Office for National Statistics

Health expectancies QMI

Contact:

hle@ons.gsi.gov.uk

Release date:
25 October 2017

Next release:
To be announced

Table of contents

1 . Methodology background

National Statistic	
Frequency	Annual
How compiled	Administrative data, survey data
Geographic coverage	UK, England, Wales, Scotland, Northern Ireland
Last revised	25 October 2017

2 . Executive summary

Health expectancies (HEs) are extensions of period life expectancy (LE), which combine morbidity and mortality data to produce estimates of the span of life that a person can expect to live in “Very good” or “Good” health; healthy life expectancy (HLE), or without a limiting long-standing illness or disability; disability-free life expectancy (DFLE). This partitioning of length of life into periods spent in various health states provide a quality dimension to LE. These metrics provide an informative summary measure of the health status of the population.

The reporting of HE estimates by Office for National Statistics (ONS) date back to 1980 to 1982 for Great Britain and to 2000 to 2002 for the UK as a whole. Subnational HEs have in the past been calculated exclusively from census data.

In response to stakeholder requests for more up-to-date figures, we have developed a set of official statistics reporting DFLE at subnational levels. These statistics differ from the UK estimates by survey source and geographical coverage only, the underlying methodology remains consistent across ONS health expectancy outputs. Developments in reporting subnational DFLE were reported in three separate articles:, Smith et al., 2010a, Smith et al., 2011 and ONS, 2013 in the ONS peer review journal, Health Statistics Quarterly.

This report contains the following sections:

- Output quality
- About the output
- How the output is created
- Validation and quality assurance
- Concepts and definitions
- Other information, relating to user needs
- Sources for further information or advice

3 . Output quality

This report provides a range of information that describes the quality of the output and details any points that should be noted when using the output.

We have developed Guidelines for Measuring Statistical Quality; these are based upon the five European Statistical System (ESS) Quality Dimensions. This report addresses these quality dimensions and other important quality characteristics, which are:

- relevance
- timeliness and punctuality
- coherence and comparability
- accuracy
- output quality trade-offs
- assessment of user needs and perceptions
- accessibility and clarity

More information is provided about these quality dimensions in the following sections.

4 . About the output

Relevance

(The degree to which the statistical outputs meet users' needs.)

Office for National Statistics health expectancy (HE) outputs are produced on an annual basis and cover the UK and constituent countries, English regions, local authority districts, upper tier local authorities and clusters of lower layer super output areas (LSOAs) grouped according to their area deprivation quintile or decile as measured by the Index of Multiple Deprivation (IMD).

UK and constituent country level data are available in rolling 3-year aggregate periods dating back to 2000 to 2002. These estimates combine data from the General Lifestyle Survey (GLF) (formerly known as the General Household Survey (GHS)) for Great Britain and from the Continuous Household Survey (CHS) for Northern Ireland. Survey data are combined with interim life tables and mid-year population estimates to give a measure of the quality of remaining years of life by age-group, sex and area.

From 2010, survey data for Northern Ireland is captured from the Health Survey Northern Ireland (HSNI).

The underlying methodology is consistent across all ONS HE outputs. However, the underlying survey source data changes depending on the geographical area under analysis. For example, the national estimate of disability-free life expectancy (DFLE) for England derived from Annual Population Survey (APS) data, used for benchmarking subnational estimates, may be different from that calculated for the England estimates in the national time series.

Data for Great Britain and England are available dating back to 1980 to 1982, although there are gaps for the years 1995 to 1997, 1997 to 1999 and 1999 to 2001 due to suspension of the GHS in 1997 and 1999.

In 2005, the GHS underwent a change in survey design, from a purely cross-sectional survey to one with a longitudinal rotating panel design, becoming the GLF. This change led to a substantial fall in the amount of cross-sectional survey data available for analysis. There was a consequent loss of precision and possibly accuracy in ONS estimates of healthy life expectancy (HLE) and DFLE, evidenced by a widening in the 95% confidence intervals (CI) surrounding each estimate. This loss of precision has important implications for detecting change over time as statistically significant changes can be indicated by non-overlapping 95% CIs, which can be used to test for health improvement or deterioration. This change, along with an improvement in the method to account for sample selection, was reported in Health Statistics Quarterly (HSQ) and (Smith et al., 2010b).

Also in 2005, the general health survey question used in the calculation of HLE was harmonised to the European Union Statistics on Income and Living Conditions (EU-SILC) Minimum European Health Module question containing five health state categories. This change in the data input and the derived definition of “Good” general health led to a substantial fall in the absolute value of HLE, which was reported in HSQ (Smith and White, 2009). A simulated time series of HLE was developed to provide users with a consistent synthetic series between 2000 to 2002 and 2004 to 2006, leading to the adoption of the harmonised measure of HLE in 2005 to 2007. ONS HLE is now broadly comparable with that of other EU member states and has the added advantage of consistency with data available from the 2011 Census.

In December 2011, the GLF ceased collecting data. Consequently, future health expectancies at the national level will be calculated using data collected on the Integrated Household Survey (IHS).

The substantial sample size of this survey will lead to improved accuracy enabling between country differences and within country changes over time to be compared with greater degrees of precision.

The full implications of this change in survey source for the national health expectancies series have been outlined in the update to methodology to calculate health expectancies article (ONS, 2013).

National health expectancy statistical bulletins are published on the ONS website and present data for males and females at birth (0 to 4 years) and at age 65 (65 to 69 years). ONS also publishes datasets, which provide figures dating back to 2000 to 2002 and includes data for all age groups and a calculation template. Data in other formats are available on request from the ONS Health Analysis Team.

A review of ONS national health expectancy series in 2008 identified the need for more timely (inter-censal), releases of subnational health expectancies and an exploration of the link between health and deprivation. In response, and in collaboration with the Department of Health, ONS developed two statistical outputs: Disability-free life expectancy subnational estimates for England and Inequality in disability-free life expectancy by area deprivation: England.

Further information about this review and a more recent assessment can be found in this report in the Assessment of user needs and perceptions section.

Disability-free life expectancy, subnational estimates for England are also based on rolling 3- year aggregate periods and are produced on an annual basis. The current series, which includes an article documenting the development of this statistic (Smith et al., 2011), dates back to the period 2006 to 2008 and is based upon data from the Annual Population Survey (APS). Subnational health expectancies based upon the 2001 Census are also available.

The statistical bulletin focuses on results for English regions and the top and bottom 10 local authority district DFLE values for men and women at age 16. Local authority districts are defined according to the p ost-2009 administrative boundaries reorganisation. Up until the period 2007 to 2009, estimates were not available for males and females at birth as the APS did not collect responses for children. However, we plan to update the subnational estimates of DFLE to produce at birth estimates which will use the imputation method outlined in the methodological update paper (ONS, 2013). These estimates will be produced at the upper tier local authority level, and will revise the time series from the 2006to 2008 period onwards. Associated datasets in the form of Excel workbooks are also published and include data for men and women at age 16 and at age 65 for English regions and all local authority districts. Data in other formats are available upon request from the ONS Health Analysis Team.

Healthy life expectancy at birth, for upper tier local authorities in England has been produced on an annual basis from 2013. The first estimates covered the time period 2009 to 2011 and, as with the subnational estimates of DFLE, are based on rolling 3-year aggregate periods. These estimates are based on the APS and are produced at the upper tier local authority level. Associated datasets in the form of Excel workbooks are also published and include data for men and women at birth for regions and all upper tier local authorities. Data in other formats are available upon request from the ONS Health Analysis Team.

Inequality in disability-free life expectancy by area deprivation: England was based on rolling 4-year aggregate periods using the GHS/GLF as the survey source. The current series, which includes an article documenting the development of this statistic (Smith et al., 2010c) covers non- overlapping periods dating back to 2001 to 2004. This series does not include estimates of HLE due to the change to the general health question, from a 3-point to 5-point response scale, in 2005.

Estimates of HLE and DFLE by clusters of area deprivation and other area clusters based on the 2001 Census are also available. The statistical bulletin provides data for males and females at birth and at age 65 and also gives estimates of the Slope Index of Inequality (SII) and a modified Relative Index of Inequality (RII) to provide indications of the scale of inequality across the clustered geographical areas. Associated datasets provide these data in the form of Excel workbooks. Data in other formats are available on request from the ONS Health Analysis Team. This release has now ceased because of the discontinuation of the GLF in 2011. Investigations into a replacement are ongoing.

Inequality in Healthy Life Expectancy at birth for England is measured using the APS. LSOAs are grouped into deciles based on their IMD 2010 score, the scores of which have been adjusted to reflect LSOA boundary changes in 2011. The responsibility for producing these adjusted deprivation scores lies purely with Public Health England (PHE) - the figures have neither been quality assured nor endorsed by the Department for Communities and Local Government (DCLG), but have been used in Public Health Outcomes Framework indicators. The prevalence of “Good” and “Not Good” general health are computed for each decile using APS data starting with the period 2009 to 2011 and annually moving forward.

These data are combined with mortality data to compute expectation of life for each decile in “Good” general health; the inequality is measured using the SII.

Main external users of ONS health expectancy statistics include:

- Department of Health - increases in HLE and reductions in the differences in HLE between communities are high-level outcomes of the Public Health Outcomes Framework
- Department for Work and Pensions - Health expectancies inform policy around ageing in the UK
- Department for Environment, Food and Rural Affairs - healthy life expectancy and disability-free life expectancy are headline indicators of sustainable development
- Academia, actuaries and the media

Timeliness and punctuality

(Timeliness refers to the lapse of time between publication and the period to which the data refer. Punctuality refers to the gap between planned and actual publication dates.)

Health expectancies at birth and at age 65 in the UK, Inequalities in DFLE by area deprivation: England and DFLE, subnational estimates for England are produced annually. The latest year in each period lags behind the current date by approximately 2 years. For example, national health expectancies 2007 to 2009 were published in August 2011. This delay is related to the reliance on the prior release of datasets required for analysis. Users understand and accept the methodological constraints that affect the timeliness of these outputs.

Office for National Statistics HE outputs are, on the whole, punctual in relation to the expected release date. However, changes of less than 1 month have been made to allow the output release to coincide with other related releases.

For more details on related releases, the GOV.UK release calendar provides 12 months advance notice of release dates. If there are any changes to the pre-announced release schedule, public attention will be drawn to the change and the reasons for the change will be explained fully at the same time, as set out in the Code of Practice for Official Statistics.

5 . How the output is created

Healthy life expectancy (HLE) and disability-free life expectancy (DFLE) at a given age, for a given population and time period provide “snapshot” estimates of population health. For example, HLE provides a measure of the average number of years that a person would expect to live in “Very Good” or “Good” general health if he or she experienced the particular area’s age and period-specific mortality and general health rates throughout the rest of his or her life.

These estimates are not, therefore, the number of years that a person will actually live in a given health state because mortality rates and general health status of the population are likely to change in the future. Also, many of those residing in an area are likely to live elsewhere for part of their lives.

Office for National Statistics health expectancy (HE) outputs all use the same core methodology, the Sullivan Method. Briefly, this method combines survey data, for example, the General Lifestyle Survey (GLF) with mortality data and mid-year population estimates to calculate the number of remaining years, at a particular age, in which an individual can expect to live in a given state of health. We use the following definitions of health to calculate both HLE and DFLE.

Healthy life expectancy is defined as the number of remaining years that an individual can expect to live in “Very good” or “Good” general health. Rates of “Very good” and “Good” general health by sex and 5-year age band are captured from the following survey general health question on the Annual Population Survey (APS) and Integrated Household Survey (IHS) is:

- How is your health in general; would you say it was…
  Very good?
  Good?
  Fair?
  Bad?
  Very bad?

Disability-free life expectancy is defined as the number of remaining years that an individual can expect to live without a limiting long-standing illness. Rates of limiting long-standing illness by sex and 5-year age band are captured from the following survey questions in the GLF and the Continuous Household Survey (CHS) and the Health Survey Northern Ireland (HSNI):

- Do you have any long-standing illness, disability or infirmity - by long-standing I mean anything that has troubled you over a period of time or that is likely to affect you over a period of time? Yes/No

If “Yes” the respondent is then asked:

- Does this illness or disability (Do any of these illnesses or disabilities) limit your activities in any way? Yes /No

Respondents answering “Yes” to both questions are considered to have a limiting long-standing illness.

Slightly different questions are asked in the APS and IHS:

- Do you have any health problems or disabilities that you expect will last for more than a year? Yes/No

If “Yes” the respondent is then asked:

- Do these health problems or disabilities, when taken singly or together, substantially limit your ability to carry out normal day to day activities? If you are receiving medication or treatment, please consider what the situation would be without the medication or treatment. Yes/No

Survey data are weighted to match age, sex and regional profiles with mid-year population estimate projections. This calibration process ensures consistency between survey and population estimates, and, additionally, compensates for potential bias that might arise from differential non- response among different sub-groups in the sample selected for the survey.

For the CHS and HSNI, data are weighted simply by age and sex. Data for the GLF and APS are also adjusted to account for sample selection and multi-household addresses. The cross-sectional elements of the GLF and APS are further weighted for non-response while the longitudinal elements of these surveys are weighted for attrition after first interview. Further information on survey data weighting is given in the Integrated Household Survey User Guide.

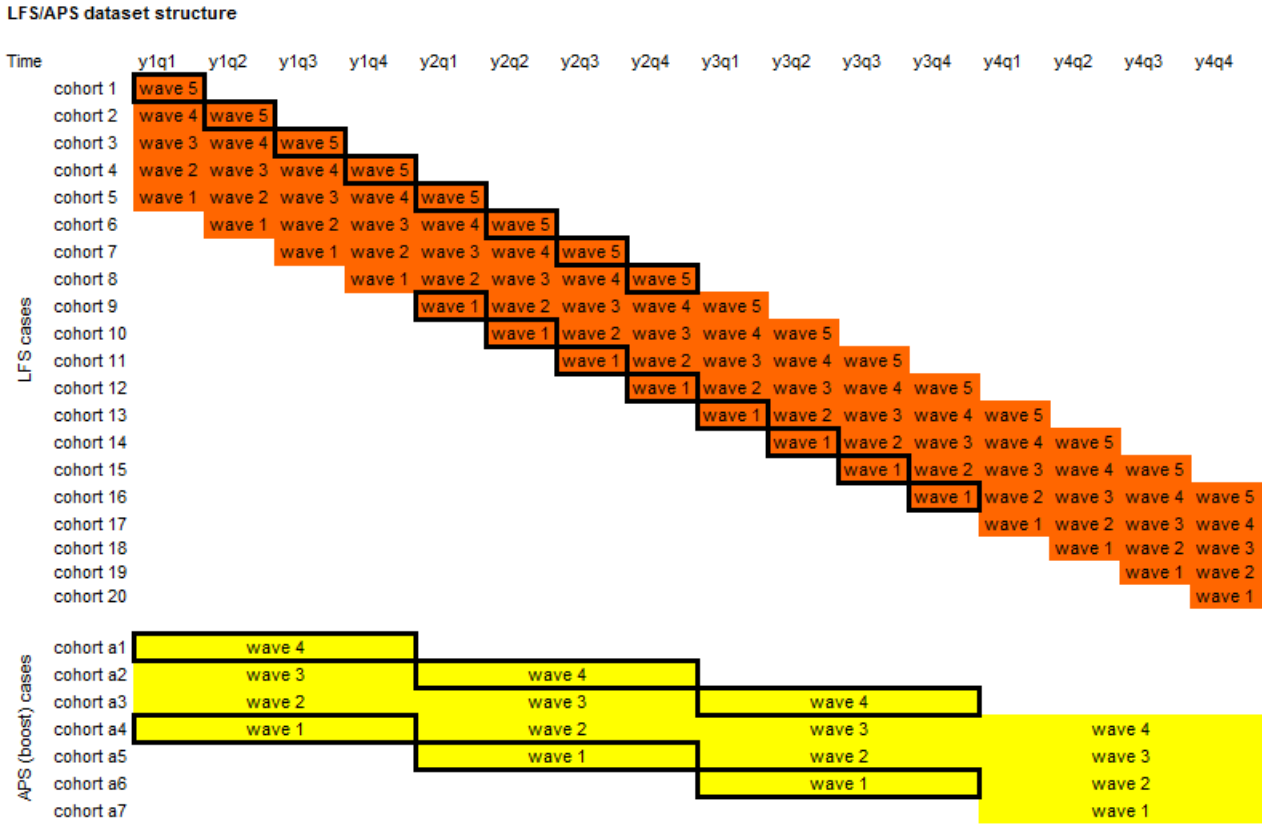
The GLF achieved a sample of approximately 9,000 households from a sample of 13,000 addresses in each year and aimed to interview all adults aged 16 or over, face-to-face, using trained interviewers and by proxy interview for those aged less than 16 years. From 2008, students who were living in halls of residence were also included as residents of the household sampled even if they were not in the original place at the time of the interview. The survey used a probability, stratified two-stage sample design. The primary sampling units (PSUs) were postcode sectors, which are similar in size to electoral wards and the secondary sampling units were addresses within those sectors. The stratification procedure ensured a representative sample was drawn across the country as a whole.

The APS is a continuous survey of households in the UK, which is produced quarterly and contains annual data. Each dataset (known as a quarterly rolling annual dataset) consists of wave 1 and 5 of the quarterly Labour Force Survey (LFS) and additional boost cases in England, Wales and Scotland, which are added to ensure that a sufficient number of interviews are conducted with economically active people in each local education authority area.

Each APS dataset contains approximately 170,000 households and 320,000 individuals. The primary purpose of the APS is to provide estimates for labour market and socio-economic analyses at subnational level and the APS is the recommended source of statistical information for analysis at unitary authority and local authority district level.

Although the design of the APS has a longitudinal element, the aggregated 3-year period used in the subnational analyses of DFLE and HLE ensures the study population used excludes duplicate survey responders. The APS is intended to be representative of subnational populations including regions, upper and lower tier local authorities. The following chart shows how the study population for the subnational DFLE and HLE estimates are constructed from distinct waves of the LFS and APS boost.

LFS/APS dataset structure



For national health expectancy estimates, up until the time period 2008 to 2010, survey data was collected from the GLF for Great Britain, England, Wales and Scotland and from the CHS and the HSNI for Northern Ireland. Survey data were combined to calculate rates for the UK.

Since these survey data only capture prevalence rates in the private household population, an adjustment is made to survey prevalence rates to account for residents of medical and care communal establishments based on data from the 2001 Census. These figures were updated to reflect the findings of the 2011 Census. Further information regarding the methodology behind these estimates is published in (Smith et al., 2010b). From 2013 onwards, and the time period 2009 to 2011, national health expectancy estimates were calculated from the IHS. This, as is noted in the update to the methodology to calculate health expectancies (ONS, 2013), was due to the discontinuation of the GLF from December 2011.

Inequality in DFLE and HLE by area deprivation, England estimates are based solely on the GHS or GLF for DFLE and APS for HLE and provide figures for the private household population alone. Estimates are based on quintile clusters of lower level super output areas (LSOAs) grouped according to Index of Multiple Deprivation (IMD) rank. Residents of medical and care communal establishments are excluded in these analyses due to the complexity of accounting for this population at LSOA level. This statistical output also includes estimates of the Slope Index of Inequality (SII) and modified Relative Index of Inequality (RII) (Mackenbach and Kunst 1997), which provide an indication of the scale of inequality across all deprivation clusters.

The SII is calculated using weighted least squares linear regression and gives a predicted value for each population sub-set. It measures the absolute difference in DFLE, in years, between the least and most deprived areas taking into account the proportion of the population and relative deprivation across all area clusters. The modified RII provides a relative measure of inequality derived from the SII. It is calculated through a linear regression prediction of DFLE or HLE for the least deprived area and divides this figure by the SII to give the ratio of DFLE or HLE between the most and least deprived areas. Further information regarding the methodology behind these estimates are published at (Smith et al., 2010c).

Disability-free life expectancy and healthy life expectancy subnational estimates for England are based solely on the APS and include residents of private households, NHS housing and students in halls of residence when interviewed at their parents' address. This survey does not collect data from children, therefore previous updates of DFLE are produced for men and women at age 16 and 65. Using the imputation method outlined in the update to methodology paper, DFLE and HLE will now be produced at birth for regions and upper tier local authorities. Further information regarding the methodology behind these estimates is published at (Smith et al., 2011, ONS, 2013).

6 . Validation and quality assurance

Accuracy

(The degree of closeness between an estimate and the true value.)

Office for National Statistics (ONS) health expectancies (HEs) are secondary analyses of published survey, mortality and mid-year population estimates. As such, the data has already been subject to rigorous quality control procedures.

ONS HEs are calculated subject to a rigorous documented quality control procedure. Calculations are performed independently by two members of the ONS Health Analysis team using STATA®, SAS® and Excel. Inconsistency and missing data checks are initially performed on the survey data. An example of an inconsistency would be where a person is reported not to have a long-standing illness but at the same time is recorded as having a limitation resulting from a long-standing illness. Missing data and inconsistencies are deleted from the final survey dataset. Cross-validation checks are carried out at each step of the calculation procedure and the final results are checked for face-validity and against recent trends by a third member of the team.

HE estimates are published with 95% confidence intervals (CIs) to allow the user to judge their precision and identify significant differences between data points (area, sex, age and time period). CI calculations are calculated from weighted prevalence and unweighted survey counts, outlined by the Sullivan method, and (with the exception of the Continuous Household Survey (CHS) and the Health Survey Northern Ireland (HSNI), which have a simple randomised sample design), include an adjustment to improve the accuracy of the standard error of HEs by accounting for the multi-stage sampling design effects of the survey sources. While more formalised and accurate methods of significance testing are available, the non-overlapping CI method is used because it is both simple to calculate and easily understood.

Certain assumptions are made when calculating the health status prevalence rates of residents of medical and care communal establishments. For instance, the proportions of people by age and sex and health status as reported in the 2001 Census are only adjusted in line with the mid-year population estimates. No assumptions are made regarding growth or contraction or health status changes in this population over time, for example, in relation to policy changes.

Undetermined, latent year-on-year variation in this population can lead to bias in health expectancies. This issue is widely recognised and not easily resolved. However, it is accepted that the impact of this potential bias is small in terms of the national population and unlikely to affect the outcome of subsequent analyses.

The health status prevalence rates by age and sex for the resident medical and care communal establishment population were updated when 2011 Census data became available. We also intend to test the underlying assumption of no change in these rates by comparing 2001 and 2011 Census data. If there is a significant change, we will assess the impact on estimates of healthy life expectancy (HLE) and disability-free life expectancy (DFLE) between 2000 and 2002 and 2008 and 2010 and publish revisions to the estimates backdated as appropriate.

Coherence and comparability

(Coherence is the degree to which data that are derived from different sources or methods, but refer to the same topic, are similar. Comparability is the degree to which data can be compared over time and domain, for example, geographic level.)

ONS HEs are indicators of population health that take into account differences in the age structure of the population. Within each output results are comparable by age, sex and between areas.

Scotland produces estimates of HLE, Scottish healthy life expectancy (SHLE), that differ slightly from ONS estimates of HLE. This is because different survey sources are used; SHLE is based on the Scottish Health Survey.

There are a number of issues that arise when trying to compare HEs derived from different sources or methods. In general HEs are sensitive to:

- measurement instruments used to collect the prevalence of health status, as the concept or definition of health may vary by survey or country
- the survey mode, for example, face-to-face interview, telephone interviews or postal surveys
- exclusion or inclusion of institutionalised persons

Differences between HEs for different countries can often be explained by differences in these points. It is therefore important that they are taken into account before attempting comparisons between countries.

HEs are calculated in other European member states and the issues highlighted in this sectionhave been highlighted in a comprehensive review (Bone et al., 1995).

National estimates of DFLE for Great Britain and England between 1980 to 1982 and (2008 to 2010) are broadly comparable, as are figures for the UK, Wales, Scotland and Northern Ireland between 2000 to 2002 and the latest period. From 2005 to 2007, our estimates of HLE were based upon the European Union Statistics on Income and Living Conditions (EU-SILC) general health question and so estimates after this date are not directly comparable with estimates prior to this date. A synthetic time series between 2000 to 2002 and 2004 to 2006 showing revised estimates of HLE for the UK and constituent countries based on the EU-SILC general health question are included in the associated national datasets.

7 . Concepts and definitions

(Concepts and definitions describe the legislation governing the output, and a description of the classifications used in the output.)

Definitions used are as follows.

Healthy life expectancy - the period of time that an individual can expect to live in “Very good” or “Good” health. This self-reported health state is taken from survey data in response to a general health question. See the How the output is created section. This definition is consistent across EU member states.

Disability-free life expectancy - the period of time that an individual can expect to live without a limiting long-standing illness or disability. This self-reported health state is taken from survey data in response to questions relating to limiting long-standing illness and activity limitation. See the How the output is created section. This definition is conceptually consistent across EU member states.

There is no legislation relating specifically to health expectancies (HEs), although there is legislation relating to provisions for the registration, processing, reporting and analysis of mortality and population data that underpin HEs. These provisions appear in different pieces of legislation that reflect the distinct and separate roles of the Registrar General for England and Wales, Scotland and Northern Ireland. Legislation relating to England and Wales can be found in Quality and Methodology Information for mortality statistics in England and Wales.

8 . Other information

Assessment of user needs and perceptions

(The processes for finding out about uses and users, and their views on the statistical products.)

A user consultation to review HE statistics produced by Office for National Statistics (ONS) took place in 2008 and the response to the review is available.

Users were also consulted as part of the UK Statistics Authority assessment of compliance with the Code of Practice for Official Statistics.

The ONS Health Analysis Team maintains a list of known users including which statistical outputs they use and how they use them. All known users will be invited to participate in any future consultation.

Feedback is also received through ONS’s regular attendance at Royal Statistical Society Health Statistics User Group meetings and academic conferences.

9 . Sources for further information or advice

Accessibility and clarity

(Accessibility is the ease with which users are able to access the data, also reflecting the format in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the release details, illustrations and accompanying advice.)

Our recommended format for accessible content is a combination of HTML webpages for narrative, charts and graphs, with data being provided in usable formats such as CSV and Excel. Our website also offers users the option to download the narrative in PDF format. In some instances other software may be used, or may be available on request. For further information please refer to the contact details at the beginning of this report.

For information regarding conditions of access to data, please refer to the following links:

- Terms and conditions (for data on the website)
- Copyright and reuse of published data
- Pre-release access (ended from 1 July 2017)
- Accessibility
- Access to microdata via the Virtual Microdata Laboratory

In addition to this Quality and Methodology Information, basic quality information relevant to each release is available in the quality and methodology section of the relevant statistical bulletins.

Useful links

ONS health and life expectancies datasets and publications

User-requested health expectancies data