NOTE: This is an Archive Report of the Healthy Life Expectancy web pages on the ScotPHO website, as at 13 December 2016

Links within this report have been disabled to avoid users accessing out-of-date information. For the latest information please see the relevant "live" web page.

Healthy life expectancy: key points (new data this update)

Life expectancy (LE) is an estimate of how many years a person might be expected to live, whereas **healthy life expectancy (HLE)** is an estimate of how many years they might live in a 'healthy' state. HLE is a key summary measure of a population's health.

Note: There is a major discontinuity in the HLE series between 2008 and 2009 due to a change in methodology to align with the European Union. This results in estimates of HLE at birth from 2009 onwards being over eight years lower for each sex. The 2009 estimates form the start of a new time trend.

- The most recent annual estimates for Scotland are for boys born in 2015 to live 76.9 years on average, 59.9 of these in a 'healthy' state. Girls born in 2015 would be expected to live 81.0 years on average, 62.3 of these years being 'healthy'.
- Although there has been a small decrease from 2014 (0.5 years for males and 0.4 years for females), underlying trends in LE at birth show a general improvement in Scotland over recent years.
- The gap between LE and HLE (the years expected to be spent in a 'not healthy' state during the average lifetime) has been fairly constant for females between 1980 and 2008, but tended to increase for males.
- Time trends show that the gap between the sexes, in both LE and HLE at birth, has narrowed over time. For LE at birth, the difference between males and females was 6.4 years in 1980, falling to 4.1 years in 2015. For HLE at birth, the difference between males and females was 3.3 years in 1980, falling to 2.4 years in 2015.
- LE and HLE are lower in Scotland than in the UK as a whole, for both males and females. For further details see the UK comparisons page.
- Scotland has one of the lowest life expectancies in Western Europe. International comparisons of HLE are hampered by the lack of consistent health measures. However, on the basis of a related indicator, healthy life years (HLY), it would appear that, in comparison with many European countries, Scotland fares badly for males but compares better for females. For further details see the International comparisons page.

ScotPHO welcomes feedback from website users on the information included in this update. Please e-mail us at scotpho@nhs.net with any comments on how the data are used and presented and how this could be improved.

Section updates:

- The last major update of this section was completed in **December 2016**. It included 2015 HLE estimates for Scotland.
- The next major update is due to be carried out in **December 2017.**

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This is an **Official Statistics Publication for Scotland** produced by Information Services Division (ISD) on behalf of ScotPHO. See the ISD About Our Statistics web page for further information on ISD and Official Statistics.

User engagement:

ScotPHO and ISD are keen to seek the views of users of health statistics in Scotland in order to improve their quality, value, accessibility and impact. A joint engagement event was arranged in 2014 with ISD, UK Statistics Authority and health statistics users (see the full report (1Mb)).

ScotPHO welcomes feedback on the information included in this update and its presentation; please email us at scotpho@nhs.net.

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Healthy life expectancy: introduction

What is life expectancy (LE)?

Put at its simplest, LE is an estimate of how long the average person might be expected to live. LE is most often quoted for an entire lifetime; LE at birth is the number of years that a newborn baby would live if they experienced the death rates of the local population at the time of their birth, throughout their life. It is a theoretical measure rather than a true prediction of life expectancy, since death rates may increase or decrease during a person's lifetime, and people may move to areas with different mortality risks.

LE can also be calculated for other ages. For example, LE at age 65 indicates the number of further years that a 65-year-old might be expected to live. As a person who reaches 65 has already survived many years, their LE when added to their current age (65) will generally be greater than the corresponding estimate of a baby's LE at birth. For example, a 65-year-old man might have a LE of 15 years, meaning that he might be expected to live until the age of 80; whereas a boy's LE at birth might only be 73 years.

While LE is a very useful measure, it does not take account of how healthy someone is during their life. The measure of healthy life expectancy attempts to do this.

What is healthy life expectancy (HLE)?

Put at its simplest, HLE is an estimate of how long the average person might be expected to live in a 'healthy' state. Like LE, it is most often expressed for an entire lifetime from the time of birth. HLE at birth is the number of years that a newborn baby would live in 'healthy' health if they experienced the death rates and levels of general health of the local population at the time of their birth, throughout their life.

HLE is calculated by combining LE and a measure of 'healthy' health: in these HLE analyses for Scotland the measure used is self-assessed general health (see HLE technical paper (section 1.4). This is self-reported by survey or Census respondents but has been shown to reflect both mental and physical health.

Why is HLE useful?

HLE provides a single summary measure of a population's health, which takes account of the population's health status and death rates at different ages. HLE can be used to look at health trends over time and to compare the health of different populations and population sub-groups. It is useful in resource allocation, planning of health and other services, and evaluation of health outcomes. Further information on the uses made of HLE estimates, and users' experiences of the statistics, are included in the HLE technical paper (Appendix B).

Why look at HLE alongside LE?

While one aim is to maximise LE for the population, a second aim is to maximise HLE for the population. In other words, the target is a healthy life and not just a long life. The gap between LE and HLE indicates the length of time likely to be spent in 'not healthy' health by the average person, and therefore when considering time trends a third aim is to try to increase HLE so that it comes closer to LE, reducing the gap or period of morbidity (ill-health). The proportion of the average lifetime expected to be spent in 'healthy' health (HLE/LE) is often used to assess whether over time there is a **compression of morbidity** (proportion increasing, i.e. less time spent in poor health) or an **expansion of morbidity** (proportion decreasing, i.e. more time spent in poor health).

The period spent in 'not healthy' health will tend to occur towards the end of life, but LE and HLE are average measures and some people experience 'not healthy' health in their early years.

Both LE and HLE are usually estimated for males and females separately, as in Western Europe women generally outlive men by several years. More detailed notes on LE and HLE and methodology can be found in the HLE technical paper.

What other measures of health expectancy are there?

The global term for HLE and other similar measures is **health expectancy**. While these HLE analyses for Scotland are based on self-assessed general health, alternative measures of health can be used. One of the most common is the absence of limiting long-term illness or disability (primarily a measure of physical

functioning), leading to the estimation of **disability-free life expectancy (DFLE)** which is sometimes also called **healthy life years**.

Page last updated: 23 March 2016

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Healthy life expectancy: policy context

Although life expectancy (LE) and healthy life expectancy (HLE) have been increasing in Scotland in recent years, both tend to be worse (lower) in Scotland than in the UK as a whole. Indeed, due to its relatively high death rates, Scotland has one of the lowest levels of LE in Western Europe (see international comparisons).

The aim of increasing HLE is included as part of the high level purpose target on Population set out by the Scottish Government in Scotland Performs:

Government Economic Strategy Target 4: "To match average European (EU15) population growth over the period from 2007 to 2017, **supported by increased healthy life expectancy in Scotland over the period from 2007 to 2017."**

Methodological changes and limited availability of data have complicated the assessment of time trends in HLE. However, estimates of HLE at birth based on self-assessed health from both the Scottish Health Survey and Scottish Household Survey suggest an increasing general trend between 2003 and 2011 for both males and females (see Scotland Performs chart). This suggests that progress is being made towards the target for the period 2007 to 2017.

Equally Well is the Scottish Government's social policy framework on reducing health inequalities initiated by the Ministerial Task Force on Health Inequalities. This sets out a series of recommendations addressing the social determinants of health – including education, poverty and employment – and the need for preventative action in the early years. In 2008 the Ministerial Task Force called for analysis to support long-term monitoring of inequalities in a number of high level indicators, of which HLE was one.

The 2015 Long-term Monitoring of Health Inequalities report, published by the Scottish Government on 27 October 2015, includes a section on Healthy life expectancy at birth. It concludes that there have been no clear changes to inequalities in male or female healthy life expectancy (HLE) since 2009-2010. Changes to the methodology from 2009 mean comparisons with earlier years cannot be made.

At a European level, the pilot European Innovation Partnership on Active and Healthy Ageing has an overarching target to increase the average healthy lifespan in Europe by two years by 2020. It is focused on three areas: prevention and health promotion; care and cure; and active and independent living of elderly people.

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Healthy life expectancy: data introduction

Estimates of life expectancy (LE) and healthy life expectancy (HLE) for Scotland and the population sub-groups indicated in Table 1 are to be found within the data pages accessible via the menu on the left.

The **December 2016 HLE update** includes previously unpublished 2015 LE and HLE estimates for Scotland. It also includes an update of UK comparisons and International comparisons.

Table 1: Data for Scotland presented on life expectancy and healthy life expectancy

Data dimensions / geographies	Data Presented ? (Y=yes; N=no)	
	Life expectancy	Healthy life expectancy
By gender	Y	Y
By age group	Y	Y
By NHS board area	Y	Y
By council area	Y	Y
By intermediate geography	Y (but not shown for very small areas)	N
By deprivation quintile	Y	Y
By deprivation decile	Y	Y
By urban rural classification	Y	Y
Time trend	Y	Y
National target	No target	Y (trends show progress towards 2017 target)
Comparison with UK/GB	Y	Y
International comparison	Y	Y (limited data, for health expectancy)

The 2004 Healthy life expectancy in Scotland (324KB) report, executive summary (92KB) and paper by Wood et al (2006) provided the first published estimates of male and female HLE for the Scottish population. They included estimates by NHS board, local authority area and deprivation quintile, with health expectancy based on either self-assessed health (SAH) or limiting long-term illness.

Important data notes

95% confidence intervals are presented alongside every LE or HLE estimate presented here, to show the precision of each figure in terms of the likely range of random year-to-year statistical variability in the data used to produce the estimates. However, it should be emphasised that it is not possible to quantify effects such as any inconsistencies in how people interpret and respond to questions about their health, or any unusual circumstances which affect the figures for a particular area or year. For further discussion of such issues, and interpretation of the 95% confidence interval for LE in a particular small area, please see the data page for intermediate geographies.

Please note that in the charts on the data pages, the y axis does not start at zero, and different scales may be used in different charts as appropriate.

ScotPHO publishes Scotland's definitive **HLE** estimates (alongside the corresponding LE estimates for the same time-periods and geographies, to allow an estimation of the time expected to be spent in 'not healthy' health).

The Office for National Statistics (ONS) publishes the definitive Scotland-level **LE** estimates (based on interim life tables by single year of age) on behalf of National Records of Scotland (NRS). ONS also publish Health Expectancies data for Scotland including LE, HLE and DFLE.

NRS publishes definitive **LE** estimates for areas within Scotland.

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Healthy life expectancy: Scotland (new data this update)

Males

The table and chart within the Excel workbook for males (38Kb) show the patterns for life expectancy (LE) and healthy life expectancy (HLE) at birth for males in Scotland, over the period 1980 to 2015. In addition to the 1-year period data which indicate trends over the full time period, more robust 5-year period data for 1999-2003 and 2009-2013 are shown for comparison. 95% confidence intervals are presented to give some indication of the stability of the estimates.

- Estimates of male LE at birth based on single years of data increased from 68.7 years in 1980 to 76.9 years in 2015; an increase of 8.2 years overall (or 11.9% of the 1980 figure).
- Estimates of male HLE at birth based on single years are quite variable, but like LE demonstrate an overall upward trend. HLE increased from 62.6 years in 1980 to 68.1 years in 2008; an increase of 5.5 years overall (or 8.8% of the 1980 figure). **Estimates of HLE from 2009 onwards are not comparable with earlier years due to a major change in the self-assessed health (SAH) question. For further discussion, please see the HLE technical paper (section 1.4.3).**
- Male HLE at birth based on the new SAH question was estimated to be 60.0 years in 2009 and 59.9 years in 2015 (figures not significantly different).
- The gap between LE and HLE for males born between 2009 and 2015 has increased slightly from 15.9 years to 17.1 years. The **percentage** of life expected to be spent in 'healthy' health ((HLE/LE) x 100) decreased slightly from 79.0% in 2009 to 77.8% in 2015, indicating an expansion in morbidity when assessed by this measure.
- The most robust HLE estimates are based on SAH measured in the Scotland Census. The estimate for HLE at birth for the 5-year period 2009-2013 based on SAH from the 2011 Census (63.1 years) is significantly higher than the single year estimate for 2011 based on SAH from the Scottish Health Survey and Scottish Household Survey (60.4 years). The former is likely to be more accurate because of the far larger sample size in the Census than in the surveys. Further details are given in the HLE technical paper (section 1.4.1).
- The wide confidence intervals for HLE compared to LE reflect the use of survey data for the SAH component of HLE. They became narrower in 1999 when the Scottish Household Survey (with a larger sample size) became available and was used in place of the General Household Survey.

Females

The table and chart within the Excel workbook for females (39Kb) show the corresponding patterns for LE and HLE at birth for females in Scotland, over the 35-year period 1980 to 2015.

- Estimates of female LE at birth based on single years of data have increased from 75.1 years in 1980 to 81.0 years in 2015; an increase of 5.9 years overall (or 7.9% of the 1980 figure).
- Estimates of female HLE at birth based on single years are quite variable, but like LE demonstrate an overall upward trend. HLE increased from 65.9 years in 1980 to 70.8 years in 2008; an increase of 4.9 years overall (or 7.4% of the 1980 figure). As discussed above, there is a break in the time series after 2008; the change in the SAH question resulted in HLE estimates of 62.2 years in 2009 and 62.3 years in 2015 (figures not significantly different).
- The gap between LE and HLE has been fairly constant for females born between 2009 and 2015 (around 18.7 years). The **percentage** of life expected to be spent in 'healthy' health ((HLE/LE) x 100) has also been fairly constant at around 76.9%. Therefore, there has been neither a compression nor an expansion in morbidity.
- The estimate of HLE at birth for the 5-year period 2009-2013 based on SAH from the 2011 Scotland Census (65.3 years) is significantly higher than the single year estimate for 2011 based on SAH from the Scottish Health Survey and Scottish Household Survey (62.7 years). The former is likely to be more accurate because of the far larger sample size in the Census than in the Survey. Further details are given in the HLE technical paper (section 1.4.1).

Comparison of patterns for males and females

The more robust 5-year period (2009-2013) data for Scotland demonstrate that:

- Females have greater longevity than males, with LE at birth over 4 years longer for females (80.8 years) than males (76.6 years).
- Females have a greater HLE at birth than males, although the difference of just over 2 years (females 65.3 years versus males 63.1 years) is less than for LE.
- Females are, however, expected to spend on average 2 years longer in 'not healthy' health than males (15.6 compared with 13.5 years).

Time trends in the single year data show that the gap between the sexes in both LE and HLE at birth has narrowed over time:

- The difference between males and females in LE at birth was 6.4 years in 1980, falling to 4.1 years in 2015.
- The difference between males and females in HLE at birth was 3.3 years in 1980, falling to 2.4 years in 2015.

Further information

LE and HLE can be estimated for people at various ages, not just at birth. These data are provided in the Excel workbook for males and females (21KB) for Scotland, based on the data presented above for the 5-year period 2009-2013. These show that, for example, an average man aged 65 could expect to live a further 17.1 years, 9.3 of them in 'healthy' health. An average 65-year-old woman could expect to live a further 19.5 years, 10.2 of them in 'healthy' health.

In addition to LE and HLE at different ages (with 95% confidence limits), Table 3 also shows for each age group: the population estimate, number of death registrations, proportion of population surviving to a specific age, number reporting SAH, proportion with 'not healthy' health, and period expected to be spent in 'not healthy' health.

The HLE technical paper provides further information on life tables and methodology, data sources, etc.

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Healthy life expectancy: NHS boards

Males

Chart 1a and the accompanying Table 1a within the Excel workbook for males (67Kb) show life expectancy (LE) and healthy life expectancy (HLE) at birth for males in the 14 Scottish NHS Board areas, for the period 2009-2013. The estimates are based on 5 years of data on deaths and populations, and a single year of data for self-assessed health (SAH) from the Scotland Census for 2011 (the middle year).

- When ordered by LE at birth, Orkney had the highest male LE (79.3 years) and Greater Glasgow and Clyde the lowest (74.5 years).
- HLE at birth broadly followed the same pattern, with Orkney having the highest male HLE (68.3 years) and Greater Glasgow and Clyde the lowest (59.4 years).
- The three island boards (Orkney, Shetland and Western Isles) and Grampian had some of the shortest periods expected to be spent in 'not healthy' health (LE minus HLE); around 11-12 years. By contrast, the figure for Greater Glasgow and Clyde was 15.1 years.

Chart 1b and the accompanying Table 1b show trends in life expectancy between the 2001 Census and the 2011 Census, with all NHS Boards showing an increase. LE for males in Scotland was 73.3 in 1999-2003, and 76.6 in 2009-2013 (an increase of 3.3 years).

Chart 1c and the accompanying Table 1c show healthy life expectancy based on the 2001 Census and the 2011 Census. **However, due to a change in the question for self-assessed health, the HLE data for 2001 and 2011 are not comparable.**

Females

Chart 2a and the accompanying Table 2a within the Excel workbook for females(68Kb) show the comparable data for LE and HLE at birth for females, by NHS Board area, for the period 2009-2013.

- When ordered by LE at birth, Borders had the highest female LE (82.5 years) and Greater Glasgow and Clyde and Lanarkshire the lowest (both 79.8 years).
- HLE at birth broadly followed the same pattern, with Orkney having the highest female HLE (70.9 years) and Greater Glasgow and Clyde and Lanarkshire the lowest (62.0 and 62.1 years respectively).
- Similarly, the period expected to be spent in 'not healthy' health (LE minus HLE) ranged from 11.0 years in Orkney to 17.8 years in Greater Glasgow and Clyde.

Chart 2b and the accompanying Table 2b show trends in life expectancy between the 2001 Census and the 2011 Census, with all NHS Boards showing an increase. LE for females in Scotland was 78.7 in 1999-2003, and 80.8 in 2009-2013 (an increase of 2.1 years).

Chart 2c and the accompanying Table 2c show healthy life expectancy based on the 2001 Census and the 2011 Census. **However, due to a change in the question for self-assessed health, the HLE data for 2001 and 2011 are not comparable.**

Further information

LE and HLE can be estimated for people at various ages, not just at birth. These data are provided in the Excel workbook for males and females (487KB) for the 14 NHS Board areas in Scotland, based on the 5-year period 2009-2013. These allow the user to look at LE and HLE at ages other than birth (with 95% confidence limits). Also shown for each age group are: the population estimate, number of death registrations, proportion of population surviving to a specific age, number reporting SAH, proportion with 'not healthy' health, and period expected to be spent in 'not healthy' health.

More recent LE data by NHS Board, including time trends, are published by National Records of Scotland (NRS, formerly the General Register Office for Scotland).

Life Expectancy by NHS Board deprivation quintiles are also published in the ScotPHO Deprivation Profiles.

The HLE technical paper provides further information on life tables and methodology, data sources, geography, etc.

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Health life expectancy: local authorities

Community Health Partnerships (CHPs) ceased to exist on 1 April 2015, following recommendations in the Public Bodies (Joint Working) (Scotland) Act 2014 (asp 9). Therefore LE/HLE data are now presented at local authority level for the 32 local authorities (also known as council areas) within Scotland.

Males

The table and chart within the Excel workbook for males(73KB) show life expectancy (LE) and healthy life expectancy (HLE) at birth for the 32 local authorities in Scotland, for the period 2009-2013. The estimates are based on 5 years of data on deaths and populations, and a single year of data for self-assessed health from the Scotland Census for 2011 (the middle year).

- East Dunbartonshire had the highest male LE at birth (80.3 years), and Glasgow City the lowest male LE at birth (72.6 years).
- HLE at birth broadly followed the same pattern, with East Dunbartonshire having the highest male HLE (68.3 years), and Glasgow City the lowest (55.9 years). This means that a boy born during 2009-2013, subject to the self-assessed health and mortality patterns for Glasgow City during that period, would be expected to live in a healthy state for 12.4 years less than a similar baby experiencing the patterns for nearby East Dunbartonshire.
- Orkney and Aberdeenshire had the shortest period expected to be spent in 'not healthy' health (LE minus HLE); 10.8 and 10.9 years respectively. By contrast, Glasgow City had the longest period expected to be spent in 'not healthy' health (16.7 years).

Females

The table and chart within the Excel workbook for females (73KB) show the comparable data for LE and HLE at birth for females for the 32 local authorities in Scotland, for the period 2009-2013.

- East Dunbartonshire had the highest female LE at birth (83.4 years), and Glasgow City the lowest female LE at birth (78.4 years).
- HLE at birth broadly followed the same pattern across the 32 local authorities as LE at birth. Orkney had the highest female HLE (71.0 years), and Glasgow City the lowest (58.5 years). This means that a girl born during 2009-2013, subject to the self-assessed health and mortality patterns for Glasgow City during that period, would be expected to live in a healthy state for nearly 12.5 years less than a similar baby experiencing the patterns for Orkney.
- Orkney had the shortest period expected to be spent in 'not healthy' health (LE minus HLE); 11.0 years. By contrast, Glasgow City had the longest period expected to be spent in 'not healthy' health (20.0 years).

Further information

LE and HLE can be estimated for people at various ages, not just at birth. These data are provided in the Excel workbook for males and females(423KB) for the 32 local authorities in Scotland, based on the 5-year period 2009-2013. These allow the user to look at LE and HLE at ages other than birth (with 95% confidence limits). Also shown for each age group are: the population estimate, number of death registrations, proportion of population surviving to a specific age, number reporting SAH, proportion with 'not healthy' health, and period expected to be spent in 'not healthy' health.

More recent LE data by council area are published by National Records of Scotland (NRS).

Life Expectancy by local authority deprivation quintiles are also published in the ScotPHO Deprivation Profiles.

The HLE technical paper provides further information on life tables and methodology, data sources, geography, etc.

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Life expectancy: intermediate geographies

Exclusion rules

Within Scotland, statistics are sometimes published by small areas such as intermediate geography (also called intermediate zone). Healthy life expectancy (HLE) is not estimated for such small areas due to the severe instability of the very small numbers that would be used to calculate the proportion of Census respondents with 'healthy' health in each age group. However, life expectancy (LE) has been analysed by this geography, and for most areas data are available for LE at birth for 5-year periods. However, to avoid the least robust situations, LE for a sex and area is not calculated where:

a) the 5-year total population for that sex was less than 5,000 people; and/or

b) there were fewer than 40 deaths for that sex over the 5-year period.

In addition, for a small number of intermediate geographies, LE could not be calculated because an age group had a zero population estimate or no deaths had occurred in the oldest (85+ years) age group. For further details, please see the HLE technical paper (section 2.1).

Available data

In June 2015, as part of the Health and Wellbeing Profiles update, LE data by intermediate zone were presented for five time periods: 1999-2003, 2001-05, 2003-07, 2005-09, 2007-11 and 2009-13. The intermediate zone data were grouped by council area - to access please use the Profiles Tool: use the drop down list to choose the Health & Wellbeing Profiles and select the geography required. The exclusion rules outlined above meant that some LE data were unavailable; for example in 2009-13, 2-3% of the 1,235 potential estimates for Scotland for each sex were not calculated.

The National Records of Scotland (NRS, formerly the General Register Office for Scotland) also produced estimates for 2003-07 and 2005-09. However ISD data are based on revised population figures from the 2011 Census, whereas NRS date are based on population data from the 2001 Census, and therefore there may be small differences for some areas.

Interpreting the LE findings

Using exclusion rules means that some extreme LE estimates are omitted from the full range for intermediate geographies within Scotland. It is therefore not possible to state which intermediate geography has the highest or lowest LE. Over the time period 2009-13, amongst the remaining data for intermediate geographies, LE at birth ranged from 58.4 to 92.0 years for males, and from 70.3 to 94.3 years for females.

Please note that some of these data have large 95% confidence intervals (up to 14 or 12 years). The implications of this are best explained using an example. The lowest remaining male LE at birth (58.4 years) has a confidence interval of 8.0 years, from 54.4 to 62.4 years. This means that there is a 1 in 20 chance that the true LE at birth lies either below 54.4 years or above 62.4 years (although the most likely true value remains at 58.4 years). The wide range of possible values indicates that further caution is required in drawing conclusions about the apparent ranking of small areas.

As small numbers are involved, these estimates for LE at birth in small areas are subject to random fluctuations in the number of deaths and the age at death. As a result, conclusions about time trends for any specific small area may not be reliable. Also, in any small area where the population is changing significantly (rising or falling), the calculated mortality rates and LE estimates may be less reliable as the population estimates may not yet fully reflect this change.

Therefore the results should be interpreted as providing a general indication of LE estimates over time, rather than precise and robust figures. The 95% confidence intervals give some indication of the stability of the estimates, in terms of the likely range of random year-to-year statistical variability in the data from which the estimates are produced. However, it should be emphasised that it is not possible to quantify the effects of any unusual circumstances which affect the figures for a particular area or year.

If a small area has a low LE at birth, there may be particular reasons for this. For example, the area may include nursing homes, hostels or other long-term care establishments which may serve people

with poorer than average health and lower LE, and many of these people may have come from other parts of Scotland.

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Healthy life expectancy: deprivation quintiles

The earliest data are for 1999-2000 because the Scottish Household Survey (which provides estimates of self-assessed health (SAH)) started in 1999. LE data are presented for 2-year periods from 1999-2000 to 2013-14; HLE data are presented for all except 2003-04 when SAH was not recorded in the survey. Note that HLE from 2009-10 onwards is not comparable with earlier years due to a major change in the SAH question. For further discussion on the change, please see the HLE technical paper (section 1.4.3).

In addition to the 2-year figures which indicate time trends, data are also presented for the more statistically robust 5-year periods 1999-2003 and 2009-2013, which are based on 5 years of data on deaths and populations, and SAH from the Scotland Censuses.

The deprivation quintiles are based on the Scottish Government's Scottish Index of Multiple Deprivation (SIMD), not weighted for population. SIMD 2006 used up to 2007-08 analyses; SIMD 2009 v2 used for 2009-10, SIMD 2012 used for 2010-14. For discussion on this change, please see the HLE technical paper (section 6 - Deprivation quintiles).

Males

Chart 1a and the accompanying Table 1a within the the Excel workbook for males (52Kb) show male life expectancy (LE) and healthy life expectancy (HLE) at birth for the 5 deprivation quintiles in Scotland, for the period 2009-2013. The estimates are based on 5 years of data on deaths and populations, and a single year of data for self-assessed health (SAH) from the Scotland Census for 2011 (the middle year).

- As expected, male LE at birth decreased steadily from the least to the most deprived quintile. In 2009-13, LE for the least deprived quintile (81.4 years) was 10.3 years longer than for the most deprived quintile (71.1 years).
- There was a similar, but more marked, pattern for HLE; in 2009-13, HLE at birth for the least deprived quintile (71.5 years) was 18.1 years longer than for the most deprived quintile (53.4 years).
- There is a clear gradient in the period expected to be spent in 'not healthy' health (LE minus HLE); in 2009-13 this ranged from 9.9 years in the least deprived quintile to 17.7 years in the most deprived quintile.

Chart 1b and the accompanying Table 1b show trends in life expectancy between 1999-2000 and 2013-14.

- Like the overall figure for Scotland, the figures for deprivation quintiles tended to show a steady increase over time in LE at birth. Between 1999-2000 and 2013-14, the increase ranged from 3.8 to 4.3 years.

Chart 1c and the accompanying Table 1c show trends in healthy life expectancy between 1999-2000 and 2013-14.

- HLE at birth for 2-year periods also tended to increase over time before 2009-10 when the new methodology was introduced.
- HLE estimates are likely to be more accurate when based on SAH from the Scotland Census than on SAH from surveys (with much smaller numbers of respondents). The 2009-2013 data based on the 2011 Census are slightly higher than the survey-based data. This emphasises the less robust nature of the 2-year survey-based data.

Females

Chart 2a and the accompanying Table 2a within the Excel workbook for females (52Kb) show the comparable female LE and HLE at birth data for the 5 deprivation quintiles in Scotland, for the period 2009-2013.

- As expected, female LE at birth decreased steadily from the least to the most deprived quintile. In 2009-13, LE for the least deprived quintile (84.1 years) was 7.0 years longer than for the most deprived quintile (77.1 years).
- There was a similar, but more marked, pattern for HLE; in 2009-13, HLE at birth for the least deprived quintile (72.9 years) was 16.7 years longer than for the most deprived quintile (56.1 years).

- There is a clear gradient in the period expected to be spent in 'not healthy' health (LE minus HLE); in 2009-13 this ranged from 11.3 years in the least deprived quintile to 21.0 years in the most deprived quintile.

  Chart 2b and the accompanying Table 2b show trends in life expectancy between 1999-2000 and 2013-14.

- Like Scotland, all quintiles tended to show a steady increase over time in LE at birth. Between 1999-2000 and 2013-14, the increase ranged from 1.9 to 3.3 years.

  Chart 2c and the accompanying Table 2c show trends in healthy life expectancy between 1999-2000 and 2013-14.

- Apart from in the most deprived quintile, HLE at birth for 2-year periods also increased steadily over time before 2009-10 when the new methodology was introduced.

- HLE estimates are likely to be more accurate when based on SAH from the Scotland Census than on SAH from surveys (with much smaller numbers of respondents). The 2009-2013 data based on the 2011 Census are slightly higher than the survey-based data. This emphasises the less robust nature of the 2-year survey-based data.

Males and females summary

It may be concluded from the data that:

- For each sex, the more deprived the quintile the shorter the LE at birth, the shorter the HLE at birth and the longer the period expected to be spent in 'not healthy' health.

- For each sex, HLE at birth differed more between quintiles 1 and 5 than did LE at birth.

- The inequality or spread between deprivation quintiles 1 and 5 was wider for males than females for LE at birth, slightly wider for HLE at birth, but narrower for the period expected to be spent in 'not healthy' health.

- Between 1999-2000 and 2013-14, female LE at birth appears to have diverged slightly between quintiles 1 and 5, indicating a possible increase in health inequality for females. For males, the LE gap increased between 1999-2000 and 2007-08, but has reduced to a smaller gap in 2013-14.

Further information

LE and HLE can be estimated for people at various ages, not just at birth. These data are provided in the Excel workbook for males and females (226Kb) for the 5 deprivation quintiles in Scotland, based on the 5-year period 2009-2013 and SAH from the 2011 Census, as this is more robust than the 2-year period data for quintiles and is in line with the life tables presented for other geographies/groupings within Scotland.

The life tables allow the user to look at LE and HLE at ages other than birth (with 95% confidence limits). Also shown for each age group are: the population estimate, number of death registrations, proportion of population surviving to a specific age, number reporting SAH, proportion with 'not healthy' health, and period expected to be spent in 'not healthy' health.

The HLE technical paper provides further information on life tables and methodology, data sources, geography, etc.

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Healthy life expectancy: deprivation deciles

The deprivation patterns in life expectancy (LE) and healthy life expectancy (HLE) at birth identified for deprivation quintiles are examined below in more detail, by looking at deprivation deciles. Like the quintiles, these are based on the Scottish Government's Scottish Index of Multiple Deprivation (SIMD) , not weighted for population. SIMD 2006 is used up to 2004-06, SIMD 2009 v2 from 2006-08 to 2008-10, and SIMD 2012 for period 2010-13. For discussion on this change, please see the HLE technical paper (section 6 - Deprivation deciles).

LE at birth is presented for 5-year periods from 1994-98 (the earliest period for which decile population estimates are available) up to 2001-05, then 3-year periods from 2004-06. Healthy life expectancy (HLE) at birth is shown for 1999-2003 and 2009-2013, based on 5 years of data on deaths and populations, and a single year of data for self-assessed health (SAH) from the 2001 Census and the 2011 Census (respectively); the data from the 2011 Census are based on the new SAH methodology and therefore the HLE data for 2001 and 2011 are not comparable. Note that although HLE estimates based on survey SAH data for 2-year periods were presented for quintiles, they are not presented here for deciles as they are less robust at this smaller geography.

Males

The tables and charts within the Excel workbook for males (55Kb) show that:

- Male LE at birth decreased steadily from the least to the most deprived decile. In 1994-98, LE for the least deprived decile (77.0 years) was 11.0 years longer than for the most deprived decile (66.0 years). In 2009-13, LE for the least deprived decile (82.2 years) was 12.6 years longer than for the most deprived decile (69.5 years). This indicates a slight increase in inequality over this period.
- Like the figures for Scotland as a whole, most deciles showed a steady increase in LE at birth between 1994-98 and 2009-13. However, over the whole period the increases tended to be greater for the less deprived deciles and smaller for the most deprived deciles. Indeed, LE at birth in the most deprived decile was fairly constant until 2001-05, after which it also started to increase.
- HLE at birth in 2009-2013 decreased steadily from the least deprived decile (72.7 years) to the most deprived (51.1 years), giving a range of 21.6 years.
- There was also a clear gradient in the period expected to be spent in 'not healthy' health (LE minus HLE); in 2009-2013 this ranged from 9.5 years in the least deprived decile to 18.4 years in the most deprived decile.

Females

The tables and charts within the Excel workbook for females (55Kb) show that:

- Female LE at birth also decreased steadily from the least to the most deprived decile. In 1994-98, LE for the least deprived decile (80.9 years) was 7.0 years longer than for the most deprived decile (73.9 years). In 2009-13, LE for the least deprived decile (84.8 years) was 8.7 years longer than for the most deprived decile (76.1 years). This indicates a slight increase in inequality over this period.
- Like the figures for Scotland as a whole, most deciles showed a steady increase in LE at birth between 1994-98 and 2009-13. However, the increases tended to be greater for the less deprived deciles and smaller for the most deprived deciles.
- HLE at birth in 2009-2013 decreased steadily from the least deprived decile (74.1 years) to the most deprived (54.0 years), giving a range of 20.1 years.
- There was also a clear gradient in the period expected to be spent in 'not healthy' health (LE minus HLE); this ranged from 10.6 years in the least deprived decile to 22.1 years in the most deprived decile.

Males and females summary

It may be concluded from the data that:

- For both males and females, the more deprived the decile the shorter the LE at birth, the shorter the HLE at birth and the longer the period expected to be spent in 'not healthy' health.

- LE at birth has increased over time in all deciles.
- The inequality or spread between deprivation deciles 1 and 10 was wider for males than females for both LE and HLE at birth, but not for the period expected to be spent in 'not healthy' health.
- HLE at birth demonstrated a greater inequality between deciles 1 and 10 than did LE at birth.

Further information

LE and HLE can be estimated for people at various ages, not just at birth. These data are provided in the Excel workbook for males and females (270KB) for the 10 deprivation deciles in Scotland, based on the 5-year period 2009-2013. These allow the user to look at LE and HLE at ages other than birth (with 95% confidence limits). Also shown for each age group are: the population estimate, number of death registrations, proportion of population surviving to a specific age, number reporting SAH, proportion with 'not healthy' health, and period expected to be spent in 'not healthy' health.

The HLE technical paper provides further information on life tables and methodology, data sources, geography, etc.

Other deprivation analyses

LE data by deprivation decile (for 3-year periods) are published annually by National Records of Scotland (NRS, formerly the General Register Office for Scotland).

LE and HLE data were published in the Scottish Government's 2008 Long-term monitoring of health inequalities report, with bi-annual updates in 2011, 2013, and 2015. Using analyses for deciles based on the income-employment index (a deprivation measure developed from the Scottish Index of Multiple Deprivation (SIMD)) the 2015 report concludes that there have been no clear changes to inequalities in male or female healthy life expectancy (HLE) since 2009-2010.

In 2013-2014, male HLE at birth in the 10% most deprived areas in Scotland was 48.0 years, 24.3 years lower than in the least deprived areas (72.3 years). Female HLE at birth was 50.6 years in the most deprived areas in 2013-2014, 22.5 years lower than in the least deprived areas (73.1 years).

Changes to the methodology from 2009 mean comparisons with earlier years cannot be made (discussed in more detail in the HLE technical paper (section 1.4.3).

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Healthy life expectancy: urban rural classification

The association between rurality and life expectancy (LE) and healthy life expectancy (HLE) at birth was examined by means of the Scottish Government's urban rural classification. The 6-fold classification was used, comprising large urban areas, other urban areas, accessible small towns, remote small towns, accessible rural and remote rural. Approximately two-thirds of the Scottish population live in the two urban area categories. For further details of the classification, please see the HLE technical paper (section 6).

The data relate to the 5-year period 2009-2013, using death registrations and population estimates for each of the 5 years, self-assessed health (SAH) from the Scotland Census for 2011 (the middle year), and the Urban Rural classification based on the Scottish Government 6-fold classifications: UR6_2009_2010 used for 2009 and 2010, UR6_2011_2012 used for 2011 and 2012, and UR6_2013_2014 used for 2013. Trend data are also shown based on the 5-year period 1999-2003.

Males

The tables and charts within the Excel workbook for males (127KB) show that:

- Male LE at birth tended to decrease as area of residence became more urban. LE for remote rural (79.5 years) was 2.8 years longer than large urban areas (76.6 years) and 4.5 years longer than other urban areas (74.9 years).
- Male HLE at birth decreased steadily as area of residence became more urban. HLE for remote rural (67.4 years) was 5.7 years longer than large urban areas (61.7 years).
- There was also a clear gradient in the period expected to be spent in 'not healthy' health (LE minus HLE); this ranged from 11.8 years in accessible rural up to 14.9 years in large urban areas.

Females

The tables and charts within the Excel workbook for females (127KB) show that:

- Female LE at birth tended to decrease as area of residence became more urban. LE for remote rural (82.8 years) was 1.4 years longer than large urban areas (81.4 years) and 3.6 years longer than other urban areas (79.2 years).
- Female HLE at birth also tended to decrease as area of residence became more urban. HLE for remote rural (69.3 years) was 5.2 years longer than large urban areas (64.1 years) and 5.3 years longer than other urban areas (64.0 years).
- There was also a clear gradient in the period expected to be spent in 'not healthy' health (LE minus HLE); this ranged from 13.5 years in remote rural up to 17.3 years in large urban areas.

Males and females summary

It may be concluded from the data that, for both males and females:

- Residents of the rural areas are expected to live longest, live longest in a healthy state and spend fewest years in 'not healthy' health. This may be partly due to the fact that rural areas tend to have lower levels of deprivation than urban areas, and deprivation has been shown to be strongly associated with a lower LE and HLE (see deprivation quintiles and deprivation deciles data pages).
- Conversely, residents of the urban areas are expected to live the shortest time, live the shortest time in a healthy state and spend the most years in 'not healthy' health.
- HLE at birth showed a greater spread or inequality between the remote rural and large urban areas (around 5.4 years) than did LE at birth (around 4.1 years).

Further information

LE and HLE can be estimated for people at various ages, not just at birth. These data are provided in the Excel workbook for males and females (232KB) for the 6 urban rural classification categories in Scotland, based on the 5-year period 2009-2013. These allow the user to look at LE and HLE at ages other than birth (with 95% confidence limits). Also shown for each age group are: the population estimate, number of death

registrations, proportion of population surviving to a specific age, number reporting SAH, proportion with 'not healthy' health, and period expected to be spent in 'not healthy' health.

LE data by urban rural categories for the periods 2004-06 to 2007-09 were also published by National Records of Scotland (NRS, formerly the General Register Office for Scotland).

The HLE technical paper provides further information on life tables and methodology, data sources, geography, etc.

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Healthy life expectancy: UK comparisons (new data this update)

Comparisons including healthy life expectancy (HLE)

The Office for National Statistics (ONS) regularly publishes reports and tables comparing life expectancy (LE), healthy life expectancy (HLE) and disability-free life expectancy (DFLE), at birth and at age 65 in the United Kingdom and its constituent countries (England, Wales, Scotland and Northern Ireland). The ONS data are for a 3-year period and therefore the LE figures for Scotland will differ slightly from those published by ScotPHO for a 1-year or 5-year period.

For HLE the ONS estimates are based on self-assessed health (SAH) from the Annual Population Survey (APS) (previously they used a cross-sectional sample of the General Lifestyle module (GLF) of the Integrated Household Survey and the General Household Survey). The APS offers a substantially larger dataset for analysis than the GLF and therefore promises greater accuracy and precision in estimating health expectancies compared to historic survey sources. In addition, the APS collects data for all UK countries meaning estimates for each of the constituent countries can now be produced on a consistent basis from the same data source.

Please also note that ONS uses the terminology 'good' health to describe the SAH responses used to estimate HLE, and 'not good' health for the other responses, whilst ScotPHO uses the terms 'healthy' health and 'not healthy' health respectively.

Scotland compared with the UK

The ONS data, comparing Scotland with the UK as a whole, show a lower LE at birth in Scotland by 2.1 years for males and 1.8 years for females. LE at age 65 also tends to be lower in Scotland by 1.2 years for both males and females. This indicates that the lower LE at birth in Scotland than the UK is not simply due to inequalities in mortality at younger ages, but at older ages too.

Similarly, estimates of HLE in Scotland are slightly lower than for the UK as a whole. In 2013-15, HLE at birth was 1.3 years lower in Scotland than in the UK for males, and 1.1 years lower for females. At age 65, HLE was 0.5 years lower in Scotland than in the UK for males, and 0.2 years lower for females.

Scotland compared with other countries in the UK

Looking at the four constituent countries within the UK, in 2013-15, Scotland had the lowest LE for males and females at birth and at age 65, while England had the highest. England also ranked highest for HLE for each sex at birth and at age 65. Scotland had the second highest figure for HLE at birth, and the second lowest for HLE at age 65 for males. For females Scotland had the second highest for HLE at birth and at age 65.

Comparisons of LE only

ONS also produce complete interim life tables for the United Kingdom and its constituent countries, giving period life expectancy by single year of age (0 to 100) and sex for 3-year rolling periods. They are known as interim life tables to distinguish them from fully graduated life tables which are prepared only every ten years, based on data around a census year. ONS also calculates abridged life tables (based on 5-year age groups) for national and sub-national areas in the United Kingdom, for 3-year rolling periods.

Key ONS documents with data for Scotland include:

- Statistical Bulletin: Life expectancy at birth and at age 65 by local areas in the United Kingdom (click on the required edition and then on Reference tables). The spreadsheet for Scotland includes LE at birth and at age 65 for the UK, Scotland and Scotland's council areas (local authorities). Of the local authority areas in the UK, Glasgow City consistently had the lowest LE at birth and at age 65, for males and females.

- National life tables (click on the required bulletin and then on "view all data used in this statistical bulletin", then select the country/countries required). Each life table is based on the population estimates and deaths by date of registration data for a period of three consecutive years. The LE data for the United Kingdom and its constituent countries are shown by single year of age (0 to 100) and sex.

- Statistical Bulletin: Past and projected data from the period and cohort life tables: 2014-based, UK, 1981 to 2064 These show Life expectancy, probability of dying and numbers surviving from the period and cohort life tables, past and projected, for the UK and its constituent countries.

- Animated maps showing changes in LE at birth by local area in the UK, between 1991-93 and 2008-10 (archive page).

- LE comparisons between Scotland and the UK can also be found on the Scotland and European Health for All (HfA) Database which is described in more detail on the HLE international comparisons data page.

- In October 2015, National Records of Scotland published a guide that describes the methodology used to produce the life expectancy statistics for Scotland. This methodology is similar to that used to produce life expectancy estimates in other UK constituent countries.

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Healthy life expectancy: international comparisons (new data this update)

Life expectancy (LE)

Life Expectancy and Healthy Life Years (also called disability-free life expectancy (DFLE) data for the EU-28 European countries are available on the Eurostat website.

Using the Eurostat data to compare male LE at birth with the member states of the European Union (EU28), for the 3-year period 2012-14, Scotland ranked worse than 18 countries: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, the Republic of Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, Spain, Sweden and the United Kingdom.

There is a similar picture for female LE at birth, with Scotland ranking worse than 21 of the 28 member states of the EU: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, the Republic of Ireland, Italy, Luxembourg, Malta, the Netherlands, Poland, Portugal, Slovenia, Spain, Sweden and the United Kingdom.

Health expectancy

There do not appear to be suitable data to draw comparisons of healthy life expectancy (HLE) between Scotland and countries other than the UK, and therefore other measures of health expectancy must be considered.

The worksheets below include comparison of HLY (DFLE) at birth, using data for the 28 European Union countries from the Eurostat Statistics Database, and data for the UK and its constituent countries from the Office for National Statistics (ONS).

Caution is needed when comparing the data for HLY as the figures for the United Kingdom differ between the Eurostat and ONS sources, due to the use of different surveys: Eurostat data are based on the European Union Statistics on Income and Living Conditions (EU-SILC) Survey; ONS data are based on the Annual Population Survey (APS).

The table and chart within the Excel workbook for males (39Kb) show that for males in 2012-14, the UK as a whole ranked lower for HLY than 8 of the 28 member states of the EU: Belgium, Cyprus, Greece, the Republic of Ireland, Luxembourg, Malta, Spain and Sweden. Scotland had the second lowest DFLE at birth of the four countries within the UK. Although it is difficult to compare Scotland directly with the EU countries, it would appear that Scotland would be in the lower half of the ranking for HLY in males.

The table and chart within the Excel workbook for females (38Kb) show that for females in 2012-14, the UK as a whole ranked lower for HLY than 7 of the 28 member states of the EU: Bulgaria, Cyprus, Greece, the Republic of Ireland, Malta, Spain and Sweden. Scotland had the second lowest DFLE at birth of the four countries within the UK, and although comparisons with the EU countries are again hampered by the use of different surveys, it would appear that Scotland would also be in the lower half of the ranking for HLY in females.

Again, some caution is needed in drawing conclusions, as the data are based on just one 3-year period, and there are differences arising from the use of different surveys in the two sets of UK data. It would appear, however, that for HLY, in comparison with many European countries, Scotland fares badly for males but compares better for females.

Other publications

LE data are included in the Scotland and European Health for All (HfA) Database. This presents data for life expectancy at birth and at ages 1, 15, 45 and 65 years, and allows quick comparisons between Scotland and any/all of the 53 member states in the WHO European Region, including the UK. Time trends are given, with the Scottish data starting in 1981 for LE for males and for females, but only 2004 for all persons. The graphs and tables from the database show that despite the general pattern of an increase in LE over time in Scotland and many other Western European countries, Scotland's LE is one of the lowest.

The Scotland and European Health for All (HfA) Database also includes indicators for disability-adjusted life expectancy (DALE) based on estimates made by the WHO. These are available for the 27 member states of the EU, including the UK, but not Scotland separately.

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Healthy life expectancy: key data sources

The Office for National Statistics (ONS) publishes data at UK and lower levels on life expectancy (LE) and health expectancy.

National Records of Scotland publishes the definitive LE estimates for Scotland's administrative areas (Councils and NHS boards) and special areas (Community Health Partnership, Urban/Rural, and Deprivation). You can also find figures for Scottish Parliamentary Constituency areas and Scottish Council Areas Split by Deprivation.

In addition, ISD publish Life Expectancy estimates for intermediate zones.

The Scotland and European Health for All (HfA) Database publishes data for LE for Scotland and the 53 member states of the WHO European Region, including the UK. Although there are also indicators for disability-adjusted life expectancy (DALE) for countries including the UK, these are not available for Scotland separately.

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Healthy life expectancy: references

HLE technical paper for these web pages

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Wood R, Sutton M, Clark D, McKeon A, Bain M. Measuring inequalities in health: the case for healthy life expectancy.*Journal of Epidemiology and Community Health* 2006;60:1089-1092.

World Health Organization. Commission on Social Determinants of Health. Final report: Closing the gap in a generation - Health equity through action on the social determinants of health. 2008. (Part 1, Chapter 2 of this report compares (in Table 2.1) male life expectancy at birth in selected countries and small areas, including data for Calton and for Lenzie North in Glasgow in Scotland.)

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Healthy life expectancy: useful links

Health expectancy

- The international organisation Réseau Espérance de Vie en Santé (REVES) promotes the use of health expectancy as a population health indicator. It focuses on disability-free life expectancy and the definition, measurement, and comparison of disability globally.
- The European Health Expectancy Monitoring Unit (EHEMU) will begin the third phase of European work to monitor and promote healthy active longevity throughout Europe through the Joint Action European Health and Life Expectancy Information System (JA EHLEIS). Its new website EurOHex facilitates the calculation of life expectancies and healthy life years in 27 countries within the European Union, including the UK (but not Scotland separately) and also provides a calculation guide and programs, an interpreting guide, a glossary and publications.
- Seminar on Healthy life expectancy - past, present and future by Professor Carol Jagger (5Mb), 15 January 2009 (4.9MB).

Life expectancy

- National Records of Scotland (NRS, formerly the General Register Office for Scotland) publishes the definitive life expectancy estimates for areas within Scotland.

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