# CHAPTER 1

# INTRODUCING GEOGRAPHIES OF HEALTH

"Code Red" refers typically to a state of emergency within a hospital; it indicates that something is terribly wrong and needs to be addressed with all urgency. In 2010 this phrase was used to indicate a general state of health emergency in neighborhoods in Hamilton, Ontario, Canada, during a week-long public health event. Why?

Hamilton is home to a legacy of health-related issues. With a diverse population close to half a million people, it is a (former) industrial city in the heart of the Great Lakes region, once home to one of the largest steel manufacturing operations in North America along with its attendant environmental and social issues (contaminated air and water, a large working-class population, and substantial immigration). The local economy is now driven primarily by education (Hamilton hosts a large, research-intensive university, McMaster) and health care (an integrated set of health care institutions, linked to an innovative medical school).

"Code Red" all started as a collaborative mapping exercise between city public health officials and university researchers at McMaster. But the champion for this week-long event was a local investigative journalist named Steve Buist, recipient of a Canadian National Newspaper Award for this work. He had begun to wonder about the geographical variations in health he was seeing across the city of Hamilton, especially given that Hamiltonians – like all Canadians – are privileged to have a universal health care system, free of financial barriers. Big questions plagued him. Why, for example, is there a 21-year difference in life expectancy between some of the city's neighborhoods? Why, in such a well-off community, do we see a neighborhood where

nearly half of all babies are born underweight; three times the rate of that in some developing countries? And why, when post-secondary education is heavily subsidized by the state, do we see one neighborhood where almost 700 adults in every 1000 has a university degree, compared with another where virtually none have a university degree? (*The Hamilton Spectator*, April 10, 2010, p. 1.)

To make these issues – quite literally – *visible*, consider two maps (Figure 1.1 and Figure 1.2), one showing average age at death, the other the distribution of people living on very low incomes. What is immediately apparent is that the two maps generate similar patterns; further, these patterns are similar across a broad range of health outcomes and social determinants of health, such as poverty, education levels, unemployment, quality of the housing stock, access to amenities like shopping and public transportation, not to mention health care facilities. And these patterns, which are far from random, tell us that our health is heavily dependent upon where we live.
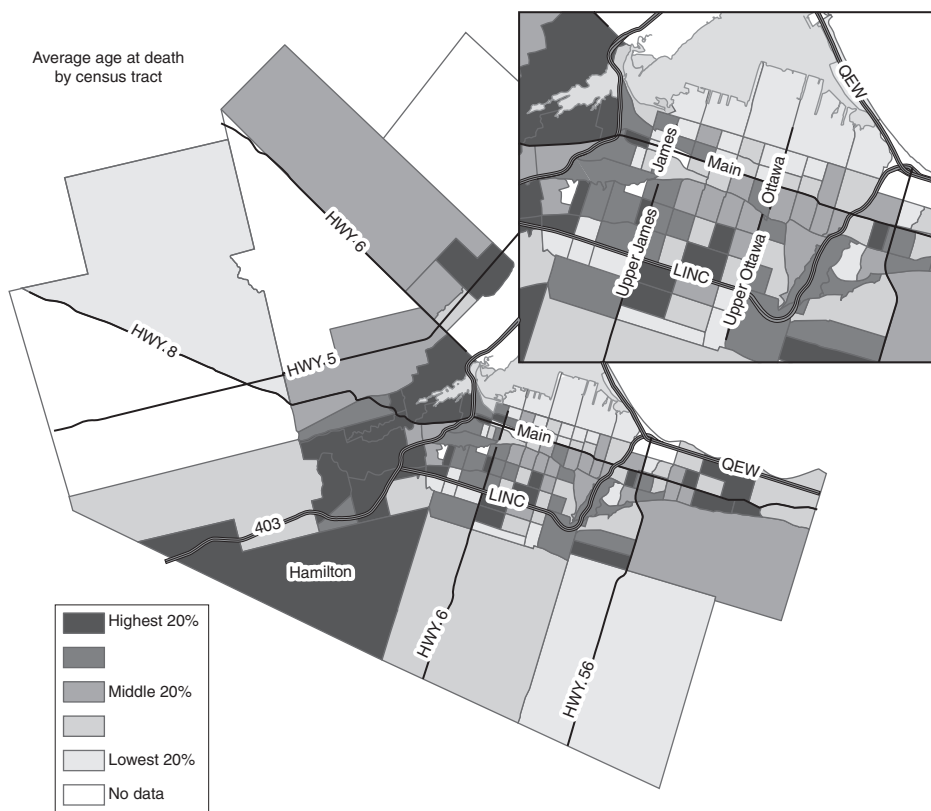


**Figure 1.1**    Average age of death: Hamilton, Ontario, Canada. Source: McMaster Spatial Analysis Laboratory.

Percentage of people 15 years
and older living below
poverty line

Lowest 20%

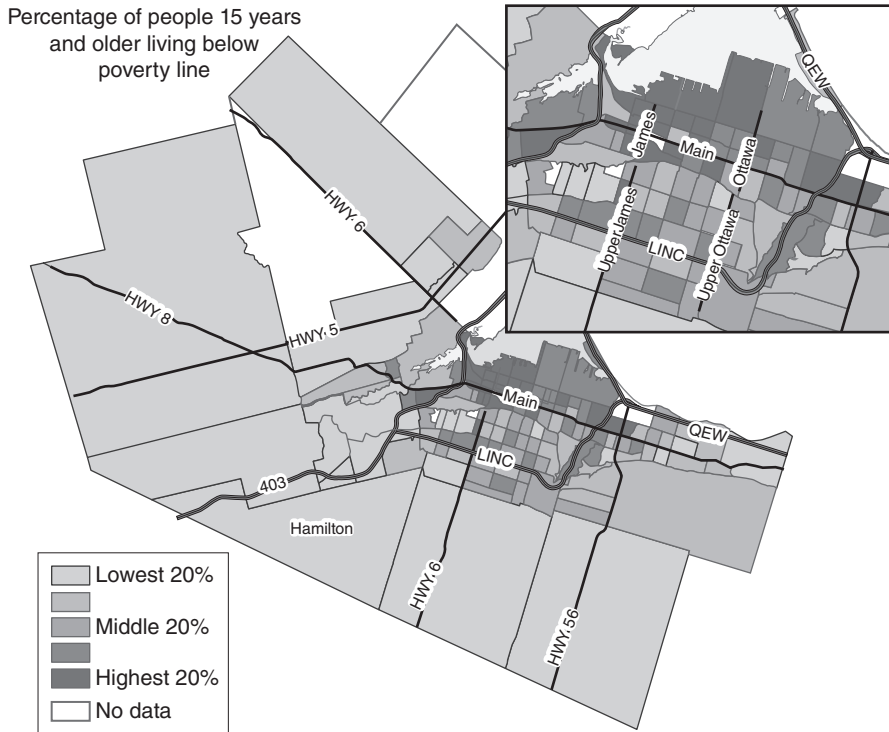Middle 20%

Highest 20%

No data

**Figure 1.2**    People living below the poverty line: Hamilton, Ontario, Canada. Source: McMaster Spatial Analysis Laboratory.

We aim to convince you in the course of this book that our "health" and our "geographies" are inextricably linked. The screening we get for diseases will be available differentially from country to country or from one health region to another. Where you live affects the treatment you get. The risks arising from environmental contamination, be this poor air quality or polluted groundwater, are not uniform over space. If you live on a busy main road, or near a site disposing of hazardous waste, you may be more at risk of illness than others who do not. Where you live affects your risk of disease or ill-health and therefore your well-being. Access to basic resources, such as nutritious food, clean water, decent housing, and rewarding (and properly rewarded) employment is also geographically differentiated. Where you live affects how accessible or available are such resources. These relationships are further complicated if you experience any type of disability; typically, access to resources to enhance health and well-being is greatly hindered.

If you approach this book with a geographical imagination already well developed via other books or courses you will, we hope, find the statements above uncontroversial, though if you are new to geographies of health we intend to persuade you that the subject of "health" is a rich source of

material that bears study by the geographer. If we can stimulate more of you to take up "geographies of health" as an area for further enquiry or research we will be delighted. But we hope, too, to interest other readers; those who come to the subject with a background in health research – perhaps public health, general practice, or nursing – or another social or environmental science, and who are intrigued by what geographers might have to say on the subject.

To set the scene, we need to explain some basic ideas and concepts. For some readers (perhaps some geographers) we need to say something about health, illness, disease, and disability. These are high-level concepts which are far from unproblematic, but we will endeavor to say something about these in this first chapter so that some of the early material makes sense. For other readers (primarily non-geographers), we need to introduce some fundamental geographical principles and concepts.

Having laid some of this groundwork we want to consider five case studies: examples of work we consider as part of geographies of health. Our purpose in describing these studies is two-fold. First, we wish at a very early stage to introduce some pieces of research in the geographies of health in order to capture the imagination. Second, we intend to use them in order to show something of the richness and diversity of geographical research on health. There are several contrasting approaches to "doing" geographies of health, and there is no single style of enquiry accepted by those working within this field. We shall not say very much in this chapter about these different styles, though we hope it will be clear from what we do say that the differences exist. Instead, we shall leave until Chapter 2 the task of explaining how these five studies differ, and we shall use other examples to show how there are, broadly speaking, five alternative modes of explanation within the geographies of health. It will emerge later that this classification is far from clear-cut, but it serves as a useful organizing device. It will also become clear from the rest of the book that by no means are all approaches widely used in studying the geographies of health. Nonetheless, we think it is essential at an early stage to set out different styles and approaches to understanding the geographies of health.

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## Health and Geography: Some Fundamental Concepts

This section considers some concepts needed for a basic understanding of "health" and of "geography." These two terms are examined separately – and in a real sense the remainder of the book represents an attempt to show the intimate connections

between the two. Clearly, entire books are devoted to each; our aim is simply to provide some ideas that will aid the grasp of material later in this book.

## Concepts of health

Health has been defined in many ways. In 1957, the World Health Organization invited us to see health as more than simply the absence of disease; rather, "a state of complete physical, mental and social well-being" (World Health Organization, 1957). This ideal state does not, however, assist us very much since, according to the definition, most if not all of us are unhealthy at all times! We could instead take health to mean the availability of resources, both personal and societal, that help us achieve our individual potential. This is consistent with a definition of health (Epp, 1986), stemming from the Ottawa Charter, where health is defined as a resource for everyday living that allows us to cope with, manage, and even change our environments. Alternatively, we might think of health as being physically and mentally "fit" and capable of functioning effectively for the good of the wider society. Linked to this is the idea of health as personal or mental "strength," fitness, or energy, or engaging in what we might think of as healthy behaviors or lifestyles (drinking alcohol in moderation, getting regular physical exercise). Further still, we could think of health as a commodity, to be given or lost, bought or sold; we "invest" in health perhaps by taking out private health care insurance, and lose it when we break a leg or become ill. Clearly, then, there are many ways to construct "health."

Consider how you behave if you feel unwell. This might take the form of a headache or a sore throat. In the first instance you would possibly decide to manage this symptom yourself, perhaps by taking to bed or by self-medication using an over-the-counter remedy. If the symptoms persisted, or took a different form, you might consult a health professional: perhaps a nurse in a clinic, or a general physician. You do this because the symptoms represent a departure from your usual healthy state. You may be examined and tested for signs of some underlying pathology or disturbance in the body's functioning. You experience some discomfort, some pain perhaps; you feel ill. *Illness*, then, is a subjective experience. The health professional, however, is concerned to offer a diagnosis; to "identify the specific underlying pathology in the patient's body that is producing the signs and symptoms, distinguish it reliably from other possible diagnoses, and label it correctly with the name of a medically recognized *disease*" (Davey and Seale, 1996: 9). Put simply, people suffer illnesses, while doctors diagnose diseases. The doctor or physician wishes, then, to cure the patient of the disease; the patient will, of course, wish to be cured of any disease, but also wants to be freed from feeling ill.

Disease and illness may or may not be associated, in that it is perfectly possible to feel ill without there being any detectable biological abnormality, while the person who has been diagnosed with such an abnormality might feel quite well. For example, those who are debilitated by a feeling of complete lethargy may find that

a health professional is unable to detect any obvious "cause" (and hence conditions such as myalgic encephalomyelitis, or ME – also known as chronic fatigue syndrome – may go unrecognized by doctors; it may be a condition they are not prepared to diagnose; see Clauw et al., 2003 and Krieger, 2005 for an extended discussion). Equally, a middle-aged man who visits his general physician for a health check-up may be feeling well but is diagnosed with high blood pressure; he arrives as a healthy person and leaves as a patient (Seale and Pattison, 1994: 16).

Since the absence of health is perhaps easier to grasp than health itself it is no surprise that we find it easier to collect data on disease and illness. Further, we find it easier in principle to "measure" disease, since we can observe and record numbers of people with a particular cancer or heart disease while, for example, illness as a subjective experience may need recording in other ways, as we see later. We call the study of disease in populations *epidemiology*, and a substantial body of material in this book could be labeled "geographical epidemiology," the study of how disease is distributed in geographical space. Epidemiologists focus on *mortality* (death) and its causes, or on *morbidity* (sickness, which can include both disease and illness). Almost always we find it sensible to calculate mortality or morbidity rates, since this allows for comparisons between populations. We also usually compute *age-standardized rates*, thus controlling for the age structure of a population; knowing that the crude (not age-adjusted) death rate in one place is twice as high as elsewhere carries little information if we also know that there are many more older people living there.

Mortality data in the developed world come from death certificates, which also specify cause of death; this may be far from easy to establish, particularly among the elderly. Moreover, mortality is a drastic measure of ill-health! Many illnesses and diseases cause a burden to the sufferer, as well as impacts on health care systems, without leading to death. As a result, health researchers often collect morbidity data, via a number of possible routes. These can include one-off patient surveys, or data from hospital consultations or emergency room visits. We shall encounter studies based on these sources at various points during the course of this book. Such data permit the estimation of an *incidence rate*, the number of new cases occurring within a given time interval expressed as a proportion of the number of people at risk from the disease. Alternatively, we can estimate *prevalence*, the number of people with the disease or illness at any one point in time.

Without attempting here a comprehensive classification of disease, we need to draw a distinction between different broad categories. In particular, we need to distinguish between *chronic* and *acute* diseases or disease episodes. Chronic diseases are those such as heart disease and diabetes, which may be long-lasting and even lifelong, while acute diseases are those such as myocardial infarction (heart attack), sudden stroke, or appendicitis: conditions that start abruptly, last perhaps for only a few days and then settle, though perhaps developing into chronic conditions or leading to death. Those suffering from a disease such as asthma may experience it

in both a chronic and acute form, able to manage it themselves on a long-term basis but perhaps requiring hospital admission if they have a sudden acute attack. *Infectious* diseases (such as measles, influenza, and tuberculosis) are those caused by organisms that can spread directly from one person to another.

If someone is restricted in some way from general physical or mental functioning, we can speak of *impairment*. For example, chronic respiratory disease may limit one's ability to negotiate stairs, while visual impairment varies from the quite mild (short-sightedness) to the most severe (blindness). Others whose impairment confines them to a wheelchair are disadvantaged by social attitudes or poorly designed environments and buildings as well as by the cause of their impairment. Some authors (e.g., Gleeson, 1999; Thomas, 1999) prefer to make a formal distinction between "impairment" and "disability," arguing that the former refers to some defective or missing body part while the latter is a socially or culturally constructed form of exclusion. What this means is that at different periods in human history, or in different geographical settings, the same physical or mental impairments might be regarded quite differently by the wider societies. Gleeson suggests that in feudal societies impairment was not uncommon, but that the treatment of such individuals as "disabled" only emerged with the rise of capitalism: "Within the complex, layered dependencies which constituted feudal village life, physically impaired people were not isolated as 'social dependants' – this abject identity was a construction of the capitalist social order" (Gleeson, 1999: 97). Even in contemporary Western society many of those who are impaired may be oppressed in just the same way as other minority groups whose faces (or bodies) do not "fit." Chouinard and Crooks (2003), for example, profile the hardships associated with being a "disabled" academic. Wilton (2004) articulates how newly emerging flexible work environments impact differentially on disabled people engaged in paid work. Health geographers (e.g., Driedger, Crooks, and Bennett, 2004) have contributed to our understanding of how space and place shape the experiences of those experiencing impairment as a result of chronic illness, while at the same time reminding academics of their obligations to their research participants, ensuring that we are sensitive to, and empower, those participating in our research endeavors (Valentine, 2003).

We saw earlier how illness may trigger a visit to a general physician or other health professional engaged in "primary" care. The diagnosis may call for a referral to other, more specialized health professionals, usually in a hospital-based setting (the "secondary" sector), or even for very specialized care (perhaps complex surgery) in the "tertiary" sector. But this possible sequence of care is very much a traditional Western model. *Complementary* (or alternative) medicine has grown rapidly in some Western countries, however, and some health care will be delivered by practitioners such as osteopaths, acupuncturists, and homeopaths; for some of these groups, treating the person rather than the disease takes priority. We return to this subject in Chapter 7.

### Geographical concepts

We want to begin this brief exploration of some geographical concepts by considering *location*. We shall take location to mean a fixed point or geographic area on the earth's surface, somewhere that can be pinpointed by using a pair of locational coordinates. These coordinates are often latitude and longitude; for example, 51.17 °N, 30.15 °E refers to a location about 51 degrees north of the equator and 30 degrees east of the Greenwich meridian, while the location 23.16 °N, 77.24 °E is closer to the equator and further east. At a more local or regional scale it is more conventional to use a coordinate-referencing scheme specified by a national mapping agency. For example, the Ordnance Survey in Britain uses a pair of coordinates (or "grid reference") known as "eastings" and "northings." The grid reference (348211, 458826) thus identifies a unique location in Britain, and has a precision of 1 meter. Of course, few of us use such locational identifiers in our daily lives; instead, we refer to a location using an address. Such an address, when containing a postal code of some sort (known as a postcode in the United Kingdom and Canada, or a zip code in the United States), turns out to be extremely valuable to a geographer, since there may be computer-based "look-up" tables that link such postal codes to the coordinates described earlier. The uses to which this may be put are considered in Chapter 3.

What we mean by a "location" does, of course, depend on whether we are looking at health or disease in the world as a whole, or perhaps within a region. For example, if we wished to look at the way disease might be spread via air travel it would be useful to define a set of locations as the set of major cities connected via air networks. But at a regional level it would make little sense to treat Beijing or Paris as a single "point" location.

Locations, then, are points or areas on the earth's surface; they do not seem to *mean* very much. However, your own home, which has an address (a location), may mean a great deal to you. A favorite theater, or sports stadium, or woodland, or town, all identifiable locations, may well mean something to you. And if we tell you that the locations 23.16 °N, 77.24 °E and 51.17 °N, 30.15 °E, referred to above, identify Bhopal and Chernobyl, respectively, then both were etched forever on our collective consciousness as the sites of devastating industrial explosions in 1984 and 1986. Once named or labeled, these locations become *places*. Locations become places when they are charged with meaning. Until the explosions, these places were, for many of us, simply dots on a map – locations – though for those living there they had always been places. We consider the Bhopal explosion further in Chapter 11.

Places, like locations, can refer to very small areas, or be of quite vast extent. Your grandfather's favorite chair, positioned to observe daily life outside the living room window, may mean a great deal to him and contribute significantly to his mental well-being; for him, it is a place. For others, particular buildings will be of enormous importance. Some stories appearing in the media, to which we referred earlier, focus on the possible closure of hospitals, and while some will object to a

consequent reduction in access to health care, for others it is the symbolic quality of the institution or building that matters as much. For others still, small neighborhoods are foci of meaning, and proposals or action to alter their character, for example by locating a noxious facility in their midst, will provoke opposition among those who fear it carries a health risk. More broadly, people develop attachments to places that may be cities or regions, as well as to nation states.

Places may be good or bad for health – indeed, this is a major theme running through this book. In some cases, as in the opposition to a noxious facility, the public perception of risk may be as important as any measurable impact on morbidity. As we shall see in Chapter 6, those places which are impoverished in terms of access to health-promoting resources, such as leisure and recreation facilities, will not be associated with good health to the extent that resource-rich neighborhoods are. Moreover, what happens in one place may have negative, even drastic, consequences for those living both nearby and at a considerable distance. Such "externality effects" are illustrated by the impact on health of those living downwind of a major chemical installation or in "Cancer Alley", the 87-mile section of the Mississippi River between Baton Rouge and New Orleans, the location of what is arguably the largest concentration of petrochemical industries in the world (Rosner and Markowitz, 2002), or, more dramatically and over much greater distances, by the Chernobyl explosion. Conversely, other places and landscapes are considered to be beneficial to health; they are *therapeutic landscapes* (see Box 1.1). For ordinary, "lay" people free of any disease, however, there will be other, much more anonymous places where we feel close to nature, where we feel secure, and with which we identify; in short, where we feel "well."

Attachment to places for some may mean separation for others. As Cornwell (whose work we examine more fully in the next chapter) notes, "where there is belonging, there is also not belonging, and where there is inclusion, there is also exclusion" (Cornwell, 1984: 53). Those "attached" to a place may object if others wish to attach themselves to it, especially if they are a different color. At the extreme, this can have severe "health" consequences for those on the receiving end of violence directed towards the "other," those whose faces are "out of place." What this means is that places, and how we identify with them, are not simply a matter of subjective experience; "rather, such feelings and meanings are shaped in large part by the social, cultural and economic circumstances in which individuals find themselves" (Rose, 1995). This indicates that there is a danger in romanticizing the notion of a sense of place. As Mohan (1998: 120) observes, "sense of place has most often and most strongly been associated with economic adversity – for instance, the instinctive collectivism of communities suffering the excesses of capitalist industrialization, such as mining settlements." Is, he asks, "the implication really that one should celebrate such conditions?" For plenty of people places are health-damaging (often in the sense of being a locus of unemployment) rather than health-promoting, and typically those with adequate resources are more likely to find themselves in the latter.

## Box 1.1   Therapeutic landscapes

"Therapeutic landscapes are places that have achieved lasting reputations for providing physical, mental, and spiritual healing" (Kearns and Gesler, 1998: 8). According to Wil Gesler, the geographer who first developed the concept, these reputations might be built on the qualities of the physical environment, such as a source of water or a distinctive piece of topography. Or, they may rest on the qualities of buildings, such as temples. But such therapeutic properties are socially or culturally constructed. People might seek out such places in order to be "cured" of a chronic disease, perhaps, or to hope for an improvement in well-being.

Gesler's own early examples include: the sanctuaries first established in classical Greece (at Epidauros, for example: see Gesler, 1993); spa towns (such as Bath in England: Gesler, 1998) based on the perceived healing qualities of local springs; or sites of deep religious significance (such as Lourdes for Catholics and other Christians: Gesler, 1996). Different people "see" these sites in different ways and at different times; for example, some claim genuine healing powers for spa waters, while for others a spa town may be simply a brief stop on a vacation. Even those who are inspired by a piece of landscape, but do not necessarily gain therapeutically from it, may notice an improvement in their mental health. Further, depending on the circumstances and our mood, even rather ordinary or everyday landscapes may contribute to well-being. For example, Milligan, Gatrell, and Bingley (2004) found the concept of value in interpreting the use of allotments (community gardens) by older adults. Wilson (2003) has sought to extend the concept to an understanding of health and identity among First Nations peoples in northern Ontario. As she points out, the relationship between health and place for such people is an intimate one. Moreover, therapeutic landscapes are not necessarily physically located; rather, the way of life of the Anishinabek peoples she studied – their use of the land for hunting and fishing and its direct contribution to health (nutrition) – is connected spiritually as well as materially to the land. Other researchers, such as Wilton and DeVerteuil (2006) take a critical look at the concept of therapeutic landscapes, arguing that in some circumstances we need to recognize the differential power relations that shape health behaviors in particular settings.

For further details, examples, and overviews, see Curtis (2004: chap. 2) and Williams (2007).

As we shall see later, geographers may choose to study health in a particular place, or they may want to make comparisons between places and study health events and outcomes in a set of places. If the latter is important they will frequently want to consider and measure the *distance* that separates places. How far are people from facilities delivering health care? How far are people from a possible source of pollution, such as a smelter? Over what distances do diseases spread? We have already seen that locations can be pinpointed in an absolute sense; but, as these examples make clear, we will often need to look at where places are located in relation to other places ("relative location"). Distance, then, is something which relates one place (or location) to another. It is perhaps *the* fundamental concept in geography. How is it measured? An obvious and important measure is the physical distance separating one location from another on the earth's surface. If measuring the distance from Chernobyl to Kiruna in northern Sweden we shall need to take into account the earth's curvature to do this; however, if looking at distances between the home locations of those stricken in a city by an infectious disease we could safely ignore this curvature and measure straight-line ("Euclidean") distance. It is worth pointing out that there are other concepts of distance that may be significant in a health context. We can think of spatial separation in terms of travel time, for example, or travel cost, or people's estimates of such separation ("cognitive distance"), or the social distance that separates them (in terms of class, income, or lifestyle, perhaps) from their neighbors. Measuring distances between areal units (such as health regions, counties, or catchment areas) creates special problems. Sometimes we can measure straight-line distances between the centers of such zones; often we are only interested in whether one zone is adjacent, or connected, to another zone and in this case simple contiguity or adjacency serves as a measure of distance. As we shall see when we discuss the spread of infectious disease across the globe, distance itself poses few barriers if we consider the journeys made rapidly by air travel between far-flung places.

We have already made oblique reference to it, but we want now to introduce formally the concept of spatial *scale*. This, too, is quite fundamental to what follows, since while health is a property of the individual we can aggregate health events for those living in a neighborhood, city, region, or country, in order to estimate disease rates for a set of such units. We might then choose to study disease incidence in a city, or make comparisons between rates for all countries in Europe, for example. We may find that factors that explain variations in disease incidence at one scale may be quite unimportant at another. For instance, international variations may be a function of how much expenditure on health care is committed by governments, or even by differences in diagnostic or recording methods, while variations from place to place within a small region may be explicable by an environmental factor. Equally, the kinds of events that impact upon our health may operate at different scales. Local contamination of a groundwater source may have consequences for those living in a quite restricted area, while (as noted already) a catastrophic nuclear explosion may have an impact across continents. On a very

different scale the quality of social relations within the home will have impacts on the health of its occupants. We shall see in what follows, therefore, that geographers span a wide range of spatial scales in studying health and disease. But, again, with reference to the spread of infections, "scale" proves relatively unhelpful as an organizing concept and the distinction between the local and the global breaks down; what matters is the connectedness of places within networks of relations.

Although geographers concern themselves fundamentally with spatial concepts we should not neglect to mention the importance of *time*. This is because while locations remain fixed over time (if we ignore the continental drift that takes place over geological time!) places do not. Those which are inhabited may gain or lose population, with possible health impacts. Chernobyl has been a place for as long as humans have inhabited it, though one could argue that for most of us it carried little or no significance until 1986. And time-scale matters as much as spatial scale; we may choose to study the health consequences of catastrophic, extreme events such as earthquakes or the tidal waves or *tsunami* that devastate Pacific coasts, most dramatically in late 2004 (Wickrama and Kaspar, 2007), or major floods, such as that which devastated New Orleans in 2005. Alternatively, we may concern ourselves more with the impacts of longer-term changes, such as global environmental change (Chapter 12). Climate affects health over different time-scales; daily hospital admissions for asthma may be elevated by climate events such as thunderstorms the day before, while seasonal change brings marked mood swings in some people ("seasonal affective disorder").

Places may be good or bad for health at different times and over different time-scales. We may, for example, be exposed to particular sources of environmental contamination at different periods of our lives, depending perhaps upon where we live and the work we do. Our "life courses" will have a major bearing on our health, and we cannot neglect the influence of our migration histories on health outcomes; indeed, Chapter 10 is devoted to this theme. Further, our health is affected by what happens to us as we move around during our daily lives, perhaps being exposed to air pollution from motor vehicles as we commute to work, to a risk of accidents in some occupations, or maybe to overt or verbal violence in domestic settings. We shall consider one way of conceptualizing the role of time in the next chapter (section "Structurationist Approaches").

While places may change over time in observable, measurable ways, it is important to note, too, that our *experience* of, or *beliefs* about, them may change too. The marshlands of southeast England and other parts of Britain were considered very unhealthy 200 years ago, because of the risk of malaria (literally, "bad air"; see Dobson, 1997) while southeast England now carries a reputation as one of the healthier parts of the country. Moreover, our experience of time changes through our lives. This, too, may affect our psychological well-being. But this experience of place also changes over very short time-scales; for example, we might feel entirely safe walking through a park during the day, yet quite threatened at night-time. The location remains the same, but the "place" changes

character dramatically during 24 hours. One's fear of crime can have a very real impact on health and well-being. Further, our access to health services changes over time. We may live next door to a health center, but if it is closed for the weekend we may have to travel much further for immediate attention, while if it closes permanently because of health service restructuring there will be longer-term impacts on access to services.

Places may also be thought of as social settings or social environments; we are literally surrounded, or "environed" by other people and features of the landscape. However, we also think of *environment* in the sense of the physical world and how it impacts upon us. Climate affects health, in both a direct and indirect sense, as we shall see later, while in earlier chapters we look at the impacts of environmental degradation, both of air and water, on health. Even the local geology can have health impacts. For example, goiter (an enlarged thyroid, resulting in severe swelling of the neck) in areas such as south-central Sri Lanka is thought to be due in part to low levels of iodine in water and soils (Dissanayake and Chandrajith, 1996).

The physical environment figures prominently in a branch of the geography of health known as *disease ecology*. Here, the argument is that one cannot understand the distribution of a disease, particularly an infectious or parasitic disease, without knowing about its relationship to local and regional ecologies – the interactions between topography, climate, water, soils, plants, and animals. Various examples of an ecological approach figure in this book, of which malaria is a good example, since we require data on particular configurations of rainfall and temperature, as well as knowledge of animal (mosquito) and human behaviors, to predict its spatial distribution. Chapter 13, on emerging, re-emerging, and neglected diseases, examines this perspective more fully. Yet the environment has impacts on health in much more subtle ways. A case can be made for suggesting that loss of biodiversity, and the despoiling of landscapes, has a negative impact on well-being. Those who derive mental health from the enjoyment of particular landscapes may well find that others' modification of such landscapes in an environmentally insensitive way causes genuine, albeit hard-to-measure, ill-health. Modern public health sees the environment as social and psychological, not merely as physical. In this sense, then, "environment" and "place" converge to provide a spatial context for health that transcends the individual's own behavior and health outcomes.

## Geographies of Health: Five Case Studies

Having set out some key ideas and concepts, we want to add some color by illustrating some work that we take to be representative of the rich variety of the geographies of health.

## *Neighborhoods and obesity in New York City*

One of the great health-related issues (some might say "obsessions") of our age is obesity. Many policy makers in health care regard this as a major public health problem, while many ordinary people are conscious of their weight and concerned not to become overweight or obese (defined as having a "body mass index", BMI, in excess of 30: BMI is defined as weight in kilograms, divided by the square of height in meters). Some geographers have sought to map and explain spatial variation in obesity. Such analysis could be to compare Canadian provinces, or US states, for example, but it could be at a finer geographic scale, examining place-to-place variation among neighborhoods in cities. We consider an example of the latter, drawn from work undertaken in New York City by Jennifer Black and her colleagues (2010).

There is a range of factors relating to individuals that might affect obesity, notably food intake and levels of exercise, but also social class, income, age, gender, and ethnicity. Black and her colleagues are interested in these, but interested more in the question of whether there are variations from place to place (between neighborhoods) and if such variations are explained by factors that pertain to such neighborhoods. In particular, does the presence of neighborhood amenities (including the nature of food outlets, such as "fast food" venues or different types of food retail stores) play any part in shaping obesity levels? To what extent is obesity also affected by the availability of facilities (such as swimming pools or health clubs) to improve fitness? Their argument, then, is that whether or not a person is obese depends partly on individual-level variables but also on those features of the local environment that may help to reduce obesity or serve to impede people in their attempts to manage their weight.

To tackle these issues Black and her colleagues collected data on almost 10,000 adults aged 18 years or over. These individuals were asked for their weight and height, from which a BMI score was derived. Other individual-level variables were collected, including age, gender, ethnicity, and educational attainment. No data were available on levels of exercise or food consumption. Data were also collected for 34 large neighborhoods, on variables such as: the numbers of supermarkets, small grocers, beverage and snack food stores, and fast food outlets, as well as the number of facilities for physical activity. Roughly speaking, there were 300 individuals surveyed in each neighborhood.

A simple mapping of prevalence of obesity relative to the neighborhood (Chelsea Village) that has the lowest level of obesity shows clear place-to-place variation (Figure 1.3). From the survey data the prevalence of obesity in Chelsea Village is estimated as 6.8% while the highest figure is in East New York, where almost one-third of the sample (31.7%) is obese. Results from a statistical analysis using only individual-level variables show that annual income and education are associated with obesity (those on lower incomes, and with less education tend to be more obese). But from a geographic perspective it is of interest to know what
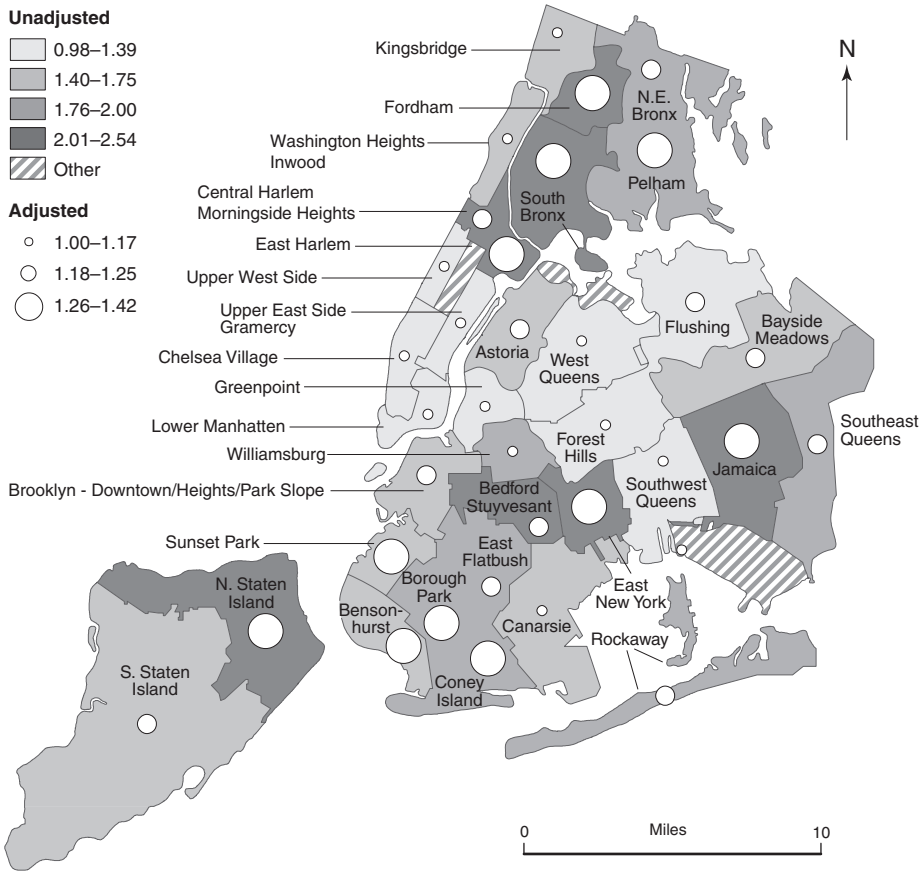
**Figure 1.3**   Obesity in New York City neighborhoods. Source: Black, J.L., Macinko, J., Dixon, L.B., and Fryer, G.E. (2010) Neighborhoods and obesity in New York City. *Health & Place*, 16: 489–99, Figure 1.

the predicted levels of obesity are, in each neighborhood, after adjusting for individual-level factors; these levels are shown as white circles in Figure 1.3. Those neighborhoods with the largest white circles (e.g., Borough Park and Coney Island) are areas in which residents are 40% more likely to be obese than in Chelsea Village. In part this is due to the poorer availability of fitness facilities and large supermarkets in such areas. The authors conclude that the determinants of obesity in New York City operate at two levels. One set of factors relates to individual circumstances, such as age and level of education. But place-to-place variation in levels of obesity is also shaped by neighborhood characteristics, such as the availability of healthy foodstuffs and the provision of fitness centers. While public health officials will continue to stress the importance of healthy eating and exercise (both of which are a matter of choice, but also dependent on income) this study adds to other evidence that these health-related behaviors depend on what is

provided (whether by the private or public sector) in the local environment. Since such provision varies spatially, it is clear from this first study that geography matters if we want to explain a health outcome such as obesity. We shall have more to say about obesity later, and in particular to outline what geographers and others have to say about "obesogenic environments" – those place-based characteristics that can shape levels of obesity.

### Public places after the introduction of "smoke free" legislation

Smoking is a primary risk factor for chronic diseases such as lung cancer, diabetes, and cardiovascular disease. While health geographers are interested in how smoking behaviors and their determinants vary from area to area, public health policy makers are interested in the impacts of public health policy changes on health behaviors. There is no question that the introduction of smoke-free policies has reduced exposure to second- hand smoke in many environments. But it was also hoped that they would serve to reduce the prevalence of smoking as well as societal attitudes toward tobacco use, particularly in disadvantaged areas. Ritchie, Amos, and Martin (2010) have undertaken a qualitative investigation of the impacts of the introduction of smoke-free legislation in Scotland. The foundation of their work was the recognition that local community context may be important in influencing the nature, level of compliance with, and success of smoke-free legislation. The researchers chose four socioeconomically contrasting localities (two "advantaged" communities in suburban and semi-rural settings, and two "disadvantaged" communities, one in a city, the other also semi-rural) in order to explore how the cultural, environmental, and social contexts are important in shaping both individual and shared smoking behaviors. A longitudinal nature of the study allowed the researchers to document attitudes and practices both prior to the implementation of the smoke-free legislation as well as afterwards. A panel of 40 adult women and men were the study participants.

Before legislation was introduced, the authors found clear differences in smoking attitudes and behaviors between the disadvantaged and advantaged communities. With respect to the former, smoking was more prevalent as well as more visible. Further, while some research participants hoped that the legislation might help them to quit smoking, several believed people would simply find ways around the ban. On the other hand, the two advantaged localities already had several smoke-free venues as well as non-smoking areas within venues. Thus, they were already on the path to smoke-free public spaces, regardless of the pending legislation.

Once passed, the legislation did indeed have an impact on smoking behavior in all four localities with respect to decreased consumption as well as increased quit rates. Ritchie and colleagues ascribe these changes to the environmental constraints of smoke-free legislation and the overriding importance of social interaction and social networks (Christakis and Fowler, 2008). Participants reported

some reluctance to interrupt social interaction in a public venue to go outside for a cigarette. As a result, research participants reported smoking fewer cigarettes on a night out and / or only smoking half of a cigarette before returning inside to their social interactions:

> If you're sitting having a conversation and you just get up and go and have a cigarette and come back down, it's not very nice, You seem to lose track of what's happening in the club if you're outside all the time [male participant from a disadvantaged locality]. (Ritchie et al., 2010: 466)

Importantly for public policy, "[s]mokers' narratives in the disadvantaged localities described greater decreases in consumption and successful quitting than those in the affluent localities" (Ritchie et al., 2010: 464). The researchers attribute this fact again to the role of environmental constraints that appear to be less severe in the advantaged localities:

> The pub that I drink in has been fantastic with the smoking ban; they've put out a big gas heater sponsored by [beer supplier]. And it's got a canopy; he has got a gazebo over it. And a couple of folding chairs and what have you; it's actually quite nice [male participant from an advantaged locality]. (Ritchie et al., 2010: 465)

Another factor contributing to reductions in smoking and increased quit rates related to the legislation involved the stigmatization of the smoking act itself:

> I feel a lot more guilty [male research participant from a disadvantaged locality]. But it just has that sort of feel about it, like a leper! [male research participant from an advantaged locality]. (Ritchie et al., 2010: 466)

Does this study show that the passing of legislation related to smoke-free public places influences reductions in the prevalence of smoking as well as societal attitudes toward tobacco use, particularly in disadvantaged areas? Yes, it does. But the socio-ecological perspective used by these researchers also reveals the importance of the social, cultural, and physical environments through which legislative (or policy) changes are made, as well as their resultant impacts.

### The health of Aboriginal populations in Canada

As of April 2014 Canada has a population of 35 million, of whom just over 1 million (4%) are described as "Aboriginal." In general, this term is applied to those people who are indigenous or "native" to a land that was later colonized by (usually white) settlers; for example, in popular culture the term "Aborigine" refers to those native to Australia, but more generally it could be applied to the Maori of New Zealand. In Canada, the term Aboriginal encompasses three groups: First Nations, Inuit,

and Métis. First Nations peoples are the indigenous population of Canada, Inuit are those living north of the Arctic Circle, and Métis are those of mixed First Nations and European descent. Chantelle Richmond, herself a First Nations researcher, has sought to explore the determinants of the health of First Nations and Inuit peoples, not through large-scale surveys but drawing on telephone interviews with 26 Community Health Representatives, or CHRs (Richmond and Ross, 2009). These CHRs are themselves First Nations and Inuit and work in those communities to deliver health and social care.

As settlers from Britain and France colonized the country Aboriginal peoples were displaced to new locations, away from their traditional homelands. While half the Aboriginal population now lives in urban areas, half lives in rural and remote areas and it is these who are the focus of the study. As the graph (Figure 1.4) indicates, such population groups (specifically, those living on reserves) have worse health outcomes than the Canadian population as a whole. Why is this? The authors suggest that the answer lies in structural (socioeconomic) inequalities; these "can *determine* the health of populations" (Richmond and Ross, 2009: 405, our emphasis). They go on to suggest that in understanding the health inequalities we need to recognize that "there are many varied and interlaced determinants, most of which are entrenched in unequal power relations and a history of colonization" (405). They seek to go beyond a description of the health inequalities to examine how such differences emerge and are perpetuated. In doing so they lay considerable emphasis on the forced relocation of First Nations and Inuit communities, which has driven people from their homelands and severed them from the deep relationships such groups have with land. In brief, it is "environmental dispossession" which, they argue, is at the heart of creating and maintaining poor
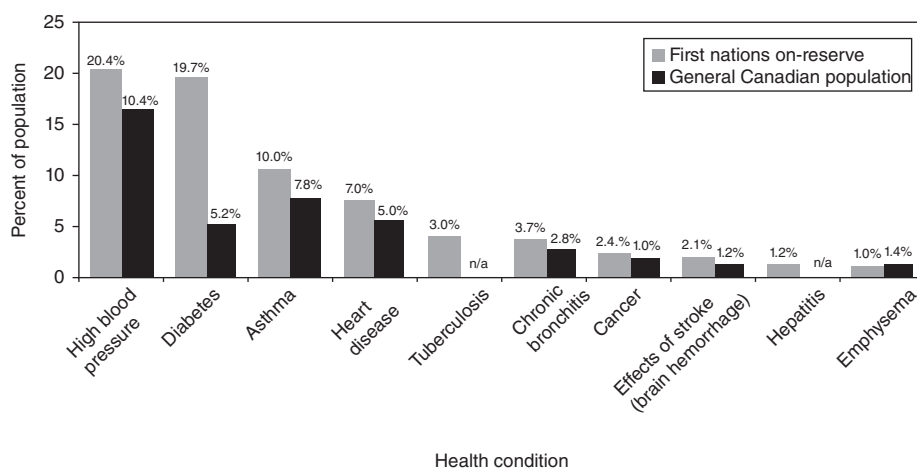


**Figure 1.4**  Prevalence of selected health conditions, First Nations Canadians. Source: Health Canada (2009) *A Statistical Profile of the Health of First Nations in Canada: Self-Rated Health and Selected Conditions, 2002–2005*. Health Canada, Ottawa. Figure 5.

health. While there are other health determinants, shared with other disadvantaged communities in Canada, such as lack of material resources and poor education, it is the weakening of environmental connectedness that distinguishes Inuit and First Nations groups from mainstream Canadians. As one of their respondents reports:

> People have lost their traditional way of life … and I think that's why people have poor health now, because we don't eat our traditional foods or do things like we used to. (Richmond and Ross, 2009: 407)

While other communities, in Canada and elsewhere, suffer the consequences of environmental pollution, Richmond and Ross claim that this burden is borne heavily among First Nations and Inuit peoples. For example, in one part of northwestern Ontario an industrial plant released more than 10 tons of mercury-contaminated effluent into a river. Since the local population fished from the river they were exposed to very high levels of mercury (which can have severe effects on human health, including brain function). More broadly, the authors suggest that environmental dispossession leads to reduced levels of physical activity (from more sedentary lifestyles) and poorer diet, both of which lead to obesity, diabetes, and other chronic health problems, as indicated in Figure 1.4. In sum, the health divide that separates the Aboriginal populations from mainstream Canadians is a function of economic, social, and political marginalization, and the "limited autonomy" (Richmond and Ross, 2009: 410) that they have in determining their health needs. There is little point, they argue, in focusing on the health behaviors of these groups; the underlying major structural determinants (so-called "upstream factors") should be the focus of attention.

> Health policies and programs must acknowledge … [the effect of] environmental dispossession and colonialism on the quality of health determinants … and they must work to encourage Aboriginal communities to reconnect with the land and resources of their traditional environments, for example by promoting the harvesting of traditional foods, by making space for community gardening practices, or by encouraging local schools to incorporate Aboriginal languages and traditional activities into their curricula. (Richmond and Ross, 2009: 410)

### Habitus and heart health: The collision of place, body, and health

Our fourth example involves the recognition of the multiple contexts within which our daily lives are played out, contexts that are nonetheless constrained by societal structures that shape our access to resources or "capital": material, cultural, social. The example (Angus et al., 2007) involves an investigation of the risk factors for cardiovascular disease (CVD), the number one killer of men and women

worldwide. As we know, many of the risk factors for CVD are modifiable (e.g., smoking, physical inactivity, unhealthy eating habits) and thus much of the mortality and morbidity from CVD is preventable, at least in principle. But that's easier said than done; of course, all of us wish we could make healthy choices, but those choices are constrained by our access to capital. These authors use French sociologist Pierre Bourdieu's notion of *habitus* to help explain this range of relationships in the context of *stress* as a risk factor for CVD in self-identified high risk populations.

Essentially, we know that CVD is unequally distributed across space and further that the stress accompanying material deprivation (e.g., poverty) and barriers to full social inclusion (e.g., racism) may have an impact on cardiovascular health. There are many routes to CVD, but all of them involve the interplay of the body, social forces, and economic forces. *Habitus* helps us to understand the juxtaposition of these determining factors in a relatively straightforward manner. That is, as human beings, we are situated in the physical spaces of everyday life. As such, our bodies and the things we do on a daily basis (live, work, play, love) are located within particular *material* settings that contain the resources and objects that keep us going. We are also situated in a series of *social* settings where we take on a certain position relative to our sex, age, class, ethnicity, and physical ability. "Social positionality" (your place in the world) and "material conditions" (the economic resources to which you have access) collide as "place." Health is produced (or not) in this "place." *Habitus* forms the interstitial space that mediates place and self, which in turn is constituted by a core of habits (things one does on a regular basis). These habits are formed as a result of both individual biography (the characteristics which make up a "self") as well as group membership, because they are established within a structural social context (made up of agreed norms).

In order to understand these relationships, the authors conducted research with small groups of people in urban, northern, and rural sites in Ontario, Canada. Four themes emerged from the analysis: workplaces, transitional spaces, gendered situations, and exclusions. With respect to workplaces: "[e]ach form of occupation differently constricts and strains the body, especially the temporo-spatial coordinates of its movements" (Angus et al., 2007: 1094). These patterns in turn differentially affect the opportunities and resources available for health. For example, some participants spoke of the stress of having to rely on public transit that often made them late for work and resulted in stressful situations with their superiors. Others spoke of the exhausting manual labor, such as coal mining. In most cases, individuals involved in working-class occupations had neither the incentive nor the energy to engage in physical activity at the end of the day.

In the context of transitional spaces, those who lived in remote areas spoke about the lack of access to health programs and services. Gendered situations emerged when research participants began to speak about the stresses of balancing work and family life. For example, women often reported the obligation to serve their families, regardless of their health status:

Well, my husband, I used to wait on him hand and foot and things had to be done just so and meals had to be on the table at such and such a time. And I always felt like – and around his mom and dad too – I was always walking on eggshells. And after I had that heart attack, whew! If I felt like making a meal, I made it. And if I didn't – "Your hands aren't painted on!" (Angus et al., 2007: 1097)

Several research participants reported having been subject to social exclusion from particular places or social positions. This included, for example, individuals who had migrated to Canada from other countries where they were practicing professionals, but only able to find menial labor in Canada. This also applied to the First Nations participants in the study.

In summary, through the analysis of how these research participants were situated in the places of their everyday lives, it became apparent that they are clearly differentially located and supported in their efforts to either maintain or improve health. As the authors conclude: "People's bodies are more than the problematic bearers of risk behaviors. They are the active pivots of place; health and illness are produced within this dynamic relationship" (Angus et al., 2007: 1099).

## Mental health in Australian immigration detention centers

As we suggested earlier in the chapter, "place" is not merely a geographical location; rather, it is a setting imbued with meaning and experiences, whether for those who live there or are passing through it. These experiences might be rich and fulfilling, or they might be destructive of health and well-being. Among the latter group we can draw attention to those places used as detention centers for refugees and those seeking asylum. One study that suggests such places are "corrosive" and "inhuman" is that by McLoughlin and Warin (2008), who take as their focus Immigration Detention Centers (IDCs) in Australia.

IDCs were set up in 1992 in order to deal with what was perceived as a growing problem of managing the flow of people (typically from southeast Asia) who were arriving at the country's borders without any valid papers (passports or visas). In particular, there were (and still are) enduring concerns, among politicians and lay people, about so-called "boat people," those who had risked their lives to seek refuge in a country where they considered they would be safer and have better life-chances. To address these concerns the government established IDCs, often in isolated and quite desolate areas, where those seeking asylum could be "housed." We put "housed" in quotes, because the focus of McLoughlin and Warin's paper is to suggest that these centers are hostile and "psychosocially destructive environments" that erode health and well-being and exacerbate any vulnerabilities faced by those who may well already have been traumatized by the journey to arrive on supposedly safe shores. Because of public pressure there is now (2014) a reduced set of less prison-like IDCs.

To understand these places of confinement as they existed at the time of their study, the authors draw on the notion of a "panopticon," originally a prison construction that ensures that those incarcerated can be watched over, controlled, and subject to surveillance. It was the French writer Michel Foucault who introduced the panopticon into social science, as a means of conveying how particular social groups could be watched over and disciplined, as well as "sealed off" from society at large. As illustrated in Figure 1.5, the architecture of IDCs was characterized by very high-security entrances, heavy fencing covered in razor wire, and unappealing blocks for housing people. These all served to separate, physically, socially, and symbolically, these marginalized groups from the host population. As the authors assert, "the regimentation of IDCs ultimately restricts the freedom and autonomy of asylum seekers and places control thoroughly in the grasp of the detention space and those who hold authority" (McLoughlin and Warin, 2008: 259).

According to McLoughlin and Warin it was taking between two and seven years to consider claims for asylum, suggesting that IDCs are "home" to asylum seekers and their families for considerable periods of time. But, far from being safe places they were "anti-places" that at best limited activity and at worst dehumanized the occupants. They may also be seen as "liminal" places, that is, borderland or indeterminate places characterized by uncertainty, transition, boredom, and fear. As one asylum seeker puts it:



**Figure 1.5**    An Australian immigration detention center on Christmas Island 2008. Source: Project SafeCom, http://www.safecom.org.au/xmas2008visit.htm, accessed July 9, 2014.

> I was carrying a mountain of burdens when I came seeking hope, seeking asylum in Australia. Unfortunately, upon my arrival, my burdens increased and my suffering led me to a new state of madness in Australia. (McLoughlin and Warin, 2008: 260)

The authors stress that asylum seekers are not merely passive or docile. Indeed, there is plenty of evidence that some resisted the treatment they suffer, drawing attention to their plight by protests (including the sewing of lips, hunger strikes, rooftop occupancy, and attempted suicide). This is, quite literally, *embodied* resistance.

This study is a powerful example of how place and mental health intersect, and how power can be exercised over highly marginalized populations (the "other") in order to keep them out of view, isolated, and controlled. The conditions exacerbate any previous mental ill-health. In response to public concern and the activities of pressure groups, as well as to the acts of resistance shown by some of those incarcerated, the Australian government has introduced a "softer edge" to their policies, for example by releasing those with young families into the community, and out of the IDCs. In 2013 the government stated that "Detention in immigration detention centers is only to be used as a last resort and for the shortest practicable time" (www.immi.gov.au/media/fact-sheets/82detention.htm). That said, the government is taking other steps to limit others arriving illegally on their shores. For example, footage is being posted on YouTube, in eight languages, targeting Iranians, Afghans, Sri Lankans, and Iraqis in particular, with the aim, according to immigration officials, of demonstrating the futility of risking life at sea, only to be flown out of the country as soon as they arrive.

## Concluding Remarks

We hope it is clear already from this first chapter that there are "geographies" of health. The five vignettes above have been chosen to illustrate a variety of approaches to the subject, a set of different perspectives that can be brought to bear on the study of health and place. Some of these – as well as our opening "Code Red" story – look to be more obviously geographical, in that they produce mapped patterns, whether of historical or more contemporary disease or illness. The geographical content of others may appear less obvious; nonetheless, location, space, and place figure prominently in all.

In the next chapter we shall set out in more detail what these different perspectives entail. We do this by laying out some of their characteristics and by describing some further case studies. In so doing, we hope to persuade the reader of the richness of approaches to the subject, as well as laying some groundwork for considering particular themes in subsequent chapters.

## Further Reading

If new to geography, you could usefully start with the collection edited by Daniels et al. (2008). An excellent discussion of some of the conceptual issues underlying health research may be found in Aggleton (1990). Also very highly recommended is the series of books on Health and Disease produced by the UK Open University; the introductory chapters in Davey and Seale (1996) and Seale and Pattison (1994) are worth reading, while the volume edited by McConway (1994) provides a superb accompaniment to both the present and the following chapter.

Key introductory texts and collections of essays relating to health geography are: Curtis (2004), Meade and Emch (2010), and Kearns and Gesler (1998). A recent compendium edited by Brown, McLafferty, and Moon (2010) has numerous up-to-date reviews.

There are several relevant journals that anyone interested in geographies of health can usefully consult. Of these, we draw attention to: *Health & Place*, *Social Science & Medicine*, *Journal of Epidemiology and Community Health*, and *American Journal of Public Health*. You should also consult the online journal *International Journal of Health Geographics*. All of these have good international coverage. In addition, other epidemiological and more "mainstream" health/medical journals carry relevant papers from time to time: for example, the *British Medical Journal*, *The Lancet*, *New England Journal of Medicine*, and the *American Journal of Epidemiology*.

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