

Creating a Pan-Canadian Database of Child Development and Socioeconomic Indicators for Research

CanNECD The Canadian Neighbourhoods and Early Child Development Study

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Background

Early Child Development

The early years of childhood are a key developmental period. Early experiences shape physiological pathways that have life-long protective or detrimental effects on health, well-being, learning and behaviour. But even though children's developmental trajectories are strongly influenced by early experiences, their outcomes are not set in stone. Policies and programs that support developmental health in early childhood can benefit physical and mental health and social functioning in adulthood. Thus, early childhood offers a window of opportunity that promises the greatest 'return on investment' in establishing policies and practices to optimize children's developmental health and help them succeed later in life.

The Canadian Neighbourhoods and Early Child Development (CanNECD) Database

We have created the **CanNECD Database**, a Pan-Canadian database of linkable EDI and neighbourhood data, allowing researchers to:

- monitor national developmental health trends;
- assess the impact of policy and program changes over time; and
- advance research that relates EDI measures to the social determinants of health.

Data Sources

- **EDI Data:** EDI data for five-year-old Canadian kindergarten children have been collected regularly since 2003-2004 in most provinces and territories (Table 1). Individual-level data are aggregated to school, neighbourhood, school district or province/territory to protect confidentiality and allow for the sharing of data with external researchers. **The CanNECD Database comprises EDI data on 798,298 children.**
- **Neighbourhood Data:** While versions of neighbourhoods already existed in some places, we used a standardized methodology to create neighbourhoods for all areas of Canada to ensure comparability. Geographic Information System (GIS) technology was used to map the home location of each student and the neighbourhood where they lived, resulting in **2,058 unique neighbourhoods.**
- **Socioeconomic Data:** Social and economic data were obtained from the Canadian Census and Income Taxfiler databases, and the **resulting 2,000+ indicators** were paired with each neighbourhood.

Data Linkage

- For each of the five developmental health domains of the EDI, we aggregated results for each neighbourhood in Canada. Linking EDI and neighbourhood data with socioeconomic indicators allows us to examine the impact of social and economic determinants of health on children's developmental health.

Research Opportunities

The unique combination of neighbourhood-level child development status and socioeconomic indicators allows us to explore relationships among social, economic and geographic variables in Canada.

We expect to engage other researchers studying child development and the social determinants of health by offering them an opportunity to access this powerful resource to address their own research questions. With data available over multiple years and for 12 of the 13 Canadian provinces/territories, studies using the CanNECD Database have the potential to **inform planning decisions and public policy on child developmental health, ultimately bettering the lives of children in Canada.**

Measuring Early Child Development

The Early Development Instrument

Throughout Canada, the developmental health of kindergarten children has been measured with the **Early Development Instrument (EDI)**, a population-level questionnaire completed by kindergarten teachers. The 103 scored questions of the EDI provide a broad spectrum of information about children's **vulnerability** across five domains of developmental health:

- Physical Health and Well-Being
- Emotional Maturity
- Communication Skills and General Knowledge
- Social Competence
- Language and Cognitive Development



Neighbourhood Effects

Developmental health outcomes follow socioeconomic gradients in our society. Developmental vulnerability can differ by as much as 10-fold across Canadian neighbourhoods. These discrete geographical units share social, cultural, demographic and socioeconomic characteristics, and appear to have an important influence on developmental health.

Work in Progress

We have developed a Pan-Canadian **socioeconomic index** that maximizes the explained variation in EDI vulnerability scores across Canadian neighbourhoods. We are now examining to what extent social determinants and the steepness of the social gradients of developmental health differ among geographical jurisdictions and among different child contexts (i.e., gender, language(s), and special needs status).

We are working to identify **outlier neighbourhoods** in which the vulnerability rate is substantially higher or lower than predicted by the SES Index, and explore which other potentially important determinants of children's health may be relevant predictors of vulnerability in these areas.

We are also aiming to better understand the extent to which **change-over-time in EDI vulnerability rates** at the aggregate level (e.g., neighbourhood, school district, or province) vary geographically, and how well they coincide with changes in SES factors.

Published Work

- Guhn M, Janus M, Enns J, et al. Examining the social determinants of children's developmental health: Protocol for building a Pan-Canadian population-based monitoring system for early child development. *BMJ Open* 2016;6:e012020.
- Webb S, Janus M, Duku E, et al. Neighbourhood socioeconomic status indices and early child development. *SSM – Population Health* 2017;3:48-56.

Table 1. EDI Records in the CanNECD Database, by Canadian Province

	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Alberta ^{1,2}						Wave 1					
						9,641	21,976	20,881	14,492	20,734	
British Columbia ^{1,3,4}		Wave 2			Wave 3		Wave 4		Wave 5		
		6,830	21,847	9,734	3,164	35,020	25,033	21,911	12,485	30,034	
Manitoba ^{1,2,3}			12,214	12,092		12,139		12,885		13,538	
New Brunswick ^{1,2}						7,252					
Newfoundland and Labrador ^{1,2}										4,942	5,182
Northwest Territories ^{1,2}									672	659	654
Nova Scotia ^{1,2}										8,592	
Ontario ^{1,2,3}		Wave 1			Wave 2		Wave 3				
		20,185	46,743	58,085	20,494	40,742	59,127	33,384	38,728	57,089	
Prince Edward Island ¹					1,147						
Quebec ^{1,2,4}									65,498		
Saskatchewan ^{1,2,3}						Wave 1					
						5	6,181	5,501			
Yukon							362	344	368	401	

Schools are included only once per wave. No data are available from Nunavut. Provincial/territorial data collections include ¹publicly funded schools; ²Francophone schools (Anglophone for Quebec); ³some on-reserve schools; ⁴privately funded (tuition paid) schools.



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