

NZDep91
Index of Deprivation

Instruction Book

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About the Health Services Research Centre

The Health Services Research Centre aims to promote excellence in academic research, to encourage interaction between researchers and policy makers and to mount policy-focused research as well as evaluative research. The Centre is a joint venture between the Wellington School of Medicine, University of Otago and the Institute of Policy Studies, Victoria University of Wellington.

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While the contents and outcomes of this research project have benefited considerably from the assistance of colleagues, the responsibility remains solely with the authors.

Confidentiality

To protect against disclosure of information supplied by individual respondents, Statistics New Zealand's practice is to randomly round all aggregated Census output. In this case access was granted to unrounded aggregate Census data, under a special contract between Statistics New Zealand and Clare Salmond and Peter Crampton, so that the scarcely populated meshblocks could be sensibly agglomerated to form larger areas. The access was granted in a strictly protected environment on Statistics New Zealand premises, under supervision of Statistics New Zealand staff and no unrounded census aggregations were removed from the site. Both researchers are bound by the same provisions of the Statistics Act 1975, which bind staff of Statistics New Zealand to preserve the confidentiality of individual respondent data.

Introduction

NZDep91 is an index of deprivation. The index combines 10 census variables from the 1991 census which reflect aspects of material and social deprivation. *NZDep91* provides a deprivation score for each meshblock in New Zealand. Meshblocks are geographical units defined by Statistics New Zealand, containing a median of about 90 people.

The *NZDep91* index of deprivation is provided on the diskette as a 10 point scale, and also as an interval variable:

- The *NZDep91* scale, **NZDEP91**, ranges from 1 to 10, where 1 represents the least deprived areas and 10 the most deprived areas.
- The *NZDep91* interval variable, **NZDEP91_PC1**, is the first principal component score, which has been scaled to have mean 1000 index points and standard deviation 100 index points.

The *NZDep91* 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.

Important points to note:

- *NZDep91* deprivation scores apply to areas 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.

NZDep91 combines the following census data (calculated as proportions for each small area):

- | | |
|-------------------|---|
| 1. Income | Equivalised* household income below an income threshold |
| 2. Income | Means tested benefit and age 18-59 |
| 3. Transport | Adults with no access to a car |
| 4. Living space | Equivalised* household below an occupancy threshold |
| 5. Owned home | Not living in own home |
| 6. Employment | Unemployed and age 18-59 |
| 7. Qualifications | No qualifications and age 18-59 |
| 8. Support | Single parent family |
| 9. Support | Separated or divorced and age 18-59 |
| 10. Support | Separated or divorced and age 60 plus |

*Equivalisation: methods used to control for family composition.

For further discussion of deprivation, and the application of indexes of deprivation to research, resource allocation and community advocacy refer to: Townsend [1], Crampton and Laugesen [2], Carstairs [3], and Morris [4].

A full research report detailing the development of *NZDep91* has been published by the Health Services Research Centre Research [5]. Also available from the Health Services Research Centre is a look up directory which provides meshblock numbers and *NZDep91* scores for each of the 35,151 meshblocks in New Zealand [6].

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Uses for *NZDep91*

NZDep91 has been developed with three main purposes in mind, resource allocation, research and advocacy.

1. Indexes of deprivation have application in funding formulas. For example, indexes of deprivation have been used in capitation funding formulas for primary health care services, population based funding formulas for area 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 have used small area indexes to describe the relationship between deprivation and health outcomes; increasing levels of deprivation are associated with higher mortality rates, and higher rates of many diseases.
3. Indexes of deprivation have been used by community groups and community based service providers to describe the populations they serve, and to advocate for extra resourcing of community based services.

How to use the diskette

The accompanying IBM formatted diskette contains a text file* (**NZDEP91.TXT**) of 35,151 records (one per meshblock) with the following fields:

- 1991 meshblock identification number (**MBNUM**) [columns 1-7]
- 1991 census area unit number (**CAUNUM**) [columns 8-14]
- *NZDep91* deprivation scale, where 1 is least deprived and 10 is most deprived (**NZDEP91**) [columns 15-17]
- *NZDep91* first principal component score standardised to mean 1000 index points and standard deviation 100 index points (**NZDEP91_PC1**) [columns 18-22]
- Meshblock usually resident population (randomly rounded to the nearest multiple of three to preserve confidentiality) (**URPOP**) [columns 23-27]

*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 (such as Microsoft Excel version 7.0).

The diskette also contains a text file (**CAUNAMES.TXT**) giving census area unit numbers and names.

- 1991 census area unit number (**CAUNUM**) [columns 1-7]
- 1991 census area unit name (**CAUNAME**) [columns 8-40]

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.
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, or (09) 357 2100, or (03) 374 8700
 - Critchlow Associates Ltd, phone (04) 472 8244
3. Merge your dataset with the *NZDep91* file (**NZDEP91.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 somewhat 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 (**URPOP**) given on the diskette.

Calculating an average NZDEP91_PC1 value for a user defined region

1. Define the regions in terms of the component meshblocks (**MBNUM**). To help define your regions we have provided census area unit numbers on the diskette (**CAUNUM**). A list of the names for census area units is also provided on the diskette.
2. To calculate a score for a region we suggest you take the weighted average of **NZDEP91_PC1** values, using population counts (**URPOP**), across all the meshblocks in the region.
3. A weighted average is obtained by multiplying each meshblock **NZDEP91_PC1** value by the meshblock **URPOP**, adding these over all meshblocks in the region, and dividing this total by the total regional population count (the sum of **URPOP** for all meshblocks in the region).

Notes to users

- **What does it mean if a particular meshblock does not have a *NZDep91* value (field is blank)?**

A number of meshblocks (298) on the coastline of New Zealand have been omitted from the index (most of these meshblocks are mainly sea or estuary), and in total contain very few people. A further 12 meshblocks could not be assigned deprivation values for technical reasons. The 12 meshblocks are:

623200	1754000	2128800	2359702
999102	1834300	2290300	2495700
1754601	1945300	2324900	2870200

- **How are very small meshblocks handled in *NZDep91*?**

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 the small area scale value has been assigned to each component meshblock.

- **I found that the distribution of *NZDEP91_PC1* did not have mean = 1000 and standard deviation = 100. Why?**

The first principal component was created from a file of 20,154 small areas with populations (as far as possible) exceeding 100 persons. Typically, each small area is one or two meshblocks. In the file of 20,154 small areas the mean is 1000 and the standard deviation is 100. For usage we have provided the file of 35,151 meshblocks giving each component meshblock of any small area the small area *NZDEP91_PC1* value.

- **I found that the distribution of *NZDEP91* did not have exactly 10 percent in each of its 10 categories. Why?**

NZDEP91 was created from our small areas, not from meshblocks. See comments about *NZDEP91_PC1* in the paragraph above.

Bibliography

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5. Crampton, P., Salmond, C., and Sutton, F., *Research Report No 5, NZDep91 Index of Deprivation*. 1997, Wellington: Health Services Research Centre.
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Questionnaire

To provide feedback, please remove this page and return to:

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1. What was your purpose in using NZDep91? Tick all that apply.

Research (specify broad area of inquiry eg, cot death research)

.....

Resource allocation / funding (specify type of funding eg, health)

.....

Needs analysis

Other (specify)

.....

2. Did you use the NZDep91 10 point scale, and/or the NZDep91 principal component scores?

Principal component scores

10 point scale → was the 10 point scale adequate for your purposes, or would you have preferred fewer/more categories. Please give details of your preference.

.....

.....

.....

.....

Please turn over 



3. **Based on your local knowledge, have you noticed any unexpected deprivation scores?**

Yes (specify meshblock number if possible, and nature of the anomaly)

.....

.....
(Continue on separate sheet if necessary)

No

4. **In future versions of the user manual we would like to indicate the uses to which *NZDep91* has been put, that is, the answer to question 1. Do you consent to us using the information in question 1? You, personally, will not be identified.**

Yes No

5. **Was the instruction book adequate for your purposes.**

Yes

No → please suggest improvements

.....
.....
.....



Peter Crampton (10 June 1932 – 12 July 2011) was a British Labour Party politician who was the Member of the European Parliament (MEP) from 1989 to 1999 representing the Humberside constituency. He was also the father of Times journalist Robert Crampton. He was born in Blackpool in 1932 and educated at Blackpool Grammar School and Nottingham University. He was a teacher and lecturer of geography. He married a geography teacher from London in 1955. They had two sons, born in 1962 and 1964. After a Clare Salmond Peter Crampton. *J Prim Health Care* 2012 Dec 1;4(4):271-80. Epub 2012 Dec 1. Tony Blakely Clare Salmond. *Int J Epidemiol* 2002 Dec;31(6):1246-52. Department of Public Health, Wellington School of Medicine, University of Otago, PO Box 7343, Wellington, New Zealand. Clare E Salmond 1, Peter Crampton. Affiliation. 1 Department of Public Health, Otago University, Wellington, New Zealand. clare.salmond@xtra.co.nz. PMID: 23618071. Abstract. Objectives: To outline the development and uses of the census-based New Zealand small-area index of relative socio-economic deprivation, NZDep. Methods: NZDep has been created from four 5-yearly censuses using theory developed from international deprivation research, a standard statistical procedure (principal component analysis) and both construct and criterion validation. Results: The latest index was based on nine soci