Early Development Instrument (EDI) A Drilled-down Report

Edmonton West, 2009 and 2010*

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*This is based on Updated Normative II cut-offs

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Acronyms

The following acronyms / abbreviations are used in the report (listed in the alphabetical order):

- AE Alberta Education
- CDC Community Development Coordinator
- CUP Community-University Partnership
- ECD Early Child Development
- ECMap Early Child Development Mapping Project
- EDI Early Development Instrument
- E/FSL English/French as a Second Language
- OCCS Offord Centre for Child Studies

Introduction

Information Acquisition and Transfer

Since 2009, Alberta Education (AE) has set out to collect information on kindergarten children's development using a psychometric tool called the Early Development Instrument (EDI) (Janus & Offord, 2007). The EDI was developed by the McMaster University's Offord Centre for Child Studies (OCCS) in Hamilton, Ontario. Information has been collected in four waves, starting in 2009 and ending in 2014. Contracted by AE, Early Child Development Mapping (ECMap) project has been mandated to analyze the EDI. Led by the Community-University Partnership (CUP) for the Study of Children, Youth and Families at the University of Alberta, ECMap collaborates with the AE, OCCS, and various school authorities in the province, in building the foundation for this report. Figure 1 below illustrates the processes of information acquisition and transfer of data for this report.



Figure 1: The Processes of Information Acquisition and Transfer

- School authorities send children's information (name, address, teacher name, school name etc.) to OCCS after Sep 30 final count.
- 2. OCCS assigns ID numbers for children, teachers, and schools and sent this information back to schools along with questionnaires.

Teachers in each school conduct surveys.

- 3. Schools send completed questionnaires to OCCS (electronic or paper versions). At OCCS, the data are analyzed and school authority reports are prepared. The reports are sent to school authorities and AE.
- 4. OCCS sends the database and reports to AE. AE conducts data cleanup and transfers the data to the ECMap via Extranet.
- 5. AE transfers data files and makes school authority reports available to ECMap. ECMap does further cleaning and recoding of variables, if necessary.
- 6. ECMap prepares various reports and information packages at the provincial and community levels.

A Community Drilled-down Report

This is a drilled-down report documenting the developmental aspects of young children for the Edmonton West community based on the EDI data. The information is intended for internal purposes (the ECMap team and the Community Development Coordinators (CDCs)) and those in the research community. The community is subdivided into eight sub-communities, as shown on the map below. The main objectives of this report are to:

- document the socio-demographic characteristics of kindergarten children in the sample;
- document the developmental aspects of children by providing a benchmark; and
- provide evidence for planning at the community and sub-community level, wherever possible.



Note: The sub-communities are labelled from A to H by ECMap for ease of interpretation. The boundaries were determined by community coalitions that support Early Child Development (ECD).

The EDI

The EDI was developed at the OCCS at McMaster University for assessing children's level of development in their pre-school years. The instrument is a teacher checklist completed for all children in kindergarten classes. The EDI neither provides any diagnostic information on individual children nor does it measure a school's performance. It is intended to identify areas of strengths and weaknesses in children's development at a macro-level, enabling communities to mobilize their resources to support children's development in their first five years of life.

The EDI comprises 103 items or questions on the development of kindergarten children in five broad areas of development.¹ The five areas are broken down by its developers into 16 sub-areas as in Table 1. In the EDI questionnaire, the five developmental areas are organized into three sections as: Section A: Physical Wellbeing (13 questions); Section B: Language and Cognitive Skills (40 questions); and Section C: Social and Emotional Development (58 questions).² Each of the five areas was rated on a scale of 0 to 10, with a high score indicating a more advanced standing in a particular area. The EDI questionnaire also contained a variety of background characteristics: age, sex, English/French as a second language (E/FSL) status, and repetition of kindergarten.

A New Approach to School Readiness and Vulnerability

The school readiness is one of the most frequently used terms in discussions of EDI, generally referring to a preschooler's ability to meet the tasks and to assimilate both socially and academically at the time of entry into the formal school system. The concept has attracted enormous interest, both in policy and academic circles, contributing to an expansion of definition that emphasizes the importance of the school in getting the child ready for school (Belsky & Mackinnon, 1994). The complexity of this and related concepts, such as vulnerability contributed to a new categorization by ECMap based on the basic message they convey.

¹ The five areas are widely known as domains in the literature. For our purpose here, we refer to them as developmental areas or simply areas. The argument is that if a construct, such as social competence if considered as a domain, it assumes defined boundaries or perimeters with areas or divisions within it. Our discussions here are limited to the five main constructs, and not the sub-areas that they are made up of, and thus we believe the term 'area' is better suited than the term 'domain'.

 $^{^{2}}$ Language and cognitive development has been renamed by ECMap to language and thinking skills in order to better reflect the very nature of the items that constitute the area, namely reading and writing abilities.

The national average for each domain (Updated-Norm II), which is often provided as a benchmark, was used to compare the performance of children in a community for which data are available.³ The percentile scores in each of the five EDI areas were first estimated and the following terms were used to describe how the distribution of children into percentiles can be translated into groups.

- *Developing appropriately* the top 75th percentile (shaded green)
- *Experiencing difficulty* between the 25^{th} and the 10^{th} percentile (shaded amber)
- *Experiencing great difficulty* the bottom 10th percentile (shaded red)

A child in the third group is, on average, more likely to be limited in his or her development than a child who scores above the 10th percentile cut-off.⁴ Percentages of children *experiencing great difficulty* are determined in each area of development in one or more areas of development, or two or more areas.



Statistical Analysis

The EDI data were aggregated at the community and sub-community level and were analyzed using various descriptive statistics such as frequency, percentage, range, mean (i.e., average). For the purposes of this report, only those children who met the following criteria were included in the analyses:

- Parental consent was provided;
- Children were in class more than one month;
- Children had no diagnosed special needs⁵;
- Data on the five developmental areas were permitted to be missing in none or no more than one area; and
- Children were from 4 years old to 7 years old.

 $^{^3}$ Since 1999, the EDI data have been collected for over 550,000 kindergarten children in Canada and beyond, and these data formed the basis for creating a national norm. More specifically, Updated-Normative II Gold Standard was based on N=174,799.The domain specific cut-off values are 7.0833, 5.5769, 6.0000, 5.7692, and 4.3750 for the physical health and wellbeing, social competence, emotional maturity, language and cognitive development, and communication and general knowledge, respectively.

⁴ Those children falling into this category are often referred to as vulnerable children in the literature.

⁵ In Alberta, all those children with severe disabilities (cognitive, code 41; emotional/behavioral, code 42; multiple disability, code 43; physical or medical disability, code 44; deafness, code 45; blindness, code 46) are referred to as exceptional/special needs. *Severe delay involving language (code 47)* and *mild/moderate disability/delay (code 30)* were not categories in special needs status, and therefore children with such problems were automatically gone into the analysis of non-special needs.

Developmental Area	Sub-area	Example of items within
Physical health and well-being (13)	Physical readiness for school work Physical independence Gross and fine motor skills	Over- or underdressed for school-related activities Is independent in washroom habits most of the time Proficiency at holding a pen, crayons, or a brush
Social competence (26)	Overall social competence Respect and responsibility Independence and adjustment Readiness to explore new things	Overall social/emotional development Follows rules and instructions Listens attentively Is curious about the world
Emotional maturity (30)	Prosocial and helping behaviour Anxious and fearful behaviour Aggressive behaviour Hyperactive and inattentive behaviour	Will try to help someone who has been hurt Is upset when left by parent/guardian Gets into physical fights Can't sit still, is restless
Language and thinking skills (26)	Basic literacy Interest and memory Complex literacy skills Basic literacy and numeracy	Knows how to handle a book (e.g., turn a page) Is generally interested in books (pictures and print) Is able to read simple words Is able to use one-to-one correspondence
Communication skills and general knowledge (8)	Communication skills	Ability to listen in English

Table 1: Early Development Instrument (EDI) Areas and Subareas

For community or neighbourhood analyses, small numbers raise a number of issues:

- *statistical* affecting the accuracy and usefulness of the data
- confidentiality as a result of small denominators (N) in rates and percentages
- *reliability* becomes a question when there are small numerators (n). Why the question of reliability? Rates and percentages based on (almost) full population counts are subject to random variation. The random variation may be substantial when rates and percentages are calculated using the small 'n' in the numerator. Rates based on small n's may fluctuate over time and also across geographic areas.

A general approach adopted in the reporting of findings is that, data are withheld in appropriate cells in tables if there is a concern of reliability and/or confidentiality. That is, if the number of children in a community or sub-community is less than 30, the information is suppressed.⁶ Further, although our preferred participation rate is 80% or more, this was relaxed on a case by

⁶ Most populations with 30 or more cases will have an approximate normal distribution for its sample mean, as determined by empirical evidence. This warrants the use of 30 as the threshold (Krishnan, 2011).

case basis.⁷ The processes that were involved in arriving at the participation rate and the number of cases for this study are as follows:



Figure 2: The Processes Involved in Arriving at Analyzed Number of Cases

* The actual number of children analyzed for the Community Information Package (CIP) or similar other documents may be different from that is in #12.

Note: The reference is made to the number of questionnaires:

- 1. Total received and scanned in West Edmonton community.
- 2. With parental consent.
- 3. Without parental consent.
- 4. With parental consent and children in class more than one month.
- 5. With parental consent, and children not in class more than one month, including "in class less than 1 month", "moved out of class", "moved out of school", "no consent" and "other".
- 6. With parental consent, children in class more than one month, and without special needs.
- 7. With parental consent, children in class more than one month, and with special needs.
- 8. With parental consent, children in class more than one month, without special needs and not missing more than one area.
- 9. With parental consent, children in class more than one month, without special needs and missing more than one area.
- 10. With parental consent, children in class more than one month, with special needs and not missing more than one area.
- 11. With parental consent, children in class more than one month, with special needs and missing more than one area.
- 12. With parental consent, children in class more than one month, without special needs, not missing more than one area, and children age from 4 to 7.
- 13. With parental consent, children in class more than one month, without special needs, not missing more than one area, and for children with age younger than 4 or older than 7.
- 14. With parental consent, children in class more than one month, with special needs, not missing more than one area, and for children age from 4 to 7.
- 15. With parental consent, children in class more than one month, with special needs, missing more than one area, and for children with age younger than 4 or older than 7.

⁷ There is no national or international standard for response rate in population surveys. However, a percentage greater than or equal to 74 is a reasonable response (participation) rate that may serve as a meaningful threshold level in community analyses, based on evidences from international censuses and surveys (Krishnan, 2011).

The total number of children included in the analysis was 1,307 from a total of 1,611 questionnaires received (Table 2). They came from the seven school authorities as in Box 1. At a sub-community level, the participation rate ranged from 62.07% to 89.16%. Based on the discussion above, information on sub-community, EdmW_A was withheld in detailed analyses.

Community	Received	Analyzed	Percentage	Sub- Community Names (Assigned)	Received	Analyzed	Percentage				
				EdmW_A	29	18*	62.07%				
			EdmW_B	151	124	82.12%					
			91 120/	EdmW_C	249	203	81.53%				
Edmonton	1.611	1 307		Q1 12 0/	81 1304	81 1304	81.13%	EdmW_D	271	222	81.92%
West	1,011	1,307	1,507	1,507	1,307	1,307		01.13%	EdmW_E	320	246
				EdmW_F	170	147	86.47%				
				EdmW_G	218	166	76.15%				
				EdmW_H	203	181	89.16%				

Table 2: Participation Rate, Edmontor	n West and Sub-communities
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* Withheld from analyses.

- Black Gold Regional Division No. 18 (2010)
- Edmonton Catholic Separate School District No. 7 (2009)
- Edmonton School District No. 7 (2009)
- Elk Island Public Schools Regional Division No. 14 (2010)
- Fort McMurray Roman Catholic Separate District No. 32 (2010)
- Greater North Central Francophone Education Region No. 2 (2010)
- St. Albert Protestant Separate School District No. 6 (2010)

Notes: Year surveyed is shown in parenthesis. The inclusion of Fort McMurray Roman Catholic Separate District in Edmonton West community was based on postal codes as they appeared in the database, and this may change once the allocation of postal codes to the appropriate communities is further examined.

Box 1: School Authorities in Edmonton West Community

Chapter 2: Children's Characteristics

At a Glance

- Participation rate (questionnaires analyzed out of those received): 81.1%
- Median age of children: 5.65 years
- Female children: 49.1%
- Children considered E/FSL: 9.9%
- Aboriginal: 7.1%
- Child repeated grade ('yes'): 3.9%
- Mean days absent: 6.17

Socio-demographic Background

The median age of children in the sample was 5.65 years. When age of children at the time of teacher assessment was divided into 3-month intervals of six categories, a majority of children (87.4%) were between 5 years and 2 months and 6 years and 1 month (not shown here). Overall, there were slightly more boys (665 or 50.9%) than girls (642 or 49.1%). When the community was sub-divided, EdmW_H had girls outnumbered boys by a margin of 3.6% (Table 3). Further, boys outnumbered girls in the age category of 5-11 and above (not shown here).

Characteristic	Edm West	EdmW _B	EdmW _C	EdmW _D	EdmW _E	EdmW _F	EdmW _G	EdmW _H
Median Age	5.65	5.62	5.62	5.59	5.68	5.64	5.66	5.71
% Girls	49.1%	48.4%	46.8%	49.5%	50.4%	50.3%	45.8%	53.6%
% Children considered E/FSL	9.9%	11.4%	7.9%	13.1%	11.8%	3.4%	14.5%	6.7%
% Aboriginal	7.0%	15.3%	2.5%	9.5%	12.6%	2.1%	5.4 %	1.1%
%Child repeated grade ('yes')	3.8%	5.6%	2.5%	3.6%	6.9%	2.7%	3.6%	1.1%
Mean days absent	6.17	7.04	4.98	7.23	7.61	4.91	4.95	5.73

Table 3: Key Characteristics of Children in Each Sub-community, Edmonton West

Note: EdmW_A was not included due to the small number of children (i.e., fewer than 30).

Other key characteristics of the children for the West Edmonton sample were: 7.0% were Aboriginal⁸, 3.8% repeated grade, and the mean days absent was 6.17. Proportionately, more children belonged to the Aboriginal ancestry in EdmW_B, more children repeated grade in

⁸ This is based on families' "self report", and it is not based on any official records on ancestry.

EdmW_E, and on average, the number of days absent was the highest among children in EdmW_E.

Out of the total of 1,307 children, 1,113 children (85.2%) had their first language (a language the child learned first in her/his development, and still can understand and/or speak) reported as English/French (Table 4). Spanish, Filipino/Taganog, Mandarin, and Cantonese were the most common other languages reported as child's first language(s).

Language	Ν	%
English/French	1,113	85.2%
Spanish	21	1.6%
Filipino/Tagalog	20	1.5%
Mandarin	18	1.4%
Cantonese	15	1.2%
Others*	120	9.2%
Total	1,307	100.0%

Table 4: Child's First Language,	Edmonton	West
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*Includes 2 missing cases

Children with Special Problems

At a Glance

- 11.9% had special problems, although they had no diagnosed special needs.
- Speech impairment was the most often noted special problem (48.6%) among those with only one type of special problem.
- Less common problems included physical and emotional (0.9% each) among those having only one type of problem.

Although children with special needs (i.e., children with diagnosed severe disabilities) were excluded from the analyses, there were children who were reported to have special problems. Out of 1,307 children, 155 (11.9%) children were reported to have special problems after removing the special needs children. Of those reported to have special problems, 109 (70.3%) had only one problem, 35 (22.6%) had two problems, and 10 (6.4%) had more than two problems.

Some of the problem areas, among those who had only one special problem (i.e., 109 children) in terms of their percentage distributions are presented in Figure 3. Due to a small number of cases, sub-community breakdown was not attempted here. The most common problem was associated with speech (48.6%). The high percentage of children with speech problems is difficult to explain. However, it was observed that of those with speech problems, one-third (16.36%) of the children were reported to have language delay and almost 5% were E/FSL children. Behavioural and home-related problems comprised 11.0% and 5.5%, respectively. Other problems (27.5%) included physical (0.9%) and emotional (0.9%).



Figure 3: Percentage Distribution of Children with Special Problems (N=109) (Note: Children with Special Needs were excluded)

Child Care Arrangement Prior to Kindergarten



Prior to kindergarten entry, children can be in non-parental care, including centre-based, licensed, for profit and non-profit care centers, home-care (licensed or unlicensed, relative or non-relative), and child's home (relative or non-relative). A short description of each type of non-parental care arrangement is as follows:

Centre-based and Licensed Care (Profit or Non-Profit): Centers operated by parents, a voluntary board of directors, or a non-profit organization such as the YM/YWCA, a college, university, school board, or municipal government for non-profit, or those commercial centers that are private businesses operated by an individual, a partnership, or a corporation are included in this type of care arrangement.

Other home-based (Licensed or Unlicensed): In this type of care arrangement, children are looked after in home-based care, either licensed or unlicensed, in relatives' or non-relatives' home.

Own-home (Relative or Non-relative): In this type of care arrangement, children are looked after in their own home either by a nanny, a regular baby-sitter (excluding occasional evenings) who is unrelated to the child, or a relative.

Editorioli West								
Non-parental care	Edm	Edm	Edm	Edm	Edm	Edm	Edm	Edm
	West	W_B	W_C	W_D	W_E	W_F	W_G	W_H
% of children in non-	42.6%	48.0%	35.6%	39.2%	40.1%	57.6%	48.1%	37.3%
parental care	(512)	(47)	(67)	(73)	(95)	(83)	(75)	(66)
Centre-based, licensed (profit or non-profit)	27.1%	25.8%	25.6%	24.8%	28.9%	27.9%	31.9%	22.1%
	(354)	(32)	(52)	(55)	(71)	(41)	(53)	(40)
Other home-based (licensed or unlicensed)	8.6% (113)	11.3% (14)	8.9% (18)	4.1% (9)	6.9% (17)	11.6% (17)	8.4% (14)	13.3% (24)
Own home (relative or non-relative)	12.7%	5.6%	13.8%	14.9%	13.0%	21.8%	10.2%	9.4%
	(166)	(7)	(28)	(33)	(32)	(32)	(17)	(17)

Table 5: Percentage of Children in Non-parental Care Prior to Kindergarten Entry in Each Sub-community, Edmonton West

Note: EdmW_A was excluded due to the small number of children (i.e., fewer than 30).

When interpreting the percentages, caution should be exercised because multiple types of non-parental child-care were permitted in the survey (i.e., a child could be in more than one non-parental child-care prior to entering kindergarten).

Child care arrangements for the West Edmonton sample were as follows: Out of 1,307 children in the community, 512 children (42.6%) were in non-parental care prior to kindergarten entry, 354 (27.1%) children were in centre-based care, 113 (8.6%) children were in other home-based care, and 166 (12.7%) children were cared in own home (Table 5). Aside from the fact that multiple care arrangements were reported, care in own home was more pronounced in EdmW_F, centre-based (licensed) care was more pronounced in EdmW_G, and other home-based (licensed) care was predominantly more common in EdmW_H.

Special Skills and Talents

At a Glance

- Children with more than one special skills or talents: 11.04%
- Literacy skills and talents were at the top of all special skills and talents, followed by skills and talents in numeracy.
- Music was the least frequent of all special skills or talents (3.3%).
- Other special skills included knowledge of several languages, computer, and drawing among others.

A child with special skills or talents is one who demonstrates unique skills that are not expected for his/her age; a skill or a talent that is greater than the level expected for a typical student. Figure 4 shows how many children were reported to have special skills and talents in certain areas (note: children could have multiple skills or talents). Due to relatively small number of cases, sub-community breakdown was not attempted here.

Compared to any other area of skills/talents, most children demonstrated special skills and talents in literacy (10.5%) and numeracy (10.4%). The least frequent area of special skills and talents was music (3.3%).



Figure 4: Distribution of Children by Special Skills and Talents, Edmonton West (Note: Multiple skills were permitted)

At a Glance

- Girls performed better than boys in all developmental areas.
- The older the children, the better they were in their average scores on all developmental areas.
- Proportionately fewer children in Edmonton West fell below the 10th percentile in the areas of social competence (9.18%), and language and thinking skills (7.80%), as compared to their Canadian counterparts.
- Proportionately more children in Edmonton West than in Canada scored low on at least one area (30.68% vs. 25.40%) and on at least two areas (16.37% vs. 12.40%).
- The only sub-community with above benchmark levels of children developing appropriately was EdmW_F.
- The sub-community EdmW_H had the lowest levels of children experiencing great difficulty in all five areas.

The focus of this section is on sections A, B, and C in the EDI questionnaire or Q2-13 from section A, Q1-40 from section B, and Q1-58 from section C. The results are discussed at the community and sub-community levels.

EDI Mean Scores

Table 6 shows measures of central tendency and spread of the distributions of scores for the five areas of development for the Edmonton West community (see also Figure 5). Generally, children tend to score very high on all areas, especially on the language and thinking skills.

Edmonton West mean scores were consistently higher across the six age groups. In general, the older the children were, the better their scores on all the developmental areas (not shown here). Further, girls performed better than boys in all developmental areas. The largest difference between girls and boys was in the area of communication and general knowledge (median scores: 8.75 vs. 7.50), whereas the smallest difference was in the area of language and thinking skills (median scores: 9.23 vs. 8.85).

Differences in mean scores between sub-communities were negligible (differences in the subcommunity mean scores for each area varied from 0.94 to 1.32), although it was slightly more pronounced for the language and thinking skills; whereas the mean score was 8.94 for language and thinking for the EdmW_F, it was 7.62 for EdmW_B. Compared to Edmonton West, EdmW_C, EdmW_F, and EdmW_H had consistently higher mean scores in all five areas.

Across sub-communities, girls scored higher than boys in all but two sub-communities (EdmW_D and EdmW_B); boys scored higher than girls in EdmW_D in the area of communication and general knowledge (7.27 vs. 7.10) and boys scored slightly higher in EdmW_B in language and thinking skills (7.64 vs. 7.61).

Developmental Area	Ν	Mean	Median	Mode	Std. Error	Std. Deviation
Physical health and well-being	1306	8.40	8.46	10.00	0.04	1.55
Social competence	1307	8.29	9.04	10.00	0.05	1.81
Emotional maturity	1305	7.77	8.00	7.67	0.04	1.49
Language and thinking skills	1307	8.41	8.85	10.00	0.05	1.75
Communication skills and general knowledge	1307	7.39	8.13	10.00	0.08	2.71

Table 6: Descriptive Statistics for the Five Developmental Areas, Edmonton West



Figure 5: The Mean Scores for the Five Developmental Areas in Each Sub-community, Edmonton West

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Edmonton West Sub-communities Figure 5: The Mean Scores for the Five Developmental Areas in Each Sub-community, Edmonton West (Cont'd)

Percentile Boundaries and the EDI Mean Scores Compared

The interpretation of the percentiles is as follows: the 10^{th} percentile divides the bottom 10% of the data from the upper 90% (i.e., 100-10%); the 25% divides the bottom 25% of the data from the upper 75%, and so on. Readers may also refer to the methodology section in the beginning of this report on the three categories of development using the percentile cut-offs.

In Table 7, the means, range, and the four percentile boundaries for the five areas of development are presented. The percentile cut-off values for the Updated Normative II (Canada) and Edmonton West are presented as well. The two sets of values together enable a comparison between Canada and the Edmonton West community.

The interpretation of the 10th percentile score for the physical health and well-being area of development, for example, is as follows: whereas 10% of children in Canada scored 7.0833 or lower on a 0-10 scale, 10% of children in Edmonton West scored 6.5385 or lower on the same scale. To put it simply, although we don't know how varied the mean scores are, on average, children falling under the 10% boundary in Edmonton West scored lower than their Canadian counterparts in the area of physical health and well-being. Further, whereas children in Edmonton West fell below the 10th percentile Canadian benchmark in three areas of development (physical, emotional, and communication and general knowledge), they scored the same on social competence and higher on language and thinking skills.

Developmental	Itome	Min-	Moon	Percentile Boundaries				
Area	Items	Max	WICall		75%	50%	25%	10%
Physical health and	12	0.38 -	<u> </u>	Updated-Norm II	10	9.2308	8.0769	7.0833
well-being	15	10.00	8.39	EW	9.6154	8.4615	7.5962	6.5385
Social competence	26	1.15 -	e 20	Updated-Norm II	9.8077	9	7.3077	5.5769
Social competence	competence 20	10.00	8.29	EW	9.6154	9.0385	7.3077	5.5769
Emotional maturity	20	1.50 -	דד ד	Updated-Norm II	9.1667	8.3333	7.1667	6
Emotional maturity	30	10.00	1.11	EW	8.8333	8.0000	7.0000	5.6667
Language and	26	0.38 -	9 41	Updated-Norm II	9.6154	9.2	7.6923	5.7692
thinking skills	20	10.00	.00 8.41	EW	9.6154	8.8462	7.6923	6.1538
Communication and	Communication and 0.00 -	7 29	Updated-Norm II	10	8.75	5.625	4.3750	
general knowledge	0	10.00	7.38	EW	10.0000	8.1250	5.6250	3.1250

Table 7: Mean, Range, and Percentile Boundaries for the Five Developmental Areas, Edmonton West

Note: The percentile cut-offs for the updated Norm II (Canada) are in red.

Table 8 shows percentages of children who fell below the 10th percentile in at least one area of development and who fell below the 10th percentile in two or more areas, based on the updated national cut-offs. Due to the small number of cases, sub-community breakdowns are not presented here. Proportionately more children in Edmonton West community than in Canada scored low on at least one area (30.68% vs. 25.40%) and on at least two areas (16.37% vs. 12.40%).

Table 8: Percent low in 'At Least One'	and 'At Least two Areas of Development',
Canada and	Edmonton West

	Canadian (Updated Norm II)	Edmonton West Community (Updated Norm II)
Low in at least one area of development	25.40%	30.68%
Low in at least two areas of development	12.40%	16.37%

The Three Groups of Children Based on Percentile Boundaries

Table 9 presents the national cut-off points for the three categories (developing appropriately, experiencing difficulty and experiencing great difficulty) by the areas of development. These form the basis for our classification of children into three groups and related discussion of results presented in Figure 6. The interpretation is as follows: if a child scored above the national bench mark of 8.0769, the child falls in to the group, *developed appropriately*, if scored at 8.0769 or below this number, but above 7.0833, the child falls into the group, *experiencing some difficulty*, and if scored at or below 7.0833, the child falls into the group, *experiencing great difficulty*. Based on national threshold levels, at a community level, a minimum of 75% of its children should fall into the first group, a maximum of 15% to the second group, and a maximum of 10% into the third group, all other things being equal.

Areas of Development	Developing Appropriately 25-100%	Experiencing Difficulty 10-25%	Experiencing Great Difficulty 10% or below	
Physical health and well-being	8.0769 <p< td=""><td>7.0833<p<=8.0769< td=""><td><=7.0833</td></p<=8.0769<></td></p<>	7.0833 <p<=8.0769< td=""><td><=7.0833</td></p<=8.0769<>	<=7.0833	
Social competence	7.3077 <s< td=""><td>5.5769<s<= 7.3077<="" td=""><td><=5.5769</td></s<=></td></s<>	5.5769 <s<= 7.3077<="" td=""><td><=5.5769</td></s<=>	<=5.5769	
Emotional maturity	7.1667 <e< td=""><td>6.0000<e<=7.1667< td=""><td><=6.0000</td></e<=7.1667<></td></e<>	6.0000 <e<=7.1667< td=""><td><=6.0000</td></e<=7.1667<>	<=6.0000	
Language and thinking skills	7.6923 <l< td=""><td>5.7692<l<=7.6923< td=""><td><=5.7692</td></l<=7.6923<></td></l<>	5.7692 <l<=7.6923< td=""><td><=5.7692</td></l<=7.6923<>	<=5.7692	
Communication and general knowledge	5.6250 <c< td=""><td>4.2857<c<=5.6250< td=""><td><=4.3750</td></c<=5.6250<></td></c<>	4.2857 <c<=5.6250< td=""><td><=4.3750</td></c<=5.6250<>	<=4.3750	

Table 9:	Undated	Normative	П (Canada)	Cut-off	Points
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Developing Appropriately

For the community as a whole, when percentages for the 'developing appropriately' category were compared across areas of development, language and thinking skills showed the highest value; almost 80% of the children were reported as developing appropriately in terms of language and thinking skills (Figure 6).

Two sub-communities, EdmW_C and EdmW_H, had all but one area, namely communication and general knowledge, with percentages above the benchmark. In EdmW_D, only language and thinking skills surpassed the benchmark. Whereas in EdmW_F, all domains had percentages above the benchmark, EdmW_G had none of the areas that met the national threshold.

Experiencing Difficulty

At the community level, communication and general knowledge was the area where most children experienced some difficulty (18.75%) and physical health and well-being was the area where proportionately fewer children (12.17%) experienced difficulty. The pattern varied across the sub-communities; with the exception of EdmW_F, where the percentages of children experiencing difficulty in the five areas of development were all below 15%. The two sub-communities, EdmW_B and EdmW_E had percentages above the bench mark in all five areas, above the 15% threshold level.

Experiencing Great Difficulty

In Edmonton West, physical health and well-being was the area where most children experienced great difficulty (16.83%), followed by communication and general knowledge (15.84%) and emotional maturity (13.39%). Across sub-communities, levels of difficulty varied and were generally above the benchmark in one or more areas. In EdmW_H, however, none of the areas had levels above the benchmark. The above benchmark situation was observed as follows:

EdmW_B and EdmW_E - all developmental areas

EdmW_C – communication and general knowledge

EdmW_D – all except language and thinking skills

EdmW_F – physical health and well-being

EdmW_G – all except social competence and language and thinking skills

















Figure 6: The Three Categories of Development for the Five Developmental Areas in each Sub-community, Edmonton West

Chapter 4: Discussion

Limitations

The differences in EDI scores within the community and between sub-communities may be due in part to differences in children's backgrounds (e.g., age and sex), impacting their performance. This warrants more exploration and analyses. Further, social desirability bias may have influenced teacher ratings of children's skills and talents by way of under-or over-estimating EDI scores.

Redefining the EDI Concepts

Development of a child does not depend solely on the child. It is a by-product of the socioeconomic fabric of the community and family, and to a greater extent, the capacity and willingness of schools and teachers to accommodate the child's varying needs. This raises the question whether such derived concepts as *experiencing great difficulty* based on child-centered ratings are appropriate to fully understand development.

Key Lessons Learned

- There can be reliability issues when reporting rates and percentages due to small number of cases for categories.
- In the case of variables, such as child care arrangement prior to kindergarten, multiple care arrangements made it difficult to draw firm conclusions.
- Aboriginal status can only be used as a proxy measure of ethnicity since it was based on teachers' own reports.

Conclusion

The statistical norm would have 75% of children considered developing appropriately. In the Edmonton West community, only social competence and language and thinking skills had levels close to or above this benchmark. There were differences in levels of development based on all EDI developmental areas across sub-communities, with EdmW_H having comparatively low levels of children experiencing great difficulty. This may be due to the fact that this sub-community had children with the highest median age and the largest percentage of girls, as compared to other sub-communities. This, however, remains to be explored further.

Glossary

Aboriginal: Whether or not a child belongs to a North American Indian, Métis, or Inuit as determined from families' 'self report', and not based on any official records on ancestry.

Alberta cut-offs: It is the 2010 Alberta baseline 10^{th} percentile cut-off values. The domain specific cut-off values are 6.92, 5.60, 6.17, 6.15, and 4.38 for physical health and wellbeing, social competence, emotional maturity, language and cognitive development, and communication and general knowledge, respectively. If, for example, the 10^{th} percentile value for the physical domain for a community is 6, it means that, on average, 10% of children in the community score lower than the 10^{th} percentile Alberta cut-off, 6.92.

Arithmetic mean (also called 'mean'): It is the number we get when all scores are added together, and then divided by the number of children contributing data. The arithmetic mean of items with scores, say, 3, 4 and 8 is 5. The arithmetic mean is the most common type of average. However, it is a crude measure that is affected by outliers; it does not represent data with extreme values.

Communication and general knowledge: As a domain in the EDI, it consists of 8 items and has no sub-domains.

Domain missing: A domain is said to be missing for individual children if **more than 25% of questions** in the domain are either blank or with "Don't Know" responses. If, for example, the 13-item physical domain has no values entered in three or more items, the domain is considered invalid or missing.

Early Development Instrument (EDI): A teacher-completed survey of 103 questions to assess kindergarten children's development in five general domains: physical health and wellbeing, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge. In addition, some demographic information is collected as part of the EDI survey. As a population-based measure, it has been used across Canada and internationally.

Early intervention program: A program that either a child (e.g., speech/language therapy, Head Start) or a parent attended (e.g., parenting program).

Emotional maturity: As a domain in the EDI, it comprises 30 items and has four sub-domains: pro-social and helping behaviour, anxious and fearful behaviour, aggressive behaviour, and hyperactive and inattentive behaviour, each of which has 8, 8, 7, and 7 items, respectively.

English as a Second Language (ESL): A child, whose first language is a language other than English, has an ESL status.

French immersion: A program in which kindergarten students are introduced early to French language through immersion in an Anglophone school, that is, the main language of the school remains to be English.

Geometric mean: The arithmetic mean of items with scores of 3, 4 and 8 is 5. However, it is a crude measure that is affected by extreme values such as 8 in this example. Using the example, the geometric mean would yield a value of 4.579 (= $\sqrt[3]{3 \times 4 \times 8}$).

Harmonic mean: The harmonic mean, unlike the arithmetic mean, tends to lean toward the lowest score. The harmonic mean is useful in a situation of this sort: fewer children score high while most children score low; it gives a higher weight to those scoring low and lower weight to those scoring high. The harmonic mean of 3, 4, and 8 is, $4.26 \ (= \frac{3}{\frac{1}{3} + \frac{1}{4} + \frac{1}{8}})$. In datasets containing at least one pair of unequal values, the harmonic mean gives the least value, arithmetic mean gives

Language and cognitive development: As a domain in the EDI, it comprises 26 items and has four sub-domains: basic literacy, interest and memory, complex literacy skills, and basic literacy and numeracy, each of which has 8, 5, 6, and 7 items, respectively.

Median: The numeric value separating the higher half of a sample from the lower half. The *median* of a finite list of numbers can be found by arranging all the observations from the lowest value to the highest value and picking the middle one. If there is an even number of observations, then there is no single middle value; the median is then usually defined to be the <u>mean</u> of the two middle values.

Mode: The mode of a set of data is the value in the set that occurs most often.

the greatest value, and geometric mean gives a value in between the other two.

Multiple Challenge Index (MCI): The MCI scores are based on challenges in **nine or more sub-domains**. The MCI is expressed as "existence of multiple challenges" (=1) and "no multiple challenges" (=0). In contrast to the cut-offs for the domains, the cut-offs for the sub-domains are not based on the normative (provincial or national) sample. They are based on the teacher's

actual responses on the questions/items. The physical independence sub-domain (within the physical health and wellbeing domain) has four items: independence in washroom habits, established hand preference, well coordinated, and sucks thumb, with each of the four items representing a skill generally mastered by 4-year-old children. Because the items are scored Yes = 10 and No = 0, a "challenge" score for the physical independence is set at lower than 9.99 and would be given to a child when the teacher responded 0 to **all of the four skills**.

Percentile: A score in and of itself is difficult to interpret. If a child scores 6 out of a possible 10 on an item that measures "shyness", 10 being very shy, how do we know how shy he is compared to his peers? If, on the other hand, we know that the 10^{th} percentile value of his score is 6, and then we would say, on average, 10% of the children in his class score lower than him. The 10^{th} percentile is the value below which 10% of the children score. Median (50^{th} percentile) as well as 90^{th} and 10^{th} percentiles provide some idea about the shape and spread of the data.

Physical health and wellbeing: As a domain in the EDI, it comprises 13 items and has three subdomains: physical readiness for school work, physical independence, and gross and fine motor skills, each of which has 4, 4, and 5 items, respectively.

Principal Components Analysis (PCA): PCA is the most common type of "factor analysis", used when the research purpose is data reduction or exploration. It analyzes a correlation matrix.

Special problem: A child who needs special assistance in the classroom due to chronic physical and/or mental disabling conditions (based on medical diagnosis, teacher observation or parent/guardian information), such as autism, foetal alcohol syndrome, or down-syndrome, as well as problems affecting a child's ability to do school work, such as problems at home, unaddressed dental needs, behavioral problem, and speech impairment.

Special need: A child who needs special assistance in the classroom due to chronic physical and/or mental disabling conditions (based on medical diagnosis, teacher observation or parent/guardian information), such as autism, foetal alcohol syndrome, or down-syndrome following the Alberta Special Education Coding Criteria.

Special skills/talents: A child who demonstrates unique skills/talents that are not expected of children of his/her age in such areas as numeracy, literacy, music, and problem solving. A skill/talent should be reflective of the child's actual performance and not relative to his/her classroom peers.

Social competence: As a domain in the EDI, it comprises 26 items and has four sub-domains: overall social competence, respect and responsibility, independence and adjustment, and readiness to explore new things, each of which has 5, 8, 9, and 4 items, respectively.

Standard deviation: Standard deviation is a widely used measurement of variability or diversity. It shows how much variation or "dispersion" there is from the average (mean, or expected value). A low standard deviation indicates that the data points tend to be very close to the mean, whereas high standard deviation indicates that the data are spread out over a large range of values.

Standard error: The standard error or the standard error of the mean of multiple samples is the <u>standard deviation</u> of the sample means, and thus gives a measure of spread. It gives an indication of the likely accuracy of the sample mean, as compared to population mean. The smaller the standard error, the less the spread and the more likely that any sample mean is close to the population mean. The standard error is important to compute because it reflect, on average, how much <u>sampling fluctuation</u> a measure will show if used with another random sample drawn from the same population.

Updated Normative II cut-offs: It is the Canadian 10^{th} percentile cut-off values, based on N = 174,799. The domain specific cut-off values are 7.0833, 5.5769, 6.0000, 5.7692, and 4.3750 for the physical health and wellbeing, social competence, emotional maturity, language and cognitive development, and communication and general knowledge, respectively. If, for example, the 10^{th} percentile value for the physical domain for a community is 6, it means that, on average, 10% of children in the community score lower than the 10^{th} percentile Canadian cut-off, 7.0833. Previously, it was referred to as Normative II cut-offs and was based on N = 176,201. The domain specific cut-off values were 7.0833, 5.5769, 6.0000, 5.7692, and 4.2857 for the physical health and wellbeing, social competence, emotional maturity, language and cognitive development, and communication and general knowledge, respectively.

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