Section 2: health inequalities

Measuring inequalities
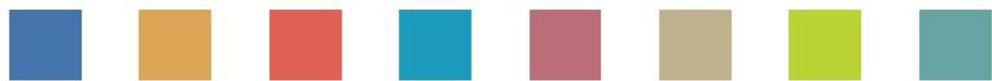
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Entire section	Health inequalities
Child mortality	Children and Young People
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Outcome Frameworks Summary

The Public Health Outcomes Framework for England, 2013-2016[1] outlines the overarching vision for public health as "to improve and protect the nation's health and wellbeing, and improve the health of the poorest fastest". Each indicator domain has an objective that includes health inequalities:

Domain	Objective
1. Improving the wider determinants of health	Improvements against wider factors that affect health and wellbeing and *health inequalities*
2. Health improvement	People are helped to live healthy lifestyles, make healthy choices and reduce *health inequalities*
3. Health protection	The population's health is protected from major incidents and other threats, while reducing *health inequalities*
4. Healthcare public health and preventing premature mortality	Reduced numbers of people living with preventable ill health and people dying prematurely, while reducing the *gap between communities*.

Edition

Edition	Version no.	Changes/Comments
2012/13	1	N/A
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Executive summary

When measuring health inequalities it is important to consider what we are trying to understand. Health inequalities can exist between many different groups.

In rural areas it should be remembered that area measures of deprivation may mask pockets of deprivation.

There are many different measures of health inequalities, with the 'slope index of inequality' currently being one of the most common ways to show the gap in life-expectancy within an area. However it does not capture issues relating to quality of life or the prevalence of chronic ill health.

Why this area is important

Health inequalities are variations in health between population groups resulting from a variety of societal and economic processes that are unequally distributed within or between populations. They are avoidable and unfair.

Health is a multi-dimensional concept, and therefore there are many ways in which both health, and hence health inequality, can be measured. Using the correct measurement is important to ensure inequalities are identified and monitored.

Background

Most measurement of health inequality involves the use of indicators or indexes to measure health. It also involves decisions on what groups or areas to compare and what is the most appropriate form of analysis.

How to measure inequalities

The South East Public Health Observatory handbook[2] suggests the following questions are answered to decide the most appropriate method for measuring inequalities:

- What is the comparator, are inequalities to be measured between:
    - Groups or populations of small areas.
    - Countries or populations to which different socio-economic classification have been applied.
    - Similar groups or populations over time.

- What type of inequality is of interest:
    - Relative or absolute inequality.[1]

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[1] The simplest inequality measures compare two groups. They do this by subtracting or dividing. Subtracting one group's performance from the other gives the absolute difference. This can then be divided by the performance of the more advantaged group (or 'reference group'), to obtain the relative difference.

- o Risk-based versus outcome-based measures.

- What is the intended use for the index of inequality:
    - o To monitor the impact of policies on specific populations.
    - o To compile league tables.

- What indicator/marker of inequality to choose:
    - o Socio-economic categories.
    - o A deprivation index.
    - o A single variable or an index.

- What indicator of health to choose:
    - o Routine health data.
    - o Data from surveys.

- What data source to use:
    - o Existing data sources.
    - o Generating your own survey data.

Indicators/markers of inequality

- Individual
    - o Socio-economic position (occupation),
    - o Income,
    - o Education,
    - o Housing.

- Area level
    - o Index of Multiple Deprivation (IMD)

Because a significant proportion of illness is linked with socio-economic disadvantage, the pattern of health inequality is remarkably consistent irrespective of the particular indicator/marker chosen.

The IMD measures multiple deprivation at small area level and is made up of seven domains with different weighting:

- Income,
- Employment,
- Health and disability,
- Education, skills and training,
- Barriers to housing and services,
- Crime,
- Living environment.

Table 1: Advantages and disadvantages of individual and area level indicators/markers of inequality.

		Advantages	Disadvantages
Individual	Socioeconomic group	Widely measure	Limited to those in paid employment. Possibility of reverse causality (i.e. poor health led to lower socioeconomic group)
	Income	Direct measure of circumstances.	People are often reluctant to answer. Does not take assets into account. Can change over a short time period.
	Education	Captures knowledge-related assets. Captures early life socioeconomic position. Easily measured.	Meaning differs by birth cohort, ethnicity, gender.
Area level	IMD	Areas can be ranked relative to one another. Goes down to lower super output area (LSOA). Comprises 7 different domains so recognises that people can experience deprivation in different ways.	May miss pockets of deprivation It is not routinely updated, and when it is updated it has always been modified, so comparable data have never been available to monitor changes over time.

Measuring the magnitude of health inequalities

- Measures of effect:
    - Absolute.
    - Relative.

- Measures of impact:
    - Population attributable risk.
    - Population attributable fraction.

- Index of inequality:
    - Slope index of inequality.
    - Relative index of inequality.

The usual presentation of inequalities is in relative terms, for example, the mortality rates of the lowest socio-economic group as a ratio to that of the highest socio-economic group. The alternate presentation is in absolute terms for example, the differences between the mortality of the highest and the lowest socio-economic group. Both of these are important, and probably should be used in combination.

It is common to assess the importance of difference in relative rather than absolute terms; however, a 50% higher rate of a rare health problem may be much less important to public health than a 10% higher rate of a frequent health problem. Presentation of the absolute difference would make this clear.

The NHS World Class Commissioning competency framework mandated the use of the slope index of inequality (SII) in life expectancy as a measure of within district health inequality. This is a measure of the extent to which life expectancy varies across the district, based on an analysis of the life expectancy of different deciles of the population defined by the index of multiple deprivation. The Public Health Outcomes Framework has adopted the SII in life expectancy as an overarching indicator.

Using a measure of differences in life expectancy has significant advantages since the data is collected routinely, and the reported measure is meaningful to lay people and professionals alike. However as a measure this does not capture issues relating to quality of life or the prevalence of chronic ill health.

The Yorkshire and Humber Public Health Observatory website has an explanation of some of the above measures of magnitude of inequality with worked examples

Rural health and measuring inequalities

"Rural deprivation affects health, but it is often hidden. Existing indices of deprivation do not adequately define rural deprivation, so there is poor targeting of scarce resources. Area-based measures using routinely gathered data to describe socioeconomic status do not highlight the heterogeneity of sparsely populated rural areas, but have a tendency to produce meaningless area averages. Deprivation may also be hidden in rural areas because people are reluctant to reveal need owing to cultural differences; for example, lower expectations or concern at being 'labelled' as poor."[3]

What is used in Wiltshire

Index of Multiple Deprivation (IMD 2010)

The Indices of Deprivation 2010 (ID 2010) were released on 24 March 2011 and are available to download in full from the Department of Communities and Local Government website. The 2010 IMD summary report for England is available here: https://www.gov.uk/government/publications/english-indices-of-deprivation-2010

An update was published by Public Health England to align scores with the 2011 boundaries for Lower Layer Super Output Areas (LSOAs).

The Indices of Deprivation 2010 (ID 2010) use a group of statistical indicators to rank the 32,482 Lower Super Output Areas (LSOAs) in England in terms of aspects of their deprivation. The 32,482 LSOAs in England are ranked in order of their Index of Multiple Deprivation so the most deprived LSOA is 1 and the least deprived is 32,482. So, when Pewsey south has an overall index of 13,226 it means that it is the 13,226th most deprived LSOA in England.

After the boundary revisions in 2011 there are now 32,843 LSOAs in England and 285 LSOAs in Wiltshire.

Wiltshire is ranked as the 245th most deprived local authority area out of 326 in England according to the average of ranks summation method.

Overall Wiltshire is relatively more deprived (compared to the rest of England) than it was in 2007. This is shown by the average IMD ranking falling from 23,814 to 22,229.

Salisbury St Martin – central has replaced Trowbridge John of Gaunt – Studley Green as the most deprived LSOA in Wiltshire.

In 2010 there are 5 Wiltshire LSOAs in the most deprived 20% nationally (compared to only 3 in 2007):

- Salisbury – St Martin (Central)
- Trowbridge – Adcroft (Seymour)
- Trowbridge – John of Gaunt (Studley Green)
- Salisbury – Bemerton (west)
- Salisbury – Bemerton (south)

The least deprived LSOA in Wiltshire is Wootton Bassett South – south east. In 2007 it was Salisbury Bishopdown – north.

See Resources section for further detail of IMD 2010 maps and data and a map based on the 2011 revised LSOA boundaries.

Slope index of inequality (SII)

The SII calculation is based on a statistical analysis of the relationship between deprivation and a selected variable, such as life expectancy. The SII gap summarises the social inequality in life expectancy. It is a single score representing the gap in life expectancy between the most deprived 10% and the least deprived 10% of the Wiltshire population. For the Public Health Outcomes Framework SII scores are aggregated into rolling 3 year time periods (previously 5 year periods were used); the latest figures cover the period 2009-11.

SII score is obtained from an analysis of the relationship between life expectancy (at birth) and deprivation score (2010 Index of Multiple Deprivation) within the county. Confidence intervals are used to show the degree of uncertainty resulting from the calculations.

How is it calculated?

SII is calculated using life expectancy at birth statistics for each deprivation decile within Wiltshire.

3 data sources:

- Deprivation scores from IMD 2010 by LSOA, to order the LSOAs into deprivation deciles. LSOAs populations are similar but do vary slightly; the fact these are aggregated to form the deciles means the population in each decile is not consistent.

- Mortality (by sex and age): registered deaths aggregated into rolling 3 or 5 year time periods. Deaths then allocated to LSOA of usual residence.

- Mid-year population estimates, aggregated into rolling 3 or 5 year time periods.

Calculation of life expectancy: Sex-specific life expectancy at birth is calculated using mortality data and population estimates. This provides an estimate of the average number of years a new-born baby would survive, if he or she were to experience a particular area's age specific mortality rates throughout his or her life.

Calculation of SII: Using population weighted linear regression to estimate the hypothetical absolute difference in life expectancy between the top and bottom decile in the Wiltshire population. This includes methodology to take into account the different population sizes amongst deciles identified above.

England Values: The England SII value itself is not a valid comparator with local authority areas, as England's overall range of deprivation is likely to be larger than the individual areas that constitute it. The median value of local authorities could be used as a comparator but the Public Health Outcomes Framework does not currently seek to compare in this manner. If calculated the median value should not be regarded at the SII value for England.

For further methodological information please refer to the Interpretation guide to Health Inequality Indicators for Local Authorities and Primary Care Organisations: http://www.apho.org.uk/resource/item.aspx?RID=110505 and to the definitions section of the Public Health Outcomes Framework: http://www.phoutcomes.info/

See Inequalities in Outcomes section for Wiltshire slope index of inequality data.

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[1] Healthy Lives, Healthy People: Improving outcomes and supporting transparency, Department of Health, January 2012 https://www.gov.uk/government/publications/healthy-lives-healthy-people-improving-outcomes-and-supporting-transparency

[2] Carr-Hill R and Chalmers-Dixon P. The Public Health Observatory Handbook of Health Inequalities Measurement. 2005. http://www.sepho.org.uk/Download/Public/9707/1/Carr-Hill-final.pdf.

[3] Farmer JC, Baird AG and Iversen L. Rural deprivation: reflecting reality. *British Journal of General Practice* 2001; 51:486-491.

[3] Yorkshire and Humber Public Health Observatory (YHPHO). Measuring Health Inequalities (Part 5 JSNA – the APHO Resource Pack). 2008. http://www.yhpho.org.uk/resource/item.aspx?RID=9957.

[4] Haynes R and Gale S. Deprivation and poor health in rural areas: inequalities hidden by averages. *Health & Place*. 2000:6(4); 275-85.