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Introduction

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OVERVIEW

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This chapter introduces some general concepts of ageing. First, it presents different views of what 'ageing' is and when 'old age' begins. Second, it examines changes in life expectancy and the proportion of the population that is old. Third, it considers attitudes to ageing. The final section outlines the structure of the rest of the book and its rationale.

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Different views of later life

Gerontology is the study of old age and ageing. Although everyone has an intuitive sense of what 'old age' and 'ageing' are, providing a watertight objective definition is surprisingly difficult. *Ageing* could be said simply to be the process of growing older. However, pedantically speaking, we are all ageing from the moment of conception: do we really wish to say that children are 'ageing'? Hence, ageing is more sensibly described as change within old age or change that affects older people. It can thus include processes that started in earlier life but only manifest themselves in old age (e.g. a cardiovascular problem that appears in a person's sixties resulting from a poor lifestyle choice in that person's twenties). However, this begs the question of how to define 'old age'. At first the issue seems a simple one. Putting the niceties of political correctness to one side for a moment, it is intuitively obvious that most people in their seventies and teens look

radically different and this is reflected in measures of fitness and health. Arguing for a distinction between older and younger people is thus reasonable. However, this raises a problem: namely, when do we decide that 'old age' begins? If we want a single 'threshold age' that marks the transition to becoming 'elderly', then this inevitably creates problems of inclusion and exclusion. For example, suppose we choose 70 years of age as marking the onset of old age. A high proportion of people aged 70 and older have the stereotypical characteristics of being 'old', but not all do. And there are many people younger than 70 who have 'elderly' characteristics. If we choose an onset age younger than 70, we are likely to include more people who lack many elderly characteristics, while choosing an older onset age will lessen this problem but increase the risk of overlooking individuals who became 'old' many years earlier.

This type of problem is sometimes likened to grading the colours of the rainbow. It is obvious that a rainbow contains bands of red, orange, yellow, green, blue, indigo and violet. It is equally obvious that when examined closely, these bands are not distinct but merge one into another. For example, there is no clear demarcation line between red and orange; instead, the red gradually changes into orange. At what point on the rainbow do we say that anything to one side is red and anything to the other is orange? The simple fact is that any demarcation line is essentially arbitrary; we have no really objective means of justifying the boundary, but for the sake of simplicity, a boundary is nonetheless created. This leads some commentators to argue that because a demarcation line is arbitrary, the entire categorization into distinct groups is wrong. However, this misses the point that although the boundaries between groups might be blurred, the groups are clear enough. Hence, even if the boundary between red and orange in a rainbow might be artificially created, nobody denies that there are distinct bands of red and orange. In a similar manner, although any threshold age marking off old age from younger ages may be arbitrary, it would be foolish in the extreme and serve no practical purpose to deny significant differences between older and younger adults in many respects. However, to return to the original question – how do we decide on what the threshold age is?

It would be possible to spend many pages of increasingly navel-gazing discussion over how to decide on a value for the threshold age. However, this would serve to do little other than obfuscate the issue. Falling on custom and practice, we can state that *old age* is defined as the final segment of the lifespan, and for those who must have a number to attach to this, it is further defined as beginning at around 60 years of age. Different gerontologists have different threshold ages for the onset, but 60 is a reasonable compromise figure. In fact, it has been accepted by the mainstream literature for nearly 200 years. The nineteenth-century Belgian statistician Adolphe Quetelet wrote a book called *Sur l'homme et le développement de ses facultés, ou, Essai de physique sociale* (Quetelet, 1836; the English translation

has the more succinct title *Treatise on Man*). This was the first appreciable statistical study of human characteristics, and was hugely influential. Of especial interest here is that Quetelet defined the onset of old age as being at 60. This was because in his view, from 'sixty to sixty-five years of age viability loses much of its energy, that is to say, the probability of life then becomes very small' (Quetelet, p. 178). Once this threshold age had been thus decreed, later researchers tended to take this as an established fact and hence nearly all research from the 1840s onwards has tended to see old age as beginning at around the age of 60 (Mullan, 2002). This in turn influenced the concept of 'pensionable age': it is salient to remember that state pensions and the concept of retirement age are largely the invention of the late nineteenth century. Prior to this time, although 'old age' was identified (e.g. by exemption from payment of certain types of tax), the idea of there being an age after which one was occupied in nothing but leisure activities and 'growing old' would for nearly everybody have been an alien concept (Thane, 2000).

Thus, the concept of old age beginning at 60 (or thereabouts) might be seen as a nineteenth-century invention. Is this for the good or the bad? It is perfectly possible to argue that by having a threshold age, we lose sight of the fact that ageing is part of a continuum. We don't become 'old' overnight when we reach 60 – what we are in later life, is, as shall be seen in many of the later chapters, to a significant degree a product of what we were when younger. Similarly, having a boundary that states 'on this side you're young, on that side you're old' oversimplifies things and tends to label people as stereotypically old at the expense of their individuality. This in turn can lead to bad policy decisions (see Mullan, 2002). However, this is not the fault of having a threshold age per se. In addition, Quetelet was certainly wrong in arguing that the early sixties were a time of major decay – a quick perusal of Chapters 2 through 4 should establish that. Again, it can be questioned why the threshold age has remained so static since Quetelet's day – is what was considered 'old' in the early nineteenth century really the same as today? This leads some sociologists to question whether maintaining the threshold age is really in the interests of various authority groups (e.g. politicians) who can manipulate the concept of age categories and what is expected of each age group for their own purposes (e.g. Bourdelais, 1998). But nonetheless, it is useful, if only for *pragmatic* reasons, to have a threshold age. Provided this is employed loosely and individual variability is borne in mind, it is a useful conceptual tool. And since the established practice is to use the age of 60 (or thereabouts), this will be used here to maintain parity with earlier studies.

Having examined the bare-bones definitions of ageing and old age, we need to turn to general attitudes towards ageing. Do we see it primarily as positive or negative? Is it something that we wish to alter or are we satisfied to leave it as it is and simply act as neutral observers? For many researchers, it has been almost overwhelmingly tempting to see gerontology's subject matter purely in terms of

decay, as in Peter Medawar's definition of ageing as the accumulation of changes that increase the probability of death (Medawar, 1952). More pithily making the same point, the character of Mr Bernstein in *Citizen Kane* describes old age as 'the only disease... that you don't look forward to being cured of' (Mankiewicz and Welles, 1941). Again, there are numerous examples in art and fiction of old age treated as a punishment. For example, anyone taking a guided tour of the Accademia in Venice is likely to be told the (possibly apocryphal) story behind the painting of Giorgione's *La Vecchia* ('The Old Woman'), an imposing portrait of an elderly woman in simple garb with wrinkled skin, thinning hair and signs of having suffered a stroke (and possibly dementia) clutching a scrap of paper on which is written *col tempo* ('with age'). Supposedly the painting was done as a riposte to a young woman who had spurned Giorgione's advances – in revenge he painted her as she would appear in extreme old age.

From this perspective, old age is a punishment, a time of waiting for inevitable death, the only uncertainty being when it will occur. This is in marked contrast to another, much older, set of views of ageing as a reward. For example, the *antediluvian ageing myth* argues that in the distant past people were rewarded for their great virtue by being given extremely long lifespans (cf. some of the early persons mentioned in the Bible, culminating in Methuselah, who lived to the tender age of 969 years). In contrast, the *Hyperborean ageing myth* states that there is a distant land where people live to very old age because of their virtuous lives. To some readers this may conjure thoughts of Shangri-La, a lamasery in the Himalayas containing improbably ancient monks, featured in the novel *Lost Horizon* (Hilton, 1933). A rather older legend is that of Prester John, whom Middle Ages Europe believed to be ruler of a distant Christian kingdom somewhere in Asia (or Africa – medieval knowledge was often sketchy on this point). He, too, supposedly lived an exceedingly long life, and his kingdom was a Christian paradise on Earth. A further myth is that of the *fountain of youth*, where imbibing at a magical spring or fountain or eating a special foodstuff confers long life, rejuvenation and/or immortality. We see this in numerous myths, from the apples tended by the goddess Idunn that kept the Norse gods immortal and healthy, through to such modern candy floss as *Star Trek: Insurrection*. Strictly speaking, Shangri-La also belongs in this category, since it is the food and water that hold the life-lengthening properties, not the place itself (Weil, 2005).

Although these myths are undeniably false, they indicate a deeply held wish of humankind to live long lives since they have been perpetuated across millennia and many very different cultures. How do we square this with the rather gloomier views of ageing as a time of waiting for inevitable death? If we take a closer look at the pro-ageing myths we can see that in fact they want old age, but not old age at any price. This is neatly illustrated by the ancient Greek myth of Tithonus, whose lover, Eos (goddess of the dawn), asked the gods for immortality without adding

the caveat of wanting eternal youth as well. The gods, with their characteristically twisted sense of humour, duly gave Tithonus eternal life in that he was allowed to age for all eternity. This was seen as a dreadful fate and neatly illustrates that the wish for long life is for a long *physically and mentally active life*, not extreme old age just for the sake of it. The point is further amplified by Ovid's tale of Philemon and Baucis, a married couple who showed hospitality to Zeus and Hermes disguised as peasants when other members of their village had shunned them. As a reward, while the gods destroyed the rest of the village, Philemon and Baucis were spared and their humble home transformed into a temple. Of interest is that when Philemon and Baucis were granted long lives by the gods, they added a request that when one of them died, the other would die as well. So not only was a long active life seen as desirable, but also one free of grief for loss of a partner.

Thus, at the root of the various views of ageing is a clear message – give us long life, but without paying the price of suffering. This concept is more neatly expressed by Dewey's *paradox of ageing*. John Dewey, a philosopher and psychologist, wrote in the introduction to a colleague's textbook that 'we are . . . in the unpleasant and illogical condition of extolling maturity and depreciating age' (Dewey, 1939, p. iv). While the textbook has been forgotten, this phrase has remained a touchstone for the curious doublethink attitude we possess to ageing and old age. On the one hand it is a reward to be enjoyed, but if anything goes wrong, then it is a punishment.

Gerontology thus finds itself in a position of providing two sorts of answer – what the process of ageing is and how to make it as enjoyable as possible (what might be termed the 'explain' and 'improve' goals). First, let us consider providing factual information on what old age and ageing actually are. Into this category fall topics such as what happens to the ageing body, what policy decisions have been made about the welfare of older adults, and what artistic portrayals have been made of ageing and old age. These are not mere exercises in cataloguing – many models of ageing have generated vigorous debates and the area is far from theoretically dull. It also has a practical purpose, since measures of the incidence of disability in later life and similar are essential if adequate governmental planning for welfare provision is to be made in advance of an increasingly older adult population. The second type of answer concerns how we can alleviate the problems of later life so that it conforms as far as possible to the ideal of a pain and trouble-free old age. As noted in Chapter 2, many people fear that gerontologists simply want to prolong life at the expense of comfort and dignity. This is often called the *Tithonus myth* and nothing could be further from the truth. Gerontology is not and never has been about prolonging life at all costs.

So far in this chapter we have examined contrasting views of what ageing and old age are, and seen that the study of these topics is multidisciplinary and needs to be. But this does not necessarily explain why these studies are important. At a time of economic stringency, why should there be an imperative to study

gerontology? The argument that it will help us to understand ourselves, while philosophically sound, is unlikely to impress those holding research funds debating whether funding the study of ageing really is more important than, for example, training more engineers or nurses. And the simple truth is that until recent times, gerontology was an academic backwater. Older people formed a minor proportion of the population, there were adequate funds to provide state pensions, and medical and nursing care largely consisted of palliative measures since, because older people by definition were going to die soon, there was little point in investing great energy into finding remedies for many of their ills. But all this was before the so-called *greying population*. Older people now form a significant proportion of the population, they are a potent economic force, and they are living longer, necessitating serious thinking about pension provision and methods of care for a group of people who can in the main expect to live for 20 years after their official retirement age. Gerontologists need to be heard because they are dealing with a significant part of the population. Not only that, but also they are dealing with a part of the lifespan that a majority of us can expect to experience, rather than the minority of a few decades ago. To explain this argument, we will need to examine population statistics.

Population trends

Let us begin by examining *life expectancy*. This is generally defined as the average time a person can expect to live. Let us start by examining what this figure means in industrialized countries with developed economies. According to the UK Office for National Statistics (www.statistics.gov.uk, accessed 29 June 2009), the life expectancy for a British boy born in 2009 is 78.3 years, and for a baby girl is 82.1 years. Women live longer than men and the reasons for this are explored in Chapter 3 (although there are suggestions the gender gap is narrowing, for which see Chapter 8). A quick perusal of the Organization for Economic Co-operation and Development (OECD) website (www.oecd.org/topicstatsportal) will reveal a similar figure for any other industrialized country. Life expectancy figures were lower in the historical past, as illustrated in Table 1.1.

In the interests of balance, it should be noted that prior to modern records, it is impossible to find totally reliable population data, but through various ingenious techniques it is possible to make a good approximation of life expectancy figures (see Acsadi and Nemeskeri, 1970) and it is these that are used here. But even allowing for measurement error, what becomes immediately apparent on looking at Table 1.1 is the vast gulf in life expectancy figures between then and now. For example, life expectancy at birth has more than doubled since 1400, and even in 1841, life expectancy was 38 years less than it is today. This increase in expectancy

Table 1.1 Life expectancy of individuals born in 1400, 1841, 1981 and 2009 in the UK

Age	1400	1841	1981	2009
0	35	40	71	78
20	48	60	72	79
40	57	67	73	80
60	69	73	76	82

Data extrapolated from Acsadi and Nemeskeri (1970) and UK Government Actuary's Department web page (www.gad.gov.uk.)

over recent historical times is truly remarkable. A study by Oeppen and Vaupel (2002) of *best practice life expectancy* (life expectancy in the country that has the longest life expectancy figure at a given time) demonstrated that the oldest age to which a human can expect to live has increased linearly from 1850 at a rate of approximately 3 months per year from 45 years in Sweden in 1840 to 85 years in Japan in 2000. The authors claim that this trend shows no sign of stopping. Is it possible that, ultimately, there will be no upper limit to how long we can live if we stay disease and accident free?

Striking as these figures are, they are potentially misleading because life expectancy figures, particularly historical ones, are poor indicators of the ages of the oldest members of the population. For example, a newcomer to the area could be forgiven for supposing that someone in 1400 who reached the age of 35 was nearing the end of their life. However, this is wrong, and a further examination of Table 1.1 will show why. It is perfectly true that at birth, there is a vast difference in life expectancy across time periods. However, look at the differences in life expectancy as people get older. If we consider people aged 60 in 1400, 1841, 1981 and 2009, we see a rather different picture. A 60-year-old in 1400 could expect to live 'only' 11 years less than someone born in 2009. This would be unlikely to have a sexagenarian of 1400 clapping their hands with glee, but it is a lot better than the 40+ years difference at birth. And the differences between the other historical times have likewise markedly diminished. For example, if we consider the difference in life expectancy for people aged 90 born in 1981 and 2009, the difference in remaining life is reduced to a mere 7 months, compared with 7 years at birth. In other words, the longer a person lives, the less extra life the modern world can give relative to historical times (though at the risk of confusing things, note that this is *relative* – there is still an increase in remaining life expectancy over time, albeit a smaller one, as will be demonstrated later in the chapter).

The principal reason why life expectancy has increased over historical time, and why the difference in expectancy decreases the older the age group considered, is

that fewer people die young. This can be explained by using a contrived example. Suppose we have three groups of people called (imaginatively enough) A, B and C. Suppose also that in our imaginary world, people either die immediately after birth (so thus have an age of 0 years when they die) or live to 100 years of age and all die on their 100th birthday in the cause of simplifying the arithmetic. Suppose that in group A, everyone lives to be 100 – logically enough, the average age at death is 100 and so the life expectancy of Group A is 100. Now suppose that in group B, a quarter dies at birth and only three-quarters live to be 100. Adopting the same calculations as before, we find that the life expectancy of group B is 75. And in group C, let us suppose that half its members die at birth, and thus its life expectancy is 50. Now anyone who *only* had the life expectancy figures to view would quite reasonably suppose that group A had far more older people in it than group B, which in turn had far more older people than group C. But this would be utterly wrong – past birth, members of all three groups have the same chance of survival. However, it is the higher proportions of people dying young in groups B and C that give the erroneous impression of greater longevity for those who survive birth.

Returning to the real world, reasons for avoidance of early death in the modern world are not hard to find. Since Victorian times we have seen, *inter alia*: inoculations and the eradication of many deadly communicable diseases, improved public sanitation; antibiotics, improvements in surgery, greater food hygiene, higher quality of housing, etc. A high proportion of these innovations benefit the health of infants and children most of all, and so it is not surprising that a key component of changes in life expectancy over the last two centuries has been due to a decline in infant mortality. This also means that much of Oeppen and Vaupel's (2002) rise in best-practice life expectancy is because of a drop in infant mortality and a decline in infectious diseases, and not particularly an increase in our ability to 'age longer'. Post and Binstock (2004) accordingly advise caution in interpreting mathematical abstractions of a constant and seemingly unstoppable rise in life expectancy – it could simply be an artefact of a unique period in human history. And once infant mortality and major infectious diseases are brought under control (or at least when they reach a stable level), this particular resource for increasing life expectancy will be gone, and possibly with it the seemingly unstoppable rise in best-practice life expectancy.

There are counter-arguments to this and counter-arguments to the counter-arguments. However, the message at any point would be the same: neither side has the monopoly of the arguments, and thus future life expectancy data are uncertain. This creates a *longevity fan*, in which a graph depicting projected life expectancy fans out the further into the future the figures are extrapolated (see Dowd, Blake and Cairns, 2008, for an excellent review). Accordingly, in the UK, the Continuous Mortality Investigation, which advises actuaries, has suggested caution

in projecting future life expectancies and (for want of a better phrase) predicts uncertainty in their calculation (Continuous Mortality Investigation, 2006a, b).

Discussion of life expectancy data, while interesting in its own right, tends to obscure another important fact; namely, that in developed countries and indeed many developing countries, old age is now an experience of the majority and the proportion of older adults in the population is increasing. None of this contradicts what has just been written about the deceptiveness of life expectancy figures. The fact that life expectancy figures have risen, largely because of decreased infant mortality, means that, in addition, more people reach old age. In addition, there has also been *some* improvement in the remaining years of life in older adults (albeit less impressive than in younger adults) as historical time has progressed. For example, in the UK the mortality rate for people aged over 75 has fallen from 137 deaths/1,000 in 1911–15 to 83 deaths/1,000 in 2006–7 (Office for National Statistics website www.statistics.gov.uk, accessed 1 July 2009). Similar figures can be reported for other industrialized countries.

As this growth in numbers of older adults has been matched with a fall in the number of births, this means that the proportion of older adults in the population is increasing. For example, in 2007, for the first time, there was a higher proportion of older adults than under-eighteens in the UK population (Office for National Statistics website www.statistics.gov.uk, accessed 1 July 2009). If we consider nineteenth-century industrialized nations (the first for whom arguably reliable data exist), approximately 4 per cent of the population was aged over 60 (Cowgill, 1970). In the UK today, circa 20 per cent of the population is aged 65 or older (Office for National Statistics website). This figure is expected to rise until it peaks at approximately 17 million (c.25 per cent) in 2060, before various demographic changes cause a relative decline (Shaw, 2004). Particularly noticeable is the rise in the proportion of the 'oldest old' (i.e. those aged 80 or older). Since 1981, their proportion of the total population has risen from 2.8 to 4.5 per cent (Office for National Statistics website).

This surge in proportions of older adults is in part due to lower infant mortality figures from earlier in the century working their way through to old age and partly to better health care and living conditions. It will (at the time of writing) soon be augmented by the baby boomers (those born in the 'population explosion' that occurred in the decade or so after the end of the Second World War) who will be reaching retirement age. However, whatever its causes, it means that gerontology is a study of a significant proportion of the population. More than this, it is also the study of a period of life that the overwhelming majority of people in the developed world can expect to reach. Today, approximately two-thirds of the citizens of developed countries can expect to live past 65 and about a third of these will live past 80. In contrast, in 1900, only a quarter of the population could hope to reach 65 (Brody, 1988; Sonnenschein and Brody, 2005).

Before leaving the topic of population trends, it should be noted that these changes are not uniform across all conditions. For example, as already noted, women have significantly longer lives than men (see Chapter 3). Within individual countries, there are significant differences in the proportions of older adults within its different regions (Blake, 2009). Likewise, there are regional differences in life expectancies (Griffiths and Fitzpatrick, 2001). There are also racial differences and educational differences. Members of minority racial groups and those with lower educational levels tend to have significantly lower life expectancy (Crimmins and Saito, 2001). And between countries, there is a marked division between the industrialized/high-income countries and the developing/low-income countries. However, this is not as clear-cut as might first be supposed. Life expectancy is significantly higher in industrialized countries, in no small part because of the lower levels of infant mortality and communicable diseases. These differences are projected to be still significant in 2030, by which time, the principal health burden in the developed world is anticipated to be chronic illnesses such as cancer, cardiovascular problems and similar. These are anticipated to form 90 per cent of the burden. In developing countries, the proportion is expected to be 54 per cent, with communicable diseases, nutritional problems and natal/perinatal illnesses forming 32 per cent of the burden, compared with a projected 3 per cent in developed countries (Lopez, Mathers, Ezzati *et al.*, 2006). However, this does not mean that developing countries are automatically lagging behind. In relative terms, their improvement in life expectancy is in many cases much greater. For example, in many developing countries, the number of people aged over 65 will increase fourfold by 2050, more than double the anticipated increase in developed countries (United Nations Economic and Social Council, 2006). A confounding factor in these considerations is Africa, where the levels of AIDS/HIV infection place a serious question mark over the size of future growth (United Nations Economic and Social Council). These issues are discussed more fully in Chapter 11.

Ultimately, many of the life expectancy issues are underpinned by a single factor – money. Socio-economic status has been repeatedly shown to underpin life expectancy across time and place (e.g. Mackenbach, Stirbu, Roskam *et al.*, 2008; Marmot, 2001; Singh and Siapush, 2006). This is not simply a matter of differences between the extremely rich and the extremely poor. Even within occupational groups that by most standards are at least financially comfortable (e.g. UK civil servants) higher-income subgroups have better life expectancies than those in middle or lower-income subgroups (see Marmot and Feeney, 1997).

Views of ageing

It might be reasonably supposed that, given the importance that ageing and old age are assuming in the modern world, not to mention the high probability that