Primary health care accessibility for rural Otago: "a spatial analysis"

A new approach

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Research

- Location and demographics of people who do not have appropriate access to primary health care
- Substitute different time scenarios (data)
- Substitute GP for services to aged care, fire-stations, emergency care, St Johns, care providers, location of De-fibs etc.

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Dimensions of access

- Availability,
- Accessibility
- Affordability,
- Accommodation and
- Acceptability

- Accessibility (Geographical dimension, Temporal dimension)

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Our approach

Modelling spatial accessibility according to:

- World health organisation “rules”,
- NZ guidelines
- A combination of physical access index with a needs index (a surrogate analysis for accessibility)

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WHO "rules"

- Universal access to PHC regardless of where people live and work
- 1000 people per general practitioner
- Focus on population with high a "health need"

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New Zealand "guidelines"

The New Zealand Ministry of Health - PHC services must be available for 95 % of population in New Zealand

- business hours = within 30 minutes travel time and
- after hours = within 60 minutes travel time.

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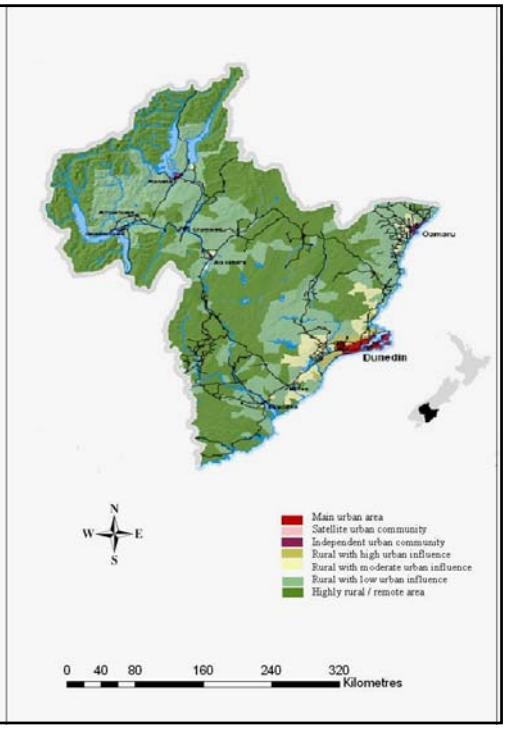
Study area and Data

- NZ Census data(2001)
- Road network
- PHC locations
- Core recorded system (CRS) address
- Meshblock data (n=1200)
- NZ deprivation index



Modelling travel time

Estimating travel time & constructing network data set based on:

- Road type, sinuosity, surface, topology, and number of lanes
- New Zealand speed limits
- One way restriction

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Mean centre / Geometric centroid

- Population distribution is not uniform inside of every Meshblock, so simple geometric centroid is not a good average of population distribution
- Especially in rural areas with large Meshblocks

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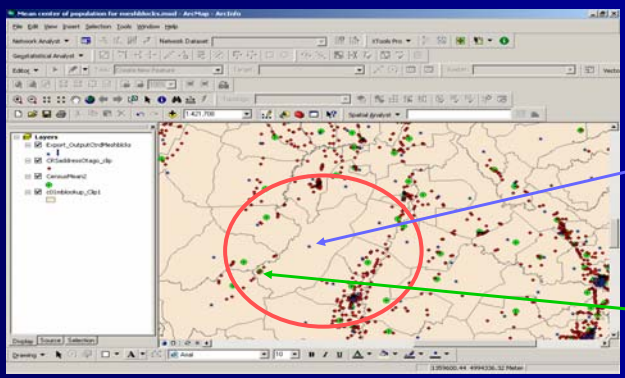
Mean centres of Meshblocks



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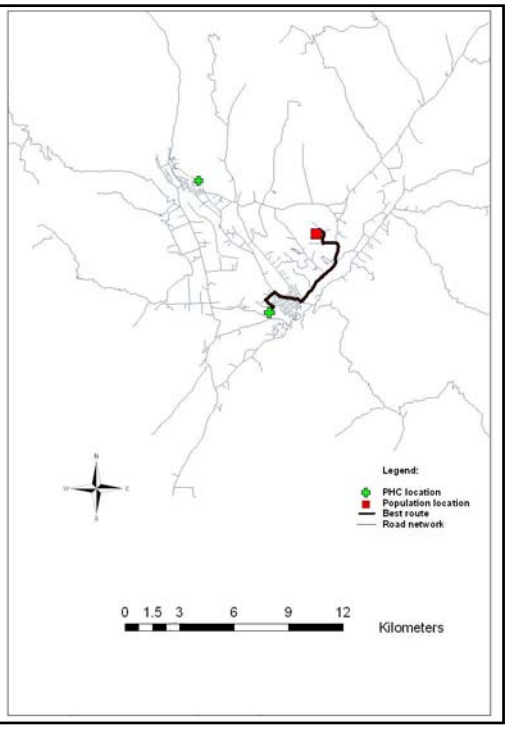
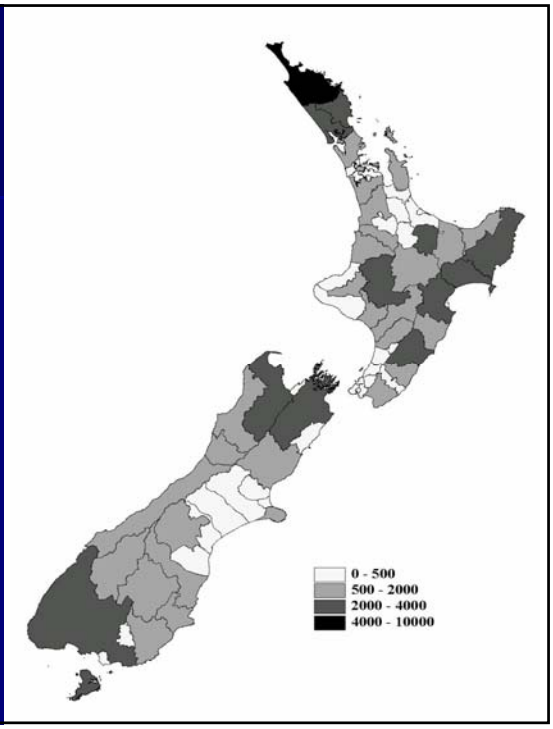
Calculating best route (shortest travel time)

From original node (mean centre of population distribution) to destination points (PHC services)



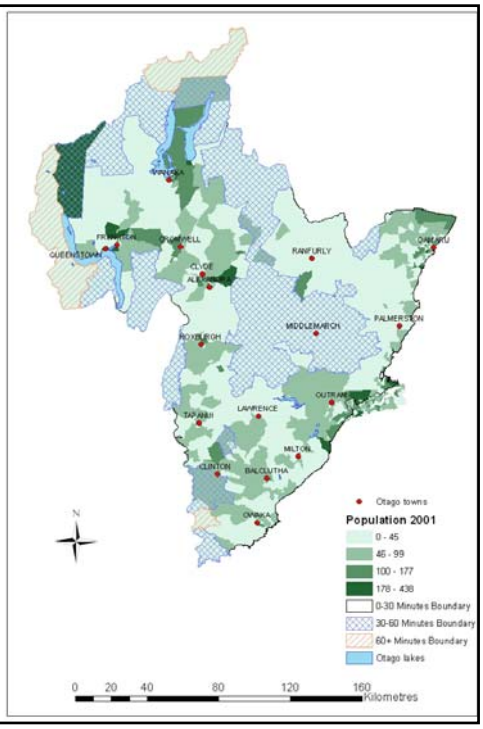
Related work

- **New Zealand population (by territorial authority) more than 30 minutes from a GP (Brabyn & Barnett, 2004)**
- **Hall *et al.***



Population - Meshblock level

4 divisions – changing this has a huge impact on results

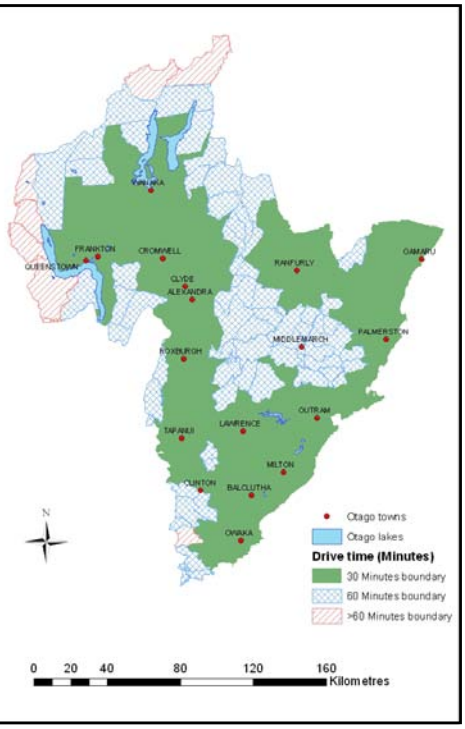


Service (PHC) accessibility

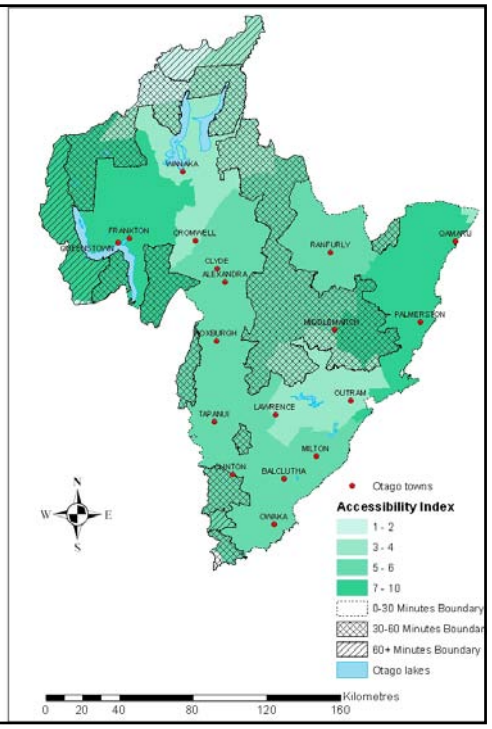
30 minutes

60 minutes

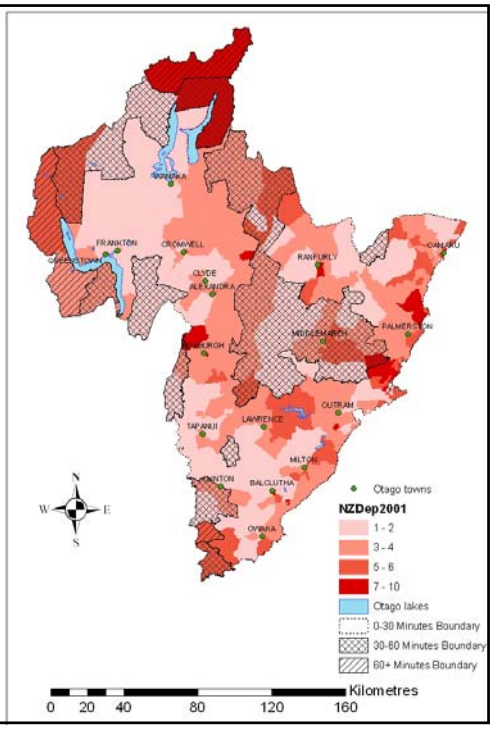
60+ minutes



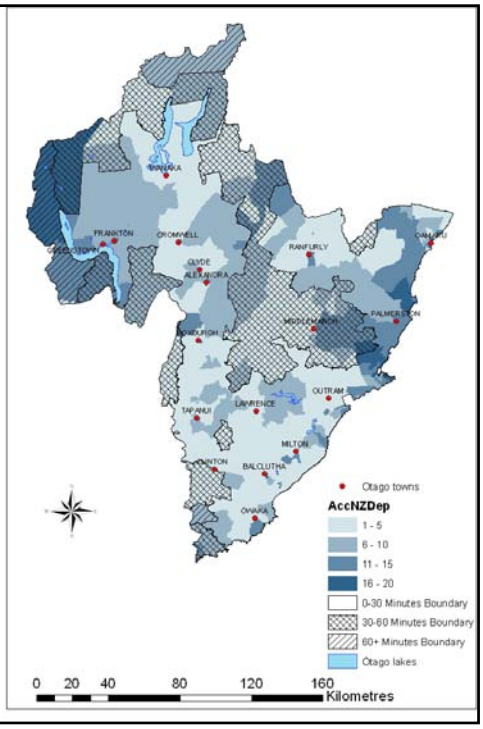
Accessibility index and drive time limits



Mapping of NZ deprivation index at Meshblock level



Combining spatial accessibility and need indices



Conclusions & future directions

- Some parts of study area (rural otago) do not meet WHO “rules” or New Zealand guidelines.
- In effect, we devised a new accessibility index, as a tool and methodology that is usable for exploring and understanding accessibility to PHC.
- Next - explore local variation of travel time, NZ deprivation index and use geographically weighted regression (GWR)
- Work with WSM on spatial issues, for example, home W.O.F.

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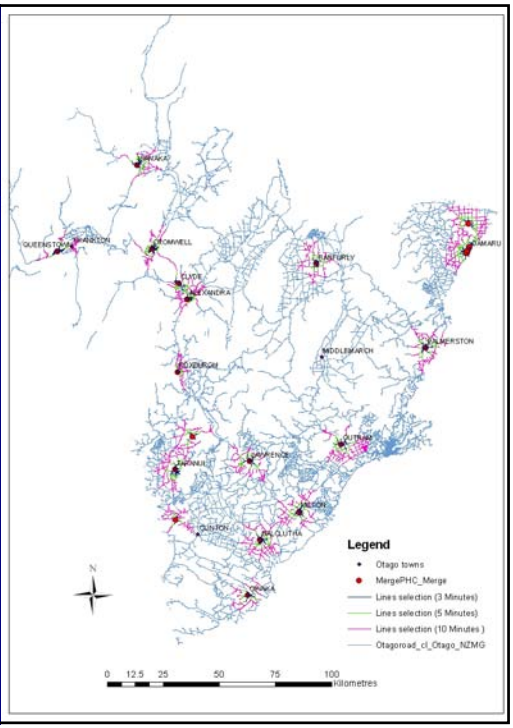
Legend
Otago towns
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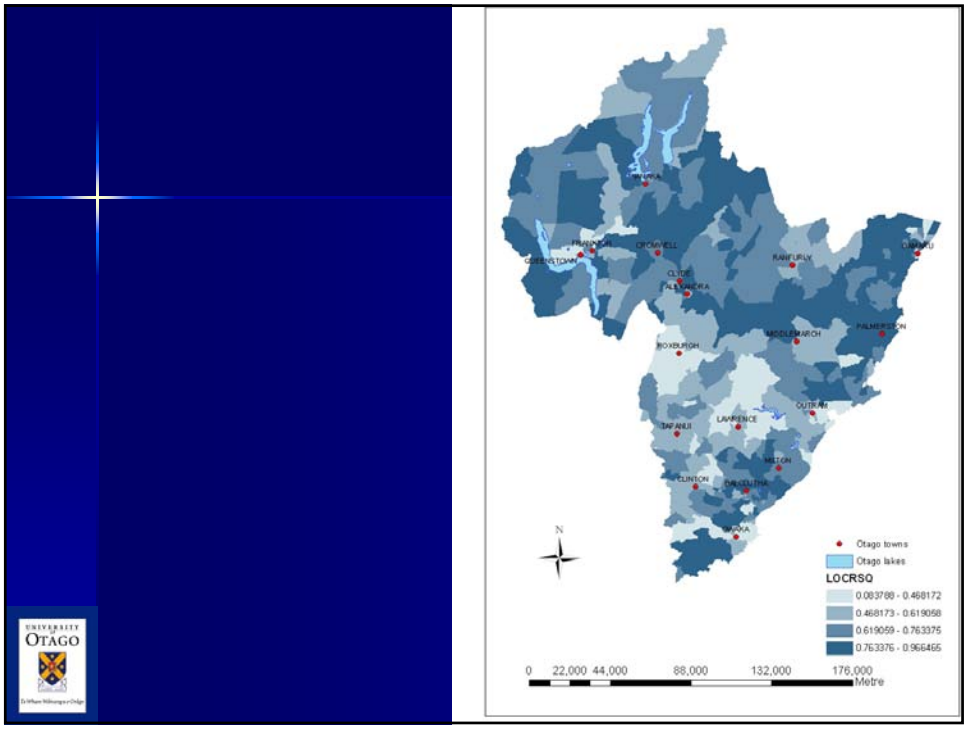
ARROWTOWN
CROMWELL
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CLYDE
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ROXBURGH
OUTRAM
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TAPANUI
MILTON
CLINTON
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Otago towns
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