



General Register Office
for
SCOTLAND
information about Scotland's people

Projected Population of Scotland
(2006-based)

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Main Points

The Key points in this report are:

Principal projection

- the population of Scotland is projected to rise from 5.12 million in 2006 to a high of 5.37 million in 2031 before slowly declining, falling below 5 million in around 2076;
- the number of children aged under 16 is projected to decrease by 7 per cent from 0.92 million in 2006 to 0.86 million in 2031;
- the number of people of working age¹ is projected to increase slightly from 3.21 million in 2006 to 3.23 million in 2031 (an increase of around 0.4 per cent);
- the number of people of pensionable age² is projected to rise by around 31 per cent from 0.98 million in 2006 to 1.29 million in 2031;
- the number of people aged 75 and over is projected to increase by around 81 per cent from 0.38 million in 2006 to 0.69 million in 2031;
- the dependency ratio – the ratio of persons aged under 16 or over pensionable age to those of working age - is projected to rise from around 59 per 100 in 2006 to 67 per 100 working age population in 2031;
- while Scotland's population is projected to fall from 2031 the populations of the other three countries in the UK are projected to continue rising, England and Wales for the entire projection period but for Northern Ireland the population is projected to peak by around mid-century and then slowly decline.

Variant projections

- under each of the alternative scenarios illustrated by the seven variant projections Scotland's population is projected to rise initially; however, under all but two of the variants (high migration and high fertility) the population begins to decline within the 75 year period covered in this report;
- all the variant projections show Scotland's population ageing significantly over the next 25 years with the number of people aged 75+ projected to increase by between 71 per cent and 91 per cent under these assumptions;
- under the natural change only variant projection (which assumes net zero migration at every age) Scotland's population is projected to fall by 0.06 million to 5.06 million by 2031.

¹ Working age is 16-59 for women and 16-64 for men until 2010; between 2010 and 2020 working age becomes 16-64 for women. Between 2024 and 2026 working age for both men and women becomes 16-65 and changes again, in two further steps, to 16-67 by 2046.

² Pensionable age is 65 for men, 60 for women until 2010; between 2010 and 2020 pensionable age for women increases to 65. Between 2024 and 2026 the pensionable age for both men and women increases to 66 and changes again, in two further steps, to 68 by 2046.

1. Background

1.1 The Office for National Statistics (ONS), on behalf of the Registrars General, prepares the population projections for the United Kingdom and its constituent countries. Responsibility for the production of these projections passed from the Government Actuary's Department (GAD) on 31 January 2006. Detailed results of these (2006-based) projections will nevertheless be published on GAD's website (www.gad.gov.uk). This paper presents the main results of the latest, 2006-based, projection for Scotland and outlines the fertility, mortality and migration assumptions used in its preparation.

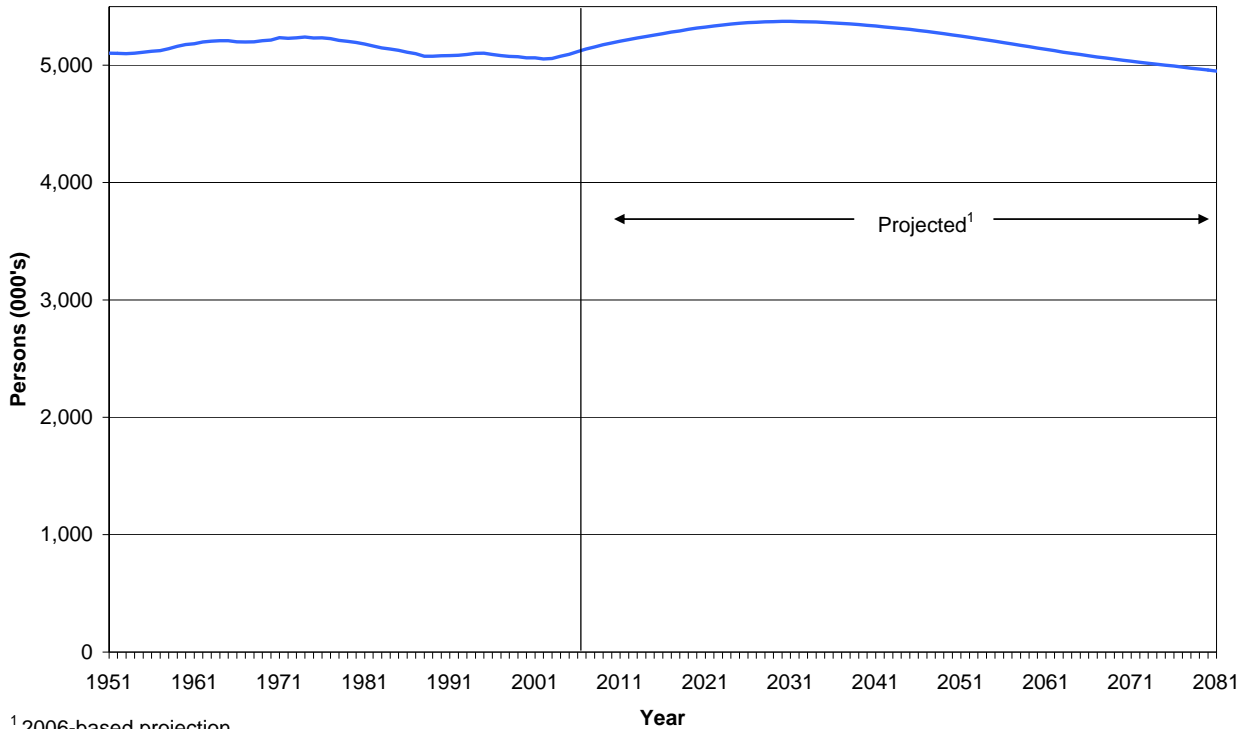
1.2 The results in this paper concentrate on the period up to 2031, although they occasionally refer to up to 75 years ahead and ONS make available projections up to 2106. However, projections this far ahead become increasingly more uncertain the further ahead they go.

1.3 As well as producing the main "principal" projection ONS also produce "variant" projections using alternative plausible assumptions. At the time this paper was written (23 October 2007) ONS had published seven variant projections on the ONS and GAD websites. Additional variants will follow in November 2007. More information on the variant projections is given in **Section 7**.

2. Summary of results

2.1 The results of this new set of projections, summarised in **Table 1** and illustrated in **Figure 1**, show the total population of Scotland rising each year from 5.12 million in 2006 to 5.37 million in 2031 before declining after 2031 to 5.19 million in 2056. Scotland's population is now projected to fall below 5 million in 2076, rather than 2036 as the last national projections suggested. It should be stressed that the 5 million mark holds no particular significance and does not represent an important population threshold. It should also be noted that the point at which the population reaches a particular level can be very sensitive to relatively small changes in the underlying assumptions, particularly when projected to occur so far in the future, and should therefore be treated with caution.

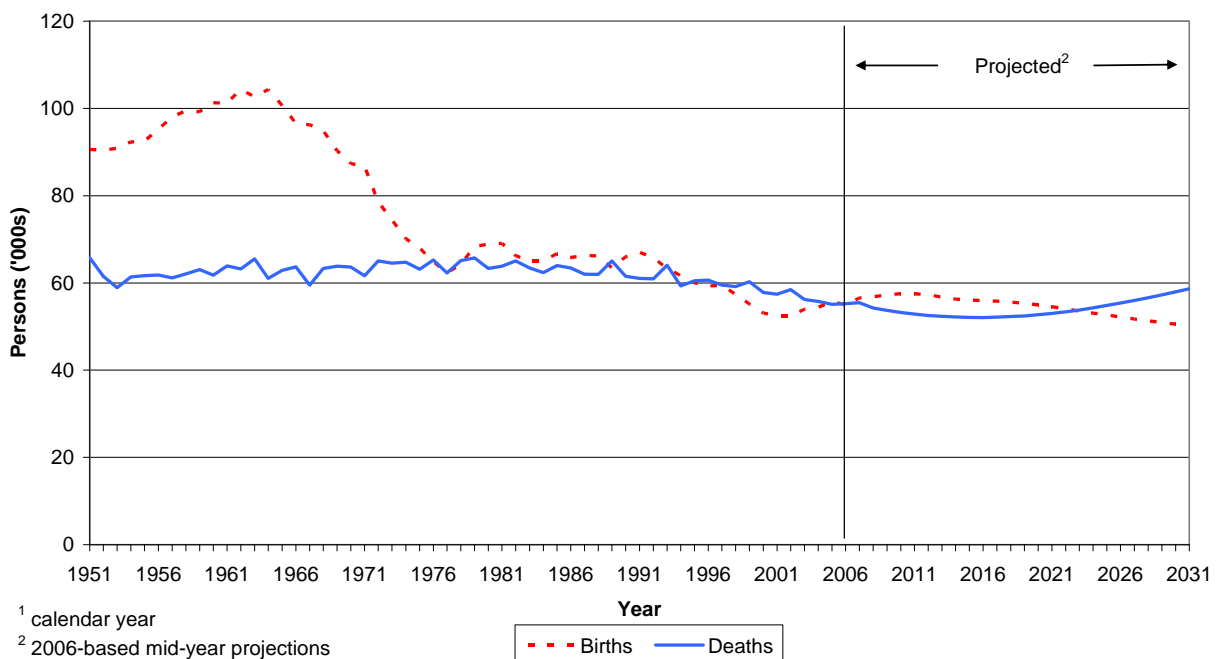
Figure 1 Estimated population of Scotland, actual and projected, 1951-2081



¹ 2006-based projection

2.2 **Table 2** provides information on the projected components of change between 2006 and 2031. The table shows that up until around 2021 natural change and migration both act to increase the size of the population as the number of births exceeds the number of deaths and there is net in-migration. After this point the number of deaths exceeds the number of births whilst the net migration into Scotland continues. By 2031 the natural decrease more than cancels out the net in-migration and so Scotland's population begins to fall.

Figure 2 Births and deaths, actual¹ and projected, Scotland, 1951-2031



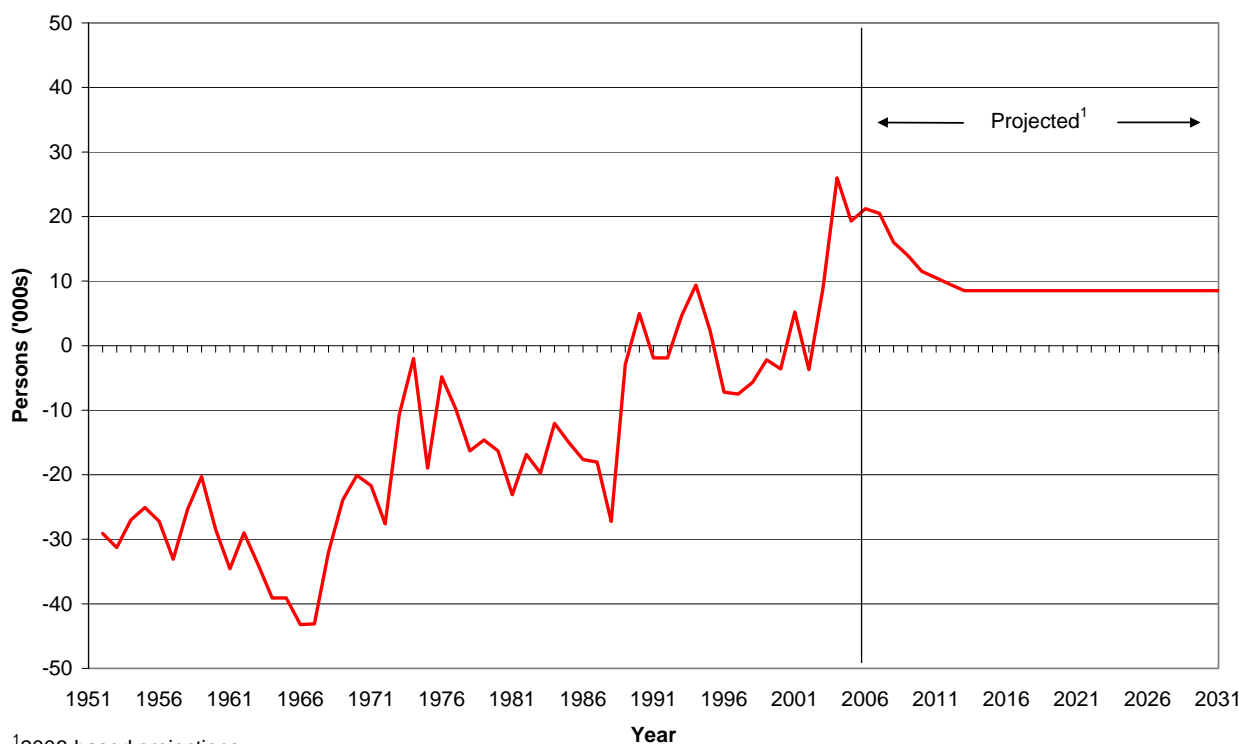
¹ calendar year

² 2006-based mid-year projections

--- Births — Deaths

2.3 As **Figure 2** shows, the number of births in Scotland fell significantly between the early 1960s and 2002 with the number of births dropping below the number of deaths in 1996. However, the last few years have seen an upturn in the number of births and this is projected to continue until 2011 with the number of births exceeding the number of deaths from 2007 (the first year of the projections) until 2023 when deaths once again outnumber births. Meanwhile the number of deaths is projected to fall until 2016 and then increase back to the levels experienced in the late 1980s as a result of the increased number of older people.

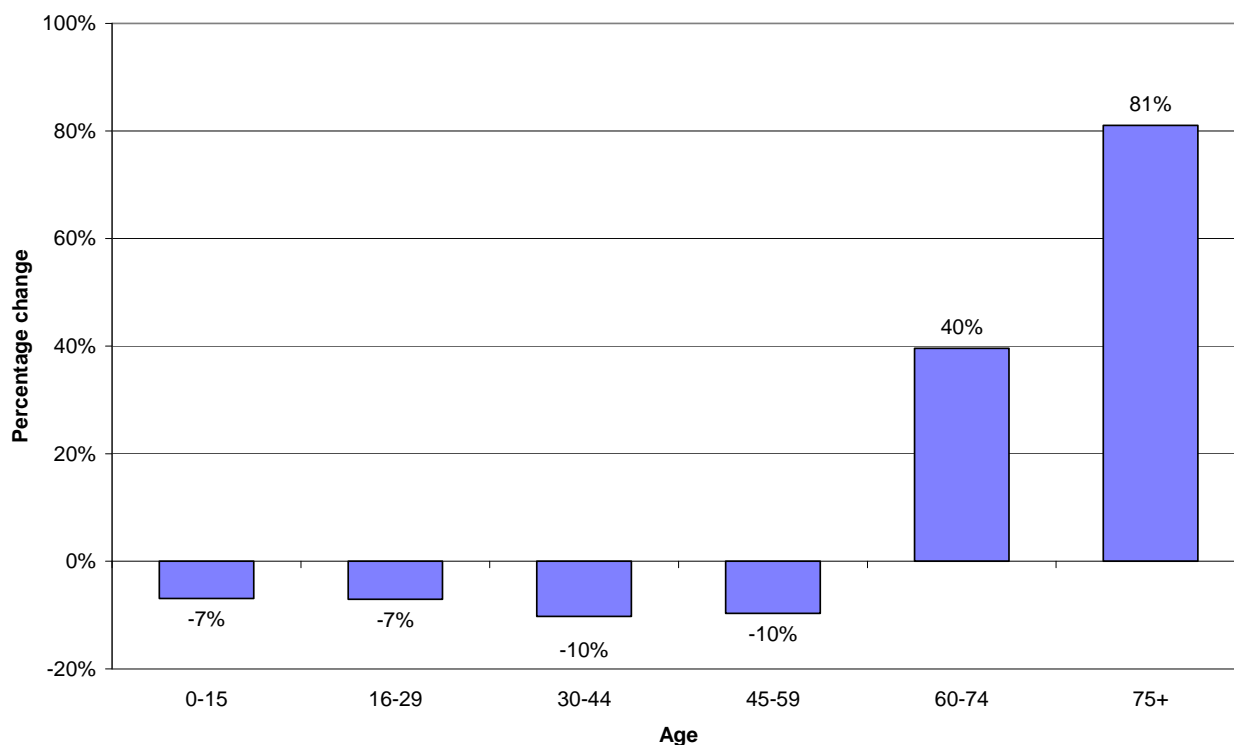
Figure 3 Estimated and projected net migration, Scotland, 1951-2031



2.4 As **Figure 3** shows, Scotland has historically been a country of net out-migration with more people leaving than coming in the other direction. However, in the last few years Scotland has experienced record levels of net in-migration. As a result of these recent trends it has been assumed that Scotland will experience a net inflow throughout the projection period. The size of this net inflow is assumed to steadily fall for the first six years of the projection until it reaches 8,500 in 2012-13 and stays at this level for the remainder of the projection period. More detailed information on the fertility, mortality and migration assumptions leading to these results is given in **Section 3** and **Annex A, Annex B and Annex C**.

2.5 A summary of projected populations by broad age groups is given in **Table 3**; projected populations by sex and five year age groups are given in **Table 6**. These tables and **Figure 4** show that the age structure of the population is projected to change markedly between 2006 and 2031.

Figure 4 The projected percentage change in Scotland's population by age group, 2006-2031



2.6 Scotland's population is projected to increase by 5 per cent between 2006 and 2031. As **Figure 4** shows the number of younger people is projected to decrease during this period whilst the number of older people is projected to increase significantly.

2.7 Between 2006 and 2031 the number of children aged under 16 is projected to decrease by 7 per cent from 0.92 million to 0.86 million.

2.8 During the same period the number of people of working age is projected to increase slightly from 3.21 million to 3.23 million (an increase of around 0.4 per cent) and the number of people of pensionable age is projected to rise from 0.98 million to 1.29 million (up by around 31 per cent).

2.9 These figures take into account the increases in the state pension age which will rise from 60 to 65 for women between 2010 and 2020 and then from 65 to 66 for both men and women between 2024 and 2026. A further increase to age 68 for both men and women will occur between 2034 and 2046. Were it not for these changes the population of working age would be projected to decrease by around 8 per cent and the population of pensionable age to increase by 58 per cent by 2031.

2.10 Among those of pensionable age the number of people aged 75 and over is projected to increase by around 81 per cent from 0.38 million in 2006 to 0.69 million in 2031 (this is in part due to the baby boomers born after the Second World War, in their early eighties by 2031, and the effect of improved mortality rates).

2.11 A useful summary measure of the age structure of a population is the dependency ratio - the ratio of persons aged under 16 or over pensionable age to those of working age. **Table 4** shows that the dependency ratio is projected to rise very slowly from around 59 per 100 in 2006 to 62 per 100 in 2026. Between 2026 and 2031 the dependency ratio is projected to increase to 67 per 100 working age population. The relatively slow increase in the dependency ratio is partly due to the changes to the state pension age described above.

2.12 In 2006 the 59 dependents per 100 working age population were made up almost evenly of children (29 per 100) and pensioners (31 per 100). By 2031 this distribution is projected to have changed with 27 children and 40 pensioners per 100 population of working age. This in turn means that there will be relatively fewer people joining the working age population in subsequent years.

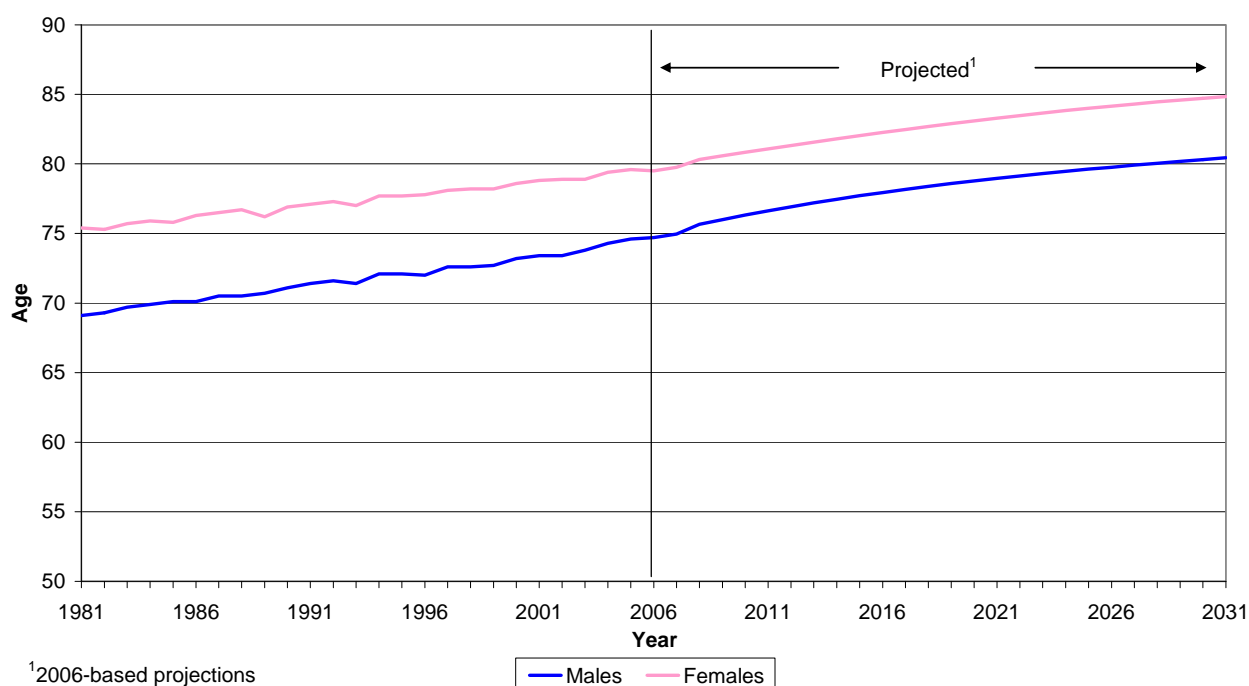
3. The base population and assumptions used in the projections

3.1 **The base population:** The projection is based on the Registrar General's population estimates for mid-2006. The population covered includes all persons usually resident in Scotland, whatever their nationality. Members of HM and non-UK armed forces stationed in Scotland are included; HM forces stationed outside Scotland are excluded. Students are treated as being resident at their term-time address.

3.2 **Fertility:** The fertility rates used in the projection are based on assumptions about the average completed family size of successive cohorts of women. It has been assumed that the average completed family size will continue to decline from around 1.85 children per woman for those born in the early 1960s and now reaching the end of their childbearing lives, before levelling off at 1.65 for those born in the 1990s and later. The number of births is expected to continue the recently observed rise before peaking at around 57,600 in 2011 and falling to around 50,300 in 2031. More details on the fertility assumptions are available in **Annex A**.

3.3 **Mortality:** Future improvements in mortality rates are based on the trend observed in the period 1961 to 2005. It is assumed that annual rates of reduction in mortality rates will tend towards a common reduction at each age of 1.0 percent a year by 2031 for most ages and then continue to improve at this constant rate thereafter. However, for those born in the years 1923 to 1940 the assumed rates of improvement in and after 2031 rise from 1.0 percent a year for those born before 1923 to a peak of 2.5 percent a year for those born in 1931 and then decline back to 1.0 percent a year for those born in 1941 or later. In line with the long-term trends, it has been assumed that the mortality rates for Scotland will continue to be higher at most working ages than those for England & Wales. Based on these rates, expectations of life at birth are projected to increase from 74.7 in 2005 to 80.4 in 2031 for males; and from 79.5 in 2005 to 84.8 in 2031 for females as shown in **Figure 5**. More details on the mortality assumptions are available in **Annex B**.

Figure 5 Expectation of life at birth, Scotland, 1981-2031



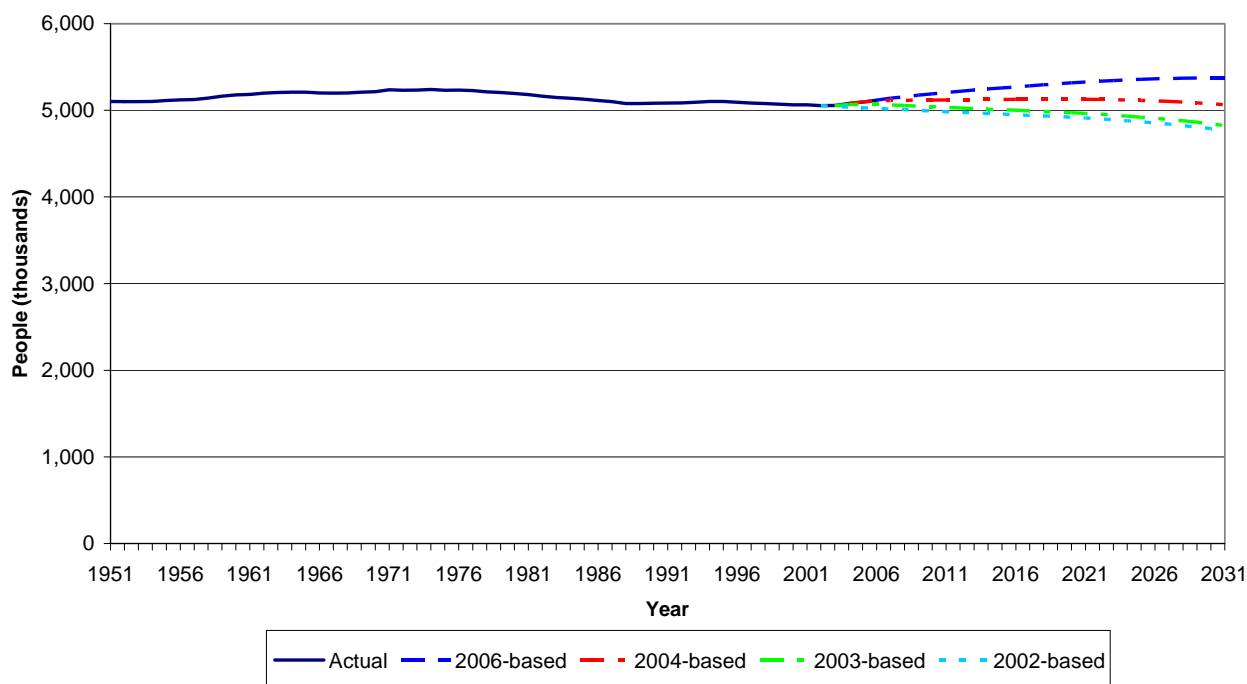
3.4 Migration: It is assumed that from 2012-13 onwards there will be a net inflow of 8,500 people per year to the end of the projection period, i.e. the total number of people entering Scotland as migrants is assumed to be 8,500 greater than the number leaving Scotland. This assumption has been derived from analyses of trends in civilian migration to and from the United Kingdom as well as cross-border migration between the four constituent countries. In the first six years of the projection higher net inflows are assumed, reflecting recent trends as described in **Section 2.4**. See **Annex C** for more details on the migration assumptions.

4. Comparison with previous projections

4.1 The last set of projections were based on the mid-year population estimates for 2004. Before this an interim set of projections, using 2003 as the base year, were produced and before this the previous full set of projections were based on the 2002 mid-year population estimate. The key changes from previously published projections in terms of births, deaths and total population are shown in **Table 5a, Table 5b and Table 5c** respectively. **Section 4.4** looks at the differences in the migration assumptions between the projections. Note that national projections are usually produced every two years – the next set will be 2008-based and are due to be published in October 2009.

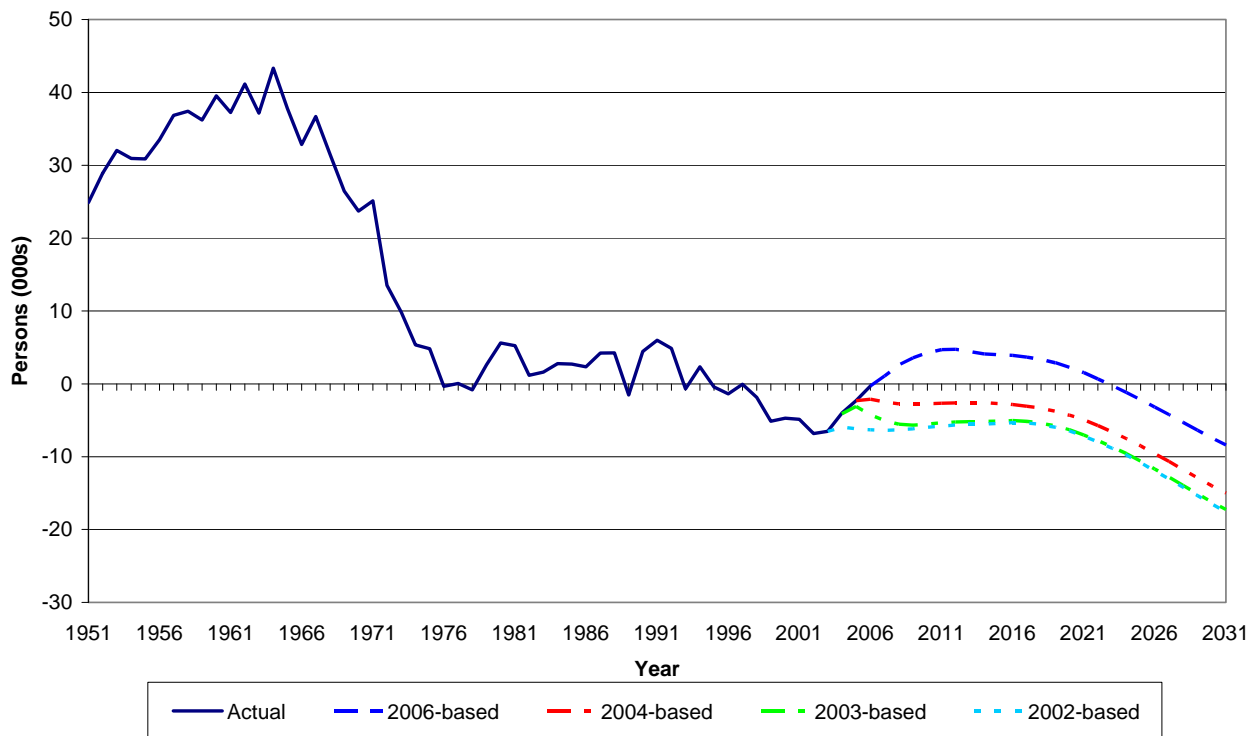
4.2 **Figure 6** compares the 2006-based projection with previous projections. It shows that the level of the population under the latest projection is higher than for earlier projections and that the population is now projected to rise until the early 2030s before declining. Earlier projections showed the population decline occurring earlier.

Figure 6 Actual and Projected total population with previous projections, 1951-2031



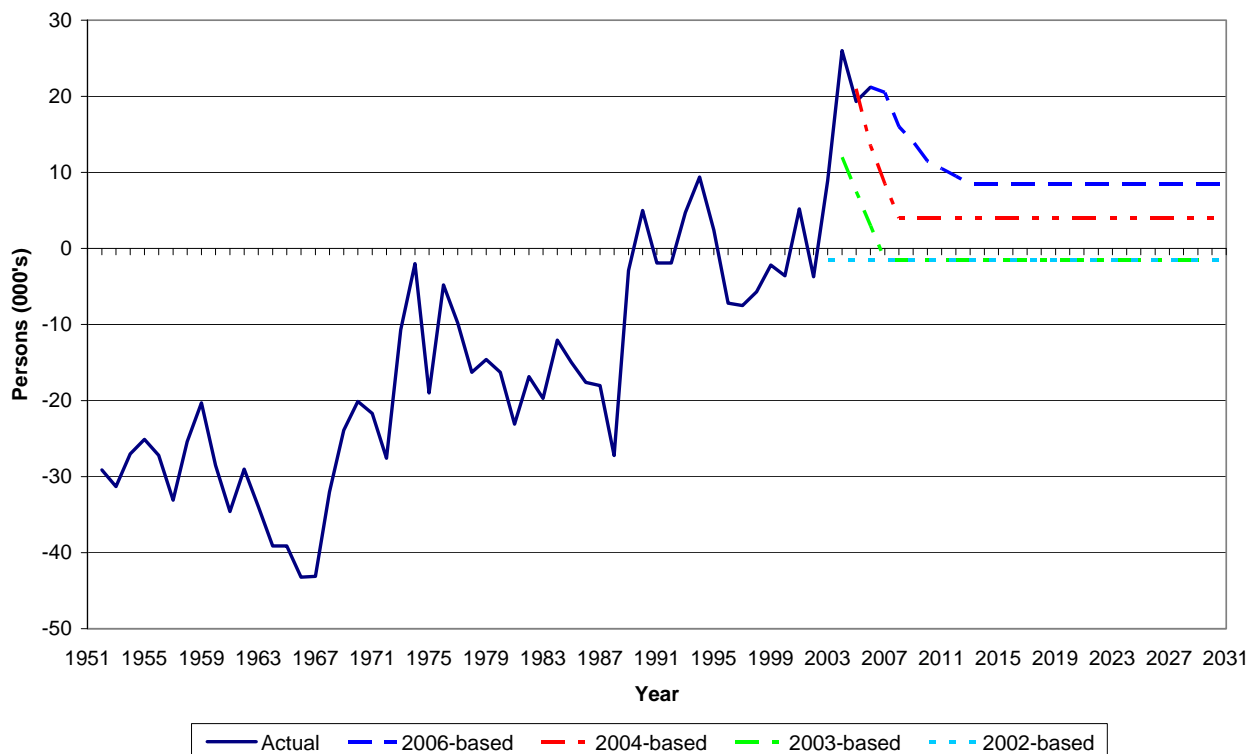
4.3 The difference between the projections is due in part to the higher starting point of the 2006 mid year estimates and in part to the different assumptions made about fertility, mortality and migration. The natural change (the difference between the number of births and deaths) for the 2006-based projection compared with previous projections is shown in **Figure 7**. The number of births is projected to be higher (by an average of almost 4,300 in the first 25 years of the projection) and the number of deaths lower (by an average of over 2,200, again during the first 25 years) in comparison to the 2004-based projections. As a result the natural change is 'higher' throughout the projections with a natural increase between 2007 and 2021 and a reduced natural decrease thereafter. More information on the reasons for the differences is given in **Section 3** and **Annex A, Annex B and Annex C**.

Figure 7 Actual and Projected Natural Change (Births minus Deaths) with previous projections, 1951-2031



4.4 The overall-long term migration assumption has been increased from the assumption used in previous projections as **Figure 8** demonstrates. Compared to the 2004-based projections Scotland's long-term migration assumption has risen from +4,000 to +8,500. This long term assumption now takes effect after 6 years rather than after 3 years as in the 2004-based assumptions.

Figure 8 Actual and Projected Migration with previous projections, 1951-2031



4.5 This increase in the assumption for the 2006-based projections compared to earlier sets is partly because they are trend based and relatively large numbers of people migrated to Scotland from the rest of the UK and overseas in the last two years. The increase is also partly due to a change in the methodology used by ONS to allocate international migrants to the constituent countries of the UK. More information on this change in methodology can be found on the ONS website at:

<http://www.statistics.gov.uk/about/data/methodology/specific/population/future/imps/updates/default.asp>

4.6 The tables below summarise the differences between the current 2006 and the 2004-based projections. The difference in results for the projected age structure of Scotland is small, but the 2006-based projections show a slightly smaller percentage of the population to be of pensionable age and slightly higher percentages to be children or of working in 2031. As a result the projected number of dependents per 100 of working age is lower in 2031 in the 2006-based projections than in the 2004-based projections.

Projected age structure of Scotland's population (percentage of total population)

Age Group ¹	2004-based		2006-based	
	2006	2031	2006	2031
Children	18.0%	15.7%	18.0%	16.0%
Working age	62.7%	59.9%	62.8%	60.0%
Pension age	19.3%	24.4%	19.2%	24.0%

Projected number of dependents per 100 population of working age, Scotland

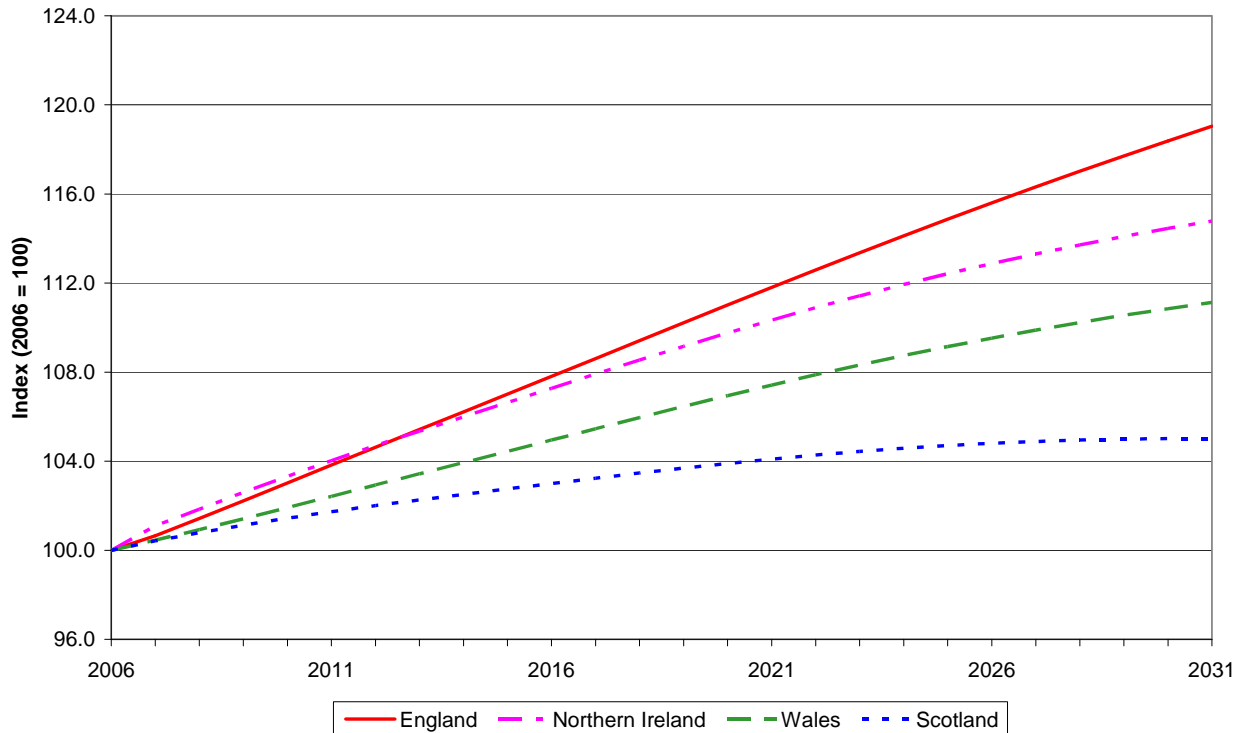
Age Group ¹	2004-based		2006-based	
	2006	2031	2006	2031
Children	28.7	26.1	28.7	26.6
Pensioners	30.7	40.8	30.6	39.9
All dependants	59.4	66.9	59.3	66.5

5. Scotland's position within the United Kingdom

5.1 The United Kingdom population is projected to increase from an estimated 60.6 million in 2006, rising above 70 million in 2028 and reaching 71.1 million in 2031.

5.2 Due to differences in demographic patterns, projected trends differ for the four countries of the United Kingdom. While the population of Scotland is projected to rise, peak in 2031 and then slowly decline, the populations of the other three countries in the UK are projected to rise to 2031 and beyond, with the Northern Ireland population projected to peak in the late 2050s and then slowly decline. England and Wales populations are projected to continue rising for the whole projection period. **Figure 9** illustrates the projected percentage change in the populations of the four countries from 2006 to 2031.

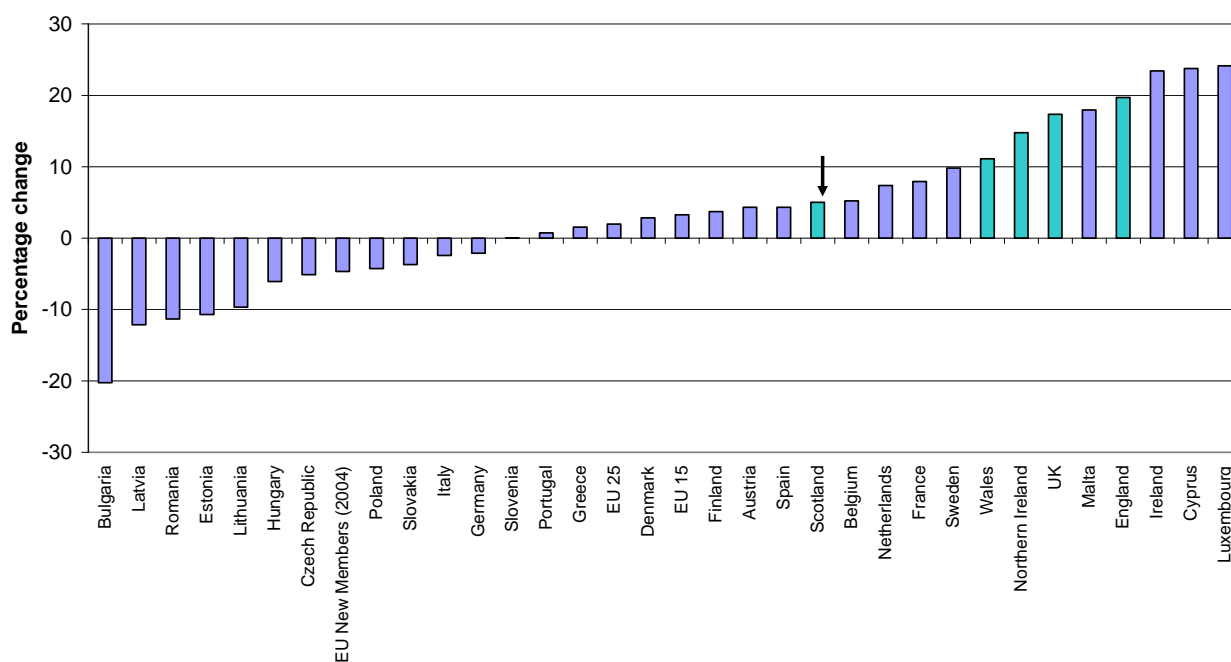
Figure 9 Comparison of population change for UK countries, 2006-2031



6. Scotland's position within Europe

6.1 **Figure 10** shows how the projected change in Scotland's population between 2006 and 2031 compares to that for other countries in Europe. For UK countries these have been calculated using the 2006-based projections. For the other countries the figures have been calculated by comparing 2006 and 2031 populations from the 2004-based projections. Countries such as Germany, Italy and a number of recent accession states in eastern Europe are projected to experience a decline in population while the populations of Greece, Denmark, Finland, Spain and Austria are all projected to increase but by less than in Scotland.

Figure 10 Projected Percentage Population Change in Selected European Countries, 2006-2031



Source: ONS (UK and constituent countries) and Eurostat.

Note: For UK countries percentage change is for 2006-2031 using 2006-based projections. For other countries percentage change is for 2006-2031 using 2004-based projections.

7. Long term and variant projections

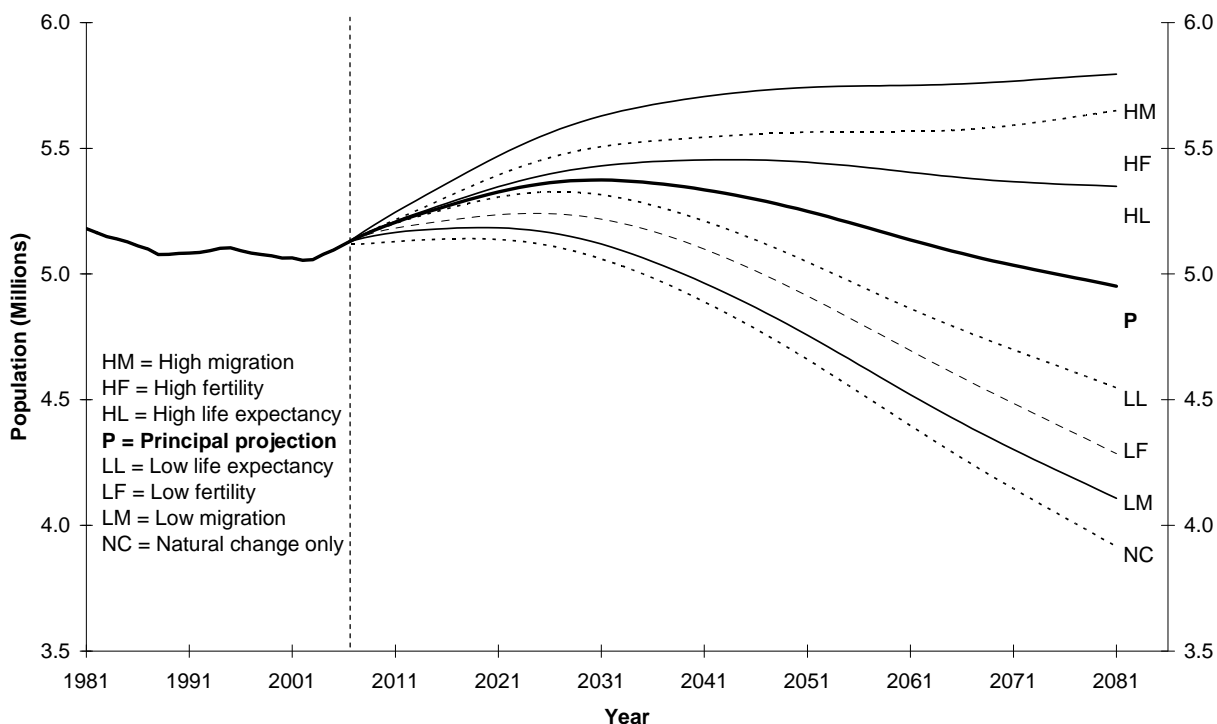
7.1 The Office for National Statistics produces projections for Scotland for up to 100 years ahead. Results for the first 75 years of this period are available from the Government Actuary's Department's (GAD's) website (www.gad.gov.uk) and results beyond this are available on request. However, projections this far ahead become increasingly unreliable. As a result ONS produce a number of "variant" projections as well as the "principal" projection which most of this report concentrates on. These variant projections are based on alternative assumptions of future fertility, mortality and migration.

7.2 The variants are produced because of the inherent uncertainty of demographic behaviour, to give users an indication of this uncertainty, especially for the long-term projections. The purpose is to illustrate plausible alternative scenarios and not to represent upper or lower limits for future demographic behaviour. These projections are simply 'scenarios' (the certain outcome of a given set of assumptions), rather than forecasts of the most likely course of future events. At the date this report was written ONS had made available the six standard high/low variants and also a variant on "zero migration". Additional variants will be published on the GAD website in November 2007. **Annex D** gives more information about these variants and the assumptions used.

7.3 **Figure 11** and **Table 7** show that Scotland's population is projected to rise initially under each of these alternative fertility, mortality and migration assumptions. Under the natural change only projection (which assumes there is net zero migration at all ages) the population peaks in 2018 before falling and dropping below the 2006 population in 2026. Most of the remaining variants show similar patterns with the timing of the peak varying. However, neither the high migration (assumes +17,000 migrants per year from 2012-13) nor the high fertility (assumes long term TFR of 1.85) variants peak within the 75 year period covered.

7.4 Throughout the period the natural change only projection gives the lowest population for Scotland, 0.31 million below the principal projection by 2031, 0.66 million lower in 2056 and 1.04 million lower by 2081. Inversely, the high migration projection gives the highest population, 0.25 million above the principal projection by 2031, 0.55 million higher by 2056 and 0.84million higher by 2081.

Figure 11 Actual and projected total population Scotland, under the 2006-based principal and selected variant projections, 1981-2081



7.5 **Table 8** shows the projected components of population change in the period to 2031 in the principal projection, the high and low migration variants and the zero migration variant. This shows the effect that different migration assumptions have on the size of the future population. Under each of these projections the fertility and mortality assumptions are the same but the number of births and deaths change. This highlights the fact that the numbers of births and deaths are partly dependent on the assumed level of net migration.

7.6 The principal projection shows Scotland's population increasing by 0.26 million (5 per cent) between 2006 and 2031. By comparison, the zero migration projection indicates a 0.06 million (1.1 per cent) decrease and the high migration variant projects a 0.51 million (10 per cent) increase. The total effect of migrants in the principal projection is therefore to add 0.31 million people to Scotland's population by 2031 (0.26 million plus 0.06 million after the effects of rounding) and, under the high migration variant, to add 0.25 million (0.51 million minus 0.26 million). It is clear that the projected increase in Scotland's population between 2006 and 2031 under the principal projection is dependent on continuing migration into Scotland.

7.7 As **Figure 12** shows, under all of the variant projections, and the principal projection, Scotland's age structure is projected to change dramatically between 2006 and 2031. In each case the number of people aged 60 and over is projected to increase significantly, particularly the number aged 75+ while, in most cases, the numbers in each of the age categories below 60 are projected to decrease. This is further demonstrated by

Figure 13 which shows the average age of Scotland's population increases under all of the variant projections.

7.8 **Figure 14** shows that the dependency ratio for the number of dependents to 100 people of working age will rise under all available variant projections although the increase in the state pension age to 66 between 2024 and 2026 will result in a short term decrease. Amongst the available variants the biggest projected increase in the dependency ratio occurs under the high fertility variant (69.1 in 2031) and the lowest occurs under the low fertility variant (64.3 in 2031).

Figure 12 Percentage change in age structure under the 2006-based principal and selected variant projections, 2006-2031

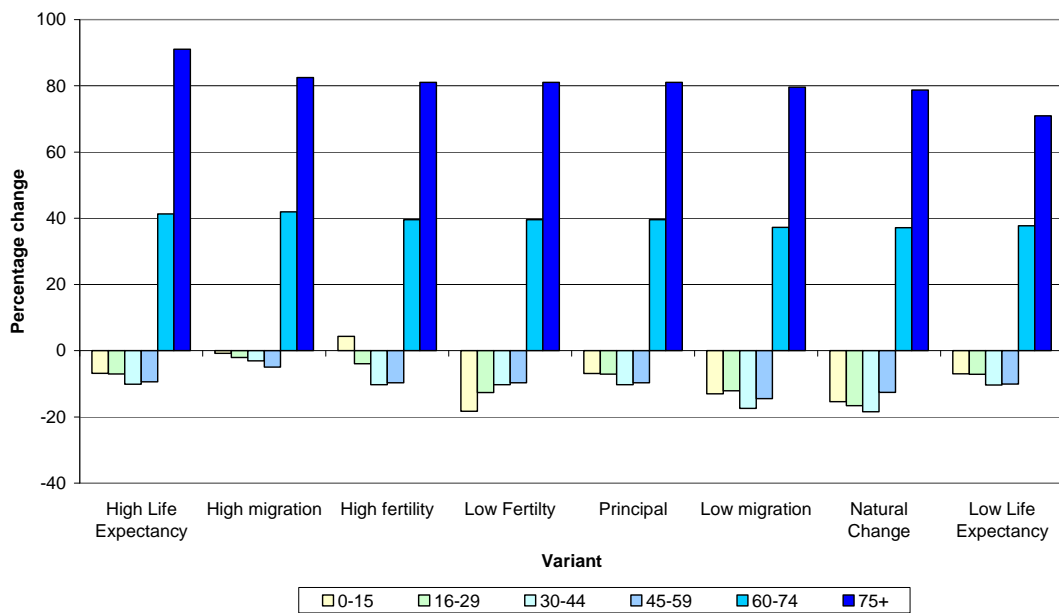


Figure 13 Average age of Scotland's population under the 2006-based principal and selected variant projections, 2006-2031

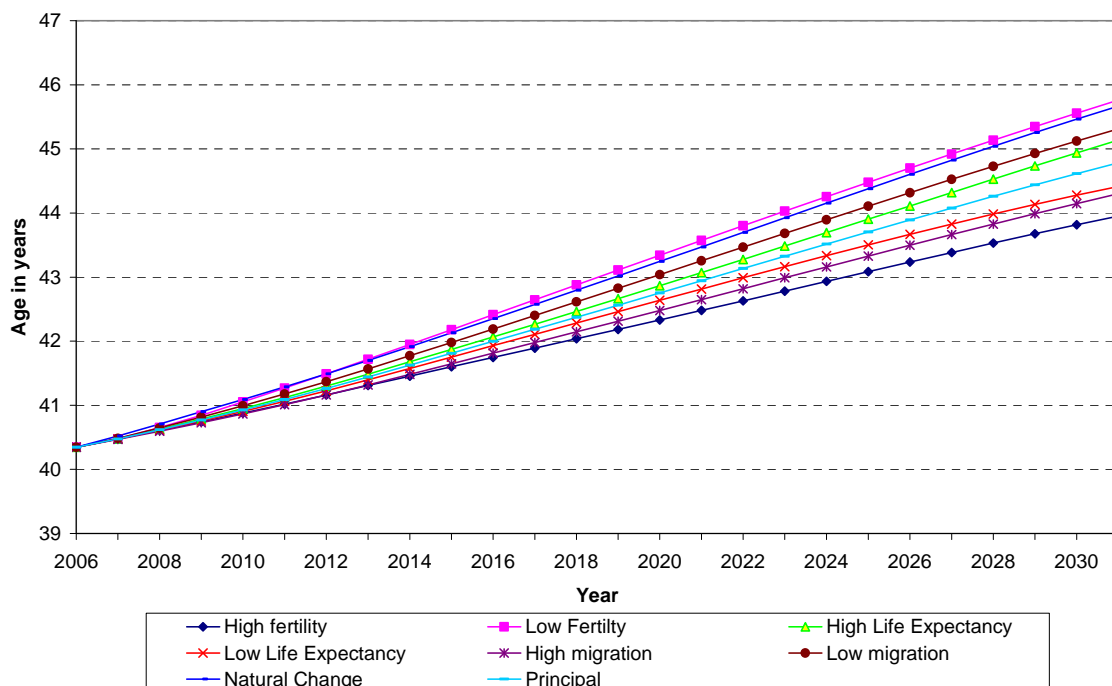
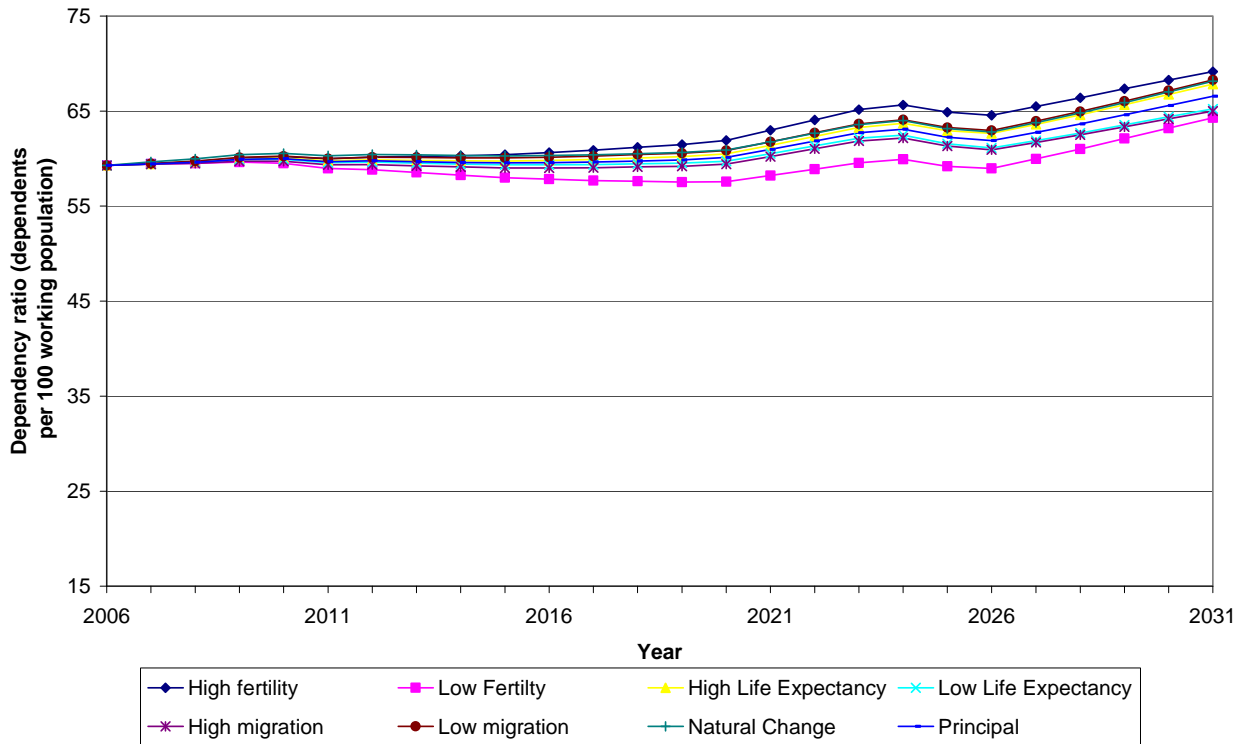


Figure 14 Dependency Ratios (dependents per 100 working population) under the 2006-based principal and selected variant projections, 2006-2031



8. Further information

Corresponding data for the United Kingdom and its constituent countries along with detailed information on the assumptions which are made is available from the Government Actuary's Department website (www.gad.gov.uk) or by contacting ONS at:

Office for National Statistics
NPP branch
D3/05
1 Drummond Gate
London SW1V 2QQ

Tel: 020 7533 5222
E-mail: natpopproj@ons.gov.uk

More detailed age and sex breakdowns of the Scottish results are available from GROS customer services or from the GAD web site (www.gad.gov.uk). The next set of sub-national projections for Scotland will be released on 22 January 2008. These will be consistent with the latest 2006-based projection for Scotland. Further details can be obtained from:

Customer Services
General Register Office for Scotland
Census Analysis and Dissemination Branch
Ladywell House
Ladywell Road
EDINBURGH EH12 7TF

Telephone 0131 314 4243
Facsimile 0131 314 4696
E-mail: customer@gro-scotland.gsi.gov.uk

Table 1 Projected population of Scotland (2006-based): 2006-2076

	('000s)										
	2006 (base)	2011	2016	2021	2026	2031	<i>Longer term projections</i>				
							2036	2046	2056	2066	2076
All Ages	5,117	5,206	5,270	5,326	5,363	5,374	5,361	5,297	5,194	5,081	4,993

Table 2 Projected components of population change, Scotland: 2006-2031 (annual averages)

	('000s)				
	2006	2011	2016	2021	2026
	-2011	-2016	-2021	-2026	-2031
Population at start	5,117	5,206	5,270	5,326	5,363
Births	57	56	55	53	51
Deaths	54	52	53	54	57
Natural change	3	4	3	-1	-6
Migration	15	9	9	9	9
Population at end	5,206	5,270	5,326	5,363	5,374
Total change	18	13	11	7	2

* Note: Not all figures will sum due to rounding.

Table 3 Projected population of Scotland (2006-based), by age group: 2006-2031

	('000s)					
	2006 (base)	2011	2016	2021	2026	2031
All Ages	5,117	5,206	5,270	5,326	5,363	5,374
0-15	922	897	896	905	887	858
16-29	912	955	922	864	842	848
30-44	1,107	1,019	978	1,011	1,032	994
45-59	1,058	1,104	1,144	1,081	992	955
60-74	735	812	866	939	988	1,026
75+	382	417	464	526	622	692
Children	922	897	896	905	887	858
Working ages	3,213	3,260	3,303	3,309	3,313	3,227
Pensionable ages	983	1,048	1,072	1,112	1,163	1,289

¹ Pensionable age is 65 for men, 60 for women until 2010; between 2010 and 2020 pensionable age for women increases to 65. Between 2024 and 2046, state pension age will increase in three stages from 65 years to 68 years for both sexes.

* Note: Not all figures will sum due to rounding.

Table 4 Projected number of dependents per 100 population: 2006-2031

Age group	2006 (base)	2011	2016	2021	2026	2031
All dependants	59	60	60	61	62	67
Children under 16	29	28	27	27	27	27
Pensionable ages						
65/60 ¹ & over	31	32	32	34	35	40
65/60 ¹ - 74	19	19	18	18	16	18
75 & over	12	13	14	16	19	21

¹ Pensionable age is 65 for men, 60 for women until 2010; between 2010 and 2020 pensionable age for women increase to 65. Between 2024 and 2046, state pension age will increase in three stages from 65 years to 68 years for both sexes.
* Note: Not all figures will sum due to rounding.

Table 5a Projected number of births¹ (2006-based), Scotland: 2006-2031

	2010-11	2015-16	2020-21	2025-26	2030-31
2006 based	57,600	56,000	54,500	52,200	50,300
2004 based	51,500	51,400	50,800	48,700	46,200
2003 based	48,800	49,300	48,800	46,400	43,600
2002 based	48,200	48,800	48,300	45,900	42,900

1. Rounded to nearest 100

Table 5b Projected number of deaths¹ (2006-based), Scotland: 2006-2031

	2010-11	2015-16	2020-21	2025-26	2030-31
2006 based	52,800	52,100	53,000	55,400	58,700
2004 based	54,200	54,300	55,800	58,300	61,200
2003 based	54,200	54,300	55,800	58,100	60,800
2002 based	54,000	54,100	55,500	57,800	60,400

1. Rounded to nearest 100

Table 5c Projected population (2006-based), Scotland: 2006-2031

	('000s)				
	2011	2016	2021	2026	2031
2006 based	5,206	5,270	5,326	5,363	5,374
2004 based	5,120	5,126	5,127	5,109	5,065
2003 based	5,034	5,000	4,963	4,907	4,825
2002 based	4,984	4,949	4,911	4,854	4,770

Table 6 Projected population of Scotland (2006-based), by sex and age group: 2006-2031

Age	Sex	Estimated population ('000s)					
		30 June 2006	2011	2016	2021	2026	2031
All ages	Persons	5,117	5,206	5,270	5,326	5,363	5,374
	Males	2,469	2,520	2,557	2,587	2,605	2,609
	Females	2,647	2,685	2,713	2,739	2,758	2,765
0-4	Persons	268	286	282	276	266	255
	Males	137	146	144	141	136	130
	Females	131	140	138	135	130	125
5-9	Persons	279	271	288	284	278	268
	Males	143	139	147	145	142	136
	Females	136	133	141	139	136	131
10-14	Persons	308	281	272	289	285	279
	Males	157	144	139	147	145	142
	Females	151	137	133	141	140	137
15-19	Persons	329	314	286	277	294	290
	Males	169	161	147	142	150	149
	Females	160	153	139	135	143	142
20-24	Persons	339	354	335	307	298	315
	Males	171	181	172	158	153	161
	Females	168	172	164	149	145	154
25-29	Persons	310	346	354	336	308	299
	Males	156	174	182	172	158	154
	Females	154	172	173	164	150	146
30-34	Persons	317	314	345	353	335	307
	Males	154	157	172	179	170	156
	Females	163	158	173	174	165	151
35-39	Persons	385	320	314	345	353	335
	Males	185	154	155	170	178	168
	Females	200	166	159	174	175	166
40-44	Persons	405	385	319	313	344	352
	Males	195	185	153	154	169	177
	Females	210	200	166	159	175	175
45-49	Persons	378	402	381	316	310	341
	Males	183	192	182	150	152	167
	Females	195	210	200	166	159	174
50-54	Persons	335	373	396	377	312	307
	Males	165	180	189	179	148	149
	Females	171	193	208	198	164	158
55-59	Persons	345	329	366	389	370	307
	Males	169	161	176	184	175	145
	Females	175	168	190	205	195	162
60-64	Persons	280	331	317	353	376	358
	Males	135	160	153	167	176	167
	Females	145	171	164	185	200	191
65-69	Persons	243	261	311	300	335	357
	Males	114	124	149	143	157	165
	Females	130	137	162	157	178	192
70-74	Persons	212	220	239	286	278	311
	Males	95	100	111	134	130	143
	Females	118	120	128	152	148	168
75-79	Persons	168	180	192	210	254	249
	Males	70	77	85	95	116	114
	Females	99	103	107	115	138	135
80-84	Persons	119	127	142	156	174	212
	Males	44	49	58	66	76	94
	Females	75	77	84	90	98	119
85-89	Persons	63	74	84	100	115	131
	Males	20	25	31	39	47	55
	Females	43	49	53	61	68	76
90 & over	Persons	32	37	47	59	79	101
	Males	8	10	14	20	29	38
	Females	25	27	32	39	50	63

Note: Not all figures will sum due to rounding

Table 7 Principal and selected variant projections (2006-based), Scotland: 2006-2076

('000s)

	2006 (base)	2011	2016	2021	2026	2031	Longer-term projections				
							2036	2046	2056	2066	2076
Principal projection	5,117	5,206	5,270	5,326	5,363	5,374	5,361	5,297	5,194	5,081	4,993
High migration	5,117	5,246	5,360	5,469	5,561	5,628	5,674	5,728	5,748	5,756	5,782
High fertility	5,117	5,216	5,305	5,393	5,463	5,506	5,529	5,556	5,566	5,573	5,619
High life expectancy	5,117	5,210	5,281	5,347	5,398	5,430	5,447	5,454	5,427	5,383	5,357
Low life expectancy	5,117	5,201	5,259	5,306	5,327	5,315	5,273	5,134	4,954	4,777	4,623
Low fertility	5,117	5,182	5,213	5,235	5,240	5,218	5,169	5,012	4,805	4,588	4,385
Low migration	5,117	5,165	5,181	5,184	5,165	5,119	5,049	4,866	4,639	4,407	4,204
Natural change only	5,117	5,129	5,139	5,137	5,112	5,060	4,983	4,780	4,529	4,267	4,030

Table 8 Projected population change for selected variant projections (2006-based), Scotland: 2006-2031

('000s)

	High migration variant	Principle projection	Low migration variant	Zero migration variant
Population at mid-2006	5,117	5,117	5,117	5,117
Population change (2006-2031)				
Births	1,419	1,365	1,310	1,282
Deaths	1,360	1,351	1,343	1,338
Migration	452	244	35	0
Population at mid-2031	5,628	5,374	5,119	5,060
Total population change between 2006 and 2031	511	257	2	-57

Annex A Fertility assumptions

Fertility assumptions are agreed in two stages. The long term assumption is decided as part of the consultation process between the UK countries and the Office for National Statistics. Then there is a detailed assumption setting to produce the age-specific fertility rates for each year of the projection period that are consistent with this long-term assumption.

Fertility assumptions of long term average completed family size for the 2006-based projections are slightly higher than those used in the previous 2004-based projections. The assumptions for Scotland and other constituent countries of the UK are given in **Table A1**.

**Table A1 Assumptions of long-term average completed family size
2004 and 2006-based projections**

	2006-based	2004-based
England	1.85	1.75
Wales	1.85	1.75
Scotland	1.65	1.60
Northern Ireland	1.95	1.80
United Kingdom	1.84	1.74

Recent data have shown increases in fertility rates over the past five years. Fertility rates for women in their thirties have continued their sustained increase over recent decades, while fertility rates for women in their twenties have stopped declining and even seen some modest increases since 2001.

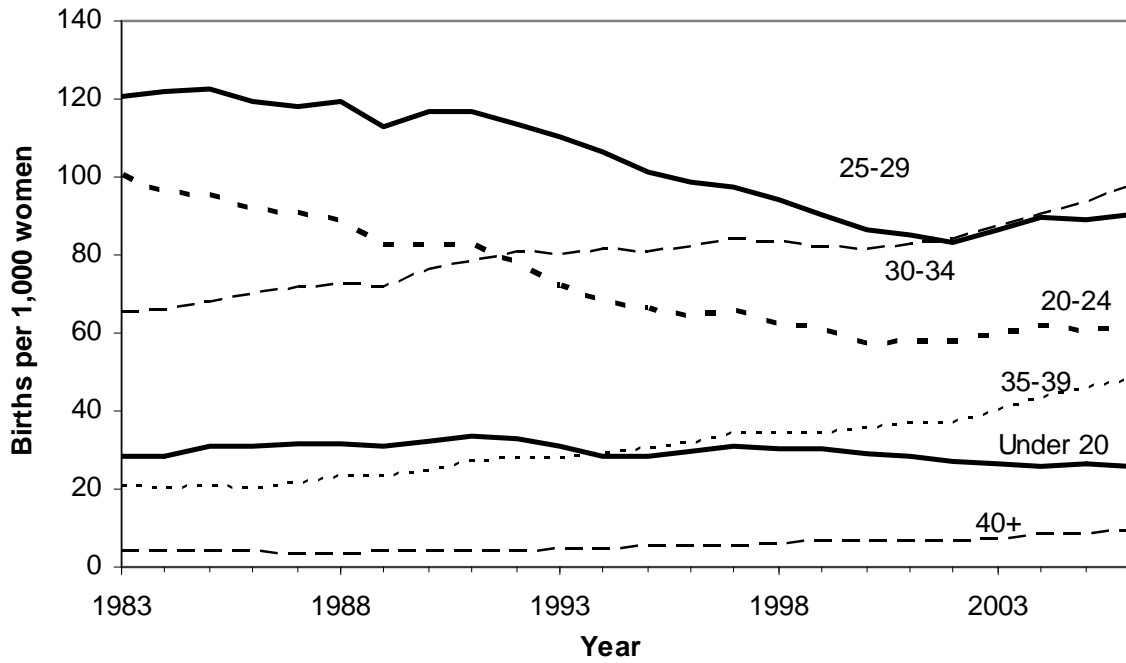
Fertility assumptions are formulated in terms of the average number of children that women born in particular years will have. This cohort measure of fertility is more stable than the analogous calendar year or period measure (the total fertility rate). This is because it is affected only by change in the total number of children women have and not by the timing of births within their lives. Period rates may rise or fall if births are brought forward or delayed for any reason.

The assumptions about completed family size are based on family building patterns to date and other relevant data. For the UK as a whole the steady decline in achieved family size at each age, a clear pattern for the 1945 to 1975 cohorts, appears to be bottoming out among the most recently-born cohorts of women. It is assumed that the completed family size will continue to decline until the early 1990s cohorts and then level off at 1.84.

The trends in age specific fertility for Scotland are shown in **Figure A1**. Up until 2002, there is a general pattern of falling fertility at younger ages coupled with rises in fertility at older ages. From 2002, with the exception of the under 20 group there have been increases in fertility.

Around 1980 the fertility levels in Scotland were similar to the UK, but they have shown a more rapid decline in age specific fertility at ages between 20 and 29. The fertility rates in the under 30s are currently 90 per cent of those in the UK as a whole.

Figure A1 Scotland Age Specific Fertility 1983-2006



More details on the background of how the fertility assumptions are derived can be found in **"Population Trends 114"** on the Office for National Statistics's website through the following link:

http://www.statistics.gov.uk/downloads/theme_population/PT114.pdf.

Annex B Mortality assumptions

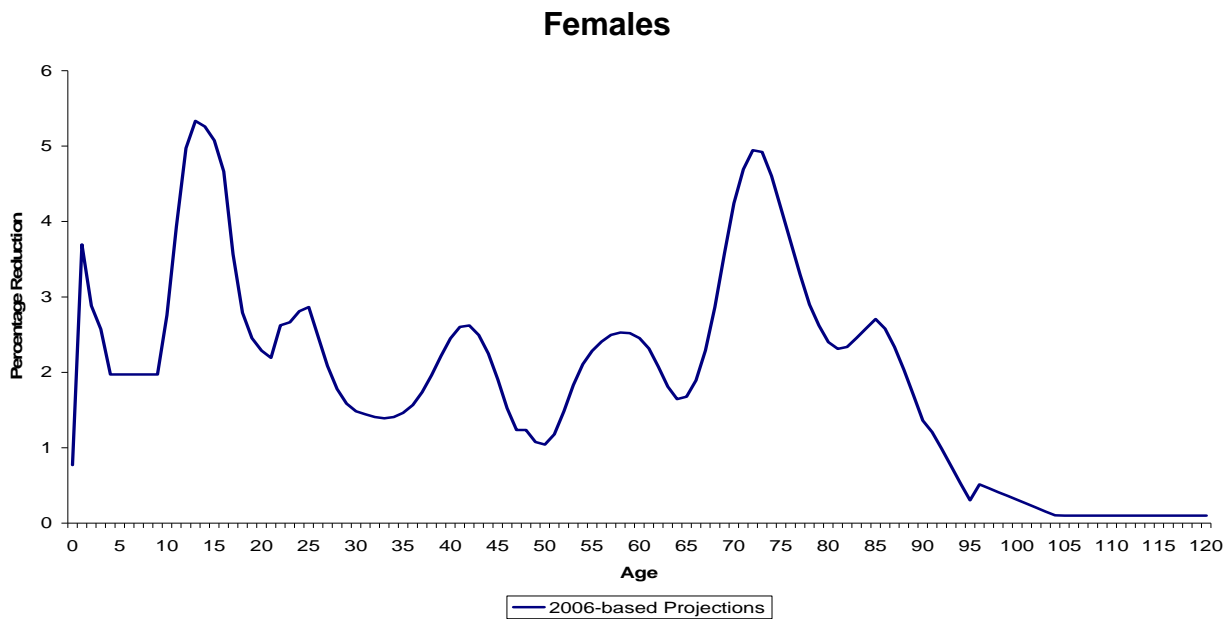
The mortality rates for the first year of the projection, mid-2006 to mid-2007, are based on the best estimates that could be made in the autumn of 2007 of the numbers of deaths at each age in 2006-07.

Assumed improvements in mortality rates after 2006-07 are based on trends in mortality rates before 2006. Improvements in mortality rates by age and gender in the base year of the projection are estimated from the trends in years from 1961 to 2005. It is assumed that annual rates of mortality improvement will converge to a common rate of 1.0 per cent a year at 2031 for most ages, and continue to improve at that constant rate thereafter. However, it is assumed that those born in the years 1923 to 1940 (cohorts which have consistently experienced relatively high rates of mortality improvement over the last 25 years) will continue to experience higher rates of mortality improvement until they die, with assumed rates of improvement in and after 2031 rising from 1.0% a year for those born before 1923 to a peak of 2.5% a year for those born in 1931 and then declining back to 1.0% a year for those born in 1941 or later. In the 2004-based projections it was assumed that these cohort differentials would disappear over time with a common rate of improvement of 1.0 per cent assumed at all ages by 2029.

The rates of mortality improvement which are assumed for the UK for the base year of the projections (2006-07) are shown in **Figure B1** below.

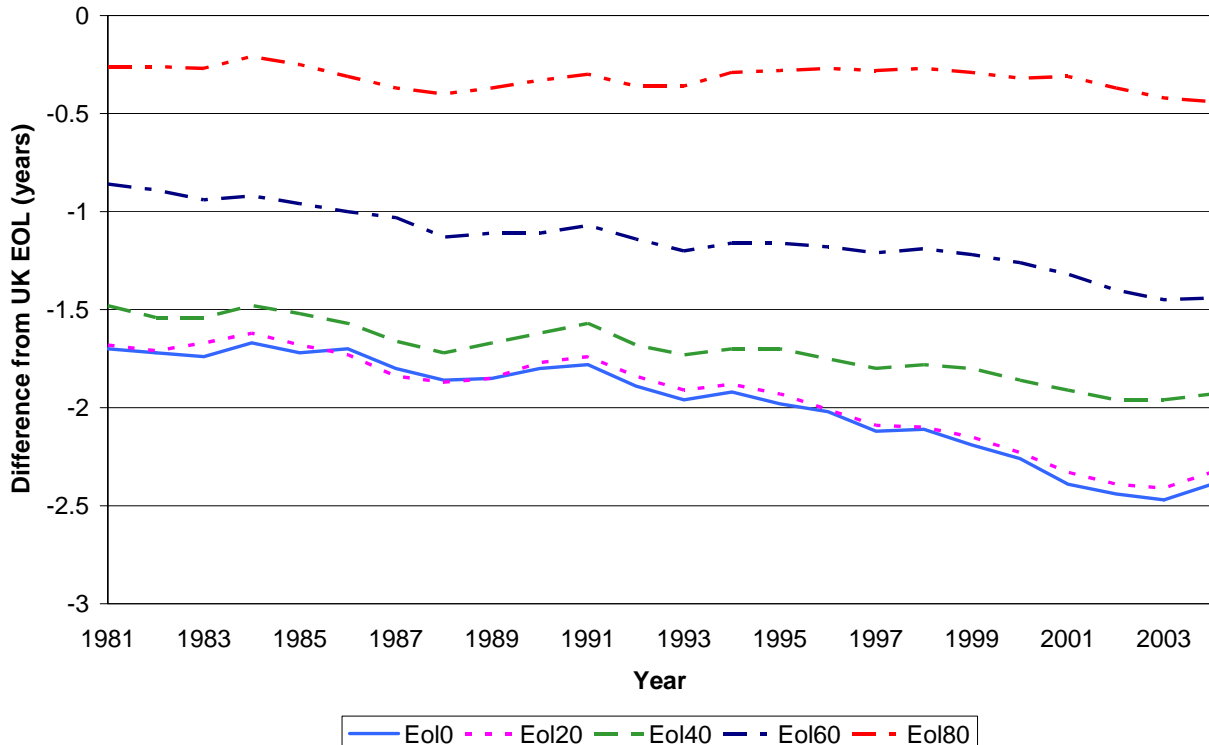
Figure B1 Projected smoothed reductions in death rates by age, UK 2006-2007
Males





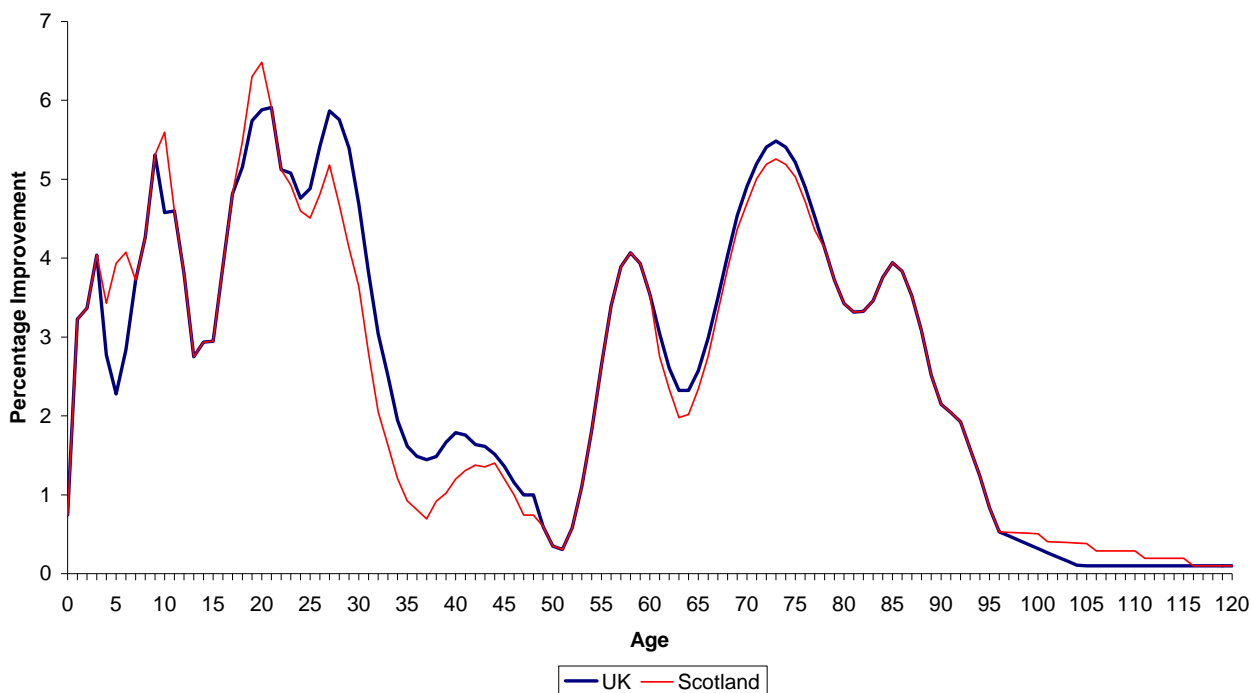
A comparison of period expectations of life (eols) for Scotland with the UK as a whole (**Figure B2**) suggests there has been a gradual widening in the difference in expectations of life for males under the age of 80, since the early-1980s. There are no obvious patterns of divergence (or convergence) in the comparison of Scottish and UK life expectancies for females.

Figure B2 Period expectations of life (Eol) for Scotland less respective expectation of life for UK – for males at birth and ages 20, 40, 60 and 80



Given this finding for males, further analysis indicated lower rates of improvement should be adopted in Scotland for males in their 20s, 30s and early 40s, and also in their late 50s and early 60s, than for the UK as a whole. The extent of these differences is shown in **Figure B3**. Higher improvement rates were adopted at a few younger and older ages to maintain a smoother run of projected mortality rates at those ages.

Figure B3: Comparison of proposed UK and Scotland mortality improvements for base year of projections - males

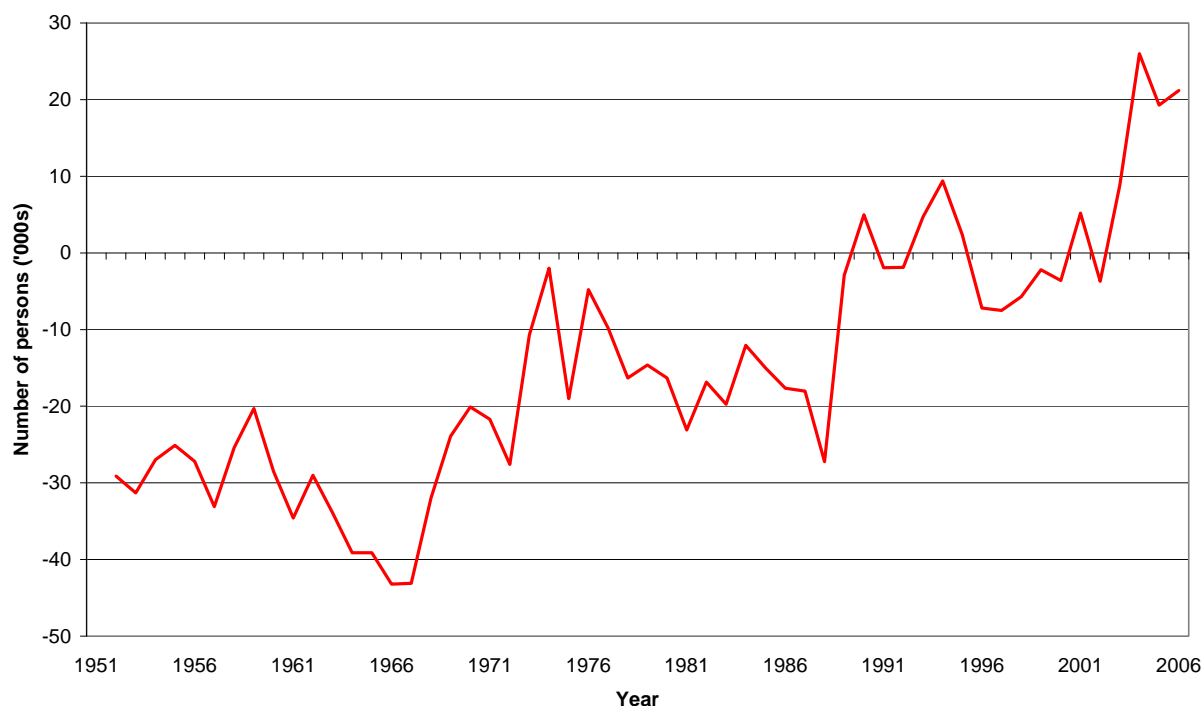


The impact of these new assumptions can be summarised using the period expectation of life at birth, based on the mortality rates for the given year. This life expectancy is assumed to rise from 74.7 years in 2005 to 80.4 years in 2031 for males, and from 79.5 years in 2005 to 84.8 years in 2031 for females (For the UK as a whole, the equivalent figures are a rise from 77.0 years in 2005 to 82.7 years in 2031 for males, and from 81.2 years in 2005 to 86.2 years in 2031 for females). Compared to the assumptions used in the 2004-based projections for Scotland, these lead to an increase in the expectations of life at birth for males of around 1.2 years in 25 years, and for females of 1.1 years.

Annex C Migration assumptions

The long term assumption for net migration to Scotland is +8,500 each year compared with +4,000 in the 2004-based projections. This increase follows a recent rise in migration compared with previous years and is also partially due to a change in the way that international migrants are distributed amongst UK countries by ONS. **Figure C1** illustrates the trends since 1951.

Figure C1 Estimated net migration, Scotland, 1951-2006



The long term assumptions are comprised of +4,000 from cross-border migration and +4,500 from international migration. The cross-border assumptions are derived from the average of moves recorded through the National Health Service Central Register (NHSCR) system over the last 10 years. The international migration assumption is based largely on International Passenger Survey data (IPS).

Table C1 shows the way in which the 8,500 net migration figure is distributed amongst age groups alongside the distribution of the population of Scotland in 2006. Migrants tend to be much younger than the population as a whole with the majority in the 16-29 age group.

Table C1 Age distribution of population (2006) and of long term net migration assumption

Age group	Scottish population (2006)	Long term net migration assumption
0-15	18%	12%
16-29	18%	68%
30-44	22%	5%
45-59	21%	10%
60-74	14%	2%
75+	7%	4%

Migration assumptions for the initial years are designed to reflect recent rates of migration, and gradually converge to the long-term assumptions. These short term assumptions for total net migration are:

These reflect recent migration data and also include an additional allowance for migrants from the A8 Accession countries.

Annex D Variant projections and assumptions

Every two years the Office for National Statistics (ONS), in consultation with the Registrars General, produces a “principal” population projection and a number of “variant” projections, based on alternative assumptions of future fertility, mortality and migration, for the UK and its constituent countries. The variants are produced because of the inherent uncertainty of demographic behaviour, to give users an indication of this uncertainty. There are two distinct types of variant produced: “standard” variants and “special case scenarios”.

As well as the “principal” assumptions, high and low assumptions are prepared for each of the components of population change (fertility, life expectancy and net migration). These are used to generate what are referred to as the “standard variants”. There are 27 possible combinations of these sets of assumptions although aside from the principal projection only 12 are published by ONS. These are the six possible “single component” variants (i.e. varying only one component at a time from the principal assumptions, the purpose being to illustrate plausible alternative scenarios rather than to represent upper or lower limits for future demographic behaviour) and also six selected “combination” variants: those which produce the largest / smallest total population size, the oldest / youngest age structure and the largest / smallest dependency ratios. Dependency ratios show the relationship between the working age population and the two main dependent groups – children under 16 and people of pensionable age.

As well as producing the “standard variants” ONS produce “special case scenarios” or “what if” projections to illustrate the consequences of a particular, but not necessarily realistic set of assumptions. In total four sets of special case scenarios are likely to be prepared:

- Replacement fertility
- Constant fertility
- No mortality improvement
- Natural change only (or zero migration)

In addition two special case projections, based on combinations of these assumptions, will be prepared:

- No change projections – shows what would happen if fertility, mortality and net migration were to remain at current levels
- Stationary projections – shows a population with an unchanging size and age structure using replacement level fertility, constant mortality rates at all ages and zero net migration at all ages

More details on the variants referred to in this paper and their assumptions are contained in **Table A** and **Table B** on the next page.

On the date of the publication of this paper (23 October 2007) only the six standard variants and the zero migration variant were published. The remaining variants will be published on GAD’s website in November 2007. More details about all the variants mentioned in this paper can be obtained from GAD’s website: www.gad.gov.uk.

Table A Assumptions for the 2006-based principal and seven variant projections for Scotland

	Assumptions	Long-term Fertility (Total Fertility Rate - TFR)	Life Expectancy Males (2031)	Life Expectancy Females (2031)	Long-term Migration
Standard variants	High variant	1.85	82.5	86.1	+17,000
	Principal	1.65	80.4	84.8	+8,500
	Low variant	1.45	78.3	83.5	0
Special case scenario	Zero migration	1.65	80.4	84.8	0

Table B Variants and Scenario

		Fertility	Life expectancy	Migration
1	Principal projection	Principal	Principal	Principal
Standard 'single component' variants				
2	High fertility	High	Principal	Principal
3	Low fertility	Low	Principal	Principal
4	High life expectancy	Principal	High	Principal
5	Low life expectancy	Principal	Low	Principal
6	High migration	Principal	Principal	High
7	Low migration	Principal	Principal	Low
Special case scenario				
8	Zero migration	Principal	Principal	Zero

9. Notes on Statistical Publications

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