

Overview of the Ontario Marginalization Index (ON-Marg)

July 6th, 2012

CENTRE FOR RESEARCH ON INNER CITY HEALTH

St. Michael's

Inspired Care. Inspiring Science.



RRASP

Réseau de recherche sur l'amélioration
de la santé des populations

PHIRN

Population Health Improvement
Research Network



Social Sciences and Humanities
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sciences humaines du Canada

Canada

What you can expect...

- Answers to the following:
 - What is ON-Marg?
 - Why was ON-Marg developed?
 - What makes up ON-Marg?
 - How is it currently being used?
 - How else can it be used?
 - Where to find ON-Marg?

Origin of Deprivation Indices

- Deprivation indices have been used for decades in the UK and elsewhere – Carstairs, Townsend indices
- In Canada, we have seen adoption of INSPQ deprivation index (Pampalon)
- Other deprivation indices in Canada – SERI (Manitoba), VANDI
- NZDep developed in New Zealand to provide a national standard
 - Results across studies can be compared on the same scale
- In Canada today, marginalization more appropriate (and broader) than deprivation

Area-Based Measures

- Usually based on aggregated personal information (e.g. from the census)
- Assumed to be capturing group characteristics that are more than the sum of individual characteristics

Area as an Individual-Level Proxy

- Some research uses area-based measures as a proxy for individual-level data when none is otherwise available
- Not everyone living in a marginalized area is marginalized – *ecological fallacy*
- *NZDep* - Acknowledging not all deprived people live in deprived areas, it was found that only 25-30% of the poor, those with no formal education and those belonging to the lowest occupational class lived in the most deprived quintiles

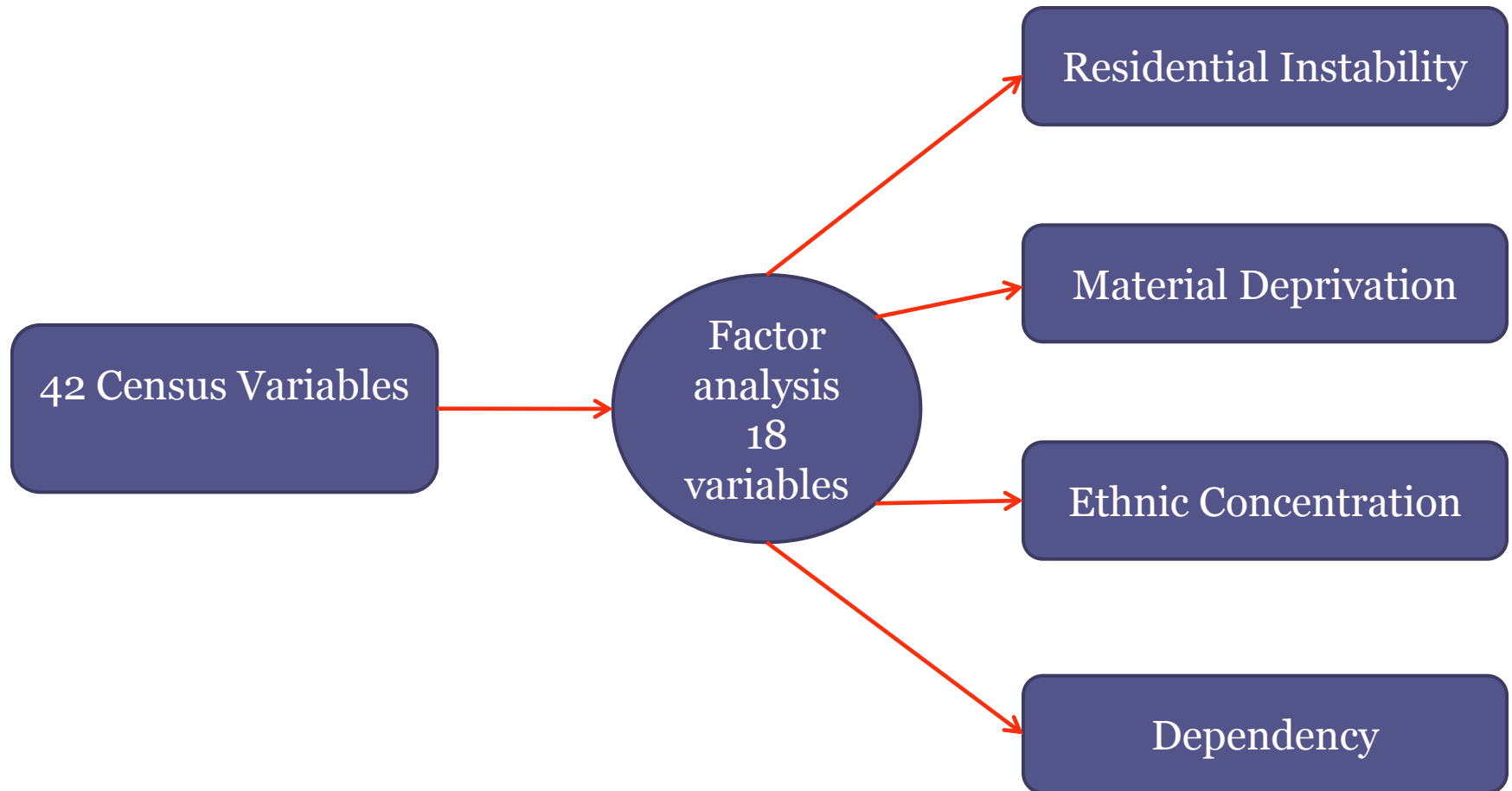
Purpose of ON-Marg

- To show differences in marginalization between areas
- To understand inequities in various measures of *health and social well-being*, either between population groups or between geographical areas

Creating ON-Marg

- Census-based, geographically derived index
- Developed originally as CAN-Marg in 2001 with census tracts (urban areas)
- 42 census measures used in principal components factor analysis
- Measures with low factor loadings were removed on an iterative basis
- Four factors emerged with 18 CT measures.

Dimensions of ON-Marg



Validation

- We repeated factor analysis using the same 18 census measures for dissemination areas (DAs) (2001 & 2006) and 2006 CTs
- Found to be empirically and theoretically stable across time and area, including rural areas
- Proved to be reliable across:
 - Census years (2001 and 2006)
 - Census geographies (CTs and DAs)

Dimensions and Census Indicators

Residential Instability	Material Deprivation	Dependency	Ethnic Concentration [^]
Proportion of the population living alone	Proportion of the population aged 20+ without a high-school diploma **	Proportion of the population who are aged 65 and older	Proportion of the population who are recent immigrants (5yr)
Proportion of the population who are non -youth (16+)*	Proportion of families who are single parent families	Dependency ratio (total population 0-14 and 65+/total population 15-64)	Proportion of the population who self-identified as visible minority
Crowding - average number of persons per dwelling*	Proportion of the population receiving government transfer payments	Proportion of the population not participating in labour force (15+)	
Proportion of dwellings that are apartment buildings	Proportion of the population 15+ who are unemployed		
Proportion of the population that is single/ divorced/ widowed*	Proportion of households that are low-income**		
Proportion of dwellings that are not owned*	Proportion of households living in dwellings that are in need of major repair		
Proportion of the population who moved within the past 5 years			

Using ON-Marg

- Each dimension represents a separate index with a standardized factor score for each area
 - E.g. the material deprivation index ranges from a score of -2 (low deprivation) to +6 (high deprivation)
- Each dimension/index is also available in quintiles
 - Q1 represents least deprived and Q5 the most deprived

Using ON-Marg

- Factor scores and quintile values are provided for every CT and DA in Ontario

Quintiles

instability_q_ CT06	deprivation_q_ CT06	dependency_q_C T06	Ethniccon_q_ CT06
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4	5	5	4
4	2	2	5
1	3	4	1
3	3	4	1
2	3	4	1
1	2	4	2

Factor scores

instability_C T06	deprivation_ CT06	ethniccon_CT 06	dependency_ CT06
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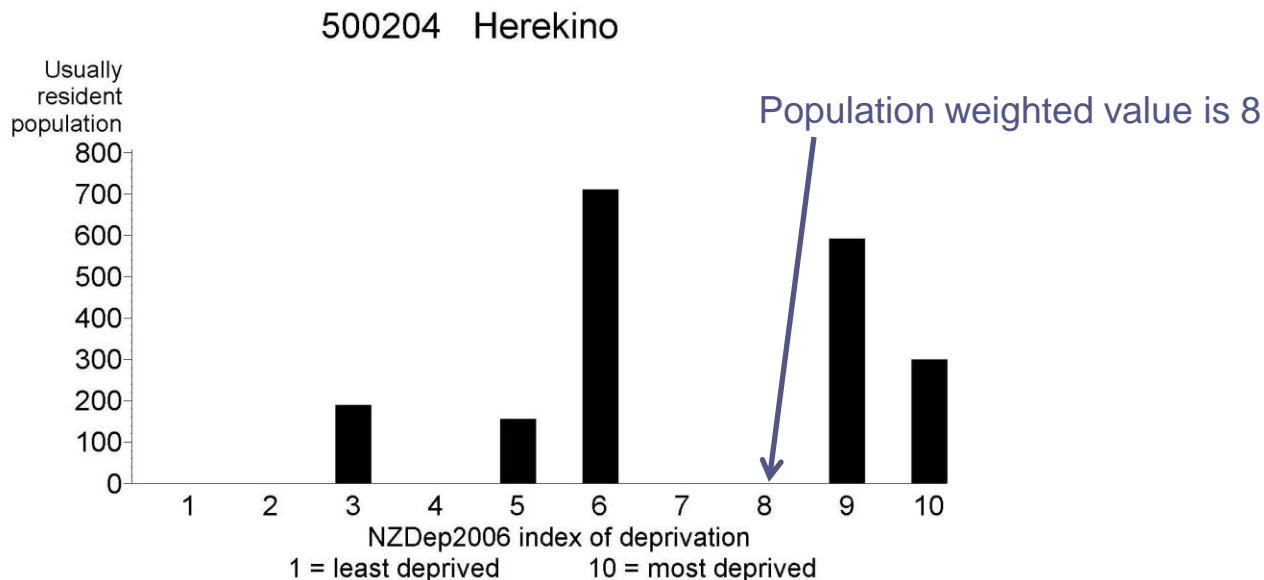
0.423422705	2.232990549	1.579814359	0.112671704
0.110892514	-0.539482787	-0.785339194	1.585061652
-0.908261873	-0.405595467	0.328543469	-0.954919773
-0.442368856	-0.002279728	0.167787271	-0.881859276
-0.837361813	-0.265881512	0.287255487	-0.81291657
-1.086845078	-0.508196924	0.349883641	-0.716724807

Higher Order Geographic Levels

- ON-Marg is available for public health units, sub-LHINs, LHINs, census divisions, census sub-divisions, and consolidated municipal service manager areas.
- Weighted population factor scores can be used to create custom scores for other areas.

Aggregation

- *Caution* – higher order levels have reduced heterogeneity. This will decrease the relationship between individual and area marginalization



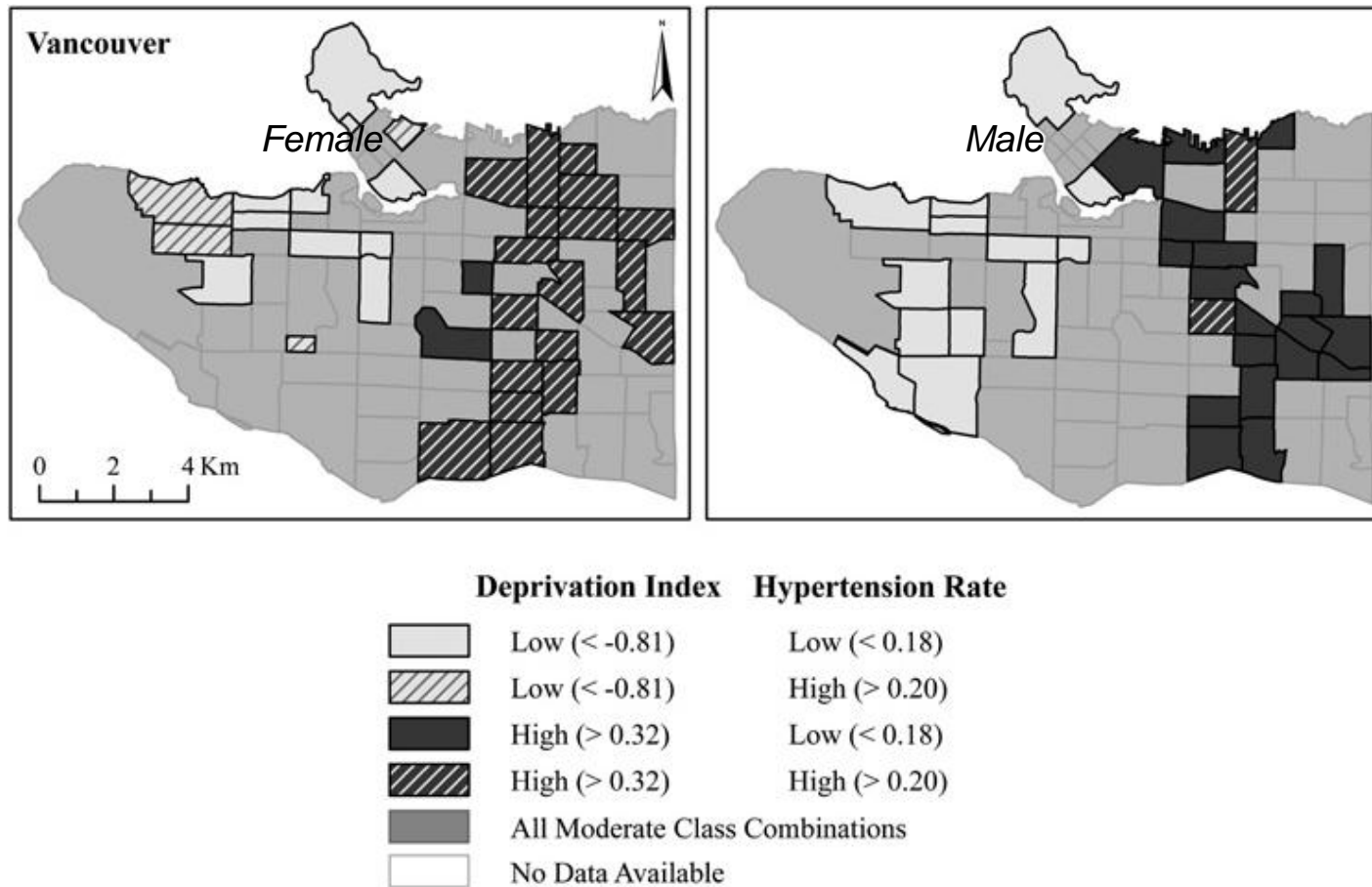
ON-Marg Uses To Date

- So far the index has largely been used in an academic environment
- CAN-Marg (precursor to ON-Marg) has been shown to be associated many health outcomes including hypertension, depression, body mass index and infant birth weight as published in a series of peer-reviewed journal articles

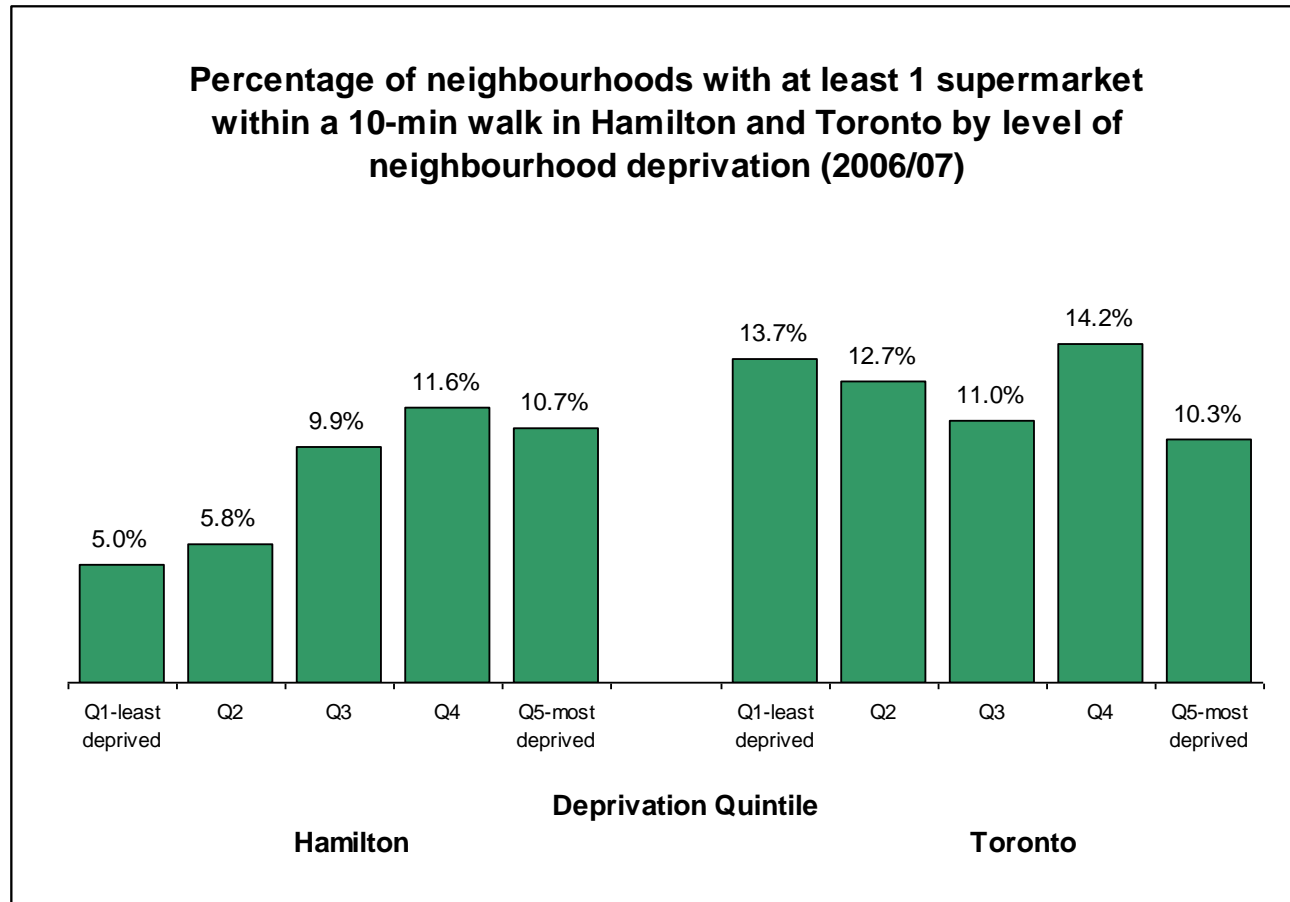
Health Indicators and Marginalization

Current smoker	Asthma
Binge drinking (<i>>5 drinks, \geq once/month</i>)	COPD (age 30+), Emphysema (age 30+), Chronic Bronchitis
Flu shot in past year	Self-reported health/perceptions
Overweight (<i>BMI ≥ 25 kg/m²</i>)	Self rated health (<i>poor/fair</i>)
Inactive	Self rated mental health (<i>poor/fair</i>)
Diabetes	Self-perceived stress (<i>quite a bit/extremely</i>)
Hypertension	Mood disorder/Anxiety
Heart Disease	Disability/Activity limitation (<i>sometimes/often</i>)

CAN-Marg and Hypertension

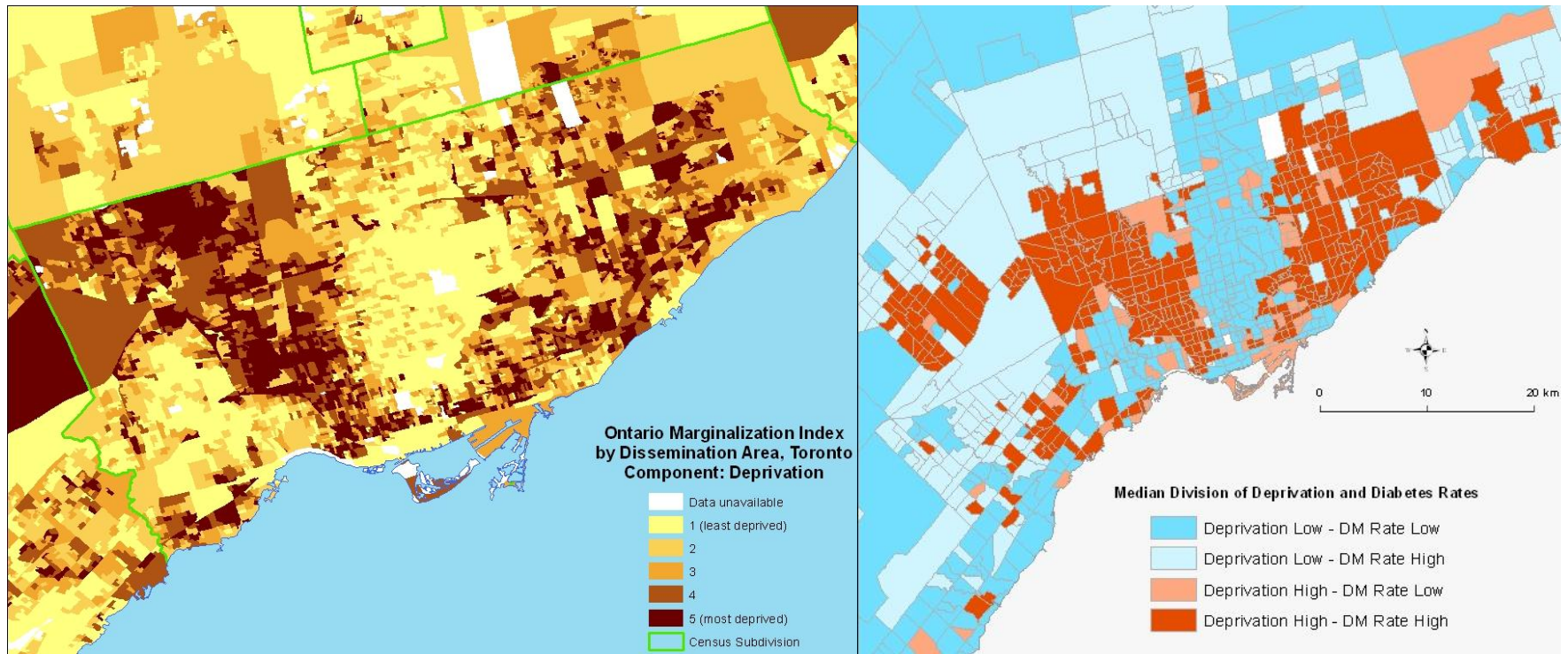


ON-Marg and Food Access

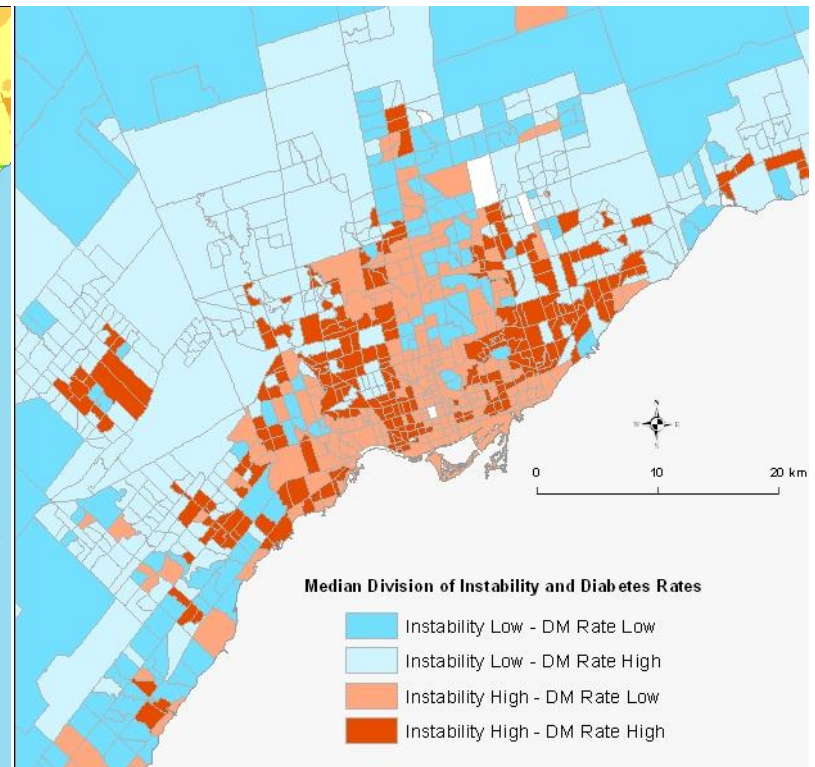
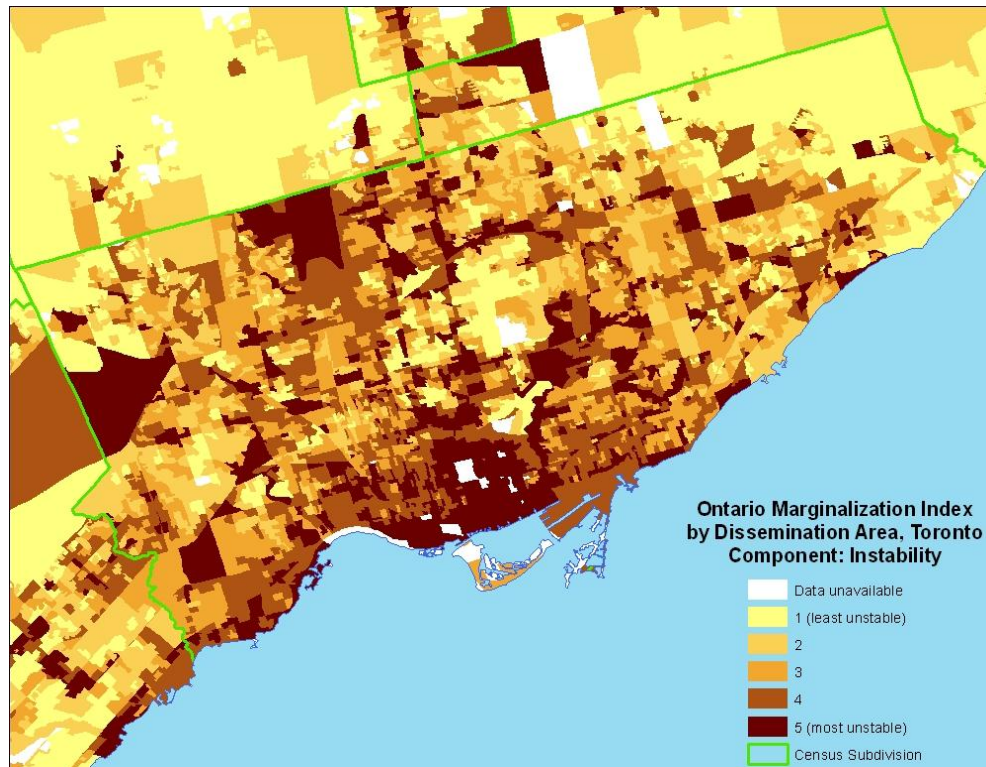


(Polsky, 2011)

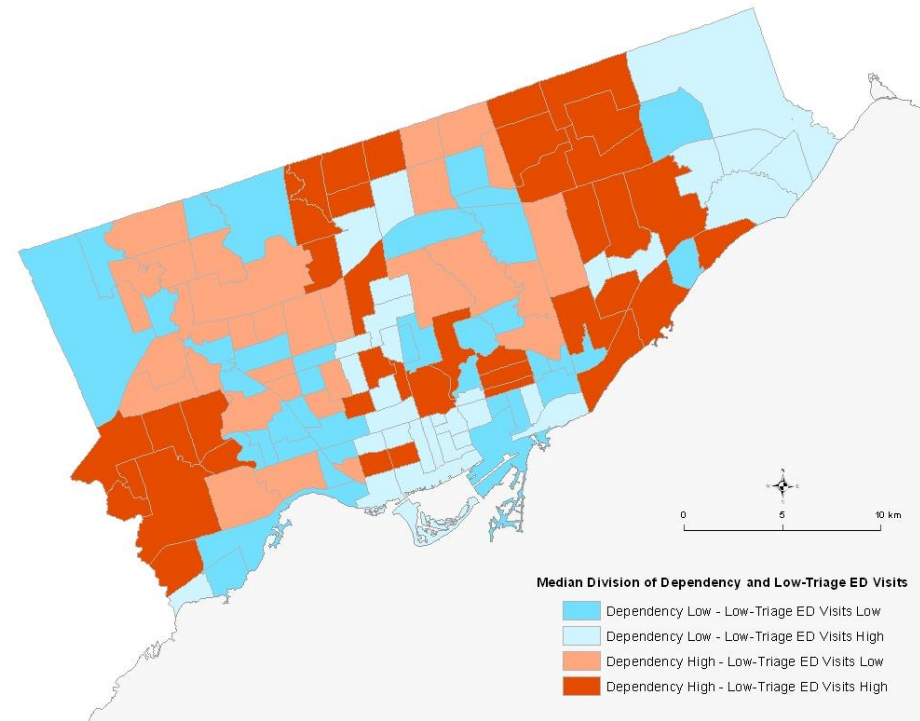
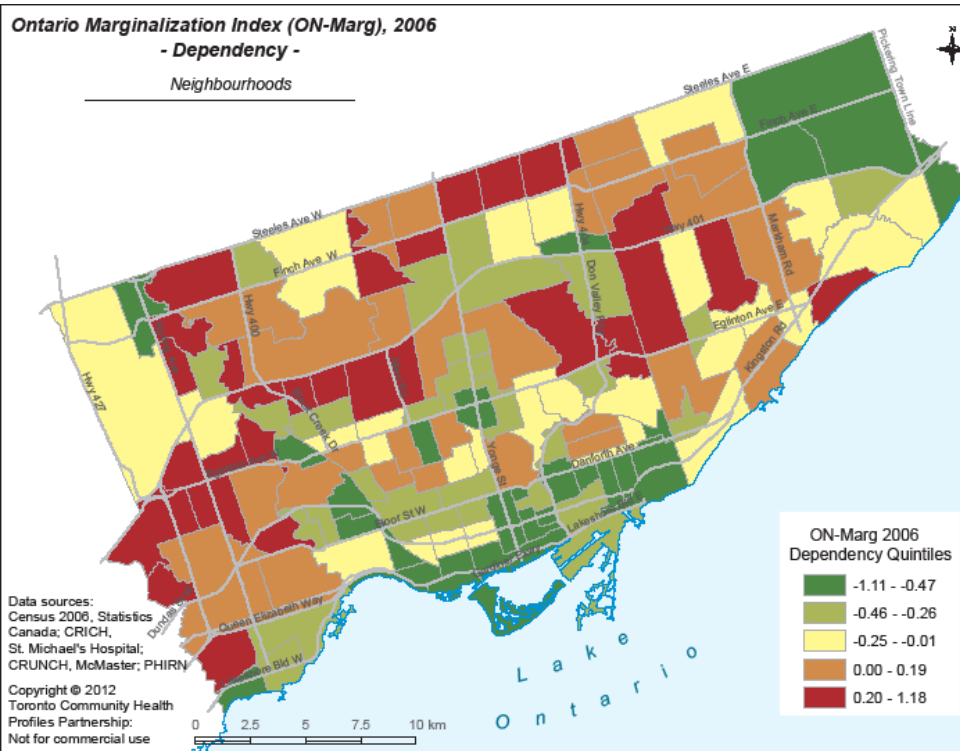
Deprivation in Toronto (CTs)



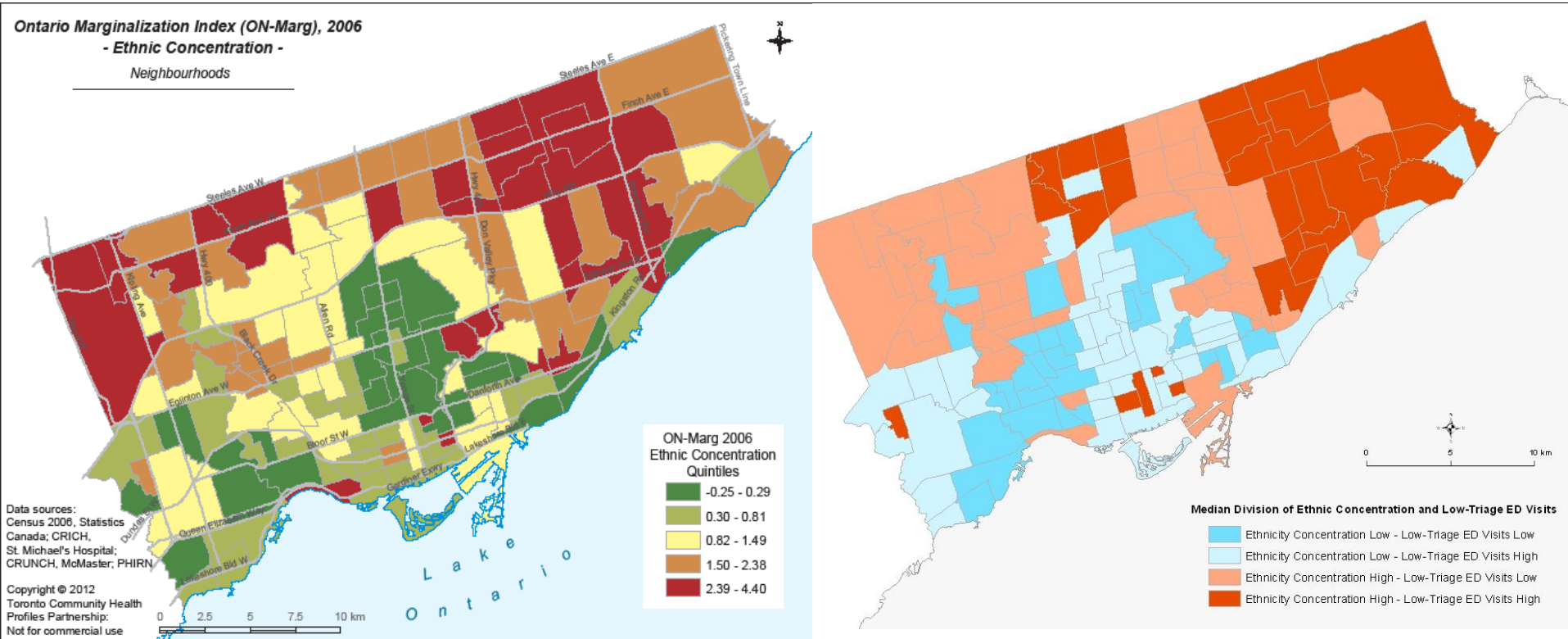
Instability in Toronto (CTs)



Dependency in Toronto (Neighbourhoods)



Ethnic concentration (Neighbourhoods)



Potential Uses of the ONMarg

1. Planning and needs assessment
 2. Monitoring inequities
 3. Resource allocation
 4. Advocacy
 5. Research
- *The benefit to ON-Marg is that it allows comparability across studies in Ontario*

Strengths & Considerations

Strengths:

- Simple to use.
- Easily understood by non-technical audiences.
- Accounts for multiple dimensions of marginalization.
- Generally aligns with current evidence related to marginalization relationships.

Considerations:

- Must apply appropriate dimension of interest and carefully consider combining dimensions.

Potential Error

- ON-Marg is recommended as an area measure, but in certain situations it could be used as proxy for individual marginalization
 - Smallest level of geography (i.e. DA) should be used to minimize error
 - Measurement error must be acknowledged when presenting results
- NZDep only found a weak correlation between individual and area level deprivation at the smallest level of geography

CAN-Marg & ON-Marg USERS

- **St. Michael's Hospital**
 - Research focus (Canadian & Ontario) – injury, low birth weight, hypertension, pedestrian and cycling collisions, immigrant health.
- **Region of Peel Health Services**
 - Early Childhood Development Indicators, Smoking, Emergency Room Visits.
- **Institute of Health Policy, Management and Evaluation, University of Toronto**
 - Injury
- **Institute for Clinical Evaluative Sciences**
 - Child health
- **Child Health Evaluative Sciences, SickKids Hospital**
 - Child obesity
- **Ministry of Child and Youth Services**
 - Early Childhood Development Indicators

Collaborations

- CIHI initiatives for CAN-Marg
 - Link to website
 - CPHA Panel – June 11 2012
 - Validation paper CJPH - pending

- Public Health Ontario (PHO) initiatives for ON-Marg (June 2012)
 - Link to Health Equity Impact Assessment (HEIA)
 - Link to Ontario Health Program Planner at PHO
 - Link to Association of Public Health Epidemiologists of Ontario (APHEO)for launch
 - Webinar July 13 2012

Where to get ON-Marg

- Available in excel format
- ON-Marg, as well as a comprehensive User Guide are available here:

<http://www.crunch.mcmaster.ca/ontario-marginalization-index>

CAN-Marg Peer Reviewed Articles

- 1 Matheson, F. I., Moineddin, R., Dunn, J. R., Creatore, M. I., Gozdyra, P., & Glazier, R. H. (2006). Urban neighborhoods, chronic stress, gender and depression. *Social Science & Medicine*, 63, 2604-2616.
- 2 Matheson, F. I., Moineddin, R., & Glazier, R. H. (2008). The weight of place: A multilevel analysis of gender, neighborhood material deprivation, and body mass index among Canadian adults. *Social Science & Medicine*, 66, 675-690.
- 3 Matheson, F. I., White, H. L., Moineddin, R., Dunn, J. R., & Glazier, R. H. (2010). Neighbourhood chronic stress and gender inequalities in hypertension among Canadian adults: a multilevel analysis. *Journal of Epidemiology and Community Health*, 64, 705-713.
- 4 Urquia, M. L., Frank, J. W., Glazier, R. H., Moineddin, R., Matheson, F. I., & Gagnon, A. J. (2009). Neighborhood context and infant birthweight among recent immigrant mothers: a multilevel analysis. *American Journal of Public Health*, 99, 285-293.
- 5 Lee, P. P. S. (2010). *Injury and Neighborhood Marginalization: Does it Matter Where You Live?* MSc University of Toronto, Toronto.
- 6 Matheson, F. I., LaFreniere, M. C., White, H. L., Moineddin, R., Dunn, J. R., & Glazier, R. H. Influence of neighborhood deprivation, gender and ethno-racial origin on smoking behavior of Canadian youth. *Preventive Medicine*, In Press, Corrected Proof.
- 7 Matheson, F. I., White, H. L., Moineddin, R., Dunn, J. R., & Glazier, R. H. (2011). Drinking in context: the influence of gender and neighbourhood deprivation on alcohol consumption. *Journal of Epidemiology and Community Health*.
- 8 Matheson, F.I., Dunn, J.R., Smith, K.L., Moineddin, R., Glazier, R.H. (2012) Development of the Canadian Marginalization Index: a new tool for the study of inequality. *Canadian Journal of Public Health*. In Press.

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