

Children & young people health & wellbeing profiles 2010

Technical Report

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1 Introduction

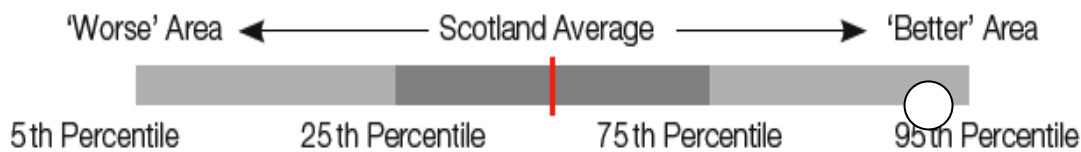
The Scottish Public Health Observatory (ScotPHO) 2010 Children and young people health and wellbeing profiles provide a focus on this important age group, drawing together 38 indicators spanning an extensive range of measures associated with health and wellbeing and wider determinants. A population summary comprising 9 indicators is included to provide additional contextual information. Outputs from this set of profiles include a Scotland overview report, local area reports and an interactive tool presenting additional data and charts. All outputs are available on the ScotPHO website at www.scotpho.org/profiles.

This document provides technical information on the indicators and methodology used to create this set of health and wellbeing outputs. It includes important details relevant to the interpretation of these indicators, their derivation, descriptions of statistics and methods, and caveats about the information contained within these reports.

2 Health and wellbeing summary

Spine charts are commonly used in public health profiles to graphically illustrate a range of complex information in a way which will be quickly and easily understood. Information for each indicator in the Children and young people health and wellbeing profiles is presented in this format (Figure 2.1) allowing comparison of the local Community Health Partnership (CHP) value (circle) against the Scottish average value (red line) and the range of values for all CHPs in Scotland (grey bar).

Figure 2.1 Sample spine chart



A modified traffic light system has been applied to identify which CHPs are statistically significantly different from the Scottish average using different coloured circles: a blue circle is used to signify that the area measure is better than the Scottish average for that indicator, a red circle signifies that the measure is worse and an amber circle signifies the measure is statistically significantly different but not classified as better or worse than the Scottish average. In addition, a white circle (such as that shown in the Figure 2.1) denotes a CHP value that is not statistically significantly different from the Scottish average for that indicator.

The 95% confidence interval for an indicator in a given area was used to compare that area measure (for example, percentage or rate) against the overall Scotland value. The Scotland value for each indicator was treated as an exact reference value, allowing the confidence interval to be used to test whether the area measure was statistically significantly different to the Scottish figure. If the confidence interval did not include the Scottish value, the area was

assessed as being statistically significantly different from Scotland. If the confidence interval did include the Scottish value, the area was assessed as being not statistically significantly different from Scotland. It is important to note, however, that being statistically significantly better than the Scottish average may still represent a significant health issue for that area.

The 5th, 25th, 75th and 95th percentiles are also included in the spine charts to indicate the distribution of local values across Scotland for each indicator and are represented by the grey bars (Figure 2.1). Different indicators will have different lengths of bars representing the distribution, depending on the variation 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 of data for a given indicator 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 drug-related hospital patients at CHP level, the rates are much more widely distributed at the 'worst' end than the 'best end of the grey bar. The range of values for this indicator is from 15.3 per 100,000 ('best') to 100 per 100,000 ('worst') the distribution of this data is illustrated by the full length of the grey bar. The difference between the 'best' value in this indicator and the 75th percentile (27.5 per 100,000) is 12.2. However, the difference between the 'worst' value and the 25th percentile (61 per 100,000) is 39 giving a much wider grey bar to the left of the Scottish average indicating a wider distribution of values towards this end.

Each indicator is based on the most recent of the time periods given in the definitions and sources table. These time periods were the most recent for which data were available at a Scotland level at the end of August 2010.

3 Measures used in the profiles

Measures included in the Children and young people health and wellbeing profiles generally follow the statistics and methods recommended by the Association of Public Health Observatories (APHO)¹. 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. For example, if the characteristic of interest is defined as 'O' and the total number of individuals in the sample/proportion is defined as 'n', then the estimated proportion (p) is defined as $p=O/n$. 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 $r=O/n \times t$. The crude rates are expressed per 100,000 population or per 1,000 population per year.
- **Directly age-sex standardised rates** have been calculated for some hospital patient indicators because the overall rate may vary with the age-sex structure of the populations. The direct standardization 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). 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 standardized rates are expressed per 100,000 population per year.

4 Confidence intervals

A confidence interval is a range of values that is normally used to describe the uncertainty around a point estimate of a measure, 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 of the entire population. 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 Public Health Observatory Children and young people health and wellbeing profiles this is 95%, and so there is a 95% probability (i.e. a 19 in 20 chance) that the confidence interval includes the 'true' value of the indicator (i.e. the actual value for Scotland). The use of 95% is arbitrary, but is conventional practice in medical and public health statistics. Appendix A comprises a table of the methods used to calculate confidence intervals for the different measures used in the profiles, following Association of Public Health Observatories recommendations.

Example: Mortality rate

Point estimate: a rate of 10 deaths per 10,000 population
95% Confidence Interval lower bound: 8
95% Confidence interval upper bound: 14

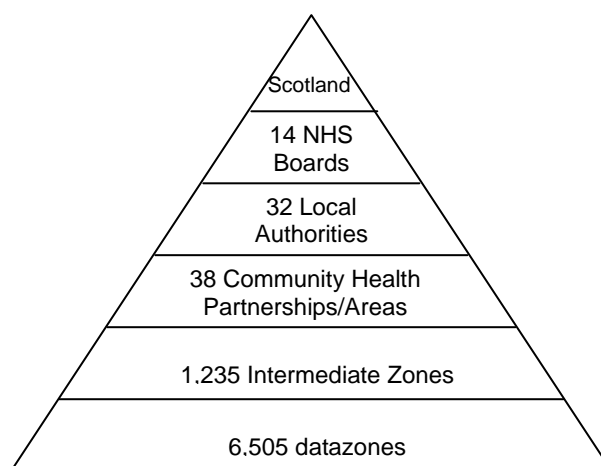
In the above example, the confidence interval is telling us that although the mortality rate in this sample is 10, there is a 95% chance that the 'true' value for the population actually lies between 8 and 14 deaths per 10,000 people.

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

5 Geographies and populations in Scotland

Scotland's geographies comprise 14 area NHS Boards and 32 local authorities, with Community Health Partnerships (CHPs) (in some cases known as Community Health and Care Partnerships or Community Health and Social Care Partnerships, but collectively referred to as CHPs throughout this report) nested within these. In many cases CHPs and local authorities are coterminous (i.e. cover the same geographical area), but some local authorities contain more than one CHP. It is important to note that instead of presenting information for five CHPs in Glasgow City as in previous years, the Scottish Public Health Observatory's (ScotPHO) 2010 profiles present information for three areas within Glasgow City (Glasgow North East, Glasgow North West and Glasgow South). This gives a total of 38 comparator areas in Scotland. For convenience this report refers to these comparator areas collectively as 'CHPs', though this is not applicable to areas within Glasgow City. Intermediate Zones are used to present data below CHP level on the ScotPHO website in the sub-CHP chart tool (www.scotpho.org/profiles), although this is only possible for a subset of indicators.

Figure 5.1 Geographical tiers used in the profiles



Where possible, raw data for the profiles were collected at datazone level. Datazones are a stable small area geography made up from aggregations of the 2001 General Register Office for Scotland (GROS) census output areas and have an average population of between 500 and 1,000 residents. These datazones were used as 'building blocks' for other larger geographies: intermediate zones (IZs), Community Health Partnerships (CHPs) and NHS Boards.

Some datazones do not fit exactly into an NHS Board and may cross multiple Boards. In these cases, a 'best-fit' methodology has been used to assign the datazone to one NHS Board. This methodology uses the population-weighted centroid of a datazone to assign it to a larger geography. For the majority of datazones, the best fit used follows the recommendations of Scottish Neighbourhood Statistics (SNS). One exception is datazone S01001694 which is located on the Lanarkshire/Greater Glasgow & Clyde NHS Board boundary and which has been assigned to Greater Glasgow & Clyde NHS Board in these profiles.

There are 12 IZs which do not fit exactly into a CHP. In these cases, the IZ has been assigned to a CHP based on a best-fit approach similar to that used at datazone level. The file showing the best fit mapping from IZs to CHP is available for download from the SNS website².

All of the population estimates used in the profiles are aggregations of datazone level populations provided by the GROS. Population estimates quoted at higher geographies such as NHS Boards are based on the best-fit methodology detailed above and may not correspond exactly to other population figures published at higher geography levels.

6 Data accuracy and completeness

The raw data for the Children and young people health and wellbeing profiles comes from a variety of sources (see definitions and sources, page 9). Data were collected with the aim of obtaining information from 1998 through to the latest year available. It should be noted, however, that this was subject to the availability of historical data and not possible for all indicators.

Where necessary, some indicators are based on data from more than one year. This is because numbers for a single year may be too small to give robust figures for small areas such as Community Health Partnerships or Intermediate Zones. Combining years allows reliable figures to be produced for these smaller geographies. It should also be noted that for some indicators obtained from cohort/survey data, the percentages are presented but the numbers are not available.

Alignment with menu of local Indicators for use in Single Outcome Agreements

The menu of local outcome indicators provided by the Improvement service (available at www.improvementservice.org.uk/local-outcome-indicators) lists indicators suitable for use in Single Outcome Agreements. Some profile indicators are similar to indicators included in the menu but are not identical (numbers 12 and 36). These differences may be crucial to interpretation and will be detailed where relevant further on in this report.

² Scottish Neighbourhood Statistics: www.sns.gov.uk

7 Definitions and Sources

This section provides detailed information on the definitions and sources used for the indicators in both the population summary and the health and wellbeing summary.

Population summary data

Indicator No.	Description	Definition	Time Period*	Source **
1-4	Population	Number and percentage of total population in each age band (<1 year, 1-4 years, 5-15 years, 16-24 years)	1998 to 2009	GROS
5-6	School pupils	Number of pupils in publicly funded schools (primary, secondary)	2003 to 2008	School Census/SG
7	Minority Ethnic Groups	Percentage of pupils in publicly funded schools (primary and secondary combined) from black and minority ethnic groups	2004 to 2008	School Census/SG
8	Live Births	Annual live births expressed as a number and rate per 1,000 population	2001 to 2009	GROS/SNS
9	Children living in rural areas	Children and young people (aged 0-24 years) living in datazones classified as 'rural'	2004 to 2008	GROS and SNS

Health and wellbeing data

Indicator No.	Description	Definition	Time Period*	Source **
1-3	Mortality	Deaths from all causes (age <1 year, age 1-15 years, age 16-24 years), 3-year total number and 3-year average crude rate per 10,000 population per year	1996-98 to 2007-09	GROS
4	Active travel to school	Percentage of school children who normally travel to school by walking or cycling	1999/00 to 2007/08	SHS
5	Alcohol-related & alcohol-attributable hospital patients	Number of patients (15-24 years) discharged from hospital (annually) with alcohol-related and alcohol-attributable conditions: 3-year total number and 3-year average directly age-sex standardised rate per 100,000 population per year	1997-99 to 2007-09	ISD Scotland (SMR1/01, linked database)
6	Drug-related hospital patients	Total number of patients (0-24 years) discharged from hospital with drug-related conditions over 3 years and 3-year average directly age-sex standardised rate per 100,000 population per year	1998-00 to 2007-09	ISD Scotland (SMR1/01, linked database)
7	Smoking prevalence	Percentage of 15 year old school pupils smoking at least one cigarette a week (regular smokers)	2006	SALSUS 2006
8	Alcohol use	Percentage of 15-year old pupils who usually drink alcohol at least once a week	2006	SALSUS 2006

Indicator No.	Description	Definition	Time Period*	Source **
9	Drug use	Percentage of 15 year-old pupils who usually take illicit drugs at least once a month	2006	SALSUS 2006
10	Road traffic accidents	Patients (aged 0-24 years) discharged from/died in hospital after a road traffic accident emergency admission: 3-year total number and 3-year average directly age-sex standardised rate per 100,000 population per year	2000-02 to 2007-09	ISD Scotland (SMR1/01 and SMR99/099, linked database)
11	Emergency medical admission patients	Emergency medical patients (aged 0-15 years) discharged from hospital (annually): 3-year total number and 3-year average directly age-sex standardised rate per 100,000 population per year	1996-98 to 2007-09	ISD Scotland (SMR1/01, linked database)
12	Child dental health in primary 1	Primary 1 children receiving a 'Category C' letter from basic inspection ("No obvious decay experience, but child should continue to see the family dentist on a regular basis."): number and percentage of all primary 1 children	2008/09	NDIP basic inspection
13	Unintentional injuries in the home	Number of patients, aged <15 years, discharged from hospital (annually) after an emergency admission due to an accident in the home: 3-year total number and 3-year average crude rate per 100,000 population per year	1998-00 to 2007-09	ISD Scotland (SMR01)
14	Extraction of multiple teeth	Hospital admissions (inpatients and day cases, age 0-15 years) for extraction of multiple teeth: 3-year total number and 3-year average directly age-sex standardised rate per 100,000 population per year	1998-00 to 2007-09	ISD Scotland (SMR01)
15	Asthma hospital patients	Patients (aged 0-15 years) discharged from hospital (annually) in particular circumstances (asthma): 3-year total number and 3-year average directly age-sex standardised rate per 100,000 population per year	1997-99 to 2007-09	ISD Scotland (SMR01)
16	Child obesity in Primary 1	Children whose BMI is within the top 5% of the 1990 UK reference range for their age and sex – percentage of the total cohort.	2000/01 to 2008/09	CHSP-S
17	Deaths from suicide (inc. undetermined intent)	Deaths from suicide (age <25 years): 10-year total number and 10-year average directly age-sex standardised rate per 100,000 population per year	2000-2009	GROS (SMR99)
18	Strengths & difficulties score	Total difficulties score, expressed as a mean (13 and 15 year olds combined)	2006	SALSUS 2006

Indicator No.	Description	Definition	Time Period*	Source**
19	Children looked after	Number of children looked after by Local Authority (aged 0-18 years) expressed as a number and crude rate per 1,000	1999 to 2009	SG
20	Child protection referrals	The definition of what constitutes a Child Protection Referral varies between local authorities. Therefore comparisons between local authorities in particular, but also over time, are not advised. At the time of publication, the Scottish Government are reviewing this and planning to issue guidance to help ensure that better consistency in reporting by all local authorities is obtained in future years. Data are currently expressed as number and crude rate per 1,000	2000 to 2009	SG
21	Education outcomes for looked after children	Average tariff score (pupil attainment) of all 'looked after pupils' enrolled in stage S4 of publicly funded secondary schools	2002/03 to 2008/09	SG
22-23	School attendance	School attendance rate (secondary, primary) number attending and percentage of all pupils (based on pupil residence).	2003/04 to 2008/09	SG/SNS
24	Average tariff score of all pupils on the S4 roll	Average tariff score (pupil attainment) of all pupils enrolled in stage S4 of publicly funded secondary schools	2002 to 2008	SG
25	Residence in 'access deprived' areas	Children (aged 0-24 years) living in 15% most access-deprived datazones in Scotland	2008	SIMD09 and GROS
26	Reliance on out of work benefits / child tax credit	The number of children living in households that are dependent on out of work benefits or where child tax credit is more than the family element	2008	HMRC
27	NEET	Number of 16-19 year olds not in education, employment or training (NEET)	2003 to 2008	SG
28	School leavers – positive and sustained destinations	Proportion of school leavers (from Scottish publicly funded schools) in positive and sustained destinations (further education, higher education, employment or training)	2007/08 to 2008/09	SG/SDS
29	Residence in 'income deprived' areas	Children (aged 0-24 years) living in 15% most 'income deprived' datazones in Scotland	2008	SIMD09
30	Assault-related hospital patients	Assault patients (aged 0-24 years) discharged from hospital (annually): 3-year total number and 3-year average directly age-sex standardised rate per 100,000 population per year	1996-98 to 2007-09	ISD Scotland (SMR1/01)

Indicator No.	Description	Definition	Time Period*	Source**
31	Referrals to SCRA for violence-related offences	Children referred to the Scottish Children's Reporter Administration (SCRA), aged 8-15 years	2003/04 to 2009/10	SCRA
32	Residence in 'crime deprived' areas	Children and young people (aged 0-24 years) living in 15% most 'crime deprived' datazones in Scotland, expressed as a number and percentage of the population in the CHP	2008	SIMD09 and GROS
33-34	Immunisation uptake at 24 months	Immunisation uptake at 24 months for MMR (indicator 34) and all excluding MMR (indicator 33): 3-year total number and percentage of children of this age	2003-05 to 2006-08	SIRS
35	Babies exclusively breastfed at 6-8 weeks	Babies being exclusively breastfed at 6 to 8 week review: 3-year total and percentage of children of this age	1997-99 to 2006-08	CHSP-PS
36	Teenage pregnancies, <18 years	Teenage (<18 years) pregnancies expressed as a number (3-year total) and 3-year average crude rate per 1,000 females aged 15-17 per year	2001-03 to 2006-08	GROS
37	Mothers smoking during pregnancy	Women recorded as a 'current smoker' at antenatal booking appointment: 3-year total and percentage of all live singleton births.	2001-03 to 2006-08	ISD Scotland (SMR02)
38	Low weight live births	Low weight live full-term singleton births (<2,500g): 3 year-total and percentage of all live singleton births.	2001-03 to 2006-08	ISD Scotland (SMR02)

* The time period column indicates the total years available from each data source. Please note that spine charts display the most recent time period only (see spine chart footnotes for further details). Data covering the full time period for some indicators can be accessed through the ScotPHO website (www.scotpho.org/profiles) using the interactive Sub CHP chart tool.

** In some cases this indicates the source of original raw datasets, with that data then re-organised to allow for the calculation of required measures (e.g. mortality)

Abbreviations

CHSP-PS:	Child Health Systems Programme – Pre-school Children
CHSP-S:	Child Health Systems Programme – School aged Children
GROS:	General Register for Scotland
HMRC:	HM Revenue & Customs
ISD Scotland:	Information Services Division (of NHS Scotland)
NDIP:	National Dental Inspection Programme
SALSUS 2006:	Scottish Schools Adolescent Lifestyle and Substance Use Survey
SCRA:	Scottish Children's Reporter Administration
SDS:	Skills Development Scotland
SG:	Scottish Government
SHS:	Scottish Household Survey
SIMD09:	Scottish Index of Multiple Deprivation 2009
SIRS:	Scottish Immunisation Recall System
SMR01/02/99:	Scottish Morbidity Records
SNS:	Scottish Neighbourhood Statistics

8 Notes on Interpretation of Indicators

This section provides detailed information pertaining to the interpretation of selected indicators in both the population summary and the health and wellbeing summary. It includes data accuracy and completeness, additional details on the calculation of some indicators as well as any caveats that should be taken into account when interpreting these data.

8.1 Population Summary

Minority ethnic groups – indicator 7

The data for this indicator relate to black and minority ethnic groups and are taken from the September Scottish Pupil Census, for the relevant year, of publicly funded schools and do not include the following - pupils attending grant aided Special Schools; pupils attending independent Schools; pupils educated out with the school education system (for example at home); adults attending publicly funded secondary schools. Postcodes were submitted for about 99% of pupils in publicly funded primary and secondary schools. Results presented in these profiles do not include pupils with a missing or invalid postcode. Therefore, the national figures may not be the same as national figures published elsewhere².

Live births – indicator 8

The data for this indicator is derived from General Register Office for Scotland (GROS) and is based on the number of births which were registered in Scotland in the specified calendar year. Births are counted on the basis of the area of usual residence of the mother if that is in Scotland; otherwise they are counted on the basis of the place of birth. GROS numbers are based on the date of registration of the births rather than the date of birth, so that a child born in late December of one year may not be registered until the following year

Children living in rural areas – indicator 9

The Scottish Government Urban Rural Classification (previously called the Scottish Household Survey Urban Rural Classification) was first released in 2000 and is consistent with the Scottish Government's core definition of rurality which defines settlements of 3,000 or less people to be rural. It also classifies areas as remote based on drive times from settlements of 10,000 or more people.

It distinguishes between urban, rural and remote areas within Scotland and includes the following categories:

Scottish Governments Urban Rural Classification:

- 1 Large Urban Areas Settlements of over 125,000 people.
- 2 Other Urban Areas Settlements of 10,000 to 125,000 people.
- 3 Accessible Small Towns Settlements of between 3,000 and 10,000 people and within 30 minutes drive of a settlement of 10,000 or more.
- 4 Remote Small Towns Settlements of between 3,000 and 10,000 people and with a drive time of over 30 minutes to a settlement of 10,000 or more.
- 5 Accessible Rural Settlements of less than 3,000 people and within 30 minutes drive of a settlement of 10,000 or more.
- 6 Remote Rural Settlements of less than 3,000 people and with a drive time of over 30 minutes to a settlement of 10,000 or more.

Note that the measure of rurality used in the Children and young people health and wellbeing profiles are those areas classified as five or six, as per the description above.

8.2 Health and wellbeing Summary

Mortality domain

Mortality indicators – indicators 1-3

Comparison of crude mortality rates between areas that may have different age structures should be interpreted with caution because the age structure of the population can affect the number of deaths and thereby the crude death rate. To overcome this problem, the common approach is to standardise the mortality rates to take account of differences between the age structures of the populations.

For the age bands within the Children and young people profiles, the standard European population is almost constant (8,000 for 0-4 year olds, and 7,000 for 5-9, 10-14, 15-19 and 20-24 year olds) and would therefore not provide any additional clarity over crude rates.

Behaviours domain

Active travel to school – Indicator 4

The Scottish Household Survey is a continuous survey based on a sample of the general population in private residences in Scotland. It presents reliable and up-to-date information on the composition, characteristics and behaviour of Scottish households. The sample is structured to be nationally representative each quarter and to provide a representative sample for larger local authorities each year, and every local authority over a two-year period.

Data are not available below local authority level for this indicator; this is important to note when interpreting values for Community Health Partnerships (CHPs) that are not coterminous with local authority areas (specifically Glasgow, Highland and Fife CHPs). Numbers have not been presented in CHP profiles due to small values.

Alcohol-related and attributable hospital patients – Indicator 5

Alcohol attributable fractions (AAFs) have become available for Scotland for 53 conditions, of which 19 conditions, are by definition, wholly attributable to alcohol assumption and 34 conditions partly attributable to alcohol consumption.³

The AAF is the estimated proportion of an individual condition for which alcohol is a contributory factor. They are ideally calculated at different points in time so that changes in levels of alcohol consumption can be incorporated into the estimated AAFs. To date, only one set of AAFs has been published for Scotland (based on 2003 consumption data from the Scottish Health Survey) so these AAFs are used to calculate the alcohol related and attributable hospitalisations for the whole time period used (1997-2009). This means that if consumption has gone up since 2003 our results will under-estimate hospitalisations due to alcohol, and if consumption has gone down then our results will over-estimate hospitalisations due to alcohol. Obviously, changes in consumption would not have an immediate effect on all the conditions considered but it would for some.

For hospitalisations: International Classification of Diseases (ICD-10) codes³ were used to extract data from SMR1/01 (hospital inpatient and day case records from acute specialties) on

patients who had been discharged from hospital with a diagnosis of one of the alcohol-related or attributable conditions for which we had AAFs. Codes were extracted for the primary diagnosis and for all secondary diagnoses. Patients in psychiatric hospitals (SMR4/04) were not included.

A person may be discharged during a particular time period with more than one alcohol-related or alcohol attributable condition. We counted the highest AAF diagnosis in the individual within the year (in any diagnostic position). For example, if someone was admitted with a diagnosis of alcoholic liver disease (AAF 1.0) and oesophageal cancer (AAF 0.31), only the condition with the higher AAF (alcoholic liver disease) was used in the analysis. This approach differs from the approach taken by the authors of the Scotland AAF report. Other approaches could include only looking at the primary diagnosis field, or only taking the diagnosis at either initial diagnosis or discharge. Our approach results in higher estimates of numbers of patients hospitalised with alcohol conditions.

Drug-related hospital patients – indicator 6

This indicator is comprised of a specific set of codes (see our Appendix B for the codes). Each person is counted once within the year. It should be noted that some hospitals are less likely to record secondary diagnoses than others and this should be taken into account when interpreting this indicator.

SALSUS substance use indicators – indicators 7-9

The Scottish Schools Adolescent Lifestyle and Substance Use Survey (SALSUS) collects local area data (local authority and NHS Board) on the prevalence, attitudes and behaviour of young people in regard to smoking, drinking and drug use every four years and national information every two years.

As the SALSUS report is based on survey data, there may be some response bias due to self-reporting of information by pupils. Data were available for every local authority with the exception of Clackmannanshire, who did not participate in the 2006 survey.

The sample design of the SALSUS survey is complex, involving stratification by local authority and school type (state or independent) as well as clustering within schools. Clustering reduces the precision of estimates compared with a simple random sample, whereas stratification can increase precision. Weighting can also reduce the precision of estimates. The extent to which precision is modified by the sample design is known as the design effect (DEFF)⁴. This is the ratio of the variance, under the sampling method actually used, to the variance computed under the assumption of random sampling³. It shows by how much the sample standard error, and consequently the confidence interval increases.

The design factor (DEFT) is the square root of the design effect. A design effect (and therefore design factor) greater than 1.0 indicates a confidence interval wider than it would be for a simple random sample meaning that the precision of the estimate is reduced. A design effect less than 1.0 indicates a narrower confidence interval and greater precision of the estimate² (See appendix C for DEFF values)

The following paragraphs provide details on the calculation of confidence intervals for each of the substance misuse indicators.

³ Alcohol attributable mortality and morbidity: alcohol population attributable fractions for Scotland. Grant I, Springbett A, Graham L. ISD Scotland, June 2009 <http://www.scotpho.org.uk/nmsruntime/saveasdialog.asp?/ID=53/8&SID=4562>

⁴ Scottish Schools Adolescent Lifestyle and Substance Use Survey (SALSUS) Technical Report 2008. http://www.drugmisuse.isdscotland.org/publications/local/SALSUS_technical_2008.pdf

In the SALSUS survey, the design effect includes the effect of the population correction factor, as well as the clustering, weighting and stratification.

- **Smoking prevalence and alcohol use (7&8)**

Data were weighted by local authority or NHS Board as appropriate. Design factor (DEFT) was applied to the confidence interval to increase the accuracy of the approximation (DEFT values available for local authorities level only).

- **Drug use (9)**

Data were weighted by local authority or NHS Board as appropriate. Design factor (DEFT) was applied to the confidence interval to increase the accuracy of the approximation (DEFT values available for local authorities level only). The DEFT for drug use applies to 15 year olds who take drugs once a week and not those who take drugs once a month, as per the indicator definition.

Physical health domain

Child dental health in primary 1 – indicator 12

The results obtained from the dental health in Primary 1 indicator are from the basic NDIP inspection and do not exactly match NHS board-level data published by the Scottish Dental Epidemiological Coordinating Committee. There are two additional reasons for this:

- In order to add in the geographical information, we used the child's address of residence rather than the address of the school (all our analyses are residence-based to aid public health interpretation).
- The Scotland total figure is slightly higher in the profiles because we included everyone with a Scottish postcode, even if the postcode file did not have a CHP/NHS board for the postcode.

The percentage of Primary 1 children indicating no obvious decay experience should be interpreted with caution, as the proportion of the Primary 1 child population receiving a basic inspection varied across CHPs. The results for areas with low response rates may be unreliable and should not be used without further investigation. Further information can be obtained from the dental team at Information Services Division (ISD Scotland). The response rates for individual NHS boards were as follows: Ayrshire & Arran, 88.1%; Borders, 83.7%; Dumfries & Galloway, 79.8%; Fife, 83.7%; Forth Valley, 44.9%; Grampian, 63.4%; Greater Glasgow & Clyde, 92.7%; Highland, 82.9%; Lanarkshire, 91.3%; Lothian, 89.6%; Orkney, 81.7%; Shetland, 93.9%; Tayside, 85.2%; Western Isles, 92.9%. Response rates at CHP level are thought to vary even more widely at CHP level, but response rates by CHP are not currently available.

Extraction of multiple teeth, aged 0-15 – indicator 14

Fife Local Authority does not use SMR00/01 recording for dental general anaesthetic procedures undertaken by the community dental service since they do not all take place in an acute hospital. As a result, rates in NHS Fife appear artificially low, and this will also have had some impact on the Scottish average with which other local areas are compared. This indicator may not capture all incidences of extractions of multiple teeth.

Child obesity in primary 1 – indicator 16

The Child Health Systems Programme – School aged children (CHSP-S), from which these data are derived, was introduced in 1993 and the number of participating Boards has increased over the years to 11 NHS Boards (and a corresponding 26 CHPs) in school year 2008/09. The Body Mass Index (BMI) statistics cover approximately 70% of children in Primary 1 among the 11 participating NHS Boards, and approximately 62% of children in Primary 1 in Scotland. Due to

the phased implementation of the CHSP-S, or the small number or proportion of reviews recorded on the system in some areas, data are not available for all years for some participating NHS Boards/CHPs:

(a) NHS Board – data are not shown for the following NHS Boards: NHS Grampian, NHS Orkney, NHS Shetland. As at school year 2008/09, NHS Orkney did not participate in the CHSP-S, and NHS Grampian and NHS Shetland had only partially implemented CHSP-S.

(b) Community Health Partnerships (CHPs) – data are not shown for the following CHPs: East Dunbartonshire, North East Glasgow, East Renfrewshire, Inverclyde, North West Glasgow, South Glasgow, West Dunbartonshire, Orkney, Shetland, Aberdeen City, Aberdeenshire and Moray.

Mental health domain

Strengths and Difficulties Score – indicator 18

The Strengths and Difficulties Questionnaire is part of the SALSUS survey (see indicators 7-9 for more information) and asks specifically about 25 positive and negative attributes of mental health. These are divided evenly between the following categories:

- Emotional symptoms
- Conduct problems
- Hyperactivity
- Peer relationship problems
- Pro-social behaviour

The Difficulties Score is calculated from the responses given to the first four categories (excluding pro-social behaviour) and pupils are given a score:

- 0-15 – normal
- 16-19 – borderline
- 20-40 – abnormal

Data are not available below local authority level for this indicator; this is important to note when interpreting values for CHPs that are not coterminous with local authority areas (specifically CHPs within Glasgow, Highland and Fife local authorities). Numbers have not been presented in CHP profiles due to small values.

Social care domain

Children looked after by Local Authority – indicator 19

Children are looked after by local authorities when they are: a) provided with accommodation under section 25, or b) subject to a supervision requirement from a children's hearing or c) subject to an order, authorisation or warrant according to which they have responsibilities under chapter 2, 3 or 4 or part ii of the Act (<http://www.scotland.gov.uk/Publications/2010/06/01094202/2>).

A local value that is significantly different from the Scottish average has been coded “amber” in the spine chart, as this indicator reflects recorded utilisation of services rather than directly measuring health or wellbeing. There are several possible explanations for high or low rates, depending on individual area, and so local interpretation is crucial.

Data are not available below local authority level for this indicator; this is important to note when interpreting values for CHPs that are not coterminous with local authority areas (specifically CHPs within Glasgow, Highland and Fife local authorities). Numbers have not been presented in CHP profiles due to small values.

Child Protection referrals – indicator 20

The definition of what constitutes a child protection referral varies between local authorities. Therefore comparisons between local authorities in particular, but also over time, are not advised. At the time of publication, the Scottish Government are reviewing this and planning to issue guidance to help ensure that better consistency in reporting by all local authorities is obtained in future years.

Because of the variation in local definitions of child protection referrals, and because this indicator reflects recorded utilisation of services rather than health or wellbeing, local interpretation is crucial and values for this indicator are not categorised as ‘better’ or ‘worse’ than the Scottish average within spine charts.

Data are not available below local authority level for this indicator; this is important to note when interpreting values for CHPs that are not coterminous with local authority areas (specifically CHPs within Glasgow, Highland and Fife local authorities). Numbers have not been presented in CHP profiles due to small values.

Education domain

Education outcomes for looked after children – indicator 21

Information collected in the Pupil Census is used to ‘flag’ whether a child is “looked after” however, this information is only a snapshot figure on one given day in September when the Census is conducted. The interpretation of “looked after” is determined by the school recording this information, and so the definition of “looked after” across Scotland may not be entirely consistent.

The Scottish Government has been working on developing the data on the educational attainment of looked after children, and from May 2011 will be publishing the education outcomes of Scotland’s looked after children based on linking attainment, exclusions, absence and leaver destination data with individual looked after children survey (which contains individual level information on each looked after child in Scotland). This will provide much more robust and comprehensive data on the educational outcomes of Scotland’s looked after children.

Average tariff score of all pupils on the S4 roll – indicator 24

The Scottish Tariff Points System is used to provide an average summary statistic on pupil performance. A pupil is awarded tariff points, ranging from 1 tariff point for a pass at Access level 2 to 120 points for an A pass at advanced higher level. A pupil’s tariff score is calculated by adding up the tariff points accumulated from the pupil’s performance by the end of the school year. Therefore, the score for 2008 is calculated at the end of the 2008/09 school year⁵.

The average tariff score enables different types of certification to be considered together, making it easier to compare average attainment for different areas. The tariff score of a pupil is calculated by allocating a score to each level of qualification and award, using the Unified Points Score scale. For example, a Standard Grade at level 1 counts as 38 points and at level 4 counts as 14 points.

Data for this indicator are restricted to S4 pupils attending publicly funded secondary schools. The data do not include: pupils attending publicly funded special schools and private independent schools; adults attending publicly funded secondary schools; and pupils educated outwith the school education system (e.g. at home).

Employment and prosperity domain

Dependence on out of work benefits or child tax credit – indicator 26

This indicator is an absolute measure of poverty; it does not account for relative (or comparative) poverty, the time spent in poverty or the depth of poverty experienced. It provides a very broad definition of child poverty that includes 47% of Scottish children and does not equate to the Scottish Government's definition of children living in poverty.

The 2008 small area data is based on the 2008/09 finalised awards data, but only awards live as at 31 August 2008 are selected for inclusion. These estimates may not match exactly with estimates for 2008/09 finalised award national statistics.

Residence in 'income deprived' areas – indicator 29

The Scottish Index of Multiple Deprivation (SIMD) income domain uses data from the Department for Work and Pensions to give the count or proportion of people defined as 'income deprived' at a datazone level. 'Income deprived' people are those in the following categories:

- Adults and Children in Income Support (IS) households
- Adults and Children in Job Seekers Allowance (JSA) households
- Adults in Guaranteed Pension Credit households

SIMD is the official Scottish Government tool for highlighting areas of concentrated deprivation in Scotland and the income domain is used to highlight areas of income deprivation. This is a useful source for understanding the spread of income deprivation at a local level and data are available at geographies down to datazone level. Users should note that some people highlighted as income deprived may not be in relative poverty according to the UK and Scottish Government definition (and vice versa). It is also worth noting that not all those living in an income deprived datazone will themselves be income deprived and likewise not all individuals who are income deprived will be living in areas with high concentrations of income deprivation.

Crime domain

Referrals to Children's Reporter for violence related offences – indicator 31

The Children's Hearings System is the care and justice system for Scotland's children and young people. A fundamental principle is that children who commit offences, and children who need care and protection, are dealt with in the same system – as these are often the same children.

At the core of the system are Children's Reporters who are based in local communities. Children and young people are referred to the Reporter from a number of sources, including police, social work, education and health. They are referred because some aspect of their life is giving cause for concern. The Scottish Children's Reporter Administration investigates each referral and determines whether compulsory measures of intervention are required⁶.

This indicator provides information on the number of children, aged from 8-15, referred to the Scottish Children's Reporter Administration (SCRA) for 'violence-related offences'. Children and young people are referred to the SCRA because some aspect of their life is giving cause for concern. They may be referred from a variety of sources, including police, social work, education and health. Each referral is then investigated to determine whether compulsory measures of intervention are required. Referrals may be on offending grounds or non-offending grounds, with the former being subdivided by type of offence. ScotPHO Profiles 2010 use a bespoke definition of what constitutes a 'violence-related' offence. The definition includes a broad range of offences, commonly associated with violence, as listed below:

- Assault
- Assault with attempt to rob
- Assault with intent to ravish
- Attempted murder
- Bodily injury
- Carrying offensive weapon
- Culpable homicide
- Indecent assault
- Knives (Sc) Act s.1
- Murder
- Possession of firearm with intent to injure/to rob
- Rape
- Serious assault
- Willful and malicious fire-raising

Data are analysed by number of children referred and not number of referrals to avoid a child being counted more than once. Data are presented as a number and the crude rate per 1,000 population aged 8 to 15 years. Referrals to SCRA may include children >15 years who are subject to a supervision requirement but such referrals are excluded for the purpose of this indicator. In addition, it is important to note that very serious offences such as rape, murder, etc. are almost always dealt with by the Criminal Justice System and not the Children's Hearing System.

This indicator is included in the ScotPHO profiles as it provides a measure of violent behaviour in children and young people. Local referring practice may vary and this indicator may reflect the extent to which violent offences are reported and acted upon as well as the actual rate of occurrence of such offences. Accordingly, local interpretation is crucial and values for this

indicator are not categorised as 'better' or 'worse' than the Scottish average within spine charts. As with all indicators, additional caution should be used when interpreting information based on a small number of events.

Crime deprivation – indicator 32

SIMD data covers the following categories: crimes of violence, domestic house breaking, drug offences, minor assault and vandalism. Data are from recorded crime and offences from the 8 Scottish Police Forces. This indicator was first included in the 2006 SIMD however due to changes to methodology care is needed when looking at comparisons over time.

Pregnancy and infancy domain

Immunisation uptake – indicators 33 and 34

The results obtained from the immunisations indicators do not exactly match immunisation statistics published on the ISD website. This is because we used the child's address of residence rather than the address of the child's GP practice (all our analyses are residence-based to aid public health interpretation). Additionally, some children do not have postcode recorded so they are included in the Scotland total figure but not at other geographical levels.

Babies exclusively breastfed at 6-8 weeks – indicator 35

These statistics are derived from breastfeeding data recorded at the 6-8 week review, for NHS Boards in Scotland which participate in the Child Health Systems Programme Pre-School system (CHSP-PS). Due to the phased implementation of the CHSP-PS, data are not available for all years for some participating NHS Boards and the constituent Community Health Partnerships. Data are available for all years presented (1997-2008) for eight NHS Boards: Ayrshire & Arran, Borders, Fife, Greater Glasgow & Clyde, Highland, Lanarkshire, Lothian and Tayside. Note that NHS Highland fully implemented CHSP-PS in May 2007; data presented for 1997-2006 relate to the area of NHS Highland inherited from former NHS Argyll & Clyde (i.e. Argyll & Bute Council Area).

In addition, data are available for NHS Forth Valley from 1998, for NHS Dumfries & Galloway from 2001, for NHS Western Isles from 2006 and for NHS Shetland from 2008. Grampian and Orkney do not use the CHSP-PS therefore data are not available for these NHS Boards.

Time trend data is omitted for any 3-year time periods where the area was not using CHSP-PS for the whole 3-year period. The exception to this is Highland, where two years (2007-08) are shown for the NHS Board and CHPs.

Among participating NHS Boards, the majority of 6-8 week reviews are carried out before babies are 9 weeks old. The maximum age limit for the 6-8 week review is recommended as 12 weeks. Variation in the timing of the 6-8 week review may affect the reported rates as there is a known drop-off in breastfeeding rates with time⁷.

⁶ Scottish Children's Reporter Administration: www.scra.gov.uk

Teenage pregnancies, <18 years – indicator 36

The Children and young people profiles present information on teenage pregnancies in women aged less than 18 years. Current Scottish Government policy focuses on teenage pregnancies under 16 years, and this younger age range is also used in the menu of local outcome indicators for Single Outcome Agreements. Data based on pregnancies to women under 18 years have been presented within the Children and young people profiles for several reasons: (i) the relatively small number of pregnancies in those aged under 16 precludes presentation of robust data at the required geographies (ii) to continue a time series from previous profiles and (iii) this information may be useful for planning purposes locally. It should be recognised though that pregnancies in those aged 16 and 17 are not necessarily associated with poorer outcomes for mothers and infants. Accordingly, local interpretation of this indicator is vital, and values for this indicator are not categorised as 'better' or 'worse' than the Scottish average within spine charts.

To improve the robustness of the data set, data have been aggregated over three years. The source for this indicator is GROS registered births and stillbirths and notifications of abortions under the Abortion Act 1967.

Mothers smoking during pregnancy – indicator 37

Note that the data we present exclude cases where smoking status is not known, and that the number of 'not known's' may vary between areas and over time, leading to interpretation issues.

9 Data Disclosure

The data contained in the ScotPHO Children and young people health and wellbeing profiles 2010 have been adjusted to conform to our policy on statistical disclosure control. As a result, the data do not contain cells considered as potentially disclosive (cells generally with small numbers, which might enable an individual patient to be identified, perhaps with the aid of further knowledge of the topic).

Analyses which have had disclosure applied will appear as follows:

- In the spine chart: number column blank (unless a standardised rate), chart value displayed.
- In the rank chart: bar suppressed (unless standardised rate).
- In the time trend graph: Suppressed values are not shown but points either side of the suppressed values are joined (unless a standardised rate).

Appendix A: Methods used to calculate confidence intervals

The following methods used to calculate confidence intervals follow the standard guidance issued by the Association of Public Health Observatories (APHO). Further guidance on these methods can be found at www.apho.org.uk.

Proportions and percentages

Confidence intervals for proportions are determined using the binomial distribution. A Normal approximation method is often presented in statistical textbooks but does not perform well when the numerator and/or denominator are small. The method used in these profiles is the Wilson Score method⁸. It can be used with any data values and, unlike some methods, it does not fail to give an interval when the numerator count, and therefore the proportion, is zero.

Crude rates

The preferred method for calculating the confidence interval around a rate is Byar's approximation. This method performs well with a low rate and large denominator i.e. where 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.

Directly age-sex standardised rates

Directly age-sex standardised rates express an indicator in terms of the overall rate that would occur in a standard population age-structure if it experienced the age-specific rates of the observed population. It is a weighted sum of the independent age-specific rates. Therefore, its variance is a weighted sum of the variances of each of those age-specific rates. The preferred method for calculating the confidence interval is one described by Dobson⁹.

⁸ Wilson E.B Probable inference, the law of succession, and statistical inference. J Am Stat Assoc 1927; 22:209-12.

⁹ Dobson A et al. Confidence intervals for weighted sums of Poisson parameters. Stat Med 1991;10:457-62.

Appendix B: Codes for death and hospital patient indicators

Indicator number	Indicator	Codes
5	Alcohol-related and attributable hospital patients	See appendix C
6	Drug-related hospital patients	ICD9: 292, 304, 305.2-305.9 ICD10: F11-F19 (excluding F17) (all diagnostic positions)
10	Road traffic accidents	Type of admission code 32
11	Emergency admission hospital patients	Old type admission code 4,5,6,7,8
13	Unintentional injuries in the home	Type of admission code 33 and age<15 years
14	Extraction of multiple teeth, aged 0-15	OPC4 codes used to define multiple extractions of teeth were: F10.1-,F10.2, F10.3-, F10.4-“
15	Asthma hospital patients, aged 0-15	J45, J46
17	Deaths from suicide	ICD9: E950 – E959 ICD10: X85-Y09 (all diagnostic positions)
30	Assault hospital patients	ICD9: E960-E969 ICD10: X85-Y09 (all diagnostic positions)

Appendix C: Design effects (DEFFs) for SALSUS substance use data

The following design effects were applied to the Local Authority level SALSUS substance use data and have been provided below to assist interpretation of results for indicators 7-9 (smoking prevalence, alcohol use and drug use). They also account for the population correction factor, as well as the clustered design, weighting and stratification. More information on interpreting DEFF values, see page 15.

Local Authority	Pupils who smoke at least once a week	Pupils who drink alcohol at least once a week	Pupils who take illicit drugs at least once a week*
Aberdeen City	1.05	0.84	0.84
Aberdeenshire	1.09	1.17	1.09
Angus	0.64	0.80	1.37
Argyll & Bute	0.63	0.83	0.50
Clackmannanshire	N/A	N/A	N/A
Dumfries & Galloway	1.40	1.05	0.85
Dundee City	1.06	1.47	0.89
East Ayrshire	1.55	1.77	0.62
East Dunbartonshire	1.14	1.05	1.76
East Lothian	1.31	1.10	0.93
East Renfrewshire	0.90	0.79	1.02
Edinburgh City	1.04	1.58	1.03
Western Isles	0.55	0.47	0.59
Falkirk	1.37	1.17	1.10
Fife	0.78	1.35	1.29
Glasgow City	1.30	1.52	0.89
Highland	1.05	1.06	0.77
Inverclyde	0.72	0.94	0.93
Midlothian	1.10	0.73	0.71
Moray	1.26	1.39	1.01
North Ayrshire	1.27	1.69	1.21
North Lanarkshire	0.86	0.87	0.92
Orkney Islands	0.91	0.39	0.59
Perth and Kinross	1.21	1.16	1.14
Renfrewshire	1.74	1.13	1.29
Scottish Borders	1.13	0.81	0.80
Shetland Islands	0.66	0.46	0.64
South Ayrshire	0.89	1.01	1.03
South Lanarkshire	1.30	1.44	0.88
Stirling	2.39	1.99	1.08
West Dunbartonshire	1.30	0.71	0.66
West Lothian	1.17	0.83	0.93

* Note that this is different to the indicator definition which is "takes drugs at least once a month".