NZDep2001 Index of Deprivation

User's Manual

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Acknowledgments

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While the contents of this report have benefited considerably from the assistance of colleagues, the responsibility for this report remains solely with the authors.

Ethics and confidentiality

Ethical approval for the original NZDep91 project was obtained in May 1995 from the Central Regional Health Authority Wellington Ethics Committee.

Access to unrounded Census data was granted under a special contract with Statistics New Zealand. The access was granted in a strictly protected environment on Statistics New Zealand premises under supervision of Statistics New Zealand staff. The researchers were bound to preserve the confidentiality of individual respondent data by the same provisions of the Statistics Act 1975 that bind staff of Statistics New Zealand.

Introduction

NZDep2001 is an updated version of the NZDep91 and NZDep96 indexes of deprivation for small areas. The index combines nine census variables from the 2001 census which reflect aspects of material and social deprivation. NZDep2001 provides a deprivation score for each meshblock in New Zealand. Meshblocks are geographical units defined by Statistics New Zealand, containing a median of approximately 90 people in 2001.

The NZDep2001 index of deprivation for small areas is provided in two forms—an ordinal scale and a continuous score.

- The NZDep2001index of deprivation ordinal scale, **NZDep2001**, ranges from 1 to 10, where 1 represents the areas with the least deprived scores and 10 the areas with the most deprived scores.

- The NZDep2001 index of deprivation interval variable, **NZDep_score_2001**, is the first principal component score, which has been scaled to have mean 1000 index points and standard deviation 100 index points. The NZDep2001 10 point scale is derived from this interval variable.

The NZDep2001 scale of deprivation from 1 to 10 divides New Zealand into tenths of the distribution of the first principal component scores. For example, a value of 10 indicates that the meshblock is in the most deprived 10 percent of areas in New Zealand, according to the NZDep2001 scores.

Important points to note:

- NZDep2001 deprivation scores apply to <u>areas</u> rather than individual people.
- The 1 to 10 scale is ordinal not interval.
- First principal component scores may be used, if desired, instead of the 1 to 10 scale.

NZDep2001combines the following census data (calculated as proportions for each small area):

	Variable (proportions in small areas) in order of decreasing weight in the index	
1	Income	People aged 18-59 receiving a means tested benefit
2	Employment	People aged 18-59 unemployed
3	Income	People living in equivalised* households with income below an income threshold
4	Communication	People with no access to a telephone
5	Transport	People with no access to a car
6	Support	People aged <60 living in a single parent family
7	Qualifications	People aged 18-59 without any qualifications
8	Living space	People living in equivalised* households below a bedroom occupancy threshold
9	Owned home	People not living in own home

*Equivalisation: methods used to control for household composition.

Further information regarding NZDep may be obtained in the following three reports, one atlas, and two articles:

Crampton, P., Salmond, C. and Sutton, F. (1997), 'NZDep91: a new index of deprivation', *Social Policy Journal of New Zealand*, 9, 186-193.

Salmond, C., Crampton, P. and Sutton, F. (1998a), *NZDep96 Index of Deprivation Instruction Book*, Wellington, Health Services Research Centre.

Salmond, C., Crampton, P. and Sutton, F. (1998b), *NZDep96 Index of Deprivation Look Up Directory*, Wellington, Health Services Research Centre.

Crampton, P., Salmond, C., Kirkpatrick, R., Scarborough, R. and Skelly, C. (eds.) (2000), *Degrees of Deprivation in New Zealand: An atlas of socioeconomic difference*, David Bateman Ltd, Auckland.

Salmond, C. and Crampton, P. (2001), 'NZDep96 - What does it measure?', *Social Policy Journal of New Zealand*, 17, 82-100.

Salmond, C. and Crampton, P. (in press, 2002), 'Heterogeneity of deprivation within very small areas', *Journal of Epidemiology and Community Health*.

Uses for NZDep2001

NZDep91, NZDep96 and NZDep2001 have been developed with three principal purposes in mind: resource allocation, research, and advocacy.

1. Indexes of deprivation have application in funding formulas. For example, indexes of deprivation are used in capitation funding formulas for primary health care services, the population-based funding formula for District Health Boards, and in funding formulas for social services in other sectors.

2. Indexes of deprivation have application in research in a variety of settings such as health and other social services. For example, in the health sector, many researchers use small area indexes to describe the relationship between socioeconomic deprivation and health outcomes; increasing levels of deprivation are associated with higher mortality rates, and higher rates of many diseases.

3. Indexes of deprivation are used by community groups and community based service providers to describe the populations they serve, and to advocate for extra resources for community based services.

File information

The accompanying downloadable file (**NZDep2001_file.txt**) has 38.358 records (one per meshblock) with the following fields:

- 2001 meshblock identification number (**MB_num_2001**)   [columns 1-7]

- 2001 census area unit number (**CAU_num_2001**)   [columns 8-14]

- NZDep2001 deprivation scale, where 1 is least
  deprived and 10 is most deprived (**NZDep2001**)   [columns 15-17]

- NZDep2001 first principal component score standardised
  to mean 1000 index points and standard deviation 100
  index points (**NZDep_score_2001**)   [columns 18-22]

- Meshblock usually resident population, randomly
  rounded to base 3 (**UR_pop_2001**)   [columns 23-26]

*This ASCII (DOS) text file can be read fastest by word processing software (such as Microsoft Word), and can also be read by statistical software (such as SAS). However, the file is too big to be read by at least some spreadsheets.

- A further down-loadable file (**CAU2001_file.txt**) gives census area unit numbers, names, a population weighted average NZDep2001 score for census area units (**CAU_average_NZDep2001_score**), and a 1 to 10 deprivation scale for census area unit averages (derived from the distribution of the weighted average scores), where 1 is least deprived and 10 is most deprived (**CAU_average_NZDep2001**).

- 2001 census area unit number (**CAU_num_2001**)   [columns 1-7]

- 2001 census area unit name (**CAU_name_2001**)   [columns 8-37]

- 2001 census area unit population weighted average
  NZDep2001 scale (**CAU_average_NZDep2001**)   [columns 38-42]

- 2001 census area unit population weighted average
  NZDep2001 score (**CAU_average_NZDep2001_score**)   [columns 43-46]

How to use the index

Using the index as a deprivation variable in analysis

1. Clean addresses, ie make sure components of addresses are in the right fields. Note that rural delivery (RD) addresses cannot be geocoded. Address cleaning is done commercially by various organisations, as listed below, for geocoding.

2. Geocode each observation in your outcome dataset (eg mortality, crime events, immunisation status) to meshblock. Automatic geocoding services are provided by various organisations, including:

   - Statistics New Zealand, phone (04) 495 4600 (Wellington), or (09) 358 4588 (Auckland), or (03) 374 8700 (Christchurch), or (03) 477 7511 (Dunedin)
   - Critchlow Associates Ltd, phone (04) 472 8244 (Wellington)

3. Merge your dataset with the NZDep2001 file (**NZDep2001_file.txt**) using meshblock number, thus linking each geocoded address with its area deprivation score.

4. Examples of possible analyses include:

   - If you are comparing two (or more) groups (eg fully immunised versus not fully immunised; or cot death cases versus control babies) compare the distributions of 10 scale values (or principal component scores) using a non-parametric test (since the scale values are ordinal, and the principal component scores are skewed, and may be more skewed in your dataset).
   - If you are comparing rates of events with deprivation (eg mortality rates in a region compared across the ten deprivation scale values) you could calculate a rank correlation coefficient, or simply plot your results. Note that the denominators for your rates can be added up from the usually resident meshblock populations (**UR_pop_2001**) downloadable from this website.

Calculating an average NZDep_score_2001 *value for census area units*

Population weighted average scores and their decile scale values for census area units should be avoided where possible as they disguise heterogeneity within census area units.

In circumstances where geocoding can only be carried out at the level of census area units then population weighted average scores and their decile scale values have to be used. For convenience these have already been calculated according to the scheme described in the next section, and are provided as a down-loadable file.

Calculating an average NZDep_score_2001 *value for a user defined region*

1. Define the regions in terms of the component meshblocks (**MB_num_2001**).

2. To calculate a score for a region we suggest you take the weighted average of **NZDep_score_2001** values, using population counts (**UR_pop_2001**), across all the meshblocks in the region.

3. A weighted average is obtained by multiplying each meshblock **NZDep_score_2001** value by the meshblock **UR_pop_2001**, adding these over all meshblocks in the region, and dividing this total by the total regional population count (the sum of **UR_pop_2001** for all meshblocks in the region).

$$Weighted\_average = \frac{\sum (NZDep\_score\_2001)*(UR\_pop\_2001)}{\sum UR\_pop\_2001}$$

Please note:

Average deprivation values for user defined regions calculated using the **NZDep2001** scale from 1 to 10 are less accurate than average deprivation values calculated using **NZDep_score_2001** values.

Notes to users

- **What does it mean if a particular meshblock does not have a NZDep2001 value (field is blank)?**

  A number of meshblocks (499) have been omitted from the index (most of these meshblocks are mainly sea or estuary), and in total contain very few people. A further 17 meshblocks have been withheld from the index for technical reasons as explained in *NZDep2001 Index of Deprivation* (Salmond & Crampton, 2002). The final number of NZDep2001 small areas was 22,077.

  The following meshblocks have had their deprivation values withheld:

  0788102, 0364601, 0496102, 0999101, 0999102, 0974500, 1239300, 1166900, 1869401, 1869402, 1869800, 1875102, 2003505, 2343701, 2851001, 2949900, 3138800

- **How are very small meshblocks handled in NZDep2001?**

  Meshblocks with populations of less than 100 people have been joined with neighbouring meshblocks to make areas with at least 100 people before creating the index. In the accompanying file (**NZDep2001_file.txt**) the small area scale value has been assigned to each component meshblock. Note that if any meshblock, or joined meshblocks, have more than one proportion (out of nine) based on fewer than 20 people the NZDep2001 value is unreliable and has been withheld. These are the 17 meshblocks listed above.

- **How are empty meshblocks handled in NZDep2001?**

  Meshblocks are areas where people live, but not necessarily all the time (such as holiday homes). Meshblocks may also have unoccupied houses which would have been occupied in the past, and may be occupied in the future. Empty meshblocks were agglomerated with connected non-empty meshblocks for the purposes of creating our small areas—for which the index is calculated—on the assumption that future occupation will, to some extent, mirror the localised small neighbourhoods. The alternative was to remove such meshblocks from the index. This could give rise to a geocoded address in the future for which no

NZDep value at all was available. In this situation the observation would be 'missing' in any analysis, whereas, in the procedure adopted, the observation would be available with the best estimate of a deprivation score. When mapping NZDep in colour by meshblocks, therefore, it may be advisable to leave any empty meshblocks uncoloured.

- **I found that the distribution of NZDep_score_2001 did not have mean = 1000 and standard deviation = 100. Why?**

  The first principal component was created from a file of 22,077 small areas with populations (as far as possible) exceeding 100 persons. Typically, each small area is one or two meshblocks. In the file of 22,077 small areas the mean is 1000 and the standard deviation is 100. For usage we have provided the file of all meshblocks giving each component meshblock of any small area the small area **NZDep_score_2001** value.

- **I found that the distribution of NZDep2001 did not have exactly 10 percent in each of its 10 categories. Why?**

  NZDep2001 was created from our small areas, not from meshblocks. See comments about **NZDep_score_2001** in the paragraph above.

- **Can I compare NZDep scores between different censuses?**

  Area comparisons at the meshblock level, over time, should not be attempted. Comparisons at a higher aggregation, such as Territorial Authorities, or perhaps Area Units, may be less fraught, but we would still urge great caution in the interpretation of changes from one area to another.

  Comparing *relationships* between deprivation and another variable, over time, may be less fraught, but we would still urge caution.

  For further information see Appendix five of *NZDep2001 Index of Deprivation* (Salmond & Crampton, 2002).

Reference

Salmond, C. and Crampton, P. (2002), 'NZDep2001 Index of Deprivation', www.moh.govt.nz