not have a particularly healthy lifestyle, especially for a middle-aged academic, and yet – if you believe the numbers – I am just as likely to reach three score years and ten (and perhaps a further five) as the average man of my age from my country is (if not much more if I continue to smoke).

What I am squandering through my lifestyle are the advantages I gain through my job. The things I am worrying about are whether the coffee is free, why the window won't open and how the fish are back home. I just phoned the

family to say I arrived okay, and they are fine. I thought it might sound a bit callous if I asked about the fish! My university has paid for me to attend a conference although no one will know if I am here or not. There are 58 concurrent sessions about to start; I will not be missed. I am being paid to write what I want, where I want, when I want. Compared to the vast majority of people walking below my sealed window, I have it easy.

I can afford to go on holidays and get a great many holidays in contrast to most Americans on the sidewalk below. I don't worry about the bills, heating or cost of food. I have a great deal of control over my environment. Of course, I could be hit by a taxi walking out of the hotel this evening, I could suddenly feel a pain on the plane home and find out that my heart does not have long to carry on working, or I could have a very bad reaction to those peanuts. I could be diagnosed with cancer very early, in say a decade's time. But, odds on, I will die of a heart attack, in England, in relative comfort, in my early seventies … That was 2004. Since writing those words I have given up smoking, as have so many other people like me. Despite the addiction it became easier not to continue given who I mix with, so now you can assume I'll make it to my 'late seventies'. And there's a fifty-fifty chance I'll live a little longer. Life and death are not distributed fairly.

This chapter tells a story of how, in our death (and that which leads to its precise timing and nature), we collectively lay down a record of our lives. Figure 7.1 shows the basic geographical distribution of mortality rates in Britain in the years leading up to the 2001 census. The rates shown are direct age–sex standardised rates. What they show is the number of people who would have died in each area, given the mortality rates of that area between 1996 and 2000 and if that area had had the same population demography as England and Wales had in the early 1980s (for which the rate is set to 1.0).

Figure 7.1 and the nine that follow are for all ages and both sexes. At the extreme, in Glasgow, people were 40% more likely to die in a given year than on average, 66% more likely than in the area with the lowest mortality rate which was, and at this geographical scale very possibly still is, Dorset & East Devon. To know where people are more likely to die it is just as important to know how many people are alive in each place as it is to know the count of how many die. We only know with some accuracy how many are alive when they are counted in the census, and estimates are then made for how many people the census may have missed or double-counted. When the 2011 census data is released during 2012 and 2013, we can update the maps in this chapter. This may be harder to do in future. The 2021 census is currently cancelled. It may be reinstated, or an alternative thought of, so that in ten years' time ten-year-old maps are not being shown *as not just the latest maps, but the last of these maps*. For now, let's not worry about the future; let's just try to understand these maps of the recent past.

Imagine that each of the areas in the figure was not a place, but a fish tank. Then the further north and west you travel, barring a few tanks in and near

London, the worse the fish generally do. In general, it is the environments in these areas, these tanks, which result in the patterns you see, especially the past environments. However, in aggregate, people differ from fish in one crucial way. They can move between their tanks. The majority of people who die in Dorset & East Devon did not begin their lives there. They moved to that area later in life and were able to afford to do so. Conversely, the majority of people who began life in Glasgow left that city long before they died elsewhere in the UK or abroad. The lifetime migration of people amplifies the environmental inequalities between places.


**Figure 7.1** All-cause mortality ratios in Britain, 1996–2000

*Note*: Age–sex standardised mortality rate, deviation from England and Wales national average of 1.0.

*Source*: Mortality records and population estimates, calculated for this book.

Within the overall geography of the dead, mortality by specific causes provides clues as to what it is about particular environments which leads to earlier or later deaths. In Figure 7.2 (but often a little differently in the eight figures that

follow) areas are highlighted where more than 40% additional deaths are due to a particular cause in an area, more than 20% more, over average, under average or less than 20% fewer deaths than average are so caused. Variations are wider by cause than for all causes combined.


**Figure 7.2** Tuberculosis mortality ratios in Britain, 1996–2000

*Note*: Age–sex standardised mortality rate, deviation from England and Wales national average of 1.0.

*Source*: Mortality records and population estimates, calculated for this book.

The first cause of mortality shown in Figure 7.2 is an old disease: tuberculosis (International Classification of Disease, 9th revision, categories, ICD9: 10–18, 119 and 137). It accounted for only 0.08% of all deaths in England and Wales by this period, two-thirds of the proportion 20 years ago. By 2010, it accounted for the same proportion (now classified as ICD10, 10th revision: A15–A19). It is a disease that you are unlikely to contract if you are healthy, and is spread by infection, which can largely be controlled to prevent mortality. However, despite all this, a person is seven times more likely to die of tuberculosis in Glasgow as

compared to the affluent enclave of North Yorkshire. These are the two extreme areas within the extreme categories, with categories as shaded on the map.

In London and other urban areas in England rates remained above average as international migration brought in (and still brings in) a steady stream of cases which were contracted abroad. In the poorest parts of Britain the disease continues to exist without the need for new introductions due to the poor housing environment suffered by many people living there. This map is a tiny part of the jigsaw of death by a cause which contributes to the overall rates being what they are where they are.


**Figure 7.3** HIV disease infections mortality ratios in Britain, 1996–2000

*Note*: Age–sex standardised mortality rate, deviation from England and Wales national average of 1.0.

*Source*: Mortality records and population estimates, calculated for this book.

Figure 7.3 shows the geographical distribution of what is still a quite new infectious disease: that associated with HIV (ICD9: 42–44, 279). When this map was drawn fewer people died of this than of tuberculosis, just 0.05% of all

deaths, but almost seven times more than two decades ago when the disease was just beginning to be diagnosed. By 2010 the proportion had risen to 0.08% of all deaths (ICD10: B20–B24). Infectious diseases in total accounted for only 0.61% of all deaths by 2000, which has risen to just above 1.05% by 2010 as other causes have diminished in importance. They are of interest here because they illustrate just how important geographical location is to people's chances of contracting and dying of such diseases and because, when the next major infectious disease sweeps round the world, when it hits Britain it is within these places that it is likely to kill most people first.

For the rich western world, HIV turned out not to be the major pandemic once feared. Rates are highest in central London, Edinburgh, North East Scotland and East Sussex & Kent south (around Brighton). These were areas with high proportions of single people and a lot of migrants, and/or injecting drug users and relatively high proportions of gay men. In each area the specific immediate reason why rates of death from these diseases were unusually high or low is unique to that area. But it would be wrong to see these as the underlying reasons why rates are high in these areas. Before HIV diseases reached Britain none of these groups was at any risk of contracting these diseases here (although of course they could easily contract them abroad). When the next new infectious disease arrives, the one thing we can be fairly sure about is that it will have most affect in areas where people mix most.

In contrast to infectious diseases, Figure 7.4 shows the distribution of deaths from lung cancer (ICD9: 162), which, in the years leading up to the 2001 census, accounted for 5.4% of all deaths in England and Wales and 6.5% of all deaths in Scotland. This is a massive number compared to infectious diseases, one cause being responsible for almost ten times as many deaths as from *all infections*. It has also been rising in recent years to account for just under 7% of all deaths in England and Wales by 2010 (ICD10: C40–C41), but is largely confined to people aged over 65 now.

Lung cancer is a disease of which the major cause is smoking, and yet the map of it is a great amplification of the distribution of smoking. People's rates of smoking in the last century did not vary across the UK as much as this map suggests, and the rates varied even less in the past when most of the tobacco responsible was consumed. In addition to rates of smoking, the map reflects the differing environments smokers lived in, which made them more or less at risk of the damaging effects of cigarettes. It also reflects the distribution of people working in industries where their environment could expose them to pollution that might increase the risk of this cancer.

It is particularly important to realise that this map also greatly reflects the movements (or lack of movement) of people to where they are most likely to die. In the past, rates of smoking in London were high, but people left London when they were young and so the smokers of London have been spread thinly across the South of England. People were more likely to move from north to south if they did *not* smoke, or to stop smoking if they moved south because there were

fewer other smokers around them. Smokers were much more likely to remain within Glasgow than non-smokers who left that city to live more frequently somewhere else, or, to put it another way, those who stayed in many areas of Glasgow were more likely to carry on smoking, perhaps partly influenced by what was then occurring in Glasgow.


**Figure 7.4** Lung cancer mortality ratios in Britain, 1996–2000

*Note*: Age–sex standardised mortality rate, deviation from England and Wales national average of 1.0.

*Source*: Mortality records and population estimates, calculated for this book.

The sedimentary record of human life, as laid down in our deaths, is as much about our movements as it is about the places in which we have lived. Figure 7.5 shows the distribution of deaths from skin cancer (ICD9: 172), which accounted for 0.26% of deaths in England and Wales and 0.20% in Scotland by 2000 as mapped here. The geography of skin cancer is clear and additional hours of sunshine in Devon, Cornwall and along the south coast will have contributed to this pattern, as will the overcast skies of the North and West and the lack of

many skin colours other than white in much of the countryside. However, skin cancer can kill at older ages and thus by the time people have moved home and possibly region or even country several times. Furthermore, it is likely to have been partly exposure to sunlight in much warmer climes than Britain which contributed to many individuals contracting this disease, particularly former sailors, but also keen sunbathers.

Some of the pattern seen in Figure 7.5 is of the people who come to live along the south coast of England who are both more likely to have been exposed most to sunlight and not to have died of another disease before that exposure could result in cancer. Younger people are more likely to die of the most fatal form of melanoma. Skin cancers, on aggregate, are diseases of the more affluent in Britain and so their geography partly reflects people's residential choices and their choices

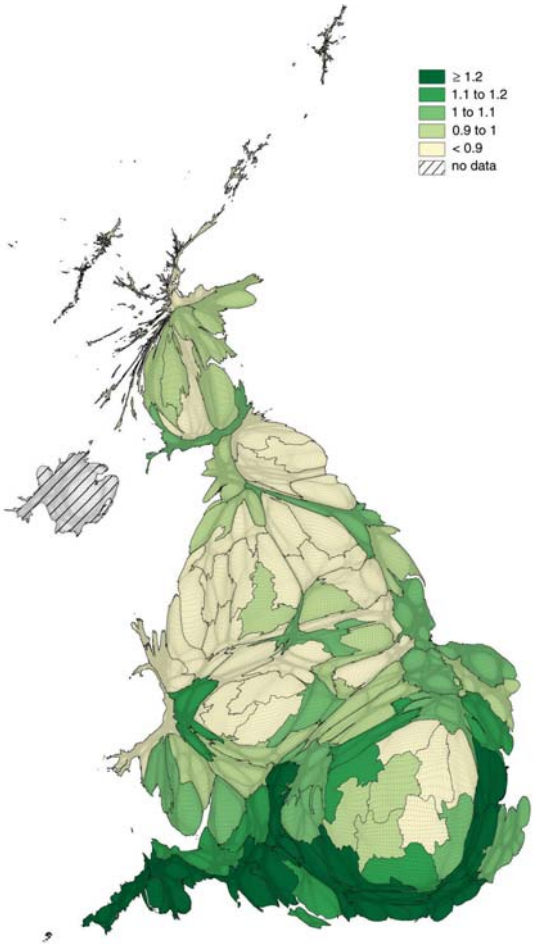


**Figure 7.5** Skin cancer mortality ratios in Britain, 1996–2000

*Note*: Age–sex standardised mortality rate, deviation from England and Wales national average of 1.0.

*Source*: Mortality records and population estimates, calculated for this book.

(made possible by wealth) in earlier years to be among the first generation to travel in large numbers abroad for their holidays. Maybe this is a large part of the reason why we see this particular pattern to these deaths. In just ten years these death rates have increased to approach 0.5% in England and Wales (ICD10: C43). This may well reflect skin-burn on holidays taken in the 1970s and 1980s having effects decades later. In the 1960s most people in Britain had no summer holiday.


**Figure 7.6** Cervical cancer mortality ratios in Britain, 1996–2000

*Note*: Age–sex standardised mortality rate, deviation from England and Wales national average of 1.0.

*Source*: Mortality records and population estimates, calculated for this book.

The third cancer we consider here accounts for 0.21% of all deaths, less than one-hundredth of the 25% of all deaths which by 2000 was attributable to cancers (just over 30% by 2010). Cervical cancer (ICD9: 180, ICD10: C35) only kills women and has reduced in impact to almost 70% of its rate in the early 1980s, partly due to earlier screening and better treatment programmes. As a proportion of all deaths it now appears stable. Figure 7.6 shows some very clear

patterns to this disease. The low rates around the Home Counties ring are very distinct, as are the high rates in Yorkshire and in the North West.

Unlike skin cancer, cervical cancer is a cause of death which contributes to the overall geographical pattern of mortality rather than one which helps to reduce geographical variations. Again, patterns of migration are key issues to understanding the map seen here. People partly live in the Home Counties as a result of migrating into them over the course of either their or their parents' lives. People at lower risk of contracting cervical cancer or with a higher chance of being successfully diagnosed with that cancer early and being treated are more likely to live in such places. There are many factors which lead to some groups of women being more likely to have this disease than others, but just as those factors are important, so too are the factors that lead women with those risks to come to be living in particular places in Britain.


**Figure 7.7** Heart attack mortality ratios in Britain, 1996–2000

*Note*: Age–sex standardised mortality rate, deviation from England and Wales national average of 1.0.

*Source*: Mortality records and population estimates, calculated for this book.

While cancers account for one-quarter of all deaths, a degenerative disease of the circulatory system accounted for the largest proportion. Up to the year 2001 this was 40% (down to around 30% by 2010). Of these the largest numbers are attributed to simple heart attacks (ICD9: 410), responsible for 10.81% of all deaths in England and Wales and 14.56% of all deaths in Scotland by the start of this century. These proportions have been falling over time, but it will be many years before diseases of the heart are no longer the primary cause of mortality in Britain. The falls to 2010 have been dramatic, but partly due to more of these deaths being attributed to other forms of heart disease, so a straightforward comparison over time is difficult to make.

Many factors make some people's circulatory systems more susceptible to diseases than others. Smoking and diet are important, yet Figure 7.7 shows patterns which yet again cannot simply be accounted for by such variations in behaviour. These are the major diseases which contribute to the overall geography of mortality in the UK. Mortality rates in Scotland and parts of the North are simply too high to be purely a reflection of behaviour and social conditions there; rates in the south of London, through Hampshire to the coast, are too low for local (lower smoking) environments to simply be the cause of these patterns.

With the distribution of heart attacks, as with so many other measures of misfortune in Britain, yet again we are seeing a distribution which is partly the result of lifetime migration. People who have been healthier during their childhood and working lives are more likely to have left the places with the highest rates. Such difference can be further amplified, as in places where rates are lower, the health service has tended to be less stretched and better able to treat early symptoms of disease.

Healthier people in poorer areas have tended to move out of those areas. At the same time healthier people in richer parts of the UK have tended to be among those most likely to move into the most affluent areas of those already more affluent regions. Thus, just as for heart attacks, we see very clear patterns from deaths attributable to strokes (cerebrovascular diseases; ICD9: 430–438), this collection of conditions being responsible around 2001 for 10.28% of all deaths in England and Wales and 11.98% of all deaths in Scotland (below 8% by 2010 as ICD10: 160–169).

Figure 7.8 shows how London's rates remain low, as London attracts ever more disproportionately the fit and those who are able to migrate there. However, Scotland, suffering from depopulation of its more moveable people in many areas, was left by the late 1990s with a population at far greater risk than average of dying from these causes. Of course, lifestyles in Scotland and London will differ, although more so now than they have in the past, and again rates of smoking are important. But if you look closely at the figures, you will see that relentlessly as you move from north and west to south and east, the rates of death from this disease fall.

Environments matter, but they are made partly by the movements of people, and cause people to move in particular directions. The deaths in these five years from strokes are laying down a very clear picture of many aspects to the lives of the past peoples of Britain, including how they came to live and die where they did. As strokes become less common as a cause of death, it has been in Scotland that the most benefit has been realised in very recent years, but other causes also rise in importance, and they tend to also rise more in Scotland than elsewhere.


**Figure 7.8** Cerebrovascular disease mortality ratios in Britain, 1996–2000

*Note*: Age–sex standardised mortality rate, deviation from England and Wales national average of 1.0.

*Source*: Mortality records and population estimates, calculated for this book.

Causes of death not related to disease are labelled as 'external' under the classification of mortality. This is a misnomer in that almost all the actual underlying causes of deaths are external to the body of the person who has died. Only 3.2% of all deaths are due to such causes, the majority of which are due to

suicide, falls and motor vehicle accidents. Figure 7.9 shows the distribution of one cause outside this group – fire (ICD9: 890–899, ICD10: X00–X09) – which accounted for (and still accounts for) 0.07% of all deaths in England and Wales, 0.10% in Scotland.


**Figure 7.9** Mortality caused by fire ratios in Britain, 1996–2000

*Note*: Age–sex standardised mortality rate, deviation from England and Wales national average of 1.0.

*Source*: Mortality records and population estimates, calculated for this book.

What is most interesting about deaths from fires in Britain in the context of this book is how they also reflect the overall pattern of mortality which is most clearly related to the distribution of poverty, and the patterns of migration which result from that distribution. But there are always caveats to such generalisations. Most deaths from fire are due to smoke inhalation by people who are unable to escape a fire or who are unaware of it. Figure 7.9 largely reflects the distribution of poverty, where people are more likely to live in homes without smoke alarms, with dangerous wiring and, yet again, where more people smoke.

The most immediately dangerous fumes of a cigarette are from the fire it can light (thus they can kill in seconds as well as years). However, in addition to smoking, the map is also strongly influenced by where people live in flats. Even in affluent parts of London, rates are high where the population is crowded. Within those affluent parts, though, the rates tend to be highest where the population is most crowded of all. Overcrowding within the capital rises, as more and more of the people with the least money squeeze into the smallest of flats. It is the poorest that are at greatest risk in the places where mortality rates from this cause are highest.

Figure 7.10 shows the last of nine selected causes of death chosen here to illustrate how each either adds to or detracts from the overall pattern of death


**Figure 7.10** Mortality ratios of suicide by hanging in Britain, 1996–2000

*Note*: Age–sex standardised mortality rate, deviation from England and Wales national average of 1.0.

*Source*: Mortality records and population estimates, calculated for this book.

in Britain and how many factors influence each individual distribution. Almost 1% of all deaths around the year 2000 were due to suicide or were 'undetermined accidents' (which are most likely to be suicide). That proportion is now rising, and by 2010 suicides and undetermined accidents accounted for 1.9% of deaths of all men, and 0.8% for all women (ICD10: X60–X84, Y10–Y34).

There are many ways in which people can kill themselves, but the most common method, particularly among men, is by hanging, which accounts for one-third of all suicides. When the map is considered, again we see the Home Counties ring: people who live here are less likely to kill themselves, especially in this way. It is in the periphery of Britain where rates are high, at the edges of Wales, in the North West and in urban and remote Scotland. Suicide is perhaps the simplest example to give of a cause of death influenced by people's environment.

There are very many reasons why people may seek to harm themselves, and why a proportion of those may manage to kill themselves, but in aggregate they reveal the geography that shows where some are more than twice as likely as others to resort to a ligature to hasten their own deaths. Thus, even how people choose to kill themselves has a geographical story. In the major cities, poisons and drugs are more common methods. In affluent areas, the fewer numbers who do resort to suicide are more likely to use the exhaust fumes from their cars. They are more likely to have both a car, and a garage.

## AN EXERCISE

Table 7.1 lists the major causes of mortality in England and Wales in the year 2010, their ICD codes, disease label and the cumulative chance of dying of each cause of death (in the first column as measured out of 1024). Thus a man or boy has about a 5.8% chance of dying of a disease not listed in the table and a woman or a girl an 8.3% chance (see the first two numbers in the first column of the table below for where those percentages come from).

We can use the first column, the 'cumulative chance out of 1024', and a coin, to give each member of the class a cause of death at random, assuming that the patterns in the future are similar to those in 2010. The distribution of causes of death in the class should then reflect those in society as a whole.

To play the game each student needs a coin. Heads are '1' and tails are '0'. They will need to toss their coin 10 times to determine their allotted cause of death. This method is similar to that used in the exercise at the end of Chapter 6. Begin with a chance of 1 out of 1024. Toss the coin for the first time, if you get heads add 1, otherwise add nothing. Do this again a second time, but add 2 if you get heads, again nothing if you get tails. Do it again, adding 4 for heads; again, adding 8 for heads; again, adding 16; again, adding 32; again, adding 64; again, adding 128; again, adding 256; and again, adding 512 if you get heads. Ten heads and your number is 1024 and you are dying of an external cause (other). There are different chances for men and women (use the rows marked M and F below).

**Table 7.1** Death rates per million population in England and Wales: selected underlying cause, sex and age-group, 2010

| Cumulative chance out of 1024 | ICD-10 code | Underlying cause | | Death rates per million population | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | All ages | Under 1 | 1–4 | 5–14 | 15–24 | 25–34 | 35–44 | 45–54 | 55–64 | 65–74 | 75–84 | 85 and over |
| | A00–R99 | All causes, all ages | **M** | 6406 | 4637 | 194 | 106 | 454 | 760 | 1530 | 3222 | 8277 | 20509 | 56638 | 152699 |
| | U509, V01–Y89 | | **F** | 4581 | 4032 | 172 | 93 | 208 | 379 | 917 | 2140 | 5291 | 13093 | 40813 | 136937 |
| 58 | | Not listed below | **M** | 365 | 4290 | 72 | 20 | 45 | 67 | 127 | 196 | 320 | 664 | 1998 | 9010 |
| 83 | | | **F** | 371 | 3670 | 60 | 24 | 35 | 55 | 84 | 127 | 239 | 553 | 2102 | 13921 |
| 79 | C15 | Malignant neoplasm of oesophagus | **M** | 128 | 0 | 0 | 0 | 0 | 2 | 15 | 88 | 274 | 578 | 990 | 1352 |
| 93 | | | **F** | 44 | 0 | 0 | 0 | 0 | 1 | 4 | 24 | 71 | 187 | 429 | 699 |
| 98 | C18 | Malignant neoplasm of colon | **M** | 119 | 0 | 0 | 0 | 1 | 4 | 12 | 57 | 188 | 518 | 1152 | 1945 |
| 112 | | | **F** | 84 | 0 | 0 | 0 | 0 | 4 | 13 | 46 | 120 | 336 | 845 | 1527 |
| 172 | C33–C34 | Malignant neoplasm of trachea, bronchus and lung | **M** | 465 | 0 | 0 | 0 | 1 | 2 | 36 | 189 | 895 | 2330 | 4195 | 5121 |
| 178 | | | **F** | 299 | 0 | 0 | 0 | 0 | 3 | 24 | 165 | 669 | 1487 | 2480 | 2491 |
| 172 | C50 | Malignant neoplasm of breast | **M** | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 6 | 10 | 50 |
| 233 | | | **F** | 245 | 0 | 0 | 0 | 0 | 15 | 124 | 294 | 548 | 807 | 1442 | 2626 |
| 269 | C51–C58 | Malignant neoplasms of female genital organs | **F** | 161 | 0 | 0 | 0 | 3 | 22 | 50 | 137 | 356 | 696 | 1046 | 1339 |
| 211 | C61 | Malignant neoplasm of prostate | **M** | 238 | 0 | 0 | 0 | 0 | 0 | 2 | 17 | 177 | 822 | 2936 | 7624 |

*(Continued)*

**Table 7.1** (Continued)

| Cumulative chance out of 1024 | ICD-10 code | Underlying cause | | Death rates per million population | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | All ages | Under 1 | 1–4 | 5–14 | 15–24 | 25–34 | 35–44 | 45–54 | 55–64 | 65–74 | 75–84 | 85 and over |
| 236 | C81–C96 | Malignant | **M** | 161 | 5 | 7 | 6 | 12 | 23 | 29 | 76 | 253 | 692 | 1459 | 2199 |
| 292 | | neoplasms of lymphoid, haematopoietic and related tissue | **F** | 102 | 11 | 6 | 5 | 10 | 10 | 22 | 49 | 150 | 430 | 969 | 1444 |
| 383 | C00–D48 | II Other | **M** | 916 | 19 | 19 | 20 | 26 | 58 | 166 | 527 | 1651 | 3848 | 7788 | 13154 |
| 413 | (other) | neoplasms (cancers) | **F** | 542 | 17 | 23 | 19 | 22 | 44 | 116 | 337 | 974 | 2138 | 4595 | 8077 |
| 408 | F00–F99 | V Mental and | **M** | 160 | 3 | 0 | 0 | 13 | 56 | 76 | 60 | 64 | 189 | 1384 | 7241 |
| 454 | | behavioural disorders (mostly dementia) | **F** | 184 | 0 | 0 | 2 | 4 | 11 | 25 | 19 | 43 | 165 | 1724 | 11430 |
| 444 | G00–G99 | VI Diseases of the | **M** | 225 | 81 | 21 | 15 | 33 | 32 | 58 | 101 | 224 | 610 | 2418 | 5377 |
| 494 | | nervous system | **F** | 180 | 114 | 29 | 13 | 21 | 20 | 39 | 85 | 196 | 464 | 1743 | 5030 |
| 509 | I21–I22 | Acute myocardial | **M** | 406 | 0 | 0 | 0 | 2 | 11 | 61 | 254 | 620 | 1432 | 3731 | 8562 |
| 535 | | infarction | **F** | 182 | 0 | 0 | 0 | 0 | 4 | 16 | 53 | 158 | 562 | 2081 | 5858 |
| 552 | I26–I52 | Other heart | **M** | 268 | 24 | 14 | 4 | 14 | 32 | 68 | 118 | 260 | 655 | 2375 | 9301 |
| 584 | | diseases | **F** | 220 | 37 | 5 | 5 | 8 | 16 | 34 | 57 | 136 | 422 | 2095 | 10188 |
| 619 | I60–I69 | Cerebrovascular | **M** | 422 | 16 | 2 | 2 | 5 | 13 | 48 | 119 | 302 | 1094 | 4510 | 15984 |
| 673 | | diseases | **F** | 396 | 20 | 1 | 1 | 4 | 9 | 28 | 97 | 207 | 801 | 4237 | 18400 |
| 636 | I71 | Aortic aneurysm | **M** | 105 | 0 | 0 | 0 | 1 | 3 | 13 | 22 | 93 | 406 | 1286 | 2469 |
| 683 | | and dissection | **F** | 46 | 0 | 0 | 0 | 0 | 3 | 3 | 6 | 26 | 149 | 628 | 1400 |
| 767 | I00–I99 | IX (other) Diseases | **M** | 817 | 6 | 0 | 1 | 3 | 20 | 119 | 403 | 1169 | 2784 | 7670 | 20075 |
| 778 | (other) | of the circulatory system | **F** | 425 | 0 | 0 | 0 | 2 | 10 | 43 | 129 | 348 | 1145 | 4461 | 15959 |
| 808 | J12–J18 | Pneumonia | **M** | 260 | 30 | 9 | 2 | 5 | 9 | 27 | 56 | 166 | 499 | 2298 | 12888 |
| 826 | | | **F** | 212 | 26 | 8 | 1 | 2 | 5 | 20 | 40 | 110 | 330 | 1869 | 11735 |

| Cumulative chance out of 1024 | ICD-10 code | Underlying cause | | Death rates per million population | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | All ages | Under 1 | 1–4 | 5–14 | 15–24 | 25–34 | 35–44 | 45–54 | 55–64 | 65–74 | 75–84 | 85 and over |
| 859 | J40–J44 | Bronchitis, | M | 314 | 0 | 0 | 1 | 0 | 0 | 7 | 45 | 329 | 1217 | 3652 | 8294 |
| 873 | | emphysema and other chronic obstructive pulmonary disease | F | 212 | 3 | 0 | 0 | 0 | 1 | 5 | 40 | 264 | 903 | 2573 | 4231 |
| 894 | J00–J99 | X (other) Diseases | M | 219 | 40 | 12 | 5 | 6 | 10 | 27 | 55 | 177 | 611 | 2289 | 7600 |
| 907 | (other) | of the respiratory system | F | 152 | 51 | 11 | 9 | 6 | 11 | 21 | 43 | 103 | 377 | 1432 | 6130 |
| 919 | K70–K77 | Diseases of the | M | 159 | 5 | 0 | 0 | 2 | 33 | 158 | 323 | 429 | 385 | 305 | 278 |
| 926 | | liver | F | 84 | 0 | 0 | 0 | 1 | 27 | 83 | 160 | 209 | 210 | 209 | 182 |
| 950 | K00–K93 (other) | XI (other) Diseases of the digestive system | M | 195 | 27 | 4 | 3 | 5 | 11 | 41 | 87 | 248 | 569 | 1892 | 5355 |
| 966 | | | F | 179 | 23 | 3 | 1 | 5 | 7 | 19 | 60 | 154 | 505 | 2001 | 5904 |
| 969 | N00–N99 | XIV Diseases of | M | 118 | 13 | 1 | 1 | 2 | 2 | 8 | 20 | 62 | 220 | 1290 | 5573 |
| 990 | | the genitourinary system | F | 110 | 9 | 2 | 0 | 1 | 2 | 9 | 20 | 53 | 199 | 1157 | 5453 |
| 1001 | V01–X59 | Accidents | M | 198 | 40 | 24 | 19 | 160 | 194 | 198 | 191 | 177 | 246 | 815 | 2938 |
| 1013 | | (mostly car crashes) | F | 101 | 28 | 19 | 9 | 43 | 51 | 63 | 76 | 89 | 158 | 607 | 2791 |
| 1020 | X60–X84, | Intentional self- | M | 120 | 8 | 0 | 2 | 86 | 148 | 206 | 193 | 166 | 101 | 136 | 177 |
| 1021 | Y10–Y34, | harm; and event of undetermined intent | F | 37 | 0 | 1 | 1 | 30 | 38 | 57 | 64 | 54 | 42 | 42 | 42 |
| 1024 | U509, V01–Y89 (other) | XX External causes of morbidity and mortality | M | 26 | 30 | 9 | 5 | 32 | 30 | 28 | 24 | 30 | 33 | 59 | 132 |
| 1024 | | (other) | F | 13 | 23 | 4 | 3 | 11 | 10 | 15 | 12 | 14 | 27 | 46 | 80 |

*Source:* ONS: Mortality Statistics: Deaths registered in England and Wales (Series DR), 2010. Available at www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-230730.

This game may appear a little complex, but all it involves is in effect turning up to 10 tosses of a coin into a number between 1 and 1,024 to give a probability which can then be used to allocate a cause of death from Table 7.1. By reading down the first column until you come to your number or a number larger than it, it quickly becomes apparent which cause of death you have been allocated.

Here's a worked example. I start with the number 1 and toss tails, heads, tails, heads, tails, heads, tails, heads, tails, heads. My score is 1 + 0 + 2 + 0 + 8 + 0 + 32 + 0 + 128 + 0 + 512 = 683. I decide I am male and look down the first column until I get to 767, the first number equal or greater than mine. I read across and see I am to die of 'IX (other) Diseases of the circulatory system'. Reading from further up the column in the table to see what I have just skipped I work out that this will be a more obscure disease of my heart and blood vessels, but not acute myocardial infarction (heart attack), Other heart diseases, Cerebrovascular diseases, or an Aortic aneurysm. Well, that doesn't sound too bad.

Having allocated each member of the class a cause of death at random, next work out which groups of causes are most numerous in your population – infectious diseases, cancers, diseases of the blood and so on. For the most common causes, see if you have people allocated similar causes within those groups. It is important to remember that these causes have been allocated at random. They mean nothing for the people specifically allocated a cause. Some congenital causes (which are mostly included in the first group) only kill young babies, for instance, and several causes largely only apply to either men or women. However, for the group as a whole the distribution should be interesting. Here are a series of questions you can ask:

1 Are there causes that people are concerned about, for instance accidents or pneumonia, which no one in your class has been allocated? Is this because they are rare or because of chance? If you think it is chance, try another random allocation of the class. If you are very good at maths, work out how many allocations you would have to make, given the size of your class, on average, until these causes were allocated.
2 What will kill the bulk of students in your class if they are representative of the population of England and Wales, and if future causes of death are distributed as they are now?
3 Can you think of any reasons why your actual causes of death may be different from those allocated by this procedure, even if future causes of death are distributed as they are now?
4 Which of the causes that have been allocated do you think students will be less likely to die of in the future and which more likely, and why?
5 Given the maps above and the location in which you are playing this game (if that is in Britain), how might your local geography influence these chances?
6 Finally, the table also includes information about the rates of death per million at particular ages. Ignoring the first general category of 'not listed below', what does kill most people of your group's average age?

## Conclusion

In aggregate, people leave more messages from their deaths than each individual mortality does alone. The deaths of the people of Britain lay down the sediment of its human geography, sediment which reflects almost everything about their pasts. In the future, if disasters and wars do not have a great impact, the population may live longer than it has ever done. However, the spatial patterns of people's deaths could be even more distinct than those shown in the whistle-stop tour of mortality presented in the last few pages.

The determinants of premature mortality and longevity are becoming more spatially distinct. From people's environmental conditions in childhood and around the time of their birth, through to their behaviours as adults, the kinds of jobs they do and the rewards, freedoms, pressures and threats which they face, through to their recreational and retirement opportunities, the maps of these countries are changing and those changes will be reflected in the patterns of future deaths. Most importantly, migration patterning is becoming ever more distinct. People are sorting themselves out in space, by place, more and more keenly as every year passes, as house prices diverge, and as yet greater proportions of the population leave home to attend university (at least they did until the year 2011).

Above all else, two forces, poverty and migration, create and amplify the spatial patterns revealed in our mortality. They also strongly influence our collective behaviours which are the immediate precursors of some of the biological causes of our physical deterioration. Although we have no very accurate figures on the geography of smoking, those estimates that have been made suggest that the map strongly mirrors that of poverty. Of course, there are exceptions, but they are becoming less and less evident and, as social groups are becoming ever more corralled together through their differential migration, they increasingly conform to what is normal for that place and that group.

When I first wrote these words it was at this precise point that I took a break from writing. I went downstairs and had my late breakfast and then I stepped out of the hotel for a smoke. There were over 5000 delegates at the conference which I was skipping to get my writing done. Only one other person from inside the building was smoking on the pavement with me. Outside, many of the people going about their normal business had cigarettes in their hands: the bus-boys on their breaks, the secretaries on an errand, the taxi drivers standing by their cars waiting for the next fare. Twenty-first-century America can partly be seen as a model for what twenty-first-century Britain could soon be.

The middle-aged, middle-class academics are going to live for a long time. Their hearts will be stronger, they will be less susceptible to certain cancers and they will be among the first to benefit from new cures for others. They will die later of causes most associated with very old age. I could have also added that they would be most likely to have given up smoking very soon. In contrast, the people who clean their hotel rooms, serve their drinks, drive them in taxis to meetings, look after their children, mend their houses and care for them in their old age are unlikely to

benefit more than a fraction from the increased longevity that comes from greater overall affluence. This will be blamed on the poor themselves, on their poor lifestyles, on their behaviour, on their claimed lack of aspiration, on their supposed weaknesses. But if it were not for them, what would the affluent have and how would they benefit from their affluence to the advantage of their health?

Without the poor, the rich would have to clean their own rooms, make their own food and drive themselves around. They could not rely on others to arrange their holidays, staff their resorts, clean their offices and take their orders. They would have to look after their children when they were very young all day every day and their parents when they were old. The rich could not have jobs where they were paid to travel round the world and could type books about the plight of the poor while other people looked after their basic needs. Most importantly, internationally, the rich countries of the world would not be rich were it not for the efforts of peoples in the poorer nations of the world. We simply could not all consume what the rich consume and we (rich) need the poor to make what we consume. The health of the affluent is as much a product of poverty as is the premature mortality of the poor – worldwide and at home.

Four thousand words, four cigarettes, six cups of coffee, one breakfast and a quick break later and I was finished. In theory, and on average, what I had smoked that morning should have reduced my life expectancy by three quarters of an hour. The coffee and the cooked American breakfast didn't do much good either. Apart from the quick walk through the lobby I had hardly any exercise. This hotel appeared to have elevators and no stairs. I had been breathing air recycled through a conditioning system. The temperature remained exactly 72 degrees Fahrenheit. Yet I had been doing exactly what I had chosen to do. I had not had to take any instructions from anyone else. I took no phone calls, received no emails, no students had been able to interrupt my work – I was 4000 miles away from them. I found it hard to imagine a degree of freedom much greater than this when I first wrote these words. Since then I have become freer. I have realised just how lucky I am, and I try to use that luck for some purpose.

When civil servants in London were monitored to assess the determinants of their health many years ago it was found that those with jobs like mine, which they often described as 'stressful', but which in reality were not, tended to live longer than civil servants on lower-pay grades even when those with more freedoms had what appeared to be worse lifestyles in terms of their health-related behaviour. Had I spent the few hours it took to write this chapter, and then revise it five year later, doing something directly for somebody else, and if that was what I normally did every day, then according to that evidence, the slow cumulative effects of being subservient to others would have done more damage to me than what currently appears to be a very unhealthy few hours spent typing these words. That is all, of course, on aggregate. For any individual, anything can happen, and averages are less useful than advice to look after their bodies and their minds. But, if you are free to think, not just free to try to make money, but really free, what more is there? What about others' misery?

## Further Reading

There is huge controversy concerning what are the factors which have improved the health of people living in Britain so much in recent years. Very large numbers gave up smoking in the last six decades and the extent to which they did so is largely reflected in differing improvements in mortality and the changing main causes of deaths in the population some two or three decades later. However, work on studying civil servants found that those higher up the hierarchy who smoked could live longer, on average, than those lower down who did not. That work was carried out by Michael Marmot and a large research team at University College London. To see what that team is doing now have a look at its website www.instituteofhealthequity.org.

Michael Marmot also conducted the 'Fair Society, Healthy Lives' review for government in Britain in 2010. It was a very thorough piece of work, but it had its critics, including this author and a friend. Here is what we said: www.dannydorling.org/?page_id=1917; the formal reference for that paper was: Pickett, K. and Dorling, D. (2010) Against the Organization of Misery? The Marmot Review of Health Inequalities, *Social Science and Medicine*, 71, 1231–1233. It was just three pages long appearing after 1230 other pages of papers in volume 71 of the *Journal of Social Science and Medicine*. You could easily miss it, so have a look on the Web. I promise not to refer to anything else I have written if you do!

## Key Point Summary

- Everybody dies, but some die too early, and there are a wide variety of rare causes of death.
- There are distinct geographical patterns to be seen in premature mortality by cause of death.
- It is far easier to live a healthy life if you are free, especially free of others' orders.