Spatial distribution of health-promoting and health-constraining environments in New Zealand

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Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

What? (Context)

Premise I.

Environment influences people's behaviour and health outcomes

Premise II.

It is usually more than one active aspect of the environment that influences people's behaviour and health outcomes

Premise III.

Accounting for co-occurrence of environmental exposures (multiple environmental domains) represents the influence of the environment more accurately

Why? (Reason)

- Nationwide environmental measure
  - Positive (health-promoting) environments
  - Negative (health-constraining) environments
  - Combination
- Usable in different scales (MB, SA1, SA2, Data Zone)
- Addition to NZDep, IMD (Index of Multiple Deprivation)
  - People vs. Environment
- Easy to understand
  - Simple but not over-simplistic
- Make data publicly available

Daras, Konstantinos, et al. Open data on health-related neighbourhood features in Great Britain. Scientific data 6.1 (2019): 1-10.
Pearce, J., Witten, K., & Bartie, P. (2006). Neighbourhoods and health: a GIS approach to measuring community resource accessibility. JECH, 60(5), 389-395.
Macdonald, L., et al.(2018). Do 'environmental bads' such as alcohol, fast food, tobacco, and gambling outlets cluster and co-locate in more deprived areas in Glasgow City, Scotland?. Health & place, 51, 224-231.

How? (Data and methods)

- Road network accessibility (distance) and median proximity from population weighted centroids to:

  – Environmental goods

  – Environmental bads

- Ranking based on the access to domains

  – Deciles: 1 (most accessible) – 10 (least accessible)

- Goods and bads - ranking of sum of ranks

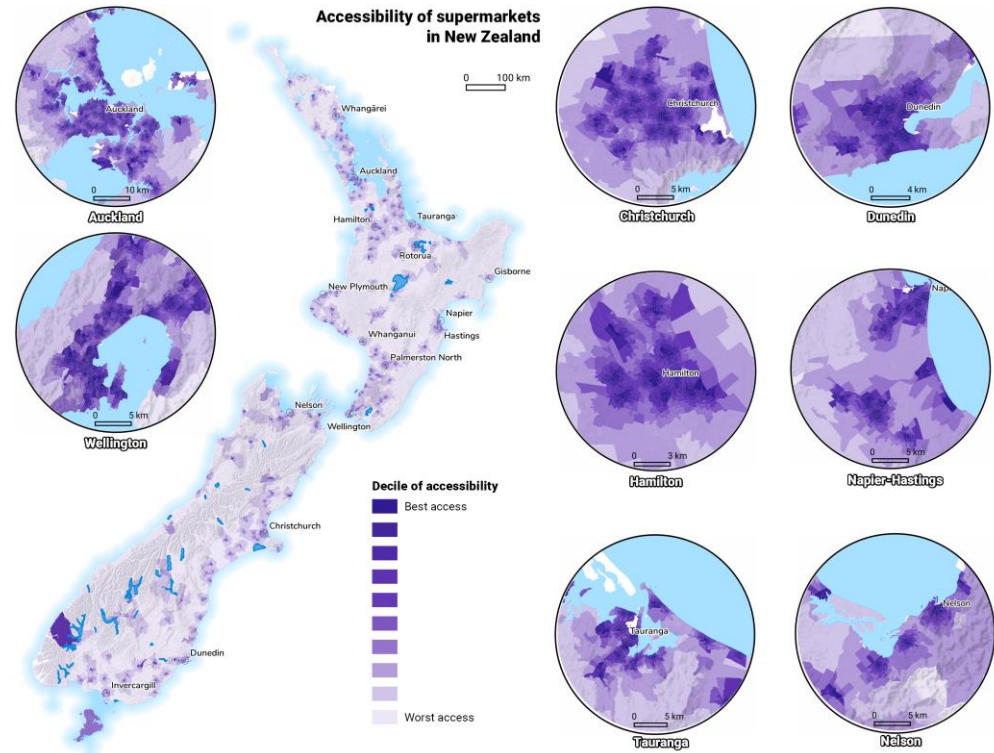 – Deciles: 1 (most accessible) – 10 (least accessible)

Access to environmental 'goods'
Health-promoting environments
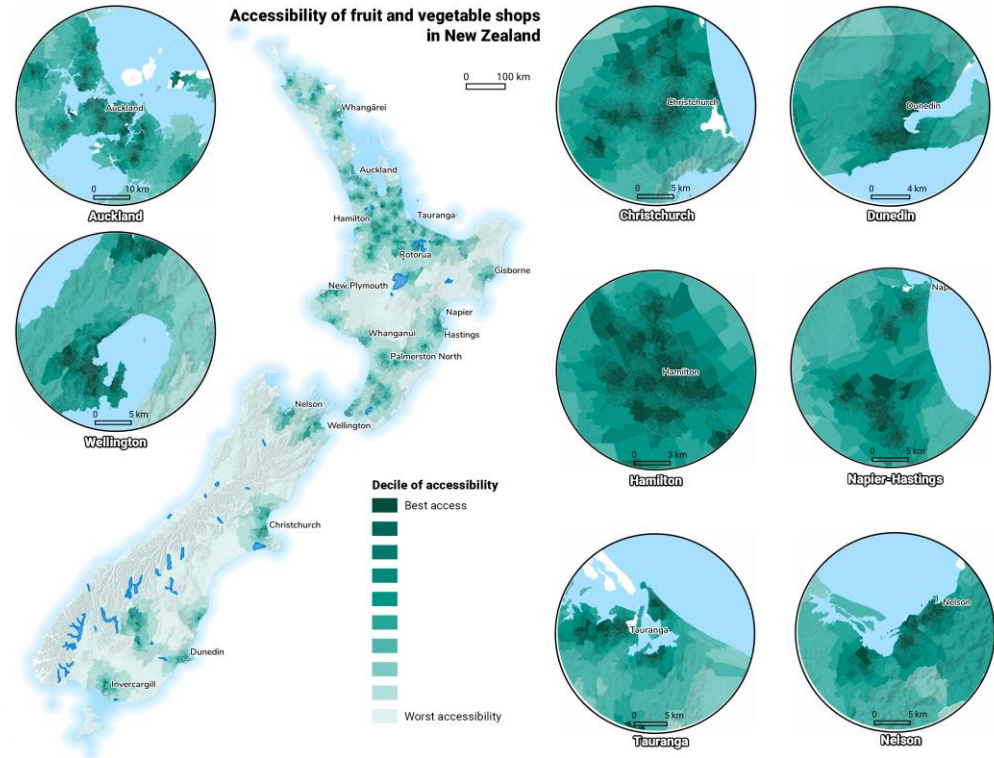
- Fruit & Vegetable

Access to environmental 'goods'
Health-promoting environments

- Fruit & Vegetable

- Supermarkets

Accessibility of supermarkets in New Zealand

Access to environmental 'goods'
Health-promoting environments

- Fruit & Vegetable

- Supermarkets

- Physical activity places
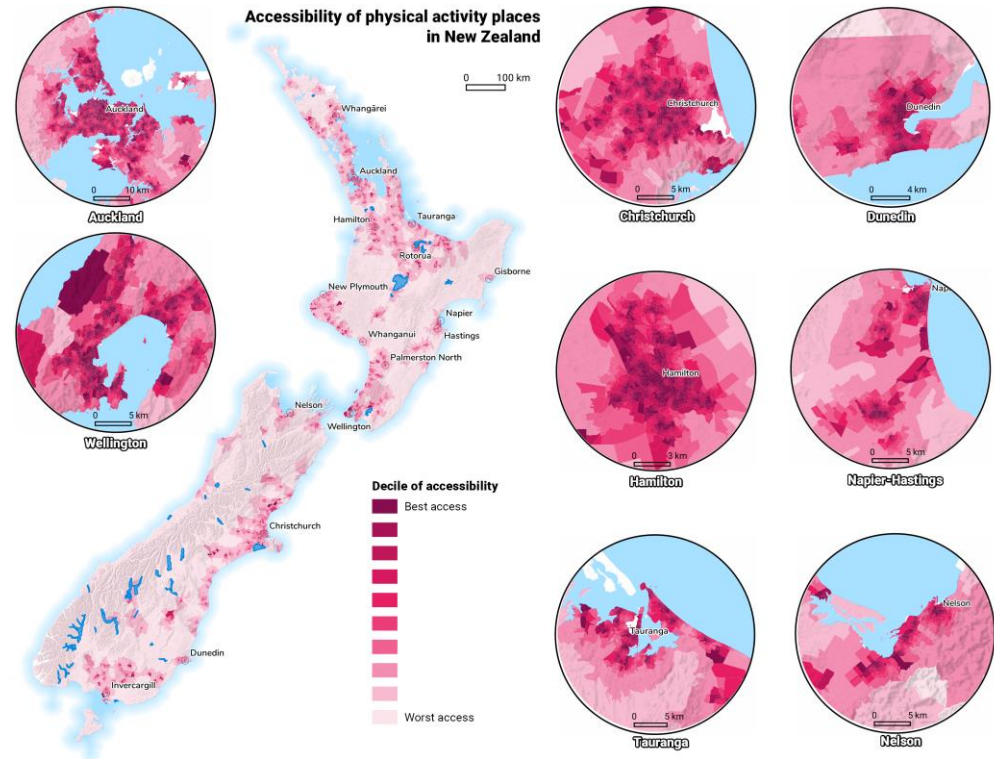
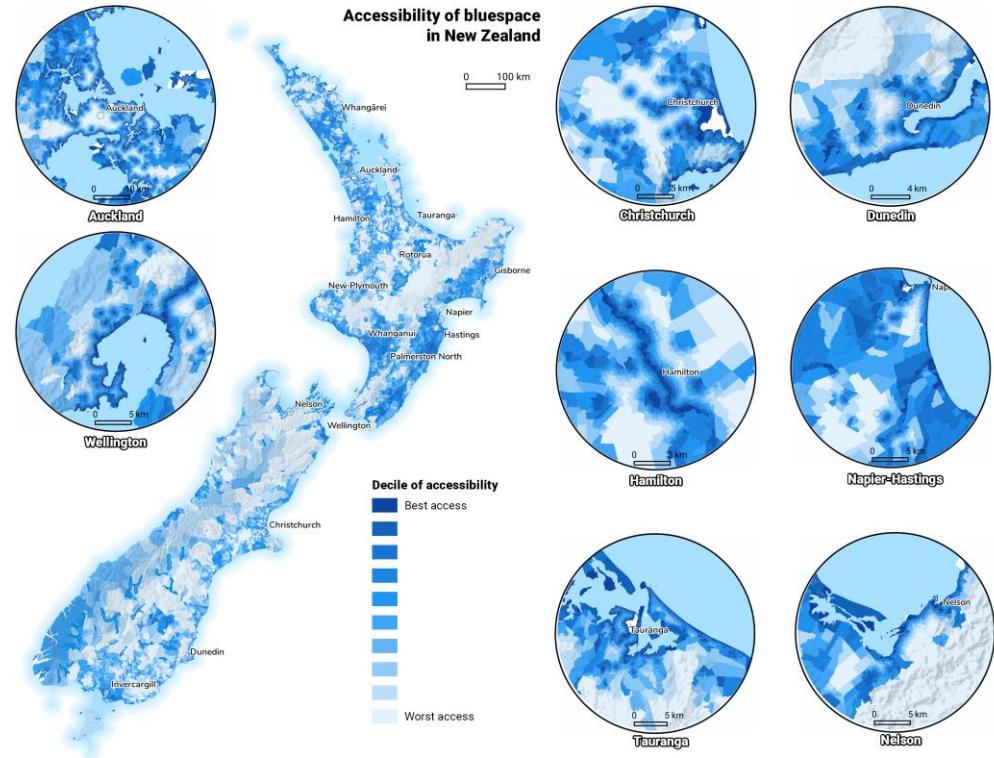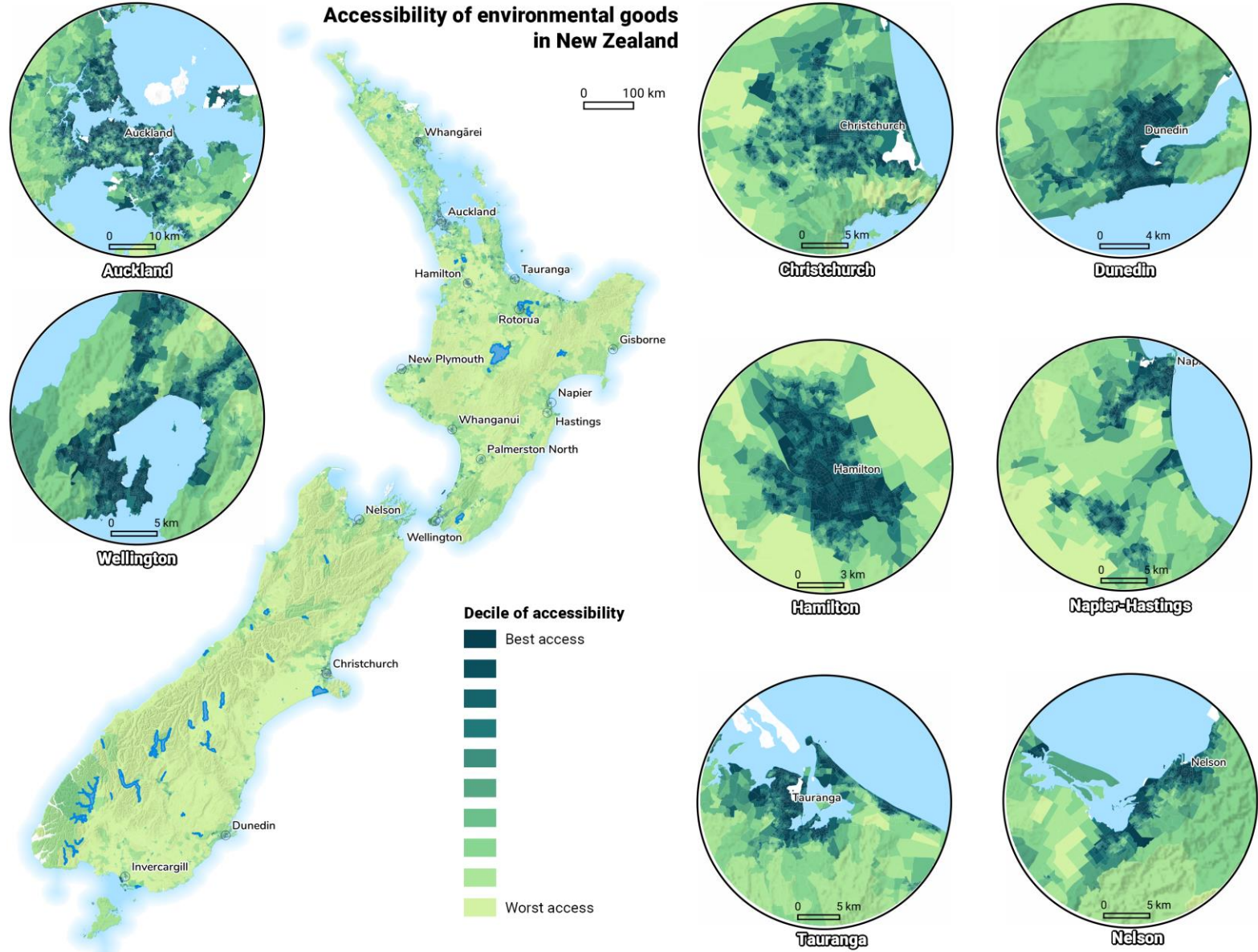# **Access to environmental 'goods'**
Health-promoting environments

- Fruit & Vegetable

- Supermarkets

- Physical activity places

- Greenspace

Accessibility of greenspace in New Zealand
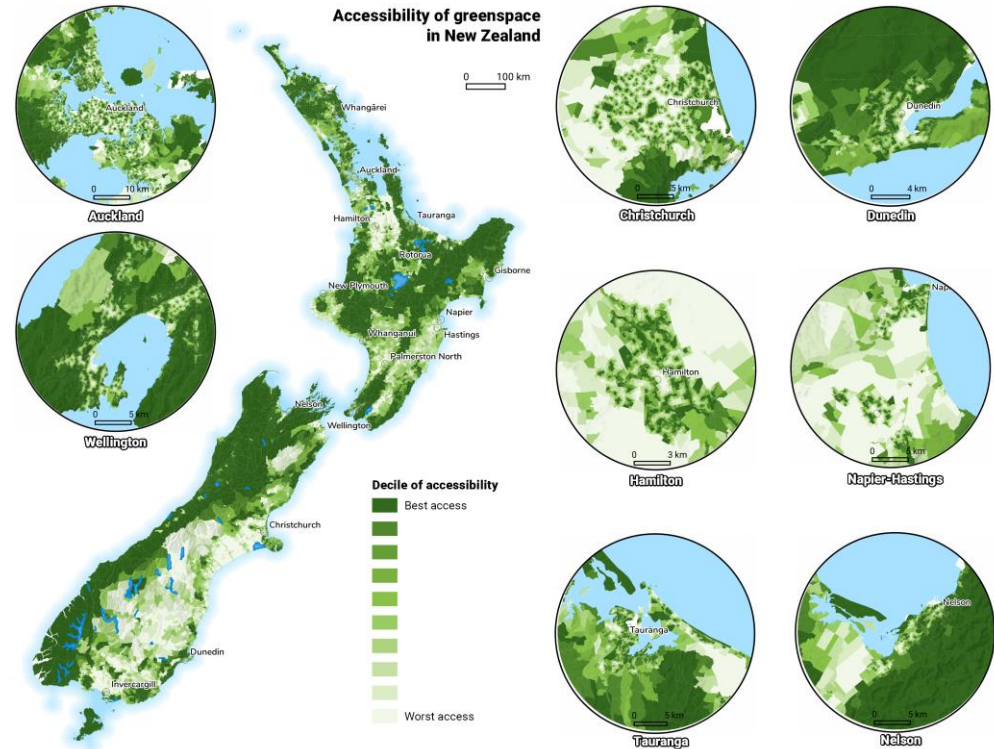
Access to environmental 'goods'
Health-promoting environments

- Fruit & Vegetable

- Supermarkets

- Physical activity places

- Greenspace

- Bluespace

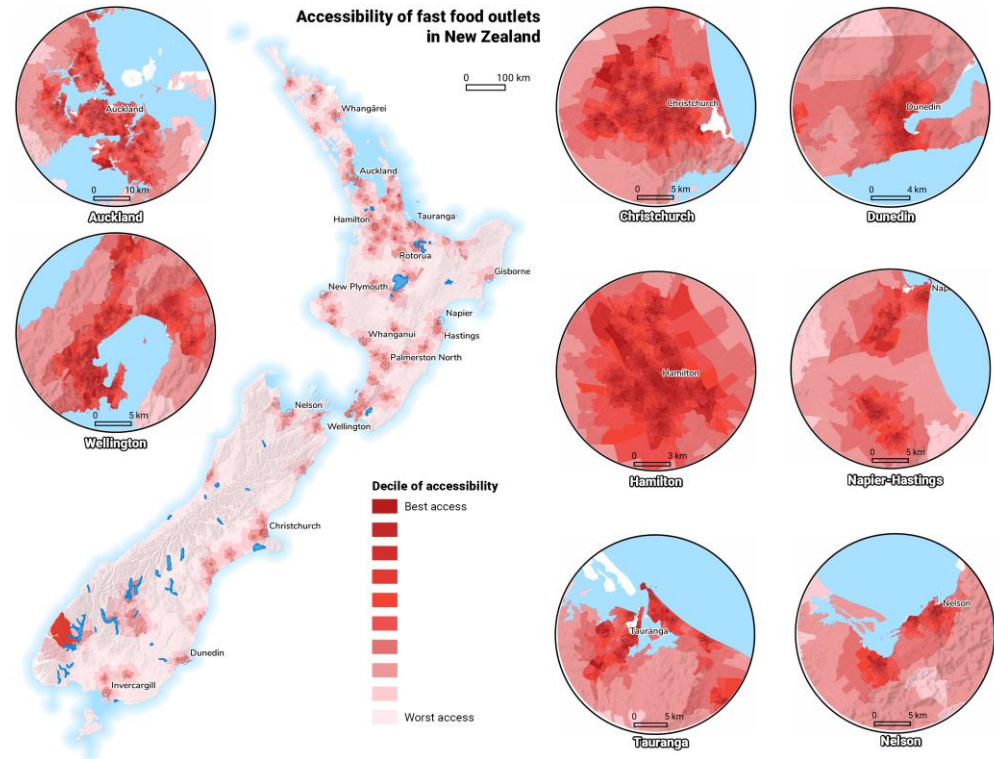Accessibility of environmental goods in New Zealand

Decile of accessibility

Best access

Worst access
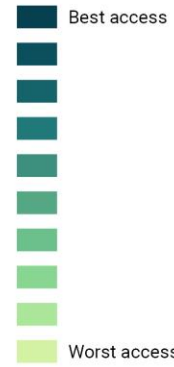
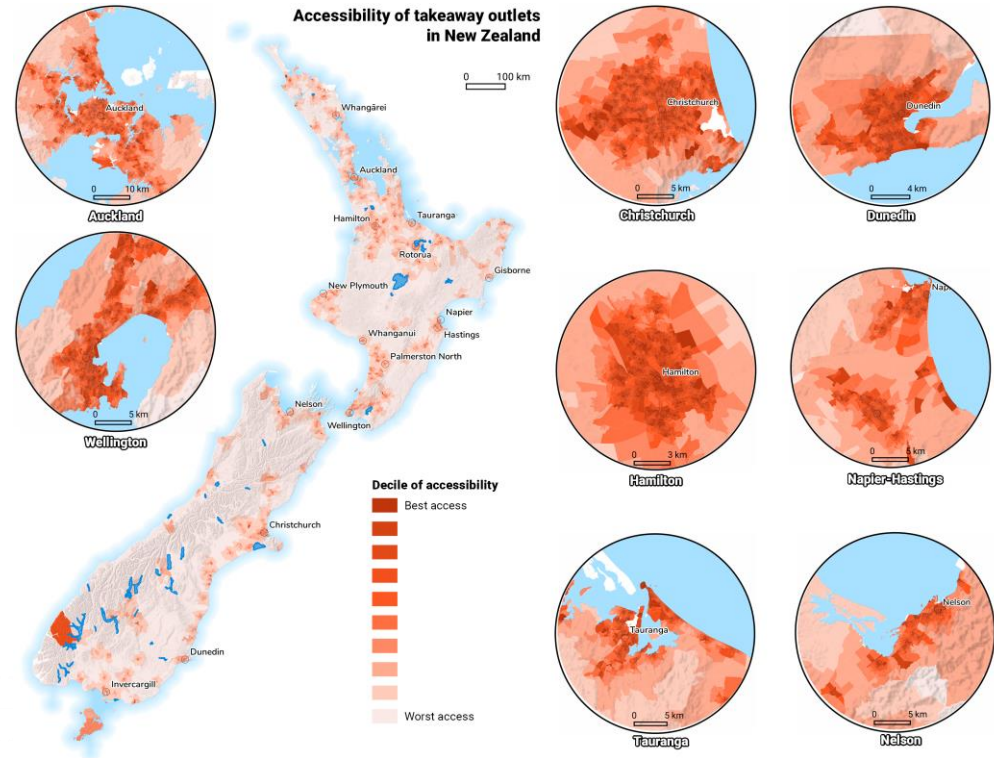# Access to environmental 'bads'
Health-constraining environments

- Fast food outlets

Access to environmental 'bads'
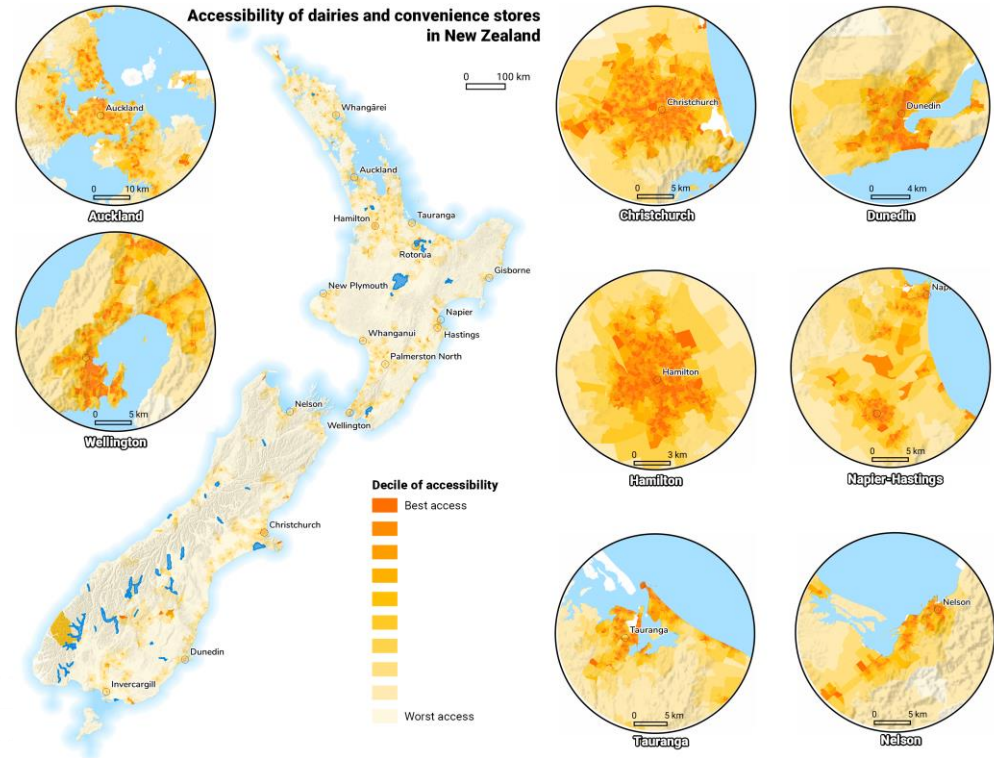## Health-constraining environments

- Fast food outlets

- Takeaways

Access to environmental 'bads'
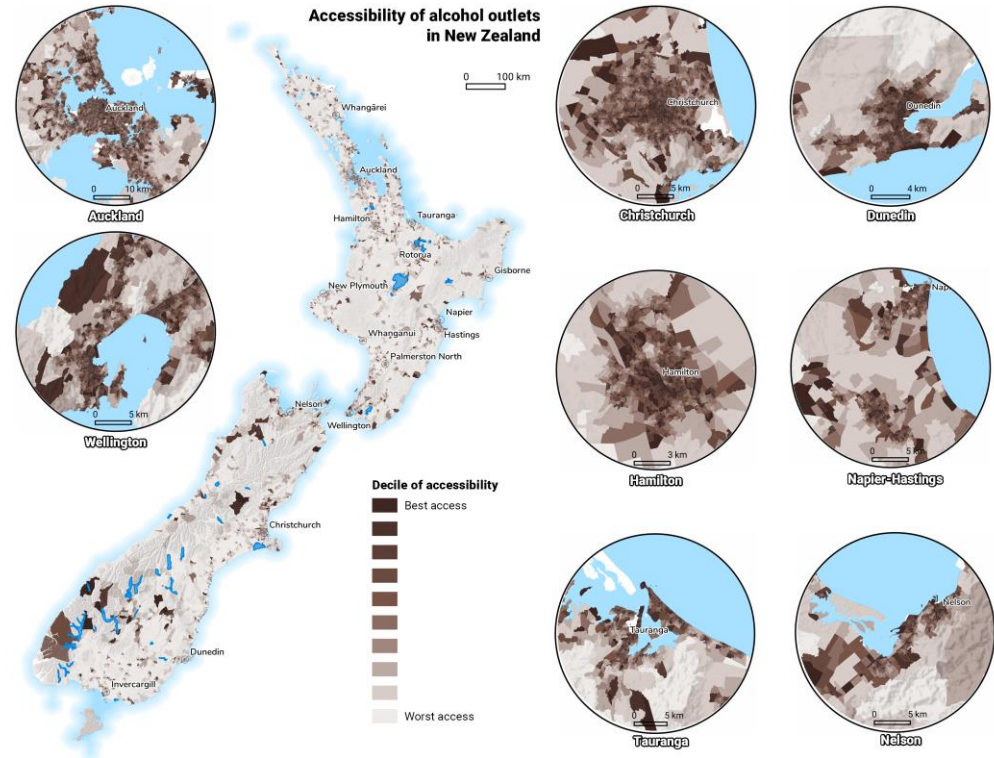## Health-constraining environments

- Fast food outlets

- Takeaways

- Dairies and Convenience stores

Accessibility of dairies and convenience stores in New Zealand

Access to environmental 'bads'
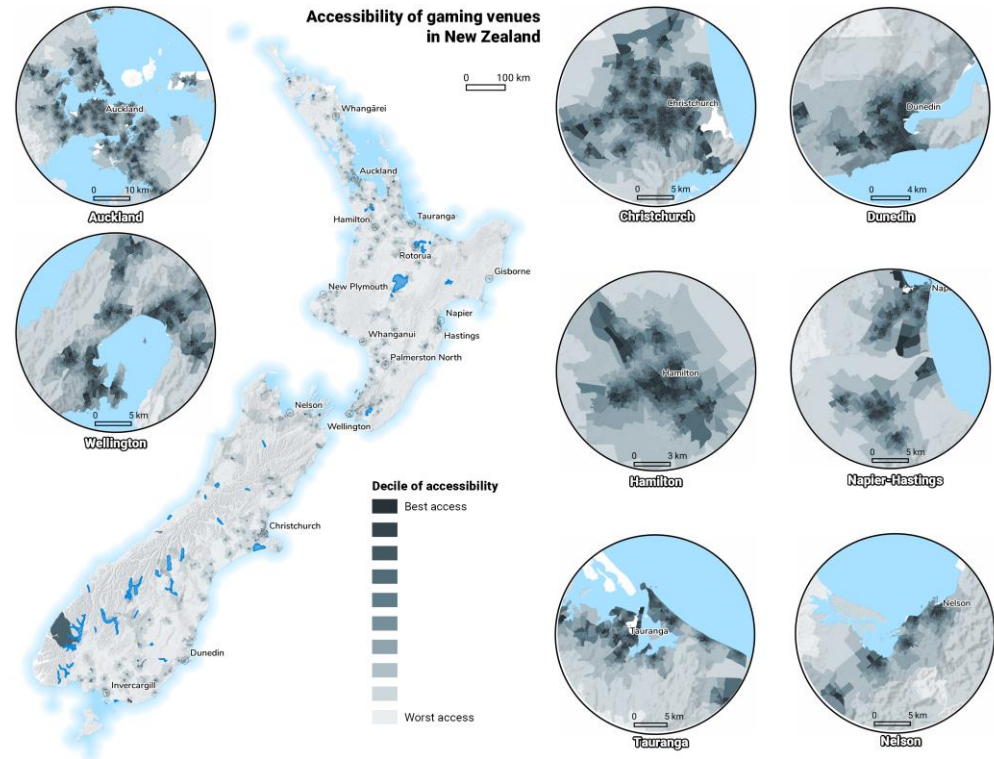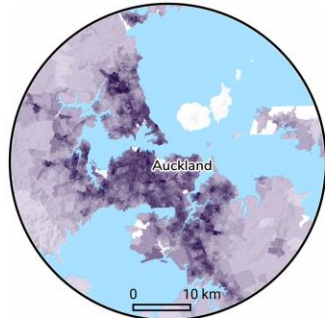## Health-constraining environments

- Fast food outlets

- Takeaways

- Dairies and Convenience stores

- Alcohol outlets

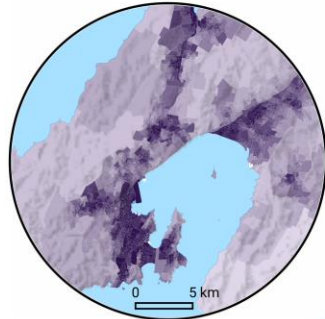# Access to environmental 'bads'
Health-constraining environments

- Fast food outlets

- Takeaways

- Dairies and Convenience stores

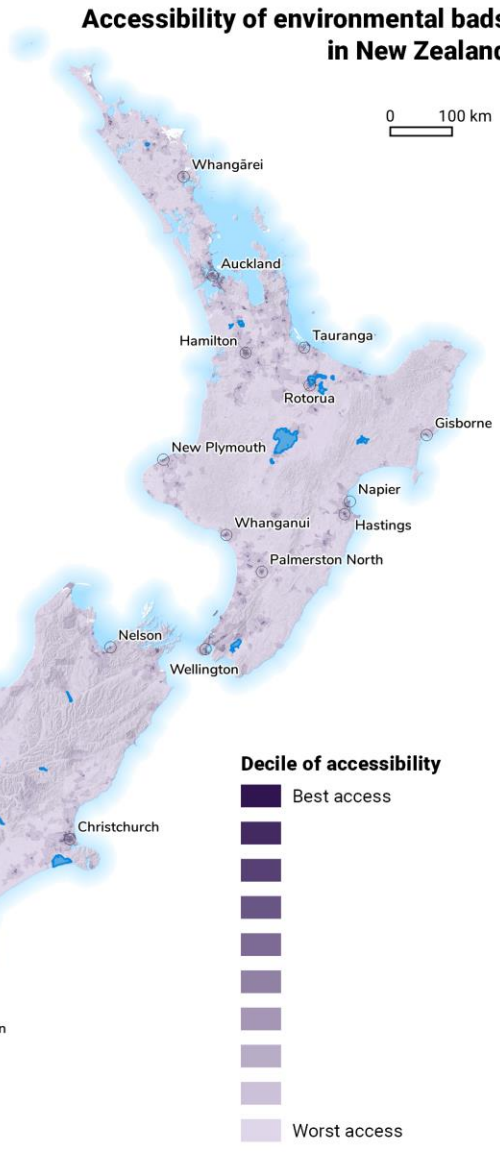- Alcohol outlets

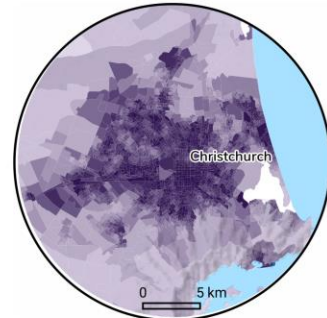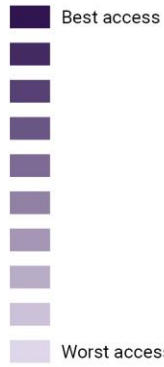- Gaming venues

Accessibility of gaming venues in New Zealand

Accessibility of environmental bads in New Zealand

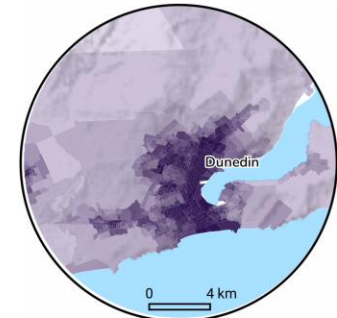Decile of accessibility
Best access
...
Worst access

Accessibility to environmental goods and bads
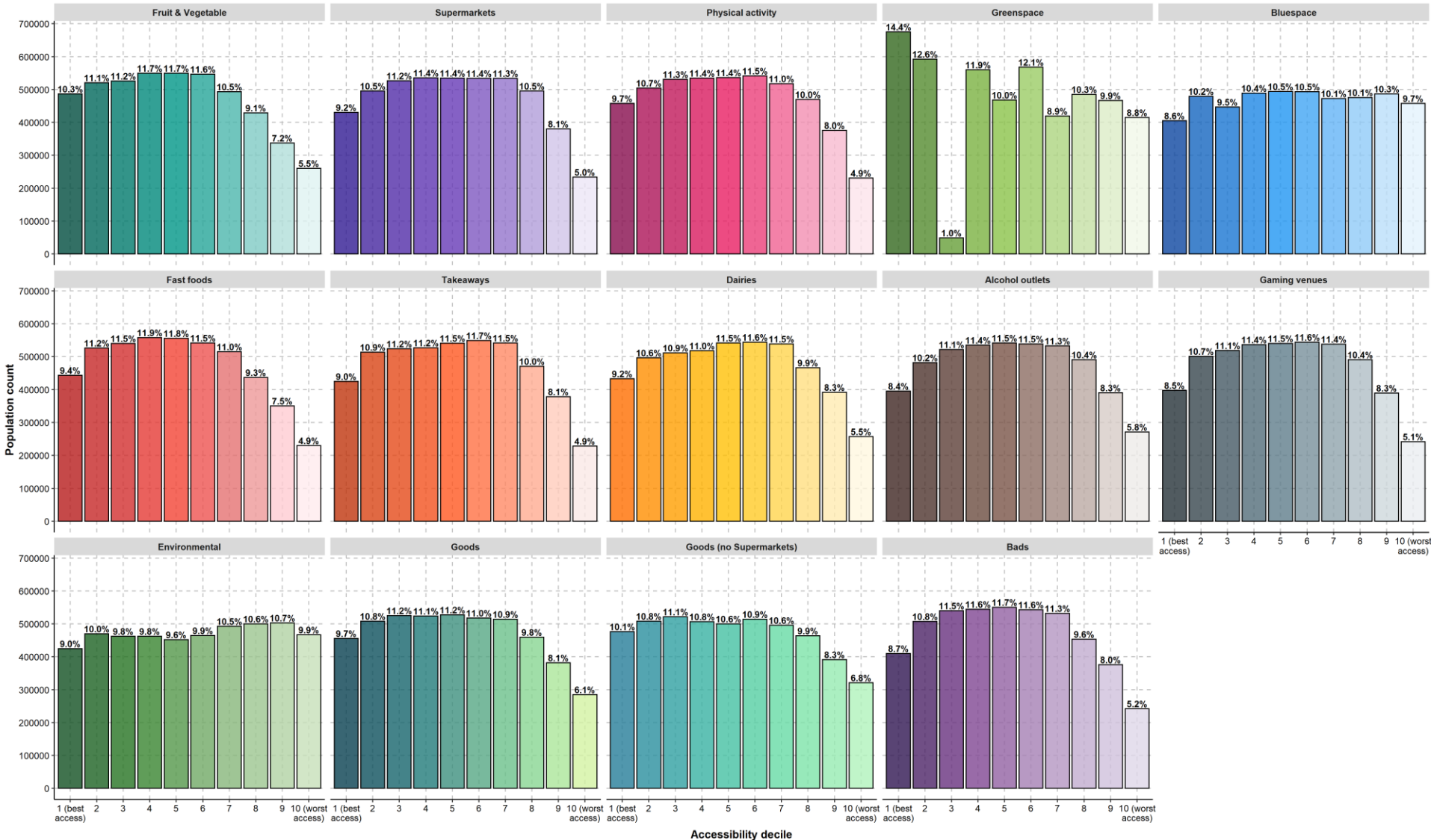
Access to goods and bads
and socioeconomic deprivation

Median distance (m) to individual domains

NZDep 2018 (Decile)	FV	SU	PA	GS	BS	FF	TA	DC	AL	GA
Overall	4590	1806	1599	141	640	2276	1303	1178	682	1653
1 (least)	5532	2319	2066	112	559	3064	1942	1884	950	2527
2	5239	2257	1941	141	570	2852	1788	1682	888	2340
3	5450	2206	1909	141	620	2856	1737	1587	838	2126
4	5024	2037	1784	141	650	2599	1549	1468	783	1955
5	5109	1875	1637	141	655	2421	1380	1236	728	1722
6	5973	1867	1706	150	667	2426	1342	1270	694	1673
7	4418	1658	1457	150	657	1966	1095	975	612	1421
8	3811	1437	1278	150	641	1703	923	820	527	1187
9	3167	1302	1195	150	658	1535	838	718	499	1102
10 (most)	3345	1438	1474	112	673	1939	966	869	585	1327

Environmental goods and bads
By deprivation | New Zealand

Accessibility of environmental bads (rank) — (most accessible) 50000 ... (least accessible) 1

Accessibility of environmental goods (rank) — (least accessible) 1 ... (most accessible) 50000

Deprivation quintile
- Q1 (least deprived)
- Q2
- Q3
- Q4
- Q5 (most deprived)

Lines represent trends using smoothed conditional means (cubic splines) by deprivation quintile

Healthy Living Index

- Combining accessibility of environmental goods and bads

  – Best accessibility (deciles 1-3)

  – Moderate accessibility (deciles 4-7)

  – Worst accessibility (deciles 8-10)
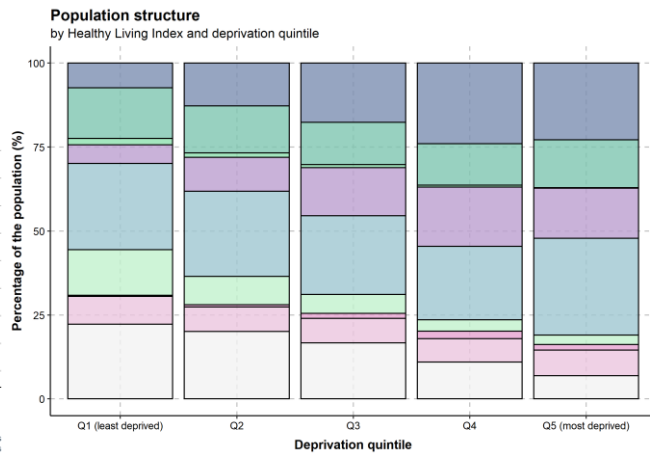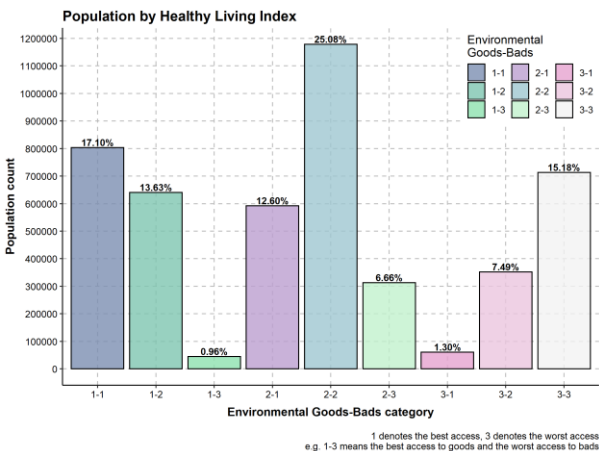
Healthy Living Index
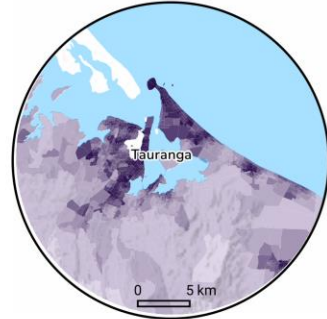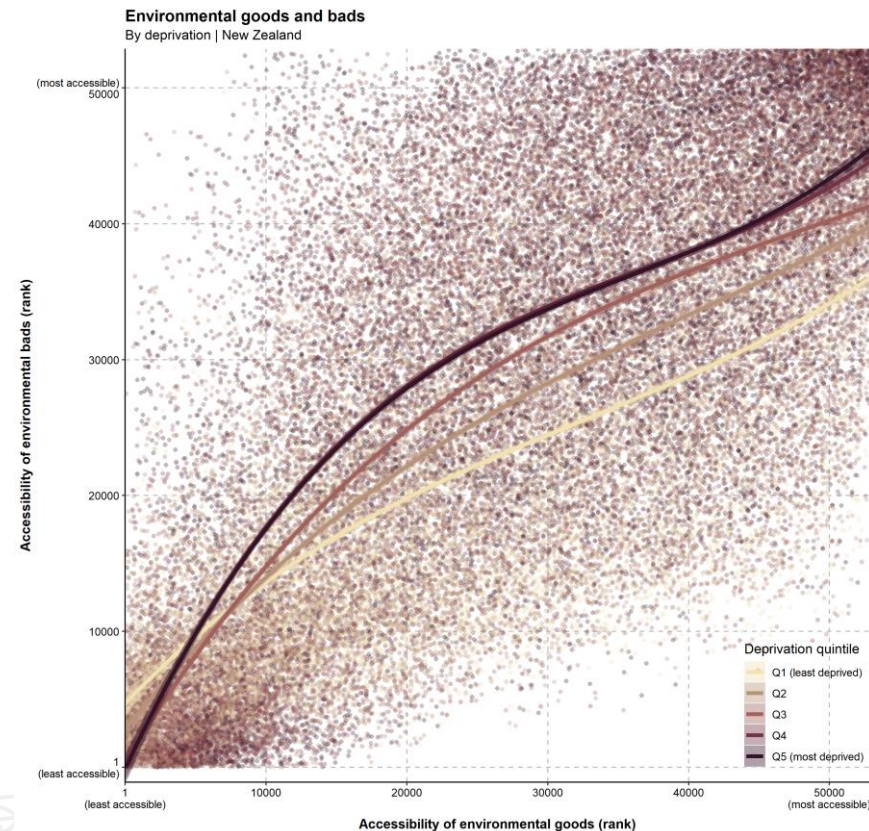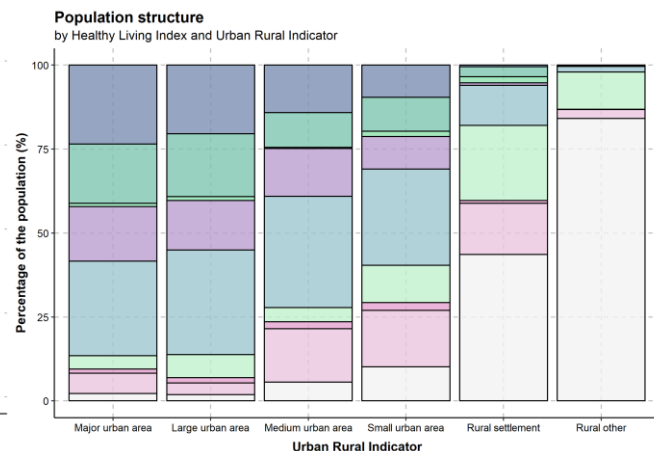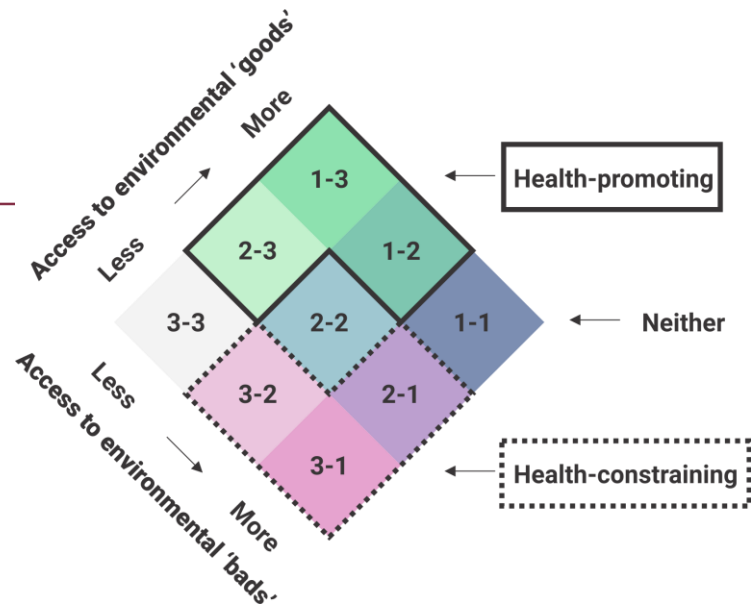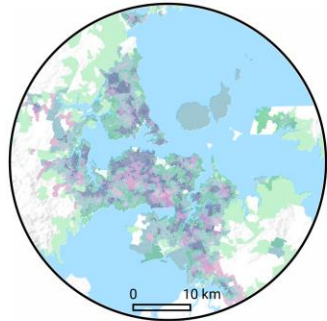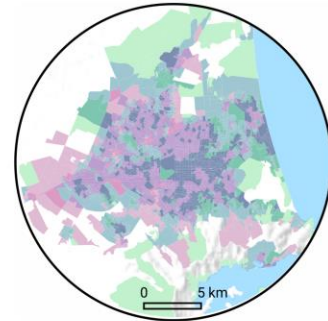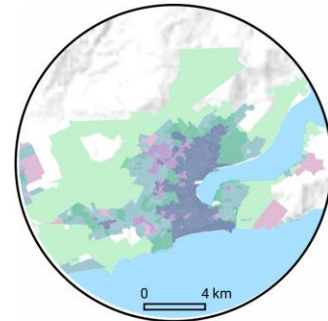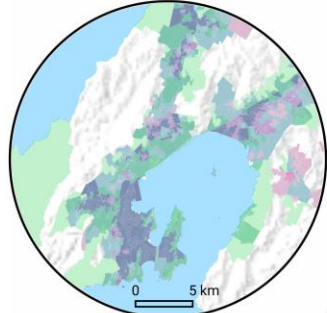# New Zealand

Auckland
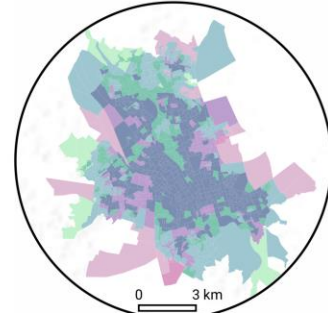
Christchurch

Dunedin

Wellington

Hamilton

Napier-Hastings

Tauranga

Nelson

Whangārei

Auckland

Hamilton · Tauranga

Rotorua

New Plymouth · Gisborne

Napier

Whanganui · Hastings

Palmerston North

Nelson

Wellington

Christchurch

Dunedin

Invercargill

0   100 km

0   10 km

0   5 km

0   5 km

0   4 km

0   3 km

0   5 km

0   5 km

0   5 km

Access to environmental 'goods'

More

Less

1-3

2-3   1-2   Health-promoting

3-3   2-2   1-1   ← Neither

3-2   2-1

Less

Access to environmental 'bads'

More

3-1   ← Health-constraining

Note: 1 denotes the best access, 3 denotes the worst access
e.g. 1-3 means the best access to 'goods' and the worst access to 'bads'
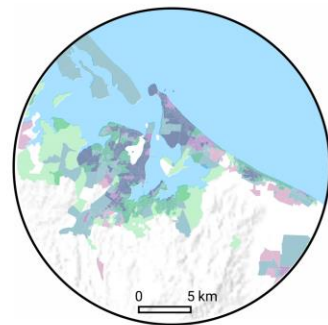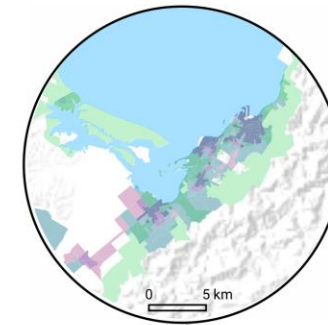
Discussion and limitations

- We provide simple measures of accessibility of environmental goods and bads in New Zealand and Healthy Living Index

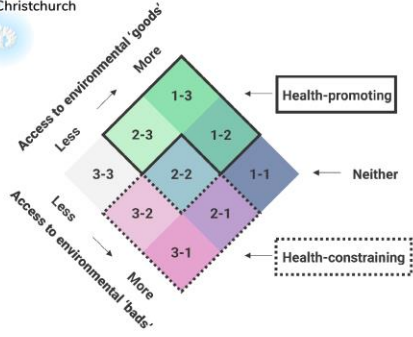- Accessibility | Needs | Preferences | Exposure

- 10 domains (only?)

- Qualitative measures of environment

  - aesthetics, safety, housing, …

- Smallest possible unit (MB2018) but still using administrative boundaries – MAUP?

Conclusion

- Using HLI we examined
  - how health-promoting *'goods'* and health-constraining *'bads'* co-occur in space
  - investigated socio-spatial patterning by area-level deprivation
- **In isolation**, proximity to features largely decreased as area-level deprivation increased
- **When considered together**, the population in most deprived areas experience increased accessibility of health-constraining and -promoting environments
- **Health-promoting/-constraining** environments in the **outer/inner suburbs** of major centres
- **High proportion of health-constraining** environments in **medium and small urban** areas
- Help in developing appropriate strategies and interventions for those areas that are most deprived and carry the greatest burden of disease
- **Data publicly available**

Marek, L., et al. (2020). Slipping under the radar: worsened health outcomes in semi-urban areas of New Zealand. NZ Med. J, 133(1519), 121-125.

THANK YOU

QUESTIONS?

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UC GeoHealth Laboratory > Publications, reports and data > Data

https://www.canterbury.ac.nz/science/research/geohealth/publications-reports-and-data/