

DEMOGRAPHY

Analysing trends and policy issues in births, deaths and diseases in the UK population in 2015

This paper highlights how general improvements in the health of the UK population hide worrying inequalities with respect to income and membership of social class groupings. Poverty, unemployment and poor housing lead to poor health outcomes. An older UK population is expected in 2015 and, in the longer term, an increasing dependency ratio is expected. These demographic shifts will have policy consequences for the UK population in terms of maintaining and improving the health and wellbeing of older people and financing health care services in the future.

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POLICY FUTURES FOR UK HEALTH

Edited by Charlotte Dargie

This paper is part of a series written for the Policy Futures for UK Health Project, which examines the future environment for UK health, with a time horizon of 2015. The full series is listed below.

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POLICY FUTURES FOR UK HEALTH

1999
Technical Series

NO 3 DEMOGRAPHY
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Charlotte Dargie

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Charlotte Dargie

FOREWORD

Since its inception the Nuffield Trust has identified individuals and subjects that would impact on health and health care policy in the United Kingdom, with notable examples being *Screening in Medical Care* [1], Archie Cochrane's *Effectiveness and Efficiency: Random Reflections on Health Services* [2], Thomas McKeown's *The Role of Medicine: Dream, Mirage or Nemesis?* [3], David Weatherall's *The New Genetics and Clinical Practice* [4] and Alain Enthoven's *Reflections on the Management of the National Health Service* [5].

In keeping with tradition and reflecting the more complex issues in health and health care policy today, the Nuffield Trust established a Policy and Evaluation Advisory Group (PEAG), supported by the appointment of a Nuffield Trust Fellow at the Judge Institute of Management Studies at the University of Cambridge, to provide a research and intelligence capability for the Trust.

The Policy Futures for UK Health Project stems from the work of PEAG. It involves examining the future environment for UK health, with a time horizon of 2015. The first environmental scan has resulted in a series of 10 technical papers, which cover the following areas¹:

1. The Global Context
2. The Physical Environment
3. Demography
4. Science and Technology
5. Economy and Finance
6. Social Trends
7. Organisation and Management
8. Workforce
9. Ethics
10. Public Expectations

Each paper in the series is a stand-alone piece, but has also been used by the project to derive an overview report, which focuses on policy assessment in the light of the environmental scan. Entitled 'Pathfinder Report', the overview report is published separately and will be subject to external consultation .

The Policy Futures for UK Health Project and the work of PEAG are ongoing. Further reports and publications will appear in subsequent years. The technical papers will also be revisited and different subjects will be tackled.

The strength of the technical series is in providing a context for analysing health and health care policy for the United Kingdom. Each author has produced an independent piece of work that analyses trends and issues in their subject area, focusing on 2015. The papers enable one to read across the issues, in order to provide a general analysis of health and health care policy, which is lacking in the highly specialised debates that dominate the health world today. They have formed the basis for consultation and discussion as part of the Policy Futures for UK Health Project.

Finally, the Trust is grateful to the members of the PEAG, to Professor Sandra Dawson and Pam Garside of the Judge Institute of Management Studies and to the authors of the 10 technical papers. A particular thanks due to Dr Charlotte Dargie, Nuffield Trust Fellow at the Judge Institute of Management Studies, the author of the Pathfinder report.

John Wyn Owen CB

July 1999

ENDNOTES

1. *Screening in Medical Care: Reviewing the Evidence* A collection of essays with a preface by Lord Cohen of Birkenhead (Oxford: Oxford University Press for the Nuffield Provincial Hospitals Trust, 1968).
2. AL Cochrane *Effectiveness and Efficiency: Random Reflections on Health Services* (London: Nuffield Provisional Hospitals Trust, 1971).
3. T McKeown *The Role of Medicine: Dream, Mirage or Nemesis?* (London: Nuffield Provisional Hospitals Trust, 1976).
4. D Weatherall *The New Genetics and Clinical Practice* (London: Nuffield Provisional Hospitals Trust, 1982).
5. AC Enthoven *Reflections on the Management of the National Health Service: An American Looks at Incentives to Efficiency in Health Services Management in the UK* (London: Nuffield Provincial Hospitals Trust, 1985).
6. S Williams, S Michie and S Pattani *Improving the Health of the NHS Workforce* (London: The Nuffield Trust, 1998).

Each of the papers in the series is available from the Nuffield Trust.

² C Dargie *Policy Futures for UK Health: Pathfinder* (London: The Nuffield Trust, 1999). The Pathfinder Report is for wide consultation and invited comment. You can email your comments to policyfutures@jims.cam.ac.uk. You can also send your comments to Dr Charlotte Dargie, Nuffield Fellow in Health Policy, The Judge Institute of Management Studies, Cambridge University, Cambridge, CB2 1AG. You can also find this Pathfinder Report along with other technical papers in the Policy Futures series at the Nuffield Trust website: <http://www.nuffieldtrust.org.uk>. Please respond with your comments by Friday 19 November 1999.

ABBREVIATIONS

AIDS	acquired immune deficiency syndrome
CDC	Center for Disease Control and Prevention
COPD	chronic obstructive pulmonary diseases
DALY	disability adjusted life years
EC	European Community
ESRC	Economic and Social Research Council
EU	European Union
Eurostat	The Statistical Office of the EC
HIV	human immunodeficiency virus
OECD	Organisation for Economic Co-operation and Development
UK	United Kingdom
UN	United Nations
US	United States (of America)
WHO	World Health Organisation

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SUMMARY

Trends

- Life expectancy will increase.
- The population as a whole will age.
- There will be an increasing dependency ratio.
- The risk of certain cancers due to lifestyle and smoking will increase.
- Population health trends will improve overall but health inequalities will persist.
- There will be a continued threat of new and recurring infectious diseases.

Policy issues

- Ethical issues about neonatal and geriatric care will arise.
- There are long-term financing issues due to the increasing burden of health care costs on the working population.
- Encouraging lifestyle changes like smoking, diet and exercise will be important.
- Care arrangements, such as housing, kinship structures, marriage, and emotional disorders, need to be made for the older population.
- Health inequalities will have to be tackled.

INTRODUCTION

In this paper, future population trends and trends in the overall burden of disease are examined in the light of their implications for health policy. From a general, population perspective, the analysis provokes some questions for policy makers. A population perspective allows policy makers to look at overall population health. Within this context, health policy is about identifying relevant issues, setting priorities, and targeting the right sub-groups within the population. The limitations of future projections, particularly in an area like population and disease patterns, are discussed. However, they do allow policy makers to have some context in which they can make decisions about the future. The main themes and issues that are highlighted, with important future implications for health and health services are:

- dealing with the ageing population
- tackling persistent health inequalities
- the changing burden of disease
- locating the risk of disease from individuals to populations.

UK POPULATION TRENDS³

Overall, 1998-2015 is expected to be a stable period in the population of the United Kingdom (UK). It is important, however, to view the chosen time period within the context of longer-term trends in the UK population, which reflect trends that are happening elsewhere in developed countries. Falling birth rates and the ageing of the population are the most consistent long-term trends that should inform a forward look at UK demographics.

Total population of the UK

The UK population is projected to increase slightly over the period 1998-2015 from present levels of around 59 million to about 61.5 million in 2015. The trend for a slight, steady increase in overall population looks set to continue up to 2025.

Births and deaths

Although falling slightly over the period 1998 to 2015, projected births exceed deaths, giving a small natural increase in the population from 1998 to 2015, an increase that is almost doubled by migration (see figure 1). Looking further ahead, the population begins to decline naturally past 2025, which results from a falling birth rate and an increasing death rate after 2020 caused by baby boomers becoming octogenarians.

There is some debate about future population decline in the UK. Sources consulted suggest that population decline is not a cause for concern. Projecting forward using United Nations (UN) and European Community (EC) data, Joshi states that future UK population trends are described mostly as 'stagnation' rather than 'imminent drastic decline' [1 p262], and says, 'there does not seem much prospect of population decline on a scale sufficient to

^a Forward trend data in both the following text and figures 1 to 5 come from 1996 UK-based population projections by the Government Actuary's Department. See acknowledgements for source.

alarm those who would see population decline as a problem' [1 p242]. The UK Government Actuary's Department makes similar remarks in its latest population projections pointing out that projections 30 years into the future are subject to considerable uncertainty [2 p45].

Within the UK, Scotland's population is predicted to decline from 1996 onward, the population of Northern Ireland is projected to peak in 2018, and the populations of England and Wales will continue increasing until around 2030 [2 p45].

Fertility rates and family size

The total fertility rate is projected to increase between 1998 and 2015 from an average of 1.72 to 1.80 children born per woman (based on age-specific fertility rates). However, the figures should be seen as part of the broader picture of changes in fertility and family size in the post-war period. Fertility rates declined from 1964 to 1977, increased slightly after 1977, and since 1980 have been fairly stable. Since the 1980s, fertility levels for older women have increased and for younger women they have fallen. Mothers are now older at the time of their first birth. Interestingly for health, the rate of multiple births in the UK rose over the last decade, from 10.8 per thousand maternities in 1986 to 13.8 in 1996 [3]^a.

There are some interesting countrywide differences in fertility rates. The latest government projections show that the assumption of long-term average family size has been reduced to 1.75 children per woman in Scotland and increased to 1.85 in Northern Ireland. 'Scotland has been experiencing lower fertility levels than the rest of the UK since the early 1980s and this differential is now quite marked. As regards Northern Ireland, fertility remains higher there than elsewhere in the UK, despite a rapid fall since the mid-1980s' [2 p44].

Using projections from both the UN and Eurostat (the Statistical Office of the EC), Joshi predicts two paths for UK future fertility levels from 1990 that are lower than UK government figures [1 p236]. Given that UK fertility levels were approximately 1.7 in 1995 [4][5], we appear to be heading down the 'low' projection, which predicts that fertility levels will be 1.70 in 2000, 1.66 in 2005, 1.66 in 2010, 1.67 in 2015, rising to 1.69 in 2019. Joshi considers that there will be a stabilising of fertility at 1.5 births per woman.

The 1.5 cohort fertility results from assuming that 25 percent of women remain childless, and that those who do become mothers have an average of 2.0 children. This is described as a likely outcome given European women's improved education and increasing aspirations for a rewarding role in the paid economy, so long as there are no institutional changes which make it easier for women to combine reproduction and production. [1 p235]

In terms of policy, achieving a higher fertility rate would require 'governments and employers to introduce "family friendly" policies, such as support with

^a Although there are data on aspects of household and family size, I was not able to locate data showing ethnic group differences in fertility rates.

"highly individualised childcare", [and] flexible employment practices of male and female partners', amongst other things [1 p235].

Government projections also consider the average completed family size to the year 2015 [2]. Completed family size is a more stable measure of fertility, and it shows a decline until it is assumed to level at 1.8 children per woman.

The average family size in the UK is currently 1.9. Historically, there has been a decline in the number of families with three or more children, but that has remained relatively stable since the early 1980s. In 1996-7, about 25 percent of dependent children lived in a couple family with three or more children. Within the UK, Northern Ireland had the highest proportion with 38 percent of families with three or more children. Families containing stepchildren also tend to be larger with an average family size of 2.3. In terms of ethnic differences, South Asian families tend to be larger, and are more likely to live in households containing two or more families [3].

Marriage, divorce and household make-up

Fewer marriages, more divorces and re-marriages, an increasing prevalence of stepfamilies and more single-person households are all current trends within the UK population. In 1995 there were 322,300 marriages in the UK - the lowest recorded figure since 1926. In the same year there were 155,500 divorces in England and Wales (figures for the whole UK unavailable for this period). Divorce rates in the UK were second highest in the European Union (EU) in 1995, but the increasing trend is felt to have levelled off, according to government reports. Divorce is most common for those under 30, and the biggest increases have been among the under 25s. Government projections based on 1993/4 divorce rates are that two in five marriages will end in divorce, and just under half of all married couples will celebrate their silver wedding. In 1996 more than one third of all live births in England and Wales occurred outside marriage, more than four times the proportion in 1971 [3].

The average size of the British household was 2.4 in 1995. Over a quarter of households in Great Britain comprised one person living alone in 1997, almost double the proportion in 1961. The proportion of 'traditional' households in Great Britain comprising a couple with dependent children has fallen over the last 35 years, from 38 percent in 1961 to 25 percent in 1996-7. Lone parents now head around a fifth of all families with dependent children [3].

Women aged over 60 formed the largest proportion of people living alone in England and Wales in 1996, but this proportion has been stable over time. There are, however, future implications for the UK ageing population in terms of the numbers of older people living alone. In recent years the largest increase in people living alone has been among men under 65, which reflects the decline in marriage and the rise in separation and divorce. It is projected that the size of this latter group will overtake older women as the largest group of single-person households within the next ten years [3].

Despite the growth in single parent families, most dependent children still live in a family with two parents. However there has been a growth in the number

of stepfamilies, where couples live with children from previous relationships [3].

There is some variation in household type according to ethnic group. In terms of single-person households, whilst 28 percent of white^a households consisted of a single person in 1996-7, this compares with 34 percent of black households, but only 7 percent of Pakistani and Bangladeshi households [3].

Mortality Rates

Government projections for mortality rates are assuming a fall of about 0.5 percent a year at all ages by 2032-3 [2 p44]. There are rising rates of mortality at some ages between the mid-20s and mid-50s, especially for women [2 p45].

According to the World Health Organisation (WHO), 'the infant mortality rate per 1,000 live births was 148 in 1955; 59 in 1995; and is projected to be 29 in 2025' [6 p3]. WHO highlight an important ethical and public policy issue for countries like the UK in relation to technology and resource allocation: 'Whilst most premature and low-birth-weight babies are born in the developing world, many born in industrialised countries owe their survival to high-technology neonatal care. Such care may have increasingly complex ethical implications' [6 p3]. The public policy questions about funding and developing equipment to help premature babies raises both ethical and funding issues. The difficult question in public policy terms is not only whether money should be spent developing this type of care, but also whether we should divert money from other sources in order to provide it.

Age distribution

Between 1998 and 2015 there are some projected developments in the age distribution of the UK population (see figure 2). There are changes in the age band 0-14, which declines over the period from 19.2 percent of the population in 1998 to 16.9 percent in 2015; the age band 30-44 declines from 22.5 percent in 1998 to 18.8 percent in 2015; and there are increases in the bands 45-59 and 60-74.

What the patterns show over a longer time period is the ageing of the UK population. If the figures were extended to 2036, we would see, according to government projections, the increase in age bands 45-74 transferred on to the 75-plus age band, which increases its steady share of around 7.5 percent of the population in our period of interest, to 11.6 percent in the early 2030s. So, the impact of the ageing population is felt at the lower levels of the ageing groups now, and will reach the very old after 2020. In 2036, there are projected to be more than 7 million people over the age of 75, whilst there are currently 4.3 million. Of that 2036 figure, over 4 million will be women, and about 3 million will be men.

Dependency ratios

Between 1998 and 2015, the total dependency ratio is actually projected to fall, from 627 per 1,000 persons of working age to 595 per 1,000, according to

^a The categorisations in this paragraph refer to those used by the source.

government figures. However, within that figure it is the children under 16 whose fall - from 333 per 1,000 persons of working age, to 288 - contributes the overall reduction. The older dependent population (or pensionable-age population) increases slightly from 294 to 308 per 1,000 in the corresponding period (see figure 3).

Within the context of the ageing population discussion, it is worth taking a longer look at projected dependency ratios. The overall dependency ratio is projected to increase to over 700 per 1,000 of the working-age population by 2036 (see figure 4). The most dramatic changes will come after 2020, with a substantial increase in the older dependent population. It is also worth noting that these projections take into account the equalisation of retirement rates at 65 years that will take place between 2010 and 2020. Without this change, the increases in the older population would almost double over the same time period.

It is also relevant in terms of policy to point out that the dependency ratio is arbitrarily calculated by age, when there are in fact increasingly differing boundaries between education, work and retirement [1][2].

Life expectancy

Life expectancy looks set to increase steadily from 1998 to 2015 (see figure 5). Currently the expectation of life at birth is about 75 for men, and about 80 for women. By 2015 those figures are likely to be 77 and 82 respectively.

The positive forward projections presented here envisage further progress with preventative services, curative care and the adoption of lifestyles. However, they do *not* include possible further technological advances. As Joshi identifies, the projections are not near to bio-medical limits, assuming that limits exist. Some Austrian figures set male and female life expectancy in 2020 at 90 and 95 respectively^a.

It is relevant to note that a more *pessimistic* scenario for UK life expectancy assumes that the mortality rate might cease to fall after 2000 because of factors such as the increase in smoking amongst women and increasing environmental pollution.

Current trends suggest steady improvements in life expectancy. However, the latest annual report from the Chief Medical Officer highlights that less progress has been made, for both men and women, in the age group 15-44. Here, adverse trends in life expectancy since the 1980s have been associated with human immunodeficiency virus (HIV) and suicides, particularly for men, although suicide amongst young adult men has stopped its upward trend of the 1980s [7].

KEY ISSUES AND POLICY DEBATES

The ageing debate

Bibliographic sources show a range of publications and organisations addressing the ageing population and consequent future health issues for older people [2][5][6][8][9][10][11][12][13][14][15][16][17][18][19]. Some individual examples include: King's College, London, the Age Concern Institute of Gerontology; the EC Observatory on Ageing and Older People; specialist journals like *Ageing and Society* [20]; and the recent launch of the Millennium Debate of the Age [21] [22]. The ageing population is one of the five themes considered by the government's Foresight Programme. It has so far established Agenet, which brings together organisations in order to research ways of improving the quality of life of older people [23]. Research into Ageing is a medical and biological research charity that looks at improving quality of life in old age^a. They carry out scientific research but they also investigate other factors relevant to ageing, like older peoples' access to the Internet, and dependency among older people.

For a more detailed analysis of the current and future issues surrounding the ageing debate, the interim report from the Health and Care Study Group of the Millennium Debate of Age is a useful reference (final papers will be published in spring 2000) [24]. The Royal Commission on the Funding of Long-Term Care reported in March 1999 [25]. It investigated the long-term options for a sustainable system of funding of long-term care for older people in their own homes and in other settings, and the relative contribution of public and individual funds. The commission looked at a range of factors such as the number of people likely to need care in the future, the expectations of older people for their dignity and security, and the strengths and weaknesses of current arrangements. They concluded that:

- The costs of long-term care should be split between living costs, housing costs and personal care. Personal care should be available after assessment, according to need and paid for from general taxation: the rest should be subject to a co-payment according to means.
- The government should establish a National Care Commission to monitor trends, including demography and spending, ensure transparency and accountability in the system, represent the interests of consumers, and set national benchmarks, now and in the future.

The government is currently considering its response to the Commission's report.

The ageing UK population has implications for many areas of health and health care:

- the ethics of giving treatment to very old patients
- financing health care costs for treatment of older people

Research into Ageing. Director: Elizabeth Mills. 15-17 St Cross Street, London EC 1N 8UN.

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- the burden of caring for older people and those with chronic conditions
- making adequate provision in working years for health needs in later life, including housing, medical care, transport and support links, like kinship ties and companionship [8 p8).

Looking internationally, WHO is pessimistic about the health demands of the future older population:

By 2025 there will be more than 800 million people over 65 in the world, two-thirds of them in developing countries...Even in wealthy countries, most old and frail people cannot meet more than a small fraction of the costs of the health care they need. In the coming decades, few countries will be able to provide specialised care for their large population of aged individuals' [6 p5].

A recent report from the Organisation for Economic Co-operation and Development (OECD), *Maintaining Prosperity in an Ageing Society*, suggests that ageing presents its member countries with a 'complex and formidable set of interrelated challenges' [26 p3]. Its proposals for policy reform address fiscal, financial and labour market pressures that will hit developed societies, particularly after 2010 when there will be a smaller proportion of the population in employment. Its policy reform proposals tackle pensions, participation in employment and society, economic growth and long-term care provision. Reforms such as removing financial incentives to early retirement and reducing public debt are proposed. In health care, its policies are suitably macroeconomic in scope, with a greater focus on cost effectiveness, on medical expenditure and research that are focused on reducing dependence, and on explicit policies for providing care to frail older people [26 p23]. Other proposals include the integration of health and long-term care, more equitable access to care, and improved protection against the financial risks associated with disability (26p83). De Jouvenel presents some alternative macro-economic scenarios for an ageing population. Examples are:

- the costs of ageing exacerbate a situation of low economic growth and high unemployment
- social welfare systems are called into question, leading to conflicts between beneficiaries and contributors to social security schemes
- life cycles generally change, with work, training, and free time succeeding each other throughout life [27].

In terms of policy, an ageing population does not necessarily mean an older population that is *ill*. However, there are issues about increasing resource use on, for example, prolonging life, social and community care for older people, and geriatric hospital care. A document produced by the Centre for Policy on Ageing has the UK well placed among its European counterparts for dealing with an ageing population. It states:

The UK is better placed than most countries to support its expanding older population. Not only are the numbers set to rise more slowly than

in other Member States, but compared to most the UK has a well developed health and social care sector [28 p7].

Using Eurostat projections, it is suggested that in the year 2020 the UK will have proportionately fewer older people than the EU as a whole [2 p48]. So trend data and current policy arrangements put the UK well placed among its European counterparts in terms of the ageing population. However, an assessment by the Millennium Debate of the Age presents alternative interpretations of the future, with relatively pessimistic as well as optimistic scenarios [24]. It is difficult to make policy decisions on the basis of the available evidence. Specialist bodies like the Millennium Debate and the Royal Commission present more detailed policy implications, using sources such as the General Household Survey, to track the self-reported status of older people. One important point within this debate is the oversimplification of the group classed as 'elderly', which conceals important health differences within the group. For example, findings on self-reported health status from 1994 showed that while only 13 percent of people aged over 65 were unable to walk down the road unaided, this was true of 21 percent of people aged between 80 and 84, and of 37 percent of those aged at least 85 [24]. The health- and social-care needs of those over 85 are likely to pose the greatest burden in future years.

One of the significant research issues in ageing is the development of meaningful quality of life indicators^a. Currently, indicators focus on observable activities, from a professional, medical point of view. There are also relevant measures that take into account people's own perceptions of their health and well-being - for example, if someone has a good social and family network. Government policy is currently concerned with increasing 'years to life' and 'life to years' in the population, which means both increasing life expectancy and improving the quality of life in those years [29]. This has particular relevance to the lives of older people in Britain.

Health inequalities

There is some debate about the validity of *national* and *global* data on demography when the important health issues are contained within *sub-sections* of the population [1][30][31][32][33][34][35][36]. Already, in this commentary, demographic trends have been identified for particular groups of the population. They are still broad groupings, and groupings by age, rather than any economic or social classification. WHO addresses the issue of equity in health in population and epidemiology in its futures consultation, stating that:

There is also continued concern with equity in health. This is first in terms of geographical equity - in relation to both inter-country differences...and intra-country differences. Inequity in health is also associated with social position, with position in terms of occupation/labour market, with ethnicity, with gender, and with generation [37 p6].

^a For example, by Research into Ageing.

Current government strategy seeks to tackle persistent health inequalities. The green paper on public health, *Our Healthier Nation*, talks about 'life expectancy' and 'healthy life expectancy', pointing out that:

The poorest in our society are hit harder than the well off by most of the major causes of death. Poor people are ill more often and die sooner. The life expectancy of those higher up the social scale (in professional and managerial jobs) has improved more than those lower down (in manual and unskilled jobs). This inequality has widened since the early 1980s. [29 p9]

Our Healthier Nation talks about economic, social, geographical and ethnic inequalities in health. The second of its two key aims is 'to improve the health of the worst off in society and to narrow the health gap' [29 p5]. It states that 'we will seek to improve the absolute and relative positions of those people and those areas which are hit hardest by poor health and premature death. That will narrow the gap between them and the better off [29 p12].

However, the four targets that the government has set - for heart disease and stroke, accidents, cancer and mental health - are all *national* improvement targets, and are *not* addressed specifically at poor health data from certain groups. Drever, Whitehead and Roden found worsening inequalities over a 20-year period up to the 1990s [38]. Census data together with national death registration data were used to study socioeconomic differences in mortality of men based on occupational class. The study found that mortality rates had fallen absolutely between the 1970s and 1990s for social classes I to IV. However, for men in social class V, mortality rates worsened over the period. Mortality was found to be almost three times higher in Social Class V (SMR 189^a) than in Social Class I (SMR 66). Classes III and IV (SMRs 117, 116 respectively) had nearly double the mortality of Class I. Even larger differentials were found for stroke, lung cancer and suicide.

Inequalities in health are related both to socioeconomic factors and geographical location. To be poor is to be relatively unhealthy. High mortality is associated with greater social and economic deprivation [39]. To live in urban areas, particularly in deprived areas of inner cities, means your health is more likely to be poor [40]. Relationships between socioeconomic status, geography and relative ill-health are found for both men and women, with stronger relationships being found in men.

In terms of ethnicity and health outcomes, there are also health inequalities. The 1991 census first produced data on minority ethnic groups. Three million people or 5.5 percent of the population of Great Britain (figures for the UK are unavailable) belong to a minority ethnic group. Excess mortality is observed in minority ethnic groups that cannot be explained by differences in social class [41]. A number of studies have identified increased mortality and morbidity

^a The standardised mortality ratio (SMR) is calculated as the ratio of the actual number of deaths in the social class under consideration to the expected number of deaths in that class (multiplied by 100).

rates among minority ethnic groups when compared to the rest of the population [42]. Studies also show increased rates of disadvantage, such as unemployment among minority ethnic groups and unequal access to health care services [42][43][44][45]^a.

In a recent comparative report by the UN, the UK emerged as one of the most divided Western countries [46]. More than one in six people in the UK are said to live in poverty, according to the 1998 UN Human Development Report, the third highest proportion among 17 industrialised nations [47]. Britain has the highest number of young prisoners, the lowest number of doctors per head, a rising teenage pregnancy rate and the longest working week at 43 hours.

In 1998, the Independent Inquiry into Inequalities in Health, chaired by Sir Donald Acheson, former Chief Medical Officer, published its report, which reaffirms much of what was already known about health and socioeconomic status [48]. The report, known as the Acheson report, addresses socio-economic determinants of health and inequalities in health across the lifecycle. It supports the basic conclusion that poverty leads to poor health. Three areas seen as crucial to reducing health inequalities are identified by the report as: giving priority to the health of families with children, taking action to reduce income inequalities, and improving the standards of poor households. It reaffirms the aims already set out in *Our Healthier Nation* [29].

Two new projects funded by the Economic and Social Research Council (ESRC) will add to our knowledge here. First, a project is planned to construct alternative future scenarios of personal lifestyles, socioeconomic structure and demographic change, at the Centre for Research on Micro-Social Change, University of Essex [49]. Second, the Health Variations Programme, which has since been renamed the Health Inequalities Programme, aims to advance understanding of why there are persisting differences in health between socioeconomic groups. Whilst the Health Inequalities Programme looks at current trends rather than future ones, it uses several longitudinal databases (Office for National Statistics Longitudinal Study; National Child Development Study; Health and Lifestyle Survey; British Household Panel Survey) to explain current circumstances, and raises policy issues for health inequalities [50].

The Health Inequalities Programme includes projects on family history, ethnicity, social welfare, income dynamics, housing wealth and social settings, among others. One of the projects looks at the dimensions of health inequalities over persons, time and place. Heather Joshi, the team leader, has already addressed future demographics trends within a European context [1][51], as well as the individual and spatial component of health inequalities [52][53][54].

The annual public health forum held in March 1998 addressed health inequalities and presented findings from different research projects

^a My thanks to Bob Matthews, a research student at Birmingham University, for these references.

investigating health inequalities. Some were initial findings from projects within the ESRC's Health Inequalities Programme. The area of work is important, and whilst research is using current rather than forward data projections, there are some findings that help predict people's life chances in health. Some relevant examples of the issues raised in the presentations and discussions are noted here:

- Reducing inequalities: national and local responses [55]: The different targets set in Wales are the backdrop for health promotion efforts to improve health for less favoured groups, and thereby reduce inequalities and meet targets. The case was argued that health promotion at a local level in Wales could achieve this. Welsh targets include low birth weight and back pain, which are absent in other public health documents.
- Variations in health and in the uptake of preventive health services between general practice populations [56]: The study looked at how mortality, risk factors and the uptake of preventative care varied by level of deprivation in general practice populations.
- Social variations in cardiovascular risk factors in women [57]: Using data from the Health and Lifestyle Survey 1984-5 and the Health Survey for England (1993), this work investigates changes in circumstances and behaviour in working-age women that are likely to affect trends in cardiovascular disease as these groups grow older. More women are gaining professional and technical qualifications and entering highly paid careers, but more are also affected by relationship breakdown or choosing to live and bring up children independently. In particular, there is a high-risk group that is older women who have not had educational and occupational opportunities, but are affected by divorce and separation.

Disease patterns

According to the Office for National Statistics, in 1995 there were 157,900 deaths due to cancer, 187,300 due to heart disease, 101,600 due to respiratory diseases, 3,700 due to road traffic accidents, and 8,300 due to all other accidents. From national statistics, annual cancer deaths have increased slightly from 1984 to 1995, heart disease deaths have fallen over the same period, and road traffic accidents have also been cut in the same period. However, deaths from respiratory diseases have increased from their 1984 level of 65,900, which means that the 1995 levels represent a 50-percent increase.

Global burden of disease

Referring to global population and disease, the 1998 World Health Report states that 'the war against ill-health in the 21st century will have to be fought on two main fronts: infectious diseases and chronic, noncommunicable diseases' [6 p2]. The main focus in industrialised countries will be chronic conditions, but they:

must not lower their guard against infectious diseases. The past few decades have seen the growing impact on health of poverty and malnutrition; widening health inequalities between rich and poor; the emergence of 'new' diseases such as HIV/AIDS; the growing problem

of antibiotic-resistant infections; and the epidemic of tobacco-related diseases. [6 p3]

The *British Medical Journal* recently devoted a whole issue to antimicrobial resistance [58]. It coincided, in September 1998, with a meeting of the chief medical officers of Europe to develop new strategies against the microbial threat^a. In its futures consultation, WHO also raises the issue of 'social and psychological ill-health' [37 p6].

Murray and Lopez [59] provide a detailed and comprehensive account of the future global burden of disease forward to 2020. They identify mortality and disability from different diseases and injuries, and they project for different regions, age groups and sex. They draw out several findings that they believe have particular relevance for public health policy up to 2020:

- a substantial shift in mortality from younger to older ages
- a relative decline in the burden of communicable, maternal, perinatal and nutritional conditions
- an expectation that the HIV epidemic will rise dramatically
- declining fertility rates
- a shift in the burden of disease from 'group I' conditions, which are communicable, maternal, perinatal, and nutritional conditions, to 'group II' diseases, which are noncommunicable, like diabetes mellitus, hypertension and cardiovascular diseases
- an expectation that death- and disability-adjusted life years (DALYs) from group II conditions will decrease in many age groups and all regions, despite the effects of smoking^b (exceptions to this projection are identified as men aged 45-69 in the former socialist economies, and Indian men in the same age group)
- predicted increases in life expectancy, with greater gains for women than men^c.

The effects of smoking on the future burden of disease are considerable. Murray and Lopez note that we do not yet know the hazards of tobacco use in developing countries. One possible but not probable scenario is highlighted where new antibiotics are not discovered, and where drug resistance becomes so significant for tuberculosis, malaria, and other diseases that mortality rates begin to increase [59 p388]. Communicable disease centres within our Public Health Laboratory Services in the UK monitor the threat of infectious diseases, as does the Center for Disease Control and Prevention (CDC) in the United States. Recent articles in the futures literature have highlighted the threat of microbial diseases like tuberculosis, malaria and AIDS [60][61]. The issue of communicable diseases is being addressed at a global level by a joint

^a Interestingly, the EU is mentioned as the body that would be able to impose policies and regulation, rather than WHO.

^b Overall trends in group II death and DALY rates are determined by the counteracting effects of the secular decline in group II rates and the increase brought about by the smoking epidemic [59 p388].

^c The UK life expectancy projections described earlier showed similar gains for men and women in the next 10-15 years, and beyond. Other UK projections show marginally larger gains for women.

EU/US task force established by Jacques Santerre and Bill Clinton [62]. The threat of infectious diseases has been considered in two other papers in this series: 'Global context' (paper no. 1) and 'The physical environment' (paper no. 2). Although Murray and Lopez show that infectious diseases will remain global killers in the next 30 years, their analysis of trends shows the declining influence of communicable diseases across the world by 2020 [59].

It is important to identify a range of scenarios for the future, and Murray and Lopez themselves discuss the limitations of forward projections of disease and mortality. They do, however, advocate projections, because 'decisions and choices need to be made today in order to cope with expected disease burden in the future [and] projections provide the information support for those decisions and choices' [59 p389].

The annual report of the Chief Medical Officer for 1997-8 highlights adverse trends in two areas - obesity and smoking - which, it says, are important determinants of future disease. It reports that the proportion of adults aged 16 to 64 who are obese has risen from 13 percent among males and 15 percent in females in 1991/2, to 16 percent in males and 17 percent among females in 1996. The proportion of children aged 11 to 15 who are regular smokers has increased from 10 percent in 1990 to 13 percent in 1996 [7]. Obesity has been raised as an important health problem by, amongst others, WHO, which carried out a consultation on obesity in 1997 [64], and the British Council, which addressed the issue at a seminar in October 1998. The council cites as evidence of a major public health problem the fact that in some Western countries between 15 and 30 percent of the adult population are now classified as clinically obese [63].

Cancer

One of the factors highlighted by WHO is ill-health and disease associated with social, environmental and lifestyle factors. One of the biggest killers, cancer, is predicted to increase because of lifestyle and smoking habits:

The burden of cancer is predicted to increase over the next decades both in absolute numbers of cases and deaths, and as a proportion of the overall burden of disease. This increase is ascribed to population growth and ageing, and more particularly to an increasing incidence rate of cancer, especially due to smoking, which already accounts for one in seven cases world-wide. Though the risk of developing a cancer is increasing for individuals of a given age, the increase is not uniform for all types of cancer; for instance, the risk of developing stomach cancer appears to be falling almost everywhere, while there are rising trends for many of the more common cancers such as lung cancer linked to tobacco smoking; and colorectal, breast and prostate cancer linked to the so-called "Western lifestyle"...Increasing incidence of these cancers has been observed, although the death rate has not increased to the same extent, because of improvements in therapy. It is projected that, even if incidence rates remain the same as in 1995, the annual number of new cases of cancer will increase by more than 30% to 13.6 million by the year 2010, and by 45% to 14.7 million by the

year 2020. Based on present knowledge, it is anticipated that for the countries of the European Union the increase during 1995-2005 may range from 11% for colorectal cancer in women to 40% for prostate cancer in men; there is likely to be 33% more lung cancer in women, two-thirds of which will be the result of their increased risk of developing the disease. [9 p123]

Figures from the East Anglian Cancer Intelligence Unit show a steady rise in the incidence of cancer in the future for the UK population [65]. According to their predictions, by 2018, lung cancer and breast cancer will pose the largest burden for women. For men, prostate cancer, colon cancer, and lung cancer will pose the largest burden. However, in men, the incidence of lung cancer is declining. The report also states that in 2018, the risk of prostate cancer within a lifetime will be one in four (25 percent) [65]. One of the main reasons for the predicted increase, especially in cancers such as prostate, is the ageing population. As people are living longer there is more opportunity for cancer to develop [66].

For women in developed regions like the UK, osteoarthritis, dementia and breast cancer are expected to be the leading causes of disease burden in terms of DALY in 2020 [59p382].

Life course epidemiology

The life course approach 'studies individual experience from conception to death and does not draw false dichotomies between adult lifestyle and early life influences, or between biological and social risk processes' [67 p13]. It explores the extent to which early life experiences explain variations in the disease risk of individuals and populations.

Trend analysis of life course influences on adult disease [68] from a recent edited collection on the life course approach to epidemiology [67] warns about predicting future mortality rates and the disease burden. We should 'acknowledge our uncertainties about the nature of many of the underlying cohort influences, the unpredictability of future changes in environment and lifestyle, and the potential for changes in case-fatality resulting from advances in medical care' [68 p201]. However, two future trends are identified:

- The impact of smoking: It is predicted that female death rates from chronic obstructive pulmonary diseases (COPD: chronic bronchitis, emphysema, asthma and chronic airflow obstruction) will tend to rise, while those among men (apart from the oldest age groups) will tend to fall [68 p214]. Changes in tar composition, inhalation behaviour and future tobacco control strategies may influence these predictions.
- A suspected rise in the prevalence of asthma: Asthma patterns may be attributable to developmental changes in the immune system related to living conditions early in life. So, 'the rising prevalence of asthma and allergy among children and adolescents maybe a worrying foresight of future trends among adults' [68 p214].

There are some policy implications put forward by the life course approach. In particular, the emphasis on accumulation of social disadvantage emphasises the issue of children's health. Rather than preventative health strategies targeted at girls, women, and mothers during pregnancy, which improves foetal and infant nutrition, the life course approach advocates preventative health policy that tackles children's health - and inequalities in children's health - as a wider social problem, related to their social and economic circumstances. The collection of papers on life course epidemiology provides evidence of the importance of child health, and they cite evidence that there is cause for concern over this issue [68 p302].

WHO raise the issue of child and adolescent health in their 1998 *World Health Report*. They say that in the future 'there will be an even greater need than at present for education and advice on unhealthy diet, inadequate exercise, unsafe sexual activity and smoking, all of which provoke disease in adulthood but have their roots in these early formative years'. They also note that 'research suggests that stress, poor physical surroundings and an inadequate care-giving environment during early childhood are related to violent and criminal behaviour at later ages. More children than ever are growing up in such circumstances' [6 p4].

Advocates of life course and class differences in health looks at how biological status is a marker of current and future social status, and future biological status, and how that accumulates over time [69]. This work investigates factors like slow growth in childhood leading to unemployment in early adulthood, and the accumulation of social disadvantage. A relevant item for demographics showed that the combination of having a father in a manual occupation, manual occupation in adolescence and adult manual occupation led to increased mortality risk. The work has important policy implications. First, it sees critical events as a means of identifying 'at risk' individuals - for example, the early incidence of mortality in immediate family. Second, policies should be 'springboards' rather than a 'safety nets' because of the accumulated disadvantage amongst at-risk groups.

CONCLUSION

It is difficult to make links between general population trends and specific policy implications of those trends. The population trends outlined in this paper tend to suggest there is no cause for alarm: Britain is well placed to deal with its older population, there is no real danger from population decline, and national statistics showing mortality and life expectancy are improving. What are more disturbing are the inequalities in health that are hidden by national data. Health is dependent on socioeconomic status, income and geographical location. If we are to make improvements that span the population it is more likely to take place through tackling unemployment, deprivation, and poor education. In the future, preventative measures are more likely to be targeted at high-risk groups, rather than the population as a whole. Other future health policy issues that have been identified from looking at national and global population trends are the ethics of technology in neonatal care and care of the older; environmental factors affecting childhood development and health risks in later life; the financial burden of health increasing for the working

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population; and the distribution of health resources towards specialised care for older people.

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APPENDIX

METHODS

Future trend data Future trend data are generally 'projections' rather than forecasts - that is, 'conditional statements of what might be expected if certain assumptions hold' [1 p222].

Uncertainty Joshi's use of two alternative scenarios indicates the difficulty of predicting future population changes with any kind of certainty. Unpredictability is compounded both by time and by the number of factors that differ from the predictions and so have 'knock-on effects' for other variables. The authors of government data in the journal *Population Trends* acknowledge the unpredictability of demographic behaviour, and present variant projections for key indicators like fertility and migration [2 p49]. For further information, there is a publication that assesses the past performance of national population projections [70].

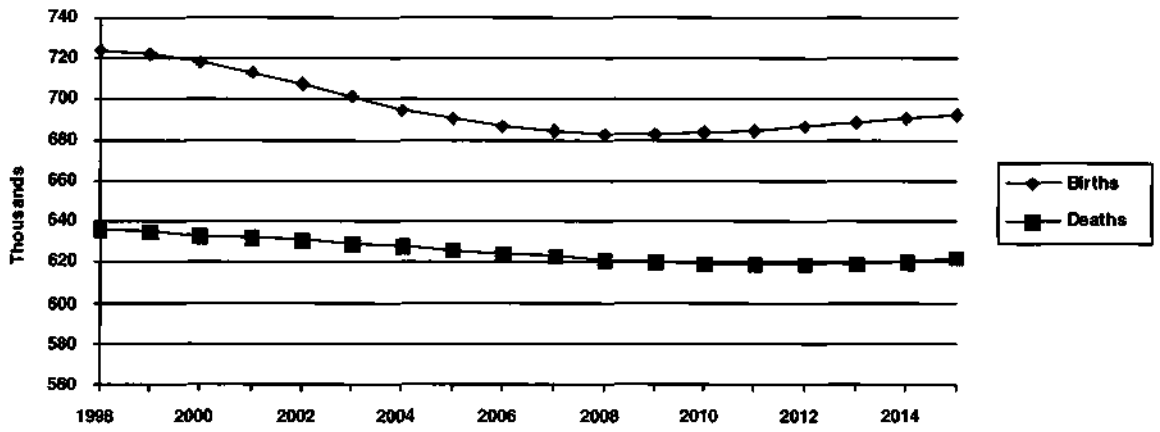
Searching Databases searched were:

- ESRC Regard database, current research
- BIDS (key words: demography and ageing)
- Internet search engine Alta Vista (key words: demography, population and ageing)
- WHO Health For All (HFA) database
- Health Data 97 from OECD (CD-ROM database, Paris: OECD)
- OECD Future Trends database (CD-ROM database, Paris: OECD)
- *Population Trends* journal, 1986-99.

Government population projections The Government Actuary's Department construct population figures in terms of numbers of population, and numbers of groups within that population (by age and sex) and projections. Their latest projections are based on 1996 data. They confirmed that for looking 15 years ahead the *dependency ratio* would *not* significantly increase. But by 2030 it *will* be an important issue. We do now have an *ageing population*, the working population is getting older but, currently, the number of births still exceeds the number of deaths. There is not predicted to be a *natural fall* in the population until 30 to 35 years in the future.

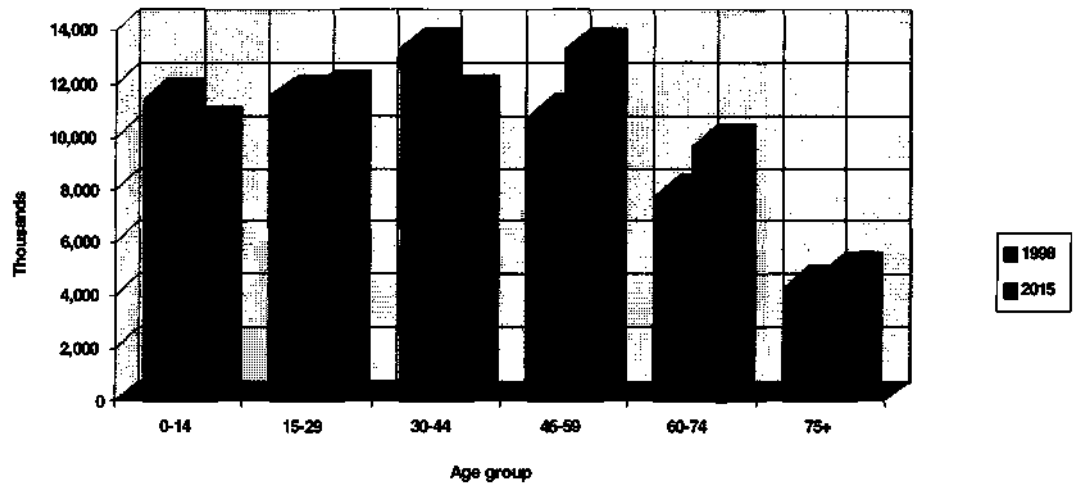
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Figure 1 UK projected births and deaths 1998-2015



Source: 1996 based United Kingdom population projections by the Government Actuary's Department.

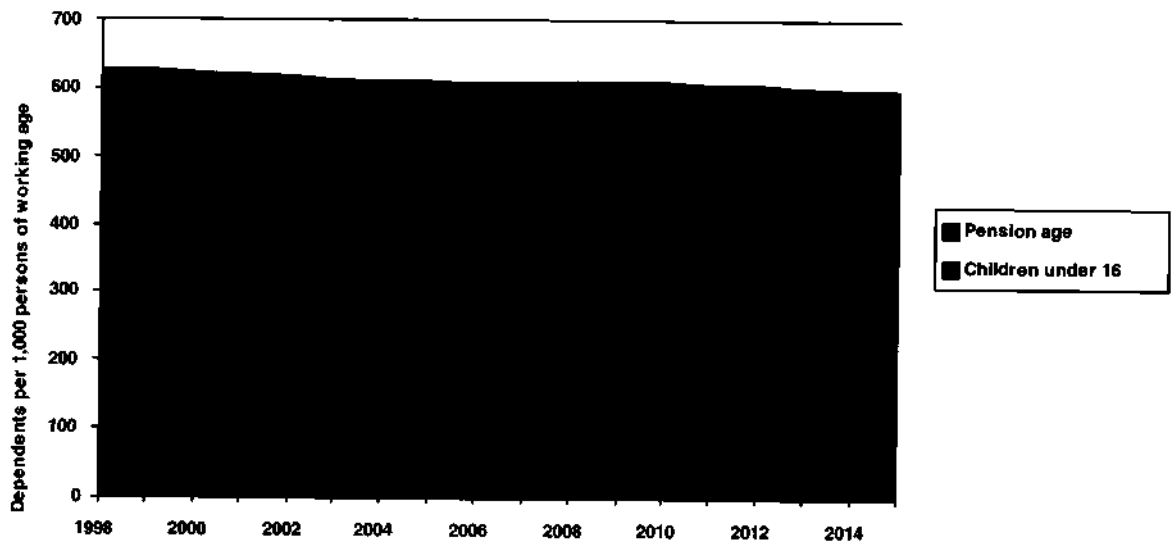
Figure 2 UK age distribution 1998-2015



Source: 1996 based United Kingdom population projections by the Government Actuary's Department.

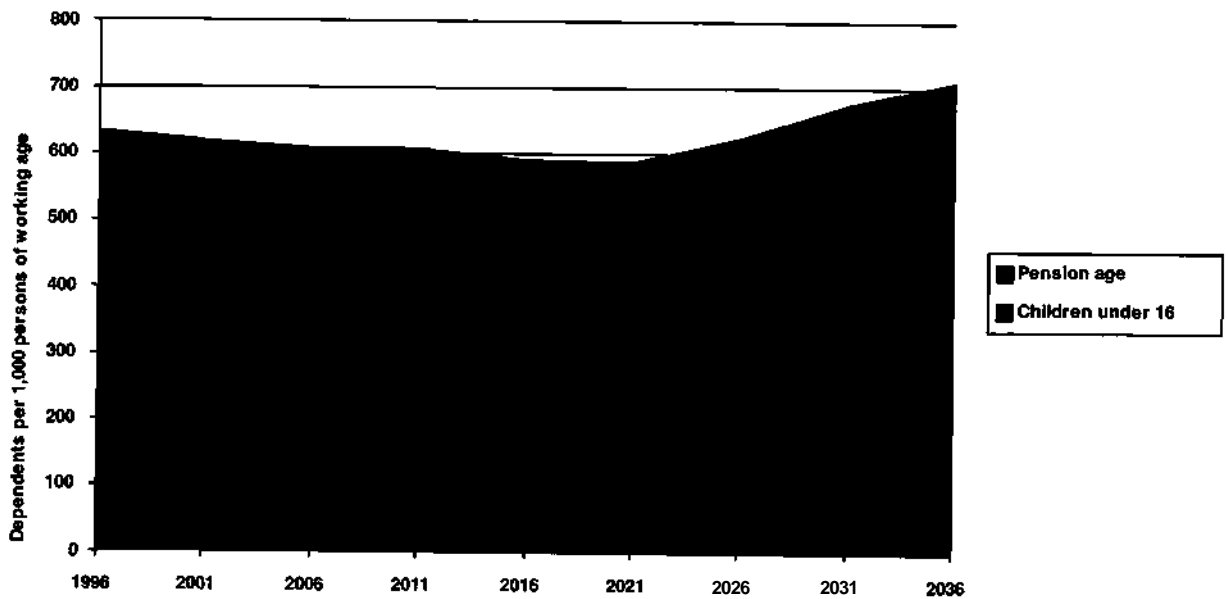
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Figure 3 UK dependency ratios 1998-2015



Source: 1996 based United Kingdom population projections by the Government Actuary's Department.

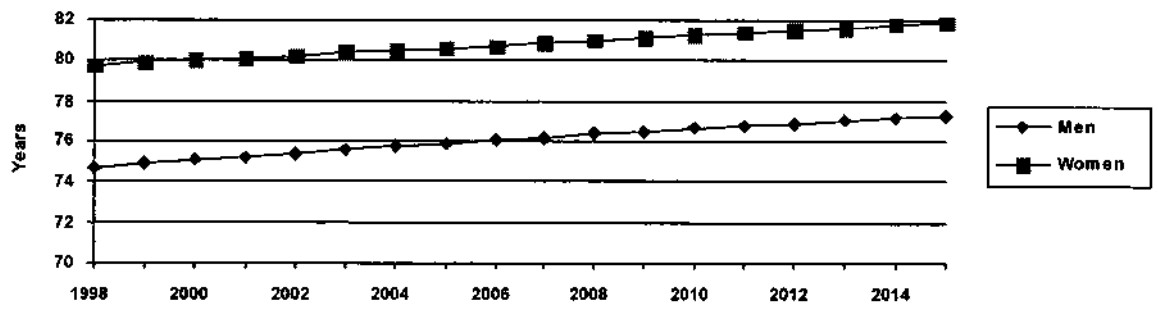
Figure 4 UK dependency ratios 1996-2036



Source: 1996 based United Kingdom population projections by the Government Actuary's Department.

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Figure 5 UK life expectancy at birth 1998-2015



Source: 1996 based United Kingdom population projections by the Government Actuary's Department.

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