Technical Guide

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Introduction

The purpose of this document is to give a brief overview of some of the acronyms, abbreviations, technical terminology and statistical methods used in the Wiltshire Health Needs Assessment and Joint Strategic Needs Assessment publications.

Acronyms

AA	All Age
AAA	Abdominal aortic aneurysm
ACM	All-cause mortality
A&E	Accident and Emergency
AF	Atrial fibrillation
ASC	Adult social care
CCG	Clinical commissioning group. Clinical Commissioning Groups (CCGs) were created following the Health and Social Care Act in 2012, and replaced Primary Care Trusts on 1 April 2013. Clinical Commissioning Groups (CCGs) commission most of the hospital and community NHS services in the local areas for which they are responsible. Commissioning involves deciding what services are needed for diverse local populations, and ensuring that they are provided.
CHC	Continuing Healthcare
CHD	Coronary heart disorder
COPD	Chronic obstructive pulmonary disorder
CVD	Cardiovascular disease
DSR	Directly standardised rate (see page 5)
DTaP	Diphtheria, Tetanus, and acellular Pertussis
GPOOH	General Practice Out of hours
HES	Hospital Episode Statistics (HES) is a database containing details of all admissions, A and E attendances and outpatient appointments at NHS hospitals in England.
HiB	Haemophilus influenza B
HLE	Healthy life expectancy is a measure of the average number of years a person would expect to live in good health
HPV	Human papilloma virus
IC	Intermediate care
IDACI	Income deprivation affecting children index
IDAOPI	Income deprivation affective older people index
IMD	Indices of multiple deprivation
ISR	Indirectly standardised rate (see page 5)
JSA	Job seekers allowance
LE	Life expectancy
MH	Mental health
MIU	Minor injuries unit
MMR	Measles, Mumps, and Rubella
NEW	North & East Wiltshire CCG group
NHS Digital	National Health Service Digital are the national provider of information, data and IT systems for commissioners, analysts and clinicians in health and social care. They work with partners across the health and social care system to ensure information flows efficiently and securely.
OP	Out Patient
PCV	Pneumococcal conjugate vaccine
PPV	Pneumococcal polysaccharide vaccine
QOF	Quality and outcomes framework
Sarum	Sarum CCG group
UC	Universal Credit
West	West Wiltshire CCG group

Methodologies

Incidence

Incidence in epidemiology is a measure of the probability of the occurrence of a given medical condition in a population within a specified period of time. Although sometimes expressed simply as the number of new cases within a timeframe, it is often expressed as a proportion or a rate with a denominator.

Prevalence

Knowledge of the frequency of disease is an important prerequisite for understanding population health, case finding, commissioning and planning services, and understanding variation in health and care. The most commonly used measure of disease frequency is **prevalence** which is an estimate of the number of cases of a given disease or risk factor in the population at a point in time (point prevalence) or over a given time period (period prevalence).

Quintiles

A **quintile** is 20% of a given population, so the first quintile represents the lowest fifth of the data (1% to 20%); the second quintile represents the second fifth (21% to 40%) and so on.

Rates

The most basic measure used in public health is the **count**. This may be a count of events such as deaths or admissions to hospital, or a count of people with an attribute such as people who smoke. This count itself is essential information for planning the health services for prevention and/or treatment.

However, to properly investigate the distribution of disease and risk factors and to make comparisons between different populations, the denominator population must also be taken into consideration. The simplest way of doing this is to divide the numerator count by the denominator population to give a **proportion, percentage or (crude) rate**.

$$\textbf{Crude rate} = \frac{\text{Count (numerator)}}{\text{Population (denominator)}} \times 100 \text{ or } 1{,}000 \text{ or } 100{,}000$$

Disease, mortality and other rates may vary widely by age (and gender). Such variation complicates any comparisons made between two populations that have different age (and gender) structures. To overcome this, **standardised rates** can be used. There are two types of standardised rates; direct and indirect.

Directly (age) standardised rates (DSRs) apply age-specific rates from the population being studied to a standard population structure, usually the European Standard Population. This gives the overall rate that would have occurred in the subject population if it had the standard age-profile. The main advantage of DSRs is that they allow comparisons between multiple populations and between time periods. However, if the age-specific rates are based on small numbers, DSRs may not be reliable and in some cases the data may not be broken down by age at all.

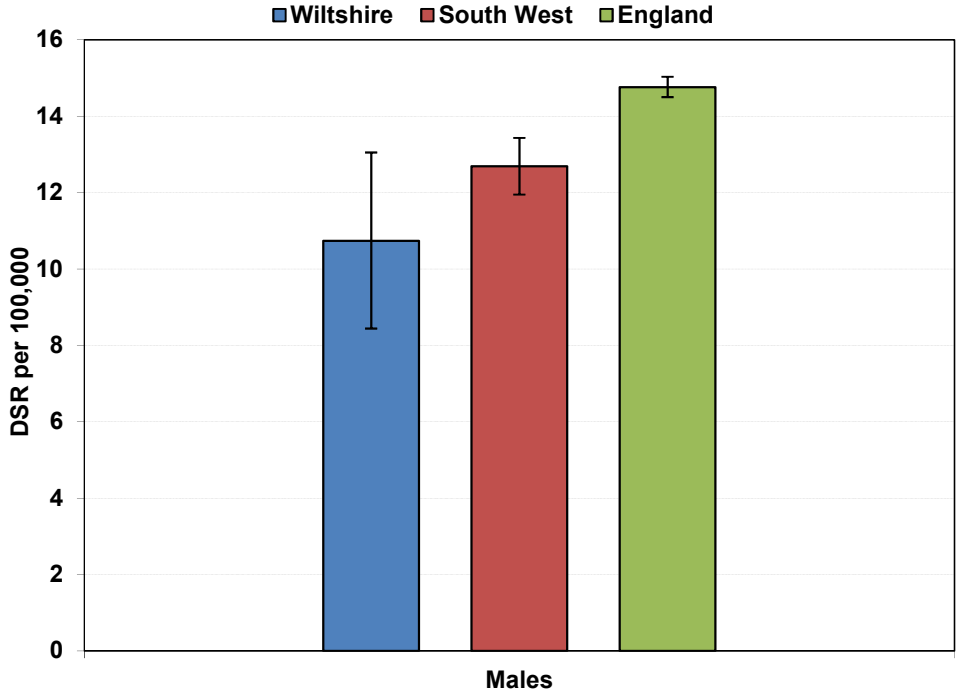
Indirectly (age) standardised rates (ISRs) apply age-specific rates from a reference population structure (often the relevant national population) to the age structure of the chosen population to give an expected number of events. The expected number is then compared to the actual overall number of events in the population being studied. The result is usually expressed as a ratio (observed/expected). Common examples are the standardised mortality ratio (SMR) and standardised admissions ratio (SAR). Usually the ratio is multiplied by 100 for ease of interpretation. Values less than 100 are lower than expected and values more than 100 are higher than expected. ISRs have the advantage of only needing the total number of observed events in the study population to be known. However, ISRs cannot usually be used to compare between multiple areas or between time periods.

Confidence intervals

Many indicators suffer from recording issues that provide uncertainty in a single point estimate. A confidence interval provides an interval estimate that is likely to contain the true value of an estimated indicator.

- A point estimate is a single value that serves as the best estimate of the true value of a measured characteristic in a population (in Graph A the peak of each bar).
- Confidence intervals are used to measure the imprecision in estimates. They can be displayed graphically as error bars.
- Their size depends on the size of the population of interest, the degree of variability in the health indicator, the required level of confidence (normally 95%) and the methodology used to create the confidence interval.
- Generally, where confidence intervals do not overlap (Wiltshire and England in **Graph A**) the difference is statistically significant. Significance is a statistical term that describes the probability that the difference or relationship observed truly exists and is not due to chance.
- Where confidence intervals overlap, a statistical test is required to determine significance. However, as a rule of thumb, if the point estimate of one indicator falls within the confidence interval of the other, then the difference is not significant (Wiltshire and the South West in **Graph A**).

Figure 1 **Mortality from stroke (ICD10: I60-I69): persons under 75, 2007 to 2009**



Source: The NHS Information Centre for health and social care.

Small number variation

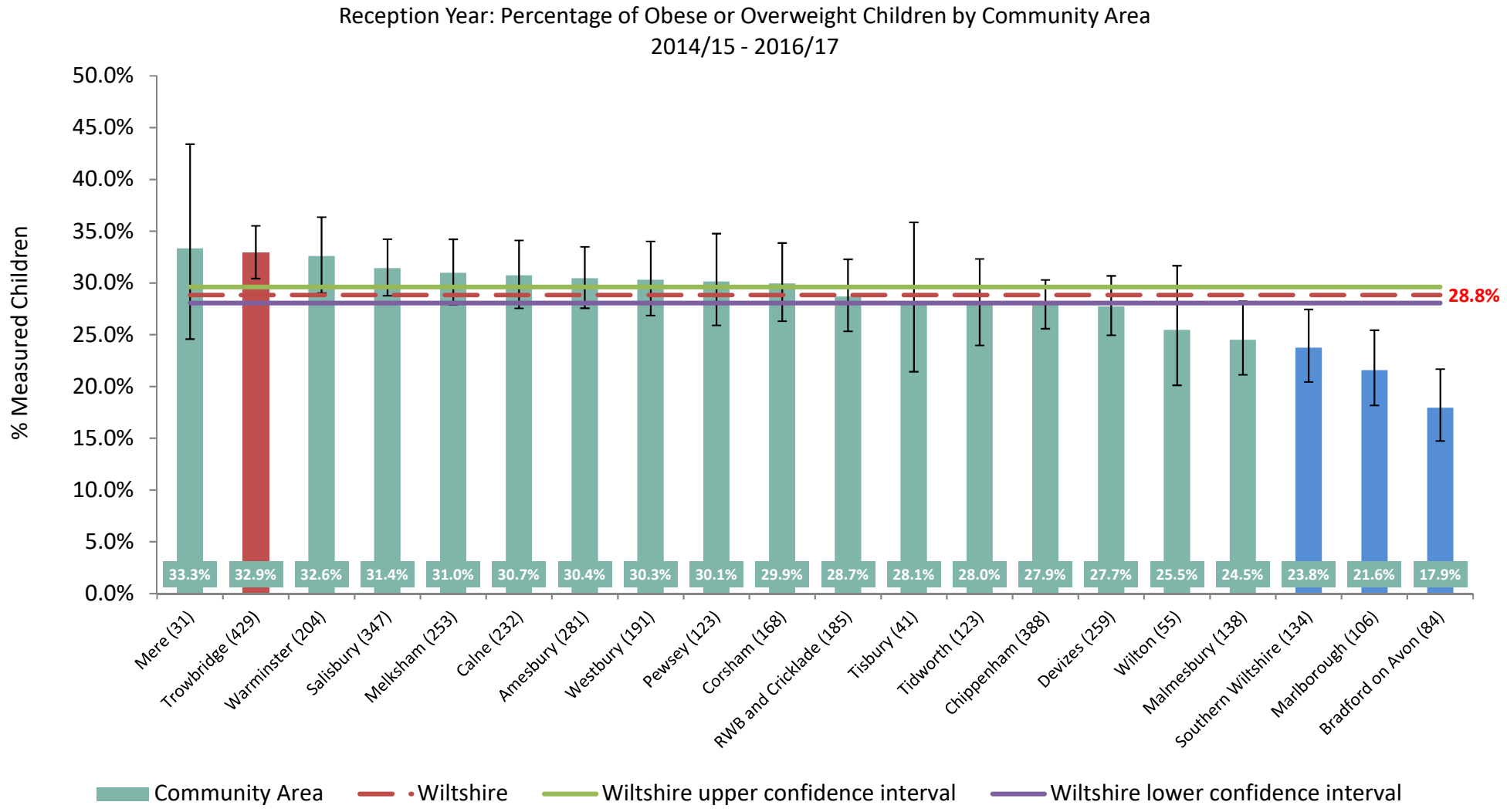
Many indicators explore behaviours, diseases and other occurrences that are rare in an area with a small population. Rates based on areas with a small population are likely to result in extreme values that can be wrongly assumed to show meaningful differences in performance. Confidence intervals can be used to discern whether a small area's rates are likely to be different from the average.

- In **Figure 1**, Wiltshire's confidence intervals are much wider than for the South West or England. This reflects Wiltshire's much smaller population.

- A smaller population means that it is more likely that random variation within that population may account for an estimate.

- In **Figure 2**, Mere has the highest percentage of overweight and obese reception year children but due to very small numbers it is not statistically significantly higher than the Wiltshire average. This is represented on the graph by the error bars that overlap with the Wiltshire lines. Trowbridge is statistically significantly higher than the Wiltshire average as shown by the errors bars not overlapping with the Wiltshire average.

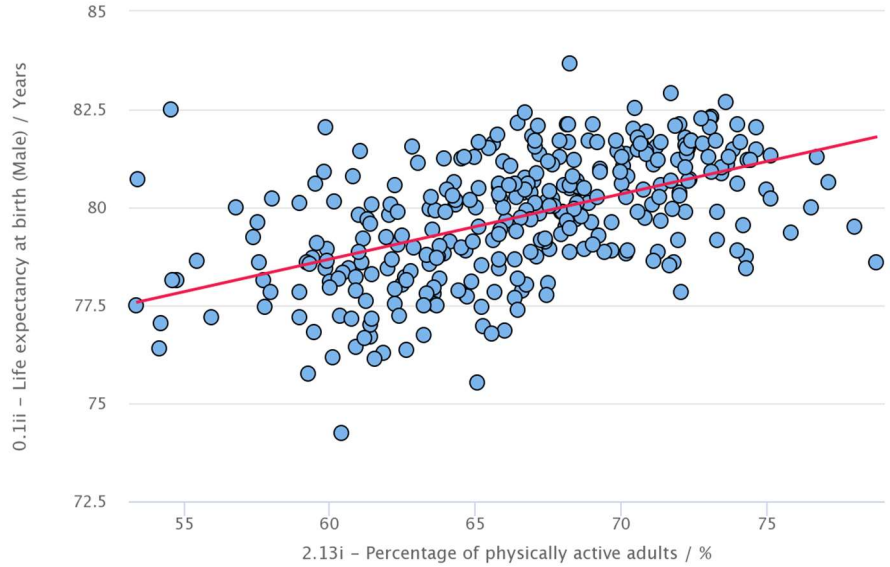
Figure 2


Reception Year: Percentage of Obese or Overweight Children by Community Area
2014/15 - 2016/17
% Measured Children
50.0%
45.0%
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
28.8%
33.3%
32.9%
32.6%
31.4%
31.0%
30.7%
30.4%
30.3%
30.1%
29.9%
28.7%
28.1%
28.0%
27.9%
27.7%
25.5%
24.5%
23.8%
21.6%
17.9%
Mere (31)
Trowbridge (429)
Warminster (204)
Salisbury (347)
Melksham (253)
Calne (232)
Amesbury (281)
Westbury (191)
Pewsey (123)
Corsham (168)
RWB and Cricklade (185)
Tisbury (41)
Tidworth (123)
Chippenham (388)
Devizes (259)
Wilton (55)
Malmesbury (138)
Southern Wiltshire (134)
Marlborough (106)
Bradford on Avon (84)
Community Area
Wiltshire
Wiltshire upper confidence interval
Wiltshire lower confidence interval

Correlation and causation

Scatter plots can show a relationship between two indicators of interest. For example, when Physical activity and life expectancy the pattern is as shown in figure 3.

Figure 3: Scatter plot showing correlation



Source: Fingertips.phe.org.uk/profile/Public-health-outcomes-framework

This scatter plot reveals that there is evidence of a positive relationship between physical activity and life expectancy. This is shown by the positive diagonal clustering of unit authorities on the scatter plot. As physical activity increases across districts an increase in life expectancy is observed.

- The scatter plots do not imply that one of the indicators is directly causing or influencing the other.
- It may be that other variables are not accounted for in the analysis and it is these that explain the association.
- Scatter plots are intended to provide a tool to reveal such correlations only, and provide the basis for further investigation or analysis.

It is possible using several statistical methods to measure the closeness of the relationship between the factors. Pearson's correlation coefficient or Pearson's r is often used to see the strength of a linear relationship. The correlation coefficient gives an answer between -1 and 1. A positive value indicates that as one factor increases so does the other, a negative value of indicates that as one factor increases the other decreases and a value of 0 implies that no linear relationship exists between the factors. The correlation found in figure 3 is r^2 0.22. Interpretation of r^2 can be difficult. For example, although the correlation in figure 3 is small it is describing a complex system involving human behaviour. Correlations involving human behaviour are often worth investigating further even with small r^2 values.

Diagnosis rate

A diagnosis rate is the proportion of people in a population who are known to have a specific condition/disease, out of the number of people in that population who are expected to have the disease.

Alcohol attributable admissions

Admissions to hospital where the primary diagnosis or any of the secondary diagnoses are an alcohol-attributable condition, i.e. a disease or illness which in a proportion of cases could be caused by the excess consumption of alcohol. For further information please see the Supporting documents page of the Local Alcohol Profiles for England.

Alcohol specific admissions

Admissions to hospital where the primary diagnosis or any of the secondary diagnoses are an alcohol-specific (wholly attributable) condition, i.e. a disease or illness which is wholly attributable to the excess consumption of alcohol. For further information please see the Supporting documents page of the Local Alcohol Profiles for England.

Social isolation

Social isolation is a state of complete or near-complete lack of contact between an individual and society. It differs from loneliness, which reflects a temporary lack of contact with other humans. Social isolation can be an issue for individuals of any age, though symptoms may differ by age group. There are different methods of measuring social isolation and the definition of these is included alongside the different measures.

Excess winter deaths

The Excess Winter Deaths Index (EWD Index) is the excess winter deaths measured as the ratio of extra deaths from all causes that occur in the winter months (December to March) compared with the expected number of deaths, based on the average of the number of non-winter deaths.

Fuel Poverty

Fuel poverty in England is measured using the Low Income High Costs (LIHC) indicator. Under the LIHC indicator, a household is considered to be fuel poor if:

- they have required fuel costs that are above average (the national median level), and
- were they to spend that amount, they would be left with a residual income below the official poverty line

There are 3 important elements in determining whether a household is fuel poor:

- •household income
- •household energy requirements
- fuel prices

NHS Health Check

The NHS Health Check is a free check-up of overall health. It can advise whether an individual is at higher risk of developing certain health problems, such as:

- heart disease
- diabetes
- kidney disease
- stroke

Those who are over 65 are also told the signs and symptoms of dementia to look out for.

Individuals aged 40-74 who haven't had a stroke, and don't already have heart disease, diabetes or kidney disease, should have an NHS Health Check every five years.

NHS Cancer Screening

The NHS offers a number of screening services to support the early detection and treatment of a number of common cancers. These include:

Breast Cancer – women aged 47-73 should be invited for screening every 3 years.

Cervical Cancer – women aged 25-49 should be invited every 3 years and women aged 50-64 every 5 years.

Bowel Cancer – persons aged 60-74 are invited to take part every 2 years.

Indices of Deprivation

The Department for Communities and Local Government (DCLG) in conjunction with Oxford Consultants for Social Inclusion (OCSI) publishes the English Indices of Deprivation. The English Indices of Deprivation provides an indication as to the relative levels of deprivation between small geographies within England. Further information can be found in the Wiltshire report on Indices of Deprivation:

https://www.wiltshireintelligence.org.uk/library_/indices-of-multiple-deprivation/

Life expectancy

This is the average number of years a person is expected to live based on contemporary mortality rates. For a particular area and time period, it is an estimate of the average number of years a new-born baby would survive if he or she experienced the age-specific mortality rates for that area and time period throughout his or her life.

Figures are calculated from deaths from all causes and mid-year population estimates, based on data aggregated over a three-year period.

Figures reflect mortality among those living in an area in each time period, rather than what will be experienced throughout life among those born in the area. The figures are not therefore the number of years a baby born in the area could actually expect to live, both because the mortality rates of the area are likely to change in the future and because many of those born in the area will live elsewhere for at least some part of their lives.

Healthy life expectancy

This is a measure of the average number of years a person is expected to live in good health based on contemporary mortality rates and the prevalence of self-reported good health. The prevalence of good health is derived from responses to a survey question on general health. For a particular area and time period, it is an estimate of the average number of years a new-born baby would live in good general health if he or she experienced the age-specific mortality rates and prevalence of good health for that area and time period throughout his or her life. Figures are calculated from deaths from all causes, mid-year population estimates, and self-reported general health status, based on data aggregated over a three-year period. Figures reflect the prevalence of good health and mortality among those living in an area in each time period, rather than what will be experienced throughout life among those born in the area. The figures are not therefore the number of years a baby born in the area could actually expect to live in good general health, both because the health prevalence and mortality rates of the area are likely to change in the future and because many of those born in the area will live elsewhere for at least some part of their lives.

Practice Codes & Names:

The following table outlines the practice codes, names and which CCG Group they are part of:

Practice code	Practice name	CCG Group
J81083	SIXPENNY HANDLEY SURGERY	SARUM
J83003	HARCOURT MEDICAL CENTRE	SARUM
J83004	WHITEPARISH SURGERY	SARUM
J83005	BARCROFT MEDICAL CENTRE	SARUM
J83006	PURTON SURGERY	NEW
J83007	HATHAWAY SURGERY	NEW
J83008	LOVEMEAD GROUP PRACTICE	WEST
J83010	PORCH SURGERY	NEW
J83011	GIFFORDS PRIMARY CARE CTR	WEST
J83013	BOX SURGERY	NEW
J83014	CASTLE PRACTICE	SARUM
J83016	ADCROFT SURGERY	WEST
J83018	AVENUE SURGERY	WEST
J83019	THE ORCHARD PARTNERSHIP	SARUM
J83021	SALISBURY MEDICAL PRACTICE	SARUM
J83023	AVON VALLEY PRACTICE	SARUM
J83026	ENDLESS STREET SURGERY	SARUM
J83029	TINKERS LANE SURGERY	NEW
J83030	BRADFORD-ON-AVON AND MELKSHAM HEALTH	WEST
J83034	LANSDOWNE SURGERY	WEST
J83037	MARLBOROUGH SURGERY	NEW
J83039	NORTHLANDS SURGERY	NEW
J83040	WHITE HORSE HEALTH CENTRE	WEST
J83041	MALMESBURY MEDICAL PARTNERSHIP	NEW
J83042	ROWDEN SURGERY	NEW
J83043	DOWNTON SURGERY	SARUM
J83045	RAMSBURY SURGERY	NEW
J83046	SPA MEDICAL CENTRE	WEST
J83048	ST MELOR HOUSE SURGERY	SARUM
J83049	SOUTHBROOM SURGERY	WEST
J83050	PATFORD HOUSE SURGERY PARTNERSHIP	NEW
J83052	MILLSTREAM MEDICAL CENTRE	SARUM
J83053	ST. JAMES SURGERY	WEST
J83055	NEW COURT SURGERY	NEW
J83056	MARKET LAVINGTON SURGERY	WEST
J83058	TISBURY SURGERY	SARUM
J83060	MERE SURGERY	SARUM
J83601	BURBAGE SURGERY	NEW
J83603	JUBILEE FIELD SURGERY	WEST
J83609	CRICKLADE SURGERY	NEW

J83615	OLD SCHOOL HOUSE SURGERY	NEW
J83618	TOLSEY SURGERY	NEW
J83619	COURTYARD SURGERY	WEST
J83625	LODGE SURGERY	NEW
J83629	SILTON SURGERY	SARUM
J83630	HINDON SURGERY	SARUM
J83632	CROSS PLAIN SURGERY	SARUM
J83636	BEVERSBROOK MEDICAL CENTRE	NEW

Practice Mergers:

Since 2012 there have been several mergers of GP practices within Wiltshire, the table below outlines which practices have merged:

Old Practice Code and Name		New Practice Code and Name	
J83015	NEW STREET	J83021	SALISBURY MEDICAL PRACTICE
J83021	GROVE HOUSE		
J83062	WILTON HEALTH CENTRE		
J83627	BEMERTON HEATH		
J83017	PEWSEY SURGERY	J83037	MARLBOROUGH SURGERY
J83020	ST ANN STREET SURGERY	J83026	ENDLESS STREET SURGERY
J83032	THREE SWANS SURGERY		
J83028	BRADFORD ROAD MEDICAL CTR	J83016	ADCROFT SURGERY
J83044	WIDBROOK MEDICAL PRACTICE		
J83642	SMALLBROOK SURGERY	J83040	WHITE HORSE HEALTH CENTRE
J83643	BOURNE VALLEY PRACTICE	J83632	CROSS PLAIN SURGERY

Further information

Public Health England have produced several technical briefings which are practical "how to" guides, designed to support health practitioners and analysts, and to promote the use of public health intelligence in decision making.

Each briefing focuses on specific elements of public health intelligence. Where appropriate, the documents are accompanied by electronic tools and resources, which can be downloaded from the web site:
https://fingertips.phe.org.uk/profile/guidance

This webpage also carries supporting materials to assist with interpretation of the Fingertips profiles and further use of the indicator data. These include guidance documents and tools, some of which were previously published on the website of the Association of Public Health Observatories, and others which are more recent PHE publications. The technical guides include descriptions of standard methods used within PHE to produce indicators robustly and consistently. The content is managed by the Public Health Data Science team.

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