

# Why are we not Outraged - We should be able to do better!

Professor Neil Coffee

Deakin Rural Health

Centre for Australian Research into Access

Deakin University

&

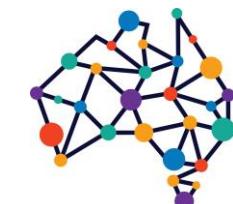
Adjunct Professor

Australian Centre for Housing Research

The University of Adelaide



**DRH** DEAKIN  
RURAL  
HEALTH



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# Historical Works

- Let's take a moment to look at some historical works
- Health and Place (Health Geography) has a long history
- And if we were doing maps like these then – what should we be doing now?





## Finke's 1792 map of human diseases: the first world disease map?

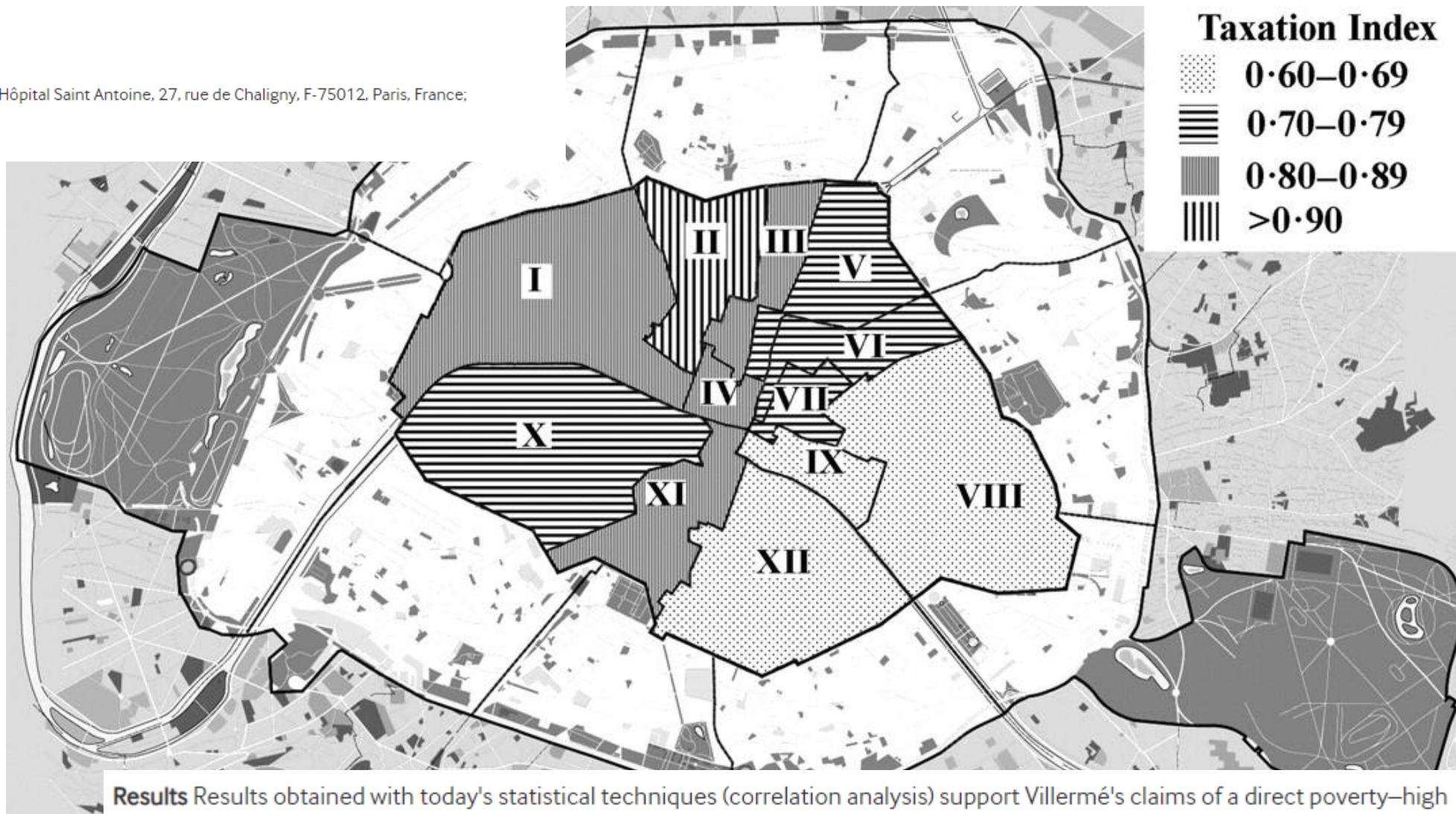
Frank A Barrett [✉](#)



# Louis-René Villermé (1782–1863), a pioneer in social epidemiology: re-analysis of his data on comparative mortality in Paris in the early 19th century

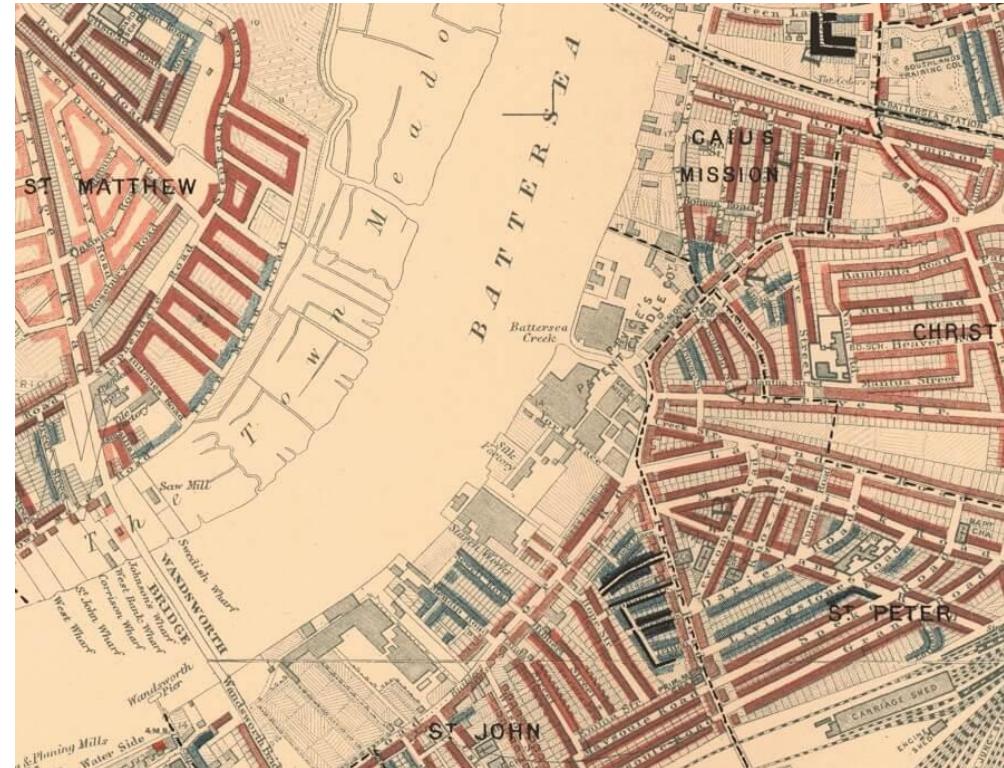
C Julia<sup>1</sup>, A-J Valleron<sup>1, 2, 3</sup>

Correspondence to Chantal Julia, Unité de Santé Publique, Hôpital Saint Antoine, 27, rue de Chaligny, F-75012, Paris, France;  
julia@u707.jussieu.fr



**Results** Results obtained with today's statistical techniques (correlation analysis) support Villermé's claims of a direct poverty–high death rate link: the three income indicators that he chose were significantly correlated with at-home mortality: taxation index ( $r=-0.83$ ,  $p<0.002$ ), average rent ( $r=-0.83$ ,  $p<0.002$ ), trade taxation index ( $r=-0.67$ ,  $p<0.05$ ), while population density variables were not associated with mortality.

# SES 1890s style: Charles Booth



Classification	Colour
Lowest class. Vicious, semi-criminal.	Black
Very poor, casual. Chronic want.	Dark blue
Poor. 18s. to 21s. a week for a moderate family.	Light blue
Mixed. Some comfortable others poor.	Purple
Fairly comfortable. Good ordinary earnings.	Pink
Middle class. Well-to-do.	Red
Upper-middle and upper classes. Wealthy.	Yellow



# Now

- How do we report health data now?



# World Examples

CDC Centers for Disease Control and Prevention

CDC UN7: Saving Lives, Protecting People™

NCHHSTP AtlasPlus

[Explore CDC's HIV • Hepatitis • STD • TB Data](#)

Viral Hepatitis, STD, and TB data to create maps, charts, and tables, or to download data.

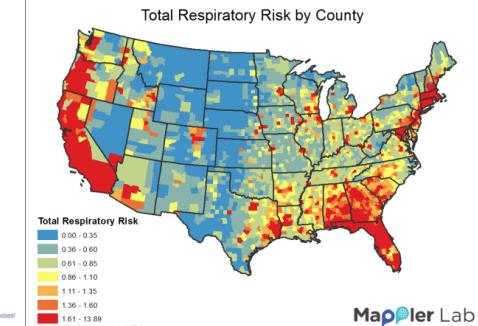
Step 1 What data do you want to see?

HIV Viral Hepatitis STD TB

and

Step 2 How do you want to see them?

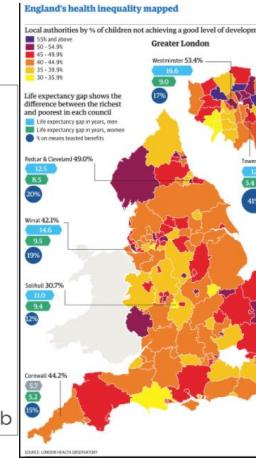
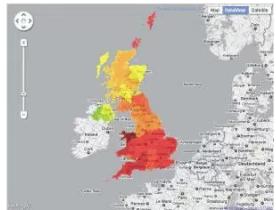
Charts Maps Tables



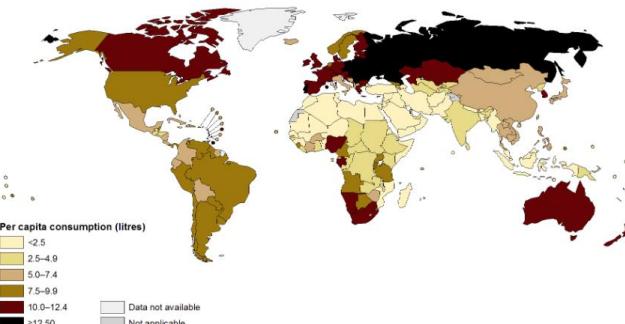
## New map shows undiagnosed dementia cases in UK

March 8, 2011 Sachie Day

A study of dementia diagnosis in UK produced by The Alzheimer's Society and Alzheimer's Scotland with the help of the supermarket chain Tesco predicts that more than a million people will suffer from dementia by 2021 in the UK. The researchers say their figures show that half a million people are now living without a diagnosis.



## Total alcohol per capita (15+ years) consumption, in litres of pure alcohol, 2010

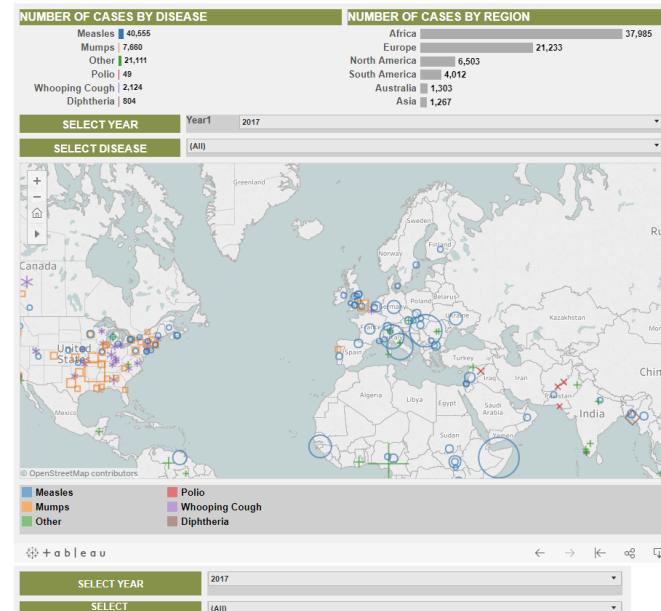


Data Source: World Health Organization  
Map Production: Health Statistics and Information Systems (HSI)  
World Health Organization  
© WHO 2014. All rights reserved.

## Vaccine-preventable disease outbreaks

Browse our interactive map to track outbreaks of vaccine-preventable diseases around the globe.

The map uses information published by news, governments and global health organisations to plot outbreaks of vaccine-preventable disease over time, including measles, mumps, polio, rubella and whooping cough (pertussis). Originally created and published by the US-based Council on Foreign Relations in 2008, this interactive tool is widely recognised by the global health community for its role in raising awareness of the continued prevalence of easily preventable diseases.



GEOSPATIAL WORLD

GEOBUIZ

Geospatial Industry Outlook & Readiness Index

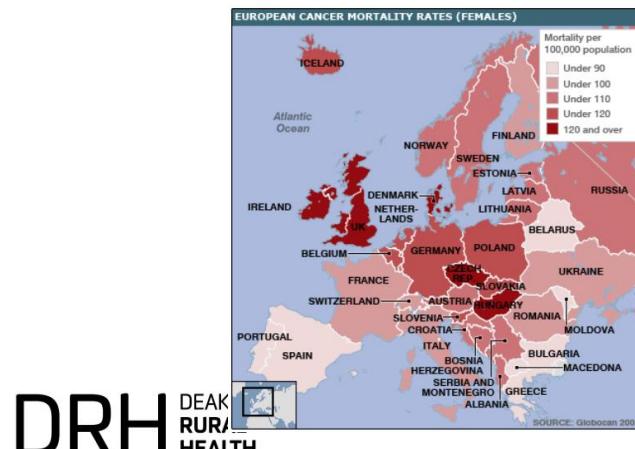
GIS & Maps Earth Observation GNSS & Positioning LIDAR Location Tech UAVs

Home Articles Geomedicine: Mapping a new era for healthcare

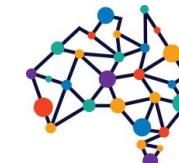
ARTICLES GEOMEDICINE APPLICATIONS HEALTH

## Geomedicine: Mapping a new era for healthcare

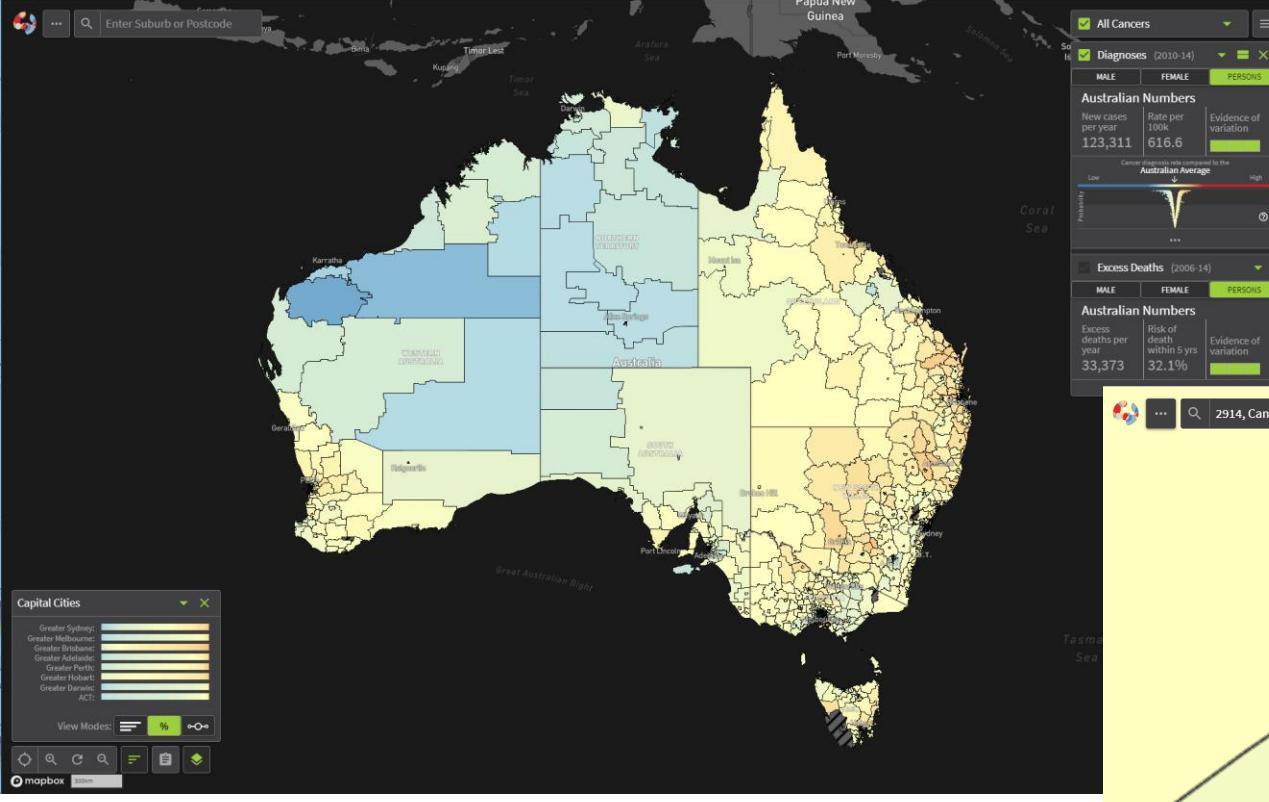
By Alicia Kourpitza - January 10, 2013



DRH DEAK RURAL HEALTH

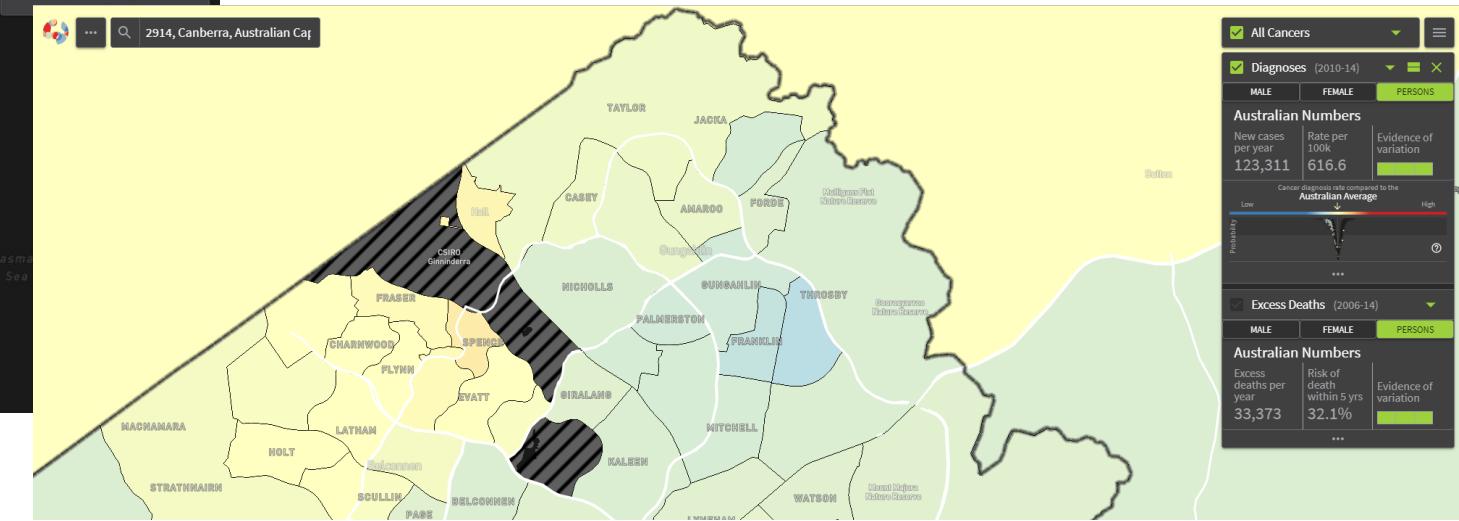


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# Cancer Maps

## By Statistical Areas Level 2 (SA2) .

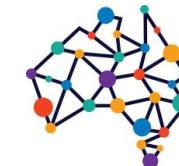


Cancer registries use address information of usual residence at the time of diagnosis to determine the **SA2** information. The method by which each cancer registry allocates this varies. Cancer Registries in New South Wales, Australian Capital Territory, Tasmania, Victoria and Western Australia apply geocoding methods to the full street address. In Queensland and South Australia, the combination of suburb and postcode were used to map to SA2 areas, either through geocoding or using a concordance file. In Northern Territory, suburb name is used in the urban areas (Darwin and Alice Springs) while a range of location information is used for areas in rural and remote areas. Additional manual checks and verification are conducted on an ongoing basis by Registry staff to increase the completeness and accuracy of the processes.



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HEALTH

<https://atlas.cancer.org.au/app>



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**Australian Heart Maps**

Heart Maps Local Profile Inequities Indigenous Inequities

Select State or Territory Victoria

Select Local Government Melbourne (C)

Population Snapshot

The City of Melbourne in Victoria has an estimated population of 4,351 and according to the ABS Index of Relative Socioeconomic Disadvantage (IRS), is in Quintile 4 for its level of relative disadvantage. Quintile 1 is the most disadvantaged. Disadvantage, Indigenous status and low education attainment are all associated with a higher risk of heart disease, along with the known risks of smoking, obesity, a lack of physical exercise, high blood pressure and high cholesterol.

The proportion of people aged 65 and over living in Melbourne is 7% compared to the national average of 15%. The proportion of Aboriginal and Torres Strait Islander peoples living in Melbourne is 0% compared to the national average is 3% and the proportion of people who left school before year 10 is 3% compared to the national average of 11%. Melbourne (C) is also a diverse community with 6% of the population not speaking English well (or at all).

Heart related hospital admissions and mortality

The rate of heart-related hospital admissions in Melbourne (34 per 10,000 persons) is significantly lower than the national average (48 per 10,000 persons). This is amongst one of the lowest rates in the country.

Melbourne has a heart disease mortality rate of (51 per 100,000 persons) compared to the national average (68 per 100,000 persons).

Heart disease risk factors

The prevalence of high cholesterol in Melbourne (35%) is significantly higher than the national average (33%). Melbourne has a prevalence of high blood pressure (43%) which is significantly higher than the national average (23%).

Melbourne has a rate of physical inactivity (58%), which is significantly higher than the national average (55%).

Prevalence of risk factors (%)

Risk Factor	Current Smoking	High Blood Pressure	High Cholesterol
Current Smoking	15%	25%	35%
High Blood Pressure	25%	43%	33%
High Cholesterol	23%	58%	33%

All heart-related admissions by Region (New South Wales)

ASR per 10,000 persons

ASR per 10,000 persons

Region	ASR per 10,000 persons
New South Wales	~55
NSW - Regional	~50
NSW - Inner	~45
National	~48

ASR per 10,000 persons

ASR per 10,000 persons

Region	ASR per 10,000 persons
ACT	~55
NSW - Regional	~50
NSW - Inner	~45
National	~48

ASR per 10,000 persons

ASR per 10,000 persons

LGA	ASR per 10,000 persons
Melbourne (C)	~34
Regional	~45
State or Territory	~48
National	~48

**Heart Foundation**

HOME NEWS ABOUT US SUPPORT PUBLICATIONS SHOP CONTACT US

Your heart After my heart attack Healthy eating Active living Research Get involved For professionals

/ FOR PROFESSIONALS / HEART MAPS / AUSTRALIAN HEART MAPS

What happened to your heart? they are having a heart attack, others have a massive heart

**Australian Heart Maps**

Heart attack treatment

ABOUT HEART ATTACKS HEART ATTACK TREATMENT HEART RECOVERY

Heart Maps Local Profile Inequities Indigenous Inequities

Geography Select State Select Indicator Sex Age adjusted Show Ranking

ASR per 10,000 persons

State/Territory: Northern Territory Indicator: All heart-related admissions

ASR: 83.5 per 10,000 persons Rank: 1 out of 8

Rate: 58.9 per 10,000 persons Rank: 1 out of 8

Analysis of hospital admissions based on 2012-2016 data obtained from the National Hospital Morbidity Database provided by the AIHW

ASR per 10,000 persons

ASR per 10,000 persons

LGA	ASR per 10,000 persons
NT - Regional	~83.5
NT - Inner	~58.9

ASR per 10,000 persons

ASR per 10,000 persons

LGA	ASR per 10,000 persons
Melbourne (C)	~34
Regional	~45
State or Territory	~48
National	~48

ASR per 10,000 persons

All heart-related admissions by Local Government Area

ASR per 10,000 persons

Category	ASR Range
Not available	<37.5
(<45.3)	(45.3-46.3)
(46.3-47.5)	(47.5-53.9)
(>53.9)	(>66.8)

ASR per 10,000 persons

All heart-related admissions by State/Territory

ASR per 10,000 persons

Category	ASR Range
Not available	<37.5
(<45.3)	(45.3-46.3)
(46.3-47.5)	(47.5-53.9)
(>53.9)	(>66.8)

ASR per 10,000 persons

ASR per 10,000 persons

Category	ASR Range
Both	(>66.8)

ASR per 10,000 persons

ASR per 10,000 persons

Category	ASR Range
Yes	(>66.8)

ASR per 10,000 persons

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Category	ASR Range
Show	(>66.8)

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Category	ASR Range
LGA	(>66.8)

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Category	ASR Range
All	(>66.8)

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Category	ASR Range
All heart-relat...	(>66.8)

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Category	ASR Range
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Category	ASR Range
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Category	ASR Range
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Category	ASR Range
LGA	(>66.8)

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## SOCIAL HEALTH ATLASES



- Select data   Filter to an area   Data notes
- > Male population, 5 year age groups, 2017 ERP - Per cent
  - > Female population, 5 year age groups, 2017 ERP - Per cent
  - > Total population, 5 year age groups, 2017 ERP - Per cent
  - > Male population, broad age groups, 2017 ERP - Per cent
  - > Female population, broad age groups, 2017 ERP - Per cent
  - > Total population, broad age groups, 2017 ERP - Per cent
  - > Male Aboriginal population, 2016 LUR - Per cent
  - > Female Aboriginal population, 2016 LUR - Per cent
  - > Total Aboriginal population, 2016 LUR - Per cent who are aged
  - > Indigenous status, 2016 LUR
  - > Indigenous status by age, 2016 LUR
  - > Birthplace and non-English speaking (NIS) residents, 2016 - Per cent
  - > Top ten birthplaces of people from non-English speaking countries, 2016 - Per cent
  - > Fertility
  - > Education
  - > Early childhood development: Australian Early Development Census, 2015 - Per cent
  - > Learning or Earning, 2016 - Per cent
  - > Families, 2016 - Per cent
  - > Child care, 2016 - Per cent
  - > Housing and transport, 2016 - Per cent
  - > Housing rent assistance, June 2017 - Per Cent
  - > Income support recipients, June 2017 - Per cent
  - > Internet access at home, 2016 - Per cent
  - > Labour force, 2016
  - > Summary measure of disadvantage, 2016
  - > Community strength
  - > Personal financial stressors (modelled estimates), 2014 - Age-standardised rate per 100
  - > Barriers to accessing transport and healthcare services (modelled estimates), 2014 - Age-standardised rate per 100
  - > Mothers and babies
  - > Child and youth health
  - > Screening programs: National Bowel Cancer Screening Program, 2014/15 - Per cent
  - > Cancer incidence, males, 2006 to 2010 - Standardised ratio
  - > Cancer incidence, females, 2006 to 2010 - Standardised ratio
  - > Cancer incidence, persons, 2006 to 2010 - Standardised ratio
    - Colorectal cancer
    - Melanoma of the skin
    - Lung cancer
    - Lymphoma
  - > Self-assessed health (modelled estimates), 2014/15 - Age-standardised rate per 100
  - > Prevalence of selected chronic diseases and conditions (modelled estimates), 2011/12 - Age-standardised rate per 100
  - > Prevalence of selected health risk factors, adults (modelled estimates), 2014/15 - Age-standardised rate per 100
  - > Prevalence of selected health risk factors, children (modelled estimates), 2014/15 - Age-standardised rate per 100
  - > Selected composite indicators (modelled estimates), 2014/15 - Age-standardised rate per 100
  - > Disability, 2016 - Per cent
  - > Median age at death, 2010 to 2014 - Years
  - > Premature mortality by sex, 2011 to 2015 - Standardised ratio
  - > Premature mortality by selected cause, 2011 to 2015 - Standardised ratio
  - > Avoidable mortality by sex, 2011 to 2015 - Standardised ratio
  - > Avoidable mortality by selected cause, 2011 to 2015 - Standardised ratio
  - > Residential aged care places, 30 June 2016 - Rate per 1,000

# Social Health Atlas

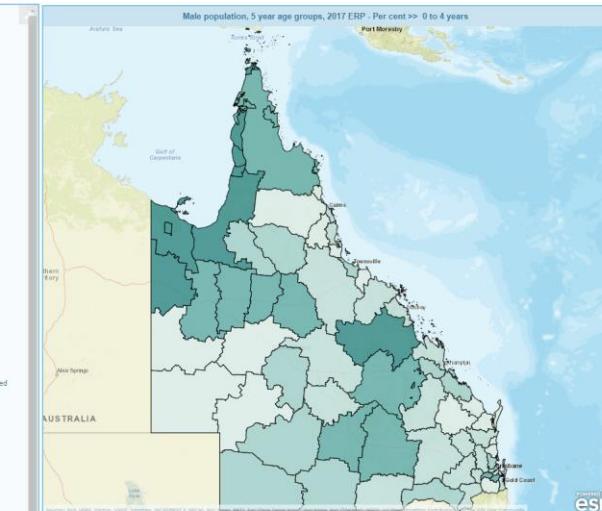
OPEN ALL

CLOSE ALL

▼ Social Health Atlases of Australia: Population Health Areas

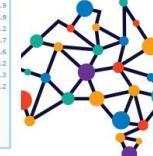
▼ Social Health Atlases of Australia: Local Government Areas

▼ Social Health Atlas of Australia: Primary Health Networks

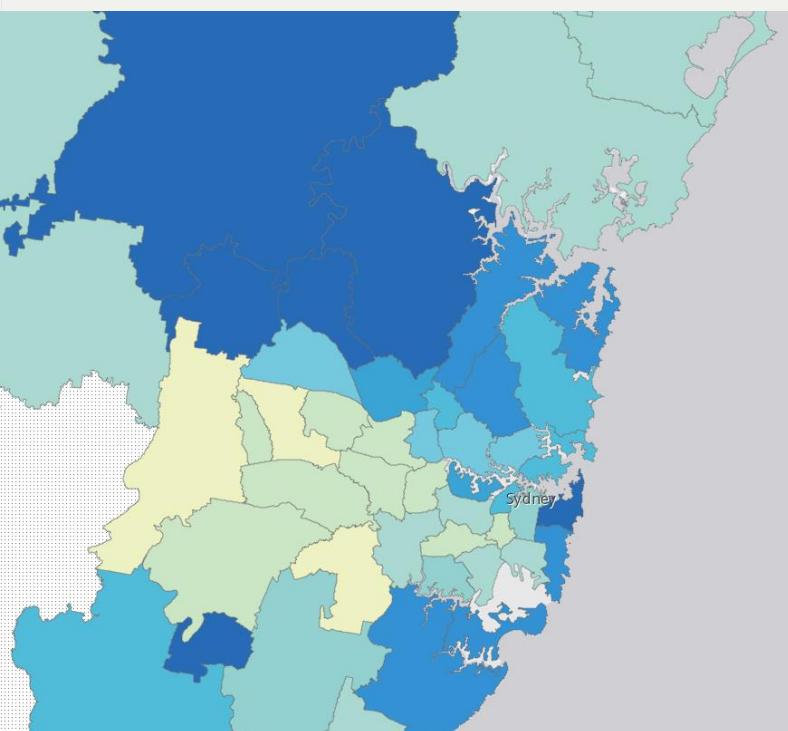


Link to data

Name	Per cent
Australia	6.5
Greater Capital City Statistical Areas	6.6
Rest of States/ NT	6.6
New South Wales	6.7
Sydney	6.2
Rest of New South Wales	6.7
Canberra	6.3
Melbourne	6.8
Rest of Victoria	6.3
Queensland	6.7
Brisbane	6.9
Rest of Queensland	6.5
South Australia	6.1
Adelaide	6.3
Rest of South Australia	5.7
Western Australia	6.9
Perth	6.7
Rest of Western Australia	6.9
Tasmania	5.9
Hobart	6.2
Rest of Tasmania	5.7
Northern Territory	7.6
Darwin	7.2
Rest of Northern Territory	8.3
Australian Capital Territory	7.2



# The Australian Atlas of Healthcare Variation



**2.1 Colonoscopy hospitalisations, all ages - Map**

Figure 2.4: Number of hospitalisations for colonoscopy per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016-17



**DRH** DEAKIN RURAL HEALTH

<https://acsqho.maps.arcgis.com>; <https://health.nt.gov.au/professionals/remote-health-atlas>; <https://victorianwomenshealthatlas.net.au/#/>; <https://www.cesphn.org.au/preview/mental-health-1/1713-the-integrated-mental-health-atlas-of-the-central-and-eastern-sydney-phn/file>

## Sexual Offences

Sexual offences include rape, indecent assault, and other acts of a sexual nature against another person, which are non-consensual or where the person is deemed incapable of giving consent because of youth or temporary / permanent incapacity. In Victoria, sexual violence is overwhelmingly perpetrated by men against women, and female victims of sexual offences outnumber male victims by 4 to 1. In 2018 there were 8,831 reports of sexual offences logged by Victoria Police comprising 4,751 female victims, and 1,399 male victims. Compared with 2017, the number of sexual offence reports increased by 5% for females from 8,689 and decreased by 13% for males (from 1,604). The sexual offences population rate is 14 per 10,000 persons for female victims, compared with 3 per 10,000 persons for male victims (average of Victorian local government areas).

## Gender Analysis

The stigma surrounding sexual assault makes it harder for victims to disclose their experience. In Victoria about one third of reported sexual offences are related to family violence. About a quarter relate to historical sexual assaults that are more than 10 years old. Less than one quarter of reported sexual offences progress to court, and even fewer result in a conviction. Most victims experience significant disclosure issues with the justice system itself (in terms of being believed, or in the nature or level of questioning they receive). Sexual assault has profound effects on the wellbeing of victim/survivors including emotional, psychological, legal, health, spiritual, and socioeconomic impacts.

## Rate (per 10,000)

The rate equals the number of victim reports received in the year period 2018, per LGA, per 10,000 total persons of the corresponding LGA.

**Source:** Crime Statistics Agency Victoria. Victim reports for selected offences by region, LGA and sex of victim – January to December 2018. Category A20 Sexual offences. Data extracted from LEAP on 18 January 2019; ABS Census 2016.

**Category:** A20

**Data Source:**

<http://www.imeastatistics.vic.gov.au>

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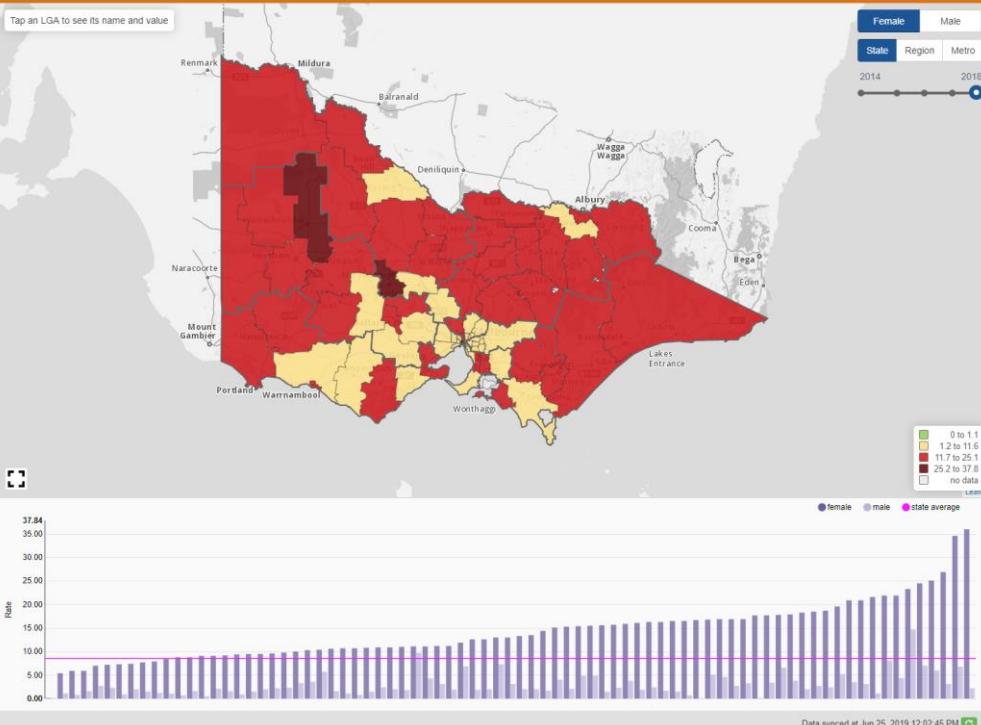
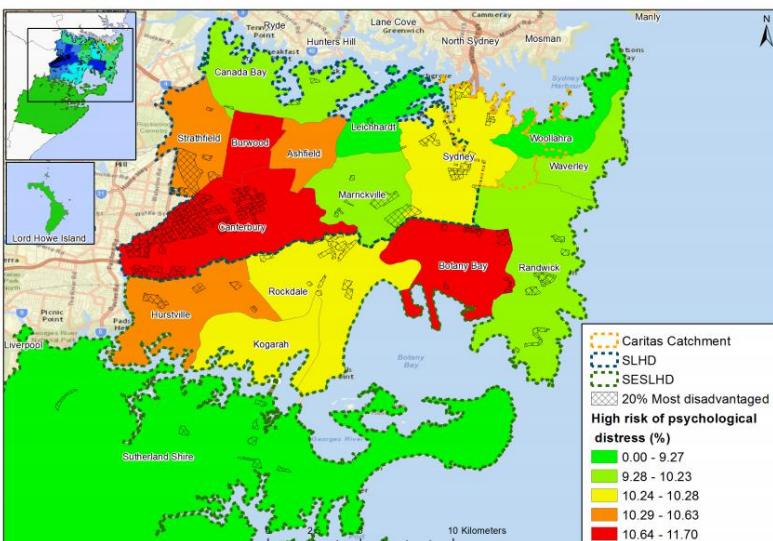


Figure 13. High psychological distress





**Cardiovascular disease in women—a snapshot of national statistics >**

**Australia's health 2018**  
Australia's health 2018 is the AIHW's 16th biennial report on... >

**Australia's welfare 2017**  
Australia's welfare 2017 is the 13th biennial welfare report of... >

**News & media**

Cardiovascular disease affects half a million Aussie women >  
18 Jun 2019

Consulting on building the evidence on primary health care >  
14 Mar 2019

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[ALL MEDIA RELEASES >](#)

• **Primary Health Network (PHN) areas—PHNs boundaries defined by the Australian Government Department of Health.** There are 31 PHN areas that cover the whole of Australia.

• **Statistical Areas—Statistical Areas are a geographical classification defined by the Australian Bureau of Statistics: Statistical Areas Level 1 (SA1s); Statistical Areas Level 2 (SA2s); Statistical Areas Level 3 (SA3s); and Statistical Areas Level 4 (SA4s).** Due to the smaller number of results in these smaller areas, and the strict privacy and confidentiality controls applied to data, results are sometimes unable to be reported for all areas in Australia.

• **National minimum data sets and data set specifications: typically SA2**

<https://www.aihw.gov.au/> <https://meteor.aihw.gov.au/content/index.phtml/itemId/676382>

# AIHW

## AIHW data by geography

HEALTHY COMMUNITY Indicators The latest information for people in a PHN area. [EXPLORE THE DATA >](#)

Primary topic	Report <sup>1</sup> or resource	Geography reported
Alcohol, Smoking, Illicit use of drugs	<a href="#">National Drug Strategy Household Survey 2016: detailed findings</a>	PHN area, SA4
Alcohol & other drug treatment services	<a href="#">Alcohol and Other Drug Treatment Services in Australia 2016–17</a>	PHN area, SA2
Behaviours & risk factors	<a href="#">Health risk factors in 2014–15</a>	PHN areas
Cancer	<a href="#">Cancer Incidence and Mortality Across Regions (CIMAR) books</a>	GCCSA, PHA, PHN area, SA3, SA4
Cancer	<a href="#">Cancer incidence and mortality in Australia by small geographic areas</a>	PHN area, SA3
Cancer	<a href="#">Cancer screening in Australia by small geographic areas 2015–2016</a>	PHN area, SA3
Cancer	<a href="#">Incidence of selected cancers in 2009–2013</a>	PHN area, SA3, SA4
Cancer	<a href="#">Participation in national cancer screening programs in 2015–2016</a>	PHN area, SA3
Diabetes	<a href="#">Incidence of insulin-treated diabetes in Australia</a>	PHN area, SA3
Expenditure, Primary health care	<a href="#">Medicare Benefits Schedule GP and specialist attendances and expenditure in 2016–17</a>	PHN area, SA3
Expenditure	<a href="#">Patients' out-of-pocket spending on Medicare services</a>	PHN area, SA3
Chronic kidney disease	<a href="#">Geographical variation in chronic kidney disease</a>	PHN area
Homelessness services	<a href="#">Specialist homelessness services annual report 2017–18</a>	SA4
Homelessness services	<a href="#">Specialist Homelessness Services Collection data cubes 2011–18</a>	SA2, SA3, SA4, LG ad PHN
Hospitals, Primary health care	<a href="#">Potentially preventable hospitalisations in Australia by small geographic areas</a>	PHN area, SA3
Hospitals	<a href="#">Potentially preventable hospitalisations in 2015–16</a>	PHN area, SA3
Hospitals, Primary health care	<a href="#">Use of emergency department and GP services in 2015–16</a>	PHN area, SA3
Indigenous Australians	<a href="#">Indigenous eye health measures 2017</a>	PHN area
Indigenous health & welfare services	<a href="#">Indigenous health check (MBS 715) data tool</a>	PHN area
Indigenous health & welfare services	<a href="#">Spatial distribution of the supply of the clinical health workforce 2014: relationship to the distribution of the Indigenous population</a>	PHN area, SA3



# AIHW by Geography

- AIHW list 68 reports by geography

## AIHW Spatial Geography

Unit	Count*
PHN	51
SA1	0
SA2	10
SA3	32
SA4	16
GCCSA	9
PHA	2
Postcode	2
IREG	4

- More than one unit per report is possible.
- National minimum data set specification is SA2 (10 of 68!)

Spatial Unit 2016	count	Mean Sq Km	Median Sq Km	SD Sq Km	Min Sq Km	Max Sq Km
SA1	57,523	133.6	0.2	3,150.5	0.002	328,260
SA2	2,292	3,354.3	13.8	25.0	0.5	513,384
PHN*	31	284,004.1	32,767.0	537,870.2	671.4	2,518,556
LGA	563	13,655.6	2,421.9	43,895.3	1.1	622,489
SSC	13304	502.4	37.37	3,763.2	0.04	178,407

The largest PHN would be 10<sup>th</sup> on the world country size list.  
For reference – New Zealand 264,537 km<sup>2</sup> and UK is 242,741 km<sup>2</sup>



# Why does this matter?



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HEALTH



# Several Concerns

- MAUP
- Ability to identify health issues at a scale that is meaningful!!!
- Let's revisit the John Snow Cholera outbreak in London.
- Famous and often cited as start of spatial epidemiology (or as I like to refer to it – Health Geography).
- Could the same outcome be achieved with existing data supply regimes?



# Could John Snow solve the Cholera Epidemic with current data privacy laws?

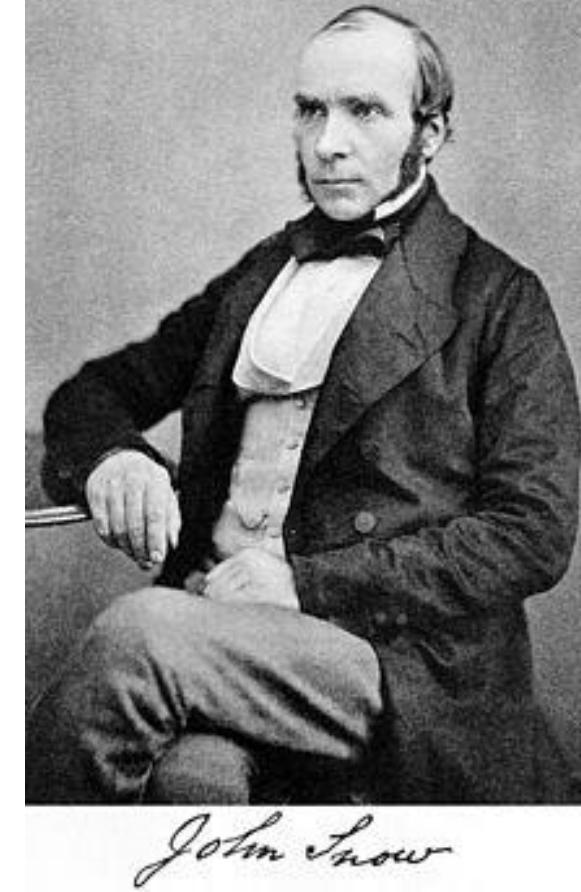


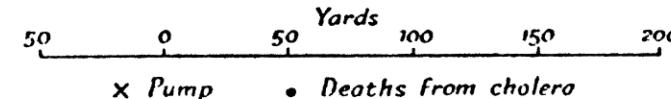
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# John Snow (not GOT)

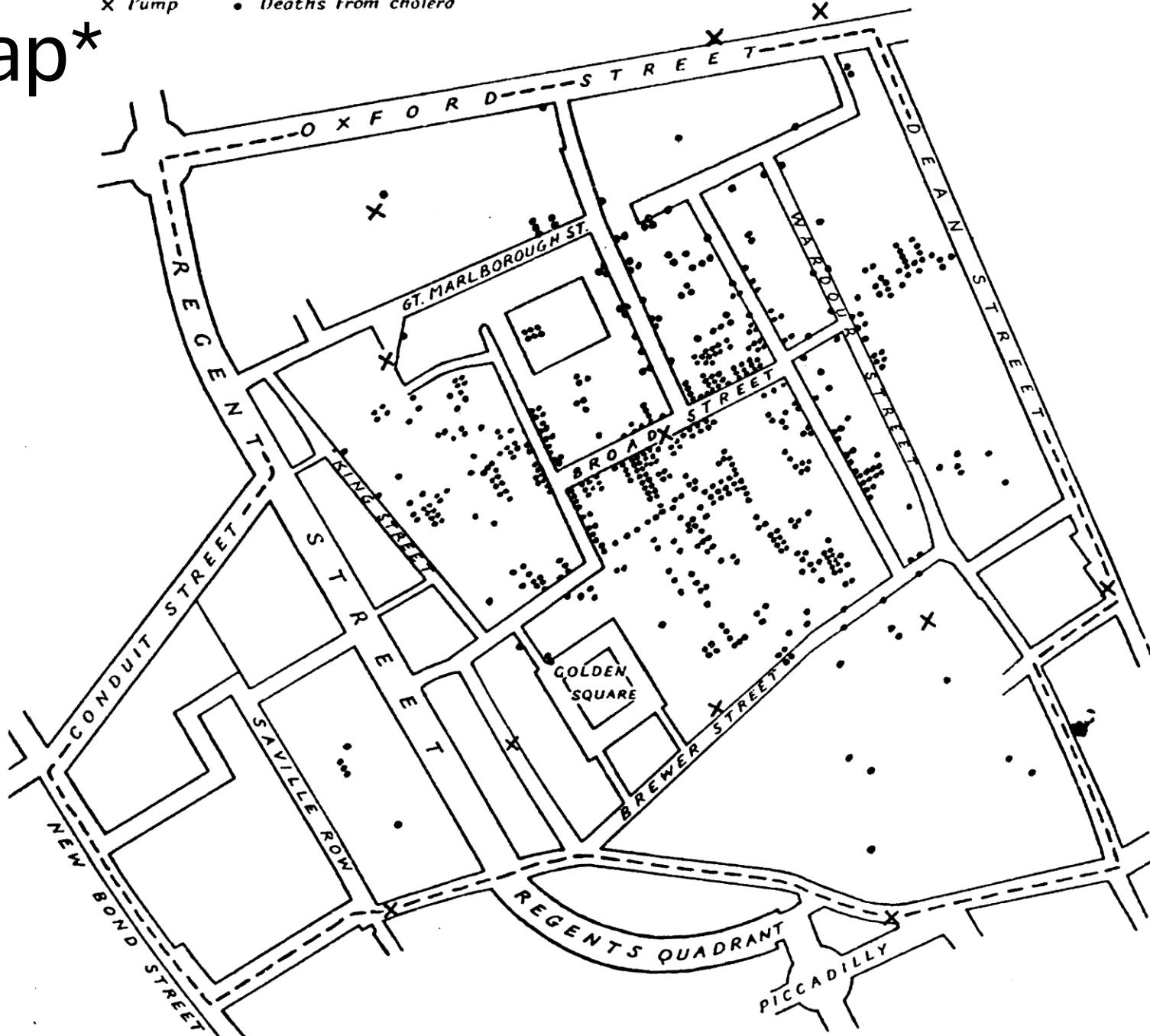
- 1854, the Soho district in London was in the grip of a cholera outbreak with thousands sick and 600 deaths.
- John Snow a surgeon and general practitioner, used what is now referred to as the start of spatial epidemiology, to solve the cholera outbreak in Soho, London.
- One of the most used examples of spatial methods to solve a health problem.
- John Snow mapped the cholera cases/deaths and reportedly used this to pinpoint the Broad Street pump as the likely source.





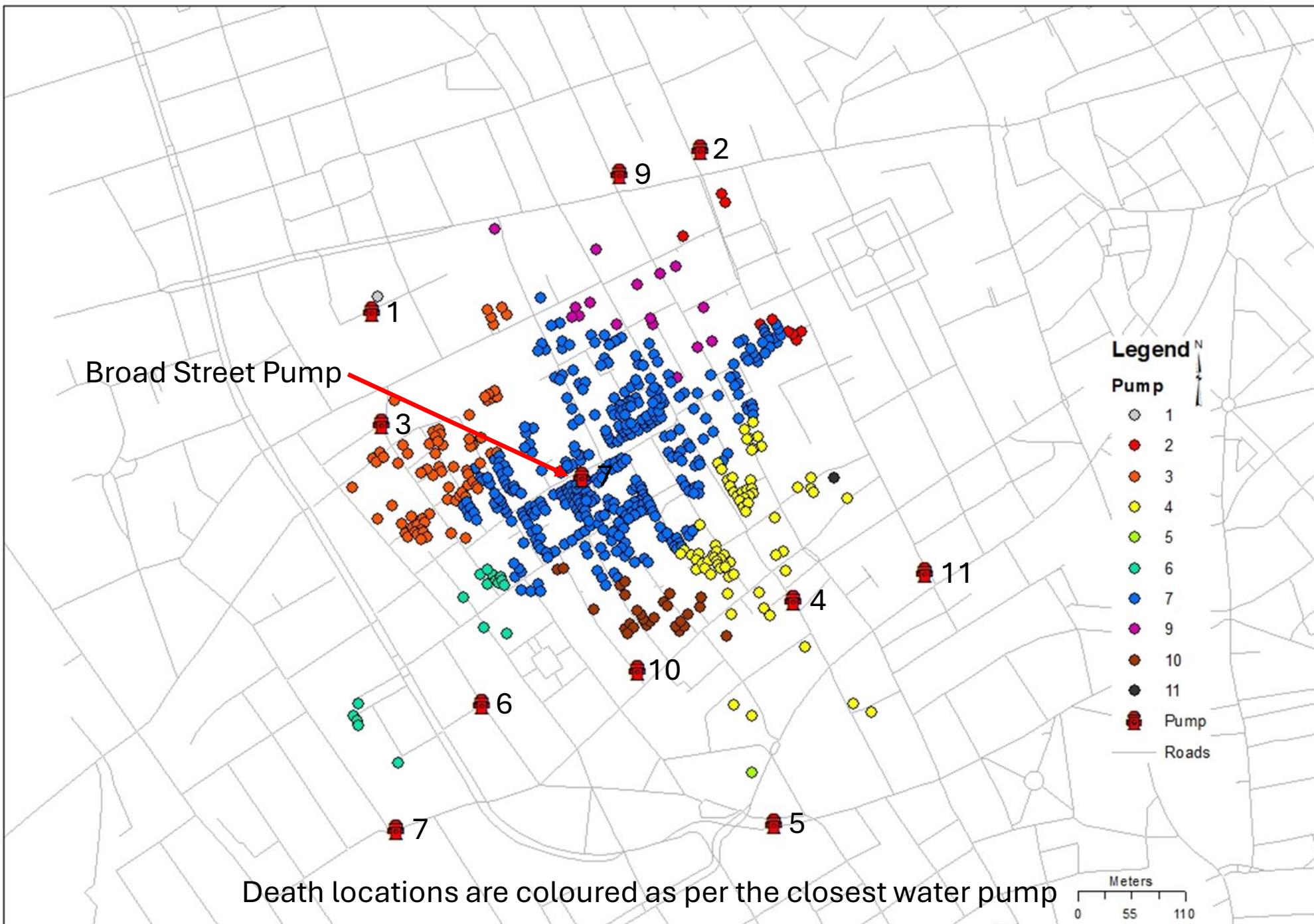
# John Snow Map\*

- \*John Snow's map of cholera deaths in London 1854.  
Deaths are marked by dots and water pumps by crosses.  
Version of Gilbert [294]. c 1958 Blackwell Publishing.



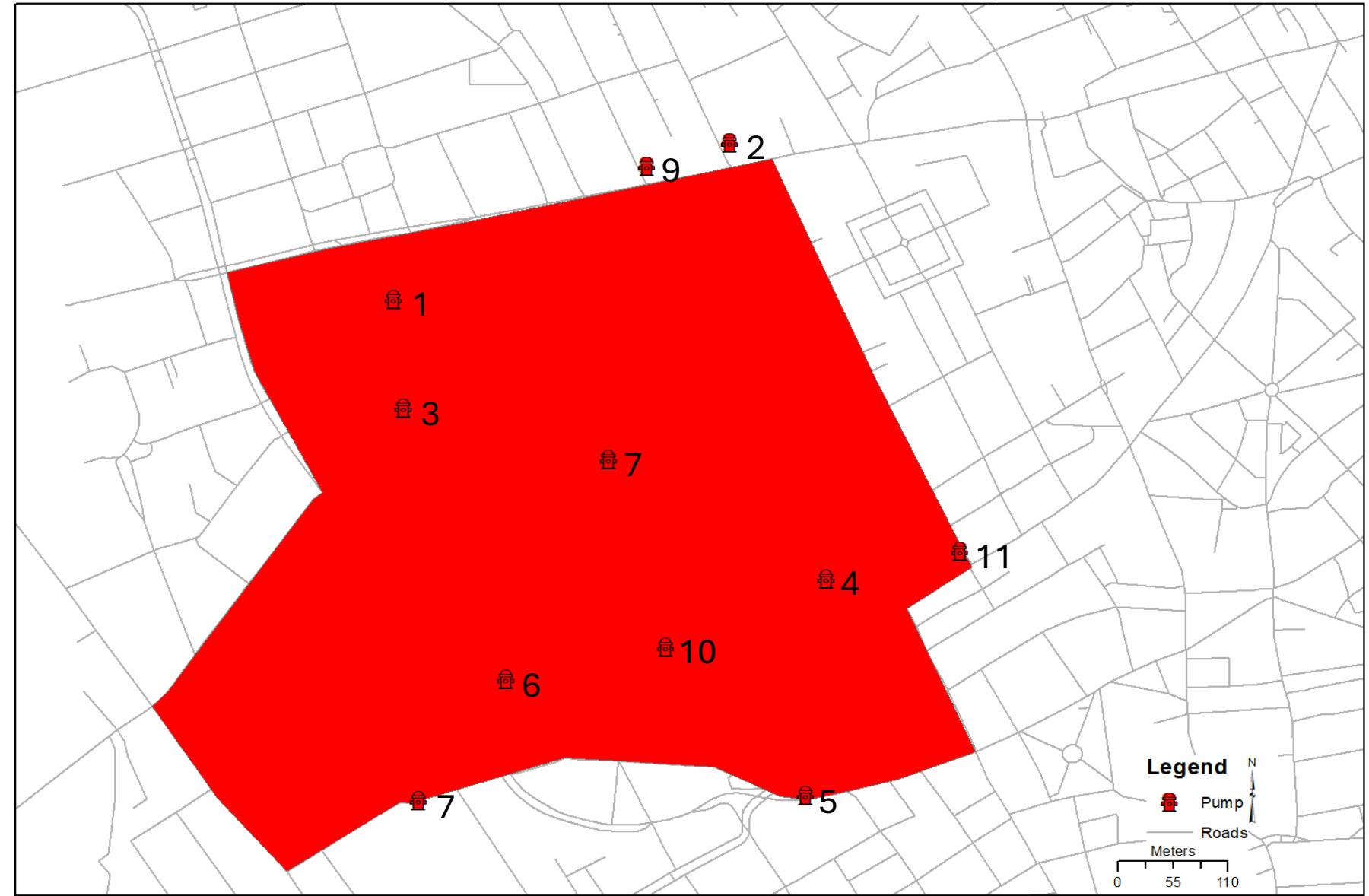
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# Network Analysis: closest pump



# Now!

- Fast forward to the 21st century and would this be possible?
- Data provided by administrative units.
- Aggregated to area of analysis.
- More akin to what we get now!
- Cholera problem not solved.



# MAUP

# The modifiable areal unit problem!



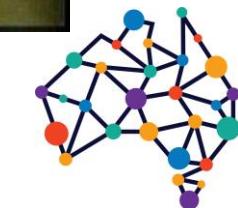
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**Don't mention the  
MAUP  
I didn't and I think I got  
away with it!**



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# MAUP

- 40 years (1979) since Openshaw and Taylor defined the modifiable areal unit problem (MAUP).
- Highlighted the need to account for or solve MAUP.
- Significant growth in place and health research.
- Researchers may not identify with geography.
- Rise of desktop geographic information systems and improved spatial data availability.
- MAUP and the use of spatial methods no longer the domain of the geographer.



# MAUP

- MAUP described with two key aspects - scale and zonation.
- Scale effect, major analytical differences depending on the size of units (generally correlations more pronounced for bigger units).
- Zonation effect zonation (Openshaw calls it the aggregation effect) - major differences depending on how the study area is divided (even at the same scale).



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[https://www.researchgate.net/publication/236219780\\_Paper](https://www.researchgate.net/publication/236219780_Paper) [accessed Jun 18 2019].



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# MAUP

- MAUP is rarely discussed in spatial epidemiology.
- Results from analysis of health datasets are very sensitive to how the spatial zones are constructed, which makes the needs to consider MAUP important.
- In particular, zone design is likely to influence descriptive statistics of the health variables as well as the coefficients of any correlation or regression analysis undertaken (Flowerdew et al., 2008).

**Analysing the Impact of MAUP on the March of Atopy in England using Hospital Admission Data**

Nick Bearman<sup>1</sup>, Nicholas J. Osborne<sup>1</sup>, Clive Sabel<sup>1,2</sup>

<sup>1</sup>European Centre for Environment and Human Health, University of Exeter Medical School, Knowledge Spa, Royal Cornwall Hospital, Truro, TR1 3HD

<sup>2</sup>Department of Geography, College of Life & Environmental Sciences, University of Exeter, Amory Building, Rennes Drive, Exeter, EX4 4RJ



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# MAUP Example using the ABS SEIFA Index

- ABS\* calculate several Indices
- ABS confidentiality prohibits unit record census data being made available
- ABS provide SEIFA for spatial units
  - Collection District (pre 2011) or SA1 smallest unit
  - Also (pre 2011) Suburb, Postal Area, SLA, LGA and 2011 the SA1-SA4
- Remember MAUP & Ecological Fallacy
- Lets look at some of these spatial units

\* Australian Bureau of Statistics

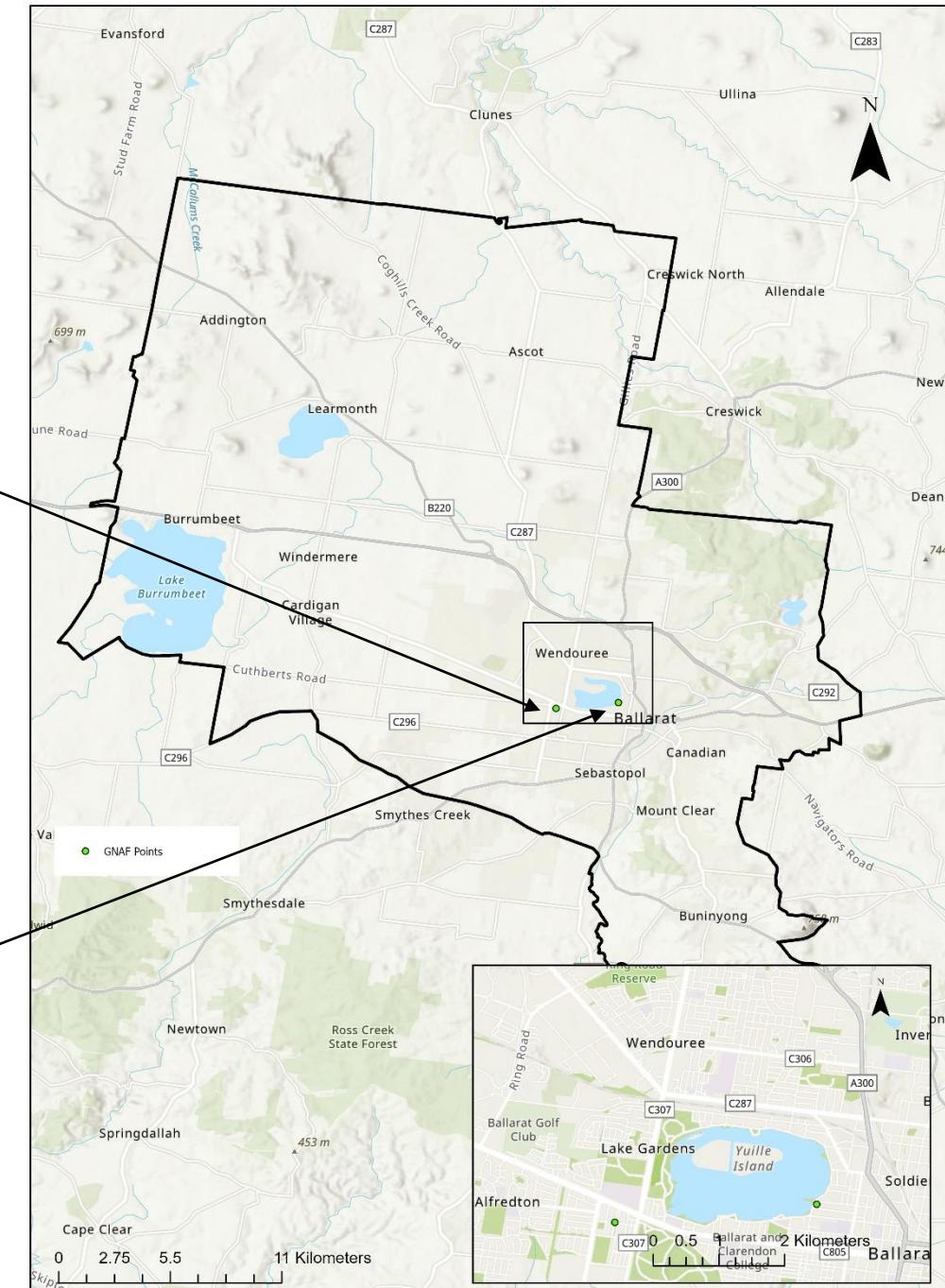


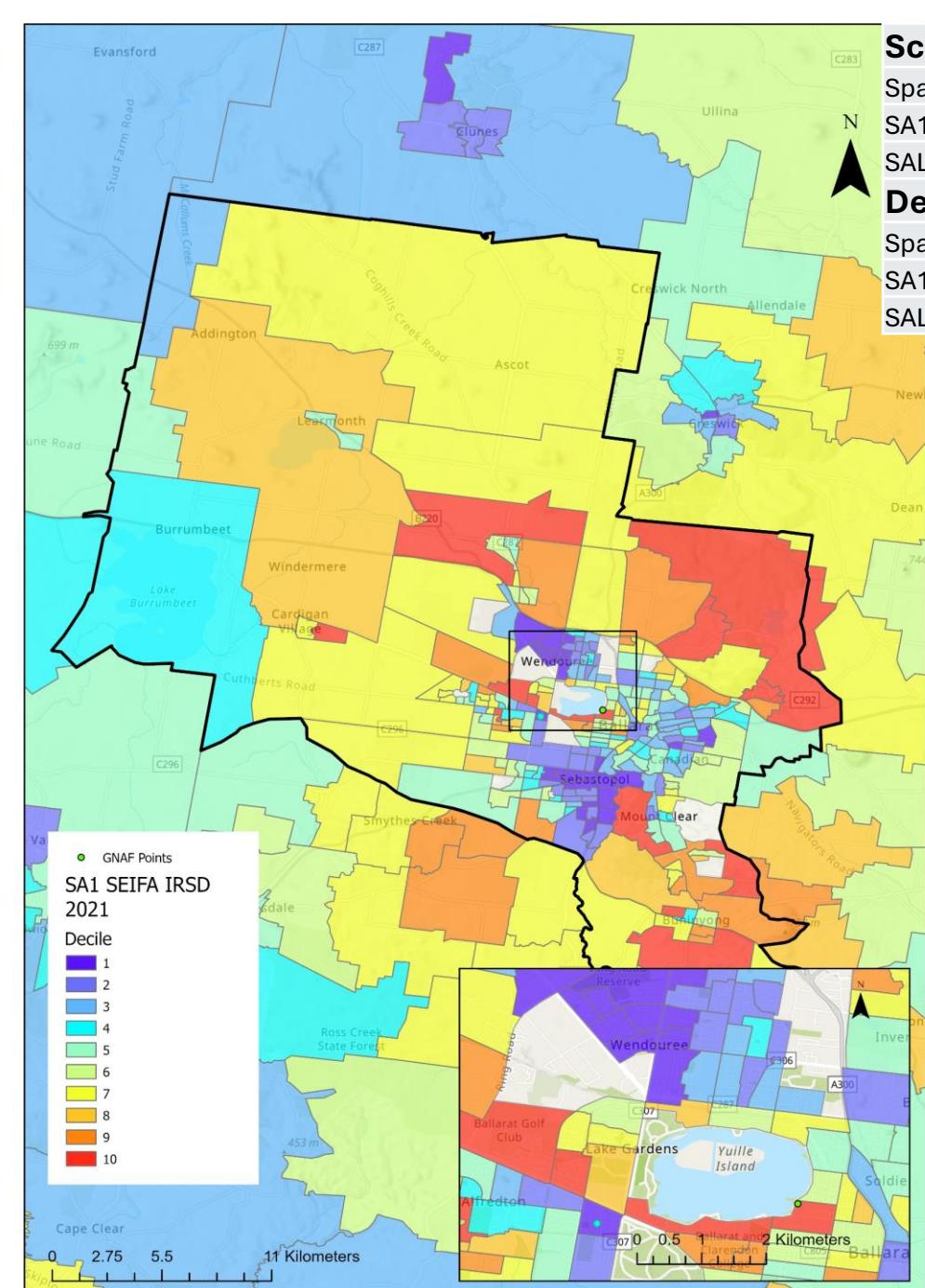
# Ballarat: Base Map

## SEIFA: Index of Relative Disadvantage

One house in a lowest decile SA1 (most disadvantaged)

One house in a highest decile SA1 (least disadvantaged)



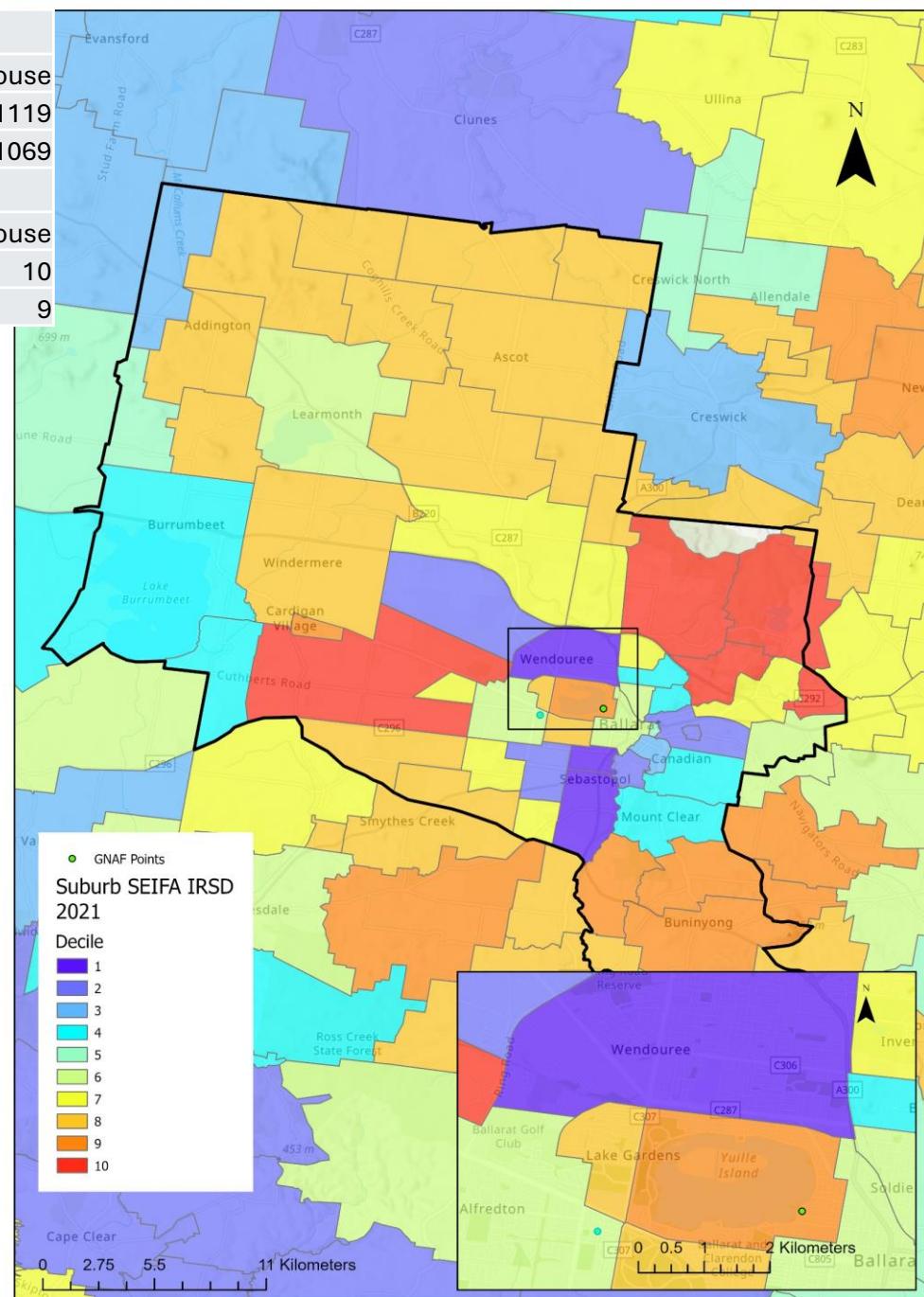


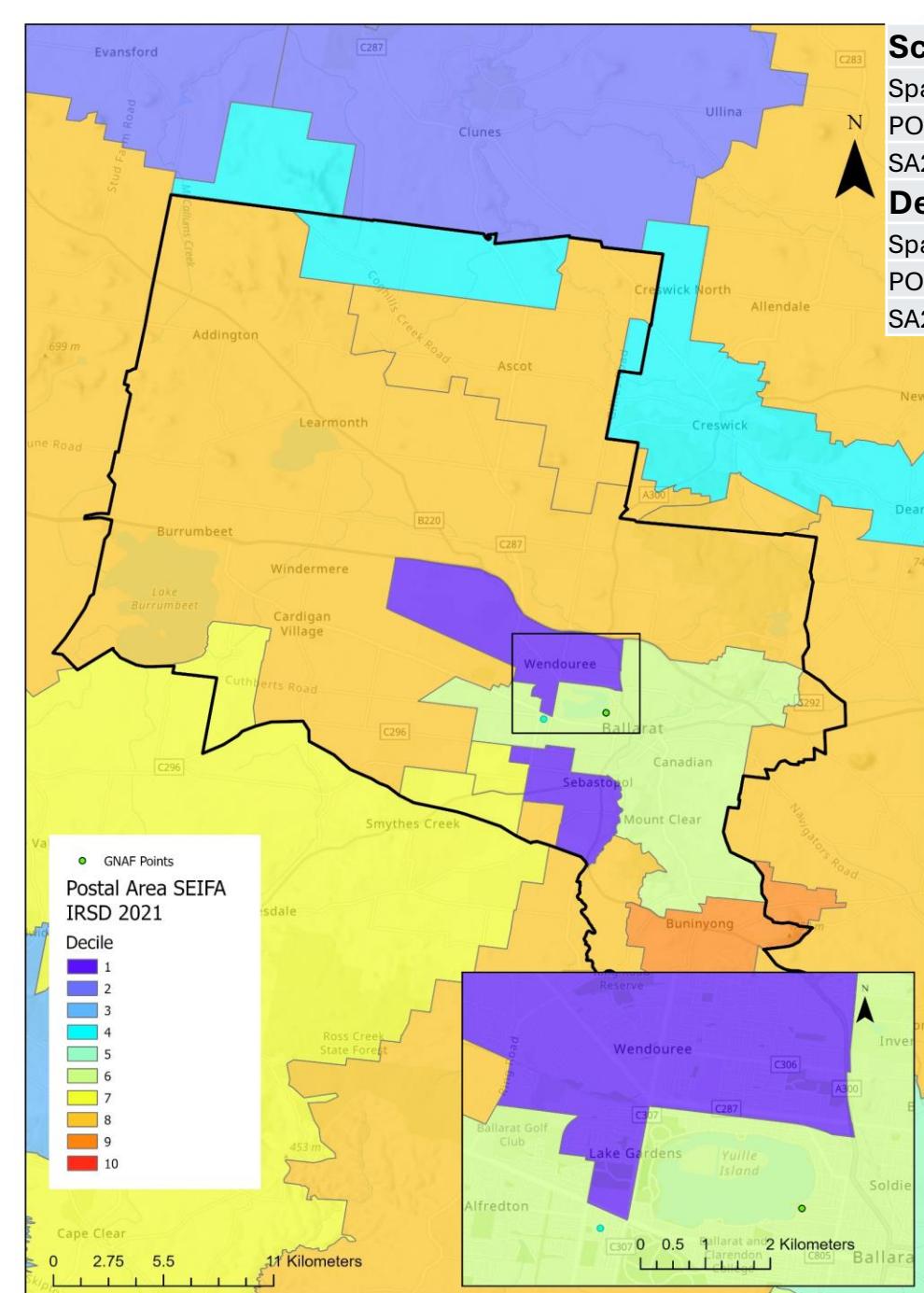
## Score

Spatial Unit	Low SEIFA House	High SEIFA House
SA1	832	1119
SAL	1026	1069

## Decile

Spatial Unit	Low SEIFA House	High SEIFA House
SA1	1	10
SAL	6	9



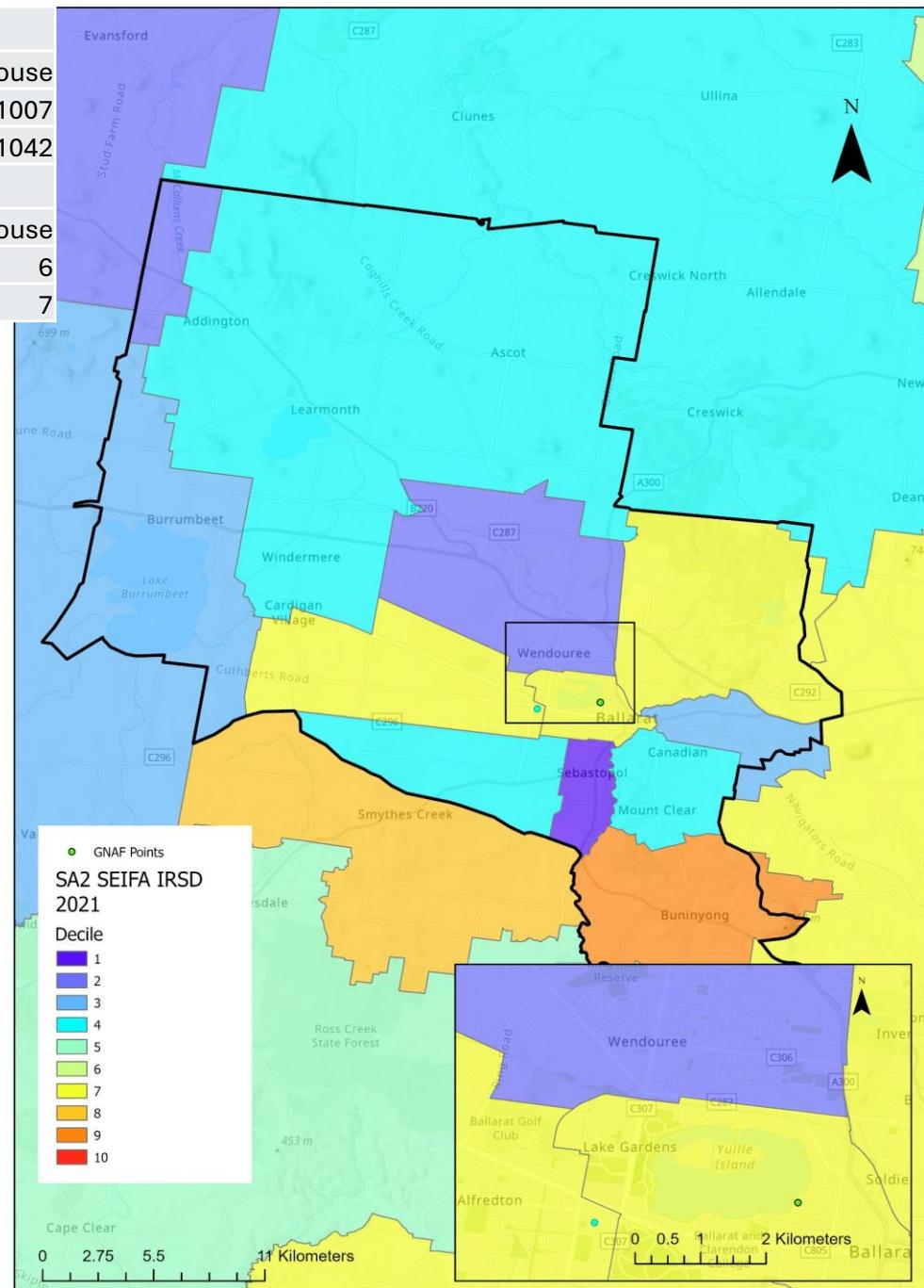


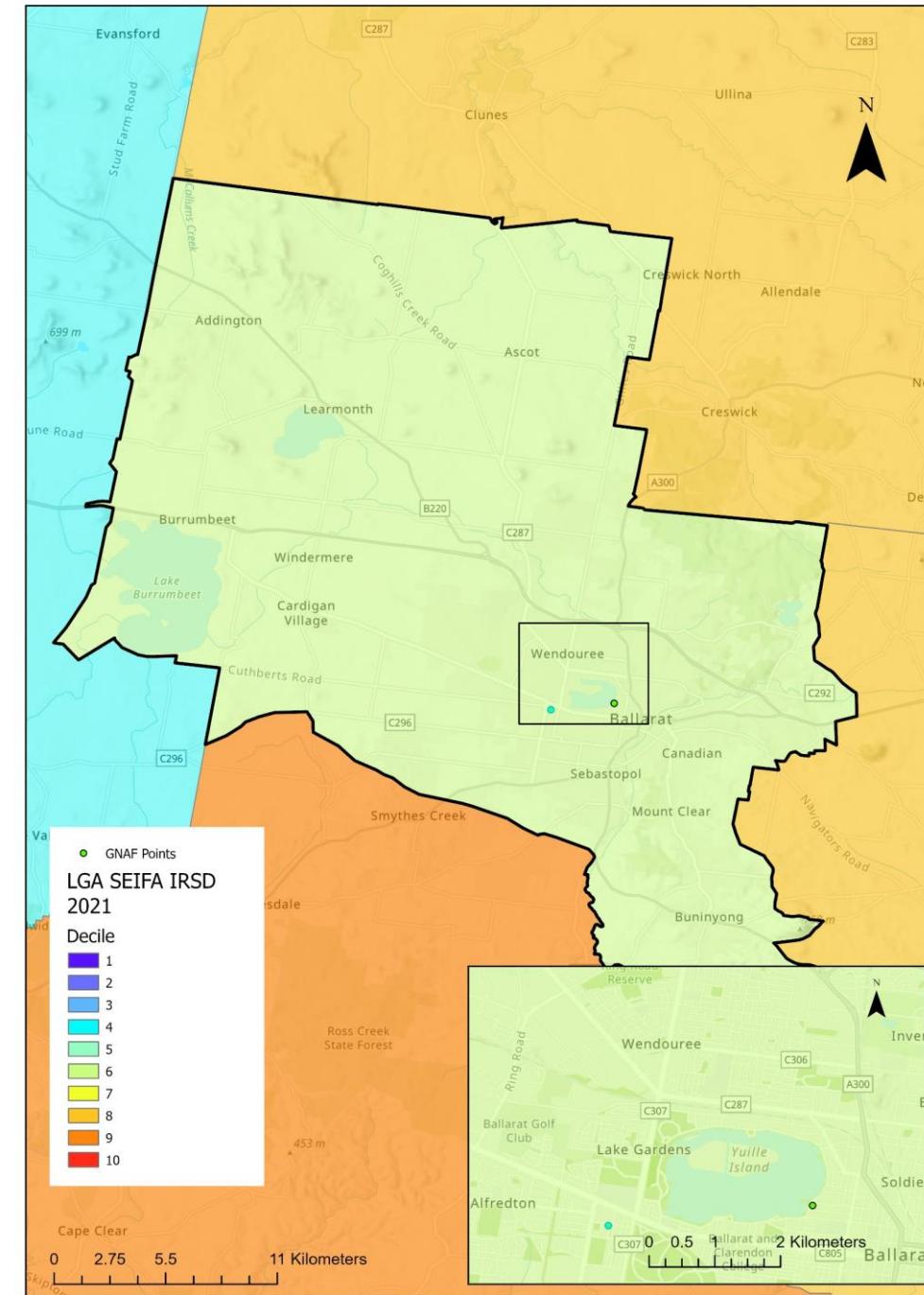
## Score

Spatial Unit	Low SEIFA House	High SEIFA House
POA	1007	1007
SA2	1035	1042

## Decile

Spatial Unit	Low SEIFA House	High SEIFA House
POA	6	6
SA2	7	7

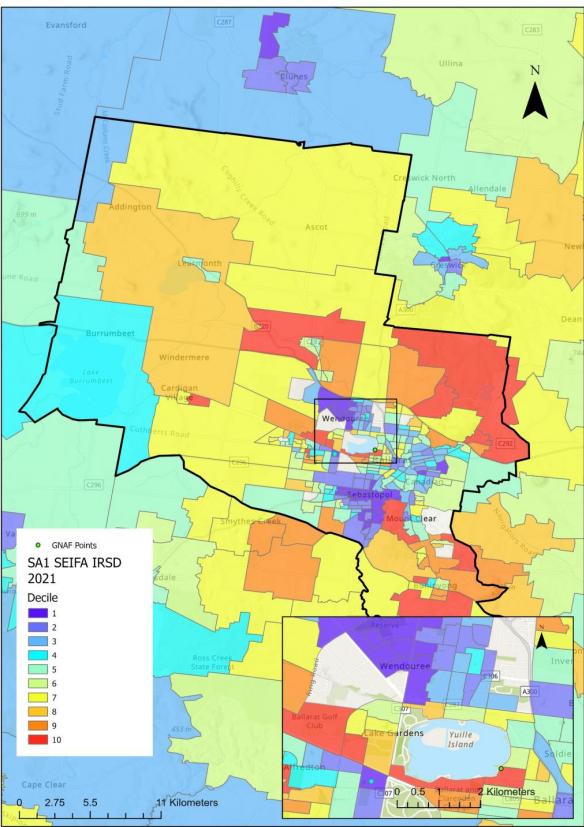




<b>Score</b>			
Spatial Unit		Low SEIFA House	High SEIFA Hous
LGA		986	98
<b>Decile</b>			
Spatial Unit		Low SEIFA House	High SEIFA Hous
LGA		6	0



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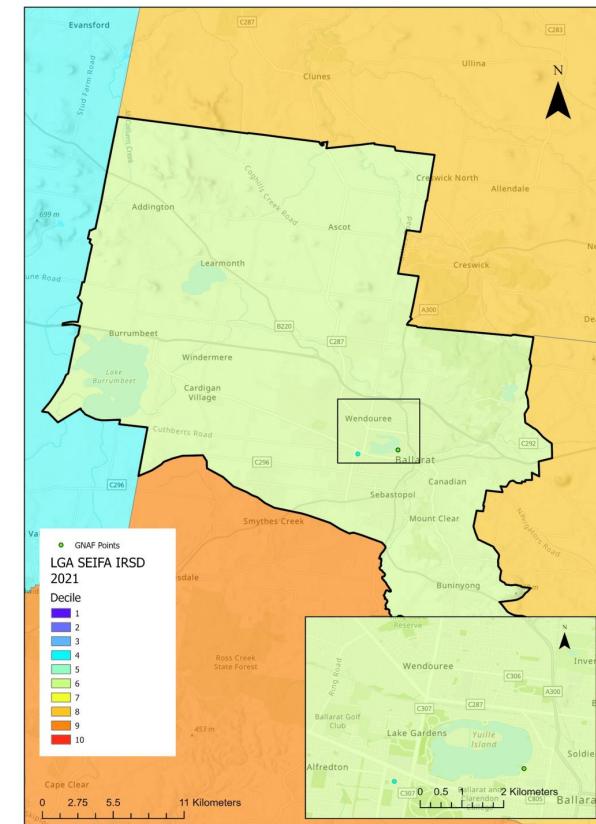


## Score

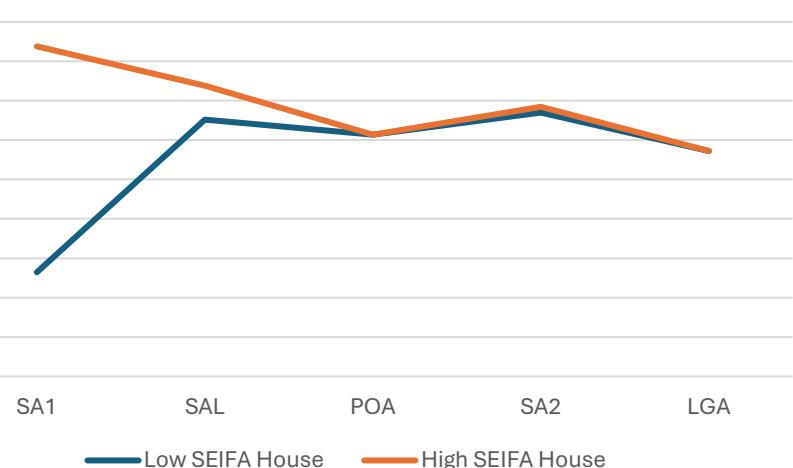
Spatial Unit	Low SEIFA House	High SEIFA House
SA1	832	1119
SAL	1026	1069
POA	1007	1007
SA2	1035	1042
LGA	986	986
<b>Change</b>	<b>154</b>	<b>-133</b>

## Decile

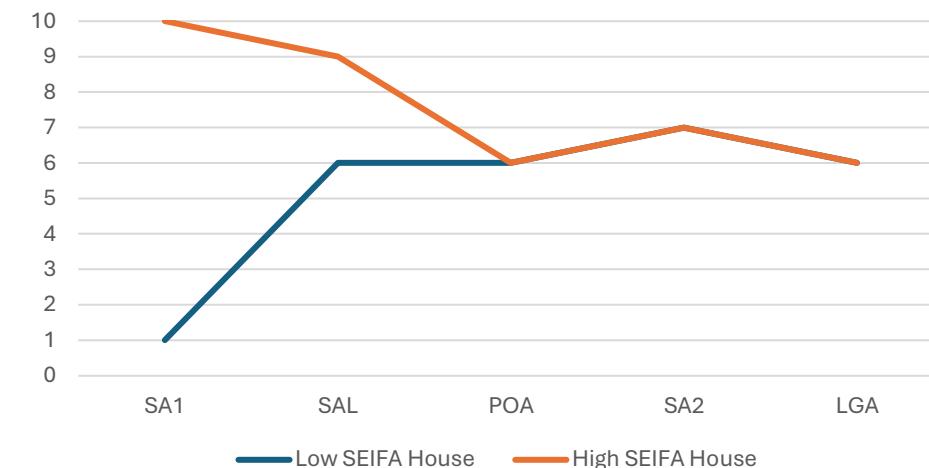
Spatial Unit	Low SEIFA House	High SEIFA House
SA1	1	10
SAL	6	9
POA	6	6
SA2	7	7
LGA	6	6
<b>Change</b>	<b>5</b>	<b>-4</b>



Score Change



Decile Change



# MAUP

- Wide use of spatial methods created a large volume of place-health articles.
- Loss of spatial understanding and uneven recognition (reduced, overall) of the importance of the MAUP.
  - E.g. the widespread exploration of health outcomes and exposures measured using a variety of administrative spatial units (mesh blocks, census tract, suburbs, postcodes, county, state etc) without a clear understanding that this invokes MAUP.
  - It is time to reassert the importance of the geographer in place health research teams?



# SEIFA Example

- AIHW above use SA2 or larger spatial units for reporting – how does that account for the pattern of disadvantage that is evident at the SA1 or at the individual level?
- As most of the health outcome analysis in Australia uses the same spatial units – what are we able to identify?
- Broad patterns
- But not detailed patterns
- But we have the data the computing power and the expertise – so what is stopping better analysis.



# COVID response

- Locked down:
- LGAs – Cities and States
- Did not use location intelligence
- Contact tracing and not location-based tracing (proximity)



# Health Data

- Hard health outcomes difficult to access at a spatial scale that is meaningful
- Confidentiality problems
- We have the technology but generally lack the access to data
- Data available for administrative units that are not meaningful!
- MAUP issues



# Health Data

- Data linkage costs
- Poor quality data especially address data
- Enormous cost and time to geocode health data
- Apart from these issues – it is very difficult to get data for research



# We should be OUTRAGED!

- We see significant technology improvements
  - (3D Cadastre); LIDAR; Geoscape, but....
- Health spatial data provision is very constrained!
- If we cannot improve the scale of data provision – we should at least recognise that MAUP could be a limitation/factor in the research outcomes!
- We could do so much!
- Highlights the importance of health geography
- Part of the solution?



# CARA

- The Centre for Australian Research into Access

**► Access for All**

The **Centre for Australian Research into Access (CARA)** is a collaborative research initiative led by Deakin Rural Health and Grampians Health Ballarat, under the co-direction of Professor Vincent Versace and Associate Professor Anna Wong Shee.

CARA's purpose is to address access-related health, education, and safety disparities between remote, regional and metropolitan Australians. The Centre will support academic research and inform policy decision-making, with the intention of improving access for essential services across all our communities.

[FIND OUT MORE →](#)

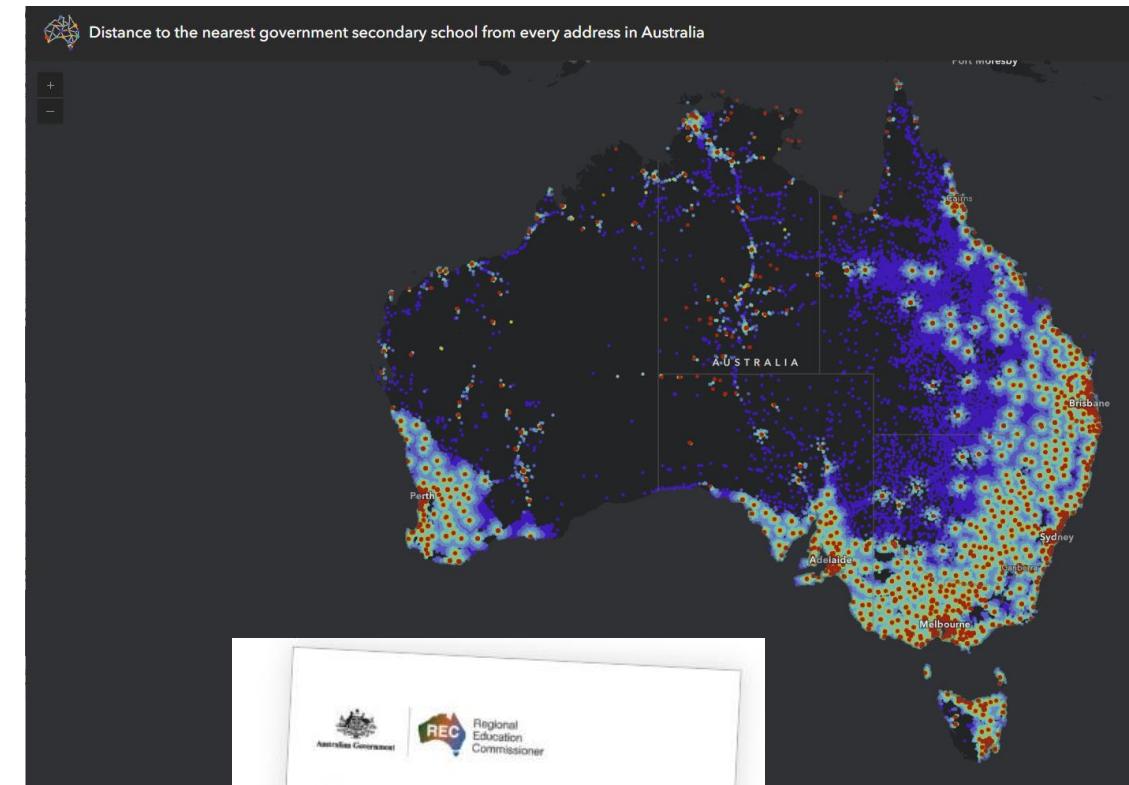
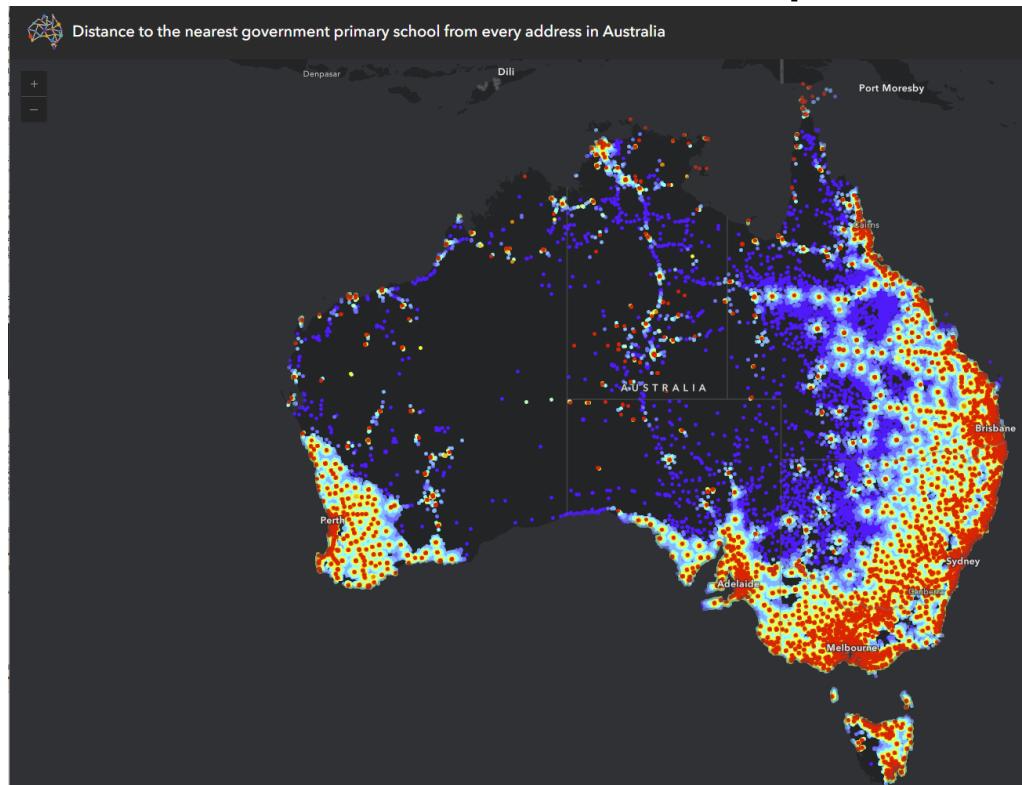


# Centre for Australian Research into Access (CARA)

- Significant **advancements** in geospatial technologies over the last 30 years.
- **Little or no change** in the geography of demographic and health data (scale).
- CARA offers a **paradigm shift** in the research and understanding of access to services.
- CARA developed **fast** network processing infrastructure that can be applied at the **dwelling scale**.
- **Distance and time** to a list of services and facilities at the GNAF point along the road network across **the whole of Australia**.
- Partnered with **Grampians Health** which provides **detailed health data** for 48,000 km<sup>2</sup> and is home to nearly **250,000 people**.
- We will be analysing health data at the **unit record level** and **address location**.

# Centre for Australian Research into Access (CARA)

- Provided distance maps for the Rural Education Commissioner



Just completed a review of the Modified Monash Model for Health Workforce planning for Commonwealth Health



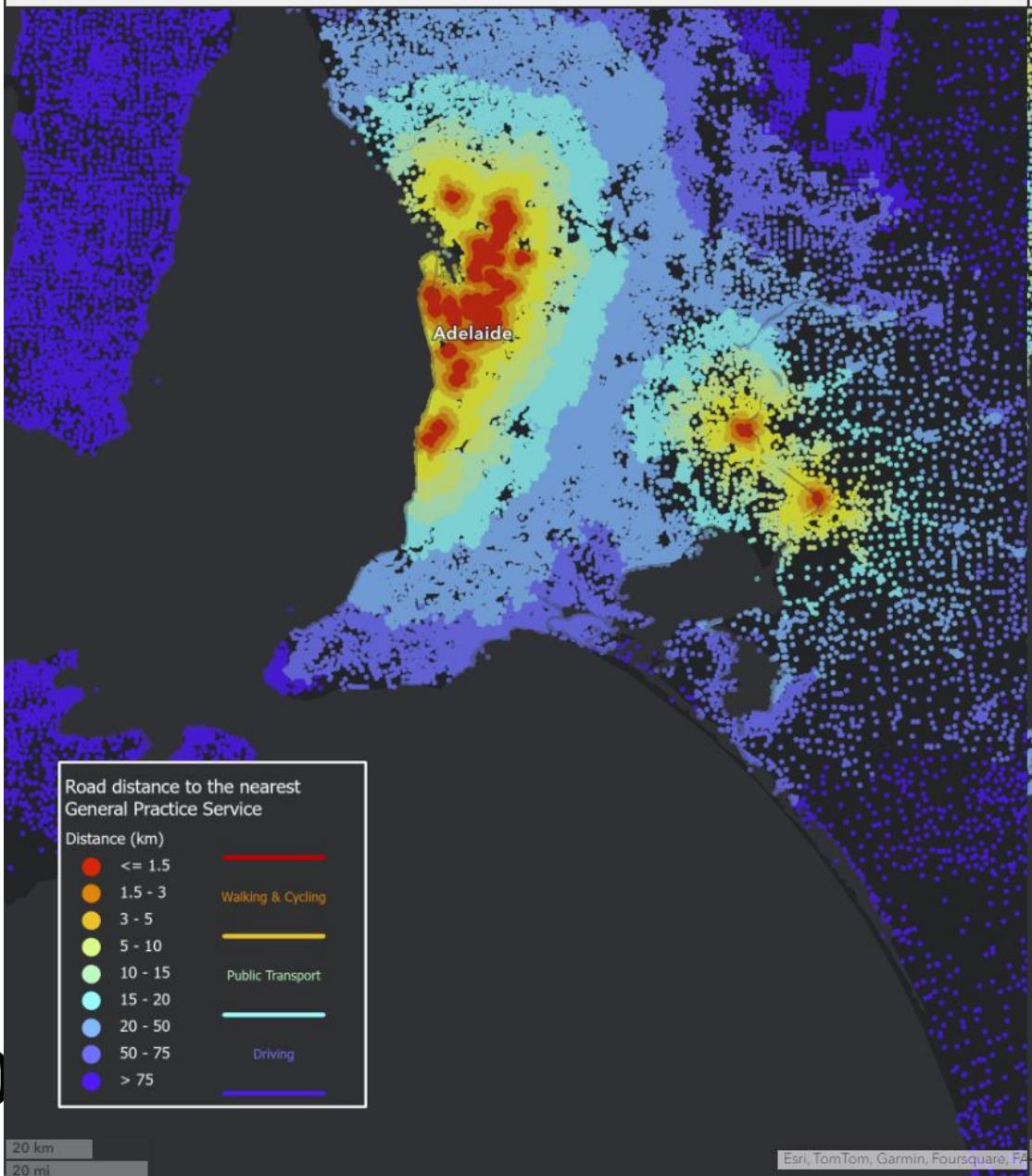
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<https://www.education.gov.au/regional-education-commissioner/resources/regional-education-commissioner-annual-report-2023>

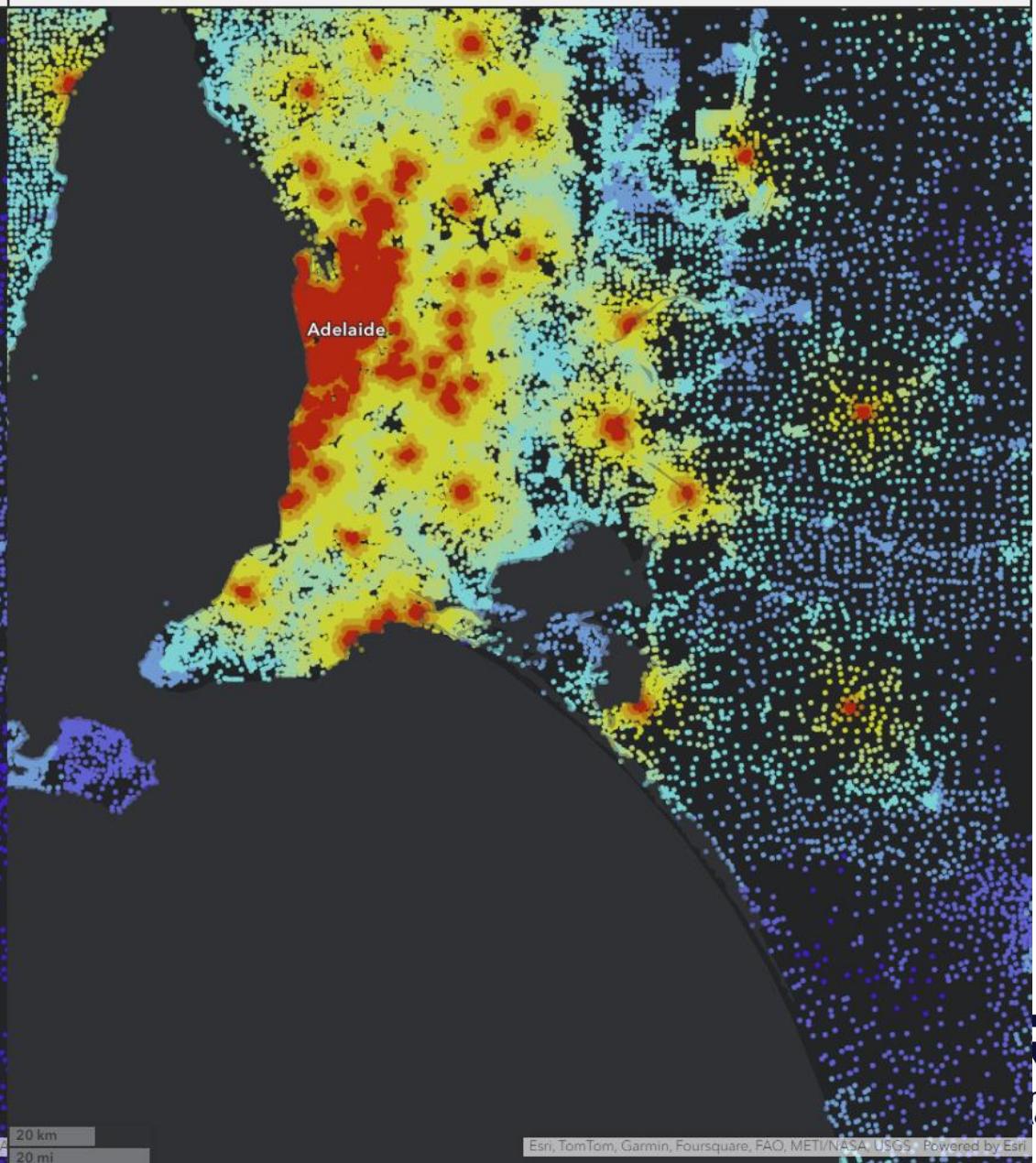


# Centre for Australian Research into Access (CARA)

Distance to Bulk Billing General Practice Services



Distance to All General Practice Services



# Synthetic Population

- At CARA
- We are building a GNAF point based data set with time and distance to a vast list of services and facilities (as per the last few slides and more in a later presentation)
- Working with the ABS address register to identify dwelling points (to remove non-dwelling GNAF points)
- Working with Professor Robert Tanton to build a synthetic population at the GNAF point.



# Synthetic Population

- Once the synthetic population is completed, we will look to add other data:
  - National Health Survey
  - Expenditure
  - Other survey data (YTBD)
- Then we will analyse relationships and associations using the synthetic population
- The only way to indicate if our work is not correctly identifying issues is to use the real data!!!!



# Final Thoughts

- As a research community we should be more critical of health data supply
- We should be using every means to highlight what we can do V what we are allowed to do
- Health is one of the largest national/state budget items, so getting a more informed base for policy should be a priority
- Perhaps if we make more noise this may change in the future
- These data are available – but not accessible
- We need to change that!!

