

National Records of Scotland

Preserving the past; recording the present; informing the future

Life Expectancy Statistics Across the UK

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1. Introduction

- 1.1 This paper outlines the availability of life expectancy estimates and the methods used to produce them across the UK. Information on life expectancy at birth and at age 65 is invaluable in providing a useful summary measure of mortality rates actually experienced over a given period. It provides an objective means of comparing trends in mortality over time, between areas of a country and with other countries. This is particularly of use in monitoring and investigating health inequality issues and in setting public health targets.
- 1.2 In the UK various different types of life expectancy statistics, mainly national and sub-national, are produced by different Official Statistic producers. The methods used to produce them are consistent as long as the treatment of non-resident deaths is borne in mind. This paper gives a broad description of the methodologies used by each producer to aid in the use of the statistics.
- 1.3 The different official statistics producers in the UK are:
- The Office for National Statistics (ONS) produces the Decennial Life Tables and Interim Life Tables for the UK and its constituent countries. ONS also produce Local Area Life Expectancy Statistics for administrative areas and health areas in the UK. Projected Life expectancy at birth for the countries in the UK is also produced as part of the National Population Projections publication.
 - The National Records of Scotland (NRS) produce Life Expectancy estimates for various geographical areas in Scotland, including Council and NHS Board areas, which they send to ONS to be used in their Local Area and Health Area publications.
 - The Scottish Public Health Observatory (ScotPHO) team at the Information Services Division (ISD), NHS National Services Scotland, also produces Life Expectancy statistics for Scotland as comparators for Healthy Life Expectancy Statistics.
- 1.4 Before going on to describe the different life expectancy statistics producers publish it is important to understand the difference between period and cohort life expectancy. Period life expectancies are calculated using age specific mortality rates for a given period, with no allowance for any actual or projected future changes in mortality. This means that period life expectancy at birth for a given time period and area is an estimate of the average number of years a new born baby would survive if he/she experienced the particular area's age specific mortality rates for that time period throughout his/her life. The figures reflect mortality among those living in the area in each period, rather than the mortality among those born in each area. Life expectancy at birth is not the number of years a baby born in the area during the specified time period is expected to live (although the term 'can expect to live' is often used for ease of reading), both because death rates are likely to change in the future and because many of the new borns may live elsewhere for at least some part of their lives.

- 1.5 Cohort life expectancies are worked out using age-specific mortality rates which allow for known or projected changes in mortality rates from relevant year based population projections. These can be accessed on the [Office for National Statistics](#) (ONS) website.
- 1.6 Period life expectancies are a useful measure of mortality rates actually experienced over a given period and, for past years, provide an objective means of comparison of the trends in mortality over time, between areas of a country and with other countries. Official life tables in the UK and in other countries which relate to past years are generally period life tables for these reasons. Cohort life expectancies, even for past years, usually require projected mortality rates for their calculation and so, in such cases, involve an element of subjectivity. More information on the differences between period and cohort life expectancies can be found within the [Guide to Period and Cohort Life Expectancy](#) section on the ONS website.
- 1.7 This paper has been split into three more sections. Section two covers national life expectancy statistics; section three, sub-national administrative area and special area life expectancy statistics, including estimates for small areas; and section 4 gives some advice and guidance on the use of these statistics.

2. National Life Expectancy

2.1 Background

- 2.1.1 ONS produces the official National Statistics on life expectancy for the UK and its constituent countries.
- 2.1.2 There are two sets of national life expectancy statistics produced by ONS: Decennial Life Tables and Interim Life Tables. The following table summarises the main uses of these outputs as well as the methodology used, the sources of the data, time frame, level of detail, frequency of publication, web location, dissemination practices and any planned or ongoing developments.

2.2 Decennial Life Tables

<p>Main uses:</p> <p>A summary measure of mortality rates actually experienced around the date of Census. It provides an objective means of comparing trends in mortality over time, between areas of a country and with other countries. This is particularly of use in monitoring and investigating health inequality issues and in setting public health targets.</p>
<p>Source of data:</p> <p>Census population and mid-year population estimates.</p> <p>Calendar year death registrations for the three years around a census.</p>

Years available for:

Published once every ten years, decennial life tables are associated with the decennial population censuses, beginning with the census of 1841. Life expectancy figures are presented in three-year periods around each census year (where possible). A three-year period is normally of sufficient length to smooth out most of the effect if the mortality of the census year happens to be unusual.

Figures for Scotland are available for 1930-32 onwards, excluding 1940-42.

Level of detail available:

Life expectancy estimates by single year of age and sex for the countries of the UK.

Frequency of publication:

Every ten years, usually a couple of years after the latest Census.

Who produces them:

ONS. Prior to 31 January 2006 the Government Actuary Department (GAD) prepared Decennial Life Tables every ten years (since 1930-32 and excluding 1940-42) for the UK and constituent countries.

Web location:

[Life Expectancies](#) section on the ONS website:

Scottish Decennial Life Tables can also be found within the [Life Expectancy at Scotland Level](#) section on the NRS website.

Dissemination:

By ONS on their website in a Statistics Publication and in datasets.

By NRS on their website in MS Excel format.

Methodology:

A paper on the method used, entitled [English Life Tables No 16 \(2000-2002\): Methodology](#) can be found on the ONS website.

Comparability with similar areas in the rest of the UK:

Comparisons between countries in the UK and internationally can be made.

Planned / ongoing developments:

None at the moment

UK Statistics Authority Assessment:

These statistics were recently assessed by the UK Statistics Authority (UKSA) and are designated as National Statistics, subject to meeting the requirements in the [Population Estimates and Projections assessment report](#) on the UKSA website.

2.3 Interim Life Tables

<p>Main uses:</p> <p>A more frequent summary measure of mortality rates actually experienced over a given period than Decennial Life tables. It provides an objective means of comparing trends in mortality over time, between areas of a country and with other countries. This is particularly of use in monitoring and investigating health inequality issues and in setting public health targets.</p>
<p>Source of data:</p> <p>Mid-year population estimates for the UK and constituent countries.</p> <p>Calendar year birth and death registrations.</p> <p>Data for a period of three consecutive years is used.</p>
<p>Years available for:</p> <p>On the ONS website – 1980-81 onwards.</p> <p>Estimates are available back to 1861-70 for Scotland on the NRS website.</p>
<p>Level of detail available:</p> <p>Period life expectancy estimates by single year of age (0 to 100) and sex for the UK, Great Britain, England and Wales, England, Wales, Scotland and Northern Ireland are published on the Office for National Statistics website.</p> <p>Life Expectancy at birth, Age 1, Age 15, Age 45 and Age 65 by sex is published on National Records of Scotland (NRS) website. For the most recent year life expectancy at birth and by single year of age up to 85 by sex is also available.</p>
<p>Frequency of publication:</p> <p>Annual - UK results are published by ONS usually in September. NRS publish provisional results for Scotland in August on the same day as Scotland's People and final results in September at the same time as ONS.</p>
<p>Who produces them:</p> <p>ONS - Prior to 31 January 2006 the Government Actuary Department (GAD) prepared Interim Life Tables for the countries of the UK.</p>
<p>Web location:</p> <p>Life Expectancies section on the ONS website.</p> <p>Scottish Interim Life Tables can also be found within the Life Expectancy at Scotland Level section on the NRS website.</p>

Dissemination:

Interim Life Tables for the UK and constituent countries are published on the ONS website in MS excel format and are released to form part of the UK Older People's data statistical bulletin and news release.

Interim Life Tables for Scotland are published on this website in MS Excel format and are discussed in the Scotland's People publication.

Methodology:

A guide to calculating interim life tables can be found within the [Guidance and Methodology](#) section on the ONS website.

Comparability with similar areas in the rest of the UK:

Comparisons between countries in the UK can be made.

Planned / ongoing developments:

None at the moment.

UK Statistics Authority Assessment:

These statistics were recently assessed by the UKSA and are designated as National Statistics, subject to meeting the requirements in the [Population Estimates and Projections assessment report](#) on the UKSA website.

2.4 Produced by ScotPHO ISD

2.4.1 Please go to [section 3.4](#).

3. Sub-National Life Expectancy Estimates within the UK**3.1 Background**

3.1.1 This section sets out information for sub-national life expectancy estimates for different parts of the UK and different types of area by official statistics producer.

3.2 Produced by ONS**Title:**

Life expectancy at birth and at age 65 by local areas in the United Kingdom
Life expectancy at birth and at age 65 for health areas in the United Kingdom

Main uses:

Provides an objective means of comparing trends in mortality over time between administrative and health areas within the UK. This is particularly of use in monitoring and investigating health inequality issues and in setting public health targets.

<p>Key users include the Department of Health, primary care organisations, public health observatories, local authorities and private pensions and insurance companies.</p>
<p>Source of data:</p> <p>Mid-year population estimates.</p> <p>Deaths registered in calendar years.</p>
<p>Years available for:</p> <p>Period life expectancy results for local areas in the UK are available for 1991-93 onwards. Results for health areas in the UK are available for 2001-03 onwards.</p>
<p>Level of detail available:</p> <p>Life expectancy at birth and at age 65 for regions, counties, local areas and health areas in the UK by sex.</p> <p>Results are rolling averages, produced by aggregating the number of deaths and mid-year population estimates across each three year period.</p>
<p>Frequency of publication:</p> <p>Annually.</p>
<p>Who produces them:</p> <p>ONS. Results for areas in Scotland are calculated by the National Records of Scotland (NRS), formerly the General Register Office for Scotland. Mortality data for Northern Ireland are supplied to ONS by the Northern Ireland Statistics and Research Agency (NISRA).</p>
<p>Web location:</p> <p>Life Expectancy Release Calendar section on the ONS website.</p>
<p>Dissemination:</p> <p>These results are disseminated on the ONS website along with a news release, statistical bulletin and reference tables.</p>
<p>Methodology:</p> <p>A template which illustrates the method used by ONS to calculate sub-national life expectancy can be found within the Data section on the ONS website.</p> <p>A Summary Quality Report which details the quality of sub-national life expectancy statistics can be found in the Guidance and Methodology section of the ONS website.</p>
<p>Comparability with similar areas in the rest of the UK:</p> <p>To provide comparisons for regional, county, local area and health area figures, national life expectancy results are also produced using the same method as the sub-national results, with abridged life tables in which death and population</p>

<p>figures are aggregated into five-year age groups. These may differ slightly from the results in the national interim life tables, which are calculated using complete life tables (by single year of age).</p> <p>In the national life expectancy figures calculated using abridged life tables, deaths of non-residents are included in figures for the UK and for England and Wales combined, but not in figures for England and Wales separately. Deaths of non-residents are not included in sub-national figures.</p> <p>Deaths of Scottish residents occurring in Scotland are assigned to place of normal residence.</p>
<p>Planned / ongoing developments:</p> <p>ONS is currently conducting a review of the method used to calculate sub-national life expectancy statistics. It is expected that the findings will be published as part of a new Quality and Methods Information (QMI) paper in Spring 2012.</p>
<p>UK Statistics Authority (UKSA) Assessment:</p> <p>These statistics were recently assessed by the UKSA and are designated as National Statistics subject to meeting the requirements in the assessment report, Statistics on Life Expectancy by Local Areas in the UK, which is available on the UKSA website.</p>

3.3 Produced by NRS

<p>Publication:</p> <p>Life Expectancy for Areas in Scotland</p> <p>This is a new publication combining the following previous publications:</p> <p>Life Expectancy for Administrative Areas within Scotland</p> <p>Life Expectancy in Special Areas (Urban/Rural, Deprivation and Community Health Partnership) within Scotland</p> <p>Additional tables are also still published for:</p> <p>Life Expectancy in Scottish Parliamentary Constituency Areas</p> <p>Life Expectancy in Scottish Council Areas split by Deprivation</p> <p>Life Expectancy in Intermediate Zones. Results for 2005-2009 were the last produced by NRS. Future results for these areas will be published by Information Services Division (ISD).</p>
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Main uses:

Life expectancy at birth provides a useful summary measure of mortality rates actually experienced over a given period. It also provides an objective means of comparing trends in mortality, over time, between areas of a country and with other countries. This is of use in monitoring and investigating health inequality issues across Scotland and in setting public health targets, particularly when used in conjunction with the Scottish Index of Multiple Deprivation (SIMD). The Scottish Government currently has a high level target to match European population growth over a 10 year period, supported by increased healthy life expectancy. It also aims to increase healthy life expectancy at birth in the most deprived areas and to reduce mortality from Coronary Heart Disease (CHD) among the under-75s in deprived areas. Healthy life expectancy is derived by combining estimates of life expectancy with survey data on self-assessed health.

Source of data:

Mid-year estimates produced by NRS for Council and NHS Board areas and Small Area Population Estimates (SAPE) at data zone level aggregated to 'best fit' areas.

Calendar year deaths by single year of age, sex (the age in this data is age at death and they are recorded by date of registration). This data is provided by the NRS Vital Events team at data zone, Council and NHS Board level.

Years available for:

Council areas, 1991-1993 onwards

NHS Board areas, 1981-1983 onwards

Urban Rural and Scottish Index of Deprivation using the most recent classification at the time of publication, 2004-2006 onwards

Community Health Partnership areas, from 1996-1998 onwards

Life Expectancy in Scottish Parliamentary Constituency Areas, 2005-2007 onwards

Life Expectancy in Scottish Council Areas split by Deprivation, 2003-2007 onwards

Life Expectancy in Intermediate Zones, 2003-2007 and 2005-2009, later data will be found on the ISD website

Level of detail available:

Council and NHS Board areas: life expectancy at birth and for age groups up to 85+ by sex.

Urban Rural and Scottish Index of Deprivation using the most recent classification at the time of publication: life expectancy at birth and for age groups up to 85+ by sex.

Community Health Partnership areas: life expectancy at birth and for age groups up to 85+ by sex.

Life Expectancy in Scottish Parliamentary Constituency Areas: life expectancy at birth by sex.

Life Expectancy in Scottish Council Areas split by Deprivation, life expectancy at birth by sex.

Life Expectancy in Intermediate Zones: life expectancy at birth by sex.

Frequency of publication:

Annually in October to coordinate with the ONS publication of results across the UK.

Who produces them:

National Records of Scotland (NRS).

Web location:

[Life Expectancy in Scottish Areas](#) section of the NRS website.

Dissemination:

A News Release, report and accompanying tables are published on the NRS website. The report includes summary results, detailed analysis of the results for each special area as well as a brief background to the methodology.

The members of the ScotStat Population and Migration Statistics Committee (PAMS) are consulted on the production of the life expectancy estimates and NRS recently ran a consultation to find out who used the statistics and what for. The results of which can be found in the [Consultation](#) section on the NRS website.

Methodology:

A paper on the methods used to produce these life expectancy estimates can be found in the [Life Expectancy in Scottish Areas](#) section of the NRS website.

Comparability with similar areas in the rest of the UK:

Life expectancy estimates for Council and NHS Board areas can be compared with similar administrative areas in the rest of the UK bearing in mind the different treatment of non-resident deaths.

Life expectancy estimates for other geographic areas such as Urban/Rural and Scottish Index of Multiple Deprivation are Scottish classifications and are not comparable with other classifications used elsewhere within the UK.

National Life Expectancy estimates are calculated as part of the process for comparison with sub-national areas only.

Deaths of Scottish residents occurring in Scotland are assigned to place of normal residence. With the exception of life expectancy in intermediate zones, NRS include deaths of non-residents but allocate them to place of death and ignore deaths of Scottish residents occurring outwith Scotland.

Planned / ongoing developments:

None. ONS's review of Life Expectancy methodology may mean that the method used by NRS will need to be reviewed.

UKSA Assessment:

These statistics were recently assessed by the UKSA and are designated as National Statistics subject to meeting the requirements in the assessment report, [Statistics on Population and Demography in Scotland](#), which is available on the UKSA website.

3.4 Produced by ScotPHO ISD**Publication:**

Healthy life expectancy (a topic on the ScotPHO website).

Main uses:

Life expectancy at birth provides a useful summary measure of mortality rates actually experienced over a given period. It also provides an objective means of comparing trends in mortality, over time, between areas of a country and with other countries. Healthy life expectancy is derived by combining estimates of life expectancy with Census or survey data on self-assessed health. The gap between life expectancy and healthy life expectancy represents the expected years in an 'unhealthy' state, and therefore is another useful statistic.

Life expectancy and healthy life expectancy are used in monitoring and investigating health inequality issues across Scotland and in setting public health targets, particularly when used in conjunction with the SIMD. The Scottish Government currently has a high level target to match European population growth over the period from 2007 to 2017, supported by increased healthy life expectancy. The Scottish Government also aims to increase healthy life expectancy at birth in the most deprived areas and to reduce mortality from Coronary Heart Disease (CHD) among the under-75s in deprived areas. It also analyses changes in healthy life expectancy at birth by income-employment index decile in its long-term monitoring of health inequalities.

Source of data:

Mid-year estimates produced by NRS for NHS Board areas and Small Area Population Estimates (SAPE) at data zone level aggregated to 'best fit' areas.

Calendar year deaths by sex and single year of age (the age in this data is age at death and they are recorded by date of registration). This data is provided by NRS at postcode level and then aggregated up to the required geography using the most recent postcode index provided by NRS.

Self-assessed health, from either surveys (mainly the Scottish Household Survey) or Scotland's Census 2001 (the 2011 Census will also be used when the data is released).

Years available for:

Scotland: for life expectancy and healthy life expectancy: annual estimates from 1980 to 2010 (with 3 years of missing data for HLE).

NHS Board areas, Community Health Partnership areas and 2001 urban rural classification (6-fold): for life expectancy and healthy life expectancy: 5-year period 1999-2003.

Scottish Index of Multiple Deprivation quintiles.

For life expectancy and healthy life expectancy: 2-year period estimates from 1999-2000, 2001-2002, 2003-2004 onwards (with 2003-04 missing for HLE). SIMD 2006 used up to 2007-2008; SIMD 2009 v2 used from 2009-2010.

Scottish Index of Multiple Deprivation deciles.

For life expectancy: 5-year period estimates between 1994-1998 and 2001-2005 then 3-year period estimates (supplied by NRS) every 2 years from 2004-2006.

For healthy life expectancy: 5-year period estimates for 1999-2003.

SIMD 2006 used up to 2007-2008; SIMD 2009 v2 used from 2009-2010.

(Note: life expectancy estimates for Scotland, NHS Board areas, Community Health Partnership areas, and intermediate zones for the periods: 1994-1998, 1996-2000, 1999-2003, 2001-2005 and 2003-2007 are available on the ScotPHO profiles. NRS produced the estimates for intermediate geography for 2003-2007).

Level of detail available:

For all geographies except intermediate geography, for the time periods stated above: life expectancy and healthy life expectancy at birth, and the expected period in a 'not healthy' state, by sex, with 95% confidence limits. Also, for the period 1999-2003 (using 2001 Census self-assessed health): life expectancy and healthy life expectancy, and the expected period in a 'not healthy' state, at birth and for age groups up to 85+, by sex.

For intermediate geography: life expectancy at birth, by sex, with confidence limits.

Frequency of publication:

Annually, generally in December after the raw data become available.

Who produces them:

ScotPHO team in ISD, NHS National Services Scotland.

Web location:

[ScotPHO website](#)

[Scotland Performs](#), available on the Scottish Government (SG) website.

Scottish Government's [Long-Term Monitoring of Health Inequalities – 2011 annual report](#), also available on the SG website.

Dissemination:

The ScotPHO website healthy life expectancy topic is updated annually with updated tables and graphs and interpretative text, including key points, a policy context page, pages on UK and international comparisons and a technical paper.

Methodology:

A paper on the methods used to produce these life expectancy and healthy life expectancy estimates can be found on the [ScotPHO website](#).

Comparability with similar areas in the rest of the UK:

Life expectancy estimates for NHS Board areas can be compared with similar areas in the rest of the UK bearing in mind the different treatment of non-resident deaths.

Geographic areas such as Urban/Rural and Scottish Index of Multiple Deprivation are Scottish classifications and are not comparable with other classifications used elsewhere within the UK.

Life expectancy estimates for Scotland overall are calculated in order to compare with healthy life expectancy, and derive the expected period in 'not good' health.

Deaths of Scottish residents occurring in Scotland are assigned to place of normal residence. Records of deaths of Scottish residents occurring outwith Scotland are not available so cannot be included in analyses. ScotPHO ISD includes deaths of non-residents in their life expectancy and healthy life expectancy analyses, imputing their 'pseudo place of residence' from the geographical patterns by age and sex for deaths of Scottish residents. This approach is also used by NRS for intermediate geographies, but for all other (higher) geographies NRS allocates non-residents to place of death.

Planned / ongoing developments:

None.

UKSA Assessment:

These statistics are due to be assessed in summer 2012.

4. Guidance on using life expectancy statistics

- 4.1 This section provides some guidance on using life expectancy statistics.
- 4.2 As the methodology for compiling life expectancy estimates is very similar for all the different geographies, the estimates are consistent and users can make relevant comparisons between countries and areas within a country provided the impact of the differences in how non-resident deaths are treated in the sub-national results are borne in mind. The classifications used in Scotland to produce estimates for special areas e.g. urban/rural cannot be compared with estimates produced elsewhere using different classifications.

- 4.3 Currently ONS, NRS and ScotPHO ISD differ in the approach taken to deal with non-resident deaths for sub-national life expectancy figures and the overall figures for each constituent country in the UK.
- 4.4 ONS include deaths of non-residents for figures that feed into United Kingdom (UK) total figures, as well as the UK, Great Britain (GB) and England and Wales Interim Life Tables. For constituent UK country Interim Life Tables, non-resident deaths in England and Wales are allocated to England and non-resident deaths in Scotland are allocated to Scotland. All life expectancy figures calculated by ONS for Northern Ireland include the deaths of non-residents. Otherwise ONS do not include deaths of non-residents nor do they include deaths of English or Welsh residents dying outwith England and Wales.
- 4.5 Deaths of Scottish residents occurring in Scotland are assigned to place of normal residence. With the exception of life expectancy in intermediate zones, NRS include deaths of non-residents but allocate them to place of death and ignore deaths of Scottish residents occurring out-with Scotland.
- 4.6 ScotPHO ISD include deaths of non-residents but impute a pseudo place of residence and ignore deaths of Scottish residents dying out-with Scotland.
- 4.7 The advantage of including non-resident deaths at place of occurrence (which are thought to balance out counts of residents dying out-with the country in Scotland), as is done by NRS, is that by doing so you are reducing the risk of over-estimating life expectancy at the national level and in areas with a small share of non-resident deaths. The disadvantage, however, is that those areas with a high share of non-resident deaths will suffer from under-estimation. Another disadvantage may be that the age-sex structure of non-residents dying within a country may be different to the age-sex structure of residents dying outwith the country.
- 4.8 The impact for users of the statistics is that at the national level for Scotland, life expectancy is higher (by around 0.2 years for males and 0.1 years for females) when non-resident deaths are excluded compared with including them. This is because deaths of non-residents are removed from the overall death count, thus lowering the mortality rate for Scotland and consequently lengthening the estimated life expectancy. At the sub-national level the impact is higher in those areas with a greater proportion of non-resident deaths e.g. Mid Highland Community Health partnership area (around 0.8 years higher) than in areas with a low proportion of non-resident deaths e.g. East Glasgow Community Health and Care Partnership area¹ where there was no difference in life expectancy using data for 2004-2006.
- 4.9 Work is planned to bring the methods of the three organisations more in line. NRS is currently investigating, alongside ISD, obtaining the records of Scottish residents dying outside of Scotland.

[Footnote 1] Changes were made in March 2011 to the Community Health and Care Partnership areas mentioned here.