



Technical briefing – Comparators

What is a comparator?

Comparators provide context to help interpret indicators. In public health, the state of an area for diseases and conditions are often measured by indicators. Without context it is difficult to interpret whether the value of these indicators is high or low, hence whether its outcomes are 'good' or 'bad', taking into account expected natural variation, and therefore whether actions should be taken to address the situation. When the value of an indicator is viewed side by side with a comparator, be it a target value or one based on values for other areas, it adds perspective to the information and provides the opportunity to decide how that indicator is performing. A benchmark is a comparator which represents good or best practice. Comparator groups can be defined, collecting together areas or organisations which are in some way similar (for example, demographically) and represent appropriate comparators for each other.

Commonly used comparators

Many ways of comparing outcomes or performance exist in different industries, and even within a single industry there can be many comparators. The number of comparators available can make it confusing when attempting to interpret information. Some commonly used comparators are:

- geographical hierarchies. For example, a local authority (LA) can be compared to the region within which the LA falls, or the national value
- target-based, as some indicators have a defined target for achievement. For example, Public Health England (PHE) recommends that LAs should work towards achieving a chlamydia detection rate of at least 2,300 per 100,000 population of 15-24 year olds
- Chartered Institute of Public Finance and Accounting (CIPFA) nearest neighbours.¹ This attempts to relate LAs by their traits by using descriptive features of the area each authority administers such as population, socio-economic, household and mortality characteristics, rather than the services it provides

- Office for National Statistics (ONS) area classifications. These use socio-economic and demographic data from each census to identify areas of the country with similar characteristics. They have been produced at different geographies including super output areas, LAs and health areas
- The English Indices of Deprivation (ID),² which provide a set of relative measures of deprivation for small areas (lower layer super output areas, LSOAs) across England, based on seven domains of deprivation: income, employment, education, skills and training, health and disability, crime, barriers to housing, and living environment, as well supplementary indices and the overall Index of Multiple Deprivation (IMD). These scores are often divided into deciles in order to group areas for comparative purposes. ID can also be used at LA level to group areas with similar levels of deprivation

Examples of methodology for creating comparators

CIPFA nearest neighbours

The values for the indicators that are included in the calculation are collated. For each area, the nearest neighbour is derived by calculating the 'Euclidean distance' to all the other areas' data once they have been standardised to a normal distribution. A simple example of Euclidean distance for two areas with two indicators is the distance of the straight line between those two indicators for the two areas plotted on a graph. This method can be extended to multiple indicators. Each area is then sorted by this distance, where the shortest distance is the nearest neighbour.

Index of Multiple Deprivation

The initial stages to the calculation identify the domains and the indicators within those domains that will be used in the calculation. In the latest IMD calculation, seven domains were used and between one and seven indicators in each domain existed. 'Shrinkage' is then applied to impute values for indicators for small areas (as values for small areas are affected significantly by small changes in numerators). Domain scores are then calculated for each area using a variety of methods depending on the domain. Where all the indicators are the same units, they are summed to produce a domain score. Otherwise, the indicators are ranked and standardised before being summed with a defined weighting for each indicator to produce a domain score. Domain scores are then ranked and standardised to an exponential distribution (the exponential distribution is used to emphasise deprivation rather than give deprivation and affluence equal weighting). The domain scores are then combined, using a pre-defined weighting, to form the overall IMD for the LSOAs. These scores can then be summarised up to larger geographies. The scores can also be grouped into deciles to create benchmarks within the groups. Note, aggregating scores to different geographies may result in the decile for an area changing, For example, a unitary authority can be in different deciles among upper tier LAs and among lower tier LAs.

Other comparators

A number of other comparators exist and are used in different scenarios. Characteristics that are included in comparator groupings are summarised in Table 1. Some examples are:

- rural-urban classification areas classified according to their urbanisation level³
- income deprivation among children (IDACI) and older people (IDAOPI), supplementary indices calculated as part of the English Indices of Deprivation²
- NFER Children’s Services Statistical Neighbours Tool, which identifies statistical neighbours for children's services^{4,5}
- NHS England clinical commissioning group (CCG) clusters, which groups similar CCGs by using data on deprivation, population structure and density, and ethnicity⁶
- PHE local outcome comparators, which identifies similar areas by calculating the complexity of the treatment population and their likelihood of success from treatment for substance misuse.⁷ Note that an NDTMS.net account is required to access guidance

Table 1. Characteristics included in methods of choosing comparator areas

	CIPFA nearest neighbours (2014)	ONS area classifications (2011)	IMD 2015	ONS Rural-Urban Classification (2011)	NFER Children’s Services Statistical Neighbours	NHS England CCG clusters	PHE local outcome comparators
Crime			✓				
Demography (incl. structure)	✓	✓		✓	✓	✓	
Employment	✓	✓	✓		✓	✓	
Health	✓		✓			✓	
Household composition	✓	✓	✓		✓	✓	
Housing (including barriers to)	✓	✓	✓			✓	
Income			✓		✓	✓	
Population density	✓			✓	✓	✓	
Socio-economic*	✓	✓	✓		✓	✓	
Other	**				***		****

* This includes indicators in the following areas; proportions of people in lower National Statistics Socio-Economic groups, educational, methods of transport to get to work, car ownership, people performing unpaid care, and English language proficiency

** Authorities with coast protection expenditure

*** Free school meal eligibility

**** Areas grouped by characteristics of population in treatment for substance misuse

Considerations when selecting a comparator

When selecting a comparator there are a number of factors to consider:

- comparing with areas that have similar characteristics. Areas can be categorised by a number of metrics related to their make-up. Comparing indicators with similar areas can be a good way of understanding how an area is performing compared to other areas that have the same challenges. Note that if the selected comparator includes the factor being compared, the comparison becomes less meaningful. For example, comparing employment indicators with other areas that have a similar Index of Multiple Deprivation (IMD) will not provide full context as employment indicators make up 22.5% of the IMD calculation
- aspirational versus realistic. Comparators such as targets, regional values and national values generally do not contain any situational context. As a result, comparing areas to other areas within the same region or to a national value may not indicate performance. Alternatively, comparing an area to other areas that have advantageous circumstances can inform aspirational goals and identify steps to achieve an improved score. **Figure 1** highlights an area that, when compared with the other areas in the same region, has the second highest under 75 mortality rate from respiratory disease (all persons). This indicates that performance could be improved. However, when compared to its ten CIPFA nearest neighbours, it has the lowest mortality rate. This implies that, compared with areas that are similar to itself, it has a good score
- level of geography. Comparators are not always published at the same levels of geography. Some organisations have standard operating procedures that estimate comparators from one geography level to another. Care should be taken when comparing areas of one geography level to another due to other influences such as political, administrative and financial. **Table 2** provides further information on which levels of geography the most common comparators are published at

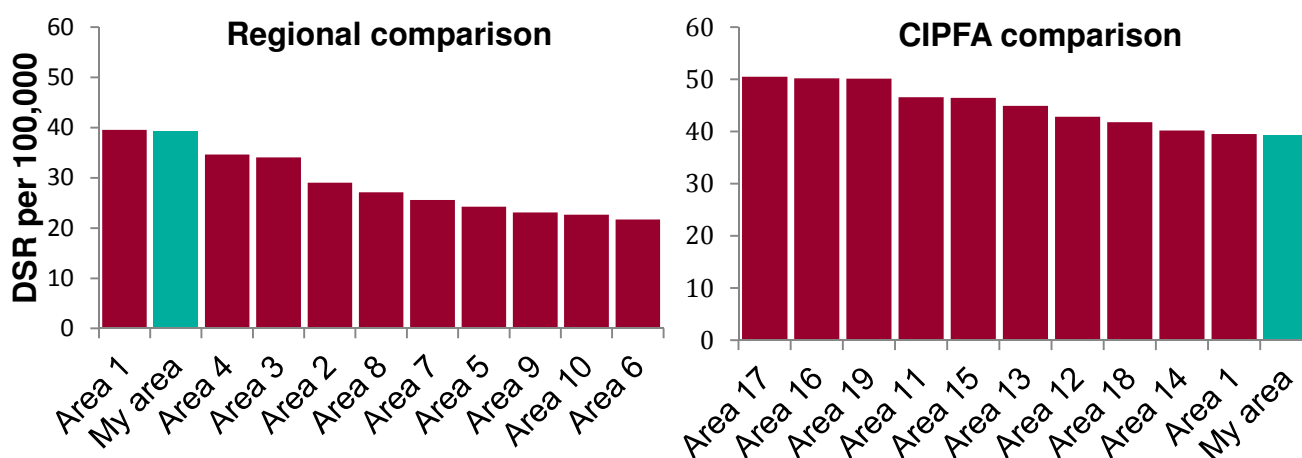


Figure 1. Under 75 mortality rate from respiratory disease, 2012-14

Table 2. Levels of geography the most common comparator groups are produced for

	CIPFA nearest neighbours (2014)	ONS area classifications (2011)	IMD (2015)
Clinical commissioning group			✓
Upper tier local authority	✓		✓
Local authority district	✓	✓	✓
Electoral ward			*
MSOA			*
LSOA			✓
OA		✓	
London boroughs			*

* Methodologies for how to aggregate to different geographies have been published

Establishing whether a difference is meaningful

It is important to identify significant differences and avoid being distracted by small differences between areas that are unlikely to be anything more than chance variation. This can be done in a number of ways. This subject was explored in more detail in the former Association of Public Health Observatories' standard operating procedure on use of RAG ratings.⁸

Examples

Examples of comparator use in practice can be found on Fingertips, including the Public Health Outcomes Framework (PHOF), which gives a wide variety of benchmarks.⁹ Other tools with incorporated benchmarking features include:

- NHS Atlas of Variation: a tool that highlights geographical variation of healthcare
- Strategic Health Asset Planning and Evaluation: a tool that informs and supports the strategic planning of services and physical assets across a whole health economy
- Local Health: health information presented at small areas
- Spend and Outcome Tool: a tool to support understanding of health outcomes and expenditure across all programmes
- NHS Outcomes Tool: provides interactive access to key data for CCGs
- Commissioning for Value: information to support CCG clinical and management leads with responsibility for finance, performance, improvement and health outcomes
- Segment tool: which highlights the causes of death which contribute most to the life expectancy gap

References

- ¹ Chartered Institute of Public Finance and Accounting. NNM 2015 - England Authorities [Internet]. Available from: [http://www.cipfastats.net/download.asp?filename=http://www.cipfastats.net/uploads/NNM2015 - England Authorities.xlsx](http://www.cipfastats.net/download.asp?filename=http://www.cipfastats.net/uploads/NNM2015-EnglandAuthorities.xlsx)
- ² Smith T, Noble M, Noble S, Wright G, McLennan D, Plunkett E. The English Indices of Deprivation 2015: Technical Report [Internet]. 2015. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/464485/English_Indices_of_Deprivation_2015_-_Technical-Report.pdf
- ³ Office for National Statistics. 2011 Rural-Urban Classification of Local Authority Districts and other higher level geographies [Internet]. 2015. Available from: <https://www.gov.uk/government/statistics/2011-rural-urban-classification-of-local-authority-and-other-higher-level-geographies-for-statistical-purposes>
- ⁴ National Foundation for Educational Research. Children's Services Statistical Neighbour Benchmarking Tool [Internet]. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/360560/childrens_services_statistical_neighbour_benchmarking_tool.xls
- ⁵ National Foundation for Educational Research. Children's Services Statistical Neighbour Benchmarking Tool. Available from: <https://www.nfer.ac.uk/publications/SNB01/SNB01userguide.pdf>
- ⁶ NHS England. NHS England CCG clusters [Internet]. [cited 2016 Apr 13]. Available from: <https://learnenv.england.nhs.uk/similar>
- ⁷ Public Health England. Comparators for 2014/15 reporting - technical guidance [Internet]. Available from: www.ndtms.net/RptConsultation.aspx
- ⁸ Edmondson-Jones M, Fryers PT. Standard Operating Procedure – RAG Rating [Internet]. 2011. Available from: <http://www.apho.org.uk/resource/view.aspx?RID=104518>
- ⁹ Public Health England. Public Health Outcomes Framework [Internet]. Available from: <http://www.phoutcomes.info/>

First published: November 2016

© Crown copyright 2016

Re-use of Crown copyright material (excluding logos) is allowed under the terms of the Open Government Licence. Visit: www.nationalarchives.gov.uk/doc/open-government-licence/version/3/ for terms and conditions.