

# Scottish Older People Profiles 2014

## Technical Report

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## **INTRODUCTION**

The Scottish Older People Profiles are intended to provide service providers, planners and policy makers with nationally comparable information to improve understanding of health issues relating to older people over 65 years in Scotland, to set these issues in a national context and to take action to improve the health of communities. They are comprised of a series of 3 age groups: those aged 65 plus, 75 plus and 85 plus, providing information for both NHS boards and Local Authorities. The reports currently include 32 local authority spines, 14 health board spines and supplementary data for each age category.

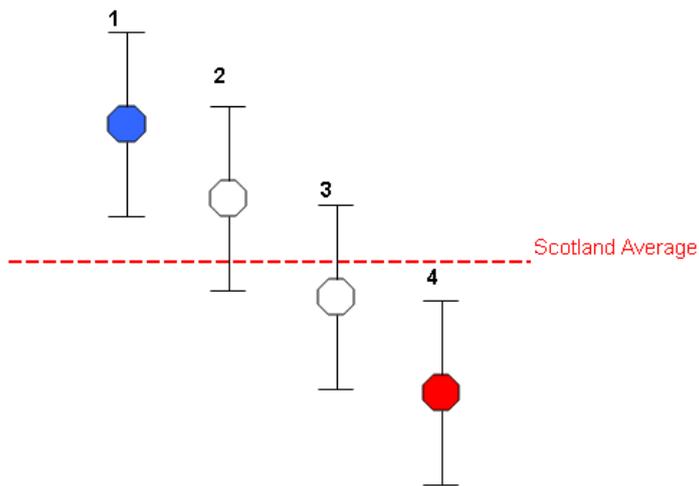
This document provides technical information to supplement the information contained in the Definitions and Sources table, available in the online profiles tool. It includes extra detail on the demography tables and spine indicators, their derivation, descriptions of statistics and methods and caveats about the information.

### **1. Interpreting the Health Summary spine charts**

Spine charts are commonly used in public health profiles to illustrate graphically a range of complex information in a way which it is intended will be quickly and easily understood. To aid comparison, in these profiles all the indicators are shown against the Scottish mean value (red line) as a reference. A modified 'traffic light' system has been applied to identify areas which are statistically significantly 'better' (blue) or 'worse' (red) than the Scottish average, or not significantly different from the Scottish average (white). An additional colour (orange) indicates where an area is significantly different from the Scottish average, but no judgement as to 'better' or 'worse' is appropriate. The 95% level of significance is used throughout.

To take some examples: in some cases (such as death rates) a higher level is clearly 'worse' (red) and a lower level 'better' (blue), while in other cases (such as immunisation coverage) a higher level is clearly 'better' (blue) and a lower level 'worse' (red). Several indicators are coloured orange when significantly higher or lower than the comparator value (by default the Scottish average), as no judgement is made as to whether a higher or lower level is 'better' or 'worse'.

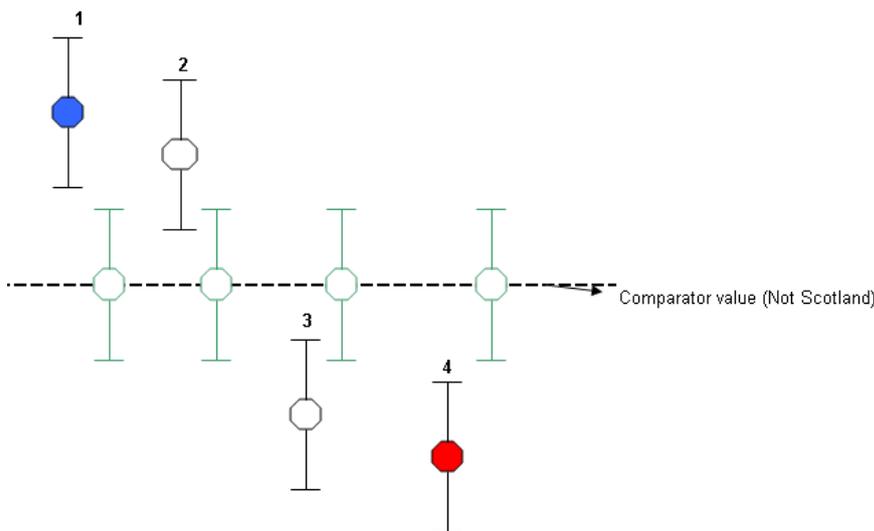
The 95% confidence interval for an indicator value for an area is used to compare that area against the overall Scotland value. The Scotland value is treated as an exact reference value, allowing the confidence interval for an indicator value to be used to test whether the value was statistically significantly different to the Scottish figure. If the interval does not include the Scottish value, the area is assessed as being statistically significantly different from Scotland (perhaps 'better' or 'worse', depending on the indicator); if the interval includes the Scottish value, the area is assessed as being similar to Scotland. This is illustrated in the example below.



- Area 1: Area is statistically significantly better than the Scotland Average.
- Area 2: Area is similar to the Scotland Average.
- Area 3: Area is similar to the Scotland Average.
- Area 4: Area is statistically significantly worse than the Scotland Average.

When the comparator is changed from the Scotland Average to another area, the comparator is no longer treated as an exact reference value. Instead the confidence interval for the comparator value is used. Statistical significance is determined if the interval for the indicator value falls out with the interval for the comparator value. This is an approximate approach that has been used for the sake of simplicity; future versions of this tool may use more exact methods.

If the interval for the indicator value includes the comparator value (OR any value within the comparator interval), the area is assessed as being not statistically significantly different. This is illustrated in the example below.



- Area 1: Area is statistically significantly better than the Comparator value.
- Area 2: Area is similar to the Comparator value.
- Area 3: Area is similar to the Comparator value.
- Area 4: Area is statistically significantly worse than the Comparator value.

The 5<sup>th</sup>, 25<sup>th</sup>, 75<sup>th</sup> and 95<sup>th</sup> percentiles are also included in the spine charts to show the distribution of the indicators.

Different indicators have different lengths of bars representing the distribution, depending on the variability inherent in the data. Note that in some profiles, the illustration of the distribution may exceed the space allowed for the bar, and is therefore truncated. When the distribution is skewed, the light grey bar will be longer on one side of the dark grey bar than the other. For example, in the case of patients hospitalised with alcohol conditions at local authority, the rates are much more widely spaced at the higher ('worse') end than the lower ('better') end.

By default, each indicator is based on the most recent of the time periods given in the Definitions and Sources table (included in the online profile tool). These time periods were the most recent for which data were available at a Scotland level at the time of publication.

## 2. Measures used in the profiles

The measures generally follow the statistics and methods recommended by the Association of Public Health Observatories (APHO).<sup>1</sup> The definitions given below are adapted from the APHO paper.

- **Proportions** are statistics where the denominator is the count of a 'closed' population, and the numerator is the count of members of this population that have a specified characteristic. If  $O$  is the observed number of individuals in the sample/population having the specified characteristic and  $n$  is the total number of individuals in the sample/population, then the estimated proportion is given by  $p = O/n$ . In these profiles, proportions have been multiplied by 100 to obtain **percentages** for presentation purposes.
- **Crude rates** are calculated in these profiles as follows. If  $O$  is the number of people experiencing an event (such as a hospital admission) in a population of size  $n$  during a period  $t$ , then the estimated crude rate is given by  $r = O/nt$ . The crude rates are expressed per 100,000 population or per 1,000 population, per year.
- **Directly age standardised rates** have been calculated for some hospital patient indicators because the overall rate may vary with the age structure of the populations. The direct standardisation method is used, with the age specific rates of the local population applied to the age structure of a standard population (in this case the European standard population 2013). This gives the overall rate that would have occurred in the local population if it had the same age profile as the standard population. It allows valid comparisons to be made between local areas with differing population age structures. In the profiles, age standardised rates are expressed per 100,000 population per year.

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<sup>1</sup> APHO Technical Briefing paper: <http://www.apho.org.uk/resource/item.aspx?RID=48457>. Date of publication 1st March 2008.

- **Directly age-sex standardised rates** have been calculated for some hospital patient and mortality indicators because the overall rate may vary with the age-sex structure of the populations. The direct standardisation method was used, with the age-sex specific rates of the local population applied to the age-sex structure of a standard population (in this case the European standard population 2013). This gives the overall rate that would have occurred in the local population if it had the same age-sex profile as the standard population. It allows valid comparisons to be made between local areas with differing population age-sex structures. In the profiles, age-sex standardised rates are expressed per 100,000 population per year.

The European Standard Population (ESP), which was first used in 1976, was revised in 2013. European Age Standardised Rates (EASRs) using ESP1976 are not directly comparable with EASRs using ESP2013. See [Appendix I](#) for further details.

### 3. Confidence intervals

A confidence interval is a range of values normally used to describe the uncertainty around a point estimate of a quantity, for example a mortality rate. In the case of indicators based on a sample of the population, uncertainty arises from random differences between the sample and the population itself. The stated value should therefore be considered as only an estimate of the true or 'underlying' value. Confidence intervals quantify the uncertainty in this estimate and, generally speaking, describe how different the point estimate could have been if the underlying conditions stayed the same, but chance had led to a different set of data. The wider the confidence interval, the greater the uncertainty in the estimate.

Confidence intervals are given with a stated probability level. In the Scottish Older People Profiles (65+ years, 75+ years and 85+ years) this is 95%, and so there is a 95% probability (ie a 19 in 20 chance) that the confidence interval includes the 'true' value of the indicator. The use of 95% is arbitrary, but is conventional practice in medical and public health statistics. The 95% confidence interval for an indicator value for an area is used to compare that area against the overall Scotland exact reference value. When the comparator is changed from the Scotland average to another area, the comparator is no longer treated as an exact reference value. Instead the confidence interval for the comparator value is used, as described in Section 1.

[Appendix II](#) comprises a table of the methods used to calculate confidence intervals for the different measures used in the profiles, following APHO recommendations.

### 4. Geographies and populations

For each of the age groups 65+, 75+ and 85+, we have presented data for local authorities and NHS boards (prior to the April 2014 boundary change). There are 32 local authorities and 14 NHS boards. The profiles are constructed

in such a way that the 75+ indicators are a subset of the 65+ indicators and the 85+ indicators are a subset of the 75+. Therefore, the numbers of individuals involved become smaller with each subsequent age range.

All of the population estimates are provided by the National Records of Scotland (NRS). Local authority and health board indicator numerators have been used alongside the corresponding published population figures as denominators. The Scotland level figures have been aggregated from Local Authority data, with the exception of those for SPARRA risk scores (see Section 5.5). In most cases 2011 based population estimates have been used (with the exception of one SIMD indicator which uses the 2001 based population estimates and a demography indicator, which uses both 2001 and 2011 based populations).

## **5. Further details on specific indicators (split by domains)**

Please note that all the data presented in the Older People Profiles 2014 are residence-based, to aid public health interpretation. Thus hospitalisation rates are based on a patient's home address (rather than the location of the hospital).

The raw data used to produce the indicators came from a variety of sources (see Definitions and Sources table in all of the products). It should also be noted that not all of the indicators appear in all three age groups. For example, the State Pension claimants indicator appears in the 65+ profiles, but not in the 75+ or 85+ profiles.

Where necessary, some indicators are based on more than one year of data. This is because numbers for a single year may be too small to give robust figures, particularly for older age groups. Combining years allows reliable figures to be produced.

### **5.1 Demography domain:**

#### **Percentage change in population between census periods 2001 and 2011**

This indicator shows the percentage change in the population between census periods 2001 to 2011. Calculated using 2001 base and 2011 base mid-year population estimates.

### **5.2 Social and Economic Circumstances domain:**

#### **Population in 15% most access deprived areas**

This indicator shows the number and percentage of total population living in the 15% most 'access deprived' areas (data zones) in Scotland. An area's access deprivation is calculated by looking at the amount of time it takes to travel to basic services, such as shops, schools and GPs. Travel time is considered for both those with access to a car and those relying on public transport. For more information on access deprivation and how it is calculated,

see: <http://simd.scotland.gov.uk/publication-2012/simd-2012-results/domain-results/geographic-access-domain/>

This indicator is produced using 2001-base mid-year population estimates.

### **People claiming pension credits (65+ profiles only)**

This indicator shows the number and percentage of the population aged 60+ years claiming pension credits. The data presented is from 2012 (DWP; quarter ending February).

### **State Pension claimants (65+ profiles only)**

Legislation was agreed in 1995 to gradually increase women's state pension age from 60 to 65 years over a 10-year period starting in April 2010. The Pensions Act 2011 speeds up the process, with the aim of reaching the 65 year age target by 2018. A further increase in state pension age to 66 years for both men and women will be implemented by October 2020. Looking further ahead, there are also plans to increase state pension age for both men and women to 67 between 2024 and 2026, eventually rising to 68 by 2046.

For further details see:

<http://www.ageuk.org.uk/money-matters/pensions/changes-to-state-pension-age/>.

The state pension claimants indicator shows the number and percentage claiming state pension, combining males over the age of 65 years and females over the age of 60 years. The data presented is from 2012 (DWP; quarter ending February).

## **5.3 Health-related Behaviours domain:**

### **Alcohol-related hospital discharges**

The indicator shown here is the European age-sex standardised rate (EASR) for general acute inpatient & day case discharges (aged 65+ years, 75+ years and 85+ years) with an alcohol-related diagnosis (in any diagnostic position). This is expressed as a 3-year (based on financial years) total number and 3-year average directly age-sex standardised rate per 100,000 population.

Standardised rates are used to allow comparisons across geographical areas by controlling for differences in the age-sex structure of local populations. They give the number of discharges (per 100,000 in this case) that would occur in a standard population if that population had the age-sex specific rates of the area being investigated. The rates are standardised to the 2013 European Standard population (ESP, see Appendix I for further details).

Hospital activity data are collected across the NHS in Scotland and are based on nationally available information routinely drawn from hospital administrative systems across the country. The principal data source for general acute inpatient & day case discharges is the SMR01 (Scottish Morbidity

Record 01) dataset. SMR01 is an episode based patient record relating to all inpatient and day cases discharged from specialities other than mental health, maternity, neonatal and geriatric long stay specialities in NHS Scotland. A record is generated for each inpatient and day case episode, of which there are about 1,200,000 each year. Attendances at Accident and Emergency that do not result in an admission are not included. Each individual patient may have more than one stay and hence the number of people discharged within a year will be less than the total number of discharges. The SMR01 data set encompasses patient identification and demographic information, episode management information and general clinical information. Items such as waiting time for inpatient or day case admission and length of stay may be derived from the episode management information. When figures are broken down by geographical area or age the numbers in some categories can be very small. In these cases both differences between categories and trends over time should be interpreted with caution because they may be misleading. A small number of patients, with a large number of hospital admissions, compounded with the small population numbers and the new ESP (2013), resulted in an inflated rate for Orkney. It was decided not to show the health board or council area output for Orkney in the 65+ and 85+ profiles to avoid any mis-interpretation. Further details regarding Orkney can be found in the ISD Alcohol-related hospital discharges publication: (<https://isdscotland.scot.nhs.uk/Health-Topics/Drugs-and-Alcohol-Misuse/Publications/2014-02-25/2014-02-25-ARHS2012-13-Report.pdf?297182799>).

Up to six diagnoses are recorded per admission, and episodes with either a main or a supplementary diagnosis of conditions resulting from alcohol misuse are included. These conditions are identified using the International Classification of Diseases 10th Revision (ICD10) Codes. The codes used can be found in [Appendix IV](#). Note that some caution is necessary when using these data as alcohol misuse may only be suspected and may not always be recorded by the hospital. The figures presented here are based on all alcohol-related diagnoses throughout the hospital stay and will reflect prevalence in the catchment area as well as local policy with regard to hospital admission and discharge. The figures may also be affected by the completeness of coding locally. For this indicator the discharge date refers to the end of the patient's continuous hospital stay, which can be made up of a number of records depending on whether the patient has been transferred from one hospital to another or from one speciality to another during the stay.

Numbers less than or equal to 5 have been suppressed.

### **Death from Alcohol Conditions (aged 65+ and 75+ only)**

Alcohol-related deaths (underlying cause) (aged 65+ years) is expressed as a 3-year (based on calendar years) total number and 3-year average directly age-sex standardised rate per 100,000 population.

Rates for this indicator are standardised to the European Standard population

(ESP, see [Appendix I](#) for further details). Alcohol-related mortality is based on an extract from a dataset of all deaths reported to the National Records of Scotland (NRS, formerly General Register Office for Scotland) based on information collected on the medical certificate of cause of death together with any additional information provided subsequently by the certifying doctor. Cases counted for this indicator are those where the 'underlying cause' (the disease or injury which initiated the chain of morbid events leading directly to death) is itself entirely caused by alcohol (Examples of such conditions include alcoholic liver disease, alcoholic cardiomyopathy etc.). This definition is generally used for reporting high level trends in mortality data for national and international statistics. However, it does not include deaths where an alcohol-related condition was recorded as a contributory factor but was not selected as the underlying cause. Further it does not include conditions (such as road traffic deaths) where a proportion of deaths are known to be due to alcohol. The codes included to define alcohol related conditions as an underlying cause of death are shown in [Appendix V](#).

Numbers less than or equal to 5 have been suppressed.

#### **5.4 Health Status domain:**

##### **Patients registered with Cancer**

The patients registered with cancer indicators display males (and separately for females), newly diagnosed with cancer, expressed as a 3-year (based on calendar years) total number and 3-year average directly age-sex standardised rate per 100,000 population.

The indicator shown here is the European age-standardised rate (EASR) of newly diagnosed cancer patients for Scotland. Standardised rates are used to allow comparisons across geographical areas by controlling for differences in the age structure of local populations. They give the number of discharges (per 100,000 in this case) that would occur in a standard population if that population had the age-specific rates of the area being investigated. The rates are standardised to the 2013 European Standard population (ESP, see [Appendix I](#) for further details).

The selection of ICD10 diagnostic codes for patients newly diagnosed with Cancer are shown in [Appendix III](#).

The data for these indicators was sourced from ISD Scotland, Scottish Cancer Registry (SMR06).

Numbers less than or equal to 5 have been suppressed.

#### **5.5 Use of Health Services - Secondary Care domain:**

##### **New Outpatient Activity**

The indicators show the total numbers and crude rates of new outpatient appointments for Consultant led Clinics from SMR00 (Scottish Morbidity Record 00 - Outpatients). SMR00 is generated for outpatients receiving care when; they attend a consultant or other medical outpatient clinic; they meet with a consultant or senior member of his/her team outwith an outpatient clinic session. The SMR00 basic data set encompasses patient identification and demographic information, episode management information and general clinical information, although there is very little data recorded on diagnosis. The numbers encapsulate all clinic attendance types marked as "new". The data is in relation to patients over 65 years old (split into 65+, 75+ and 85+) and is reported by using Health Board of Residence in order to allow further and comparable analysis of local council area. Outpatient data is normally presented by Health Board of Treatment therefore there may be some variation in the figures between the indicators and other published data. E.g. Although Orkney HB does not offer the specialty 'Acute Surgical' for Outpatients, the data shows activity because the data is based on the residence of the patient even if they are treated elsewhere. SMR00 has a high level of completeness for 2011. Note that figures for outpatient activity reflect not only need and demand for care, but also the pattern of provision of care. For example some areas will have services labeled as geriatric while other areas will provide similar services labeled as general medical. In smaller boards changes like the appointment or retirement of a consultant may have a noticeable impact on the figures.

Numbers less than or equal to 3 for the Outpatient Indicators have been suppressed.

### **Some hospital-based indicators**

These indicators include COPD, Coronary Heart Disease and Cerebrovascular Disease. They are reported at patient level and report the number of people who have had a hospital admission with the specified condition at least once during the year in question. This figure is divided by the relevant population size. Since a three year combined number is presented, each patient can be counted a maximum of three times, corresponding to once per year. Patients discharged from hospital (annually) with COPD, is expressed as a 3-year (based on calendar years) total number and 3-year average directly age-sex standardised rate per 100,000 population. The methodology was repeated for patients discharged from hospital (annually) with CVD, and also CHD. Rates are calculated using ESP 2013 and 2011-base population estimates.

The selection of diagnostic codes for these indicators uses only the first diagnostic position (the principal diagnosis) on the hospital records.

A list of all ICD10 codes used for hospital based indicators can be found in [Appendix III](#).

Numbers less than or equal to 3 for the hospital-based Indicators have been suppressed.

## **Multiple Admission patients**

This indicator is based on the number of people aged 65+ years who had multiple admissions in any particular year, where multiple admissions are defined as two or more emergency hospital admissions. This count is divided by the relevant population size. Multiple admissions are reported at patient level. Since this is a three year combined number, each patient can be counted a maximum of three times, corresponding to once per year. Multiple admission patients (aged 65+ years) discharged from hospital (annually), have been expressed as a 3-year (based on calendar years) total number and 3-year average directly age-sex standardised rate per 100,000 population. Rates are calculated using ESP 2013 and 2011-base population estimates.

The hospital data extract for the multiple admissions indicator was taken from ISD Scotland (SMR1/01, Linked Database at a more recent date, thereby accounting for very slight discrepancies in numbers quoted in the 2014 National Profiles indicator.

Numbers less than or equal to 3 have been suppressed.

## **Emergency hospital discharges as a result of a fall**

The indicator shown here is the European age-sex standardised rate (EASR) for hospital discharge following an emergency admission as a result of a fall. This indicator combines males and females over the age of 65 years, split into 3 age ranges of 65+, 75+ and 85+. Standardised rates are used to allow comparisons across geographical areas by controlling for differences in the age structure of local populations. They give the number of discharges (per 100,000 in this case) that would occur in a standard population if that population had the age-specific rates of the area being investigated. The rates are standardised to the 2013 European Standard population (ESP, see [Appendix I](#) for further details).

The selection of diagnostic codes for this indicator used all six diagnostic positions (primary position and 5 secondary positions) on the hospital records. Users should note that the variation in the completeness of recording of secondary positions (co-morbidities) between hospitals may affect this indicator. The extent of the impact of under-recording is not known.

A list of the ICD10 codes used for the falls indicator are shown in [Appendix III](#).

Numbers less than or equal to 3 have been suppressed.

## **Population 65+/75+/85+ years at risk of hospital admission/re-admission (SPARRA score $\geq 40$ )**

Scottish Patients at Risk of Readmission and Admission (SPARRA) is a risk prediction tool developed by ISD which predicts an individual's risk of being admitted to hospital as an emergency within the next year.

This indicator shows the number of people in each of the 3 age bands with a SPARRA score  $\geq 40$ , expressed as a percentage of the whole population in that particular age group. For example, the 75+ group would show the percentage of over-75s who had a SPARRA score  $\geq 40$ , of all over 75s in the group. SPARRA data is from the January 2014 SPARRA report, which predicts the number of patients who have a greater than 40 percent risk of admission from January 1st 2014 to December 31st 2014. The denominator is based on the 2012 population estimates.

### **Traumatic hip fracture discharge rates**

The indicator shown here is the European age-sex standardised rate (EASR) for discharges from hospital following traumatic hip fracture. The indicator shows the combined rate for males and females in each age group. Standardised rates are used to allow comparisons between geographical areas taking account of differences in the age structure of populations. They give the number of discharges (per 100,000 in this case) that would occur in a standard population if that population had the age-specific rates of the area being investigated. The rates are standardised to the 2013 European Standard population (ESP, see [Appendix I](#) for further details).

The selection of diagnostic codes for this indicator used all six diagnostic positions (primary position and 5 secondary positions) on the hospital records. As noted previously, the completeness of recording of secondary positions (co-morbidities) varies between hospitals.

Under-recording may contribute to variations seen in the data for the indicator.

The actual impact of the under-recording of relevant secondary positions for the profiles indicators is unknown.

Numbers less than or equal to 3 have been suppressed.

## **5.6 Use of Social Care and Continuing Health Care Services domain:**

### **Adults claiming incapacity benefit/severe disability allowance (65+ profiles only)**

Employment and Support Allowance (ESA) replaced Incapacity Benefit (IB) and Income Support paid on the grounds of incapacity for new claims from 27th October 2008. Recipients of ESA are included in this indicator for the 2014 Older People Profiles (65+years).

The indicator shows the number and percentage of all adults over the age of 65 years claiming incapacity benefit, severe disability allowance (SDA) or

employment and support allowance (ESA). The data is presented is from 2012 (DWP; quarter ending February).

Numbers less than or equal to 3 have been suppressed.

### **Adults claiming attendance allowance**

The indicator illustrates the number and percentage of adults over the age of 65 years, 75 years and 85 years claiming attendance allowance. The analysis includes any level of attendance allowance (e.g. both high and low rate award type). The data presented is from 2012 (DWP; quarter ending February).

Numbers less than or equal to 3 have been suppressed.

### **People 65+ years receiving free personal care at home (65+ profiles only)**

This indicator illustrates the number and percentage of people (65+ years) who receive free personal care services at home. The data is based on the 2011 financial year (Scottish Government community care statistics). For this indicator, Health Board level data is based on Local Authority data which has been adjusted using population estimates.

### **People aged 65+ receiving 10+ hours of home care (65+ profiles only)**

This indicator shows the Number and percentage of people aged 65+ with intensive care needs who receive 10+ hours of home care per week. 'People aged 65+ with intensive care needs' are defined as those: Receiving 10+ hours of home care (purchased or provided by a local authority) per week/Resident in a Care Home/Resident long-term in an NHS hospital. In the spine chart this indicator is assigned to 'worse' if percentage is below the Scottish average. The data presented is from 2012 (Scottish Government community care stats).

### **Number and crude rate of older people (65+ years) supported in care homes per 1,000 population (65+ profiles only)**

This indicator shows the number and crude rate of older people (65+ years) supported in care homes per 1,000 population. The data shown is from the 2011/12 financial year.

### **Number and crude rate of home care clients**

This indicator shows the number and crude rate of home care clients per 1000 population in age groups 65+, 75+ and 85+. The Health Board level data shown is based on Local Authority data, which is adjusted using population estimates. The data presented is from 2012 (last week in March; Scottish Government community care stats).

### **Clients aged 75+ with a telecare package (75+ profiles only)**

This indicator is the number and percentage of home care clients receiving a telecare service within their home. The Health Board level data is based on Local Authority data, which is adjusted using population estimates. The data presented is from 2012 (Scottish Government community care stats).

## **5.7 Carers and Caring domain:**

### **Respite care for unpaid carers (65+ profiles only)**

This indicator illustrates the number and crude rate of respite provision (respite weeks) for carers aged 65+ years per 1,000 population (65+). The data shown is for the 2011 financial year (Scottish Government community care stats).

## **APPENDIX I**

The appendix explains why European Age Standardised Rates based on the 1976 and 2013 ESP are not comparable.

Example: General acute inpatient and day case discharges in Scotland with an Alcohol-related diagnosis in any position: 1997/98-2012/13.

Based on the number of discharges observed in each of the financial years, the following rates were calculated:

### Crude Rate

In this example the crude rate is the number of people who are admitted to hospital or die from a specific condition in a country or region, divided by the total population of that country or region and the total time at risk. The rate is normally expressed 'per 1,000 per year', 'per 10,000 per year' or 'per 100,000 per year'. Comparing crude rates can be misleading if the age structures of the populations being compared are different. For example areas with larger percentages of younger people may have lower death rates than areas with larger percentages of older people. Differences based on comparisons of crude rates may reflect differences in age structure rather than real differences in the risk of disease. Age standardised rates take account of differences in age structure and allow comparisons to be made between different geographical areas that reflect real differences in risk rather than differences in age structure.

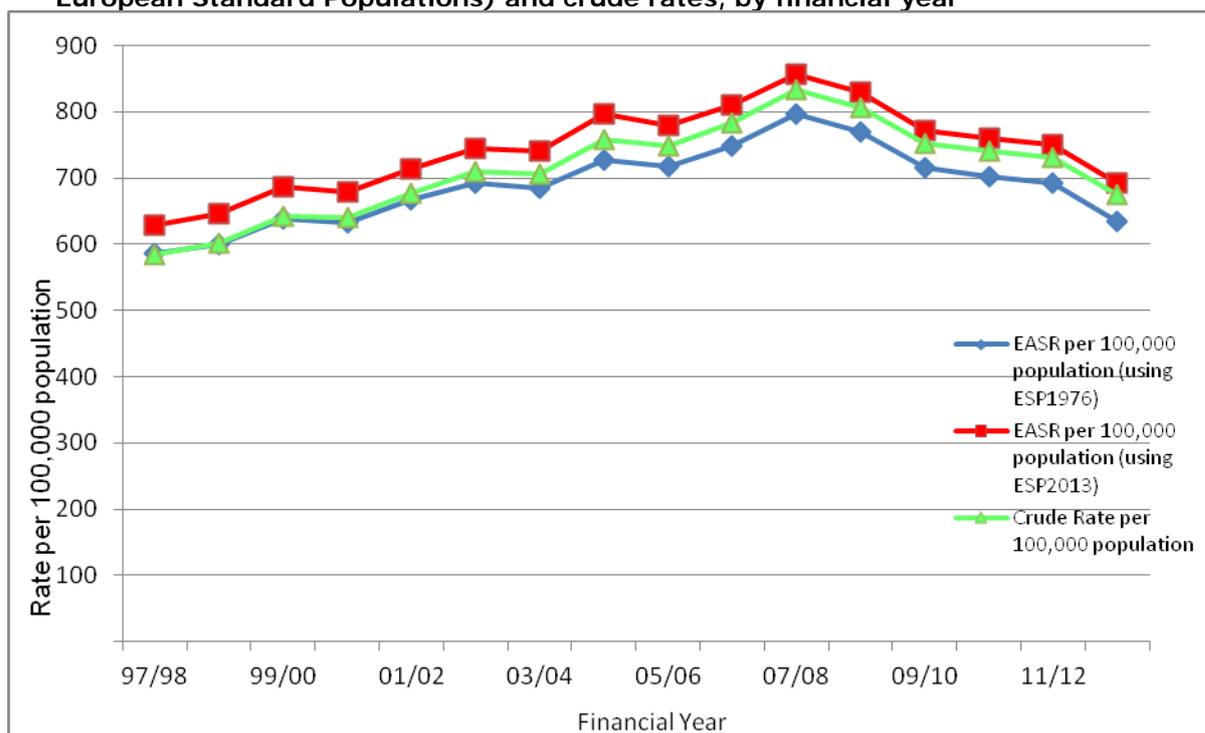
### European Age Standardised Rate (EASR) using ESP1976

The age-specific rate is calculated for each 5 year age group by dividing the number of cases by the population and time at risk. The weighted average of all the age-specific rates is calculated to give the overall EASR. The weights are based on the population in each 5 year age group in the 1976 European Standard Population. The 1976 European Standard Population has a relatively young age structure. This has the effect of producing higher rates for conditions common in younger ages and lower rates for conditions common at older ages.

### European Age Standardised Rate (EASR) using ESP2013

The age-specific rate is calculated for each 5 year age group by dividing the number of cases by the population and time at risk. The weighted average of all the age-specific rates is calculated to give the overall EASR. The weights are based on the population in each 5 year age group in the 2013 European Standard Population. The 2013 European Standard Population has a relatively old age structure. This has the effect of producing lower rates for conditions common in younger ages and higher rates for conditions common at older ages.

**Comparison of European Age Standardised Rates<sup>1,2</sup> (using both 1976<sup>3</sup> and 2013<sup>4,5</sup> European Standard Populations) and crude rates, by financial year**



**Notes:**

- (1) The population estimates used in the calculation of rates above are based on the 2011 Census results.
- (2) The European Standard Population (ESP), which was first used in 1976, was revised in 2013. European Age Standardised Rates (EASRs) using ESP1976 and ESP2013 are not comparable.
- (3) European Age-Sex Standardised Rate (EASR), calculated using ESP1976 and using 5 year age groups 0-4, 5-9 up to an upper age group of 85+.
- (4) European Age-Sex Standardised Rate (EASR), calculated using ESP2013 and using 5 year age groups 0-4, 5-9 up to an upper age group of 90+.
- (5) The upper age group for the 2013 European Standard Population structure is 95+. However, due to Scotland population estimates data being unavailable for the 95+ age group for all required geographies, the upper age group used is 90+. This is an amalgamated age group containing both the 90-94 and 95+ age groups.

It can be seen that the EASR (using ESP1976) is the lowest of the three rates. The Crude rate is slightly higher than this, and the EASR (using ESP2013) is a little higher still. Alcohol-related discharges are more frequent among older age groups. As explained above, because ESP2013 uses an older population, it gives additional weight to discharges at older ages. This explains why the ESP2013 rates are higher than the other two rates. The ESP1976 rates are lower than the crude rates because they use a younger age structure and so give less weight to discharges at older ages. The trends shown for each method of calculating rates are similar, suggesting that there has not been an appreciable change in the age distribution of the discharges. EASRs

(using ESP1976) are not comparable with EASRs (using ESP2013). For example, comparing the EASR (using ESP1976) for 09/10 in a report issued in 2013, to an EASR (using ESP2013) relating to the same financial year 09/10, in a report issued in 2014, is meaningless.

## APPENDIX II

### Methods used to calculate confidence intervals

For indicator presented as:	Method	Comments/ Assumptions	References
<b>Proportions and Percentages</b>	Wilson Score method	Wilson Score performs well when the numerator and/or denominator is small.	Wilson EB. Probable inference, the law of succession, and statistical inference. <i>J Am Stat Assoc</i> 1927; <b>22</b> : 209-12.
<b>Crude rates</b>	Byar's approximation	Performs well with low rate and large denominator (i.e. the variability in the observed event $O$ is described by the Poisson distribution). This method is simple to calculate and gives very accurate approximations to the exact Poisson probabilities even for small counts.	
<b>Directly age-sex standardised rates</b>	Dobson	Rates assume the Poisson distribution.	Dobson A et al. Confidence intervals for weighted sums of Poisson parameters. <i>Stat Med</i> 1991; <b>10</b> : 457-62.

### APPENDIX III

#### Codes selected for death and hospital patient indicators

Indicator	Codes
Alcohol related discharges	<u>See Appendix IV</u>
Deaths from Alcohol conditions	<u>See Appendix IV</u>
Cancer registrations	ICD10: C00-C97 (excl C44)
COPD hospital patients	ICD10: J40-J44, J47 (principal diagnosis only)
Coronary heart disease hospital patients	ICD10: I20-I25 (principal diagnosis only)
Cerebrovascular disease hospital patients	ICD10: I60-I69, G45 (principal diagnosis only)
Multiple admission hospital patients	Patients with 2 or more emergency admissions in a year (Old type admission code 4,5,6,7,8).  Excludes dental hospital and geriatric long stay admissions.
Falls	ICD10: W00-W19
Hip Fracture	S720, S721, S722

## APPENDIX IV

### ICD-10 codes used to count the number of alcohol-related discharges

ICD10 code	Description
F10	Mental & behavioural disorders due to use of alcohol
K70	Alcoholic liver disease
X45	Accidental poisoning by and exposure to alcohol
X65	Intentional self-poisoning by and exposure to alcohol
Y15	Poisoning by and exposure to alcohol undetermined intent
Y90	Evidence of alcohol involvement determined by blood alcohol level
Y91	Evidence of alcohol involvement determined by level intoxication
E24.4	Alcohol induced Pseudo-Cushing's syndrome
E51.2	Wernicke's Encephalopathy
G31.2	Degeneration of nervous system due to alcohol
G62.1	Alcoholic polyneuropathy
G72.1	Alcoholic myopathy
I42.6	Alcoholic cardiomyopathy
K29.2	Alcoholic gastritis
K86.0	Alcohol-induced chronic pancreatitis
O35.4	Maternal care for (suspected) damage to foetus from alcohol
P04.3	Foetus and newborn affected by maternal use of alcohol
Q86.0	Fetal alcohol syndrome (dysmorphic)
R78.0	Finding of alcohol in blood
T51.0	Toxic effect of ethanol
T51.1	Toxic effect of methanol
T51.9	Toxic effect of alcohol, unspecified
Y57.3	Alcohol deterrents
Z50.2	Alcohol rehabilitation
Z71.4	Alcohol abuse counselling and surveillance
Z72.1	Alcohol Use

## APPENDIX V

ICD-10 codes used to count the number of alcohol-related deaths (underlying cause); as also used by the National Records of Scotland (NRS).

ICD-10 code	Description
F10	Mental & behavioural disorders due to use of alcohol
K70	Alcoholic liver disease
K73	Chronic hepatitis, not elsewhere classified
X45	Accidental poisoning by and exposure to alcohol
X65	Intentional self-poisoning by and exposure to alcohol
Y15	Poisoning by and exposure to alcohol undetermined intent
G31.2	Degeneration of nervous system due to alcohol
G62.1	Alcoholic polyneuropathy
I42.6	Alcoholic cardiomyopathy
K29.2	Alcoholic gastritis
K74.0	Hepatic fibrosis
K74.1	Hepatic sclerosis
K74.2	Hepatic fibrosis with hepatic sclerosis
K74.6	Other and unspecified cirrhosis of liver
K86.0	Alcohol-induced chronic pancreatitis