

The Early Development Instrument: A Population-based Measure for Communities

A Handbook on Development, Properties, and Use



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Inspiring Innovation and Discovery



EARLY DEVELOPMENT INSTRUMENT
a population-based measure for communities



CENTRE FOR
**Community
Child Health**



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This work is dedicated to Dan Offord, the founding director of the Offord Centre for Child Studies, in appreciation of his lifetime contributions to the well-being of children.

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Foreword

Knowledge transfer from research results into mainstream practice is often a long process and in the case of innovative methods in the social sciences, can be confined within the academic or professional worlds of journals, conference papers and, occasionally, workshops bringing together front-line workers and researchers. One such innovation, the Early Development Instrument (EDI), has successfully moved beyond limited research use to more mainstream recognition in a relatively short time. The first uniform, systematic method for measuring whether a community's children are prepared to learn and succeed in their first years of schooling, the EDI has been accepted in psychometric practice across Canada and internationally. Because of that proliferation in use, information about its attributes and value to policy making in different jurisdictions has been documented in a variety of reports and academic articles, albeit in somewhat piecemeal fashion. Because it is viewed as an effective tool to assist decision makers at various levels with resource planning for children, it has the potential for even wider implementation.

In this handbook, we bring together information from various collaborators to explain the origin and function of the EDI, and its importance to the field of early childhood development. We discuss the concepts underlying its development, its structure and the testing it has undergone to determine its psychometric properties. The EDI has proven to be culturally adaptable and open to modification for a variety of population groups. In several case studies describing where and how it has been utilized, we provide differing models for future use and highlight a range of infrastructure and policy supporting child development. While promoting the wider use of the EDI for population screening, the Offord Centre for Child Studies, which controls its use, is nevertheless careful to prescribe the stringent safeguards necessary to ensure continued effective, consistent implementation.

Additional material such as definition of terminology used in this document, technical specifics and licensing requirements, and some online resources for further research can be found in the glossary and appendices.

1. Purpose of the Early Development Instrument

Children's Readiness to Learn

Over the last few decades, basic neuroscience has provided evidence that the interaction between a child's genes and his or her early environment has a profound impact on later outcomes. Children by nature are receptive to learning, their brains are hardwired from birth to absorb sensory information and use it to shape their understanding

Readiness to learn refers to the state of a child's neurosystem being ready to develop various skills and neuropathways based on the stimuli it will receive. A child is ready to learn right from birth, and likely even in utero.

School readiness is a much narrower concept, focussing on a child's ability to meet the demands of school. Such expectations include:

- *being comfortable exploring and asking questions,*
- *the ability to hold a pencil,*
- *listening to the teacher,*
- *playing and working with other children, or*
- *remembering and following rules.*

Having these and other similar abilities makes it possible for children to benefit more fully from the educational activities provided by their school (Janus & Offord, 2000, 2007).

and interactions with the world, yet that propensity to learn can be limited by a variety of physical, cognitive and emotional-psychological factors. For instance, both positive and negative stimulation that each child receives long before he or she can communicate verbally, have long-term effects on the development of their cognitive and social abilities (Janus, 2000; Shore, 1997). When researchers talk of early childhood development, they refer to the expected milestones reached in normal development, generally in the span from birth to age six, and to the process of engagement between a child and the outside environment, which enhances or hinders growth and learning.

An awareness of the impact of early experiences on the future development and success of children, both at school and in life, has now reached beyond the circles of neuroscientists, psychologists, and educators. Families, teachers and child advocates are increasingly aware of the need to provide their community's children with a range of high quality, beneficial early experiences.

There is considerable potential for meaningful decisions to be made when communities are aware of the importance of early childhood development, interested in learning how children are doing at various stages, (and what is and what is not working for them at a population level), and have access to community-level data to answer questions on children's developmental status.

Providing a Measure of Readiness to Learn

The Early Development Instrument (EDI) was developed in response to a need for a uniform methodology that would assess children's level of development in their first year of schooling. An ambitious Government commitment to measure and report on young children's readiness to learn at school made it a priority to address the need for such a standardized measurement tool. A consultation process with community groups and experts in the field of child development and behaviour began in 1997 under the leadership of Dr. Fraser Mustard, founder of the Canadian Institute for Advanced Research, and Dr. Dan Offord, Director of the Canadian Centre for Studies of Children at



Risk (CCSCR). The CCSCR, now the Offord Centre for Child Studies at McMaster University, was commissioned to develop an appropriate tool, with financial contributions from The Founders' Network in Toronto, the Early Years Action Group and Invest in Kids Foundation (See Appendix D). Dr. Offord and Dr. Magdalena Janus created what they first termed the School Readiness to Learn Tool, in which teachers were asked to assess their kindergarten student's abilities in several specific areas of early development. The goal was to provide a feasible, affordable, and psychometrically sound tool to report on populations of children in different communities, monitor groups of children over time, and predict how they would fare in elementary school. It was designed to measure specific outcomes of early development that are particularly relevant in determining children's readiness to learn at school.

2. EDI Implementation Across Canada

The pilot implementation of the EDI, in 1998, occurred in the Toronto community of North York, and was conducted by the Offord Centre for Child Studies (then the CCSCR) in a partnership funded by Human Resources Development Canada. This project served as a prototype to the federally funded Understanding the Early Years (UEY) initiative beginning in 1999. The UEY project utilized the EDI to study young children in one community in each of five provinces:

Manitoba, Saskatchewan, British Columbia (BC), Newfoundland and PEI. The UEY implementation included a battery of measures from the National Longitudinal Study on Children and Youth (NLSCY) on a representative sample of the same 5-year-old children, together with a community mapping study. The NLSCY component provided a trove of detailed information on children's early development. The community mapping study was able to plot both demographic and service-related data about each neighbourhood in a community. Along with the EDI results, the NLSCY and community mapping gave full and rich information about the state of each community, measuring its level of success in fostering healthy child development, as well as the variables that contributed to it.

Consult the OCCS website for:

- *An EDI factsheet with a detailed description of the finalized scales*
- *The EDI Guide, a manual to assist teachers in completing the EDI, available in English and French (Janus, 2005)*
- *A table of EDI sites across Canada.*

The Understanding the Early Years Initiative has its own useful website (See Appendix D for all web addresses.)

In addition to the five UEY sites, several other communities approached the OCCS directly, requesting use of the EDI. The Ontario Children's Secretariat funded an additional five communities in Ontario. In the 1999/2000 school year a total of 18 communities participated, encompassing approximately 45,000

children. Upon completion of basic psychometric testing, the EDI was finalized in early 2000, and the final version was used in the Spring of 2000.

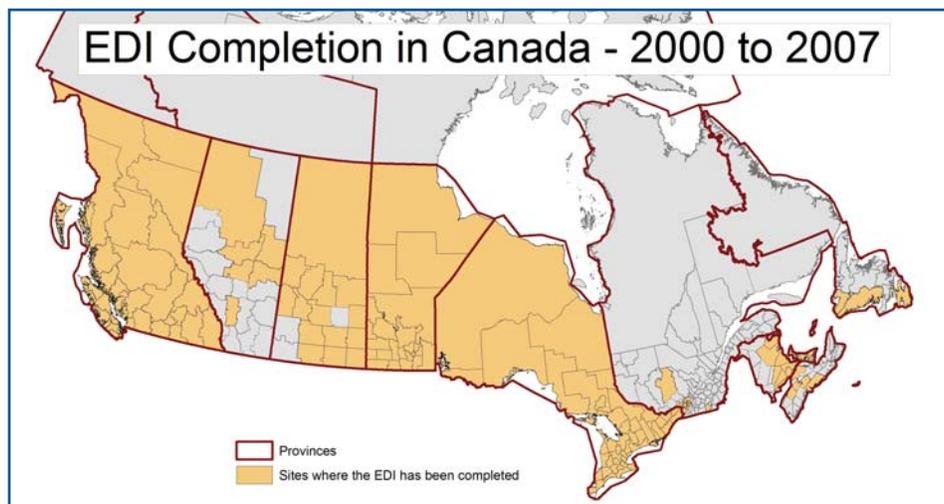
In 2000/2001, 12 UEY sites across Canada (7 new sites plus 5 sites repeated from the first project), as well as four new sites in Ontario, increased the database to 90,000 children. In 2001/2002 the EDI was implemented in British Columbia, Alberta, Saskatchewan, Ontario, New Brunswick and Nova Scotia at 46 sites, four of which were research projects, bringing the total number of children in the EDI database to over 150,000. In the subsequent school year, an additional partnership was formed with Healthy Child Manitoba allowing the EDI to be implemented in school divisions across



Manitoba. That year 50 sites across Canada (covering approximately 92,000 students) were using the EDI. As of October 2007, the current database includes responses on approximately 520,000 kindergarten children from across Canada (See Fig. 1.)

British Columbia, Ontario and Manitoba are the only three provinces in Canada that benefit from government involvement, and leadership at the provincial level by mandating inclusion of all SK children in regular EDI measurement. In other provinces the EDI has usually been carried out in selected communities as single projects, and not always with provincial funding. The EDI initiatives in Ontario, British Columbia and Manitoba are discussed in detail in later sections.

Figure 1



3. The Early Development Instrument: Design & Content

The EDI, a questionnaire available in both French and English, is completed by the teacher, or sometimes an early childhood educator, for every individual in the class, usually in the second half of the kindergarten year (Janus & Offord, 2007). Waiting until children have been in class a few months allows teachers time to get to know the children and allows children time to adjust to their new school setting.

The EDI assesses a child’s *school readiness* in five general domains of child development:

- 1) physical health and well-being,
- 2) social competence,
- 3) emotional maturity,
- 4) language and cognitive development, and
- 5) communication skills and general knowledge.



EDI items within these five domains are further divided into subdomains, described in Table 3.1. It can be used for children from the ages of 4 to 7 and includes 104 core items, with several additional questions available as appropriate to local or community needs.

EDI items were developed in consultation with the Early Years Action Group and Parenting and Literacy Centres, as well as with educators, in particular kindergarten teachers, in the Toronto District School Board and former North York District School Board. The EDI was refined through extensive preliminary testing in the school year 1998-99 for validation purposes and cultural validity before being introduced in all kindergarten classes in the Metro Toronto and North York sections of the Toronto District School Board, as well as in several other communities across Canada.

Table 3.1 Domains, Subdomains, and Sample Questions on the EDI

EDI Domains	Subdomains	Example items
Physical Health and Well-being	Physical readiness for school day	arrives at school hungry
	Physical independence	has well-coordinated movements
	Gross and fine motor skills	is able to manipulate objects
Social Competence	Overall social competence	Is able to get along with other children
	Responsibility and respect	accepts responsibility for actions
	Approaches to learning	works independently
	Readiness to explore new things	Is eager to explore new items
Emotional Maturity	Prosocial and helping behaviour	helps other children in distress
	Anxious and fearful behaviour	appears unhappy or sad
	appears unhappy or sad	gets into physical fights
	Hyperactivity and inattention	is restless
Language and Cognitive Development	Basic literacy	Is able to write own name
	Interest in literacy/numeracy, and uses memory	Is interested in games involving numbers
	Advanced literacy	Is able to read sentences
	Basic numeracy	Is able to count to 20
Communication Skills and General Knowledge	(No subdomains)	Is able to clearly communicate one's own needs and understand others; shows interest in general knowledge about the world



The instrument also includes three sets of questions that may be used for contextual purposes but do not contribute to domain scores; these ask about special problems, special skills, and pre-school experience. Communities have the option to include questions of local interest, in consultation with the EDI team at OCCS who can be a valuable resource providing assistance, clarification, and support for analysis. Analyses of raw data are routinely carried out by OCCS staff, who provide results to community personnel for interpretation and reporting to stakeholders.

The EDI is a useful population health tool, allowing aggregation and comparison of data from uniform, consistent indicators of children’s status at a broad level such as the neighbourhood, or the larger community level. Results can be used to identify the need for community resources that can contribute to school readiness.

Utilizing the EDI to Assess Population Groups

The EDI as an instrument for measuring population health has the most value when implemented for an entire group of children within a geographical community. However, it can also be used in project evaluation or as a research tool for more restricted population groups. In such cases, the results should be interpreted within the research design framework, since EDI applicability will be dependent on the design of the project. This section describes several ways in which the EDI scores can be used to describe, compare and contrast groups of young children in communities.

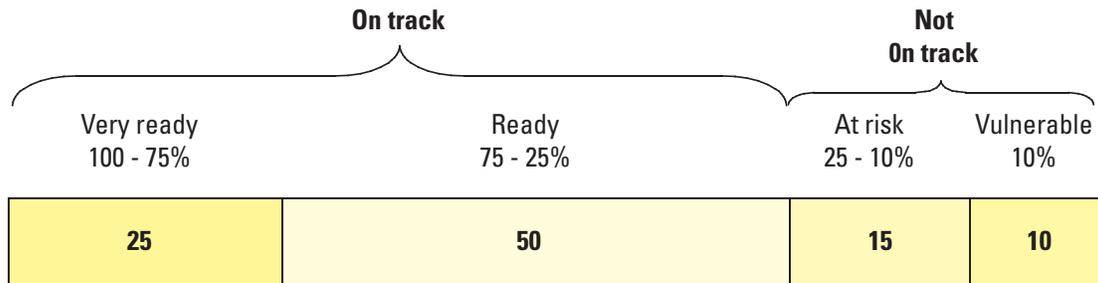
Analysis and Interpretation of Results

Selecting Population Groups

EDI results for individuals may be aggregated to small groupings at the micro level, such as schools, city neighborhoods, and non-geographic communities (e.g., ethnic groups) or to larger groups with various levels of complexity, provided there is always a logical basis for forming the groups and they can be clearly categorized. The different aggregations or groupings, which may vary in composition (e.g., background, socioeconomic standing, culture, ethnicity) to reflect the units of aggregation, will provide locally relevant information about the school readiness of those particular groups of children.

The EDI average scores for each developmental area—Physical Health and Well-being, Social Competence, Emotional Maturity, Language and Cognitive Development, and Communication Skills and General Knowledge—are divided into categories representing the highest scores to the lowest scores in the population group. The distribution of scores across the five EDI domains can be used to determine percentages of children at various levels of readiness to benefit from school. Children who have been scored in the lowest 10th percentile in their site in one or more of the five domains are categorized as “vulnerable” in terms of school readiness. (See Glossary.) General norms are available for comparison. See Figure 2 opposite.

Figure 2



- **On track (Very Ready)** - The total group of children who score in the best 25% of the site's distribution.
 - **On track (Ready)** - The total group of children who score between the 75th and 25th percentiles of the site's distribution.
 - **Not on track (At risk)** - The total group of children who score between the lowest 10th and 25th percentile of the site's distribution.

For population-wide reporting purposes, the designation *vulnerable* (not ready to learn) is only applicable to children who score in the lowest 10th percentile on one or more scales. Children above that score, in the lowest 25th percentile, may be considered at risk but not classed as vulnerable.

Drawing Comparisons among Groups

Neighbourhood comparisons can be made by using the distribution of local scores at the specified cut-off points, as this gives the most accurate local picture of possible inequalities. Neighbourhood-level aggregations may be used not only to compare average scores, but also to contrast a range of scores. For example, two communities may differ only slightly in the average percentage of children who are vulnerable in terms of school readiness, that is, scoring below the 10th percentile. However, communities may have greater differences than are apparent if there is a wide variation in the range of scores among neighbourhoods. For example, in one community an average of 22 percent of children may be categorized as vulnerable, while in another community the percentage of vulnerable children is 28 percent, which is not a big difference. Yet, if in the first community from 5.7 to 26.5 percent of kindergarten age children in various neighbourhoods are categorized as vulnerable and in the second community from 10.5 to 46.7 percent are considered vulnerable, then the second community has a much higher degree of inequality across neighbourhoods than the first.

Comparisons with Normative Data

The OCCS has established normative data for the EDI in order to set a representative benchmark for comparison of data from all projects using the instrument, past, present and future (See Glossary). Some reports compare local scores with Canadian, i.e., national results. EDI users may request Canadian results from the OCCS. For example, Manitoba uses annual normative cut-off scores for 'not ready' and 'very ready' categories from national data



produced by OCCS. From 1999 to 2004, EDI data were collected for over 300,000 4 to 5-year-old children from Canada and several other countries. A sub-set of this database, including data from the year 2000 and later, was analyzed to provide normative data on all EDI domains. The normative sample of Senior Kindergarten children includes 116,860 children.

A description of the process for establishing the normative database, and the descriptive statistics, are available on the Offord Centre website (Janus & Duku, 2004; Janus, Walsh, & Duku, 2005). A new set of normative data, encompassing the implementations from 2005 to 2007, will be available at the Offord Centre website by the end of 2007.

Comparisons over Time

Repeating data collection over time using the EDI in the same communities or regions makes it feasible to assess change. Measuring change over time is a complex issue that can be approached in a variety of ways depending on the availability of appropriate data. Analyses of trendlines over several years, which require the establishment of a baseline, can be done by using one of the two following strategies. In Ontario, Manitoba and British Columbia, where provincial cut-offs are available, these cut-offs and provincial means should be used to establish a baseline. In sites where there is no provincial database, the normative cut-offs should be used. The use of values based on the provincial distribution of scores is recommended because they include kindergarten children from all school boards in the province, and are based on more recent data collected over the last 3 years, while the normative database, though larger, covers all EDI sites across Canada over the last 5 years.

Change can be conceived of as an increment or decrement in value, or as a comparison of first measurement point and the next measurement point. OCCS proposes four options, all relatively simple methods that can capture both the change and its variability (See Appendix A). The unit of analysis is assumed to be the neighbourhood or, at a higher level of aggregation, the community and then province, or country.

Relating School Readiness to Other Societal Indicators

“Macro-level” aggregations of EDI scores can be useful data in association with other societal indicators. For example, one could relate school readiness to national macro-level indicators, such as gross domestic product (GDP), and to city, country, state or provincial statistics on education levels, school enrollment, and income.

EDI data also could be related to data on longer-term outcomes, including those of older children, if presented at the same macro level. Some useful associations may be drawn, for example, from school drop-out rates and international studies of youth literacy, e.g., the Program for International Student Assessment (PISA). In some jurisdictions, such as Ontario and British Columbia, the results of population-level academic testing of children in later grades can be explored in relation to patterns in EDI results.

One also could relate school readiness scores to environmental or geographic statistics—again, if the level



of aggregation is comparable. Possible associations include, for example, pollution levels or, more locally, the availability of parks and playgrounds. A broader assessment of the environment might take into account factors such as access to and use of local family and children's services.

Policy issues, such as the availability and duration of parental leave, could be explored in association with international variations in EDI results. Population-level health variables, such as low birth weights, childhood injuries, and frequency of breastfeeding also may have an association with school readiness. In addition, EDI data could be used to explore the possibility of associations between cultural differences (e.g., promotion of independence, learning styles) and socio-emotional and cognitive competence.

How EDI Results Can Influence Policy and Social Change

The EDI scores can provide a powerful catalyst for influencing policy and programming decisions by providing population level data about all the kindergarten age children in a neighbourhood or community and how they fare on measures related to early success in school. Increasingly EDI data are being used to identify areas of special need, to plan and locate timely interventions such as early childhood programs and, where data are available across an entire jurisdiction, to guide broad policy development.

Although it is a helpful tool, the EDI does not provide a recipe for action. Programs to improve children's school readiness must be based not only on EDI results, but also on data gathered from other sources, and in collaboration with the many partners involved in children's education. In Canada and elsewhere, the EDI has been an important catalyst for communities to undertake a closer examination of what resources they make available to support families with young children.

Community Mobilization

In many places collection of EDI data is a first step toward mobilizing a community and gaining evidence that political leaders and policymakers can use to improve young children's opportunities for success. The EDI can provide a focal point to enhance the efforts of leaders already actively involved with young children in their community. Community toolkits are available to guide interpretation and assist communities to consider the EDI within the context of other local Early Childhood Development organization (ECD) and socio-economic characteristics (Human Early Learning Partnership, 2005). Communities are encouraged to layer the EDI with other available information to develop a comprehensive plan for young children.

Many people who may not have traditionally been involved in promoting the development of young children are engaged by EDI results. In particular, when the results are displayed using GIS maps, citizens, parents, and business people can be inspired to join the local movement for young children. EDI data and results can be provided through internet access or by contacting resource people within the jurisdiction. The aim is to provide easy access and understandable results in synchronicity with both ongoing and episodic community development activities (Kershaw, 2005; Offord Centre for Child Studies, 2005).



EDI Results Can Improve Early Childhood Opportunities: Canadian and Australian Examples

CANADA. A follow-up investigation of Ontario and Manitoba communities using EDI data over a six-year period found that a majority (72.1%) of communities had implemented a variety of programs or projects to remedy areas of weakness brought to light as a result of EDI findings. In addition, most communities reported having an Early Years coalition in place and having school boards or divisions involved. In a similar survey from British Columbia, all sites who responded indicated that change in their communities was taking place, with coalition and school divisions being involved in most of these changes. Survey details can be obtained from OCCS and HELP.

AUSTRALIA. The Australian version of the EDI is the Australian Early Development Index (AEDI), discussed in sections 8 and 10. The existence of champions, individuals who facilitate the AEDI initiative, has been essential in ensuring that AEDI results are translated into action in the more than 60 communities where it has been used. One strategy is described below.

IN RESPONSE TO AEDI RESULTS

One community held an Early Years Forum to identify new ways of working together to improve outcomes for families and children. Over 130 people attended the forum, listened to presentations about the early years and learned about AEDI results for their community. After dividing into groups according to AEDI suburbs, members were asked to explore the following questions:

- What is available in your area that contributes to the wellbeing of families and children?
- What else might be needed in your area that would make a difference for children and families in light of the AEDI results?
- Of the identified needs, which three should be given top priority?

Forum recommendations included the establishment of an Early Years Committee; future, ongoing consultations with parents, and the implementation of regular early years' meetings.

4. Core EDI Concepts

Important Considerations for EDI Users

The prime consideration around EDI use is its applicability to entire population groups of children. It is not suitable for determining or supporting any diagnosis for an individual child. *For example, one cannot use the EDI questionnaire to indicate that a child has a learning disability.* It should be applied to logically-defined groups, that is, groups based on geographical boundaries such as a city or census tract or on administrative boundaries such as a school board catchment area or school network, and populous enough to make analysis feasible. Data on subgroups of 10 or fewer children should be interpreted with extreme caution. The smallest level of data aggregation recommended is either the school or census tract.

Since the OCCS owns the copyright of the EDI, and maintains a repository of EDI data from across Canada and internationally, for research purposes, it reserves the right to oversee all EDI use. To preserve the standard and

utility of EDI data, prospective users must consult the OCCS about their research design, purchase a license and sign a licensing agreement before using the instrument for any purpose. OCCS involvement may be limited to such consultation or may include analysis of data for EDI users as required.

Included in the licensing agreement are specific obligations related to data collection, analysis and reporting: e.g.,

- timing of data collection,
- definition of subject groups,
- informing parents,
- confidentiality of data held in data bases,
- aggregation of data in all analyses and reporting,
- preservation of anonymity in reporting, and
- information sharing of raw data, analyses and reporting.

Teacher Respondents

In order for the EDI to provide reliable and meaningful information, its respondents need to be very familiar with the range of appropriate child behaviour and skills within an early learning setting and be familiar with the specific abilities of each child. Kindergarten teachers and early childhood educators have proven to be the best respondents

The Kindergarten Parent Survey (KPS), a recent Offord Centre tool, enables parents to provide contextual information about their child's development to augment the EDI. See Section 9.

for these indicators. In fact, there is a high inter-rater reliability between these two types of professionals (Janus & Offord, 2007). Arguably, parents would seem to be the most knowledgeable experts on their children; however, although parent ratings on the EDI correlate well with teacher ratings, they are not as close as those of other teachers (See Table 10.2). This could be due to documented differences in the patterns of child behaviour between the home and school setting (Janus & Offord, 2007). As well, teachers are more aware of children's specific academic skills than many parents and their training in child development provides them with a fairly uniform background from which to assess their students in comparison with a standard of

what levels of ability constitute 'school readiness to learn'. Given the multiethnic composition of Canadian society, parent respondents would lack such uniform conceptions.

Training

Training is a necessary preliminary step to EDI implementation. A copy of the EDI Guide should be provided to each teacher respondent. In addition, a training/information session will ensure accurate, consistent interpretation of items, as well as inform respondents about the purpose of data collection, how results will be used, and the logistics of the data collection process. Respondents with some education in the early childhood area will likely require only minimal training on the use of the EDI.



5. The Ontario Model of EDI Use

In 2000, EDI data were collected on over 6,000 children in an initiative sponsored by the Ontario Children's Secretariat, at five sites across Ontario: Ottawa, London, Near North Region, South East Grey, and York Region. Each site also carried out a survey designed to establish the number and types of services and programs offered to children from birth through six years of age, and their families. In a report for the Government of Ontario, EDI results from four of the sites were integrated with survey results. A comparison of these results with the optimal characteristics set out by the Early Years Study Report (McCain & Mustard, 1999) allowed communities and policy-makers to measure for the first time the school readiness of children in a variety of different settings with varying levels of resources. This pilot study demonstrated two important points. First, building a base of information about children's developmental outcomes in the early years, and about community resources that may contribute to them, is an essential step toward achieving improvements in those outcomes. Second, while comparisons across sites highlight differences among communities, analysis of the linkages between resources and children's outcomes at the neighbourhood level has much more power to become a real catalyst of change, both at the local and policy levels (Janus, 2001).

Partly in response to issues highlighted in the Early Years Study, the Government of Ontario/Children's Secretariat initiated the Early Years Challenge Fund Provincial Project in 2000/2001. Ontario Early Years Centres are places where parents and caregivers can take part with their children in a range of programs and activities; get answers to questions; access information about programs and services that are available for young children; and talk to early years professionals, as well as other parents and caregivers in the community. See Appendix D.

An Endowed Chair in Early Child Development awarded to McMaster University in 2002 by the Province of Ontario ensured a wider reach of the EDI initiative and improved the feedback and reporting of the results. Improvements were also made to Ontario baseline data. Through the Early Years Challenge Fund 30 EDI sites were established in 2001/02 and EDI data were collected on approximately 45,000 children.

The Ontario government's Best Start Initiative has as its goal: "to strengthen healthy development, early learning, and child care services during a child's first year so that children in Ontario will be ready and eager to learn by the time they start Grade 1". See Appendix D.

In 2004 the Ministries of Community and Social Services and Children and Youth Services contracted the OCCS to establish a 'readiness to learn at school' baseline for all children entering kindergarten in Ontario. This was accomplished in a three-year roll-out between the school years 2003/04 and 2005/06. The OCCS provided support to communities in implementing the EDI: training, analysis and interpretation of results and report preparation.

The OCCS also continues to produce maps displaying EDI results for communities. All Ontario cohort reports are available on the OCCS website. Cycle 2 of the 3 year roll-out will be completed in 2008/09.



6. The Manitoba Model of EDI Use

Manitoba Children and Youth Secretariat and Children First Strategy

The history of the EDI in Manitoba began in 1998 when Dr. Fraser Mustard and Dr. Dan Offord, in presentations to government and the community, both referred to a newly constructed instrument for measuring children's early development and school readiness at a population level. The prospect of a reliable and valid instrument for monitoring early childhood development (ECD) at a population level caught the interest of policymakers in the then Conservative Government of Manitoba.

Healthy Child Committee of Cabinet and Healthy Child Manitoba Strategy

Manitoba's policy interest in the promise of an EDI continued after the province elected a New Democratic Party government in 1999. Soon after, in March 2000, the Government of Manitoba announced the Healthy Child Manitoba (HCM) Strategy, its long-term, cross-departmental, evidence-based prevention and early intervention strategy to improve outcomes for all of Manitoba's children and youth (prenatal to 18 years). The Healthy Child Manitoba Office serves as government's central agency for children and youth, providing secretariat support to standing committees of Cabinet and Deputy Ministers of the relevant partner ministries. The HCM Strategy continues the previous government policy, including a focus on measuring progress in early childhood development. Currently, Manitoba has the only standing Cabinet committee in Canada, and one of the few worldwide, dedicated to the well-being of children from their earliest years through their transition to adulthood.

Understanding the Early Years (UEY)

As one of the first five pilot sites in 1999, Winnipeg provided Manitoba with its first experience using the EDI within a large metropolitan population ranging from lower-socioeconomic (SES) inner-city neighbourhoods (including a significant proportion of Aboriginal children) to middle-SES suburban neighbourhoods. In 2000, the Government of Canada selected Manitoba's South Eastman region as one of the second set of UEY sites, providing additional experience using the EDI within a large rural population that included a significant proportion of the province's Francophone community. It soon became apparent to Manitoba from these two UEY sites, and others across Canada, that the EDI demonstrated appropriate psychometric properties, as well as relevance to both government and community partners interested in early childhood development. (See Section 10 for a full discussion of psychometric properties.)

Province-wide Implementation

Influenced by the foregoing experiences, Manitoba's Healthy Child Committee of Cabinet mandated funding and coordination for a province-wide, voluntary phase-in of the EDI in all public school divisions, beginning in the 2002/03 school year. Nearly two-thirds (63%) of Manitoba school divisions voluntarily implemented the EDI in that year. This occurred despite a November 2001 direction by the Minister of Education for the province's 54 school divisions to amalgamate into 37 school divisions. This remarkable initial participation rate amidst massive reorganization reflected widespread and growing understanding of and commitment to ECD, including its measurement, within school divisions and at the community level in Manitoba. The EDI was soon in use province-wide, with 74% of school divisions



implementing in 2003/2004, 82% in 2004/2005, and 100% in 2005/2006. Beginning in the 2006/2007 school year, the EDI will be collected in all 37 public school divisions every two years.

Manitoba’s Commitment to EDI

The Government of Manitoba and communities across the province are committed to using the Early Development Instrument. The Government has funded two random sample EDI Parent Surveys, based on the National Longitudinal Survey of Children and Youth, and similar to the parents’ surveys used in UEY, and the Kindergarten Parent Survey. The linkage of results from the 2004 and 2006 EDI Parent Survey samples with population-level EDI results have enhanced the scientific, policy, and community value of the EDI.

7. The British Columbia Model of EDI Use

The British Columbia Human Early Learning Partnership (HELP) undertook community mapping using EDI data as a way of assisting the Province and local communities to recognize and address the challenges they faced in fulfilling the objectives of the National Children’s Agenda. EDI work began in the school year 1999/2000 as three initiatives, funded under separate umbrellas by the federal and provincial governments, in Vancouver; the Squamish-Whistler corridor and the tri-city area of Coquitlam, Port Coquitlam, and Port Moody. Thanks to generous funding from the provincial Ministry of Children and Family Development (MCFD), HELP was able to expand across the province, school district by school district, until by 2004 every district and virtually every kindergarten classroom had completed the EDI, including a large fraction of independent and reserve schools. Currently every school district repeats the EDI every three years. The second round of EDI was completed in the 2006/07 school year.

Manitoba uses the EDI in at least five ways:

1. *measuring progress in early childhood education* (e.g. establishing a province-wide baseline for all 12,500 kindergarten students throughout the 37 public school divisions)
2. *understanding progress and identifying priorities in ECD* (e.g., comparing results of parent, family, and community predictors of EDI results as identified in the EDI Parent Surveys)
3. *informing communities* (e.g., via provincial EDI reports, annual EDI knowledge exchange forums and local EDI mapped reports for school divisions and community coalitions)
4. *influencing public policy*
 - via public reporting of EDI results (e.g., in Manitoba’s federal-provincial-territorial ECD progress report, sustainability report, performance measures reports, and HCMO annual report)
 - use of EDI results in Government policy, planning and budgeting, and program implementation (e.g., for the province’s Community Schools initiative, for securing a government funding commitment to implement the world-renowned Triple P–Positive Parenting Program provincewide in Manitoba)
5. *evaluating population-level effects of current and future ECD investments:* using 2005/06 results as the provincewide baseline, linked to population data on the same cohort (born in 2000), e.g., from the province’s universal postpartum screening completed by the public health system.

Neighbourhood Mapping

Neighbourhood mapping of EDI results quickly became the popular standard of reporting for British Columbia. This approach involves mapping child development according to the neighbourhood in which the child resides, rather than the census unit, school catchment area, or school attended. Local intersectoral coalitions for Early Child Development (ECD) were consulted to determine natural neighbourhoods of 40 children or more, which ensured statistical stability and anonymity in the results. In all, BC has been divided into 469 local neighbourhoods, each identified by a unique 6-digit postal code. In cities, the neighbourhoods tend to cover small geographic areas and differ significantly from one another in their socioeconomic characteristics. In smaller urban or rural areas, neighbourhoods may be synonymous with communities. Through collaboration with Statistics Canada, EDI data and socioeconomic data have been aligned on neighbourhood maps, presented in a package, scale by scale. The mapped neighbourhood data are made available to the local intersectoral coalitions for ECD and also to the MCFD for strategic planning in policy, programs, and community development for children.

EDI RESULTS IN ACTION

The British Columbia/HELP EDI work has been used in six different ways:

1. to assess the state of ECD at the population level;
2. to judge the resilience of communities in supporting children's development;
3. to anchor then evaluate change in ECD over time;
4. to understand the state of ECD in special populations;
5. to monitor progress in meeting the Convention on the Rights of the Child; and
6. to inform community development and policy for ECD.

8. The Australian Model of EDI Use

The widest implementation to date of the EDI beyond Canada occurs in Australia. The EDI has been adapted to the Australian context, renamed the Australian Early Development Index (AEDI), and is being used in the Building Better Communities for Children project. This project enables over 60 communities throughout Australia to assess how their children are developing by the time they reach school age (Sayers, 2004). The project is conducted by the Centre for Community Child Health at the Royal Children's Hospital in Melbourne in partnership with the Telethon Institute for Child Health Research in Perth. To date the AEDI project has had substantial funding from the Australian Government Department of Family and Community Services and Indigenous Affairs as a commitment to its National Agenda for Early Childhood and through the corporate support of Shell Australia. Further funding has been secured to develop and test a culturally appropriate version of the AEDI for use with Indigenous children. Additionally, the Australian Government is committed to repeating the AEDI in the original 60 communities.



Communities have noted the following benefits arising from implementation of the AEDI (Goldfeld, 2006):

- *Raising awareness about the importance of early childhood development:* Communities have used a wide range of strategies, such as holding forums, and the AEDI results have encouraged schools and communities to reflect on specific factors impacting early childhood development within their community.
- *Reviewing services/programs and identification of high need areas:* The AEDI data have prompted service providers to review how existing services and programs are delivered and to consider new initiatives that may be needed to address some of the issues raised.
- *Building relationships and working collaboratively:* AEDI champions have encouraged schools, health and community services to determine program/service gaps or infrastructure enhancements that can be addressed jointly.
- *Asset mapping:* Most communities indicate that the AEDI data were a useful adjunct to other tools, such as Australian Bureau of Statistics data, local statistics, community and service provider feedback.
- *Application for grants:* Many agencies, such as schools, local government, community organizations, and early years groups have used AEDI data to support grant and funding applications.

More information about The Australian Early Development Index and Building Better Communities for Children, an initiative of the Australian Government's National Agenda for Early Childhood is available online. See websites in Appendix D.

9. Modifications, Adaptations and Enhancements to the EDI

The version of the EDI established in 2000 has remained consistent in terms of core items, however, minor changes have been introduced based primarily on feedback from teachers and communities. Between 2000 and 2006, questions related to children's Aboriginal status, first language, bilingual language abilities, grade repetition, and transfers during the school year, have been added or modified.

Only one major change in the EDI has been made since 2000, a modification to response categories for a subset of questions in 2005 resulting from the Australian experience. This is fully described in Appendix A.

The Kindergarten Parent Survey (KPS)

While the EDI can provide information on children's abilities and skills as they enter school, in order to achieve a well-rounded picture of the health of a community's children, EDI results should be used in conjunction with other measures providing data, demography, and availability, accessibility and use, of services and resources such as parks and playgrounds. In 2003, the OCCS developed one such instrument, a parent survey, in collaboration with the Halton Region and Halton District School Boards. This survey is aimed at parents of children who are subjects of EDI

Before considering any changes to the instrument to meet local needs and context, it is important to consult the OCCS, follow specific steps and adhere to certain requirements in order to retain the integrity and validity of EDI results. See Appendix C for details.



data collection. The Kindergarten Parent Survey (KPS) has a set of core questions, but certain community-related questions should be tailored to community context. The KPS is a useful companion tool to the EDI as it provides information to assist communities in interpretation of results.

The core KPS consists of seven sections:

- 1) child health and development
- 2) child care
- 3) pre-kindergarten
- 4) senior kindergarten
- 5) family
- 6) neighbourhood, and
- 7) background information.

Because the KPS covers such a wide range of topics, it cannot be considered a standardized uniform instrument, and therefore was not subjected to a detailed psychometric investigation such as the one applied to the development of the EDI. Nevertheless, a study conducted in 2005 revealed that the test-retest of items in the KPS, and parent consistency in reporting, were satisfactory. To date, four communities have implemented the KPS with parents of children whose teachers completed the EDI, with response rates of from 40% to 60%.

Data from KPS demonstrated that parental involvement expressed through volunteering in a child's school, and through the child's participation in community-based sessional activities had a stronger association with positive EDI outcomes than other forms of parental involvement.

Not only does information from the Kindergarten Parent Survey allow a deeper understanding of the children's health and economic background to provide context to EDI results at a population level, it is also useful to distinct stakeholders. It permits service providers to assess the popularity of programs for preschool children, child care providers to obtain information on child care usage, barriers, and satisfaction; and schools to measure parent satisfaction and engagement in various school initiatives.

The Electronic EDI

The OCCS, in consultation with Health Research Computing, has developed a web-based version of the EDI, called the e-EDI. The province of Ontario funded the development of this web-based EDI. Following a pilot study and a reliability assessment with a group of volunteer teachers (Duku & Janus 2004), the e-EDI was first used in 2005. Its first large-scale implementation was undertaken in 2005/06. Nineteen sites within 31 school boards have used the electronic EDI, involving approximately 23,000 children; following which, the e-EDI has been further fine-tuned.

The e-EDI is accessible from any web-enabled computer. It is available in both English and French and offers considerable flexibility for data entry and management. The data entry is very intuitive, requiring only basic typing skills and rudimentary knowledge of computers. The data can be entered over several days as there is provision for saving data and returning to the online form at various stages of completion. The program also facilitates the ability



of site coordinators and EDI staff to monitor data entry for omissions. Communities are encouraged to consider the electronic EDI, as this mode of data entry dramatically reduces the amount of paper and mailings, and allows a quicker turnaround for data analysis. Implementation of the e-EDI can be administered by the OCCS or, alternatively, rights to the software can be purchased through McMaster University.

Adapting the EDI for Local Use

Adaptation of the EDI to local context must be conducted systematically to uphold the EDI standards and validity across settings and to guarantee that the assessment is relevant to each setting (Janus, 2007).

Required Steps:

- Consult with local experts (university faculty, clinicians, teachers, education administrators) to establish the relevance of the EDI items locally and to monitor accuracy of any translation into a language other than English. If the items need to be translated, these local experts should be consulted about the accuracy of the translation. The regional EDI coordinator must consult with the Offord Centre about any changes and modifications made to the instrument.
- Changes and modifications are possible within the limits of comparability for the subdomains. Changes can be made to adapt an item to the local context, (e.g., modify wording slightly) or to remove or replace an item that is not relevant locally.
- To ensure that the EDI items reflect children's skills accurately and that teachers and educators can respond to the questions readily and easily, the EDI must be tested first on a pilot basis with kindergarten teachers or early childhood educators.

The value of the EDI as a measure that provides consistent results for comparison across population groups in neighbourhoods, communities and over time, will be lost if modifications are improperly designed.

Collecting data on the reliability and validity of the EDI locally is necessary to ensure that the previous steps in adapting the EDI have not compromised its value. Reliability and validity could be assessed in several ways—for example, by having a subgroup of teachers complete their assessment twice (test–retest), by linking the EDI data with individual assessments of children's cognitive abilities (conducted separately, or previously as is often done routinely in schools), or by selecting a representative sample of parents for parent interviews. To document reliability and validity, the data from these additional assessments should be analyzed for their level of agreement or association with the EDI results.

Adaptation and Validity of the EDI for International Use

The EDI has been used, or adapted for use, with minimal changes in many other countries. Other international collaborations include some regions in the United States, Australia, Chile, Egypt, England, Holland, New Zealand, and implementation in Jamaica, Kosovo, Moldova, and Mexico, funded by the World Bank. Australia has implemented it in more than 60 communities country-wide.

The EDI has been easily transferable for use in other countries because the items included in the EDI reflect developmental milestones, rather than specific curriculum goals (Janus, 2006). However, the above cautions remain relevant when adaptations are necessary because some terminology or skills in the EDI are culturally or linguistically inappropriate in some areas of the world. Whenever possible, the EDI team at the OCCS works with local experts to adjust the items to reflect the culture in which the EDI will be implemented.

The designation of subdomains in the EDI has facilitated adaptation of the instrument for use in other countries. Subdomain items were selected based on their statistical characteristics and relevance to the context in which the EDI was originally implemented; if some items are not relevant locally, they may be adjusted or replaced with others from the bank of original questions to ensure that the instrument is contextually relevant.

To ensure that the EDI remains comparable across different settings, a shortened version of the EDI now under development and testing, will include up to three representative items from each subscale. The factor loadings and analyses of reliability of items in samples from different countries will provide the basis for selection (Duku & Janus, 2007).

Reliability of an instrument includes:

- internal consistency of the domains: an assurance that all items within a domain measure the same concept
- test-retest-reliability: the degree to which an informant consistently provides the same responses when questioned twice over a short period of time
- inter-rater reliability: the degree to which two informants agree with each other's responses

10. Testing Psychometric Properties of the EDI

The Early Development Instrument has undergone psychometric testing in Canada to ensure its reliability and validity (Janus & Offord, 2007). Rigorous validity testing has also been carried out in Australia (Brinkman et al., in press). Conclusions from testing carried out in other countries are also highlighted.

For some countries, data collection and analyses are ongoing. Comparisons of the Canadian normative data with EDI datasets from other countries suggest that children's patterns of association in these countries are similar, a finding



that renders the EDI equally valid for these countries. For example, results from Australia, Kosovo, and Jamaica indicate that the gradient of EDI outcomes based on family socioeconomic status is similar to the one observed in Canada.

Reliability

The internal consistency of the EDI varies from 0.84 to 0.96, which indicates a high internal consistency. Test-retest reliability correlations are also high (See Table 10.2). Clearly, teachers’ assessments of children in their classes were more in accord with one another than with the parents’ assessments, particularly in the physical and emotional areas. It is a commonly accepted discrepancy that agreement between parents and teachers is in the moderate range, and therefore EDI figures indicate acceptable inter-rater reliability.

A test of validity asks whether an instrument is assessing what was intended.

There are several approaches for determining validity:

- from an interpretation of the instrument’s content;
- from its performance in operation, e.g., its ability to distinguish known differences among subjects (construct);
- from its performance in comparison with other previously validated instruments (concurrent);
- and from its ability to predict outcomes (predictive).

Table 10.2 Summary of EDI Reliability Tests

	Internal reliability of the domains (Cronbach alpha)	Test-retest reliability	Inter-rater reliability	
			School teacher- Day care teacher	Parent-teacher
Physical Health and Well-being	0.84	0.82	0.69	0.36
Social Competence	0.96	0.92	0.80	0.50
Emotional Maturity	0.90	0.89	0.77	0.36
Language and Cognitive Development	0.93	0.82	0.72	0.64
Communication Skills and General Knowledge	0.94	0.94	0.53	0.41



Concurrent validity

Concurrent validity indicates the degree to which an instrument measures the concepts it intends to measure when assessed in comparison to other, already established tools. The results of two studies assessing concurrent validity are summarized in Table 10.3. It shows correlations between the EDI domains and children’s scores for both studies in which an observer carried out a direct assessment of a child’s abilities shortly after the child’s teacher completed the EDI. In one study (N=122), children were tested directly with the developmental assessment, First STEp (Miller, 1993), which addresses cognitive and language areas during an approximately 40-minute testing period. In addition, the observer rated the child’s socio-emotional skills at the same time.

In the second study (N=1700), the Peabody Picture Vocabulary Test (PPVT) of receptive vocabulary (Dunn & Dunn, 1981), and the Who Am I? test (deLemos & Doig, 1999) were administered to children. PPVT is a test of receptive language which provides a brief index of cognitive functioning. The PPVT score is considered to be a reasonably reliable approximation of the IQ. Who Am I? is a nonverbal language assessment. It provides a reliable measure of development and is valid across different cultural groups, including children whose knowledge of English is limited. It comprises three scales: copying (circle, cross, square, triangle, diamond), symbols (printing name, letters, numbers, words, sentences), and drawing (a picture of self). The Who Am I? is suitable for children aged 3 to 7.

Table 10.3 Association of the EDI Scores with Direct Cognitive Measures

	Correlations		
	With First STEp score N=122	With PPVT N=1700	With Who Am I? N=1700
Physical Health and Well-being	Motor 0.54	0.05	0.14
Social Competence	Socio-emotional 0.65	0.22	0.38
Emotional Maturity	Socio-emotional 0.73	0.11	0.36
Language and Cognitive Development	Cognitive 0.58	0.26	0.46
Communication Skills and General Knowledge	Cognitive 0.52	0.57	0.22

External validity

External validity is the degree of association between scores on one measure and those from other tools that measure similar concepts from a different perspective. In order to establish the external validity of the EDI, OCCS researchers examined the association of EDI scores with responses from parent interviews. Questions were asked that



corresponded with the EDI domains (e.g., for physical health, “how would you rate the child’s health?”, “how would you rate the child’s level of activity?”) and the answers correlated with the EDI scores. Individual correlations within the Physical Health and Well-being domain ranged from 0.15 to 0.34, within the Social Competence and Emotional Maturity domains from 0.21 to 0.48, and within Language and Communication from 0.15 to 0.26. All correlations were in the expected direction, and 16 out of 24 (66%) were statistically significant.

Predictive validity

Predictive validity indicates to what extent the measure of a construct collected at one time predicts or agrees with the outcomes for the same children on the same construct at a later time. Ideally, the two measurements are based on the same instrument. However, since the EDI is applicable only for the 4-6 year-old range, different measures have to be chosen for the later assessments.

In a study carried out in Ontario, three measures were collected three years after the original EDI implementation and linked with children’s EDI scores. For an equivalent of the Physical health and well-being domain, the Developmental Test of Visual-Motor Integration (VMI) was used (Berry, 1989). The VMI is designed for children aged 3 to 8 years. This test has children duplicate drawn figures in order to assess their visual motor integration, fine motor skills, and visual-perceptual skills. For an equivalent of the social and emotional areas on the EDI, teacher ratings on the Strengths and Difficulties Questionnaire (SDQ, Goodman 1997) were used. SDQ is a brief, 25-item behavioural screening instrument for children.

The first four scales are added together to generate a Total Difficulties Score. Finally, for the language, cognitive, and communication areas on the EDI, the Detroit Test of Learning Aptitude (DTLA, Hammil, 1998), a direct screening measure, was used. DTLA is a cognitive measure composed of 11 subtests. The subset scores used for Grade 2 screening in the study were: Word Opposites, Basic Information, and Symbolic Relations. Table 10.4 shows the correlations between the EDI domains for children in kindergarten and the scores in Grade 2.

Table 10.4 Predictive Validity of EDI for Development in Grade 2

	With Grade 2 scores	N=122, all p<0.05
Physical Health and Well-being	Visual-Motor Integration	0.27
Social Competence	SDQ Emotional score	-0.19 ^a
Emotional Maturity	SDQ Emotional score	-0.20 ^a
Language and Cognitive Development	DTLA-4 scores	0.46
Communication Skills and General Knowledge	DTLA-4 scores	0.43

^a Higher values on the EDI indicate better scores; higher values on the SDQ indicate lower scores, and therefore the negative correlation was expected.



A recent study by Forget-Dubois et al. (in press) demonstrated that the kindergarten EDI scores predicted children's academic outcomes in Grade 1 as well or better than direct measures.

In British Columbia the opportunity existed to examine the predictive validity of the EDI on a much larger scale, given that EDI results were linked by student number to school records. In that province, all Grade 4 students are mandated to complete the Foundation Skills Assessments (FSA) in reading, writing and numeracy. FSA outcomes are assigned to one of four levels of performance, based on the performance standards developed by BC Ministry of Education:

- exceeding expectations,
- fully meeting expectations,
- minimally meeting expectations,
- and not yet meeting expectations.

Following the FSA test, Grade 4 children are assigned to one of three collapsed categories: exceeding expectations, meeting expectations or failing to meet expectations. The "not yet meeting expectations" (or "failing") category only includes children who wrote the test and failed it. A further category of "not passing" can be created by including all children who did not pass the test, i.e., those who wrote the FSA and failed it, those who did not write the test, and those who did not complete sufficient responses to generate a useable test.

EDI scores for almost all children tested in 2000 and 2001 (94.5%) were matched by a personal education number with their corresponding FSA results. Percentages of children "failing" and "not passing" were compared to the number of domains on which their EDI scores showed them vulnerable in kindergarten. Table 10.5 shows the results. For both numeracy and reading, the failure rate increases with the number of vulnerabilities on the EDI (writing is omitted for clarity as it showed very similar results). As expected, each "not-passing" rate is higher than its respective failure rate; moreover, the "non-passing" rates increase at a faster pace than the failure rates.

Increasing numbers of vulnerabilities across the five EDI domains predict both an increasing probability of failure to achieve basic competencies by Grade 4 and an increasing rate of non-participation in the assessment process.

These results indicate that kindergarten EDI scores have predictive validity for the attainment of basic school competencies in a dose-response gradient manner.

Table 10.5 The Cost of Vulnerability: Failing to Meet Expectations & Not Passing on Grade 4 FSAs

# of Vulnerabilities (Kindergarten)	% Failing to Meet Expectations	% Not Passing
Numeracy		
0	7.5	12.3
1	11.8	22.2
2-3	18.7	33.8
4-5	27.5	55.6
Reading		
0	13.6	17.8
1	26.7	33.9
2-3	29.5	43.1
4-5	48.4	68.3

There are also preliminary data from a large school board in Ontario indicating that the EDI scores predict the school-board-wide testing results in Grade 3 and Grade 6 (Yau, personal communication, June 2007).

Validity of the Australian EDI

The first step toward implementing the Canadian EDI in Australia required researchers to test its current content validity and utility when used as a measure of early child development and readiness for school in the Australian context. This was undertaken by a collaboration between the Perth North Metropolitan Area Health Service, the Swan and West Coast District Education Offices and the Offord Centre for Child Studies, McMaster University in 2002 (Brinkman & Blackmore, 2003). Apart from minor wording changes to reflect common Australian English usage, the overall content and structure remained essentially unchanged from the original Canadian version. After piloting the EDI in 7 schools with 200 students, this version of the instrument was completed across the entire North Metropolitan geographical region of Perth involving 120 pre-schools (government and non-government) and 4,319 children who were 4-5 years of age (Hart, Brinkman & Blackmore, 2003, Brinkman, Hart & Blackmore 2003).

The next step in the revision process involved Rasch scaling analysis (N = 4,319 children) to examine the psychometric properties of each of the five EDI domains. (See Glossary for a definition of the Rasch model, an established analytical method in psychology and educational research.) This analysis established that all five domains had excellent reliability and validity in terms of the Rasch model; however, in four of the domains (physical health and well-being, social competence, emotional maturity and communication skills) a recommendation was made to reduce the 5-point Likert scale response options to a three and in some cases a two point option, thus improving the thresholds between the ordered response categories (Andrich, 2004). The Rasch analysis also identified that nine items could be safely eliminated without any loss of scale precision. Following a pilot study to confirm the feasibility of the

change, the AEDI Project Technical Reference Group, in consultation with Dr. Janus, the EDI author, sanctioned these modifications to the AEDI in 2005. The reduction of answer options necessitated recoding the modified items from the original version of the EDI (See Appendix C). The EDI has retained the nine questions omitted from the AEDI.

The Longitudinal Study of Australian Children

This is a clustered, nationally representative, cross-sequential sample of two cohorts of Australian children: 5,104 infants and 4,976 four year olds (Sanson et al, 2002).

(See Appendix D for LSAC & AEDI websites.)

The first wave of data collection of the Longitudinal Study of Australian Children (LSAC) (Sanson et al., 2002) in May 2004 provided a convenient opportunity to further validate the Australian Early Development Index (AEDI). LSAC collects a wide range of data on early development, health, education and living circumstances, gathered from face-to-face interviews with parents, parent self-completed questionnaires, interviewer observation, direct child assessment, and teacher/caregiver completed questionnaires. The response rate for the 4-year-old child cohort was 59.4% (Solof, Lawrence & Johnston, 2005.)

The construct validity of the AEDI was assessed by examining it against a range of established individual level measures of children's development utilizing a sub-sample of 642 children assessed by the LSAC. (For details, see Brinkman et al., in press.)

Comparable LSAC instruments used to assess construct validity:

- Parents Evaluation of Developmental Status (PEDS) (Glascoe 1997, Glascoe 1999)
- Paediatric Quality of Life (PedsQL) (Varni et al., 2001)
- Strengths and Difficulties Questionnaire (SDQ) (Goodman 2000, Goodman et al., 1999)
- Peabody Picture Vocabulary (PPVT-III). (Dunn and Dunn 1997)
- Who am I? (WAI) (deLemos and Doig 1999)
- The Short Temperament Scale for Children (STSC) (Prior et al., 1989; Sanson et al., 1987).

The construct validity of the AEDI as a general measure of "early child development" and as a predictor of "readiness for school learning" was investigated by reviewing the strength of association between each of the AEDI domains and the relevant LSAC instruments with Pearson correlation coefficients.

Moderate to large correlations were observed between each of the five AEDI developmental domains and their sub-domains and the relevant teacher-rated LSAC measures assessing comparable constructs. The strongest associations were evident for the AEDI Language and Cognitive Development domain with teacher-rated measures of reading, writing and numeric competencies (0.62, 0.69 and 0.72 respectively). The AEDI Social Competence and Emotional Maturity domain and sub-construct scores also showed moderate to strong correlations with the LSAC teacher-reported SDQ peer problems (0.33 to 0.47), conduct problems (0.35 to 0.64), pro-social behaviour (0.57 to 0.75) and hyperactivity (0.63 to 0.69).



While the parent reported LSAC social and emotional competence measures also showed a consistent pattern of significant associations with the AEDI Social Competence and Emotional Maturity domains, these correlations were generally much weaker than those for the comparable teacher ratings.

In general, parent-rated instrumentation correlated less well to the AEDI than did teacher rated instrumentation and the AEDI. These results are consistent with the correlations found between the other LSAC teacher-rated instrumentation and the LSAC parent rated instrumentation. These weaker correlations may be partially explained by the time lag (on average 2 months) between parent interviews, parent self-completed questionnaires, concurrent observational methods, and the teachers' responses.

The AEDI Physical Health and Well-being and the Communication Skills and General Knowledge domains were found to correlate less well with the available relevant LSAC measures. Moderate correlations were observed between the AEDI and LSAC teacher rated fine and gross motor skills (0.37 to 0.45), but other aspects of the LSAC health and well-being measures showed poor correlations, which suggests that the two measures were assessing quite different aspects of physical health.

This study indicated that the AEDI as a teacher-completed checklist has sound construct validity when compared with data collected independently from teacher ratings and direct assessment of children and, therefore, can be confidently used as a population level indicator of children's current developmental status.

Further validity analyses, particularly the predictive validity assessment of the AEDI and the LSAC measures are necessary. The extent to which children's developmental status, as measured by the AEDI at age 4-5 years, is predictive of their subsequent trajectories of school learning and behaviour will be assessed using data collected from schools and families in the second wave of the LSAC data collection available for analysis in mid 2007.

Validity of the EDI in a Jamaican sample

The EDI was used for data collection in a Jamaican sample of 151 children from 18 schools selected using stratified randomization, based on the Jamaican government's determination of rural/urban and small/medium/large schools. Each school contained from two to 15 children. Teachers completed the EDI, and children were assessed directly using the McCarthy Scales of Children's Abilities and Peabody Picture Vocabulary Test (PPVT). McCarthy Scales are designed to measure the child's cognitive skills and cover a wide range of abilities. While only the associations with Language and Cognitive Development, and Communication and General Knowledge are conceptually important for the assessment of EDI validity, as they measure similar construct to those measured by PPVT and McCarthy, Table 10.6 demonstrates statistically significant associations among the direct measures within all five EDI domains.

Table 10.6 Association of the EDI scores and direct assessment measures in a sample of Jamaican children

Direct assessments		Physical well-being	Social competence	Emotional maturity	Language and cog. dev.	Comm. and gen. knowledge
PPVT – raw score	r	0.304	0.255	0.208	0.396	0.331
	Sig.	<0.001	0.002	0.011	<0.001	<0.001
	N	150	150	147	150	151
McCarthy - verbal	r	0.260	0.320	0.226	0.361	0.318
	Sig.	0.001	<0.001	0.006	<0.001	<0.001
	N	147	147	144	147	148
McCarthy - perceptual/ performance	r	0.223	0.362	0.307	0.401	0.346
	Sig.	0.007	<0.001	<0.001	<0.001	<0.001
	N	146	146	143	146	147
McCarthy - quantitative	r	0.130	0.315	0.207	0.443	0.308
	Sig.	0.113	<0.001	0.012	<0.001	<0.001
	N	149	149	146	149	150
McCarthy - cognitive memory	r	0.228	0.295	0.218	0.371	0.312
	Sig.	0.005	<0.001	0.009	<0.001	<0.001
	N	147	147	144	147	148
McCarthy - general cognitive	r	0.258	0.389	0.309	0.448	0.383
	Sig.	0.002	<0.001	<0.001	<0.001	<0.001
	N	144	144	141	144	145

Reliability of the Electronic EDI

The test-retest of the electronic EDI with the paper version was carried out in Ontario with a sample of 151 children. Ten teachers in one large school board completed the paper EDI, and, two weeks later, the electronic version, with reference to the same children. Test-retest correlations as well as intra-teacher (inter-instrument) reliabilities using intra-class coefficients (ICC) were calculated (Table 10.7). Both sets of values indicate a high test-retest reliability between the two versions.

Table 10.7 Comparison of EDI paper version and electronic EDI

Domain	Test-retest (N=151)	Mean intra-class coefficients (N=10)
Physical health and well-being	0.90	0.84
Social competence	0.92	0.87
Emotional maturity	0.87	0.85
Language and cognitive development	0.94	0.82
Communication skills and general knowledge	0.91	0.87

Testing for Teacher Bias

Socio-economic status of children

The existence of a potential bias in teacher reporting is an issue that needs to be addressed. The reliability and validity results, as highlighted above, indicate that, on average, teacher reports are reliable and are associated with other child characteristics in a predictable manner. For example, large group averages consistently show a gender difference: boys have lower scores than girls. This is a well-established developmental phenomenon, and the fact that the EDI scores replicate it supports the accuracy of teacher ratings. Intra-class coefficients, higher than 0.8 for each of the EDI domains (Table 10.7), also add to the confidence in teachers' ratings. Concerns are occasionally raised about a potential "halo" effect in giving students from wealthy families or living in affluent neighbourhoods higher ratings than they deserve, or, conversely, a reverse "halo", discounting scores for students from low-income families or neighbourhoods. Several pieces of evidence dispute this contention. First, there is a similar amount of variation due to affluence levels in the EDI scores as there is in the outcomes of the direct assessments conducted by outside observers (Janus & Duku, 2006). Second, if teacher bias were to exist, we could expect a close to perfect association of neighbourhood SES and vulnerability, which is indeed not the case (Janus & Raos, 2007; Kershaw et al., 2005, Raos et al., 2007). In most communities there are so called "off-diagonal" neighbourhoods, which have low SES yet high EDI scores or vice versa. As an example, in one school in a very wealthy neighbourhood, the 5 year olds had one of the lowest physical health and well-being scores in the cohort. Closer investigation indicated that a lack of physical independence, likely related to a large percentage of children being supervised at home



by nannies, contributed to the scores. Teachers were not influenced by parental wealth in reporting the lack of children's physical abilities.

Aboriginal status

The recent linkage of the EDI results in British Columbia provided an unanticipated opportunity to explore a possible racial bias among BC teachers towards Aboriginal children. In the course of the first wave of data collection in BC between 2000 and 2004, 2514 children were identified by their kindergarten teacher as Aboriginal. When records were linked to BC Ministry of Education files that included individual children's caregiver-declared Aboriginal status, 3728 children were discovered to have an Aboriginal status indicator for at least one enrollment period from kindergarten to Grade 4. Thus, for approximately 1200 children the EDI was completed by a teacher who was unaware of the child's Aboriginal status. These 1200 responses were considered to be 'blind' EDI evaluations. (Only 13 children without the Aboriginal status in the Ministry file were identified by a teacher as Aboriginal.)

In order to determine any existence of bias, the proportion of Aboriginal children deemed vulnerable on one or more scales of the EDI, using the EDI-based indicator, was compared to the proportion of vulnerable children based on the Ministry-based status indicator. Only school districts where there were more than 30 Aboriginal children identified by Ministry records were included. The results showed no evidence of bias. In 51 school districts the proportion of vulnerable children based on the status information from the two sources was within 5% of each other. In eight districts the difference was greater than 5%; however, in four cases it was greater using the Ministry status indicator and in four it was greater using the EDI status indicator. Thus, the 1200 Aboriginal children who were assessed by BC kindergarten teachers 'blind' to their status were found to be neither more nor less vulnerable in their development than those known to the kindergarten teachers as being Aboriginal.

A study by Guhn, Gaderman & Zumbo (in press) demonstrated that teachers' responses are free of bias due to students' Aboriginal status, ESL status, or gender.



11. Conclusion

The underlying premise of the Early Development Instrument is the need to help all children find an equal place on the starting line to formal education. Children who come to school without the essential skills, abilities and attitudes for learning, which the authors call school readiness to learn, have poorer trajectories throughout their school careers. As with many other societal concerns, early screening and intervention with regard to school readiness can greatly improve children's outcomes. Communities who wish to assess whether children are adequately prepared to fit within the formal school system or need additional resources to thrive have found the EDI an important asset for data collection. Though not a diagnostic tool, data at a micro-level can be used to help identify small groups of children within schools or neighbourhoods who are in need of extra support. At a more macro-level, groups, neighbourhoods or larger regional pockets of under-prepared children can be identified before they are locked into a cycle of frustrations and failures.

Since its inception, use of the EDI has proliferated in regions across Canada and internationally, under the watch of its originators at the Offord Centre for Child Studies. Its large database provides ample opportunities for comparison studies and, in combination with community mapping projects, for research into societal factors affecting children's physical, emotional and intellectual growth. Based on EDI results, community leaders can determine patterns of skills and deficits or vulnerabilities that supersede differences in family circumstances and reflect the larger environment affecting children. For, if indeed it takes a village to raise a child, children are also reflections of those villages. This larger environment is where families should have access to resources and information helping them to prepare their children for school and later life.

On this community level, the allocation of resources is dependent on a myriad of factors, both economic and political, which can be improved by meaningful, reliable data such as those produced by the EDI. The EDI has been proven to be an important tool for community leaders who wish to mobilize support for children who may otherwise face greater challenges in life. The models profiled in this document, British Columbia, Manitoba, Ontario, and Australia in particular, and in smaller projects like that in Jamaica, show how the EDI can become an intrinsic part of a community system seeking to benefit children. Its psychometric properties have been thoroughly tested and provision made for cultural modifications. Australia has successfully adapted it as the Australian Early Development Index and incorporated it into widespread use with the assistance of the Offord Centre EDI team. The potential exists for broader use, so that community leaders and policy makers have the tools and data they need to help our children thrive.



APPENDIX A: Recoding of Selected Categories

Following psychometric testing of the AEDI, the original version was retested and modified. The following describes the recoding procedure and subsequent psychometric test results.

In response to results of psychometric testing, answer options were reduced for 18 items from the domains of: physical health and well-being (9 items), social competence (2) and communication and general knowledge (7). In order to accurately recode these items in databases collected prior to the change in 2005, OCCS conducted a study to establish empirical recoding values.

Two hundred kindergarten teachers in Manitoba and Ontario were randomly selected to complete the 2003/04 version of the instrument with the 5-answer options two weeks after they had completed the current revised version of the EDI. Complete responses for 161 teachers (80.5%) were analyzed. In a comparison of teachers' responses from the two versions, it was possible to assess how frequently their responses changed when the range of options was altered. For example, a second lowest rating out of 5 might become either the middle rating or the lowest rating of three. As test-retest reliability for the EDI was high and the short testing period ruled out significant change in student abilities, this experiment allowed the OCCS to determine the likelihood, range and pattern of response shifts. Since different shifts were found for different items, recodes were based on the most frequent shifts and applied to the normative EDI data.

The results of the EDI scores and change to vulnerability percentages in the normative database before and after recodes are shown in Tables 10.8 and 10.9.



Table 10.8 Descriptive statistics for the normative sample before recoding of the 18 questions

		Physical Health & Well-being	Social Competence	Emotional Maturity	Language and Cognitive Development	Communication and General Knowledge
N	Valid	116512	116817	115739	116200	116794
	Missing	348	43	1121	660	66
Mean		8.7867	8.2853	8.0476	8.3577	8.0556
Median		9.0385	8.8462	8.3333	8.8462	8.0556
Std. Deviation		1.04616	1.74116	1.50592	1.81489	1.94170
Minimum		1.82	.00	.17	.00	.00
Maximum		10.00	10.00	10.00	10.00	10.00
Percentiles	10	7.3077	5.5769	6.0000	5.7692	5.0000
	25	8.2692	7.3077	7.1667	7.6923	6.3889
	50	9.0385	8.8462	8.3333	8.8462	8.0556
	75	9.6154	9.6154	9.1667	9.6154	9.4444
	90	10.0000	10.0000	9.8333	10.0000	10.0000

The 10th percentile low cutoffs, for the domains (defining vulnerable children) remained constant with the exception of the communication skills and general knowledge domain. After the recode, there was a shift to higher means in the domains of physical health and well-being and communication skills and general knowledge. However, the proportions of children falling below the 10th percentile cutoffs remained similar before and after recoding as shown in Table 10.10.

Table 10.9 Descriptive statistics for the normative sample after recoding of the 18 questions

		Physical Health & Well-being	Social Competence	Emotional Maturity	Language and Cognitive Development	Communication and General Knowledge
N	Valid	116512	116817	115739	116200	116794
	Missing	348	43	1121	660	66
Mean		9.1147	8.3510	8.0476	8.3577	8.1803
Median		9.6154	9.0385	8.3333	8.8462	9.3750
Std. Deviation		1.28079	1.77609	1.50592	1.81489	2.47805
Minimum		.77	.00	.17	.00	.00
Maximum		10.00	10.00	10.00	10.00	10.00
Percentiles	10	7.3077	5.5769	6.0000	5.7692	4.3750
	25	8.4615	7.3077	7.1667	7.6923	6.8750
	50	9.6154	9.0385	8.3333	8.8462	9.3750
	75	10.0000	9.8077	9.1667	9.6154	10.0000
	90	10.0000	10.0000	9.8333	10.0000	10.0000

Table 10.10 Percentage in Lowest 10th Percentile (Vulnerable) for Each Domain

Domain	Before recoding	After recoding
Physical health and well-being	10.4	11.2
Social competence	9.1	9.0
Emotional maturity	10.9	10.9
Language and cognitive development	9.5	9.5
Communication and general knowledge	10.4	11.6
Low on 1 or more domains	25.9	26.8
Low on 2+ domains	12.9	13.4

APPENDIX B: Methodological Approaches in Using EDI Data to Measure Change Over Time

Four approaches are recommended for the measurement of change over time using data derived from the EDI. The best approach should be determined by the number of waves of data as well as the level of aggregation of available data .

The first three approaches are feasible using two waves of data on the same unit of analysis. Two waves of data measure change using a variant of the difference score which provides minimal information about change (see Approach 1). The difference score is easy to compute, and is an unbiased estimate of the underlying true change between two measurement points. The difference score suffers from one limitation, that is, one cannot assess the precision and goodness of fit of the modeled change. Several authors have suggested modifications to the difference score in order to better estimate true change (Willett 1989). These include the reliability-weighted change score and the residual change score. Approaches 2 and 3 are variations of Approach 1.

Describing a trajectory of change requires three or more observations on the same unit. This allows the use of multi-wave data to estimate change, which can be summarized and characterized with greater validity and make it possible to perform within-unit and between unit analyses. A trajectory for each unit of the analyses is modeled at the within-unit level of analysis. The between-unit differences in the trajectories are estimated. The analytical methods involve using repeated measures ANOVA and multi-level or mixed methods software such as PROC mixed (SAS), SPSS or MLWin.

- Unit of analysis – community or neighbourhood
- Measures – means, standard deviations, minimum, maximum and % low for domains, % MCI

Approach 1: A reference-year analysis

This is a reference/base year approach for community year over year analysis. The percent change from the base year is computed, producing in effect a year-over-year trend analysis. This approach is simple and doesn't take into account variation in data. It is defined as follows:

$$\% \text{ change over base year} = (\text{year2} - \text{year1}) * 100 / \text{year1}$$

The provincial percentage change can be used as a meaningful comparison for communities in provinces with complete coverage. In communities in provinces with less than complete coverage, it is suggested that percentage change in cohorts for the same years be used as a benchmark.

$$\frac{(\text{community2} - \text{community1}) - (\text{cohort2} - \text{cohort1})}{(\text{community2} - \text{community1}) - (\text{province2} - \text{province1})}$$

or

$$\frac{(\text{community2} - \text{community1}) - (\text{cohort2} - \text{cohort1})}{(\text{community2} - \text{community1}) - (\text{province2} - \text{province1})}$$

Approach 2: Using cohort/province change as benchmark (similarity index)

- Compute change for cohort/province during same period and compare change in community to cohort/provincial change.
- Compute differences between change in community and change in provincial measures.

Approach 3: Effect size approach using within community variation

In this approach it is recommended that variations in domain scores be used to contextualize the change from one year to the next.

Computed as:

$$ES = (\text{mean year 2} - \text{mean year 1}) / \text{sd base year}$$

An effect size is exactly equivalent to a 'Z-score' of a standard normal distribution. Another way to interpret effect sizes is to compare them to the effect sizes of differences that are familiar. For example, Cohen (1969) describes an effect size of 0.2 as 'small'. An effect size of 0.5 is described as 'medium' and an effect size of 0.8 is 'grossly perceptible and therefore large'.

An alternative approach is to compute the difference between two years as follows:

$$\text{Standardized change} = (\text{mean year 1}/\text{sd yr 1}) - (\text{mean year 2}/\text{sd yr 2})$$

The result can then be compared to the standardized provincial change using the difference between community change and provincial change.

Approach 4: Multilevel/growth curve analyses

Multilevel/growth curve analyses are used by OCCS and other centres with cohort data or by communities with



neighbourhood level data. This method is the most sophisticated statistically.

Growth curve analyses with data at the community/neighbourhood (repeated measures) are described below:

Using community (or neighbourhood) as the unit of analysis, repeated measures analyses of variance or preferably growth curve analyses can be performed.

At least 3 data collection points are needed in order to allow model variation between communities/neighbourhoods and within communities/neighbourhood, which will answer the following questions:

- what factors contribute to the variation between and/or within communities/neighbourhoods over time?
- what community/neighbourhood level characteristics explain the changes (if any) over time?
- how different are neighbourhoods within a community (or how different are communities within a region/province or nationally)?

APPENDIX C: Responsibilities of EDI Users

Users must agree to follow specific implementation rules in order to obtain accurate, reliable data from the EDI and maintain confidence for comparative purposes in future EDI data. The first set of general rules given below refers to both community-wide implementation and research use. Additional specific guidelines for either community-wide or research use are also provided.

Requirements for community-wide or research use

1. Prospective users must purchase a license from the OCCS, through the EDI author, and sign a user's agreement. Researchers should provide a brief project description including specific timing of data collection and data collection area.
2. Users agree to share an electronic copy of raw data collected using the EDI with the OCCS.
3. Data collection must take place in the second half of the kindergarten year (JK or SK-level), no earlier than January and no later than April, giving teachers sufficient time to become familiar with their students' abilities.
4. Data in analyses and reports must be reported only at aggregated levels without any information that could be used to identify specific individuals.
5. EDI data can be used at an individual level during analysis for matching data from other sources (e.g., birth weight information, or results from other school-directed testing), but only if the resulting analyses are based on group comparisons.
6. The database must not include students' names. The database with the EDI data should include: child's date of birth, gender, and postal code, unique school and teacher identification numbers, and time of class.
7. Confidentiality of raw data must be maintained at all stages of the data collection and analysis.
8. The OCCS may be requested to analyze data and provide analytical results for report preparation, with appropriate funding in place for such services.
9. If users conduct analysis and reporting, their guidelines must be made available to the OCCS.
10. If the EDI data are linked with any other data for research purposes, the OCCS must be informed in advance of such a project, and a copy of the report outlining the results sent to the OCCS.
11. A copy of any research paper or any other publication including data collected with the EDI should be sent to the OCCS.

Community-wide implementation: additional requirements for EDI use

1. For implementations directed from OCCS, local project directors must contact the OCCS team no later than September 30th of the school year in which implementation is going to take place.
2. Any reports sent to schools and community must be accompanied by interpretation guidelines and copies sent to the OCCS by the project directors .
3. Supporting materials available from OCCS must be used to inform teachers and community representatives. The updated version of the EDI Guide will be provided to teachers.



Cautions

4. The groups for which the EDI is implemented must be logically-defined, that is, the populations are based on geographical (e.g., city, census tract) or administrative boundaries (e.g., school board, network of schools).
5. Extreme caution should be given to interpretation of data for aggregations of 10 or fewer children. The smallest level of data aggregation recommended is either the school or census tract.
6. For population-wide reporting purposes, the designation “vulnerable” (not ready to learn) should only be applied to children who score in the lowest 10th percentile on one or more scales.

Research project requirements

1. If the EDI is used for a research project, the user will provide to the OCCS a list of all other measures used that will be linked with the EDI data in analyses or reporting.
2. Major analyses must always entail the five predefined domains. If any other subscales are reported, they must be scientifically justified, and their internal reliability must be examined and included.

If users require data for research purposes only, the time of implementation can be adjusted; however, the timing of data collection in relation to the school year has then to be clearly stated in the brief research description sent to the OCCS.



APPENDIX D: Online Resources

Australian Early Development Index
<http://www.rch.org.au/australianedi>

Best Start initiatives
<http://www.children.gov.on.ca/CS/en/programs/BestStart>

Building Better Communities for Children (Australia)
<http://www.rch.org.au/australianedi/results>

Chedoke Child and Family Centre
<http://www.mcmasterchildrenshospital.ca>

Early Years Action Group
<http://www.eyag.org/eyag/>

Education Quality and Accountability Office (EQAO), Ontario
<http://www.eqao.com/>

Foundation Skills Assessment (FSA), British Columbia
<http://www.bced.gov.bc.ca/assessment/fsa/development.htm>

Founder's Network
<http://wwwFOUNDERS.NET>

Healthy Child Manitoba
<http://www.gov.mb.ca/healthychild/>

Human Early Learning Partnership University of British Columbia
<http://www.earlylearning.ubc.ca/>

Human Resources Development Canada
http://www.hrdc-drhc.gc.ca/redirect_hr.html

Invest in Kids Foundation
<http://www.investinkids.ca>



Longitudinal Survey of Australian Children
A Picture of Australian Children
<http://www.aihw.gov.au/publications/phe/apoac/>

The Offord Centre for Child Studies
www.offordcentre.ca

Ontario Children's Secretariat
Ministry of Child, Family and Social Services
<http://www.cfcs.gov.on.ca>

The Ontario Early Years Study
www.ontarioearlyyears.ca/oeyc.html

Social Development Canada
<http://www.sdc.gc.ca/en/home.shtml>



GLOSSARY

Construct Validity - Tested agreement between a theoretical construct that describes the relationship between the attribute under scrutiny and other attributes (drawn from discussion in Streiner, Norman and Munroe Blum, PDQ Epidemiology, 1989); whether or not a perceived common factor can be shown to exist, underlying several measurements using different observable indicators; whether a scale measures the unobservable social construct that it purports to measure.

Cut-off - The score value of a particular percentile. The 10th percentile cut-off is the score below which 10% of the study population has scored. In an example with 200 children, it would be the score of the 20th child counting from lowest score to highest. The cut-offs could be local (based on the distribution of scores in the community-level implementation), provincial (based on the provincial data), normative (based on the normative data), etc. See also percentiles.

Distribution of scores - Scores obtained on each of the subdomain scales for all children in a site, when arranged from the lowest to the highest, are called a distribution of scores.

Effect Size - the magnitude of the differences that exist between two or more samples or the magnitude of the degree of association between two or more variables.

Multiple Challenge Index - The Multiple Challenge Index is an indicator of a child experiencing challenges in at least three EDI domains (Janus, Walsh & Duku, 2005). The MCI is scored based on challenges in 9 or more subdomains, and is expressed as “existence of multiple challenges” (1), or “no multiple challenges” (0). (Detailed descriptions and cut-off boundaries for each of the subdomains are listed on The OCCS website. See Appendix D.)

Normative Data - Normative data characterize what is usual in a defined population at a specific point or period of time (O’Connor, 1990) Since 1999 EDI data have been collected for over 300,000 4-5-year-old children in Canada and several other countries. A sub-set of this database, including data from the year 2000 and later, was analyzed to provide normative data on the EDI domains. The “Gold Standard” normative sample includes only children without the “Special Needs” status and with non-missing data in key categories. There are 116,860 children in the final “Gold Standard” sample. This represents 93.3% of the full sample of children (Janus & Duku, 2004).

Percentiles - The distribution of scores can be divided into groups called percentiles, based on the number of children. It is most common to divide a distribution into four groups, each consisting of scores of a quarter or 25% of the children in the site. In a site with 200 children whose scores are arranged from the lowest to the highest, the first 50 scores from the lowest will be the lowest (or “bottom”) 25th percentile. The actual score of the 50th child in the distribution of 200, or the score of the 30th child in a sample of 120, or 100th in the sample of 400, etc.—the one on which the first one-fourth of children ends—is the lowest 25th percentile boundary. The next 50 scores, starting right after the last in the previous group, will be the next 25th percentile, which is from the 51st to the 100th score. The



next 50 scores will be the next 25th percentile, from 101st to 150th score, and finally, the last 50 scores (from 151st to 200th, the highest), are the “top” 25th percentile.

Rasch Scale - In the development of a scale according to the Rasch model, researchers position items along a continuum in accordance with the number of valid responses obtained from a group of subjects. This determines the item values and relationships. The same subjects are plotted along the same continuum by the concordance of their responses with the full range of items. Thus the characteristics and performance of subjects are considered in relation to the scale design. The Rasch model can be used to determine levels of competence, and the basic steps necessary in the process of attaining competence.

Site Means - refers to the means (average value of a set of numbers) of all senior or junior kindergarten children tested in the site for that given year. Children with known special needs, missing more than 1 domain, and missing JK/SK classification are excluded.

10th Percentile - If we arranged a domain scores for a site with 200 children from the lowest to the highest, the first 20 scores from the lowest will constitute the lowest (or bottom) 10th percentile. Thus, the 10th percentile score is sometimes also referred to as a “cut-off”, being the division below which children are defined as vulnerable.

Vulnerable - Not on track or not ready. Children who have been scored in the lowest 10th percentile in their site in one or more of the five domains are categorized as “vulnerable” in terms of school readiness. General norms are available for comparison purposes.



ENDNOTES

¹The Federal Government made a commitment to: “measure and report regularly on the readiness of Canadian children to learn, so that we can assess our progress in providing our children with the best possible start.” Speech from the Throne to Open the First Session of the 36th Parliament of Canada, Sept. 23, 1997 under the Liberal government.

²The Foundation Skills Assessment (FSA) is a test used in British Columbia schools, and in Ontario the Education Quality and Accountability Office, (EQAO) authors tests used in Grades 3 and 6 classrooms. See Appendix D for website information.

³Dr. Magdalena Janus was appointed the first recipient in 2002.

⁴Dr. Mustard and Dr. Offord had previously influenced the Government of Manitoba in establishing the cross-sectoral Children and Youth Secretariat in 1994 and developing and announcing its Children First Strategy in 1998, which focused heavily on early childhood development.

⁵The HCM Strategy is led by the standing Healthy Child Committee of Cabinet (HCCC), established by the Premier in 1999; implemented within partner departments by the standing Healthy Child Deputy Ministers’ Committee (HCDMC); and coordinated across government and community by the Healthy Child Manitoba Office (HCMO). HCCC and HCDMC respectively comprise the Ministers and Deputy Ministers of the following departments: Aboriginal and Northern Affairs; Culture, Heritage and Tourism; Education, Citizenship and Youth; Family Services and Housing; Health; Healthy Living; Justice; and Labour and Immigration/Status of Women.

⁶In May 2002, Dr. Dan Offord helped formally launch the EDI in Manitoba. In October 2002, Dr. Magdalena Janus trained the first school divisions in the use of the EDI, which first implemented the EDI in February 2003.

⁷The federal, provincial and territorial governments agreed in January 1997 to work together to develop the National Children’s Agenda, a comprehensive strategy to improve the well-being of Canada’s children. Federal, provincial and territorial governments will work together to develop this broader agenda for children, including clear outcome measures by which to gauge success....” Speech from the Throne, September 23, 1997.

⁸The commonly accepted differences between how parental ratings of their children compare to teacher ratings is discussed in Janus & Offord (2007).

⁹Authorization for the final revisions to be published and used in the national implementation of the Australia Early Development Index: Building Better Communities for Children project was formalized through a memorandum of understanding between the Offord Centre for Child Studies, the Centre for Community Child Health, the North Metropolitan Population Health Program and the Telethon Institute for Child Health Research (The Australian Early Development Index Partnership, 2005).



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