

Project 4.402 | Place as a Vital Sign - Impact of Geography on the Management of Type 2 Diabetes Mellitus

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Objectives A 13 month retrospective observational study, of non-identifiable adult patients older than 18 years of age, from a medical practice, has been analysed using descriptive statistics and geographical weighted regression analysis to identify risk factors, including access to clinic, for Type 2 Diabetes. The objective is to determine to what extent is physical access to the GP clinic associated with how Type 2 Diabetes is managed.

- Outcomes**
- Access to patient data with detailed history and medications
 - Team including experts in geocoding, statistics and clinical medicine
 - Interest from other General Practices in WA to participate in follow-up research

Research Questions

Do people with continuing risk factors associated with diabetes mellitus:

- live in close proximity and in a defined location?
- who receive less than maximum treatment live in the same location?

Background

Type II diabetes mellitus has become a major cause of morbidity and premature mortality in Australia. One strategy to reduce cost and improve service for people diagnosed with diabetes is to focus on the role of general practice in reducing risk factors. In this project we investigate the profile of people with continuing risk factors, in particular focussing on their interactions with general practice (compared to national guidelines) as a function of geography.

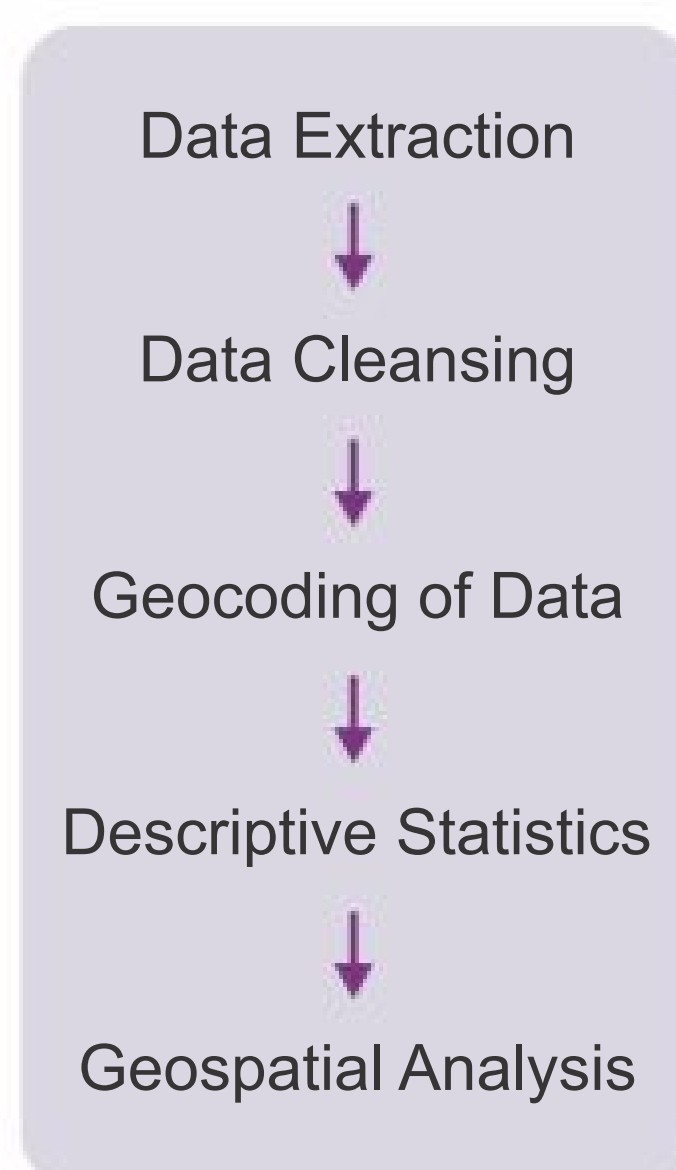
Area of Interest

The Peel region is located on the west coast, roughly 75 km south of the state capital, Perth. It covers an area of approximately 5,648 km² with a population of about 112,677 people, of whom around two-thirds live in Mandurah.



Methods

- Anonymised, point-level geographical data and relevant diabetes clinical information obtained from the General Practice (GP).
- Data handling, in strict accordance with the ethical & privacy guidelines, in all the following steps.



Data Cleansing

- Practice data was de-identified, resulting in 1,745 diabetic patient records, of which 1,654 (94.8%) were identified as being unique.
- A series of iterative cleansing steps were taken to ensure consistency for subsequent analysis.
- Nonsensical clinical values were interpreted by clinicians and excluded if deemed uninformative or misleading.

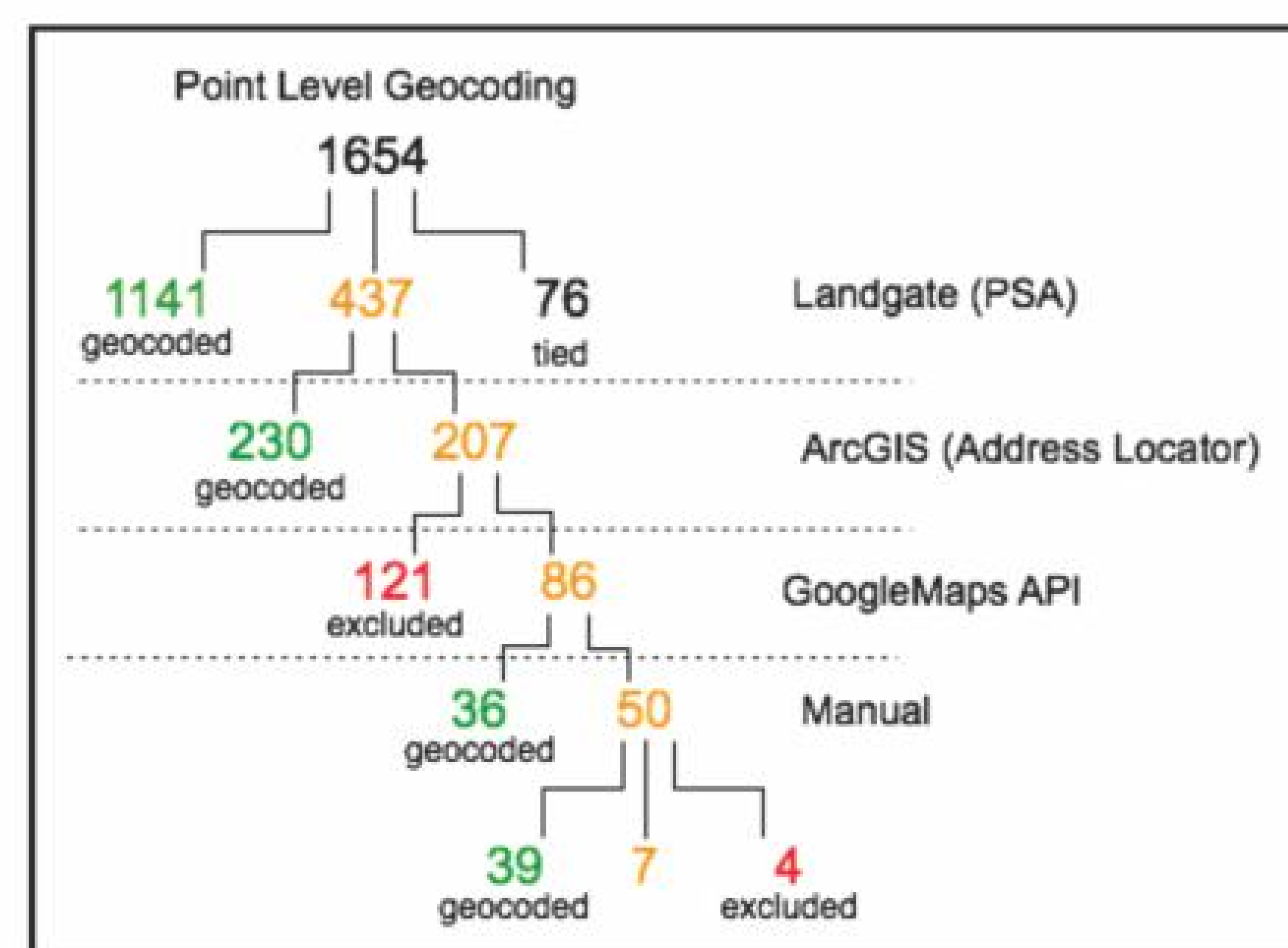
Patients identified with Type 1 Diabetes were excluded.

Geocoding

Unique patient entries were geocoded by using:

- PSA (point level data set) for Western Australia, generated by LANDGATE.
- ArcGIS address locator was used for the unmatched set
- Deleting 121 of the remaining 207 addresses, due to incomplete addresses or inconsistencies.
- Manual assessment of the remaining 86 addresses using Google Maps and re-geocoded with ArcGIS.
- Manually geo-coding of remaining 50 addresses.

This procedure resulted in a total of 1522 addresses that were used in this study.



Review of Medical Data

- Were the recorded clinical parameters elevated beyond the acceptable range (highlighted in red in the figures below)?
- Is there scope to increase the dose or add new drugs to the patient's current regimen?

Descriptive Statistics

Clinical Parameters used in this study:

- Glycosylated haemoglobin HbA1c (<7%)
- Blood pressure (130/80 mmHg)
- Total cholesterol (<4 mmol/L)
- Low density lipid cholesterol (<2 mmol/L)
- BMI (kg/m²).

The median age of the population was 70 years with a slightly higher representation of males than females, 53% and 47 % respectively.

From a clinical perspective, the patients in this study area are failing management guidelines on all investigated parameters, with the exception of glycosylated haemoglobin (HbA1c).

