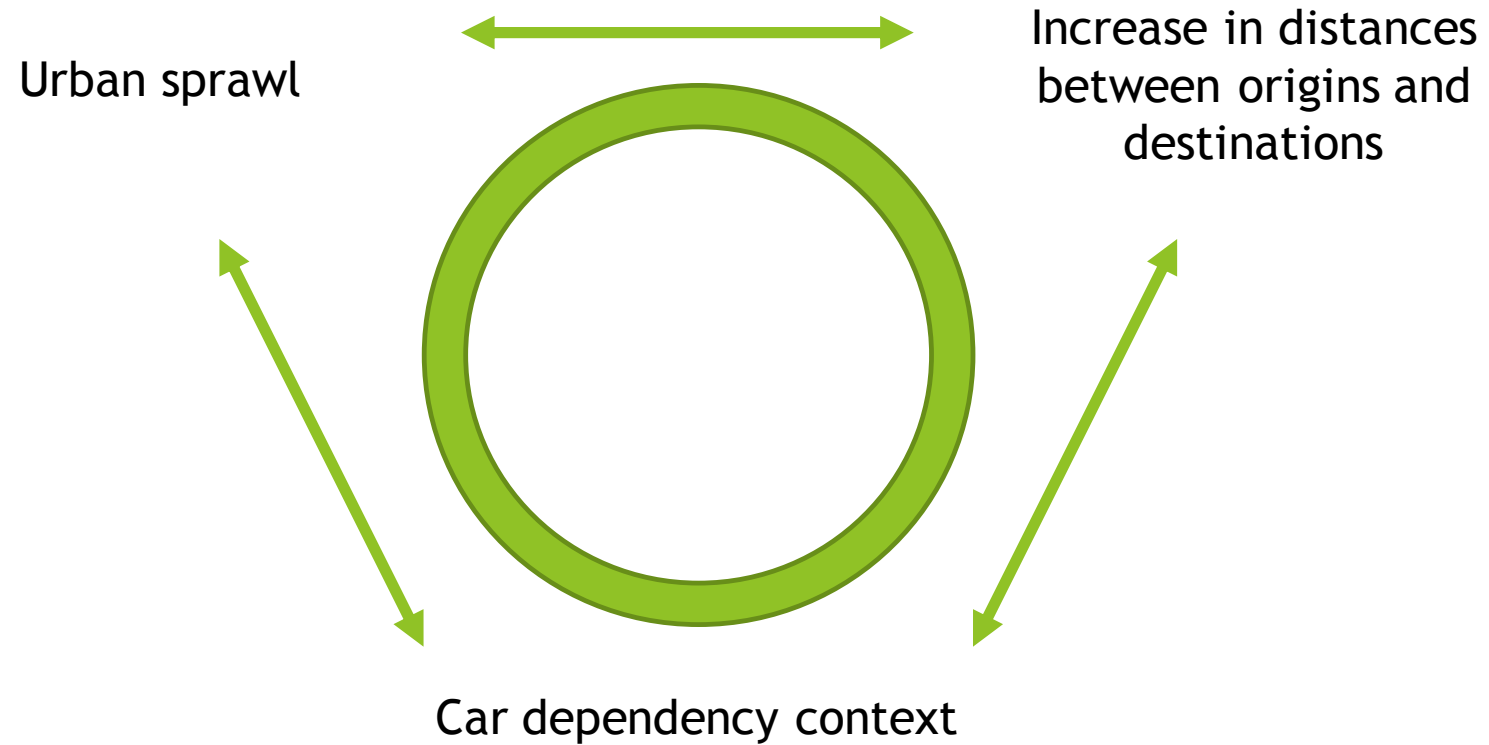


# Comparison of scenarios improving the distribution of local opportunities

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# Introduction



# Introduction

- ▶ Possible solutions to urban sprawl :

- ▶ Increase in density

- ▶ Increase in diversity of land use

- ▶ Controlling housing costs

- ▶ Controlling commuting (e.g. by tolls)



Optimization of the  
localization of  
proximity services

# Methodology

- ▶ Investigating two scenarios relocating opportunities proportionally to the night population and day population
- ▶ Study impacts of scenarios with 30% and 60% of restaurants closures
- ▶ Evaluating the effects of the virtualization of activities



Egalitarianism  
principle

Day population



Daily commuting to  
activities

Night population



Total virtualization of  
activities

# Methodology - Data

- ▶ Aggregation to the census tract level
  - ▶ In the Greater Montreal area
  - ▶ Census tracts limits from the Census of Canada of 2011
- ▶ Points of interest of proximity services
  - ▶ From the 2019 CanMap® Content Suite database of DMTI Spatial
- ▶ Night population and day population
  - ▶ Data from the Origin-Destination Survey of 2013
    - ▶ furnishes the population at midday

# Methodology

- ▶ Diagnostic of the current distribution of opportunities
  - ▶ Grocery Stores (3400)
  - ▶ Drugstores (1072)
  - ▶ Child Daycare Services (1414)
  - ▶ Restaurants (10 722)
- ▶ These opportunity types were chosen because :
  - ▶ Regularly frequented by the population
  - ▶ Still visited in times of lockdown

It is possible to use the methodology with other opportunity types.

# Methodology

- ▶ Indicators :
  - ▶ Opportunity density per thousand of people and per squared kilometer
  - ▶ Percentage of opportunities to be relocated if the scenario were to be implemented
  - ▶ Number of opportunities to be relocated per census tract
  - ▶ Risk indicator of restaurant closure

$$\text{Risk indicator} = \text{Number of restaurants} \times \frac{\text{Day population}}{\text{Night population}}$$

# Results - Diagnostic

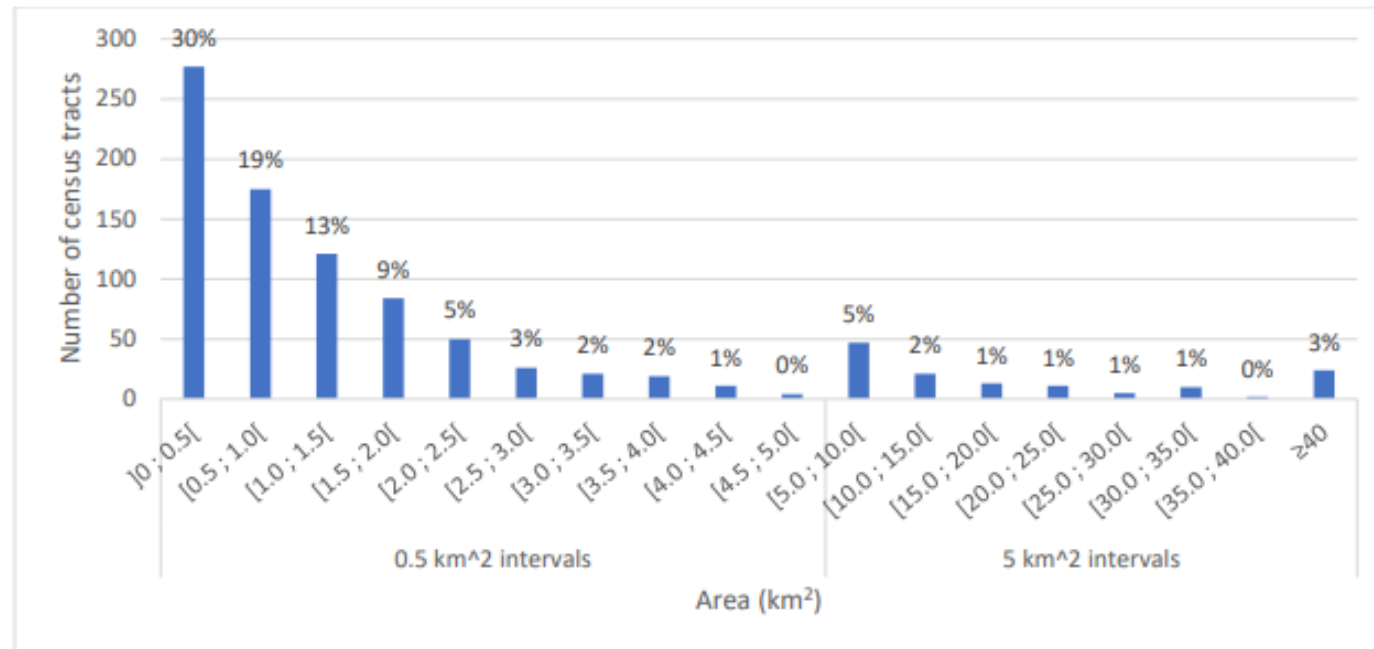


Figure 1 : Distribution of census tracts per area

- ▶ Heterogeneity in size
  - ▶ Delimitation of census tracts considering the population
  - ▶ Higher concentrations of population in downtown Montreal



# Results - Diagnostic

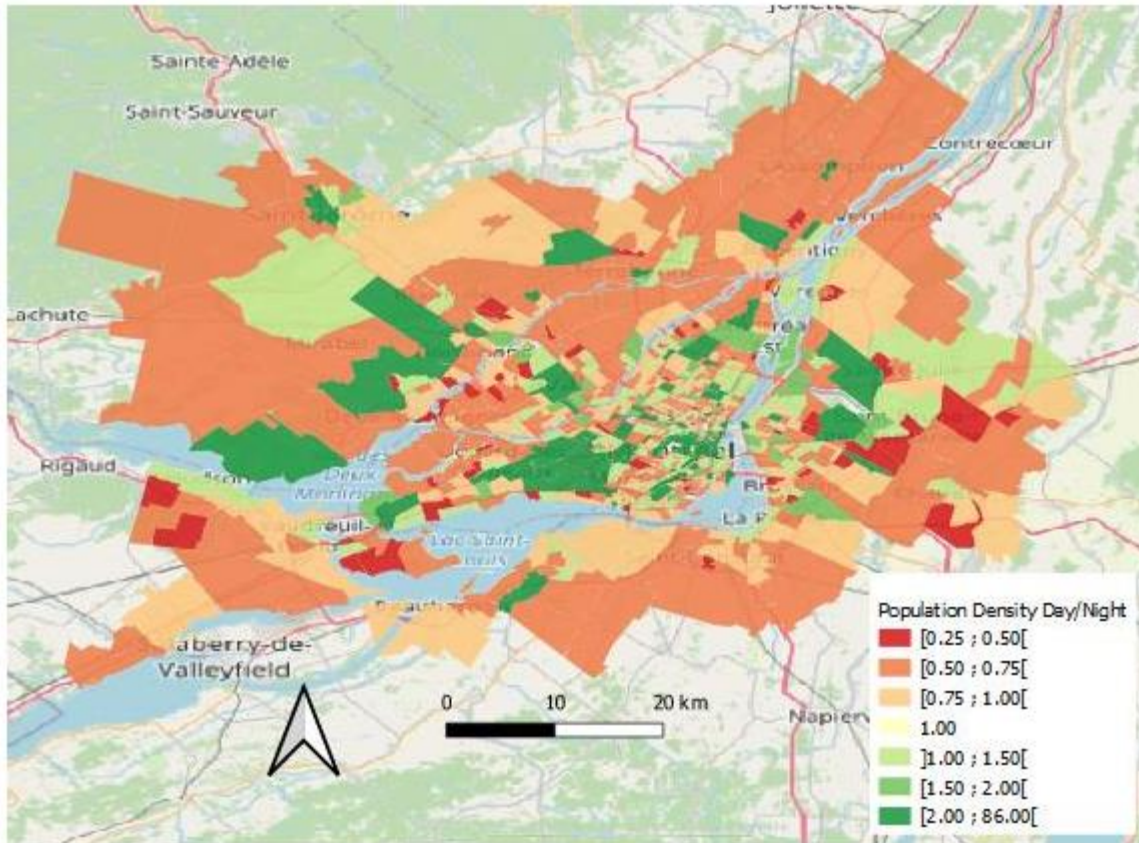
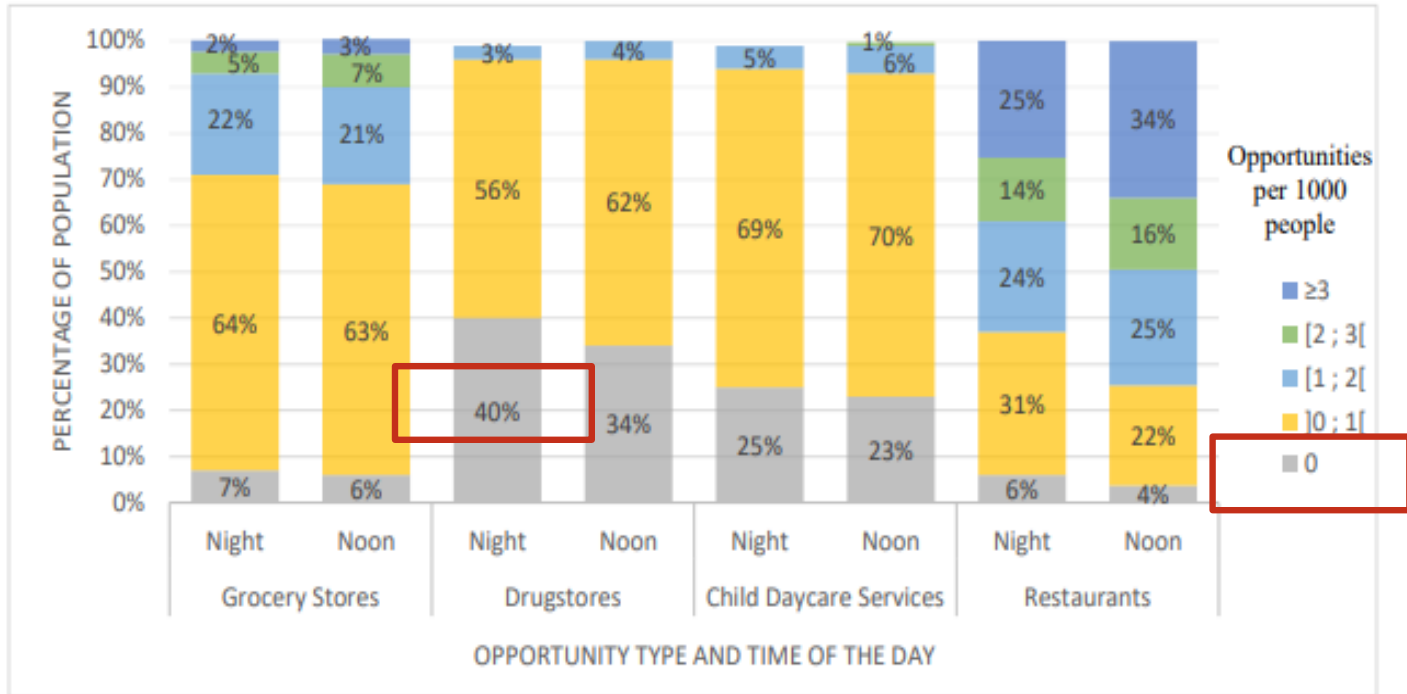


Figure 2 : Map of day population over night population ratio by census tract

- ▶ Night population up to 4 times more than the day population
- ▶ Day population up to 86 times more than the night population

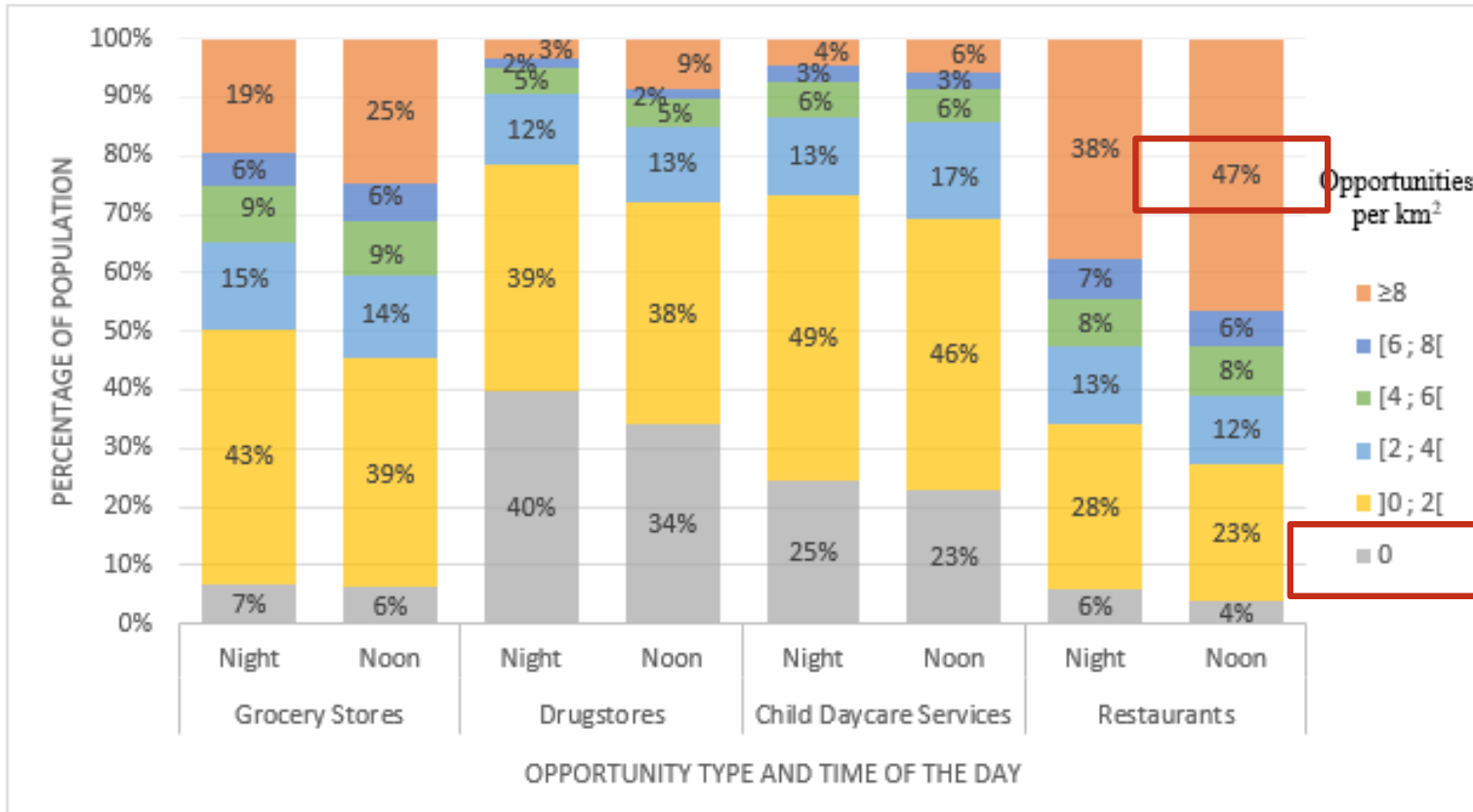
# Results - Diagnostic



► Higher proportion without opportunity during the night than during the day

Figure 3 : Night and day population distribution per opportunity density per thousand of people

# Results - Diagnostic



- ▶ Higher proportion without opportunity during the night than during the day
- ▶ 47% have more than 8 restaurants per km<sup>2</sup> during the day

Figure 4 : Distribution of the night and day population per opportunity density per squared kilometer

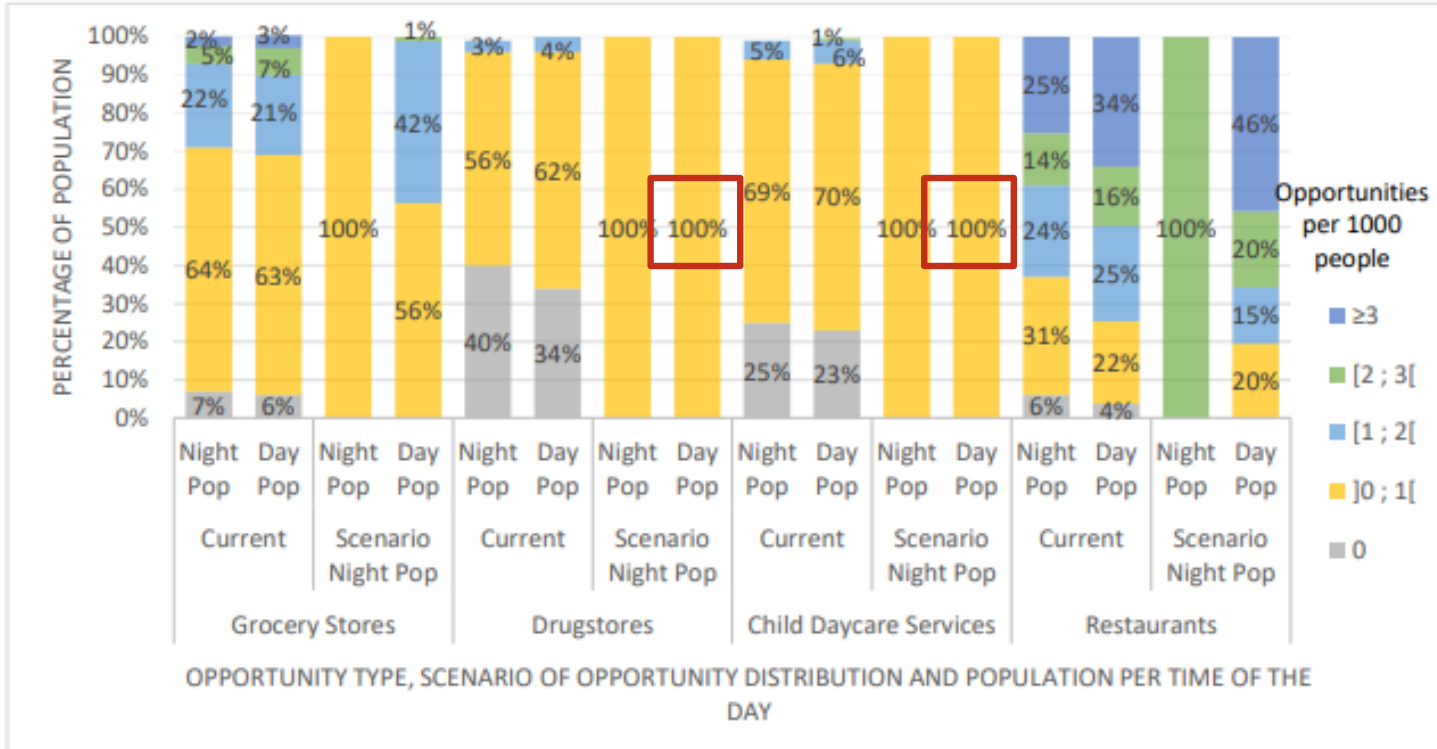
# Results - Scenarios

Table 1 : Percentage of opportunities to be relocated for the scenario to be implemented

<b>Scenario</b>	<b>Grocery Stores</b>	<b>Drugstores</b>	<b>Child Daycare Services</b>	<b>Restaurants</b>
Scenario Night Pop	34%	47%	39%	45%
Scenario Day Pop	35%	46%	42%	35%

- ▶ Drugstores are the least distributed proportionally to the population
- ▶ Grocery stores are the more distributed proportionally to the population
- ▶ Restaurants distribution corresponds more to the day population than the night population

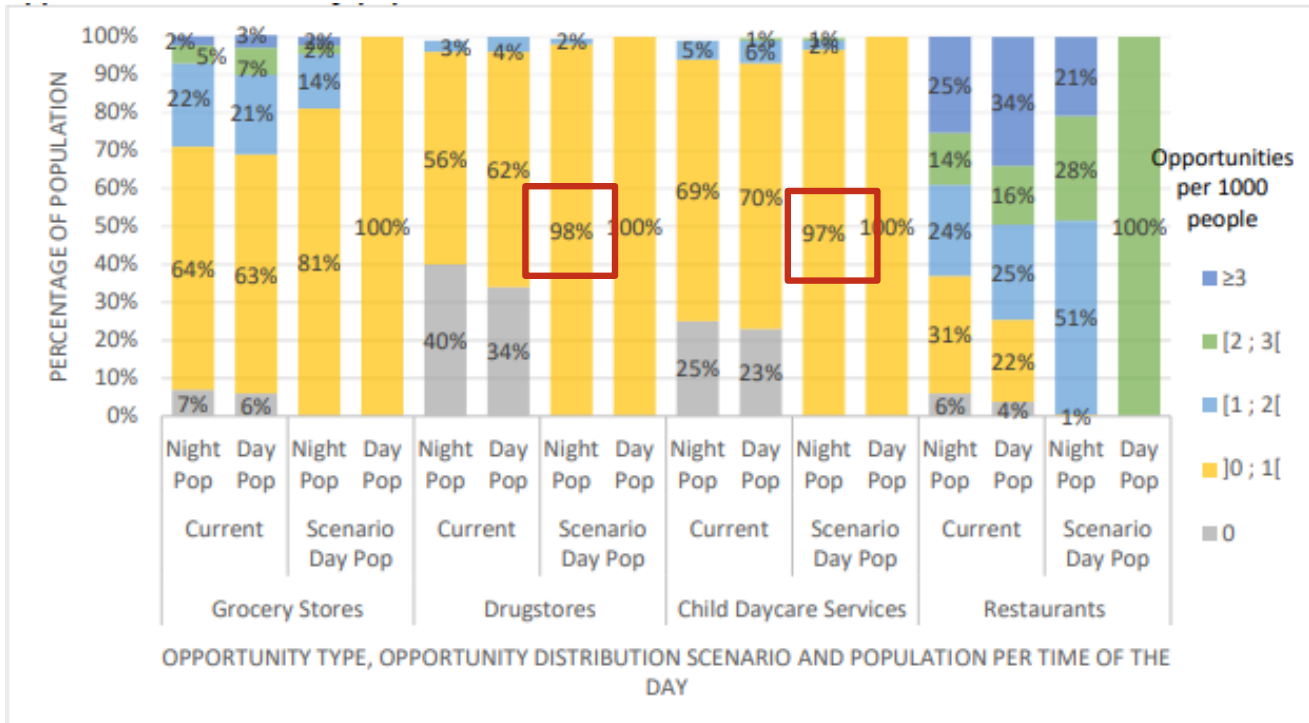
# Results - Night population scenario



- ▶ Total equity for drugstores and child daycare services, even with the day population

Figure 5 : Distribution of night and day population per opportunity density per thousand of people with the current distribution and the night population scenario

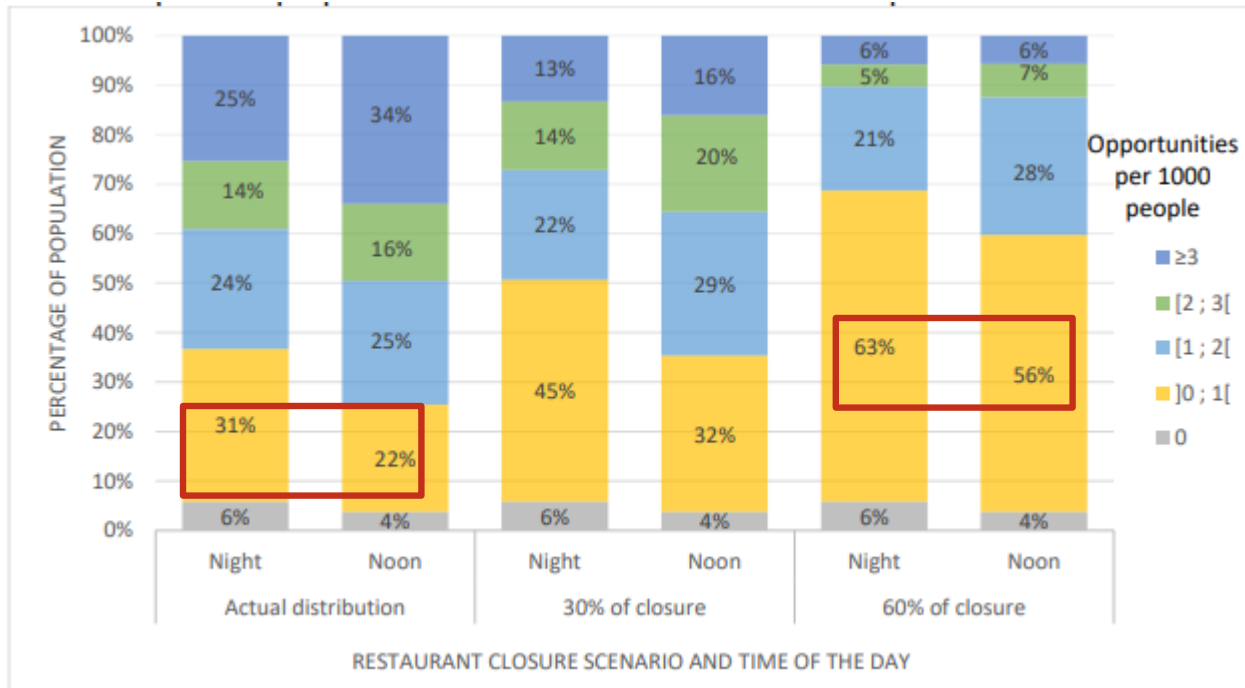
# Results - Day population scenario



- ▶ Increase in equity compared with the current distribution
- ▶ But less than the night population scenario increases the equity for the day population

Figure 6 : Distribution of night and day population per opportunity density per thousand of people with the current distribution and the day population scenario

# Results - Restaurant closures scenarios



- ▶ With 60% closures, more than the double of the population have access to less than 1 restaurant per thousand people in their census tract

Figure 7 : Distribution of night and day population per restaurant density per thousand of people with the current distribution and the scenarios of restaurant closures

# Results - Risk Indicator

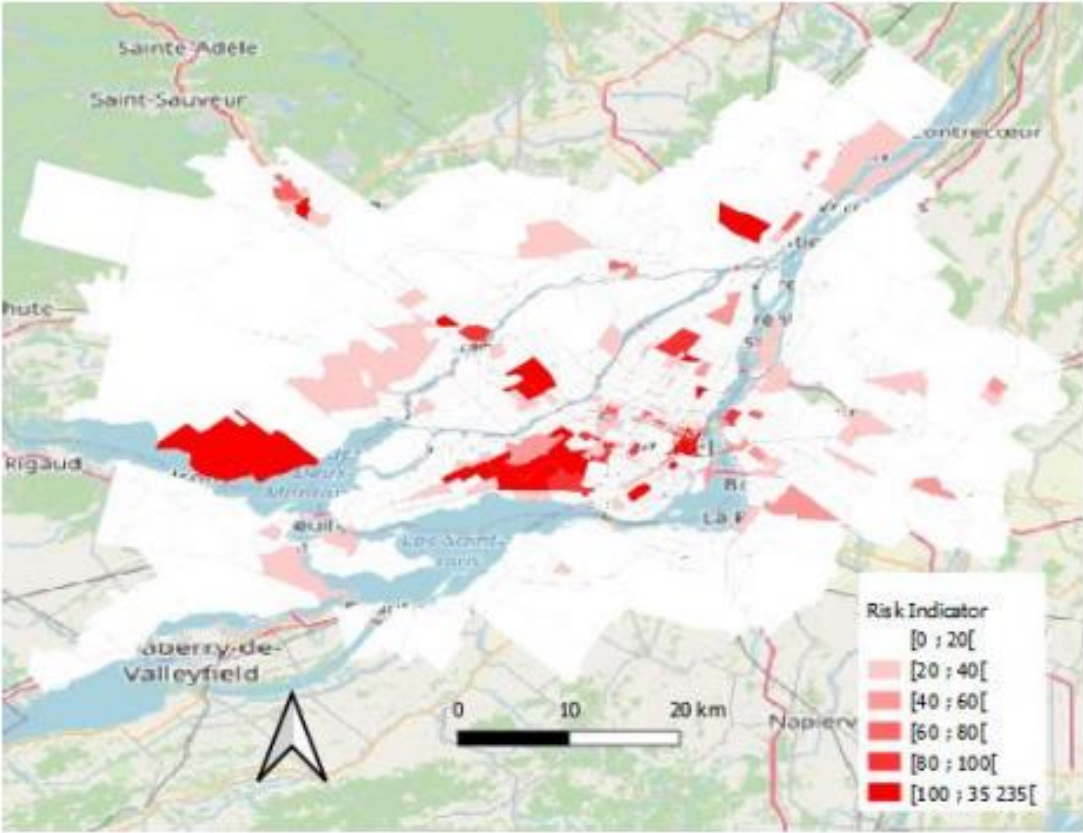


Figure 8 : Risk indicator of census tracts

Risk indicator interval

[0 ; 35 235[



# Discussion

- ▶ Increase in equity
  - ▶ For the two optimization scenarios studied
- ▶ Night population scenario confers more equity with the day population than the day population scenario does for the night population
  - ▶ Higher variability in the day population distribution
- ▶ Considering the potential increase in virtualization of activities
  - ▶ Beneficial to apply strategic planning based on the localization of the night population

# Limitations

- ▶ Study of theoretical scenarios only
  - ▶ Investigate the possible impacts of strategic planning
- ▶ Border effects due to the aggregation level
- ▶ All opportunities of the same type are considered equivalent
- ▶ Increase in e-shopping has not been considered
- ▶ Opportunity density is a normative, not positive, accessibility indicator
- ▶ Restaurant closures are supposed uniformly distributed
  - ▶ Risk indicator proposed to improve the analysis

# Conclusion

- ▶ Impacts of strategic planning considering the localization of the population
  - ▶ Everybody has access to opportunities in their area
  - ▶ Diminution of distances
  - ▶ Increase in active modes potential
- ▶ Investigating more on this subject
  - ▶ Refine the aggregation level
  - ▶ Study different scenarios
  - ▶ Evaluate the impacts of the virtualization of activities using the sum of person-hours per area

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