University of Manitoba | Faculty of Medicine
Community Health Sciences

# EARLY DEVELOPMENT MATTERS FOR MANITOBA'S CHILDREN

*A summary of the report, The Early Development Instrument (EDI) in Manitoba: Linking Socioeconomic Adversity and Biological Vulnerability at Birth to Children's Outcomes at Age 5 by Rob Santos, Marni Brownell, Okechukwu Ekuma, Teresa Mayer, Ruth-Ann Soodeen*

*Summary written by Souradet Shaw*

That first day of school. For children who receive their education through the formal school system, this day can be full of excitement, fear and anticipation. For parents, as we watch our children walk down the hallway, sometimes bounding, sometimes full of hesitation, the emotions can be just as mixed. It is a milestone that almost every parent goes through: the culmination of years of care, as our children transition from the comforts of home, to the bright halls of the school system. But with this milestone, an important question is raised. As parents, how can we be sure that our children are ready for school? As a community, how do we know that we have done what we can together to adequately prepare all of our children?

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To help with this exact task, we have what is called the Early Development Instrument (EDI). The EDI is a survey which was designed in Canada and is used internationally to measure the school-readiness of children in Kindergarten. The survey is filled out by almost all Kindergarten teachers in Manitoba, for all children in their classrooms. Because it is filled out for virtually every child in Kindergarten, the EDI provides planners and organizations with a good sense of how prepared children in Manitoba are for school. Because research has proven that education is important for positive outcomes later in life, the EDI is useful for identifying groups of children that could benefit from additional help in achieving success in school.

Now, what do we mean when we say ready for school? First, measuring school-readiness is not as easy as it seems, because there is not one single thing that makes a child ready for school. The EDI takes this into account by measuring children along five factors that are thought to contribute to school-readiness. These five factors are **physical health & well-being, social competence, emotional maturity, language & cognitive development** and **communication skills & general knowledge**. In the language of the EDI, these factors are called domains. So, for example, the physical health & well-being domain measures, among other things, how well a child can run, how energetic they are in the classroom, and how independent they are. Table 1 shows the five domains and what they measure.

To make things a bit easier, for each of the five domains, cutoff scores were used to determine whether or not a child was ready for school. So if a child scored above a certain score in a domain, they were considered ready in that domain. Likewise, if they scored below a certain score, they were not ready.
To simplify things even further, because what we are really concerned about is vulnerability, or those children that need some extra help, for the purposes of this summary, when we report that children are **vulnerable**, we mean that they are not ready in one or more of the EDI domains. That is, their score was below

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the cutoff on at least one of the EDI domains. Now it is important, at this point to say that the EDI was not meant to assess children on an individual basis. We can't say, for example, that a specific child needs help in a certain domain (much more in-depth assessment would be necessary). Rather, the EDI was meant to measure vulnerability in large groups of children.

As was mentioned, although knowing who is ready for school is helpful, the focus of the EDI really is on vulnerabilities — on those children that need the most help. With this in mind, there were three main questions that Manitoba Centre for Health Policy (MCHP) researchers wanted answered for this deliverable. First, researchers at MCHP wanted to map vulnerability, as measured by the EDI, across Manitoba, and assess whether the patterns of vulnerabilities seen in maps were connected to how rich or poor an area was. Second, MCHP researchers wanted to see whether there was a connection between how healthy a child was at birth and their EDI scores at age 5. That is, are there conditions at birth that make children more vulnerable to not being ready for school? Third, MCHP researchers wanted to focus their attention on three groups of children that were thought to be especially vulnerable. Researchers wanted to look at EDI scores in those children whose mothers were teenagers at their first birth, children whose families were receiving income assistance, and children in the care of Child and Family Services (CFS). Previous research has shown that children in these three groups often are at highest risk for poor outcomes later on in life.

To answer these questions, researchers at MCHP linked information from the EDI scores to the population-based administrative health data available in MCHP's data repository, using anonymized personal health numbers. So information on doctor's visits, hospitalizations, and drug prescriptions were linked to EDI outcomes. For the third question, data from Manitoba Family Services and Labour were used to define two of the at-risk groups of children. For all three questions, researchers used EDI results from 2005-06 and 2006-07, as these results were from the first province-wide administration of the EDI. To answer the second and third questions, the EDI results from Kindergarten-aged children were linked to birth information of children born in 2000 and 2001.

**Table 1: Early Development Instrument (EDI) Domains & Sub-Domains**

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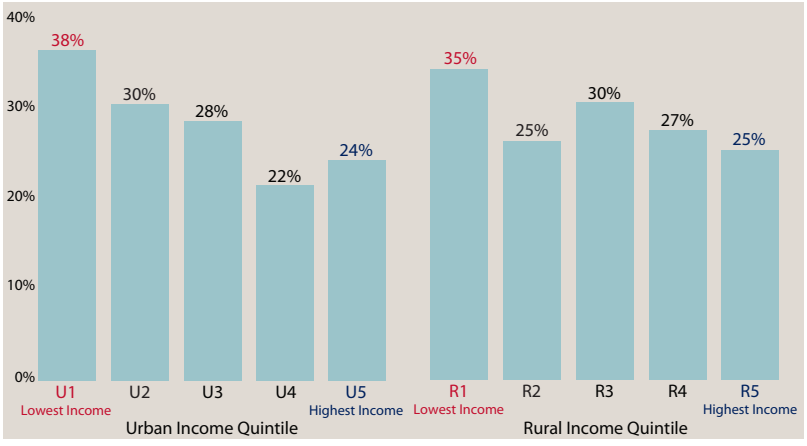
|---|
| **Physical Health and Well-Being (13 items)** |
| Sub-domains:<br>- Physical readiness for school day<br>- Physical independence<br>- Gross and fine motor skills |
| **Social Competence (26 items)** |
| Sub-domains:<br>- Overall social competence<br>- Responsibility and respect<br>- Approaches to learning<br>- Readiness to explore new things |
| **Emotional Maturity (30 items)** |
| Sub-domains:<br>- Prosocial and helping behaviour<br>- Anxious and fearful behaviour<br>- Aggressive behaviour<br>- Hyperactivity and inattention |
| **Language and Cognitive Development (26 items)** |
| Sub-domains:<br>- Basic literacy<br>- Interest in literacy/numeracy, and uses memory<br>- Advanced literacy<br>- Basic numeracy |
| **Communication Skills and General Knowledge (8 items)** |
| No sub-domains<br>Covers skills on:<br>- communicating effectively<br>- symbolic use of language<br>- age-appropriate knowledge about the world |

## EDI Outcomes Linked to Area of Residence and Conditions at Birth

What did the researchers find? First and foremost, among the 21,898 children included in the first portion of the study, researchers found that there were large differences in how EDI outcomes were distributed across Manitoba. More importantly, they found how EDI outcomes were distributed seemed to be strongly related to how rich or poor the area was. To find this out, MCHP researchers ranked neighbourhoods in Manitoba, according to their income levels, into five levels with equal numbers of people in each level. In doing this, a five-step scale (called a quintile) was developed, with each step up the scale indicating a higher level of income. Because income levels differed so much between urban and rural Manitoba, and to make sure the comparisons were fair, separate scales were developed for urban (Winnipeg, Brandon), and for rural (the rest of) Manitoba.

**Figure 1: Percent Not Ready by Income Quintile: Urban and Rural**

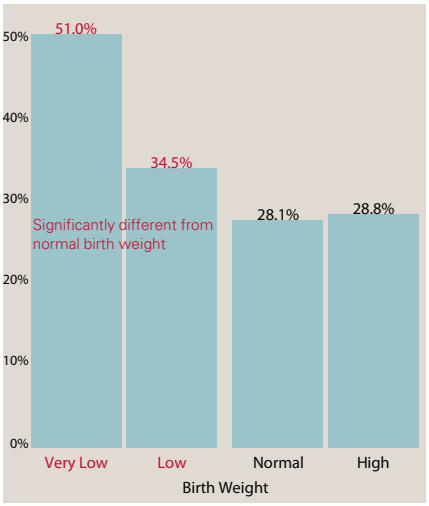



Looking at urban Manitoba (Figure 1), researchers found that 38% of children living in the lowest income quintile areas were not ready in one or more of the EDI domains. In comparison, only 22-24% of children living in the highest income quintile areas were not ready in one or more of the EDI domains. The story was

similar for children living in rural Manitoba. We can see that 35% of children living in the lowest income quintile areas were not ready in one or more EDI domains, compared to 25% of children who were living in the highest income quintile areas. So regardless of whether children lived in urban or in rural parts of Manitoba, children living in the poorest areas were almost 1 ½ times as likely to be not ready in at least one EDI domain, when compared to children living in the most well-to-do areas.

For the second question, whether health status at birth is related to EDI outcomes at age 5, MCHP researchers were able to link the EDI scores of 18,398 children to information available from the time of the child's birth. So things like birth weight, and time spent in the Intensive Care Unit (ICU) after the child was born could be related to EDI scores. What did the researchers find? Researchers discovered that the health status of children at the time of their birth was indeed associated with their EDI scores, five years later. As an example, they found that over half of children born at very low birth weights (those weighing less than 1,500 grams at birth) were not ready in one or more of the EDI domains at age 5 (Figure 2). In comparison, 28% of children born at normal birth weight (between 2,500 and 4,000 grams at birth) were vulnerable.

**Figure 2: Percent Not Ready by Birth Weight**

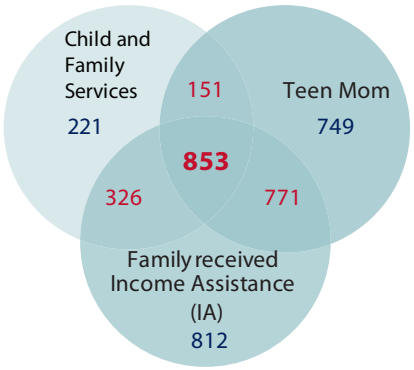



In very sophisticated statistical analyses, which adjusted for things like socioeconomic status, and thus, made an apples-to-apples comparison between children living in different areas of Manitoba, MCHP researchers were still able to find a relationship between EDI outcomes, and the health status of children at their birth. For example, in these complex analyses, researchers found that children who required longer stays in the ICU at birth were more likely to be vulnerable at age 5. At the same time, researchers found that children who were breastfed were less likely to be vulnerable at age 5.

## EDI Outcomes for At-Risk Children

We now turn our attention to the remaining question: what EDI outcomes looked like for children in at-risk groups associated with especially poor outcomes. Figure 3 shows the distribution of the children in the three at-risk groups included in this portion of the study. Notably, Figure 3 also shows the overlap, among the children, of the three groups.

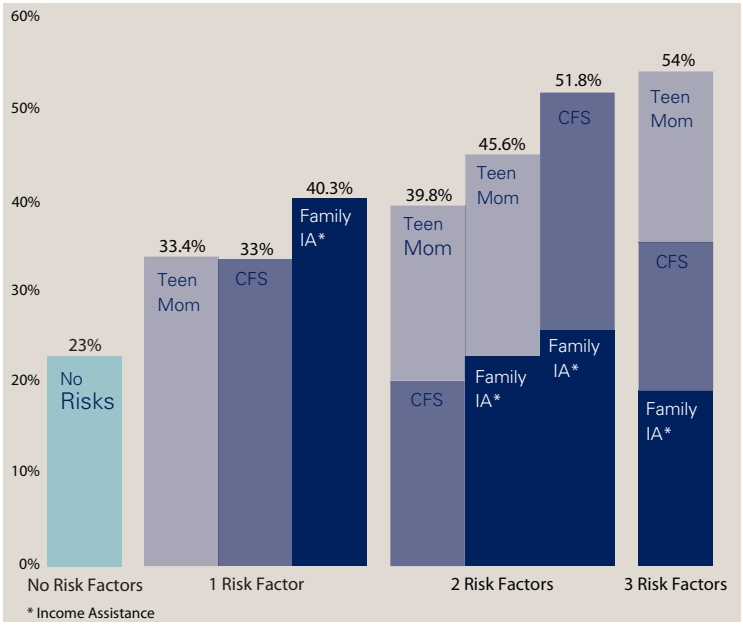
**Figure 3: Overlap of At-Risk Groups**




Of the 11,954 children included in this analysis, almost 1 in 3 were in one or more of these at-risk groups; even more striking was the fact that almost 1 in 10 children included in this analysis belonged to all three groups. Most importantly, (as seen in Figure 4) when looking at EDI outcomes, the results showed that risk for vulnerability was related to which of the groups children belonged to, and how many of the groups children were in. For example, among children who were in none of the three groups, 23% were not ready in one or more of the EDI domains. In comparison, 54% of children who were in all three groups were vulnerable, representing more than a doubling in risk. For children belonging to only one at-risk group, children whose families were receiving income assistance were most vulnerable. Therefore, what the analyses showed was that not all risk groups are created equal, but being in multiple at-risk groups was clearly worse than being in just one group.

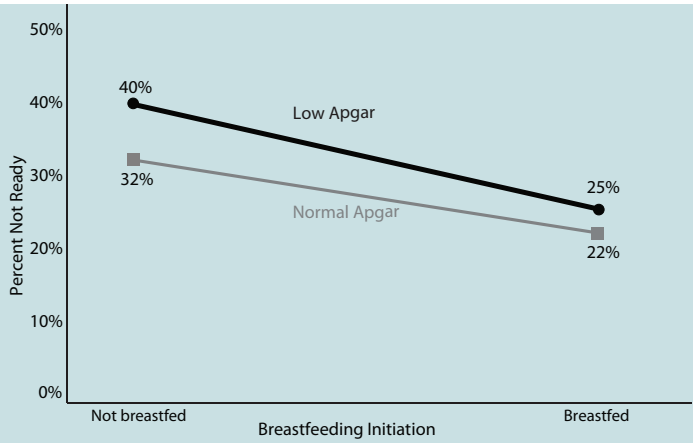
Although the analyses we have so far discussed suggest that differences in EDI outcomes are present at a very early age, and that right from birth, differences in health status have an impact on school readiness, other analyses conducted by MCHP researchers suggest that these differences need not be inevitable. That is, the paths toward school readiness are not necessarily set in stone. And in fact, interventions designed for the most vulnerable may have the largest impact, in terms of closing the gap. To illustrate this, researchers looked at the

**Figure 4: Percent Not Ready by Number of Risk Factors**



effects of breastfeeding on EDI outcomes. In Manitoba, every time a child is born in a hospital, medical personnel are trained to give the baby a score (called the Apgar score) that basically assesses how healthy the baby is. A high Apgar score would indicate a healthy baby, and a low score, a baby that was not as healthy. What MCHP researchers did was to measure the impact of breastfeeding on EDI scores among those children assessed to be very healthy, compared to those that were not as healthy at birth. What the researchers found was that 40% of children who were born less healthy and who were not breastfed were not ready in one or more domains at age 5 (Figure 5). In comparison, about 32% of those children who were also not breastfed, but born healthier were not ready in one or more domains. So far, no big surprises yet — as we know those who are born more vulnerable tend to also be more vulnerable as they age. However, when we look only at children who were breastfed, the differences between children born with different health states all but disappear. Among children breastfed at infancy, about 25% of children born less healthy were not ready in one or more EDI domain, compared to 22% of the children born healthy.

**Figure 5: Percent Not Ready (≥ 1 EDI Domains) at Age 5 by Breastfeeding and 5-Minute Apgar Score**




The lessons this analysis tells us are two-fold. First, breastfeeding seemed to pull the EDI scores of children to the same level, regardless of whether they were born healthy at birth or not. Second, the difference in EDI outcomes among those breastfed and those who were not was 15% among those born less healthy, while the difference was 10% in those born healthy. Thus, breastfeeding seemed to have a larger impact in those children that were more vulnerable at birth. This differential susceptibility to interventions was observed for all domains of the EDI. Given the amount of money and time invested in interventions to help children, these very preliminary findings deserve further study.

**Our study shows that health at birth can be strongly linked to how prepared children are for school and it shows that children facing multiple risks require substantially more attention.**

We devote our time, to the best of our abilities, towards nurturing our infants and toddlers. We wish them to become healthy, thoughtful, independent, and caring children, as they step out into the world outside their homes. As a society, and no matter what our roles happen to be, we have a vested interest in ensuring that every child has an equal chance to realize his or her potential. One of the most important steps in doing this is to ensure an equitable chance of success at school, starting with that first day at school.

What this report from MCHP shows is that differences in this potential are apparent at an age earlier than we had previously thought, and can be tied to the overall wealth of where children live. It shows that health at birth can be strongly linked to how prepared children are for school, and it shows that children facing multiple risks require substantially more attention. To have this information available province-wide is absolutely essential for planning purposes. The EDI can provide insights into where, and to whom resources can be mobilized to ensure school success. That interventions aimed at the most vulnerable may have, relatively speaking, the largest impact is a source of hope. At the same time, however, this initial analysis of the EDI shows that there is still a large amount of work that needs to be done to ensure that all children in Manitoba are at an equal footing, as they take each new step into the future.

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