

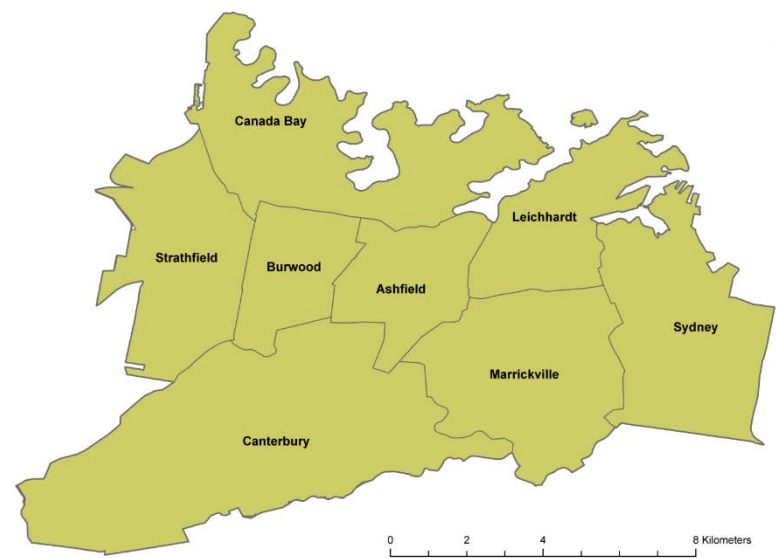
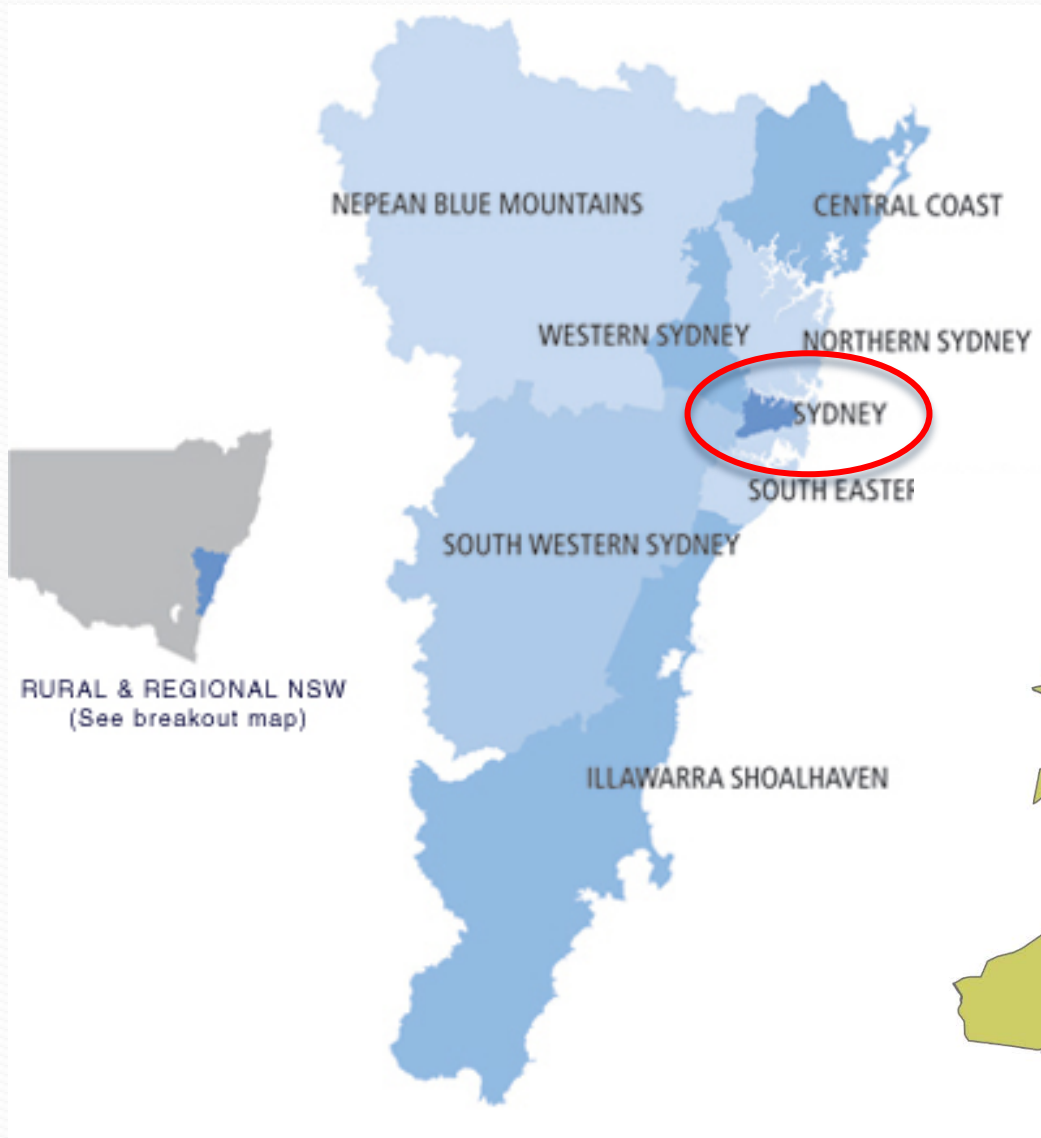
GEOSPATIAL ANALYSIS OF DISADVANTAGE IN SYDNEY LOCAL HEALTH DISTRICT

Dr Katherine Todd
Department of Community Paediatrics, SLHD
Early Years Research Group (EYRG), Ingham

Research question

- What is the geographical distribution of the “most vulnerable” families with intergenerational cycles of disadvantage and trauma in Sydney Local Health District?

Background



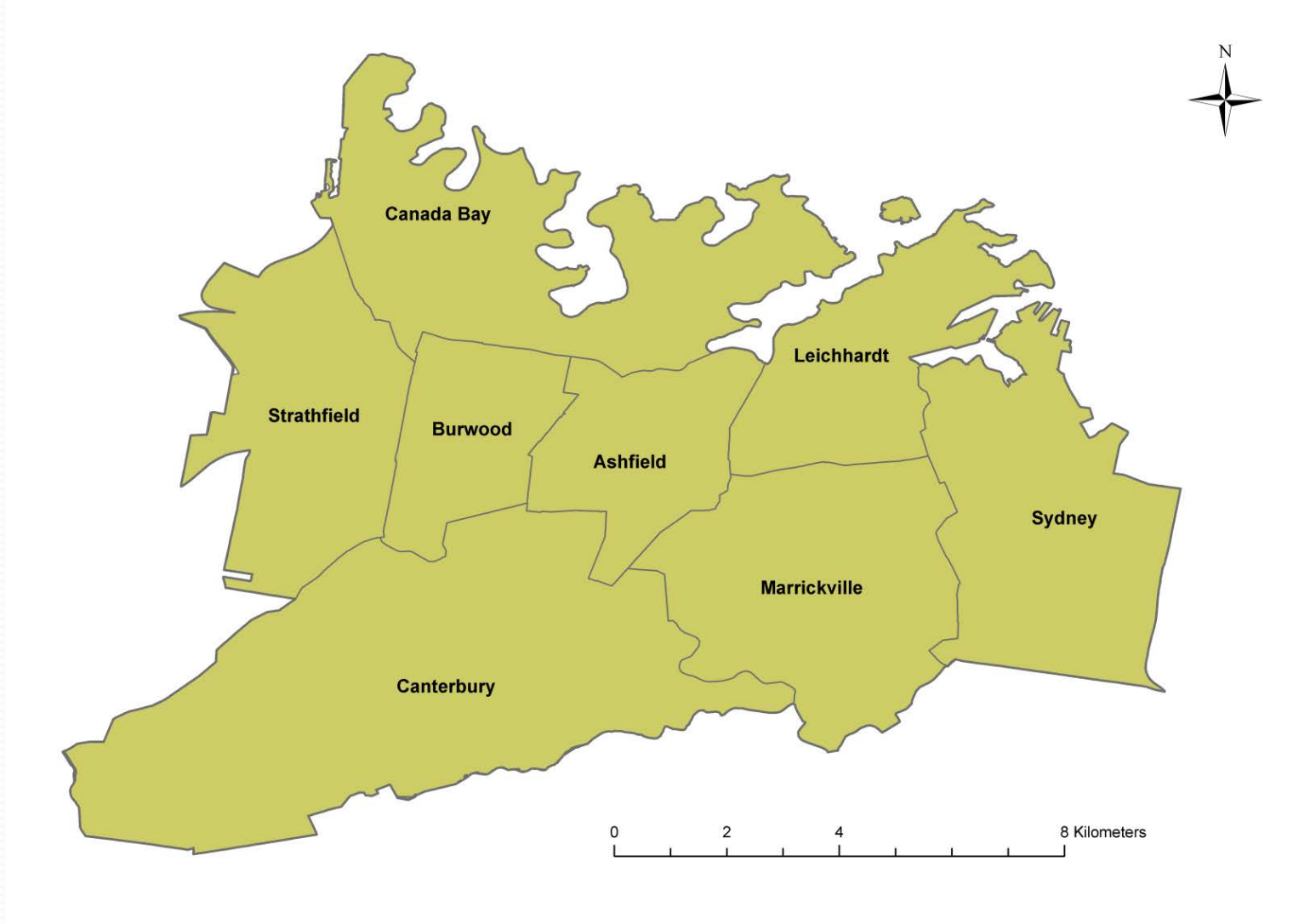
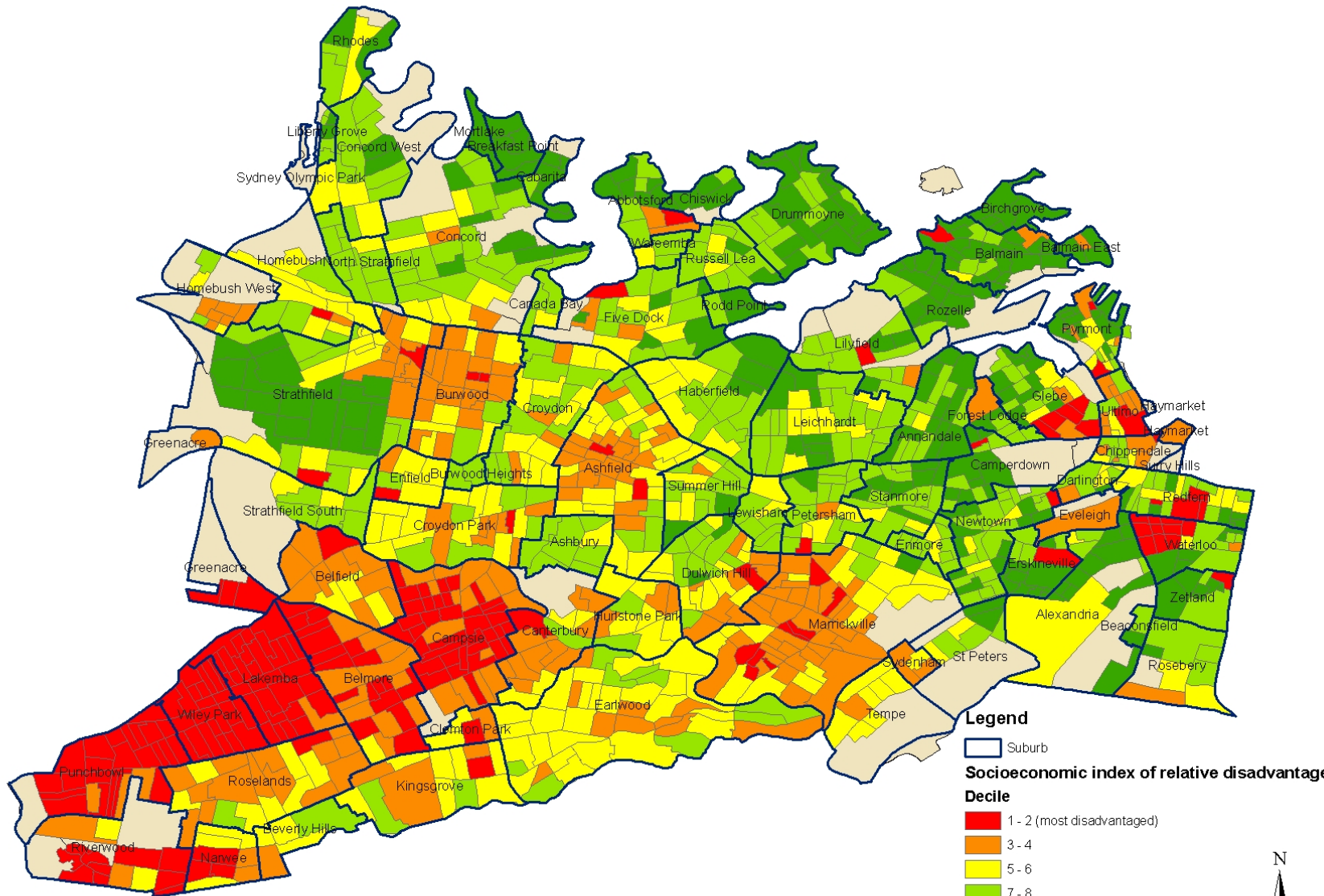









Figure 1: Sydney Local Health District and included LGAs



0 1.5 3 6 Kilometers

Legend

-  Suburb
- Socioeconomic index of relative disadvantage**
- Decile**
-  1 - 2 (most disadvantaged)
-  3 - 4
-  5 - 6
-  7 - 8
-  9 - 10 (least disadvantaged)
-  Excluded from SEIFA analysis



Objectives

- To take a spatial epidemiology approach to identifying the geographical distribution of the “most vulnerable” families with intergenerational cycles of disadvantage and trauma in Sydney LHD by:
 1. Identifying indicators of disadvantage and mapping them within SLHD
 2. Identifying clusters of disadvantage
 3. Analysing potential pockets or “hot spots” of extreme or complex disadvantage

Included indicators of disadvantage

2011 ABS Census

1. High proportion of the population identifying as Aboriginal or Torres Strait Islander
2. Low rates of year 12 attainment
3. Low median weekly household income
4. High proportion of people reporting speaking English not well or not at all
5. High proportion of people requiring assistance with activities of daily living (disability)
6. High proportion of one-parent families
7. Large proportion of households with no access to a car
8. Large proportion of housing consisting of state housing
9. Large proportion of households with no internet access
10. High rates of unemployment
11. Low labour force participation rates

SLHD Clinical Data (Midwives data)

1. High rates of teen mothers
2. High rates of pregnant women without partners (sole mothers)
3. High rates of smoking during pregnancy
4. High rates pregnant women with a high antenatal Edinburgh depression score (≥ 10)
5. High rates of pregnant women reporting domestic violence (have either been hit or hurt by their partner, or report being frightened of their partner)
6. High rates of pregnant women reporting a history of child abuse
7. High rates of families known to Family and Community Services
8. High rates of pregnant women who have other children in out-of-home care
9. High rates of women who report consuming alcohol during pregnancy
10. High rates of LBW infants
11. High rates of pregnant women with delayed antenatal care (first visit at ≥ 20 weeks)

SEIFA vs. family disadvantage

Included in 2011 SEIFA Index of
Relative Socio-Economic Disadvantage
(IRSD) only

Included in index of family
disadvantage only

Included in both

- No educational attainment
- Labourers
- Machinery operators and drivers
- Low-skilled occupational services
- Low rent
- Overcrowding
- Separated or divorced
- Children in jobless families

- Low educational attainment
- Unemployment
- Non-English speaking
- No car
- No internet
- *Low-income households
- *Single-parent families
- *Disabilities

- Indigenous
- State housing
- Low labour force participation rates
- Teen mothers
- Sole mothers
- Smoking during pregnancy
- High antenatal EDS
- Domestic violence
- Child abuse
- Children in out-of-home care
- Known to Family and Community Services
- Alcohol consumption during pregnancy
- Low-birth-weight infants
- Delayed antenatal care

**Similar variables that have different derivations*



Methodology

Routinely collected clinical data for SLHD (Midwives data)

2013 maternal data

2014 maternal data

2013 infant data

2014 infant data

2011 ABS census data

Combined maternal data

Combined infant data

Data acquisition

Calculation of rate as a percentage of the total for each SA area:

- Proportion of the population aged under 15 years
- Percentage of the population identifying as Indigenous
- Percentage of the population >15 years completing year 12
- Percentage of the population who were born overseas
- Percentage of the population who report speaking English not well or not at all
- Percentage of the population volunteering
- Percentage of the population providing unpaid assistance
- Percentage of persons in a one-parent family
- Percentage of families that are one-parent families
- Percentage of dwellings with no car
- Proportion of housing that is state housing
- Proportion of households without an internet connection

Raw data for each SA area:

- Median total household weekly income
- Average number of persons per bedroom
- Average household size (persons)
- Percent unemployed persons
- Percent labour force participation

- Creation of frequency tables using SPSS
- Calculation of SMR

Maternal indicators:

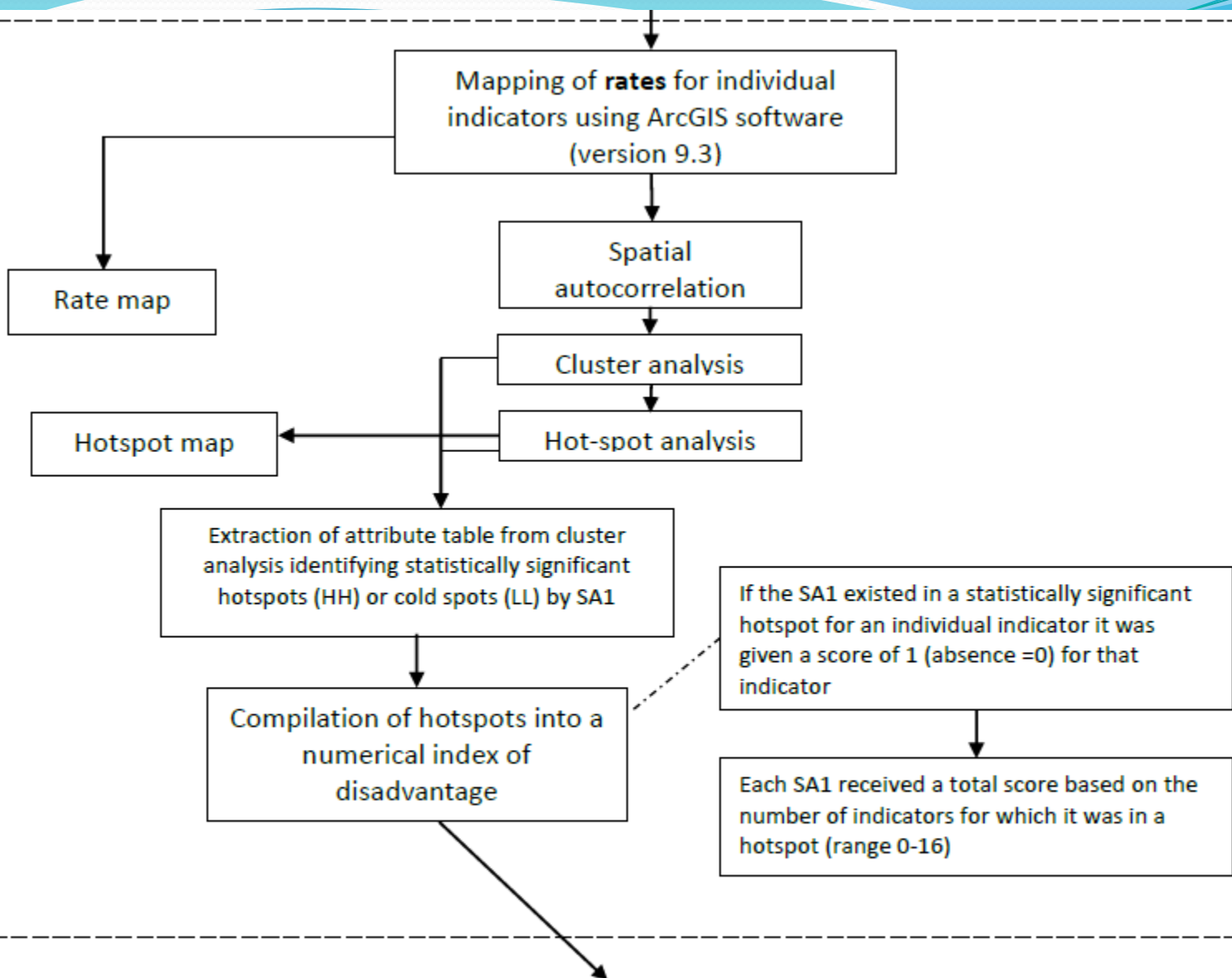
- Teen mothers
- ATSI mothers
- Sole mothers
- Smoking during pregnancy
- High antenatal EDS (≥ 10)
- Physical domestic violence (hit or hurt)
- Emotional domestic violence (frightened of partner)
- Domestic violence (either/or)
- Maternal history of child abuse
- Family known to FACS
- Mother has another child in OOHC
- Mother not breastfeeding on discharge
- Maternal alcohol use during pregnancy
- Mother from culturally/linguistically diverse background

Infant indicators:

- Low birth weight (<2.5kg)
- Delayed antenatal care (first antenatal visit at ≥ 20 weeks)

Data preparation

Data analysis

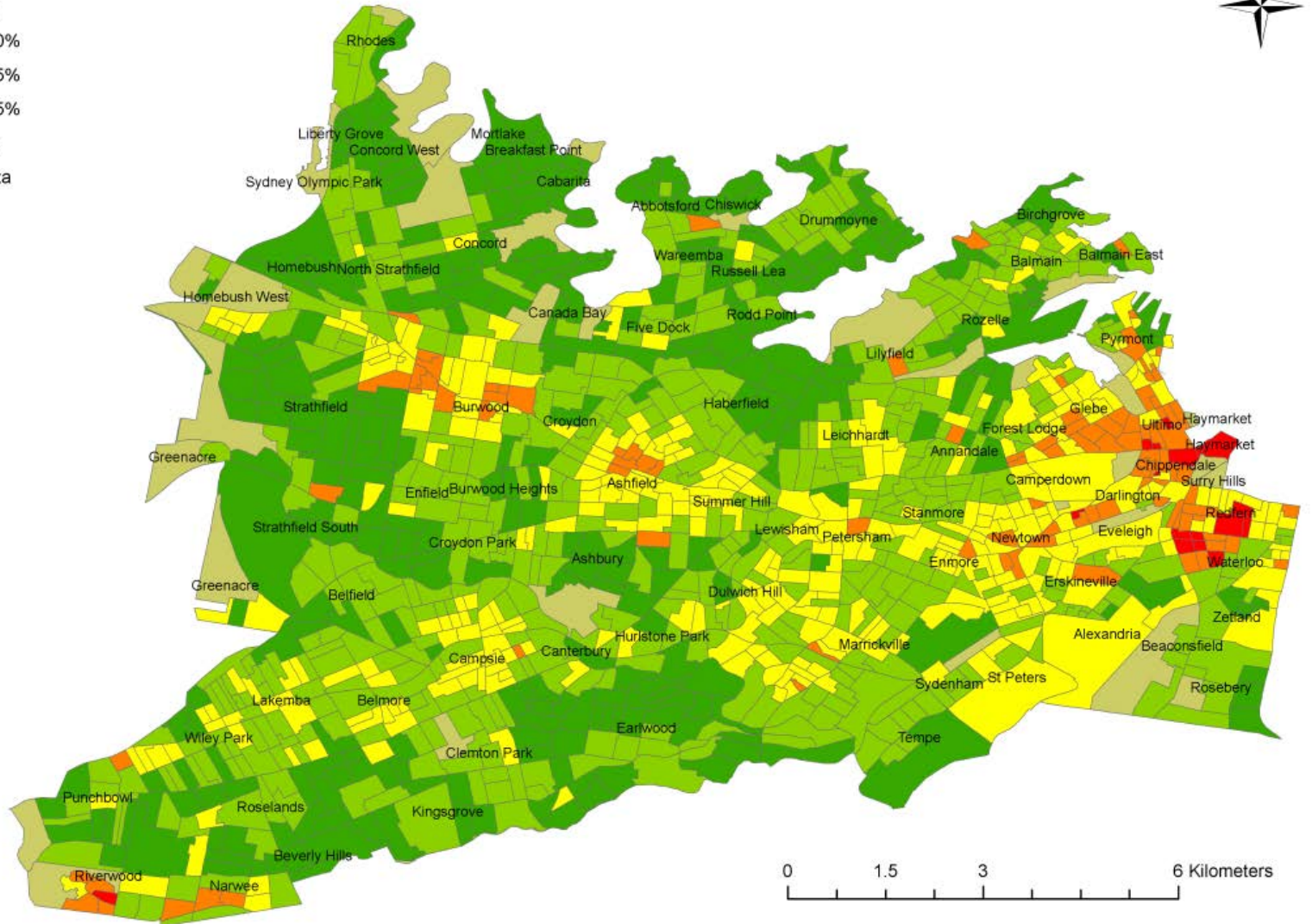


Result

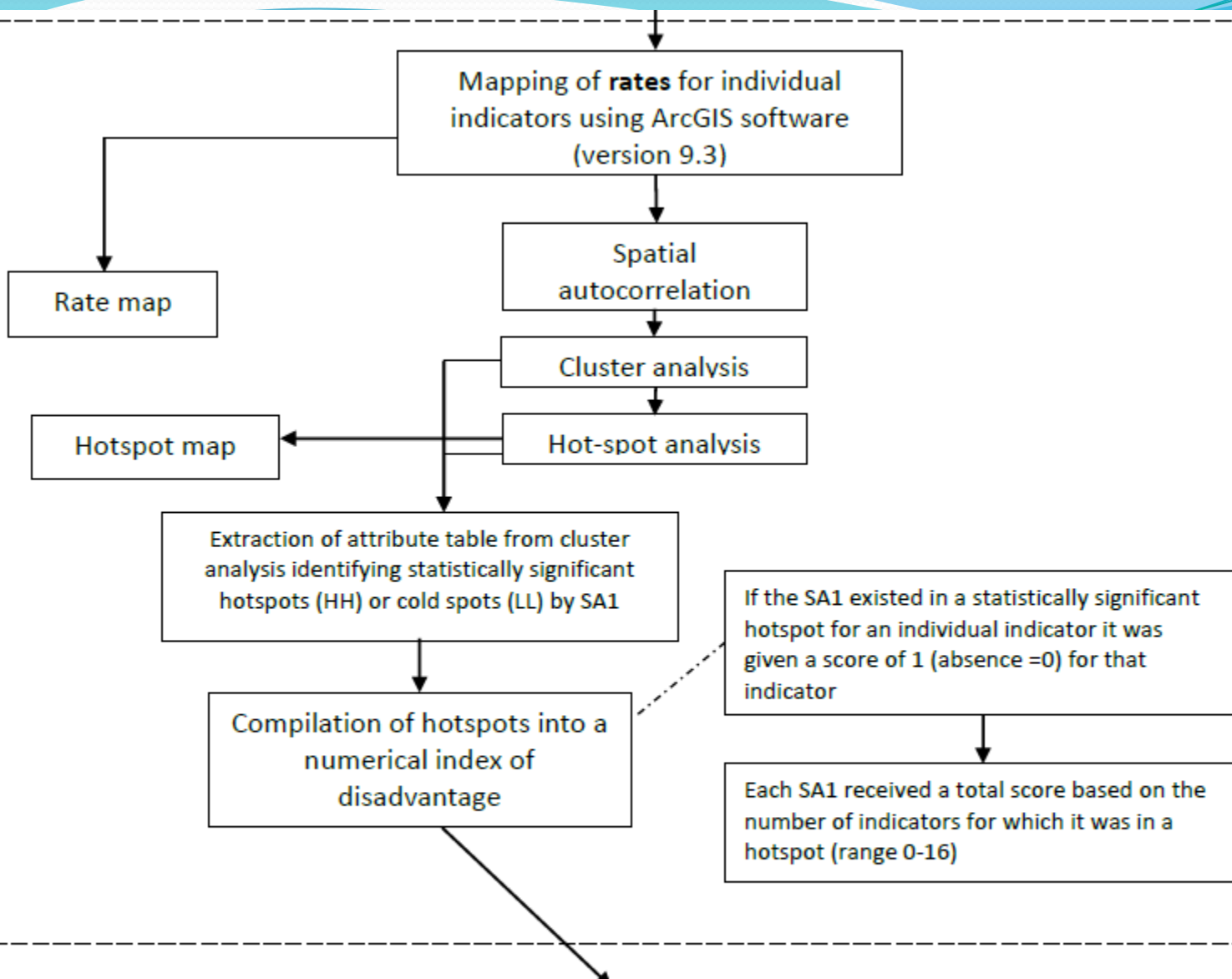
Spatial pattern
– Map of concentrated disadvantage

SA1

Proportion of the population who do not have access to a motor vehicle



Data analysis

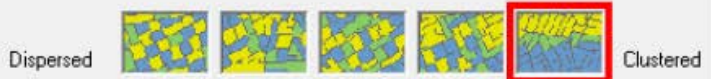


Result

Spatial pattern
– Map of concentrated disadvantage

No car

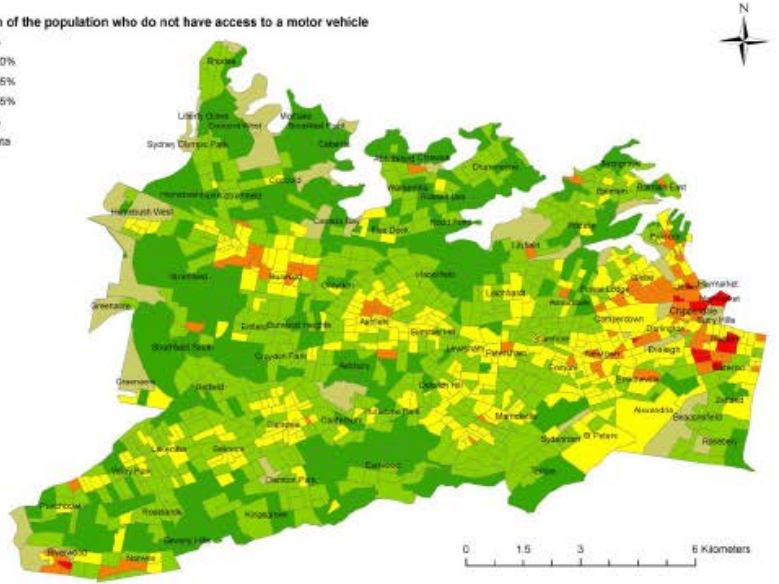
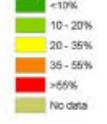
Moran's I Index = 0.67
Z Score = 69.27 standard deviations



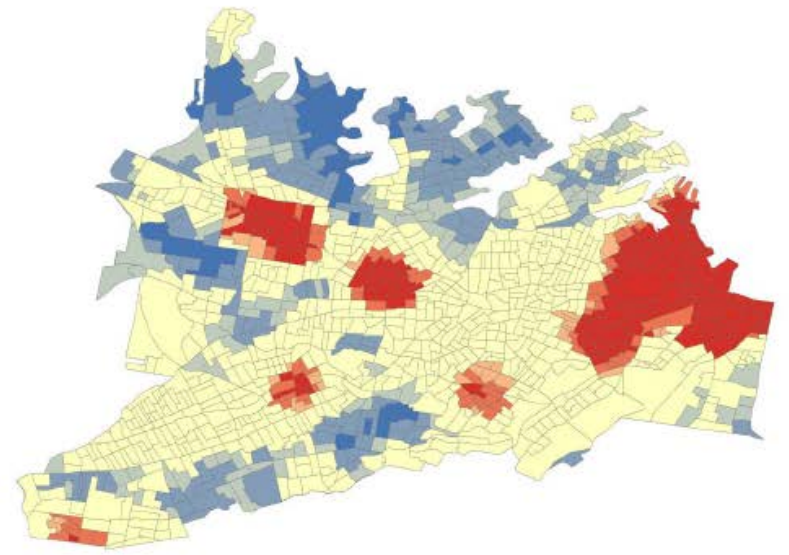
Significance Level:	0.01	0.05	0.10	RANDOM	0.10	0.05	0.01
Critical Values:	(-2.58)	(-1.96)	(-1.65)		(1.65)	(1.96)	(2.58)

There is less than 1% likelihood that this clustered pattern could be the result of random chance.

SA1
Proportion of the population who do not have access to a motor vehicle



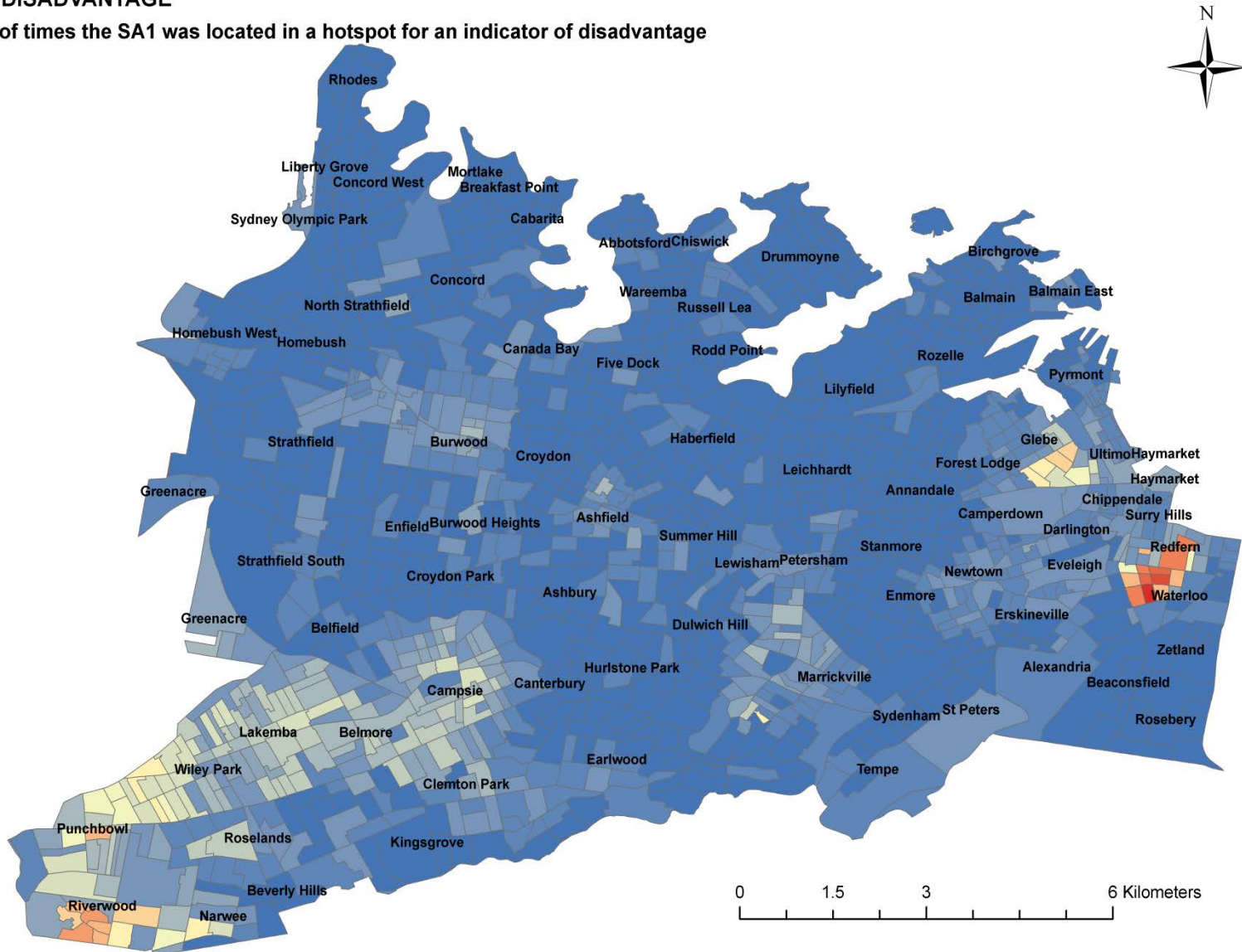
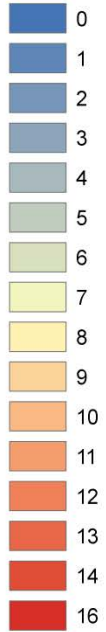
- Cluster analysis
- Rate map
- Hot spot map



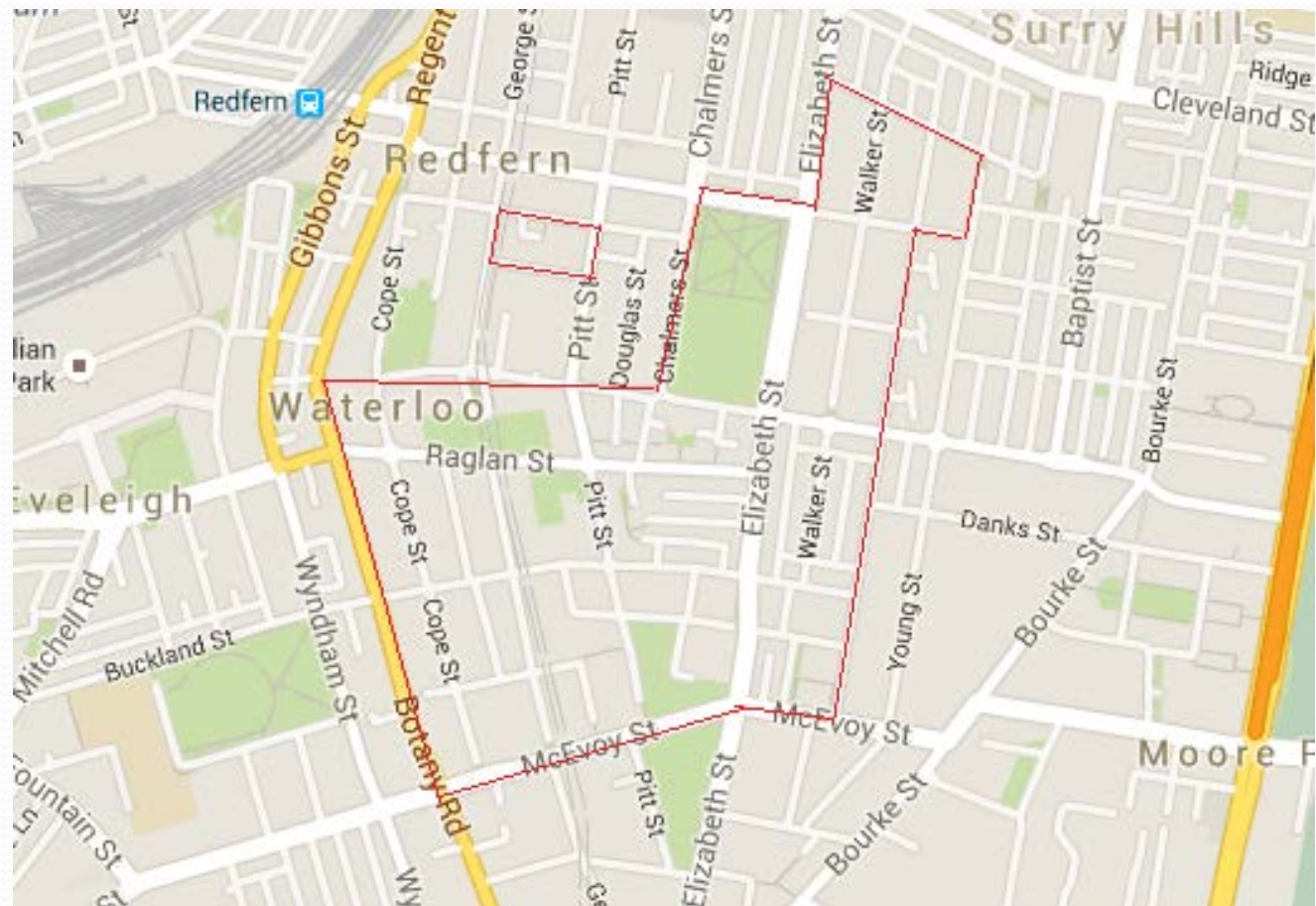
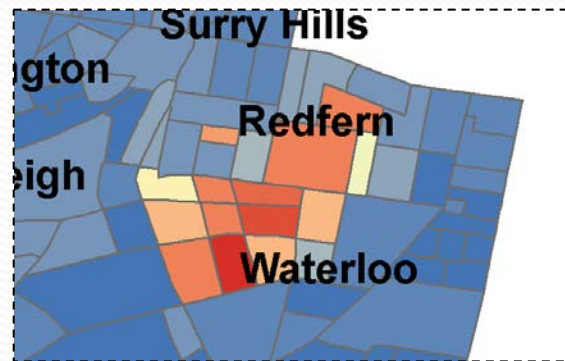
Results

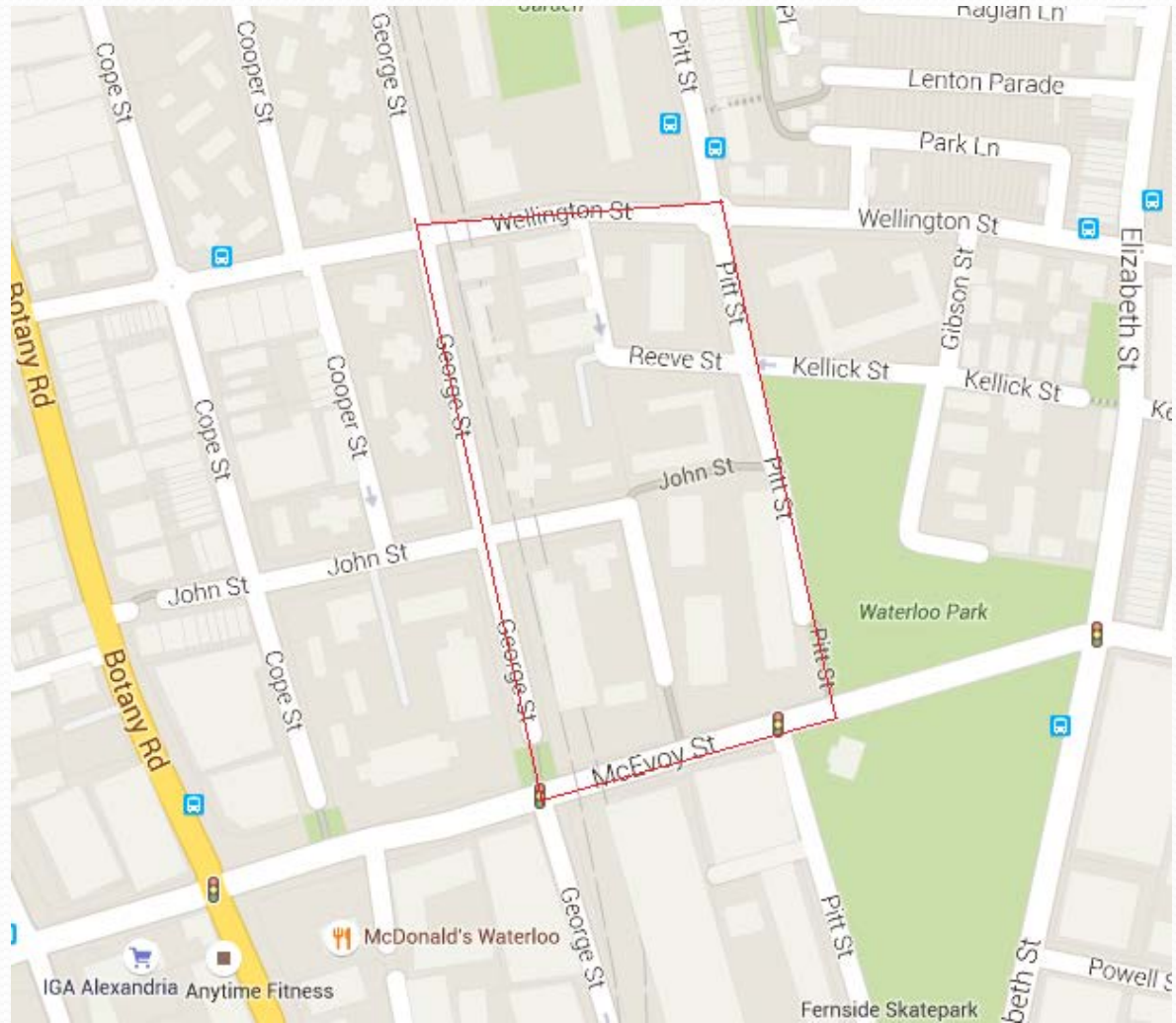
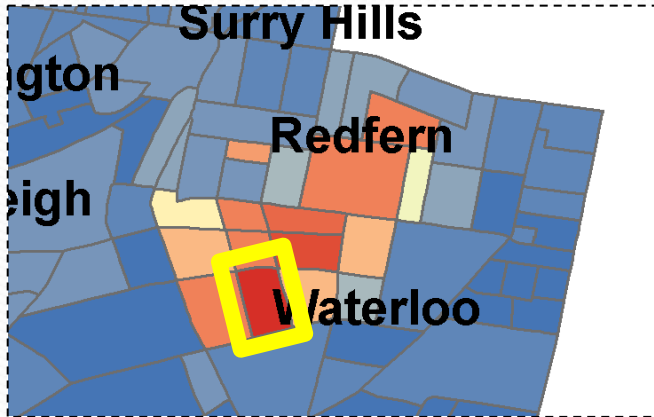
FAMILY DISADVANTAGE

Number of times the SA1 was located in a hotspot for an indicator of disadvantage



Applications and Implications





Limitations/future directions

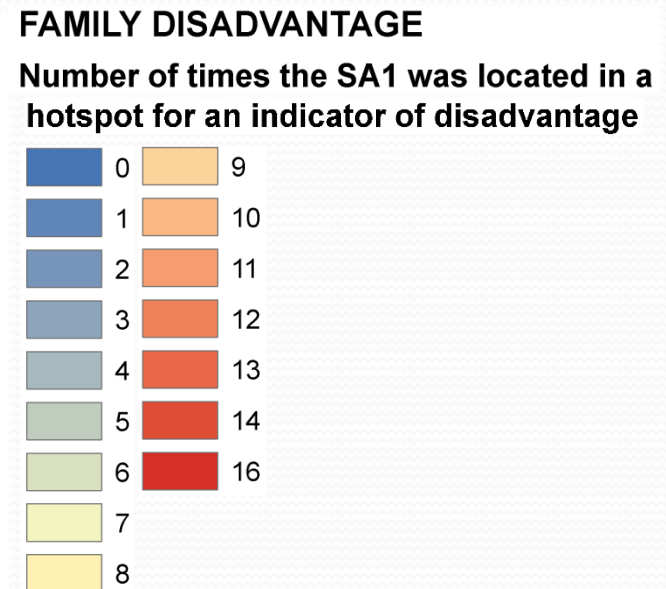
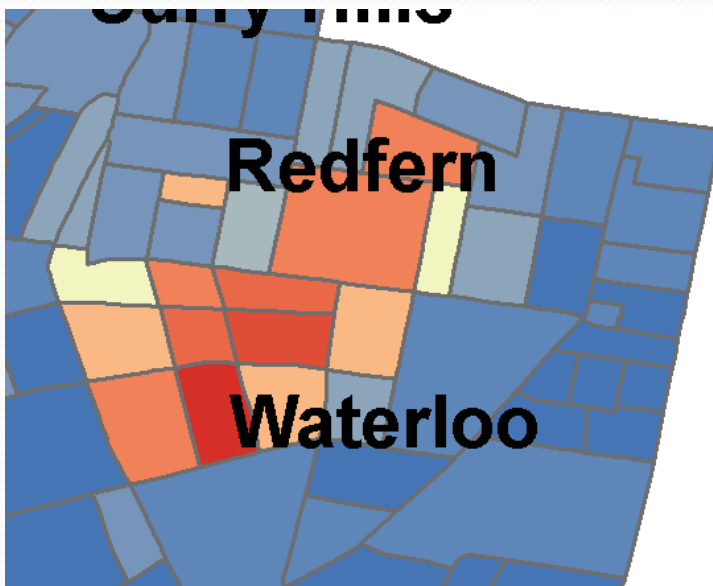
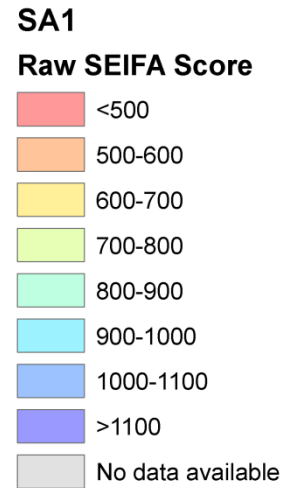
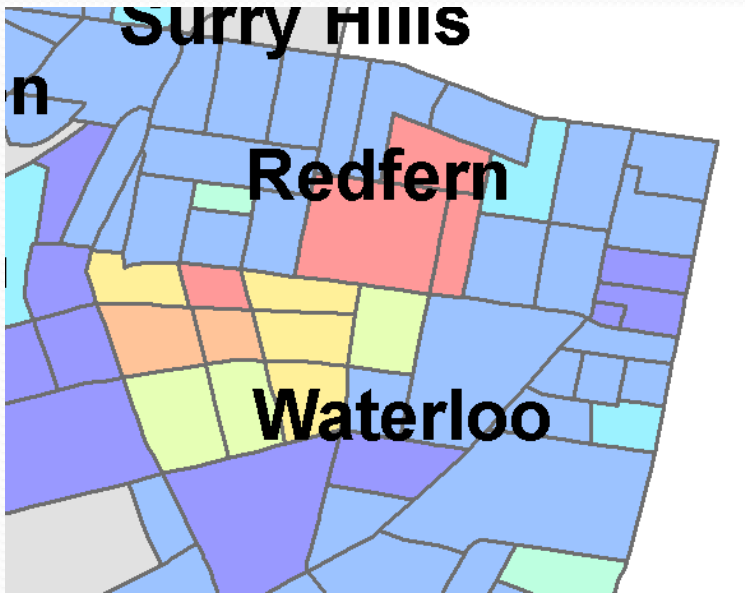
- Small numbers in the clinical data from the Midwives dataset
- Differing years for data collection between the two main datasets (2011 for the census vs. 2013/14 for the Midwives dataset)
- Weighting of indicators using Principle Component Analysis

References

- AIHW. (2009). *The geography of disability and economic disadvantage in Australian capital cities* Canberra Retrieved from <http://www.aihw.gov.au/publication-detail/?id=6442468227>.
- Allen, D. W. (2009). *GIS Tutorial 2: Spatial Analysis Workbook*: ESRI Press.
- Department of Prime Minister and Cabinet. (2011). *Breaking Cycles of Disadvantage: Australian Social Inclusion Board*. Canberra Commonwealth of Australia.
- Goldie, X., Kakuk, I., & Wood, G. (2014). Two Tales of a City: detecting socio-economic disadvantage in an 'advantaged' Australian urban centre. *Australian Geographer*, 45(4), 521-540. doi: 10.1080/00049182.2014.953737
- Goltsman, D., Li, Z., Bruce, E., & Maitz, P. K. (2014). Geospatial and epidemiological analysis of severe burns in New South Wales by residential postcodes. *Burns*, 40(4), 670-682.
- Pawson, H., & Herath, S. (2013). *Developing a typology of socio-spatial disadvantage in Australia*. Paper presented at the State of Australian Cities (SOAC) National Conference Sydney, NSW. <http://www.soacconference.com.au/wp-content/uploads/2013/12/Pawson-social-2.pdf>
- Pawson, H., & Herath, S. (2015). Dissecting and tracking socio-spatial disadvantage in urban Australia. *Cities*, 44(0), 73-85. doi: <http://dx.doi.org/10.1016/j.cities.2015.02.001>
- Pawson, H., Hulse, K., & Cheshire, L. (2015). *Addressing concentrations of disadvantage in urban Australia*. . Australian Housing and Urban Research Institute (AHURI) Retrieved from http://www.ahuri.edu.au/publications/download/ahuri_70704_fr6.
- Population Health Division. (2008). *The Health of the People of New South Wales - Report of the Chief Health Officer 2008: Summary report*. Sydney: NSW Department of Health
- Public Health Information Development Unit. (2012). *Life Opportunities, Social Inclusion and Health Outcomes: an Australian Atlas*: The University of Adelaide
- Salinas-Perez, J. A., Garcia-Alonso, C. R., Molina-Parrilla, C., Jorda-Sampietro, E., & Salvador-Carulla, L. (2012). Identification and location of hot and cold spots of treated prevalence of depression in Catalonia (Spain). *Int J Health Geogr*, 11, 36. doi: 10.1186/1476-072x-11-36
- SLHD. (2013). *A Picture of Health: SLHD Health Profile 2013*. Sydney Local Health District Retrieved from https://www.slhd.nsw.gov.au/pdfs/SLHD_Health_Profile_2013.pdf.
- SLHD. (2014, 10/02/2014). Interesting Facts: Sydney Local Health District Retrieved 7/10/2015, 2015, from http://www.slhd.nsw.gov.au/about_facts.html
- Vinson, T. (2009). *Markedly socially disadvantaged localities in Australia: their nature and possible remediation*. Canberra: Australian Department of Education, Employment and Workplace Relations.

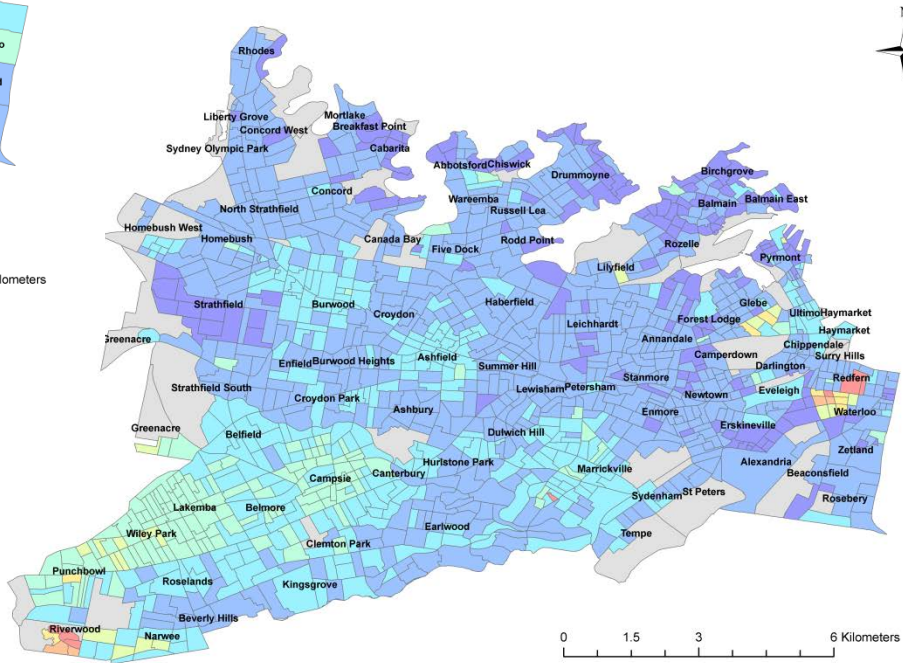
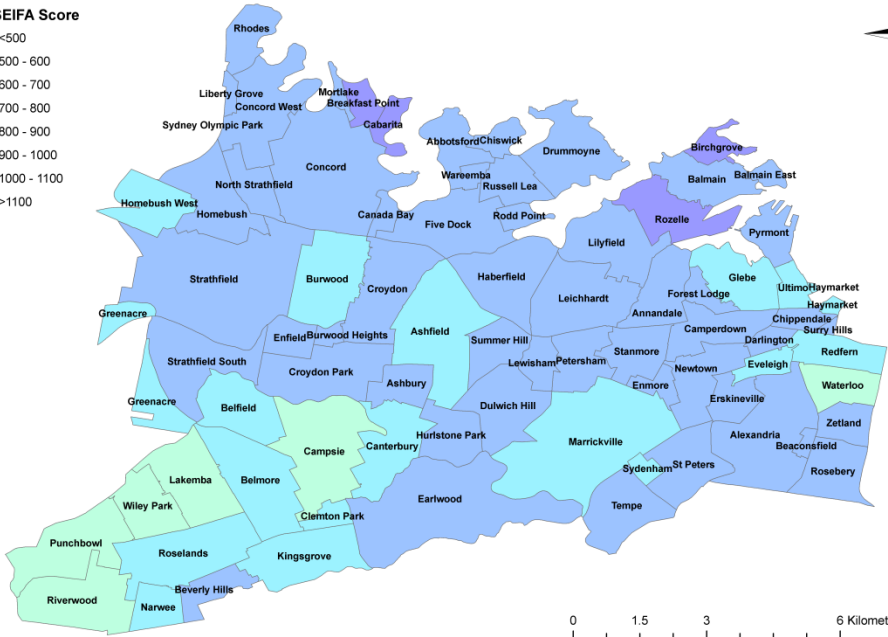
Questions?



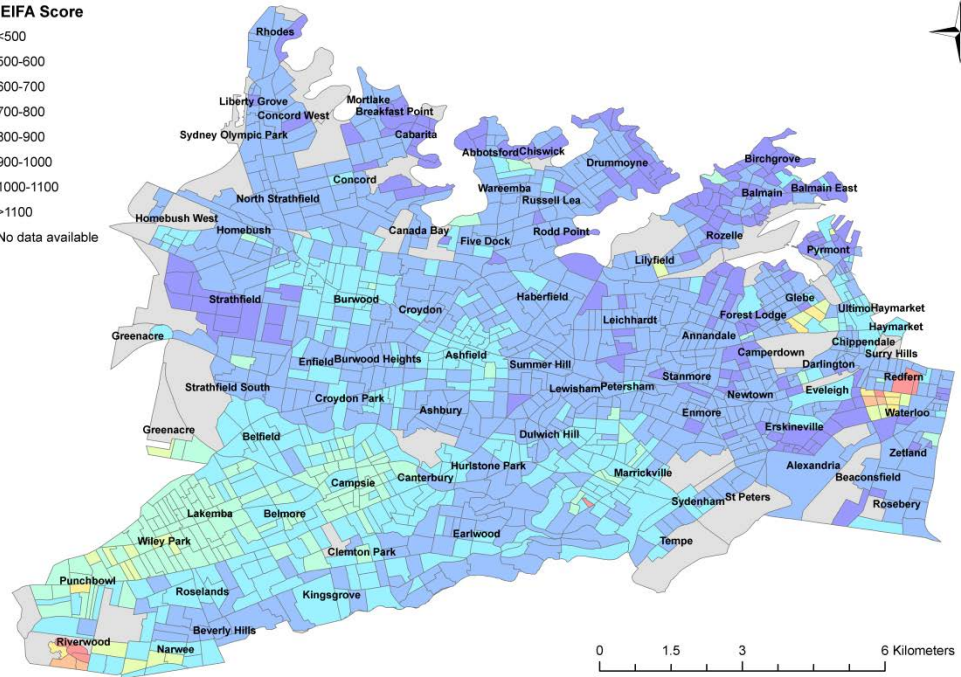
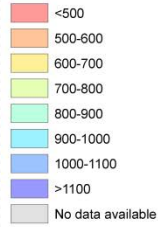


SA1

Raw SEIFA Score



SA1
Raw SEIFA Score



FAMILY DISADVANTAGE

Number of times the SA1 was located in a hotspot for an indicator of disadvantage

