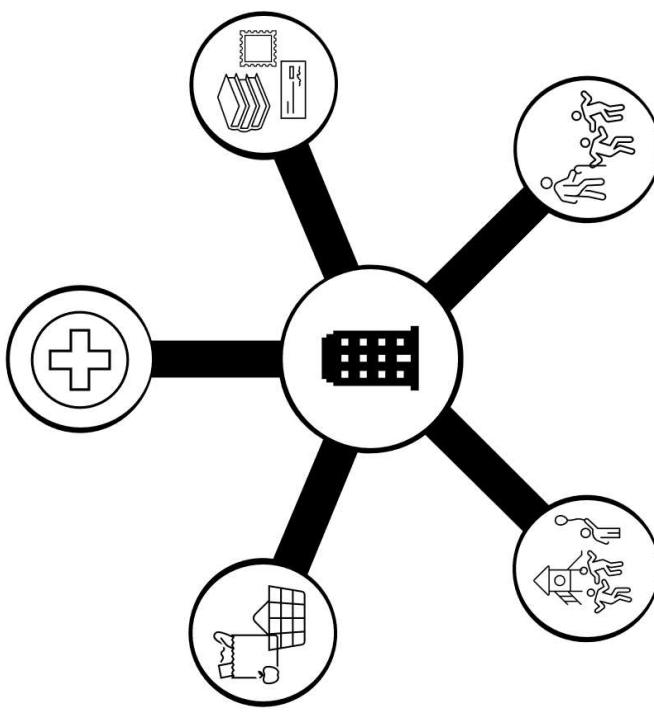


Towards caring 15-minute neighbourhoods



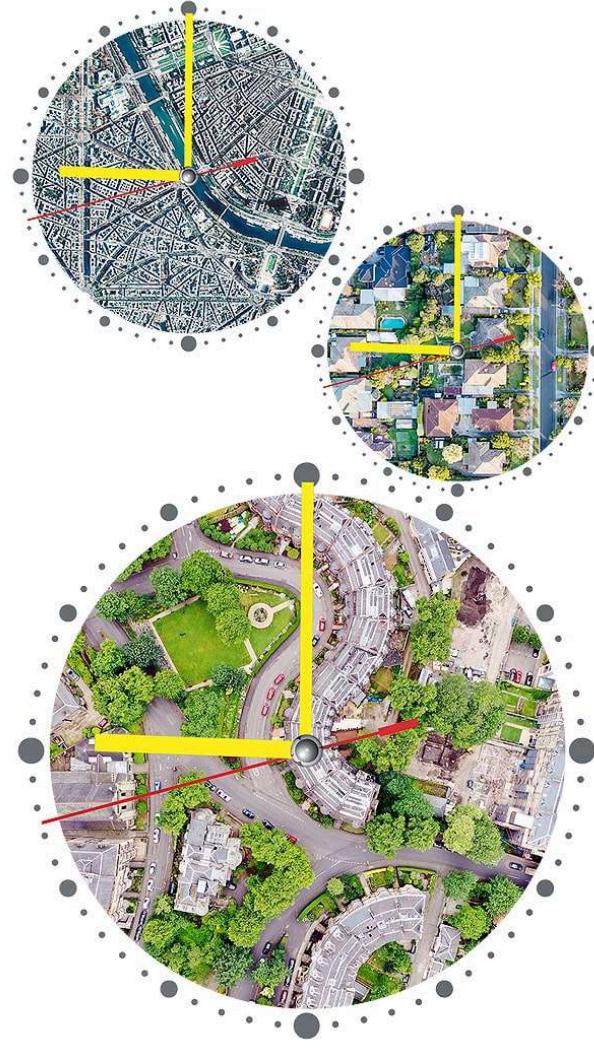
Anastasia Soukhov (McMaster University)

Léa Ravensbergen (McMaster University), Lucía Mejía Dorantes (Karlsruhe, Germany), Antonio Páez (McMaster University)

7th TRB International Conference on Women and Gender in Transportation: 10 September, 2024

The 15-Minute City

- a normative conceptualisation gaining ground in urban planning: reaching daily necessities/activities within 15* minutes by walk, bike*, and transit*. (Allam, Nieuwenhuijsen, Chabaud, and Moreno, 2022; Moreno, 2022; and Pratlong, 2021)
- Practical challenges:
 - Non-specific: 15-minutes? By which travel modes?
 - **For whom? To what destination?**



Shutterstock; Getty / Aerial views of Glasgow, Paris and Melbourne. Retrieved from *Financial Times article "Welcome to the 15 Minute City"* by N. Whittle in 2020

The 15-Minute City and Mobility of Care

- Mobility of Care is also a normative conceptualisation; coined in (Sánchez de Madariaga, 2013), emphasizes all travel needed to sustain yourself and the household, i.e., all non-paid work related travel.
- Mobility of Care trips are often: under 15 minutes, proximate to home, and more frequently conducted by non-car modes (than work trips). Pair well with the 15-Minute City conceptualisation
- **Guiding research aim:** a method to identify what neighbourhoods are, are somewhat, and are not 15-minute caring neighbourhoods

TRIPS BY PURPOSE - POPULATION 30-45 years, Madrid 2014

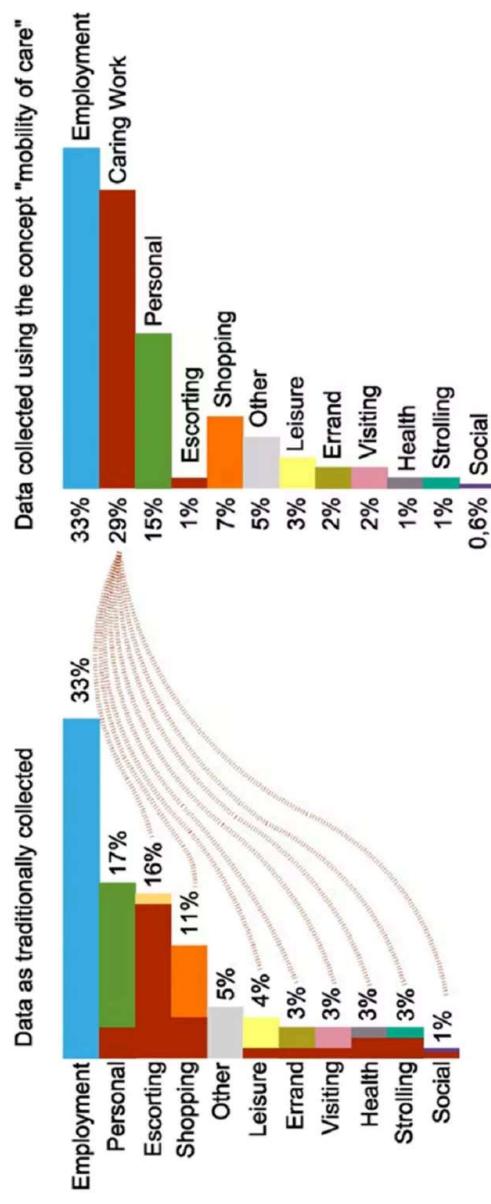
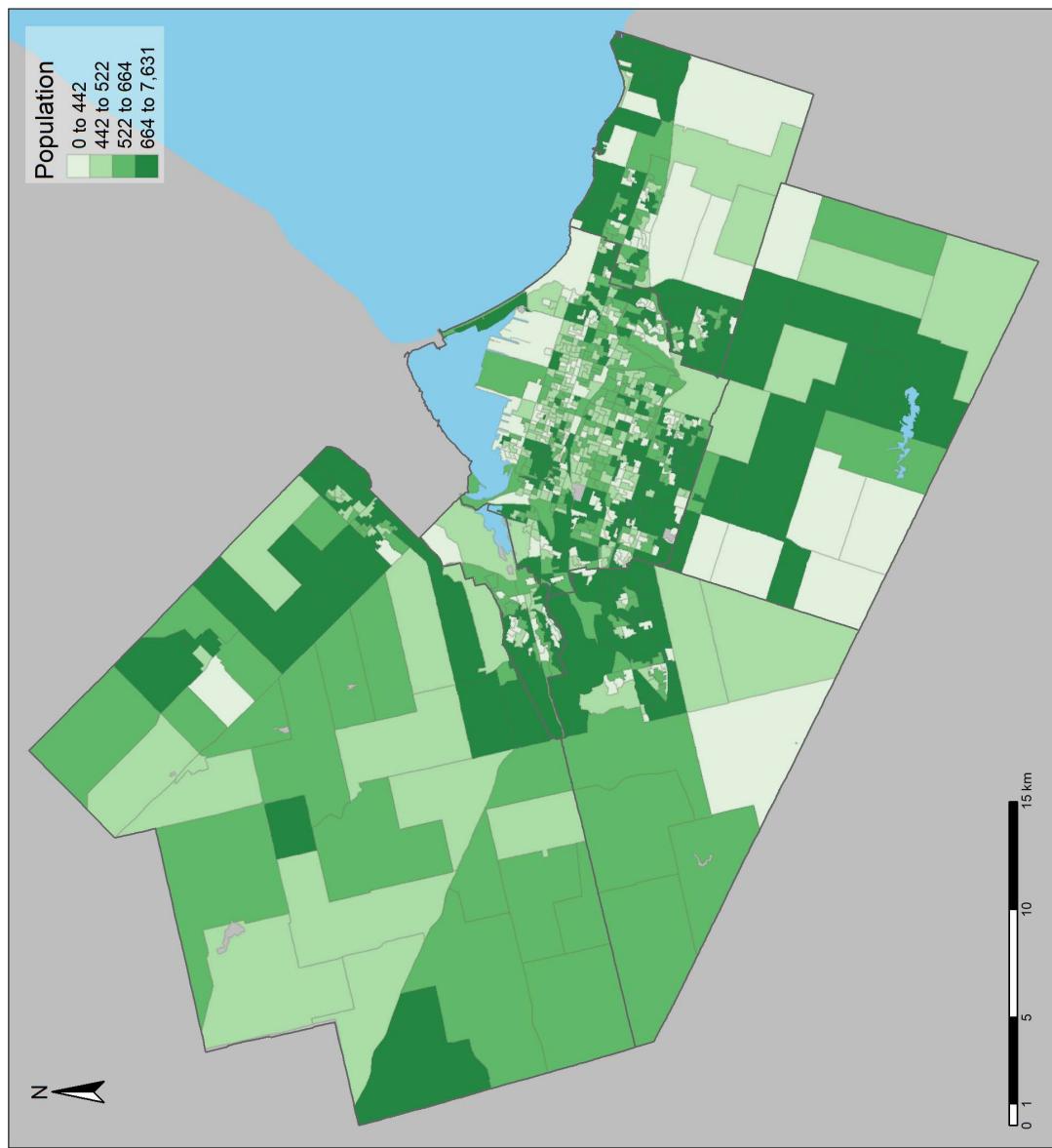


image from (Sánchez de Madariaga and Zucchini, 2019a)

■ Care Related Trips

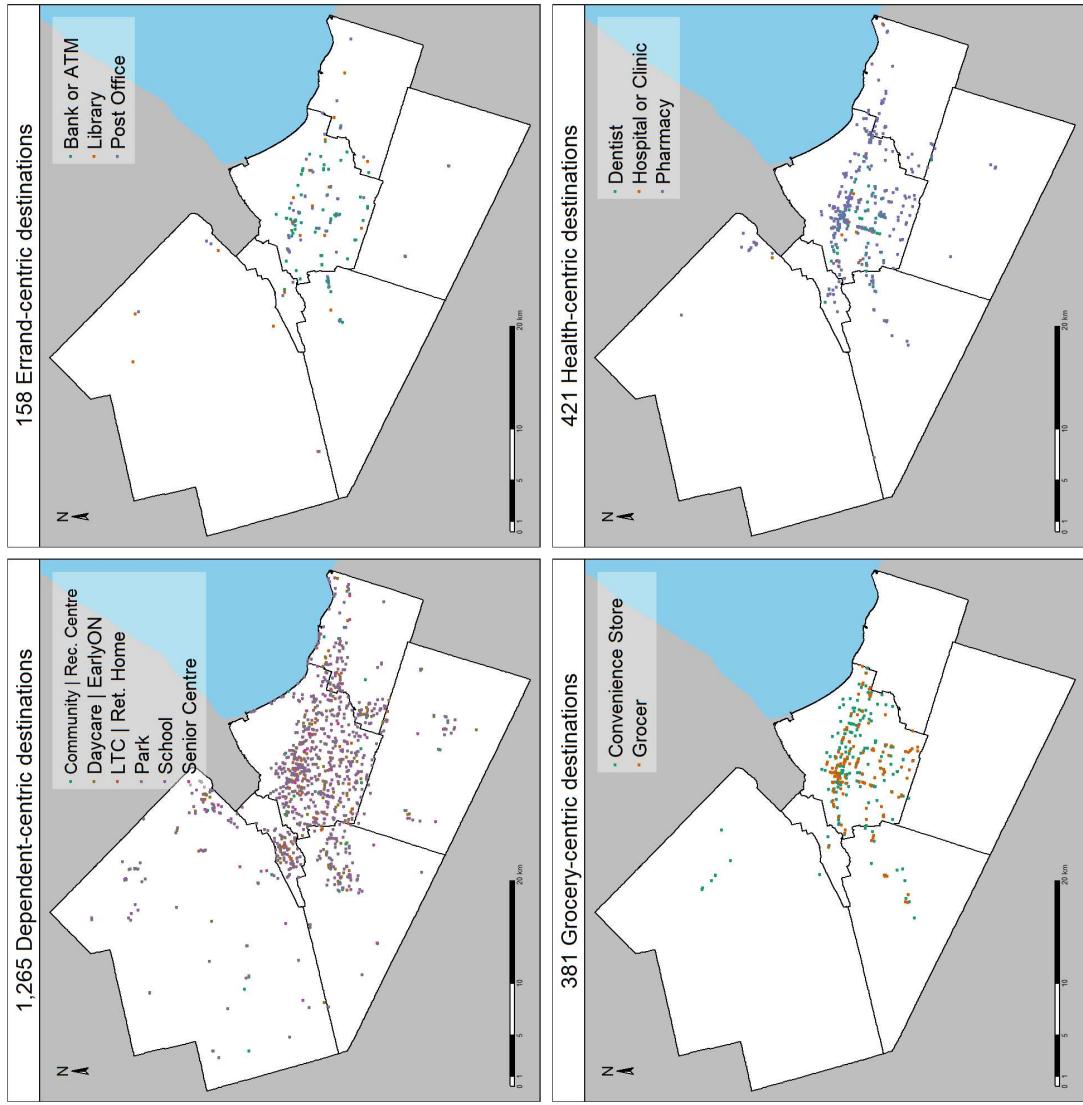
Case study: Hamilton, Canada

Research question: what neighbourhoods are, are somewhat, and are not 15-minute caring neighbourhoods?



Case study: Hamilton, Canada

Research question: what neighbourhoods are, are somewhat, and are not 15-minute caring neighbourhoods?



Quantifying 15-minute caring neighbourhoods

A) Spatial accessibility of care destinations

How many care destinations can be reached within a 15 minute walk? The *potential of opportunities for interaction* (Hansen, 1959).

- Dependent-centric care destinations
- Errand-centric care destinations
- Grocery-centric care destinations
- Health-centric care destinations

$$S_i = \sum_j O_j f(c_{ij})$$

- i is a set of parcel point origin locations; j is a set of destination locations.
- O_j is a number of opportunities at j .
- c_{ij} is the travel cost between i and j .
- $f(\cdot)$ is an impedance function of c_{ij} ; within the cumulative opportunity approach, it is a binary function that takes the value of 1 if c_{ij} is less than a selected value

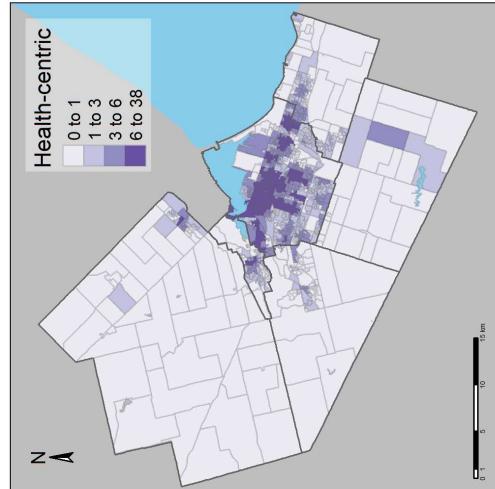
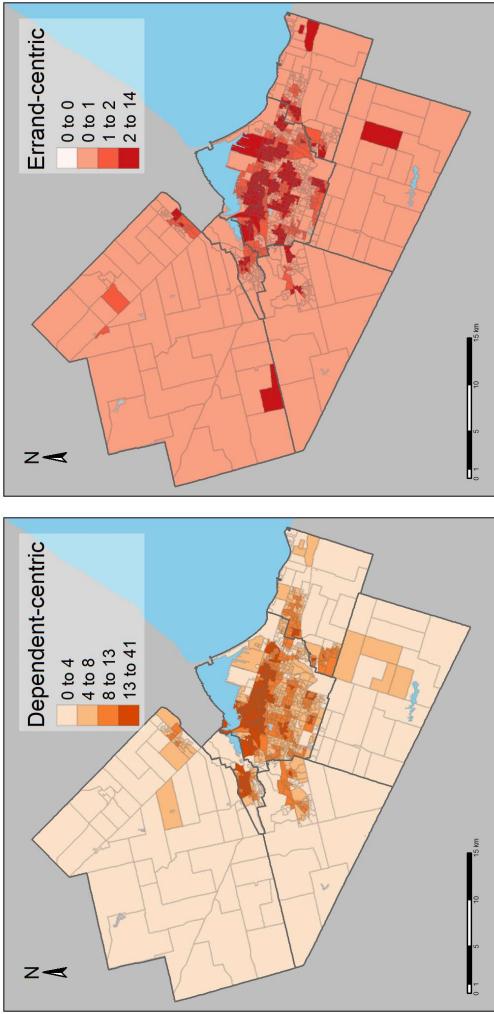
B) The diversity of categories

What is the mix of care destination types within a 15 minute walk? The entropy measure:

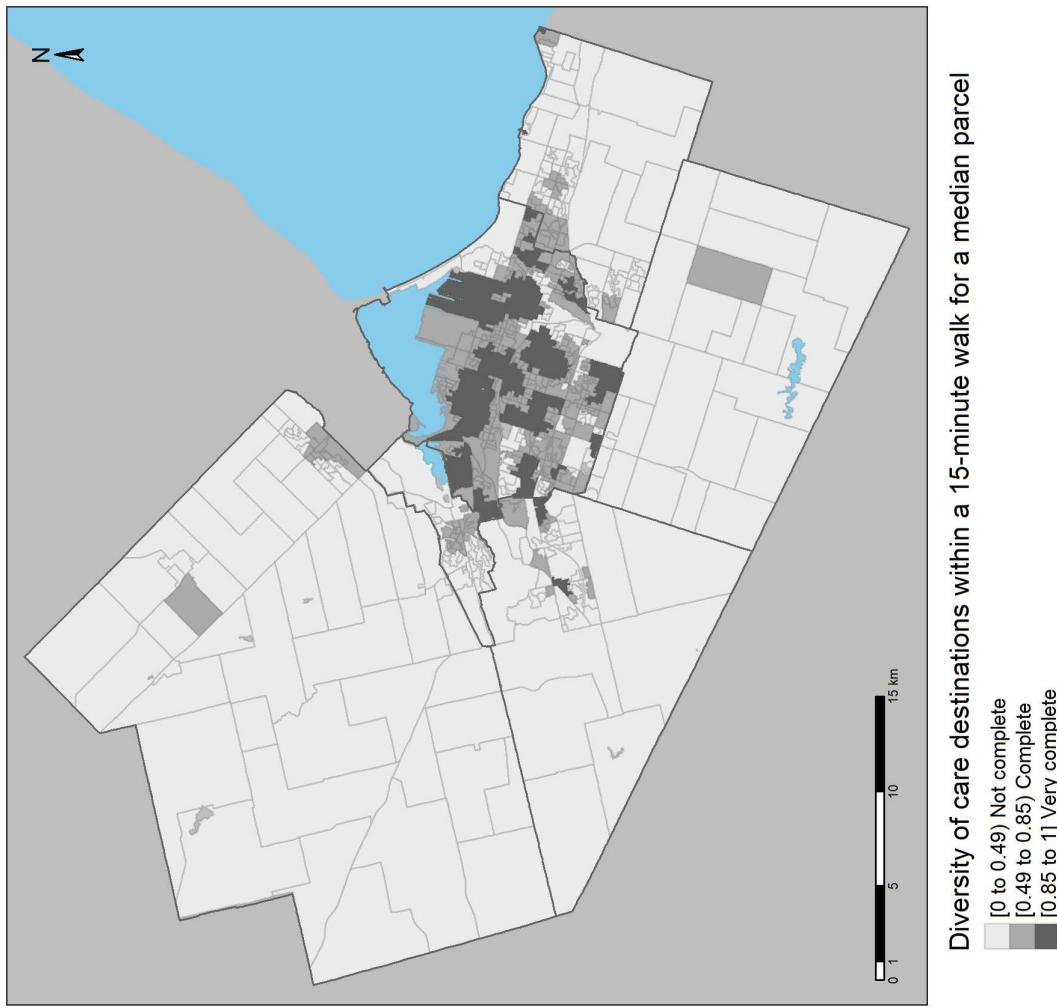
$$D_i = \frac{-\sum_c S_i^c / \sum_c S_i^c \times \ln(S_i^c / \sum_c S_i^c)}{\ln(n_c)}$$

Quantifying 15-minute caring neighbourhoods

A) Spatial accessibility of care destinations



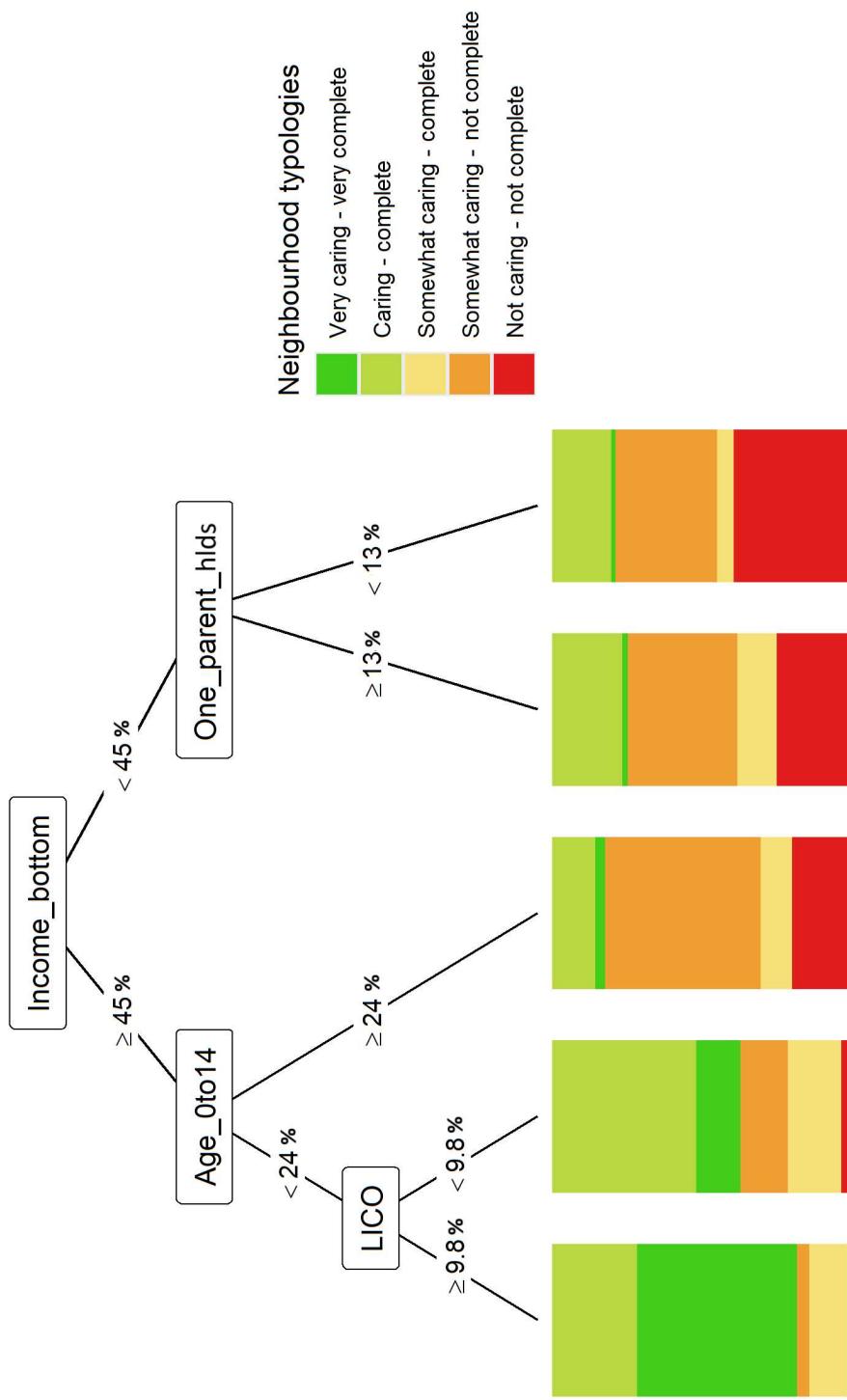
B) The diversity of categories



"Self Organizing Maps" typologies: 15-min caring neighbourhoods



Profiles of 15-minute caring neighbourhoods typologies



- Lower income households tend to reside in **very completely caring** or **completely caring** neighbourhoods;
- Those with a ↑ proportion of children tend to reside in **somewhat caring - not complete** neighbourhoods;
- Higher income households in DAs with a ↓ of single-parent households tend to reside in **not caring - not complete** neighbourhoods.

Conclusions

Implications of findings and future considerations:

- Gentrification concerns: populations residing in **very completely caring** neighbourhoods are often lower-income and those in **not caring - not complete** neighbourhoods are better-off.
- Potential to improve caring for children and children's self-maintenance:
 - Why do lower-income DAs with a  proportion of children, and DAs with  proportion single-parent households have (medium) **somewhat caring - not complete** access?
 - What barriers are they facing?

Recap:

- 15 minute-city is bridged with **Mobility of Care**: 15-minute caring neighbourhoods.
- A data-driven pattern recognition method (i.e., self-organizing maps) is used to create **15-minute caring neighbourhood typologies** using **accessibility** and **diversity** indicators.
- Used Self-Organizing Maps again to **profile** these typologies based on relevant **census variables**.
- Discussed implications: concerns about gentrification and mobility of care children's trips



Thank you for listening!

Any questions? Remarks?

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Anastasia Soukhover, soukhoa@mcmaster.ca

Léa Ravensbergen, Lucía Mejía Dorantes, Antonio Páez