# Association between the Fast-Food Environment and Obesity in Canada: A Cross-sectional Analysis

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# Outline:

- **Background**
- **Research question**
- **Theoretical motivation**
- **Data and design**
- **Results**
- **Conclusion**

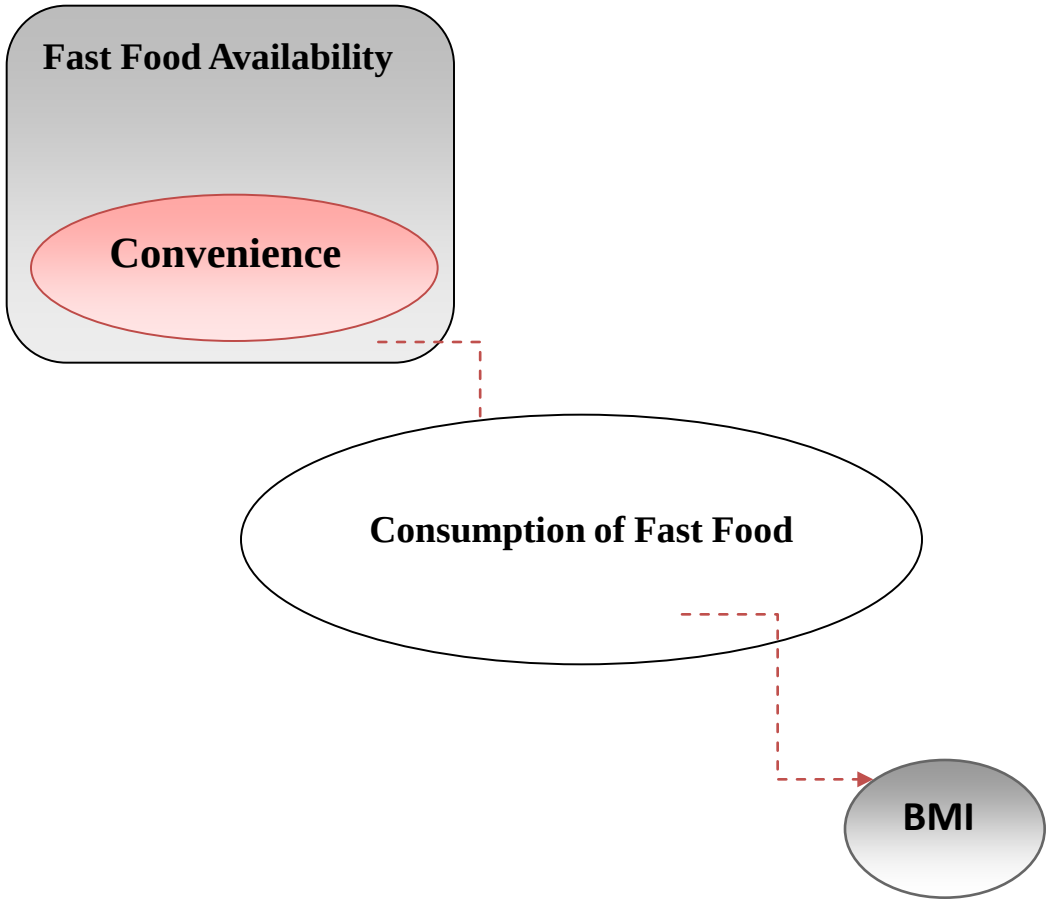
# Background

- Obesity is now considered an epidemic, both in Canada and internationally
- Conventional determinants cannot explain the dramatic increase
- Current interest in the influence of the built environment, especially growth in fast food outlets, as an important cause of obesity

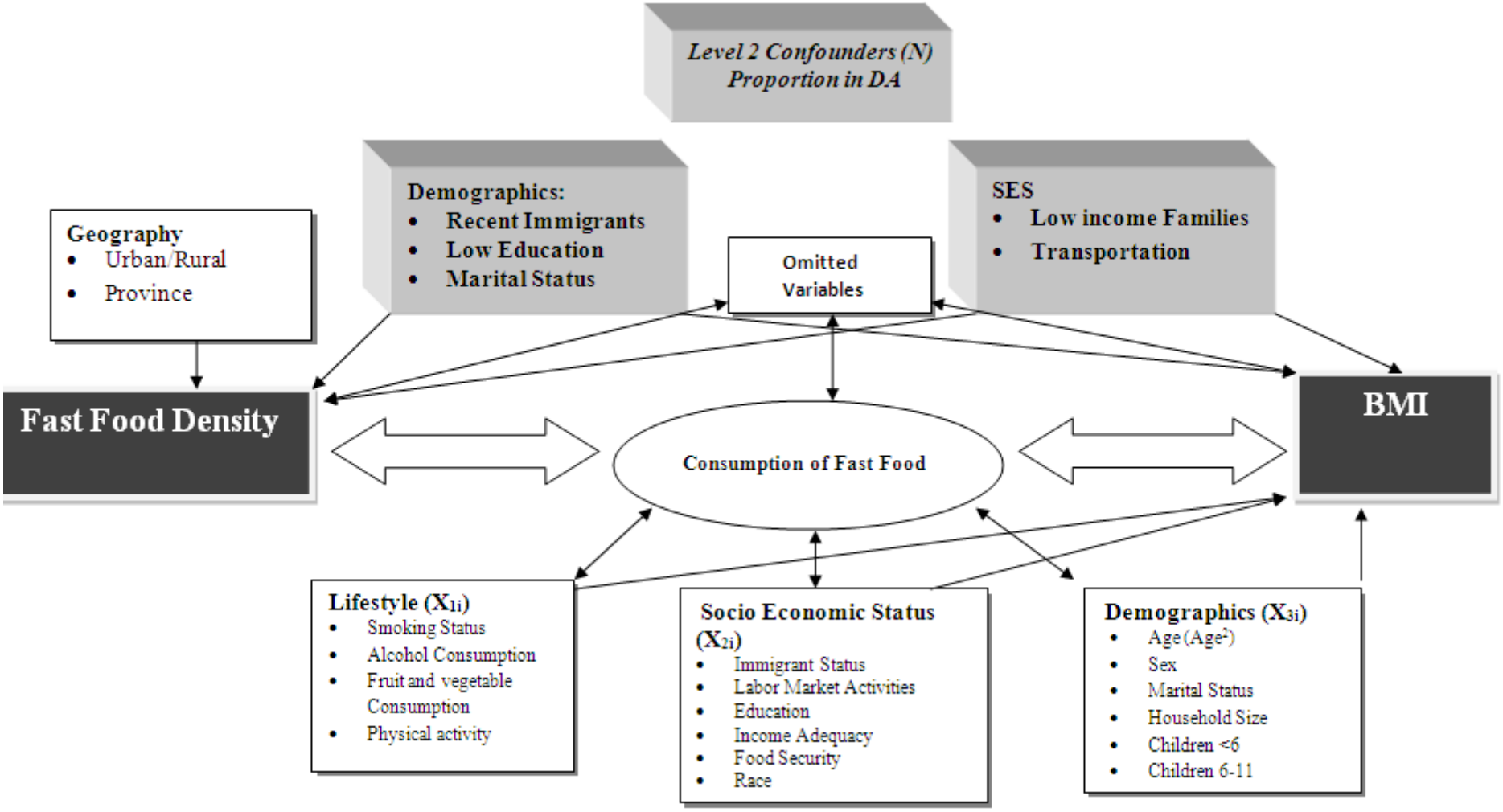
# Research Question:

- Does density of fast food restaurants, measured as the number of outlets per 10,000 people in ones neighborhood adversely effect BMI across Canada?

# Theoretical framework



# Confounding



# Data

## 2007-2008 Canadian Community Health Survey (CCHS)

- ❑ *Inclusion* : Adults (ages 18-65), provinces
- ❑ *Exclusion:* Missing or extreme BMI, breastfeeding women, pregnant women

- ***Full Sample: n=72,660***

## Canadian Census (2006):

- ❑ Neighborhood level confounders (Dissemination Area)

## Restaurant data (2008):

- ❑ Source: Info Canada ®, CFM leads
- ❑ Categorization based on 2008 Restaurant directory:
  - Fast food restaurants: Food is ordered and paid for before eating/take out
  - Full service restaurants: Customers are served food and pay after eating
  - Non-chain: Independent restaurants specific to a local area

# Implementation

## 1) Ordinary Least Squares Regression

**BMI=a + B0 + B1Density + B2Individual2 + B3Neighborhood3 + e**

**-Density=** Number of outlets within respondents 3 digit postal code (FSA) per 10,000

**Subgroup Analysis:** Sex, Central Metropolitan Area (CMA)

## 2) Spatial Econometric Regression

-Accounts for spatial heterogeneity of BMI

# Results: OLS Weighted Regression

Associated between BMI and Food Service Density

| Variables | β (95% CI) |
|---|---|
| **Fast food restaurant density** | **0.031 (0.017 to 0.045)** |
| Full service restaurant density | -0.061 (-0.11 to - 0.013) |
| Non-chain restaurant density | -0.014 (-0.019 to -0.008) |

Robust SE adjusted for clustering used

***Models controlled for***:

- Individual level demographic, socio-economic, behavioral factors and geography
- Neighborhood level socio demographic factors

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An increase in 5 fast food outlets per 10,000 people corresponds to a higher weight of:
**~1 Lbs. for someone 5”5**
**1.1 Lbs. for someone 6”**

# Results: Subgroup Analysis

## Central Metropolitan Area: Interaction by Sex

| Variables | β (95% CI) | |
|---|---|---|
| | **Males** | **Females** |
| **Fast food restaurant density** | 0.032 (0.001 to 0.063) | 0.041 (0.01 to 0.072) |
| Full service restaurant density | -0.1 (-0.19 to -0.002) | -0.008 (-0.1 to 0.08) |
| Non-chain restaurant density | -0.01 (-0.018 to -0.001) | -0.024 (-0.034 to -0.014) |

Robust SE adjusted for clustering used

***Models controlled for***:

- Individual level demographic, socio-economic, behavioral factors and geography
- Neighborhood level socio demographic factors

# Results: Aggregate (FSA) Analysis

## Spatial Regression

| Variables | Model | |
|---|---|---|
| | OLS | Spatial |
| **Fast food restaurant density** | **0.023 (0.006 - 0.039)** | **0.022 (0.006 to 0.038)** |
| Full service restaurant density | -0.024 (-0.079 to 0.030) | -0.024 (-0.078 to 0.03) |
| Non-chain restaurant density | -0.013 (-0.018 to -0.007) | -0.013 (-0.017 to -0.008) |
| Rho | | 0.11** (0.025 - 0.196) |

Robust SE adjusted for clustering used

***Models controlled for***:

- Individual level demographic, socio-economic, behavioral factors and geography

# Key Messages

**Availability of fast food is associated with BMI in a nationally representative sample of Canadians**

**The effect appears to be much stronger for females, and in urban areas**

**Availability of full service and non-chain restaurant density is inversely associated with obesity**

**Observed effects are robust to spatial heterogeneity**

# Conclusions

**Fast food availability is a (somewhat) modifiable neighborhood level risk factor**

**Policy Actions in Canada to some extent are underway**

**More can be done, can take some examples from the south**

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