Social Determinants of Development of Children with Autism Spectrum Disorder: A Population-Level Study

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Disclosure Statement

I have no affiliation (financial or otherwise) with a pharmaceutical, medical device or communications organization.

BACKGROUND

- Autism Spectrum Disorder (ASD) is the most commonly diagnosed neurological disorder in Canada
  - 1 per 66 children diagnosed per year

- Limited information on jurisdictional profile of development of children with ASD

- Sparse evidence on the relationship between socioeconomic status (SES) and development of children with ASD
  - Both at individual and neighbourhood level

NEIGHBOURHOOD SES AND VARIANCE EXPLAINED IN DEVELOPMENT

	Typically developing CanNECD study	Children with special needs CCHICS study
Physical Health & Well-Being	23%	17%
Social Competence	18%	17%
Emotional Maturity	14%	12%
Language & Cognitive Development	28%	29%
Communication Skills & General Knowledge	29%	19%

CanNECD – Canadian Neighbourhoods and Early Child Development Study
CCHICS – Canadian Children Health in Context Study

OBJECTIVES

1. Determine neighbourhood developmental profile of children with ASD up to kindergarten age at national and provincial levels

2. Determine variance explained by neighbourhood SES in development of children with ASD at national and provincial levels

CanNECD🇨🇦 & CCHICS

- **CanNECD** - Canadian Neighbourhoods and Early Child Development Study
  - Investigate association between SES and children's developmental health at neighbourhood level, comparable across Canada - for typically-developing children

- **CCHICS** - Canadian Children Health in Context Study
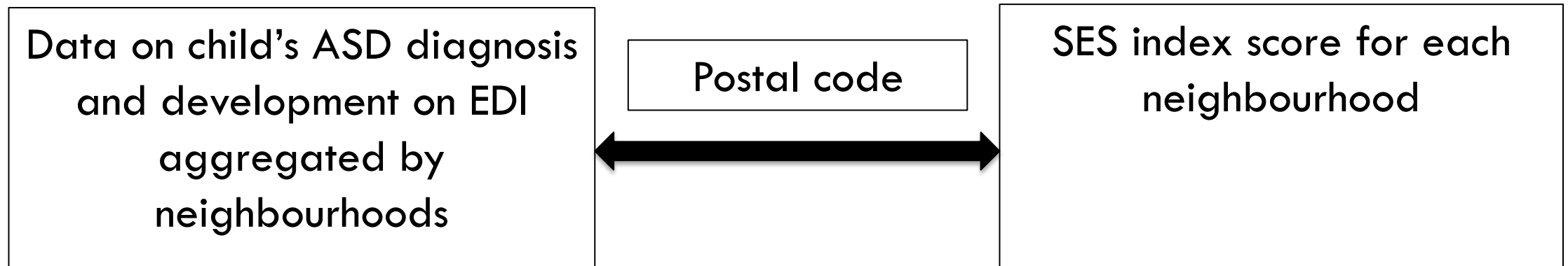 - Follow up study for children with special health needs

DATA SOURCES

ASD diagnosis and development data	SES data

- Derived from the **Early Development Instrument**
 	
- 103-item questionnaire completed by kindergarten teachers in second half of school year; Measures developmental health at school entry in 5 domains
 	
- A score below a baseline 10th percent cut-off on any domain indicates vulnerability
   - Overall vulnerability: Vulnerable on $\geq$1 domains
 	
- Since 2010, the EDI includes information on children's medical diagnosis
	- 2,358 SES variables from:
	   - Canadian 2006 Census
	   - 2011 National Household Survey
	   - 2005 and 2010 Taxfiler data
	
	- Created neighbourhood SES index with 10 variables based on relevance to children and families

Janus M, Offord, D.R. Development and psychometric properties of the Early Development Instrument (EDI): A measure of children's school readiness. Canadian Journal of Behavioural Science. 2007; 39:1-22.

SES INDEX

Marital Status	Percent separated or divorced
Education	Percent of those 25 to 64 with no high school diploma
Language/Immigration	Percent whose home language is a non-official language
Residential Stability	Percent of individuals, non-migrant movers in the past year
High Income	Percent at or exceeding twice the median provincial income, families with children under 6
Poverty	Percent below Low Income Measure, lone parents with children under 6
Dues	Percent deducting dues, families with children under 6
Social Capital	Percent families declaring charitable donations, families with children under 6
Wealth	Percent families with investment income or capital gains, families with children under 6
Income Inequality	GINI coefficient quintiles (income inequality), lone female parents with children under 6

METHODS

- Study period: 2010-2015

- Developed custom defined neighbourhoods as geographic units

- Calculated neighbourhood SES index score for 2011

Data on child's ASD diagnosis and development on EDI aggregated by neighbourhoods	Postal code ⟷	SES index score for each neighbourhood

METHODS

- Linear regressions used to examine variance explained by SES index and each of its components in overall vulnerability in a neighbourhood at national and provincial levels

DEVELOPMENTAL PROFILES OF CHILDREN WITH ASD

	Average % of vulnerability per neighbourhood					
	Overall vulnerability	Physical Health and Well-Being	Social Competence	Emotional Maturity	Language and Cognitive Development	Communication Skills and General Knowledge
Canada (2058)	**85.93**	**51.19**	**63.12**	**68.14**	**36.33**	**65.44**
Alberta (265)	86.38	59.05	66.92	69.60	43.13	68.35
British Columbia (297)	88.93	61.36	69.51	69.82	42.03	70.49
Manitoba (72)	87.20	58.41	70.21	71.59	48.72	68.92
Newfoundland (41)	80.99	48.65	63.67	65.72	32.21	67.73
Nova Scotia (57)	87.96	59.12	68.30	69.40	38.85	69.42
Ontario (790)	88.93	54.60	67.75	71.63	37.67	70.34
Saskatchewan (55)	85.13	61.21	64.97	70.86	47.53	65

% VARIANCE EXPLAINED BY SES INDEX IN OVERALL VULNERABILITY

Canada	**3.6**
Alberta	-1.9
British Columbia	3.8
Manitoba	7.4
Newfoundland	-9.1
Nova Scotia	-0.5
Ontario	3.4
Saskatchewan	-29.6

COMPONENTS OF SES INDEX NOT EXPLAINING ANY VARIANCE IN OVERALL VULNERABILITY

- % at or exceeding twice the provincial median income, families with children under 6

- % below low income measure, lone parents with children under 6

- % whose home language is a non-official language

- % of individuals, non-migrant movers in the past year

% VARIANCE EXPLAINED BY COMPONENTS OF SES INDEX IN OVERALL VULNERABILITY

	Canada	British Columbia	Manitoba	Ontario
% divorced, separated	**0.2**	0.1	-1.7	0.2
% below Low Income Measure, lone parents with children under 6	-0.1	0.7	5.7	-0.1
% of those 25 to 64 with no high school diploma	**0**	-0.3	-1.4	0.1
% deducting dues, families with children under 6	**0.1**	0.3	6	-0.1
% families declaring charitable donations, families with children under 6	**0**	-0.3	-0.7	0.4
% families with investment income or capital gains, families with children under 6	**0.2**	0.4	0.2	-0.1
GINI coefficient quintiles, lone female parents with children under 6	**0.1**	0.2	2.8	0

CONCLUSION

- A large proportion of children with ASD are developmentally vulnerable
  - Greatest concerns observed in emotional development

- Neighbourhood SES does not explain variance in overall vulnerability in some provinces
  - Explains small proportion of variance across Canada and some provinces

- Non-SES factors may play a more salient role in influencing development of children with ASD

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