Factors Influencing Health

Children Vulnerable in Areas of Early Development: A Determinant of Child Health
Our Vision

Our Mandate
To lead the development and maintenance of comprehensive and integrated health information that enables sound policy and effective health system management that improve health and health care.

Our Values
Respect, Integrity, Collaboration, Excellence, Innovation
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Introduction

The indicator Children Vulnerable in Areas of Early Development is a reflection of health and well-being among 5-year-olds (the average age of children in kindergarten). It measures developmental outcomes and milestones achieved during the first five years of life within the context of early experiences. It is also an important determinant of health and well-being in later life. How children develop as they grow depends on many factors, such as prenatal and postnatal environments, effective parenting, and the social and economic circumstances in which a child lives and grows up. Research shows that all of these factors have a vital impact on the way the brain develops. Early life experiences affect a person’s learning skills, coping skills, resiliency and even overall health as an adult.

Healthy Development: Good for Children, Good for Society

Children who are exposed to optimal environments early in life have the best opportunities to grow up healthy and happy. On the other hand, adverse experiences early in a child’s life—if not addressed—can lead to poor health (obesity, cardiovascular disease and diabetes), poor educational attainment, economic dependency, increased violence and crime, greater substance abuse and depression. All of these add to the burden and cost to society, including the health system.\(^1\)\(^,\)\(^2\) Research shows that limiting exposure to risk and promoting protective factors in early years can reduce the need for more costly interventions later in life.\(^3\)\(^,\)\(^4\) Positive interventions in early childhood can also help mitigate the impact of adverse experiences.

Ensuring healthy child development leads to a country’s sustainable development and is one of the most cost-effective investments in human capital that a country can make.\(^3\)\(^,\)\(^4\) Literature shows that there is a 7:1 return on public investment for programs for young children compared with a 1:1 payback from adult education.\(^5\) On a global level, those societies—rich or poor—that invest in children in their early years have the most literate populations, the best health status and the lowest levels of health inequality in the world.\(^2\)\(^,\)\(^6\)

As a leading source of reliable, comparable and timely health information in Canada, the Canadian Institute for Health Information (CIHI) has embarked on an initiative to strengthen its work on pan-Canadian health system performance reporting to better support jurisdictions’ efforts to improve care and the health of Canadians. This initiative is based on the Health System Performance Measurement Framework, which demonstrates how indicators interconnect and relate to one another, and how they contribute to overall performance goals for provinces and territories, such as improved health status and better value for money. The framework is based on the relationship between four main quadrants: health system inputs, health system outputs, social determinants of health and health system outcomes.

Children Vulnerable in Areas of Early Development, as measured using data collected by the Early Development Instrument, informs the health system outcomes quadrant of the framework, which reflects on the health status of Canadians. While reported as a measure of health outcomes (or how well children are doing now), it is also an important determinant of health (or a measure of how well children might do in the future).
Our childhood years represent a critical stage that most strongly impact the rest of our lives, and where the greatest opportunity for positive influence lies.

—David Butler Jones, Canada’s Chief Public Health Officer, in Report on The State of Public Health in Canada 2009

Measuring Child Vulnerabilities

The indicator Children Vulnerable in Areas of Early Development is measured using the Early Development Instrument (EDI), a tool that is widely used around the world to monitor the state of early child development. The EDI is a kindergarten teacher–completed checklist that measures a child’s performance in five general areas of development:

1. Physical Health and Well-Being;
2. Social Competence;
3. Emotional Maturity;
4. Language and Cognitive Development; and

Developed in 1999 by McMaster University’s Offord Centre for Child Studies, the EDI provides population-based information on key dimensions of children’s development that relate to their readiness to learn at school and their ability to meet the task demands of school (including playing and working with other children, listening to the teacher, remembering and following rules, and being comfortable exploring and asking questions). Recent longitudinal studies have indicated that early child development measured using EDI is a strong predictor of success in later life.

How Is This Indicator Calculated?

This indicator is calculated by dividing the number of children who are vulnerable on at least one area of development by the total number of children with valid EDI data; it is reported based on the school year, from September to June. The EDI data collection periods for the provinces/territories included in this report are outlined in Table 1.

Table 1: EDI Data Collection Periods for This Report, by Province/Territory

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>Data Collection Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.B.</td>
<td>2008–2009</td>
</tr>
<tr>
<td>Que.</td>
<td>2011–2012</td>
</tr>
<tr>
<td>Ont.</td>
<td>2009–2010 to 2011–2012</td>
</tr>
<tr>
<td>Man.</td>
<td>2010–2011</td>
</tr>
<tr>
<td>Y.T.</td>
<td>2011–2012</td>
</tr>
</tbody>
</table>

Source
Offord Centre for Child Studies, McMaster University.
A child is considered vulnerable when his or her EDI score for an area of development is equal to or lower than the score corresponding to the 10th percentile of all kindergarten children for that area of development. Children who are vulnerable in areas of early development are more likely to face greater challenges in school learning than those who are not vulnerable. A lower percentage of children considered vulnerable at school entry is a positive indicator of healthy development at age 5.

**Canada’s EDI Score**

The majority of children in Canada are doing well on each of the five EDI areas of development. Overall in Canada, one in four children (26%) is vulnerable in one or more areas of development prior to entering Grade 1.

Girls were less likely to be vulnerable at age 5 than boys. According to data from the Offord Centre, 33% of boys in Canada were vulnerable on one or more areas of development, compared with 19% of girls.

**Figure 1: Children Vulnerable in at Least One Area of Development at Age 5, by Sex (Percentage)**

<table>
<thead>
<tr>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.9%</td>
<td>19.0%</td>
</tr>
</tbody>
</table>

**Notes**
A higher percentage indicates greater vulnerability.
For data years, please see Table 1.

**Source**
Offord Centre for Child Studies, McMaster University.
Children Vulnerable in Areas of Early Development: A Determinant of Child Health

Vulnerability Rates Across Provinces and Territories

The rate of vulnerability in one or more areas of development varied across Canada. For example, Yukon and B.C. had higher vulnerability rates (a higher proportion of children measured as vulnerable) than the Canadian average, whereas the vulnerability rates for P.E.I. and Ontario were lower than the Canadian average (a lower proportion of children measured as vulnerable).

Figure 2: Children Vulnerable in at Least One Area of Development at Age 5, by Province/Territory (Percentage)

Notes
Provincial/territorial analysis is available for only those jurisdictions that have complete province-/territory-wide coverage and have participated in this analysis.
For data years, please see Table 1.
Source
Offord Centre for Child Studies, McMaster University.

Variations in how (and how often) the EDI is administered might affect provincial/territorial comparisons. While some provinces (e.g., P.E.I., New Brunswick) administered the EDI in the entire province in one year, other provinces (e.g., B.C., Ontario) used a phased approach. For example, it took two years in B.C. and three years in Ontario to complete data collection for the entire province. This variability in data collection means that the time period is not uniform when making comparisons across jurisdictions.
Association Between Income and Vulnerability Rates

Early child health outcomes are positively associated with indicators of socio-economic status, such as income. This is partially attributed to the fact that low-income families usually experience a number of disadvantages that would impact the home environment and the quality of childrearing.

![Figure 3: Children Vulnerable in at Least One Area of Development at Age 5, by Income Quintile (Percentage)](image)

**Notes**
A higher percentage indicates greater vulnerability.
For data years, please see Table 1.

**Source**
Offord Centre for Child Studies, McMaster University.

The data shows that lower neighbourhood income is associated with higher vulnerability (poorer EDI scores). Children in low-income neighbourhoods showed a higher rate of vulnerability (34.9%) than those in high-income neighbourhoods (19.5%).

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i. Neighbourhood income quintiles are determined using each child’s home postal code and Statistics Canada’s Postal Code Conversion File+. The distribution of neighbourhood income is divided into five categories (quintiles), where approximately 20% of the neighbourhoods fall into each category. The lowest income quintile category is assigned to represent those neighbourhoods in the lowest 20% of the distribution of neighbourhood income. Those in the highest income quintile represent the neighbourhoods in the highest 20% of the distribution.
Areas of Vulnerability for Canadian Children

Evaluating data gathered using the EDI questionnaire also lets us measure vulnerability by area of development.

Figure 4: Areas of Vulnerability Among Children Vulnerable in at Least One Area of Development, Canada (Percentage)

<table>
<thead>
<tr>
<th>Areas of Development</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Skills and General Knowledge</td>
<td>44.2%</td>
</tr>
<tr>
<td>Emotional Maturity</td>
<td>43.4%</td>
</tr>
<tr>
<td>Physical Health and Well-Being</td>
<td>39.5%</td>
</tr>
<tr>
<td>Social Competence</td>
<td>34.8%</td>
</tr>
<tr>
<td>Language and Cognitive Development</td>
<td>30.1%</td>
</tr>
</tbody>
</table>

Notes
A higher percentage indicates greater vulnerability.
For data years, please see Table 1.

Source
Offord Centre for Child Studies, McMaster University.

The area Communication Skills and General Knowledge stands out as the one that had the greatest vulnerability among children vulnerable on at least one area of development. Nearly half of the children who had some (one or more) vulnerability were vulnerable in this area. Language and Cognitive Development was the area with the lowest vulnerability rates.
# Table 2: Areas of Vulnerability Among Children Vulnerable in at Least One Area of Development, by Province/Territory (Percentage)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>P.E.I.</td>
<td>31.2</td>
<td>45.5</td>
<td>30.7</td>
<td>28.0</td>
<td>37.6</td>
</tr>
<tr>
<td>N.B.</td>
<td>38.8</td>
<td>52.9</td>
<td>25.5</td>
<td>36.8</td>
<td>40.7</td>
</tr>
<tr>
<td>Que.</td>
<td>33.4</td>
<td>53.5</td>
<td>36.6</td>
<td>28.4</td>
<td>30.5</td>
</tr>
<tr>
<td>Ont.</td>
<td><strong>47.3</strong></td>
<td>41.5</td>
<td>25.8</td>
<td>38.0</td>
<td>37.3</td>
</tr>
<tr>
<td>Man.</td>
<td>49.4</td>
<td>39.6</td>
<td>38.0</td>
<td>37.2</td>
<td>35.0</td>
</tr>
<tr>
<td>Sask.</td>
<td>46.4</td>
<td>37.3</td>
<td>40.5</td>
<td><strong>46.8</strong></td>
<td>31.7</td>
</tr>
<tr>
<td>B.C.</td>
<td><strong>47.8</strong></td>
<td>44.1</td>
<td>29.2</td>
<td>46.3</td>
<td>36.3</td>
</tr>
<tr>
<td>Y.T.</td>
<td>37.4</td>
<td>51.2</td>
<td>12.2</td>
<td><strong>61.8</strong></td>
<td>23.6</td>
</tr>
</tbody>
</table>

**Notes**

Bold numbers indicate areas of highest vulnerability for the province/territory.

For data years, please see Table 1.

**Source**

Offord Centre for Child Studies, McMaster University.

Levels of vulnerability across areas of development varied by province/territory. Children in Ontario, Manitoba and B.C. had the highest vulnerability rates in the area Communication Skills and General Knowledge. Children in Quebec and the two Atlantic provinces for which data was available (New Brunswick and P.E.I.) had high vulnerability rates for Emotional Maturity, whereas children in Saskatchewan and Yukon had high vulnerability rates for Physical Health and Well-Being.
National data suggests that boys who were vulnerable in at least one area of development had the highest vulnerability rate in Emotional Maturity (50.9% of boys were vulnerable in this area), while girls had the highest vulnerability rate in Communication Skills and General Knowledge (45.2%).
Vulnerability in areas of development also differed across income quintiles. Communication Skills and General Knowledge was the area of highest vulnerability among children in low-income neighbourhoods (49.7%), whereas Emotional Maturity was the area of highest vulnerability for children from high-income neighbourhoods (46.5%).

How Do Early Interventions Support Early Child Development?

Evidence suggests that policies that strengthen the foundations of health in early childhood may have long-lasting positive effects. Here are some examples of how data on early childhood development is being used to identify the early life determinants or predictors of school readiness to eventually inform decision-making:

- Reading to children and having a regular bedtime positively affect development. A study in Canada found that reading to children daily was associated with better language development in children. Low-income families are less likely to engage in these activities. In all income groups, children who were read to daily had better receptive vocabulary scores than those who were not.
• Low family income is associated with poorer EDI outcomes at both the individual and neighbourhood levels. An analysis from the Manitoba Centre for Health Policy showed that the odds of EDI vulnerability were 1.7 times greater for children in families on income assistance than for those in families not on income assistance.12

• Breastfeeding has a protective effect in reducing vulnerability. According to an analysis by the Manitoba Centre for Health Policy, children who were breastfed had reduced odds of being vulnerable (odds ratio = 0.86).12

**What Is Happening in Canada to Improve Early Child Development?**

Each of Canada’s 14 jurisdictions—the 10 provinces, 3 territories and federal government—has a defined approach to early childhood development with the goals of providing care and education to children, supporting parents and, more specifically, ameliorating the effects of poverty. Here are some of the early child development investments being made across Canada:

• Ontario Early Years Centres offer services for new parents and children to support healthy child development and early detection of any developmental concerns. The centres offer programs on prenatal education and parenting skills for parents, as well as early learning and literacy programs for children up to the age of 6.17

• Early intervention services in B.C. provide community-based physiotherapy, occupational therapy, speech–language pathology and family support worker services for children from birth to school entry who have, or are at risk for, a developmental delay and/or disability.18

• As part of its action plan to reduce poverty, Newfoundland and Labrador has invested in early years to ensure all children develop to their full potential. The province has invested $1.3 million to make quality child care more affordable for low-income families and to provide these families with the support and services they need.19

These and other initiatives that are being implemented in Canada and around the world promote early child development at a population level. The indicator Children Vulnerable in Areas of Early Development, measured using the EDI, is the first population-level measure of school readiness. Improving knowledge of such measures is essential for mobilizing community action to improve children’s health and development.12

For regional analyses of this indicator, visit Your Health System at http://yourhealthsystem.cihi.ca. For more information on the EDI, see the Offord Centre for Child Studies’ School Readiness to Learn (SRL) Project at www.offordcentre.com/readiness.
References


Production of this document is made possible by financial contributions from Health Canada and provincial and territorial governments. The views expressed herein do not necessarily represent the views of Health Canada or any provincial or territorial government.

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How to cite this document:

Cette publication est aussi disponible en français sous le titre *Enfants vulnérables dans certains domaines de la petite enfance : un déterminant de la santé des enfants.*

ISBN 978-1-77109-313-2 (PDF)
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