

**It Takes a Village to Raise a Child:
Disentangling the Effects of Material and Social Deprivation
on Early Childhood Development in the
KFL&A Public Health Planning Area**

By

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Abstract

Life course literature states that early childhood development (ECD) can influence most aspects of health throughout the life-cycle. Canada ranked last among 25 wealthy nations in meeting ECD objectives. Fewer than 5% of children born have clinically detectable shortcomings in developmental health, increasing to 26% by school age with emerging socioeconomic associations. Understanding how social determinants of health (SDH) influence ECD at the household and neighbourhood scales would help identify conditions for optimal developmental outcomes.

The effects of SDH on ECD in the Kingston, Ontario area were studied. SDH were classified via marginalization (ONMarg) and deprivation (Pampalon) indices. ECD was measured via 2006 Early Development Instrument (EDI) scores for children most at risk upon school entry (Grade One). The basic spatial unit of analysis was 2006 Census of Canada Dissemination Areas, subdivided into quintiles of deprivation (Q1 being the least deprived and Q5 the most). EDI results from each of the quintiles within the two indices were compared and then combined.

The socioeconomic health gradient assumes that EDI scores will directly correlate to material and social deprivation. Social deprivation had a slightly greater impact than material deprivation on children's developmental vulnerability, with Q5 being the most vulnerable in all competencies. Surprisingly, emotional health and social competence were significant areas of vulnerability for children in Q1 and Q2. "Village effects" – when social determinants at the neighbourhood level have protective effects on ECD despite material deprivation at the household level – were present within the Q3 and Q4 groups for the domains of social competency and emotional health. While the highest proportions of early childhood developmental vulnerability are found within the most deprived households, the largest numbers of vulnerable children are spread throughout the middle-class in a variety of neighbourhoods.

Canadian policy should focus on mediating avoidable risks within this critical time to avoid future deleterious health effects and costs. Mapping the effects of SDH at the neighbourhood level generates knowledge that informs intersectoral action by policy makers to provide the supports needed to foster healthy children.

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List of Abbreviations

ECD:	Early Childhood Development
ECEC:	Early Childhood Education and Care
EDI:	Early Development Index
GIS:	Geographic Information System
HPA Axis:	Hypothalamic-Pituitary-Adrenal Axis
KFL&A:	Kingston, Frontenac, Lennox & Addington (Public Health Planning Area)
LCHD:	Life Course Health Development
ONMarg:	Ontario Marginalization Index
PDI:	Pampalon Deprivation Index
SDH:	Social Determinants of Health
SES:	Socioeconomic Status
WHO:	World Health Organization

Chapter I: An Ecological Approach to Life Course Health Development

The biggest problem in the world could have been solved when it was small.

(Laotzu, 6th century, B.C.)

1.1 Background

The Alma-Ata Declaration, supported by 170 national signatories at the International Conference on Primary Health Care at Alma-Ata, USSR in September 1978 and since accepted by all members of the World Health Organization (WHO), explicitly recognized the WHO definition of health, “a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity, “but also took a step further in declaring “that health...is a fundamental human right.” (1978, p. 1). Alma-Ata outlined how health inequalities, within countries, but also, between the developed and developing worlds, are a common concern of all nations. The realization of “good health for all”¹ is critical to security, economic prosperity and world peace, and that all nations should work towards this goal by 2000. The new millennium has come and gone, but the Alma-Ata Declaration provides a definition of health that is still relevant, highlighting how much work has yet to be done.

In the quest for “good health for all,” sustainable funding of universal health care has become a conundrum for many Canadian provincial governments, challenging public policy thinkers to develop innovative solutions to both trim costs and increase access and quality of care provided to Canadians. The Ontario Government is imposing austerity measures to curb budget deficits that are growing at an untenable rate, practically freezing health care spending.

¹ The Ottawa Charter for Health Promotion. (1986) First International Conference on Health Promotion, Ottawa, 21 November. World Health Organization.

This is at a time when the “grey tsunami” is about to test the healthcare system to its limits as the Baby-Boomers age and the incidence and prevalence of chronic diseases rise. As Canadian social structures deal with the growing burden of our aging citizens’ health needs, how will we ensure the health of Canadian society for the generations that follow? Similar to concerns over government pension plans and other social safety nets, will there be a sufficient tax base to continue funding these programs after the “Boomer Bulge?”² Will governments be able to ensure the health of young families and new Canadians, those who form the backbone of our economy? How do we conceptualize a health care system that delivers “health for all” as per the Alma-Ata Declaration of 1978, when policy analysts predict the health care system will be bankrupt within a generation if we do not engage in some very creative thinking?

Ontario’s Chief Medical Officer of Health, Dr. Arlene King, delivered a provocative Annual Report to the Legislature in December 2010 entitled “Health, Not Health Care – Changing the Conversation.” (King, 2010) The report notes there are many threats to the health of Canadians: obesity, tobacco and substance abuse, diabetes, cancer, heart disease and injuries. Dr. King argues that if the health care system is to continue to meet the needs of Canadians, there has to be a shift of focus from health care to health promotion in an effort to reduce morbidity in the population, thus lessening the number of sick and injured Canadians seeking treatment. She points to several interventions to alleviate these threats – many not exclusive to the Canadian health care system, but broadly within the realm of population health, health promotion, and social policy. They include promoting healthy behaviours, reducing poverty, fostering healthy childhood development, and eliminating health inequalities and food insecurity. These types of system-level interventions require a multi-disciplinary approach to population health as advocated by Dr. King and echoed by Dr. Trisha Greenhalgh in a lecture

² Robson, William B.P. (2009) Boomer Bulge: Dealing with the Stress of Demographic Change on Government Budgets in Canada, No 71, e-briefs, C.D. Howe Institute, <http://EconPapers.repec.org/RePEc:cdh:ebrief:71>.

she delivered at the 2011 North American Primary Care Research Group meeting. She said: “interdisciplinary research is medicine’s only hope of release from a paradigm that has gone beyond its terms of reference and is beginning to do damage. It is only by grappling with unfamiliar paradigms that the limitations of our own will become evident.” (Greenhalgh, 2011)

One such paradigm was articulated by Kearns (1993), when he challenged medical geographers to expand their theoretical understanding from a biomedical model of disease to a social model of health. From a population health perspective, “curative biomedical interventions were no longer to be viewed as the primary means of securing better health.” (Brown & Duncan, 2002, p. 361) New thinking within the field of public health, including interdisciplinary partnerships with health geographers and medical sociologists, echoed this approach as the discipline moved beyond infectious disease control and Germ Theory to address the new epidemiological curve of chronic disease management and a social model of health. Brown and Duncan noted that while public health expanded its vision to “the material character of health inequalities, to the production of healthy living and working environments, and to the promotion of community participation and individual empowerment in relation to health,” they were not convinced that geographies of public health had emerged “beyond the shadow of medicine.” (Brown and Duncan 2002, p. 363) This point was echoed by Dr. Francescutti, Director of the Alberta Centre for Injury Control and Research. He suggested that a change in culture within the Canadian health care system was needed, including revisiting priorities for health care spending. In order to deal with the growing burdens of obesity, coronary disease, mental health and addictions and injuries, he advocated for a “focus on determinants of health, keeping people healthy and out of hospitals in the first place... and [that] political intention will be required to change the emphasis from tertiary care to prevention.” (Francescutti, 2005, p. 21) He advocated for greater investment in prevention programming to counteract spending in acute care so that eventually, fewer sick and injured people will translate into less burden on the

healthcare system, though this would entail a paradigm shift in how healthcare is funded in Canada.

Dennis Raphael expands on Brown and Duncan's view of public health, but moves the health paradigm beyond the social and material character of health inequalities and the lifestyle choices of individuals to one of wellness – and the resources required to cope with one's environment and achieve personal aspirations. He notes that the “social determinants of health are about the quantity and quality of a variety of resources that a society makes available to its members.” (Raphael, 2009, p. 2) This positions the individual within a larger societal framework, where systemic forces impact the health of the person, depending on their access to such resources as income, education, food, housing, employment, health and social services, and of particular interest to the subject of this thesis – conditions of childhood. Each individual is positioned on a “social gradient of health” whereby economic and social policies are correlated to the health of the individual, jumping scales from the national level through to the provision of services at the local level and effects on the household. By extension, inequalities in health become a question of social justice, rather than the traditional biomedical view centered on the individual – their genetics and behavioural lifestyle choices – such that health inequalities left unresolved become health inequities.

Where does one start, to move Canada from “an illness model to a wellness paradigm that connects the dots of all the factors that contribute to health for individuals and society at large”? (Romanow, 2009, p. xvi) Start at the beginning of the life course, with the health of children. In spring of 2012, Dr. Jean Clinton, Associate Clinical Professor from the Department of Psychiatry and Behavioural Neuroscience at McMaster University, delivered a presentation entitled “Promoting Healthy Child Development with Ontario's Enhanced 18-Month Well-Baby Visit.” (Clinton 2012) She demonstrated the importance of early childhood

development (ECD) – defined as conception to age six – to the life course and how the conditions of childhood impact an individual’s health throughout the decades that follow. Not only is ECD strongly associated with behavioural risks like school failure, teen pregnancy, and criminality, but also propensity to obesity, elevated blood pressure, depression, coronary heart disease, diabetes, premature aging, memory loss and dementia. Dr. Clinton outlined the phenomenon of epigenetics and how ECD maps out a person’s future health, based on complicated chemical interactions, where the quantity and quality of early learning either open or close a variety of neuro-pathways, sometimes irrevocably.

There exists overwhelming evidence that ECD is a precursor to health throughout the life course. (Clinton, 2012; Gunnar and Loman, 2011; Halfon & Hochstein, 2002; Hertzman, 2006, 2010, 2011; Hertzman et al., 2010; Irwin et al., 2007; Keating, 2011; Maggi et al., 2010; Moore 2012; Morley, 2005; Raphael, 2009; Rutter, 2011; Shonkoff, 2009, 2010; Shonkoff and Phillips, 2000; Smith-Chant, 2009; Terrion, 2006; Tremblay, 2004; Victora et al., 2003; World Health Organization, 2008; Xue et al., 2005; and Young, 2002) This would suggest that health policy focus on mitigating avoidable risks within this critical time to avert deleterious effects on health in the future, to “help shift our emphasis on treatment in the latter stages of disease to the promotion of earlier, more effective preventive strategies and interventions focused on maximizing optimal health development.” (Halfon and Hochstein, 2002, p. 434) As per the idiom, an ounce of prevention is worth a pound of cure, but Halfon et al. (2010, p. 14) emphasize the challenges are great, especially in

Individualist-oriented societies such as the United States and Canada [where] child health development and wellbeing are regarded as the responsibility of families, resulting in an approach that emphasizes second-chance programs for children that fail, rather than a community-wide strategy focused on investing in all children for success.

Arguably, many Canadians believe that their health and social systems take care of its children, given publicly funded health care and education are core to the Canadian value system. So it seems reasonable to first determine how *are* Canadian children faring?

The answer is disconcerting. Fifteen percent of Canadian children are living in poverty; only 17 percent of families have access to regulated childcare due to a lack of program availability; and in 2006, the Organisation for Economic Co-operation and Development (OECD) rated Canada *last* among 29 wealthy nations in meeting various ECD objectives. (Milkkonen and Raphael, 2010) Specifically, Canada “ranked 21st of 29 [countries] for child wellbeing (a category that included mental health), 22nd in terms of preventable childhood injuries and deaths, and 27th for childhood obesity.” (Denny and Brownell, 2010, p. S4) In 2006, the Liberal government was defeated by the Conservatives who dismantled the nascent National Childcare Program, which had been successfully negotiated with all of the provinces, save Quebec which has had its own system in place since 1997. All the while, according to Statistics Canada, the labor force participation rate for mothers had increased from 39.1 percent in 1976 to 72.9 percent in 2009; the rate for working women with children under three had increased from 27.6 percent in 1976 to 64.4 percent in 2009; and single-parent households were 24.6 percent of all households with children. (Catalyst 2012) Canadian households where both parents work are the norm, not the exception, and social programming has not addressed this reality.

The situation did not get better over time. In 2008, UNICEF reviewed early childhood education and childcare programs (ECEC) in 25 of the world’s wealthiest nations, reporting that an average of 80 percent of three to six year olds and 25 to 50 percent of children under age three were participating in ECEC programs. Canada was tied with Ireland in *last* place, “failing to attain nine of UNICEF’s ten benchmark indicators of quality and access in ECEC provision.” (Friendly and Prentice, 2009, p. 3) In 2012, a United Nations special advisor

looked into food security in Canada and warned “that inequality is getting worse, with many Canadians having problems getting the healthy food they require... there are more than 800,000 households who are considered food insecure... two to three million people who can't afford the diets they need to lead healthy lives.” (Payton, 2012) Canada is struggling with some fundamental social and material issues that are having a deleterious effect on ECD, which do not seem to be on the current Canadian public policy agenda. (Bryant, 2003, 2009; Bryant et al., 2011; Raphael, 2006, 2009; and Raphael et al., 2004, 2005)

The evidence shows that early childhood education and care (ECEC) programming in Canada is deficient. Clyde Hertzman, Canada Research Chair for Population Health and Human Development, notes that “Canada is like most other societies on the planet, where regardless of national wealth, inequalities in socio-economic resources among families are associated with inequalities in developmental health.” (Hertzman, 2010) If this is the case at the macro level, it would then follow that the social determinants of health play an important role in ECD. In Canada, “less than 5 percent of children at every socio-economic level are born with clinically detectable limitations to their development, but by school age, vulnerability in developmental health grows to over 26 percent and profound socio-economic inequalities in development emerge.” (Council for Early Childhood Development 2009 from Hertzman 2010, p. 33) Where five percent of the population’s vulnerability at birth could be attributed to genetic and/or pre-natal health issues, one quarter of Canada’s young children are at risk of developmental limitations subject to their environments and interaction within them. (Hertzman, 2006, 2010, 2011)

Modern public health approaches emphasize the importance of the social determinants of health to ECD. (Barnes et al., 2006; Haflon & Hochstein, 2002; Haflon et al., 2010; Hertzman, 2010; Maggi et al., 2010; Moore, 2012; and Raphael, 2006, 2009) These are

either protective exposures (e.g., cultural mores and support networks) or risk factors that may affect health at different points in the life cycle. Avoidable risks have little to do with the health care system per se. Rather, the complexities of social determinants of health and their interaction calls for a better awareness of how a child's development is influenced by the household and the neighbourhood in which they live, in an effort to identify and provide the conditions under which they can reach optimal developmental outcomes.

With respect to ECD, a better understanding of the risks and protective factors would inform this process. Mitigating avoidable risks means identifying them and developing strategies, policies and programs to address them effectively, which may include fostering protective factors. Yet the variables that influence ECD are numerous, complex and interactive: biological/genetic endowment; temperament; parenting skills; physical environment; significant stressors; social supports; abuse or neglect; family relationships; and attachment. (National Scientific Council on the Developing Child, 2010) Unraveling these pathways, which are so intertwined and often mutually reinforcing, is a daunting task. Halfon and Hochstein build on Bronfenbrenner's (1979) concept of "nested contexts" to describe the dynamic interaction between genetically programmed bio-behavioural pathways that are then "adaptively influenced by individuals, families, and social experiences and environments." (Halfon and Hochstein, 2002, p. 457)

Geographers are playing a greater role in understanding ECD with increased recognition that an ecological³ approach to population health research would better address the compositional and contextual effects that affect health (Krieger, 1994; Macintyre et al., 2002;

³ *Human Ecology* can be defined as the study of the spatial and temporal relations of human beings as affected by the selective, distributive, and accommodative forces of the environment. Human ecology is fundamentally interested in the effect of position, in both time and space, upon human institutions and human behavior. (McKenzie, 1924)

and Schwab and Syme, 1997); and that community participation would enable actionable research relevant at the local level. (Leung et al., 2004; Schwab and Syme, 1997; and Weed and McKeown, 2003) An ecological approach often involves inter-disciplinary inquiry, and places the human being at the centre of their ecology, their “intimate settings,” where they live, learn, create, work and play, and the ways in which they perceive and deal with their environments.

In terms of human development, the intimate settings also involve the relations between settings, the influence of cultural and societal mores, and the impact of structural factors like the welfare state and health care systems on intimate settings. (Bronfenbrenner, 1979) The geographic concepts of scale, that position children at the centre of their worlds – the household, neighbourhood and the community(ies) that they are a part of – are important areas of study to discern the correlations between socio-economic status and ECD. There is a body of research suggesting that ECD outcomes are affected by the socio-economic status of neighbourhoods (Jack, 2000; Irwin et al., 2006; Maggi et al., 2010; and Marmot, 2007) as well as the households found within them. Social, educational and medical supports will be of interest, such as: the availability of affordable, high quality childcare; access to primary care, immunizations and medication; food security; housing security; and educational and psycho-social supports for parents. The practical objective of fostering ECD in Canada as a means of securing a healthier society through the life course is complicated, while governance structures and the supports they provide are often in silos. The Ontario Chief Medical Officer of Health calls for cooperation between the health and non-health sectors, so that every child born begins

and remains on the road to lifelong good health... a road that starts with a healthy, safe and loving home environment in an equally healthy, safe and generous community... a road where learning is everything, and leads eventually to a good job, in a healthy workplace, and a good home... Nobody has responsibility for public health policy because we *all* do. (King, 2010, p. 26)

1.2 Purpose

There is empirical evidence to suggest that fostering early childhood development (ECD) through healthy families and communities in Canada will result in a decrease in health risks to the life course, resulting in increased wellness and productivity and decreased health and social welfare costs. (Clinton, 2012; Haddad, 2010; Hertzman, 2010; Irwin et al., 2007; Morley, 2005; and Raphael, 2009) The goal of this thesis is to use an ecological approach to unravel the pathways of ECD and identify the resources required to support and optimize children's socialization and readiness to learn upon school entry (Grade One in Ontario, Canada). Specifically, this investigation strives to understand better the effects of social determinants of health on ECD – material and social deprivation – and whether social determinants can mitigate the effects of material deprivation. It is hypothesized that by collapsing the dualism between composition and context in early childhood development by first unpacking the effects of material deprivation, typically ascribed to the household; social deprivation, typically ascribed to the neighbourhood; and re-combining them, a more specific differentiation of their effects on children's developmental health can be achieved.

This thesis consists of literature reviews on sub-topics of importance to the study of ECD and a cross-sectional, exploratory study to investigate the effects of material deprivation, social deprivation and combined factors on ECD in the Kingston, Frontenac, Lennox & Addington (KFL&A) Public Health catchment area. The majority of studies on ECD point to socioeconomic status as a predictor of child developmental health, particularly household income as a means of procuring the supports needed to raise healthy children. Of particular interest to this study is evidence of “village effects” – whether the influence of social determinants at the neighbourhood scale can have a health promoting and protective influence

on children when other risk factors are present within the household. Thesis questions are as follows:

- a. Is ECD influenced differently by material and social determinants of health?
- b. What household (family-level) characteristics carry the most weight in shaping children's socialization and readiness to learn? How do these compare to other studies of ECD?
- c. Are there neighbourhood factors that are independently associated with early development outcomes? How do these compare to other studies of ECD?
- d. Can "village effects" mitigate the effects of material deprivation?
- e. What are the influences of community (e.g., social capital, social cohesion and informal control) on ECD?
- f. Do protective factors exist that could build resilience in children and competence in ECD?
- g. Are there policy recommendations to foster ECD through healthy communities?

As ECD is a complex, multi-disciplinary area of study, several reviews were undertaken to identify the literature on sub-topics of importance. Chapter Two examines causal pathways and the "place effects" that impact the health of populations. These include the geographic constructs of place, space and scale, and how contextual, compositional and collective determinants of health interplay within and across scales. The concepts of health inequalities and inequities are explored, and the mechanisms that produce and maintain them, including how social determinants of health (SDH) act as resources, as well as predictors of wellness or illness in populations.

Chapter Three focuses on ECD and its importance to the life course, including associated morbidities and their early causes. Current studies of ECD that use developmental indicators such as the Early Development Index (EDI) are reviewed and their results summarized. Factors that influence ECD are inventoried from the literature and a taxonomy created that nests each of these within its appropriate scale of influence. This provides a foundation for classifying SDH as material, social or village effects on ECD. These effects may be risk factors that can render children vulnerable to developmental difficulties or are protective effects that build resilience. The literature reviews provide a detailed consideration of how SDH affect ECD and their dynamic interplay at various scales.

Chapter Four provides a table of results from recent studies on ECD that use outcome measures such as the EDI and highlights study findings around the relevance of specific SDH to the five domains of ECD. This provides contextual background for a study of the effects of material and social deprivation in the KFL&A catchment area. The thesis hypothesis is outlined with study methods, results, and discussion.

Chapter Five centres on the influence of community on ECD and policy recommendations to foster healthy children. It is hoped that the knowledge generated from this thesis will assist researchers, policy makers, educators, childcare workers, public health practitioners, parents and care givers in identifying the resources required to support and optimize children's early development.

Chapter II: Causal Pathways

"No man is an island, entire of itself; every man is a piece of the continent." (John Donne, 1624)

2.1 Place Effects: Key Geographic Constructs that Impact Health

In Chapter 1, the value of an ecological approach to Life Course Health Development (LCHD) was introduced, calling for multi-disciplinary inquiry to address the various environmental and societal factors that influence peoples' *wellbeing*. Wellbeing relates to health and wellness, which Prilleltensky et al. define as: "a satisfactory state of affairs, brought about by the acquisition and development of material and psychological resources, participation and self-determination, competence and self-efficacy." (2001, p. 143) The geographic constructs of *place* and *space* permeate all aspects of human ecology and so are relevant to discussions about health and wellness. Add the effects of temporality to these spatial, material and cultural dimensions, and geography becomes inextricably and intuitively linked to human ecology. Geography enables the study of the individual at the micro-scale, and the factors that impact his or her life at the household level that can then be linked to other units of analysis, from the neighbourhood or community, to the region, the state, the nation and the global village.

Dunn describes population health as a "broad and complex field that must explain the systematic, differential distribution of health status by socio-economic position," and that research in population health as a theoretical project is "still in early infancy." (Dunn, 2006, p. 572) Jones and Duncan assert that "individuals and their ecologies must be modeled simultaneously," (1995, p. 30) to determine whether health variations arise "simply because different sorts of people live in different places (*compositional* effects), or because places

themselves differ in terms of environmental quality or other attributes (*contextual effects*).” (Gatrell, 2002, p. 69) As place is pervasive in many discourses about the factors that influence human health and wellness, finding the answer(s) as to why health disparities exist – the causal pathways to wellness or illness – calls for an ecological approach that, without denying the importance of the incidence of disease at the individual level, delves beyond the biomedical model to also examine the social determinants of health that either foster or hinder health.

2.1.1 Place, Space and Scale: Defining Household, Neighbourhood and Community

Location is a geographic term that refers to a specific point on the earth’s surface, and can be pinpointed by intersecting degrees of longitude and latitude. Modern Geographic Information Systems (GIS) can easily locate and map any location on the globe. Locations become places when “they are charged with meaning.” (Gatrell, 2002, p. 9) It is important to note that while locations are generally fixed over time, places are dynamic, with fluid boundaries, often evolving. (Ley, 2006) For example, Times Square in New York City is a specific location at the intersection of several city blocks on Manhattan Island. But a visitor to Times Square in the early 1980s might have left with a very different concept of the place than a person who visited after the area had been revitalized and decriminalized during Giuliani’s term as mayor of New York. New Yorkers themselves may feel very differently about the place, where once it was derelict and unsafe, it is now one of the most recognized symbols of the Big Apple. This demonstrates that not only do places evolve, but people’s perceptions of them change as well. (Gatrell, 2002) Similarly, the city of Vancouver in the 1970s was associated culturally with the British monarchy, while today, it is a cosmopolitan city shaped by Asian culture as a result of immigration. So place can be defined as an “objective location that has uniqueness and interdependence with other

places,” but is also a “subjective social and cultural construct with personal meanings.” (Gutberlet, 2007, p. 1)

This is different from the concept of space, which “denotes a dimension in which phenomena are distributed.” (Curtis and Jones, 1998, p. 646) Space is more than a physical “container, it is also a cultural and social creation, affected by socioeconomic systems, power relations, and representation,” (Knox et al., 2007) both a medium and outcome of social relations. *Topological* spaces relate to the connectivity between people and places, like a subway system. *Socioeconomic* space relates to distribution patterns within a region for example, and the political constructs that support them. *Cultural* space relates to places of special significance to people with common ties, (Gatrell, 2002; and Gutberlet, 2007) while *cognitive* space is “defined and measured in terms of the nature and degree of people’s values, feelings, beliefs, and perceptions about locations, districts, and regions.” (Knox et al., 2007, p. 41) The concepts of place and space are especially important in relation to the effects of neighbourhoods on early childhood development (ECD). For example, the child of a family who lives in a neighbourhood with a high crime rate might be forbidden from playing outside (an important activity promoting healthy ECD) because the parents perceive the neighbourhood as an unsafe place. This is in contrast to a safe neighbourhood, where the local park may be regarded as a positive space, where children can play without parents worrying about their welfare. The creation of this positive space may have come about by parents actively supporting a neighbourhood program such as “Neighbourhood Watch,” so the safe places have other associations of space, such as civic empowerment. Finally, *sense of place* refers to the psychological attachments people develop to a place based on their experiences with it and how it evolves as a symbol of the memories they harbour.

In the study of human geography, spatial *scale* refers to a great deal more than cartographical map scales. Scales are territorial and conceptual units where contextual and compositional effects interplay, including health events, which can be aggregated. Scales represent different units of analysis, “are linked, and processes operating at one scale can have significance on other scales... in some cases, processes operate in different ways at different scales.” (Knox et al., 2007, p. 47) Scales are “central to political discourse.” (Cox, 1998, p. 1) Scales relevant to health geography include: *the body* (representing the physical manifestation of the individual (i.e., age, gender, race, sexuality, ethnicity); the *individual* (representing the body as well as non-physical characteristics such as level of education attained, political affiliation, etc.); the *household*; the *neighbourhood*; the *community* (referring to a social grouping that is relational or associative, but may be geographically dispersed); the *town/city*; the *region*; the *state*; the *nation*; the *international*; and the *supra-national* or *global*. There are material, social and political manifestations at various scales that can have impacts on other scales. The following is an example of this phenomenon in its most complex form:

The WHO Declaration of Alma-Ata proclaiming an holistic comprehensive, contextually-sensitive and participatory approach to primary health care, and subsequent practical and political struggles between global, regional and local players over whether and how this could be achieved, have played out in different ways in regional (e.g., less wealthy compared to wealthier countries), national, and local contexts. (Wiles and Rosenberg, 2009, p. 89)

Indeed, the local level is where health, economic and social policies play out with consequences at the individual scale, where health or illness manifests.

The household is a place where people live out their daily life. It represents an aggregation of a variety of social and environmental determinants of health. In the study of households, Lawrence advocates that cultural, social, economic, political and individual

human factors be considered simultaneously at the geographic scale of the housing unit and its site and conditions in the local neighbourhood.” (2004, p. 492) The household is also a place where “people learn who and what they are and how they should think and behave.” (Knox et al., 2007, p. 3) In the case of children and their relationship to and within the household, Cox’s concept of “spaces of dependence” is perhaps the most apt, “those more-or-less localized social relations upon which we depend for the realization of essential interests and for which there are no substitutes elsewhere; they define place-specific conditions for our material wellbeing and our sense of significance.” (1998, p. 2)

The neighbourhood is a further aggregation of the characteristics of the households found within it, as well as other characteristics that impact the health of people who live there: safety, crime level, green spaces, environmental hazards (e.g., a freeway, power plant or garbage dump nearby), services available (e.g., schools, health centres, grocery stores, public transit, etc.) and sporting or cultural amenities (e.g., arenas, swimming pools, churches, theatres, etc.). The neighbourhood is also a place, or many different constructs of place and space, depending on individuals’ views, their backgrounds, and their social standing. Neighbourhoods of mixed ethnicity, for example, may be home to people who have very different attitudes about religion, social roles and values, and so their perceptions about where they live might be quite different. A neighbourhood, which presupposes a geographically delineated area as well as a conceptualization of place, may or may not be deemed a community, based on the levels of relatedness amongst its citizens.

A community, however, need not be geographically delineated or discrete. For example, a community of “moms-to-be” might arise from women attending a pre-natal class who come from different neighbourhoods, but who continue to communicate on-line. Different ethnic groups may be dispersed across a city, but converge and congregate at a

community centre, which provides a space for culture and association. Some communities are geographically delineated by a particular place. The gay community of Toronto is associative and occupies a social and political space, but is also clustered within a particular geographic area – the “Gay Ghetto” of Church and Wellesley. Interestingly, the gay space in Toronto evolved over time, as gays became more socially and politically active and cohesive. So too did gay places, evolving from bars and parks to an entire neighbourhood.⁴ A school is a community (and in some cases, collections of communities) clustered within a geographic space, sometimes associated with a particular neighbourhood (such as the district system of public schools), sometimes acting as an area of convergence for people from different neighbourhoods (e.g., the separate school system which buses Catholic children from across a city). Whether geographically discrete or dispersed, a community always entails shared identity, interests and/or values, whilst neighbourhoods may be less cohesive, though spatially delineated. A neighbourhood which has a high level of cohesiveness could be viewed as a community, particularly if it acts as a “space of engagement” where residents have to engage with other centres of social power in order to secure and maintain the “conditions for the continued existence of their spaces of dependence [i.e., households].” (Cox, 1998, p. 2)

The household, the neighborhood, and community(ies) are more than physical units – they are social and psychological places and spaces, interrelated, converging “to provide a spatial context for health that transcends the individual’s own behavior and health outcomes.” (Gatrell, 2002, p. 13) The complexities surrounding the study of ECD calls for inter-disciplinary approaches that put the child at the centre of their ecosystem, and how

⁴ Michael F. Paré, Archivist, *History of Gay Toronto and Birth of Queer West*, M.L.S - M.Phil © Copyright 2013, sourced from <http://www.queerwest.org/history.php> February 2013.

various scales – the household, the neighbourhood, and community(ies) – influence the individual’s developmental health. Further to this, political and economic processes at the global scale impact people differently, depending on their relative social power positions within ecological spatial configurations at the local scale. Swyngedouw describes scale as “neither an ontologically given and *a priori* definable geographical territory, nor a politically neutral discursive strategy in the construction of narratives.” (1997, p. 140) Thus, from a policy perspective, there are structural effects to consider, like state welfare policies and political regimes; socio-economic forces, including gender, class, education, and poverty, that systemically impact the health of individuals within various scales (e.g., their respective households, neighbourhoods and communities). (Brown and Duncan, 2002; Cummins et al., 2007; and Doyal, 2000) These also affect ECD and the experiences of childhood that parents and caregivers can provide.

2.1.2 Contextual, Compositional and Collective Determinants of Health

The realm of public health is complex, as the causes of wellness (health) or illness (morbidity) intersect and interplay at many different scales, from the individual or body to the supra-national. Macintyre et al. explain:

Compositional explanations draw our attention to the characteristics of individuals concentrated in particular places; contextual explanations draw our attention to opportunity structures in the local physical and social environment. Collective explanations draw our attention to socio-cultural and historical features of communities. This last type of explanation emphasizes the importance of shared norms, traditions, values, and interests, and thus adds an anthropological perspective to the socioeconomic, psychological, and epidemiological perspectives often used to examine area effects on health. (2002, p. 130)

Based on the examples cited in the previous section, the influx of Asian immigrants to Vancouver had a compositional effect on that city as Asian culture spread to replace British

culture in particular places. Giuliani's war on crime in New York had a contextual effect on Times Square, through activism and political mobilization, modifying the physical and social environment of that place. Inversely, the parents living in an unsafe neighbourhood may be poor and lack the social capital and means of advocacy to address the issue of crime in their community. The Gay Ghetto of Toronto is a collective expression of the social, political, cultural and historic features of that community within a geographically discrete neighbourhood.

Curtis and Jones note that the discussion around compositional and contextual effects "does suggest that ecological information is important to our understanding of health variation, not merely as a substitute for individual data, but also as a means of testing for the combined effects of compositional and contextual influences." (1998, p. 648) Gender, sexual orientation, class, race and ethnicity are relevant compositional factors that influence health, though often neglected in epidemiological studies. (Curtis and Jones, 1998; Krieger, 1994; Leung et al., 2004; Macintyre et al., 2002; and Östlin et al., 2004) Especially when inequalities in health are present in a given community or neighbourhood, the local scale becomes important to understand the contextual factors that influence health, the "structural material landscapes, landscapes of consumption... surveillance and control... often determined by the most influential and privileged groups in society [which] are of greatest benefit to them." (Curtis and Jones, 1998, p. 653) Health research and programming needs to be relevant to the people it purports to serve. It has only been as women, gays and racial minorities gained political influence that these factors have begun to be addressed. Krieger called for an "ecosocial" epidemiologic theory that embraces population-level theory as well as biology, as disease etiology cannot be understood through biomedical individualism alone, which views population health as simply the

the sum of individual traits and choices. It instead asks how individuals' membership in a society's historically forged constituent groups shapes their particular health status, and how the health status of these groups in turn reflects their position within the larger society's social structure. It further implies that changing these population patterns requires explicitly studying and addressing their political, economic, and ideologic determinants. (1994, p. 894)

An ecological perspective frames individuals within the social and physical environments in which they live, work, study and play, and acknowledges the complex intersections between these factors. Coupled with an examination of the structural impacts of global, national and regional policies on the local scale, researchers can begin to address "the fundamental questions of 'why' rather than 'how' exposure and disease are related... and the motivation for conducting epidemiological research should include not only increasing the knowledge base for public health but also applying that knowledge to support structural changes to promote health and prevent disease." (Leung et al, 2004, p. 504) The contextual, compositional and collective determinants of health are especially important when studying ECD, as children are the most vulnerable of all demographic groups in any society, given their dependence on caregivers and an almost complete lack of autonomy. How children are valued within society, which can be subject to subtle or pronounced gender differences and to the effects of poverty, is also a critical contextual and collective determinant of health. (Doyal 2000; Östlin et al., 2004; and Whiteford and Manderson, 2000)

2.1.3 Health Inequalities and Inequities

Health inequalities and inequities are produced and reproduced at various scales, involving "relationships among systems and across places." (Crooks and Andrews, 2009, p. 271) Health inequalities, sometimes referred to as health disparities, indicate that health and wellness (as measured by a variety of indicators like life expectancy) is not shared

equally across a population, and is “used to signal that both social inequalities, and the dimensions of health with which they are associated, are multiple.” (Graham, 2007, p. 4) This is different from the term health inequities, which refer to health inequalities that are judged to be unfair and/or unjust. Health inequalities are descriptive, while health inequity is a normative concept, often “based on the principle of distributive justice... and closely linked to principles of human rights.” (Östlin et al., p. 741) Graham further breaks down health inequalities into three categories: those between individuals; between population groups; and, given that socio-economic position has been demonstrated to be a structural location, health inequalities can exist between those at unequal positions in the dominant social hierarchies of their ecosystems. Östlin extends this categorization to health inequities, which often manifest “by systematic disparities in health, or its determinants, between socially, demographically or geographically defined populations or sub-groups of populations.” (Östlin et al., p. 741) Starfield states that “inequity results from systematic and a potentially remediable disadvantage in one or more aspects of health across socially, demographically, or geographically defined populations or subgroups.” (2002, p. 386) The difference then between health inequalities and inequities is that where health inequalities exist and could be remedied, there is inequity... inequity is “unjust and avoidable inequalities.” (Baum et al., 2009, p. 1967)

Since the Alma-Ata Declaration, strengthening primary care and public health have been touted as ways to address health inequalities and perceived inequities in populations, given their emphasis on wellness and health promotion over and above the biomedical model, leading to better health and less morbidity. (Hanlon, 2009; Starfield, 2001, 2002, 2007; Sturmberg, 2011; and Wiles and Rosenberg, 2009) Guagliardo (2004) explores the concepts and methods of spatial accessibility in primary care and notes that most studies

have centered on social inequity in access, or health care utilization. Access to care involves stages and dimensions, and that there are differences between “potential” for care delivery and “realized” delivery of care. (Aday and Anderson, 1974) These dimensions involve “the ability to get care, the act of seeking care, the actual delivery of care, and [quality] indicators thereof,” all of which may be impacted by socioeconomic status at the individual level, potentially leading to health inequalities. (Guagliardo, 2004, p. 2) Hanlon infers that health care utilization is largely driven “by need (i.e., the presence of a health concern for which an individual seeks medical attention), but that those in need may face particular sets of barriers that vary by place and over time.” (2009, p. 46) At the individual level, these include “predisposing factors” such as age, sex and health status, as well as “enabling factors” such as income, and knowledge of services available. Barriers to care can also be structural in nature, such as the cost of services, travel costs and language barriers.

Phelan et al. have deemed social conditions as fundamental causes of health inequality. The basic principle of their Fundamental Cause Theory is that people of higher socio-economic status (SES) have access to flexible resources (including healthcare) and to social networks that allow them to avoid disease, leading to the prediction that “at any given time, greater resources will produce better health, and consequently inequalities in health and mortality will persist as long as resource inequalities do.” (2010, p. S34) The associations between SES and health status persist over time, even as risk factors and disease patterns change. Graham agrees that class (as a classification of SES) is particularly important for understanding health inequalities because class is “embodied,” sustained and reproduced through “the interplay of social structure and individual agency.” (2007, p. 47) So too is the concept of race, as demonstrated in numerous American studies where people of race (African Americans and Hispanics) often have poorer health

outcomes than whites of the same socio-economic groups, yet “race has no biological basis.” (Budrys, 2010, p. 173) Agency also appears to be linked to health inequalities at the individual and population levels.

Coburn theorizes that health inequalities stemming from SES and the consequences of income distribution have arisen from social and class changes at the macro-level, including “the spread of neo-liberalism, the decline of the welfare state, differences amongst nations regarding welfare regime type, and, most generally, the relationship between class structure, economies and human wellbeing.” (2004, p. 41) Income inequality is a consequence of the policies that drive social conditions, and class is seen as shaping socio-economic status. (Auger and Alix, 2009) There is a causal link between welfare regime types and the health status of populations. As in many social democratic Northern European countries, social welfare policies “flatten the health gradient” – lessen poverty and inequality and provide better access to higher quality primary care. (Coburn, 2004; Lobmayer and Wilkinson, 2001; Navarro and Shi, 2001; Sen, 2000; and Starfield, 2001, 2002)

The World Health Organization’s Early Childhood Development Commission (2008) notes that a combination of different environments expose different social groups to health risks, including home, school, work, neighbourhood and healthcare systems. However, the nature of these environments, in addition to economic circumstances, shapes children’s development in the areas of physical growth, language and cognition, social and emotional health. (Marmot, 2007) Social position and hierarchy have a significant effect on how parents are able to provide resources for their children, but “achieving a fairer distribution of power requires collective social action – the empowerment of nations, institutions and communities.” (Marmot 2007, p. 1155) Inequities in child health arise from structural causes

at the national level, and the strength of welfare policies to support ECD can be deemed issues of social justice. (Powers and Faden, 2006) Inequalities in ECD arise from the interplay of several scales and the impact of global, national and provincial/state policies on the household, the neighbourhood, and communities – which are greatly influenced by the social determinants of health.

Crooks and Andrews explore the core geographic concepts of community, equity and access in primary health care, emphasizing that primary care practice must be responsive to the “highly localized needs of community residents while addressing regional and national, if not international, priorities.” (2009, p. 271). Access is inherently related to equity, such that the accessibility of primary care for a given population involves not only the issue of proximity, but also whether the needs of marginalized individuals within that location are met. Herein lays the distinction between potential to access care and realized care. More work needs to be done to quantify how a broader definition of spatial accessibility to primary care impacts population health, “a challenge made more difficult by recent regulations to protect patient privacy, including patient street address... [but where] the payoff is potentially very great.” (Guagliardo, 2004, p. 10)

Hanlon calls for more research into the institutional forces of health care delivery, to expose “the tensions and fissures between medical and population health orientations” that can hasten or hamper health reform and efforts at population-based initiatives to address equity in access and utilization of health resources. (2009, p. 51) This will be an important consideration in the development of policy and programs to enhance ECD, where the recommended “principle of progressive universalism of service provision... means providing support for everyone, with more support going to those with greater need... which

is consistent with public health principles of population-wide [screening] and targeted intervention.” (Lynch et al., 2010, p. 1245)

An example of such a program can be found in Ontario: the Enhanced 18-Month Well-Baby Visit, which was piloted in 2008 and is now being promoted across the province to promote healthy child development by “Getting it Right at 18 Months... Making it Right at 18 Years and Beyond.” Ninety-six percent of children aged 0-23 months made more than 50 percent of their recommended visits to a Family Physician (69%) or Paediatrician (27%).⁵ Yet despite this high rate of compliance with recommended visits to a health care provider, almost 30 percent of non-special needs students in Ontario score below the 10th percentile on at least one readiness to learn domain (based on Early Development Instrument data for 2010).⁶ This highlights a gap between potential for care delivery and realized delivery of care.

2.2 Social Determinants of Health – Predictors and Resources

The Whitehall Studies of health and occupation in Great Britain sparked world-wide scholarly attention to the associations between illness and the social determinants of health, culminating in the Black Report of 1980. Since then, a great body of literature has emerged on the determinants that shape the health of individuals and populations (environmental, behavioural and social determinants). The “Social Gradient of Health” is now a commonly accepted construct that associates poverty, or the lowest social economic standing (SES), with the poorest health and increased mortality. (Bradley and Corwyn, 2002; Bryant et al., 2011;

⁵ Jaakkimainen, L., Upshur, R., Kelin-Geltink, J., Leong, A., Maaten, S., Schultz, S., Wang, L., Institute for Clinical Evaluation Sciences (ICES), Primary Care in Ontario, November 2006.

⁶ The Offord Centre for Child Studies, McMaster University, Early Development Instrument: School Readiness to Learn Ontario SK Cycle 2 Results based on the Early Development Instrument Data Collection for Senior Kindergarten Students in Ontario, 2010.

Budrys, 2010; Denburg and Daneman, 2010; Denny and Brownell, 2010; Drukker et al., 2003; Gatrell, 2004; Graham, 2007; Halfon et al., 2010; Macinko and Starfield, 2001; Maggi et al., 2010; Marmot et al., 2008; Marmot and Wilkinson, 2001; Raphael, 2006, 2009; Raphael et al., 2004, 2008; and Starfield, 2011, 2002, 2007) However, poor health “is not confined to those who are worse off. At all levels of income, health and illness follow a social gradient: the lower the socioeconomic position, the worse the health.” (Marmot et al., 2008, p.1661).

The World Health Organization defines social determinants of health (SDH) as “the conditions in which people are born, grow, live, work and age, including the health system. These circumstances are shaped by the distribution of money, power and resources at global, national and local levels.”⁷ Several definitions of health have evolved over time, which impact the definition of SDH. Raphael outlines this evolution as follows:

Social determinants of health are the primary determinants of whether individuals stay healthy or become ill (a narrow definition of health). Social determinants of health also determine the extent to which a person possesses the physical, social, and personal resources to identify and achieve personal aspirations, satisfy needs, and cope with the environment (a broader definition of health). Social determinants of health are about the quantity and quality of a variety of resources that a society makes available to its members... conditions of childhood, income, availability and quality of education, food, housing, employment, working conditions, and health and social services. (2009, p.2)

This expanded view of health and its determinants is based on an appreciation that human beings live within unique ecosystems that influence them, and which they influence in turn through social interaction at a variety of scales. The natural environment becomes an area of interest in terms of air, soil and water quality, and how it impacts the health of individuals and populations. (Buzzelli, 2007; Chu and Simpson, 1994; and Schultz and Northridge, 2004) A subset of literature exists around the built environment and housing as determinants of health.

⁷ World Health Organization. Social Determinants of Health website, sourced December 2012 at http://www.who.int/social_determinants/en/

(Bryant, 2003; Dunn and Ross, 2009; Dunn et al., 2006; and Lawrence, 2004) “The environment of any living species is multi-dimensional and extremely complex. Therefore, residential environments should not be interpreted as a neutral background to human behavior.” (Lawrence, 2004, p. 491) Though these bodies of literature relate to the physical environments that people live in, the quality of said environments is often a construct of income inequality, such that people of lower socio-economic status may live in places where there are higher exposures to health risks and toxins, like air pollution, noise pollution and garbage dumps. (Buzzelli, 2007) They may also lack the disposable income needed to make major structural repairs to their homes (Bryant, 2003) such as the removal of lead or asbestos, insulating damp basements, replacing drafty windows or fixing leaky roofs. People of low socio-economic standing often cannot afford to move to a better neighbourhood, and they may not possess the confidence or skills needed to advocate for change at the community level. Thus, the physical environment, as impacted by socio-economic factors and structural forces, evokes issues of social and environmental justice. (Buzzelli, 2007; Dunn and Ross, 2009; Dunn et al., 2006; and Lawrence, 2004)

As discussed, the household as a level of scale represents an aggregation of a variety of environmental, social and behavioural determinants of health. Dunn et al. developed a “Housing, SES and Health Framework”. They utilize the following SES indicators as determinants of household health: income levels, whether the home is owned or rented, family/marital status of inhabitants; population density; air quality, etc. and environmental determinants of health, (dis)ability, incidence of mental illness, life stage of inhabitants (particularly young children and seniors), gender, aboriginal status, and ethnicity/immigration status. They also study the following housing dimensions: physical hazards, physical design, psychological benefits, social benefits, political dimensions, financial dimensions, and location.

(2006) There are additional social determinants at the household scale that have been used by other scholars, such as employment status, type of employment (occupation) and education level of inhabitants. (Budrys, 2010; Graham, 2007; and Raphael, 2009) “Deprivation indices” have been developed as tools to measure socio-economic status in populations and are used in public health and social welfare program planning to identify potentially vulnerable populations that would benefit from interventions. The use of deprivation indices will be discussed in greater detail in Chapter Four.

Dahlgren and Whitehead’s model of the “main determinants of health” also include individual lifestyle factors, the healthy or unhealthy behaviours emphasized by modern public health policy (Dahlgren and Whitehead, 1993 in Graham, 2007). Their model starts with the individual, their age, sex and constitutional factors. Then individual lifestyle factors are overlaid (e.g., smoking, alcohol consumption, obesity). Next, there are social and community networks, and then general socio-economic, cultural and environmental conditions (i.e., living and working conditions, education, agriculture and food production, unemployment, water and sanitation, healthcare services, and housing). Their model moves from the individual scale to the household, networks and structural factors at the macro level. Raphael’s Social Determinants of Health Framework adds other variables such as quality of early life, food security, social safety nets, and social exclusion. (Raphael, 2009)

Najman’s “general model of social origins of health and wellbeing” (2001) introduces the concept of the biological and social pathways that influence health. The model begins with the social, cultural and economic characteristics of a society, which exert influence on social position (class, gender, race, ethnicity and age). Social position then manifests in three ways: as beliefs and behavior, within the family and within the neighbourhood. Next, the model looks at specific exposures (e.g., smoking, diet, physical activity, alcohol consumption, etc.), genetic and

constitutional factors, pathophysiologic and biologic pathways, and finally, that which is being measured – individual health and/or population health. Similarly, Keating’s “Predictors of Social Gradient” include income, social status, education, race/ethnicity, gender, parental marital status, neighbourhood and community of residence. (2011)

Marmot and Wilkinson highlight the importance of psychosocial variables and neuroendocrine pathways in the relationships between income and health. Variables such as anxiety, insecurity, control issues, social associations and depression, impact the health gradient. It is these “psychosocial pathways associated with relative disadvantage [that] act in addition to the direct effects of absolute material living standards.” (2001, p. 1233). Harsh material conditions, such as living in a crime ridden neighbourhood, affect the “fight or flight” reaction in people, and these stressors, particularly if prolonged, lead to imbalances in allostatic load⁸ and a host of health issues associated with weakened immune systems, endocrine function and heart disease. Simply put, “individuals of lower socioeconomic position experience a range of psychosocial states that threaten health.” (Raphael, 2006, p. 657) Link and Phelan (2010) identify social position as the “fundamental cause” to health, as it relates to the access to resources that can help individuals avoid diseases through a variety of mechanisms. Their theory is widely supported by a variety of studies, like the 2008 study of 22 European nations by Mackenbach et al. They found that “socio-economic status served as a strong independent predictor of mortality rate, both within and across the highly varied groups studied. Their findings were independent of epidemiology, disease, risk factors and health system characteristics.” (in Denburg and Daneman, 2010, p. 24)

⁸ *Allostatic Load* is a term coined as a more precise alternative to the term *stress*, used to refer to environmental challenges that cause an organism to begin efforts to maintain stability (allostasis). Mosby’s Medical Dictionary, 8th edition. © 2009, Elsevier.

Access to resources at the individual, household and neighbourhood scales is also influenced by structural variables like social safety nets, availability of primary health care and early childhood development and education programs. These social programs can mitigate the risks associated with low-income households by providing additional supports and resources that cannot be readily acquired at the household-level. Lapointe et al. (2007) also highlight the importance of what they term “social wealth” at the neighborhood-level, which arises from neighborhood culture, stability, and heterogeneity in promoting ECD and better school readiness outcomes for children. Based on recent studies in British Columbia, Morley echoes the view that developmental vulnerability in children is not only related to socio-economic status (though children from poor families generally are at higher risk), but “consistent parenting styles, safe neighbourhoods that have a strong sense of cohesion, and strong cultural identity can mitigate developmental vulnerability flowing from the effects of poverty.” (2005, p. 6)

At the structural level, global health research has shown that despite per capita income levels, social factors such as “a high degree of female autonomy, open political culture, mutable class structure and a history of egalitarianism, political contest and populism” (Denburg and Daneman, 2010, p. 25) are associated with gains in health indicators such as life expectancy and reductions in infant and early child mortality rates. ECD is an important area of study and a telling indicator of present and future population health. (Drukker et al., 2003; Halfon et al., 2010; Hertzman, 2011; and Maggi et al., 2010) For “once a nation achieves a basic level of prosperity, differences in social determinants of health such as income and its distribution, quality of early childhood, and employment and working conditions explain differences in life expectancy and infant mortality rates among citizens.” (Raphael, 2006)

The literature suggests that the social determinants of health manifest at a variety of scales, are interrelated, and can develop as “socially shared understandings of places, and how

the lives that people lead, in very different places, shape their health experience.” (Gatrell et al., 2004, p. 246) A theoretical foundation exists in Bourdieu’s work on “relational thinking,” where society is structured from a network of fields of social practices, which in turn are structured social networks onto themselves, “each having regulative principles that serve to delimit a social space in which agents struggle, depending on the position they occupy in that space, either to change or preserve its boundaries and form.” (Bordieu and Wacquant, 1993 in Gatrell et al, 2004, p. 246) Health inequalities and inequities can also be traced to the effects of social determinants of health, from the body to the global scale and all points in between, which can be preserved or changed, depending on agency and civic engagement. There is an emerging body of literature around determinants of health that extends the focus from the geographical context of local environments to the context of social space, differentiating between the psychosocial and material pathways that exist between income and health, (Drukker et al., 2003; Halfon et al., 2010; Keating, 2011; Maggi et al., 2010; and Marmot and Wilkinson, 2001) the influence of social capital (Drukker, et al., 2003; Halfon et al., 2010; Hertzman, 2010; Lapointe et al., 2007; and Terrion, 2006) and relational communities. (Bradley and Corwyn, 2002; Hertzman, 2010; Labonte and Laverack, 2001; and Rolfe, 2006) This body of literature will be explored in the next chapter, highlighting the importance of ECD to the life course. For “the social environment is a fundamental determinant of early child development and, in turn, early child development is a determinant of health, wellbeing, and learning skills across the balance of the life course.” (Maggi et al., 2010)

Chapter III:

The Importance of Early Childhood Development to the Life Course

"Childhood is the fiery furnace in which we are melted down to essentials and [when] that essential [is] shaped for good." (Katherine Anne Porter, journalist and novelist)

3.1 Early Childhood Development and Life Course Health Issues

Early childhood is defined as the period from conception to age six, encompassing the most developmentally active period of a person's life, and the most crucial, as these social and biological beginnings lay the foundation for future health and wellbeing based on complex pathway effects. (Bryant et al., 2011; Clinton, 2012; Cockerham, 2005; Denny and Bromwell, 2010; Evans, 2004; Fantuzzo and McWayne, 2002; Graham, 2007; Haddad, 2010; Halfon and Hochstein, 2002; Hertzman, 2006; Irwin et al., 2007; Jack, 2000; Janus and Duku, 2007; Keating, 2011; Maggi et al., 2010; Marmott, 2007; Morley, 2005; Pati et al., 2011; Prilleltensly et al., 2001; Raphael, 2009; Shaw et al., 2001; Shonkoff and Phillips, 2000; Singh-Manoux and Marmot, 2005; and Terrion, 2006) Over the past three decades, multi-disciplinary inquiry, including health and developmental science, sociology, psychology, social work and geography, has led to studies about the complexities of health development, defined as "a lifelong adaptive process that builds and maintains optimal functional capacity and disease resistance." (Halfon and Hochstein, 2002, p. 437) The study of early childhood development (ECD) is multifarious and multi-disciplinary.

Many have struggled with the complexities of the nature-nurture debate within the science of ECD. Indeed, heredity and environmental pressures are areas of study and dispute that date back to Platonic philosophy. In modern times, social policies and institutions have

been shaped by these sometimes contrasting arguments. (Keating, 2011) Based on new scientific discoveries in developmental behavioural genetics, molecular genetics, and brain development, the modern standard of ECD emphasizes the inseparability and coactivity of nature and nurture, “nature though nurture...which accounts for both stability and malleability in growth.” (Shonkoff & Phillips, 2000, p. 41) This new paradigm is especially important to the design of interventions, programs and policies that address the needs of young children (e.g., early childhood education, childcare, family supports, social welfare, etc.). Life Course Health Development (LCHD) approaches and frameworks have attempted to identify the complexity of influences and exposures that an individual experiences over time, starting in the womb, and the mechanisms that lead to and sustain health and wellbeing, or conversely, can trigger the onset of disease.

As discussed in Chapter 2, the determinants of health combine to “unequally expose different groups to factors that damage health,” (Marmot, 2007, p. 5) leading to health inequalities. Where these inequalities can be, but are not addressed, we see the emergence of health inequities. This is a cumulative process (Maggi et al., 2010), and “the main threat to healthy child development lies in the accumulation of adversities that they face, rather than any isolated event.” (Jack, 2000, p. 707) The life course approach examines health inequalities “from the cradle to grave, to emphasize that the accumulation of advantage or disadvantage is crucial to [our] chances in life and [our] chances of death... and that health outcomes in later life are the product of the accumulation of advantage or disadvantage.” (Shaw et al., 2001, p. 296) In the case of children, their advantage or disadvantage typically results from factors outside of their control, including the individual choices made by their parents (where to live, how to parent, whether to smoke or not, etc.), but also the effects of the greater society on their parents’ ability to provide for them (e.g., whether there is a policy to provide free daycare). The impact of the physical and social environment on young children is particularly pronounced

given their developmental vulnerability (Hertzman, 2006; Morley, 2005; Mustard and Picherack, 2002; and Shonkoff and Phillips, 2000), such that

in contexts of lower socio-economic status, children are more likely to be born at low birth weight; to experience higher rates of injuries, higher rates of disability and disease, mental health disorders and behavioural problems; and to start school in a less-developed state of readiness to learn than their better-off counterparts. (Denny and Brownell, 2010, p. S4)

Young children typically spend most of their time within the home, and are thus more exposed to the variety of environmental, social and behavioural determinants found within the household as compared to older children who spend most of their day in school or within the neighbourhood. (Denny and Brownell, 2010; Hertzman and Kohen, 2003; Keating, 2011; Morley, 2005; and Shonkoff and Phillips, 2000) Hertzman and Kohen note there are multiple contexts that shape the pathways of ECD – families, pre-schools (or child care programs), peers, and neighbourhoods, and that inequalities develop systematically based on “parental education, parenting style, neighbourhood safety, cohesion, socio-economic mix; and access to good child care and family programs.” (2003, p. 3) They argue these variables are based on what parents and care givers can provide, which is largely established by family income. So once again, social position influences the distribution of resources that promote health, including ECD. (Graham, 2007; Marmot and Wilkinson, 2001; and Raphael, 2009)

Advantages accumulate inter-generationally, (Shaw et al., 2001) such that parents who inherit money may be able to improve their housing situation, or afford private school for their children. The opposite is too often true for many living in poverty, where parents do not have the means or the education to provide adequately for their children, and may lack the social supports needed to help themselves or advocate for their children. (Denny and Brownell, 2010; Graham, 2007; and Marmot, 2007) Especially with respect to literacy, which is so critical

to ECD and school readiness, “both economic capital (money, homes with space and facilities for home-based learning) and cultural capital (self-assurance, particular kinds of linguistic and social skills) are needed.” (Graham, 2007, p. 45) Most studies confirm that the lifestyles of the upper and upper-middle class are the healthiest, as they have “the highest participation in leisure-time sports and exercise, healthier diets, moderate drinking, little smoking, more physical check-ups by physicians, and greater opportunities for rest, relaxation, and coping with stress.” (Cockerham, 2005, p. 58)

Conversely, Bradley and Corwyn (2002), whose research focuses on socioeconomic status (SES) and its effects on ECD, note that children from low SES families are more likely to: experience inadequate neuro-behaviour development *in utero* and growth retardation; suffer injuries and die; have higher blood levels of lead; have iron deficiency leading to stunting; have increased likelihood of dental caries; and develop sensory impairments. These health outcomes are related to “an array of conditions associated with low SES, including inadequate nutrition, exposure to tobacco smoke, failure to get recommended immunizations, and inadequate access to healthcare,” (Bradley and Corwyn, 2002, p. 374) which compromise the health of the child. They also suggest that the social skills that parents use in the workplace are incorporated into their parenting styles, which may have an impact on the cognitive performance of children. They cite nutrition, access to healthcare, and housing as major determinants of health, but also add cognitively stimulating materials and experiences (reading and social exchanges), parent expectations and parenting styles, and parental ability to cope with stress (including healthy/unhealthy behaviours like smoking and substance abuse) as determinants of health important to ECD. They identify how much a family spends on housing as an important factor to determine wealth, and occupational status of parents as an indicator of education level and social capital.

Also discussed in Chapter Two, these influences and exposures, termed social and environmental determinants of health, occur within a variety of scales – the body, the household, the neighbourhood and/or community, and broader social structures at the regional, state, national and global levels – combining to create a child’s environment(s). The terms *meso* or *macro* and *micro* levels are used outside of the geography literature. The micro level is intimate life, the relationships and supports people can draw on when needed, while meso and/or macro refers to the level of civil society and the capacity of institutions to either “buffer or exacerbate the stresses of daily living.” (Hertzman, 2006, p. 88) Interventions to address inequalities in social and economic resources often operate at both the meso and micro levels (i.e., social policy interventions at the meso level, leading to family benefit policies such as income transfer mechanisms at the micro level). (Prilleltensky et al., 2001) But these terms do not specify the places and spaces where such determinants of health interplay, and often do not address the more informal acts of civic duty at the community level. There is a body of research suggesting that ECD outcomes are also affected by the socio-economic status of neighbourhoods, (Jack, 2000; Irwin et al., 2006; Maggi et al., 2010; and Marmot, 2007) as well as the households found within them. At the neighbourhood scale, there is a confluence between meso and micro-level determinants of health. The influence of scales on ECD will be explored in greater detail in section 3.2.

Temporality is an important aspect of life course health development, especially early childhood, which prepares the individual for school, which in turn has an effect on school success and social adjustment. “What happens in the first months and years of life matters a lot, not because this period of development provides an indelible blueprint for adult wellbeing, but because it sets either a sturdy or fragile stage for what follows.” (Shonkoff and Phillips, 2000, pp. 4-5) Graham describes early childhood as a “sensitive period” where vulnerability to environmental adversity has a greater biological impact than later in life. (2007) Hertzman’s

work on the biological embedding of early experience attempts to address the issue of temporality and resolve how the life course perspective works in relation to the adult gradient of health. He notes that a life course approach is required to understand the developmental biology of host resistance, but that general resilience and vulnerability operate in addition to the factors exclusively linked to specific diseases. It has been demonstrated in the United States and Canada that the socioeconomic health gradient in adults is mirrored by their socioeconomic gradient in cognitive and behavioural development of early life, and longitudinal studies show that the “socioeconomic and psychosocial environment of childhood are empirically linked to adult health status.” (Hertzman, 2006, p. 86)

This last link occurs through three life course processes: *latent effects*, *pathway effects* and *cumulative effects*. Latent effects are biological or developmental early life experiences that influence adult health independent of intervening experience (e.g., the association between low birth weight and cardiovascular disease). (Hertzman, 2006; and Raphael, 2009) Pathway effects shape health, wellbeing and competence over time by setting people onto a life trajectory stemming from early development (e.g., behavioural problems in youth arising from issues with socialization in childhood). (Hertzman, 2006; and Raphael, 2009) Cumulative effects are the accumulation of advantage or disadvantage over time, which changes health status through a dose-response relationship, what Hertzman describes as how negative effects “get under the skin.” Health status is affected by the intensity and duration of exposure to an unfavorable environment (e.g., stress over a prolonged period stemming from the cyclical nature of poverty). (Hertzman, 2006; and Friendly, 2009) These life course processes operate in place and space at different scales (Kraftl et al., 2012), interacting “with contemporary circumstances at various levels of social aggregation on a moment-by-moment basis and over time, with differential health status emerging as a function of these interactions.” (Hertzman, 2006, p. 87)

The impacts of ECD on adult health, wellbeing and achievement are numerous. This is due to the process of “biologic embedding” whereby differences in the quality of early childhood environments, “in terms of stimulation and emotional and physical support, will affect the sculpting and neurochemistry of the central nervous system in ways that will affect cognitive, social, and behavioural development.” (Hertzman, 2006, p. 89) As well, exposures to environmental toxins such as lead, asbestos and pesticides have been linked with physical health problems, cognitive deficits and behavioural problems. (Budrys, 2010; Evans, 2004; Keating, 2011; and Shonkoff and Phillips, 2000) Lead exposure in particular, which is much more likely to occur in children from poor households, is linked to neuro-behavioural problems like attention deficit disorders. (Graham, 2007; and Shonkoff and Phillips, 2000) Differences in life course factors invariably put children of lower socio-economic status at risk of multiple disadvantages. “Whereas human morbidities may still be identified that have their origins in solely genetic or environmental causes, it appears highly plausible at present to anticipate that variation in the onset and course of most human disorders will be ultimately explained by interactions among biological and environmental forces.” (Boyce, 2011, p. 118)

Research in neuro-behavioural development and epigenetics coins the term “methylation” for any process, including biologic embedding, that can alter gene activity without changing DNA sequences. Infancy is the developmental period whereby the brain has the most connections between neurons. Over time, neural connections for different brain functions are woven together sequentially, such as sensory pathways for vision and hearing, from the womb up to age one. Language pathways develop from within the womb to age seven. Higher cognitive functioning follows from these to age fifteen. (Clinton, 2012) As such, there are discrete times in early childhood, periods of “neural plasticity,” where development can take place, providing the brain receives appropriate stimulation. (Clinton, 2002, Denburg and Daneman, 2000; Hertzman, 2006; Marmot, 2007; and Smith-Chant, 2008) Because

development is sequential, underdevelopment in one area (e.g., language and literacy) can lead to problems with higher cognitive functioning. This is because of “synaptic pruning” that occurs from birth onwards. As one part of the brain matures, connections are altered, and unproductive connections are eliminated so the brain can focus on productive ones. Synaptic pruning results from the experiences and stimuli children are subjected to as they interact with their environment. These common experiences trigger “optimal synaptic pruning in the associated areas of the brain. A failure to trigger the process would... result in a domino effect as other areas of the brain relying on that aspect of the brain development as a foundational support would be undermined.” (Smith-Chant, 2008, p. 147) The quality of a child’s environment will have a measured effect on early development – “the more stimulating the environment the more connections are formed in the brain and the better the child thrives in all aspects of their life: physical development, emotional and social development, and their ability to express themselves and acquire knowledge.” (Marmot, 2007, p. 1157-8)

How children respond to stimuli is further complicated by the influence of the hypothalamic-pituitary-adrenal (HPA) axis and allostatic load. (Clinton, 2012; Denny and Brownell, 2010; Hertzman, 2006; and Shonkoff and Phillips, 2000) The HPA axis relates to the “fight or flight” instinct all humans experience as a response to stressful circumstances, real or perceived, and the secretion of the hormone cortisol. It has “widespread metabolic effects on the organ systems of the human body [whose] effects are adaptive in the acute phase, but may be damaging to end-organs with chronic overexposure.” (Hertzman, 2006, p. 89) Allostatic load relates to how stress is handled by the body, with psychosocial and physical effects on health. Particularly in families that face social and/or economic disadvantage, the effects can be more “chronic” in nature, affecting parents and their children, leading to developmental issues and poorer health outcomes. Research shows that maternal-child attachment triggers the HPA axis. In cases where maternal attachment is compromised, which is more prevalent in poor

households or households where the mother has mental health issues (particularly depression), children develop less adaptive behavioural responses to conflict situations, leading to “systematic social class differences in basal cortisol levels among both primary and secondary school children.” (Hertzman, 2006, p. 91) The epigenetic interaction between genes and the social environment of early childhood determines subsequent resilience in mental health. (Clinton, 2012; and Denburg and Daneman, 2010)

So methylation, involving the altering of gene activity, has long-reaching effects on the life course. Methylation arises not only from physical and environmental stimuli (or lack thereof) in early childhood, but “social experience [becomes] an heritable predisposition, and the transcription of genes [is] a process governable by the character of social experience.” (Boyce, 2011, p. 117) Early childhood development is important because it influences the life course of the individual, but also leaves genetic and social imprints for future generations, as advantage or disadvantage is cumulative and trans-generational. (Shaw et al., 2001)

Each day of a child’s early life is a building block for further development, creating a foundation for future health, wellbeing, and achievement, or an impasse, sometimes irreversible, leading to distress, illness, and misfortune. (Clinton, 2012; Haddad, 2010; Keating, 2011; and Shonkoff and Phillips, 2000) There is strong evidence that life course health effects are intergenerational, to the degree that cumulative health effects, if not addressed, can lead to decreased productivity of populations. (Keating, 2011; Raphael, 2009; and Shaw et al., 2001) So a child’s early development is not only foundational to his or her future as an individual, but is a precursor to the health of future generations. Hertzman (2010) points to inequalities in developmental health as society’s most pressing issue, and Raphael (2009) brands these inequalities as issues of social justice. Interdisciplinary science can play a role to understand better the factors that impact ECD with a view to informing policy makers, community leaders

and caregivers as to the quality and quantity of resources required to raise healthy, resilient and productive children. Next, an ecological approach will be used to identify these complex factors and how they interplay between scales.

3.2 Factors that Influence Early Childhood Development at Various Scales

In Bronfenbrenner's seminal work on the contexts of child rearing (1979), he proposes a theoretical integration of how ecological contexts affect the course of ECD. These entail four propositions for optimal child-rearing that relate to the different environments, or "settings" (scales), to which a child is exposed. Proposition one is the influence of child-adult interactions, or "primary context" (largely within the household). Proposition two relates to how children then use their acquired skills in other environments – "secondary contexts" – like the playground or school. He notes that primary and secondary developmental contexts are mutually exclusive in time, but can occur sequentially within the same setting or from one setting to the next.

A primary developmental context is one in which the child can observe and engage in ongoing patterns of progressively more complex activity jointly with or under the direct guidance of persons who possess knowledge and skill not yet acquired by the child and with whom the child has developed a positive emotional relationship. (Bronfenbrenner, 1979, p. 845)

In this context, the influence of parents, relatives and other caregivers are of prime importance, and relate to the term "parenting" which loosely describes this/these influence(s). The "secondary developmental context" is one in which the child "is given opportunity, resources, and encouragement to engage in the activities he or she has learned in primary developmental contexts, but now without the active involvement or direct guidance of another person possessing knowledge and skill beyond the levels acquired by the child." (Bronfenbrenner, 1979, p. 845) This secondary developmental context is especially important with respect to

children's "readiness" to begin school and learn – they must have the needed skills (physical, social, emotional, cognitive and communicative) and be able to implement them. Janus and Duku suggest that the way children are able to use their skills "in the course of learning is much more important to their overall success... put[ting] as much emphasis on non-cognitive skills as on the strictly cognitive ones." (2007, p. 376)

Bronfenbrenner introduces the concepts of advocacy and agency in his third proposition for effective child rearing, particularly in the context of single parent families who require additional support systems, often from outside the household. He states that "the developmental potential of a setting depends on the extent to which third parties present in the setting support or undermine the activities of those actually engaged in interaction with the child." (1979, p. 847) He advocates for social policies and interventions that reduce stress and provide new support systems. This may apply to families where there is discord in parenting styles, the influence of other relatives who may help or hinder the parent-child dyad, or social services that are helpful or confrontational.

Finally, Bronfenbrenner highlights the interconnections between a child's environments, and that the developmental potential of a child is "increased by the number of supportive links between [the household] setting and other contexts involving the child or persons responsible for his or her care." (1979, p. 848) He cites examples such as shared activities, two-way communication and information exchange between settings (e.g., between parents and school teachers).

Though Bronfenbrenner's model speaks to optimizing child-rearing at a conceptual level, including sequencing of development and interactions between settings, it does not delve into how settings can be optimized (i.e., specific compositional, contextual or collective factors

that can be enhanced or avoided, and at what scale). However, he calls, for the development of a “specific taxonomy for analyzing settings in terms of developmentally relevant parameters for assessing development in terms of environmentally relevant outcomes.” (1979, p. 844) Bronfenbrenner’s process-person-context-time model conceptualizes an integrated system for studying the course of human development, and “just as all the components of the model must be included in any adequate conceptual specification of the dynamic, human development system, so too must research investigate the role of all of them to provide data adequate for understanding human development.” (2004, p. xv)

Since then, many scholars across disciplines have explored a variety of factors that affect the course of ECD, though arguably, a complete taxonomy has yet to be developed and scholars have tended to focus on sub-sets. Several life course factor models and frameworks have been proposed, most shaped by social and environmental determinants of health as causal mechanisms triggering gene-environmental interactions, but also by scale (e.g., neighbourhood-based approaches) and the concepts of agency and social justice. A summary of these sub-sets follows from a review of the literature on the ecological contexts and constructs that affect ECD, with highlights and brief examples.

- **Birth weight, biological and genetic endowment:** Early childhood development starts from the time of conception, so *in utero* nutrition and exposure to environmental toxins such as alcohol, drugs or tobacco carcinogens have an effect on birth weight and pre-term delivery. Unfortunately, it is usually women who “have faced a life time of disadvantage who are at greatest risk of poor health and nutritional deficiencies [and] in high-income countries, are also most likely to smoke and smoke heavily.” (Graham 2007, pp. 152-153) Thus the social status of grandparents also matters to ECD, as “female children living within a social context of poverty will not only be more likely to have been born with low birth weight, but they will

also have an increased probability of transmitting this poor perinatal outcome to the next generation.” (Barrington, 2009, p. 91) Brain growth, both pre- and post-natal, is greatly affected by nutritional status, as is strength of the immune system in combatting infection and energy levels overall. Lethargy in the child due to malnutrition makes eliciting attention from the parent more difficult, leading “not only to compromised growth but increased likelihood of insecure attachment, negative effect, and limited mastery motivation.” (Bradley and Corwyn, 2002, p. 380)

- **Social and environmental determinants of health and disparities, including class, race and poverty, and the physical/built environment:** Denny and Brownell (2010) point to poverty, housing and education as key determinants of ECD, noting that in 2004, 13 percent of Canadian children still lived in low-income households. The cycle of poverty needs to be addressed by structural policies designed to help low-income families and promote family health, given that “health inequities result from unequal distribution of power, prestige, and resources among groups in society.” (Marmot, 2007, p. 1159) Health care seeking behavior is impacted by SES/class (Williams, 1995), even where there is universal health coverage, such that poor families cannot purchase needed services that are not insured (e.g., drugs, psychiatry, dentistry and physiotherapy) and are more likely to use emergency rooms for their children who are often in greater states of illness and acuity. (Bradley and Corwyn, 2002) Janus and Duku identify socioeconomic resources as “accounting for much of the difference in social and school readiness outcomes of [children in] the United States and Great Britain.” (2007, p. 378) Less optimal outcomes in nearly every area of functioning are linked to SES in the literature. (Bradley & Corwyn, 2002)
- **Gender-based inequalities and inequities:** Along with socio-economic standing, or “class,” gender is a powerful determinant of health. In many societies, gender differences in health

are associated with power differentials between men and women, uneven distribution of unpaid work in the household, uneven distribution of wealth (particularly after a marital breakup) and a tendency to spend more on the development of male children over female children, including access to health care and education.

Even in health (where the physical body has a central place), biology is not destiny. Sex and society, nature and nurture, chromosomes and environments interact in fascinating ways to determine, among other things, who is well or ill, who is treated or not, who is exposed or vulnerable to ill-health and how, whose behavior is risk-prone or risk-averse, and whose health needs are acknowledged or dismissed (Sen and Östlin, , 2010, p. 1)

- **Neural development, plasticity and biological embedding:** As discussed in the previous section, neural development is sequential and occurs within specific stages where the brain “re-wires” based on external stimuli and learning. If a developmental milestone is missed, the neural pathways may be “closed” permanently, leading to subsequent learning deficiencies. Similarly, biological embedding relates to the “biological memory” that negative effects such as stress can have on major systems of the body starting in early childhood, “biologic and behavioural differences, including growth, the timing of pubertal changes, cognitive functioning, metabolism and susceptibility to illness.” (Bradley and Corwyn, 2002, p. 383)
- **Maternal attachment, “hidden regulators” and nurturing environments:** Maternal depression is associated with cognitive and language problems in pre-schoolers, as well as socio-emotional difficulties like emotional regulation, social interaction and behavioural issues. (Kiernan et al., 2008) Maggi et al. highlight maternal mental and physical health, and parental stress and depression as some of the most important determinants of ECD, (2010) and that single parenthood, particularly single mothers of lower socio-economic standing (Liu and Chen, 2006) is associated with depression three times more than in co-parenting families. Bradley and Corwyn note that anxiety, depression and hostility reduce orientation

toward mastery and efficacy, leading to poorer relationships with family and friends and reactionary behaviours that are more emotional, of a present orientation, with few self-generated goals, “using few options to deal with environmental demands.” (2002, p. 384).

- **Communication rich environments, including verbal interactions and reading between adults and children:** Evans notes that cognitive development is affected by the quantity and quality of child-parent speech and exposure to reading. One study demonstrated a “fourfold difference in the amount of verbalizations to children in families on welfare versus professional families...as well as verbal responsiveness of parents to children’s verbal and nonverbal behaviours.” (2004, p. 80) Cognitive abilities are impacted by reading and literacy promoting activities between parents and their children, and the earlier the pattern of literacy is established, the better for the child’s developmental outcomes. (Janus and Duku, 2007) Pati et al. (2011) use the number of children’s books available in a household as one of their measures of predicting ECD.
- **Play and/as socialization:** The ability to establish effective peer relationships is an essential competency and predictor of school readiness. Play competencies displayed in the home “were significantly associated with pro-social behavior in the classroom, motivation to learn, task persistence, and autonomy.” (Fantuzzo and McWayne, 2002, p. 79) Play provides children with the opportunity to deal with conflicts, practice cooperation and sharing, learn to ask for and accept help, and group problem-solve. Through play, children learn autonomy, how to assert themselves verbally, and develop social capital through the acceptance of their behavior by peers. Children who have difficulty engaging in play groups also have difficulty participating in the classroom, as “overall, peer social and learning-related competencies are interdependent for younger children.” (Fantuzzo and McWayne, 2002, p. 84) Neighbourhoods where parents perceive there to be crime, or a lack of safety, are less likely

to allow their children to play outside, “restrictions that not only severely curtail their [children’s] opportunity for physical activity, but also puts limits on their socializing within their neighbourhoods... [where they] learn about and negotiate their identity and the social subtleties of relationships.” (Irwin et al., 2006, p. 358) Within the household, “positive sibling relationships and parent-child interactions, the availability of toys and safe play space and appropriate parental expectations are all protective for young children.” (Jack, 2000, p. 708)

- **Family make-up, including number of siblings, parental education, parental profession, “achievement,” parenting styles, family functioning and socialization:** Teen parenthood and associated socio-economic disadvantage is one of the most powerful predictors of adverse outcomes for educational achievement in children. (Boyle et al, 2007) But low SES is not the only factor at play, given a 2004 study found that behavioural issues for children aged four to seven (e.g., hyperactivity, anxiety and difficulties with achievement) was more strongly predicted by parents’ level of education than income. (Janus and Duku, 2007) Evans’ summary of environmental risk and development outcomes identified the following associations: socio-emotional and cognitive development were impacted by family discord, unpredictable/chaotic households, non-responsiveness of parents to children’s needs, harsh parenting practices, and exposure to violence; psychosocial distress and elevated stress were associated with crowded and noisy environments; and adverse social, emotional and cognitive outcomes were associated with instability at home and at school. (Evans, 2004) Parents of lower socio-economic status are often disadvantaged from the start, having been brought up in families that experienced financial hardship, and exposed to stressors which continue into adult life, “circumstances that can leave them depressed and unconfident about their [own] parenting skills.” (Graham 2007, p. 155) This can lead to the “over use of negative control strategies, low warmth and responsiveness, and failure to adequately monitor children.” (Bradley and Corwyn, p. 384) Harsh parenting negatively

impacts social and academic skills, while supportive parenting and maternal social support reliably predict children's successful school adaptation. (Janus and Duku, 2007)

- **Early childhood education, enriched learning and child care:** Quality early childhood care and education (ECEC) has been linked to “lasting benefits in all domains [of EC] development, including physical, cognitive, linguistic and social, particularly for children experiencing disadvantage.” (Kiernan et al., 2008) Interventions to provide enriched learning opportunities for children in disadvantaged neighbourhoods in the United States have translated into desirable long-term outcomes such as “increased rates of high school graduation and adult earnings, as well as reductions in special education referrals, welfare dependence, and incarceration, among others.” (Shonkoff, 2010) Interventions “to attenuate developmental risks in vulnerable groups of children in settings as diverse as Jamaica, Cuba, Romania and the United States” have led to sustained linguistic, cognitive and behavioural benefits associated with ECEC. (Denburg and Daneman, 2010, p. 28)
- **Parental involvement in school activities:** Parental involvement in school activities such as helping with homework and assignments, attending school functions and serving with school governance is strongly linked to income (Evans, 2004). However, parental involvement in a child's scholastic life has a strong positive effect for ECD, as research is consistent that “regardless of background characteristics, parent involvement makes a difference in developmental outcomes.” (Janus and Duku, 2007, p. 380)
- **Education as a means of social mobility:** For many immigrant groups, a focus on educational achievement is synonymous with building social capital. Though the parents of many first generation immigrant families lose income and social capital by having to work below their standing, there is a pervasive view that education is a means of elevating the

class of their children, this often “in the face of economic disadvantage and racial discrimination.” (Graham, 2007, p. 127) However, outside of immigrant groups, education as a means of social mobility tends to be correlated with maternal education levels (beyond high school graduation) and their “goals and expectations for their pre-school-aged children [which is] linked to their cultural understanding and models of childrearing.” (Hanson et al., 2011, p. 97) Maternal education is predictive of child achievement in all academic areas and social participation at school. (Evans, 2004; Hanson et al., 2011; Janus and Duku, 2007; and Raphael, 2009)

- **Mental health, psychosocial adversities and the effects of stress on the family:** The strains of economic hardship, including chronic unemployment, can lead to “diminished self-esteem, a diminished sense of control over one’s life, anger and depression,” (Bradley and Corwyn, 2002, p. 383) which in turn can lead to alcohol and substance abuse, partner and child abuse or neglect. Longitudinal studies of children indicate that persistent “economic disadvantage is strongly associated with psychosocial difficulties and lower cognitive outcomes from toddlerhood to Grade 3” and that consistently, the “disruption of family structure results in worse outcomes for boys than girls.” (Janus and Duku, 2007, p. 378-9) Maintaining a positive outlook is important to combatting the effects of stress on parents, and it models self-reliance to children, such that “if parents remained optimistic, despite being poor, it served as a protective factor against negative parenting.” (Bradley and Corwyn, 2002, p. 384) Genetic and environmental modifications resulting from environmental interactions within the early years of life help to explain “why some children appear to do well in the face of adversity and why selected interventions appear to be effective for some children, but not for others.” (Shonkoff, 2010, p. 359)

- **Lifestyles, “habitus” and preventive health-related behaviours, including health seeking:** The study by Coburn and Pope (1974) on general preventive health behavior noted that explanatory variables on their own did not explain variance in behavior, but taken together accounted for about half of the variance. Education, age, income and social participation were the most predictive variables. Having a health plan or additional insurance influenced health seeking behaviours, particularly for health services not covered by a government plan (e.g., dental check-ups). “Habitus” refers to Bourdieu’s theory that throughout the life course, there exists a correspondence between social and mental structures, and that the dispositions of individuals are a result of learnt behavior and connections to their place in wider society, “cultures” which are reproduced and often class-dependent. (Lindbladh, 2002; and Singh-Manoux and Marmot, 2005) Both health-enhancing and health-impairing behaviours are learned through the socialization process and mechanisms such as observation. Cockerham’s healthy lifestyle theory posits that “whereas health and other lifestyle choices are voluntary, life chances – which primarily represent class position – either empower or constrain choices, and choices and chances work off each other to determine behavioural outcomes.” (2005, p. 55) Children’s emotional and cognitive development, as well as their general health status, is negatively impacted by environmental exposure to tobacco smoke. (Janus and Duku, 2007)
- **“Future Time Perspective:”** FTP relates to a person’s ability to project a course of action into the future and identify outcomes, a process conditioned by socio-economic context, and/or class. It has been associated with level of educational achievement and the propensity to engage in risky behaviours. (Cockerham, 2005; and Manoux and Marmot, 2005)

- **“The basics” - food and housing quality, security and stability:** Housing deprivation during childhood, particularly overcrowding, has been linked to respiratory illness (due to poor air quality and mold) and infectious diseases (heightened contagion, rodent and insect infestation), while housing insecurity leads to increased stress, and incidence of social exclusion in families. (Bradley and Corwyn, 2002; Bryant, 2003; and Evans, 2004). Households who spend more than 30 percent of their monthly expenditures on housing are likely to lack disposable income for utilities (heat and water), food, educational resources and recreation, nor are they able to conduct necessary upkeep like roofing, or upgrades like insulation (to remove asbestos or to enhance energy efficiency), plumbing (to remove lead pipes) and other structural issues that can affect health. (Dunn et al., 2006) Risk of childhood injuries within the household is higher for families of lower SES because they often lack smoke detectors or fire extinguishers, may not be able to regulate tap water temperature (increasing the risk of scalding), and may have more unprotected stairways and closets. (Evans, 2004) Children often know about a balanced diet and that “good food” keeps them healthy, but poor children may not have access to such foods in the household. School breakfast and snack programs can help level the playing field in terms of nutritional content available to these children, but there must be sensitivity to the stigma that may be attached to such programs, or children’s own feelings of inadequacy in not being able to eat well at home which might cause them undue stress. (Irwin et al., 2006)
- **Social gradients and biological development - resilience versus inter-generational vulnerabilities:** Social gradients perpetuate at the individual level via biological embedding, which in turn can occur over generations at the household level as families exposed to the effects of poverty and/or social disadvantage become less healthy over time. Neighbourhoods with low social cohesion, low rates of educational attainment and high rates

of poverty often do not provide a mediating influence to help individuals and families cope with day-to-day stressors and there

is evidence that when social disadvantage becomes entrenched within a limited number of localities, a disabling social climate can develop that is more than the sum of individual and household disadvantages and the prospect is increased of disadvantage being passed from one generation to the next. (Moore, 2012, p. 6)

Maggi et al. posit that “the social meanings that people attach to their environmental circumstances ultimately affect their health and contribute to the social gradients of health observed in population-health studies.” (2010, p. 632)

- **Neighbourhood/community, including “extended family” and other social networks – cohesion and relational communities:** Stress increases for parents who do not have social support, while evidence suggests that well-supported parents are “less restrictive and punitive with young children.” (Kiernan et al., 2008, p. 123) In a study of associations of neighbourhood poverty with ECD in four and five year old Canadian children, higher verbal ability scores “were significantly associated with [parents’] lower ratings of emotional distress and higher ratings of perceived social support.” (Kohen et al., 2002, p. 1855) The impacts of marital breakups and other major transitions can “be mediated by effective and supportive parenting.” (Janus and Duku, 2007, p. 378) Children growing up in high-risk environments “can be protected by an enduring relationship with a special person outside of their household... [and that] a source of recognition and achievement outside the home, perhaps through an educational or sporting success or involvement in a church or youth group, can lead to improved life chances in adulthood.” (Jack, 2000, p. 708) Higher verbal ability scores were highly associated with higher rating of neighbourhood cohesion, “even after controlling for neighbourhood and family socioeconomic characteristics.” (Kohen et al., 2002, p. 1854) Hertzman and Kohen’s review of Canada’s National Longitudinal Study of Children and

Youth indicated that the level of neighbourhood cohesion (e.g., shared values and strong informal control) “is an important factor over and above maternal emotional distress, social support and poor health.” (2003, p. 4)

- **Social capital versus social exclusion and isolation:** Kawachi et al. (1997b) define social capital as “those features of social organizations – such as networks of secondary associations, high levels of interpersonal trust and norms of mutual aid and reciprocity – which act as resources for individuals and facilitate collective action.” (in Drukker et al., 2003, p. 826) Evans notes that neighbourhood disadvantage “accounts for more than 70% of the variance in informal social control across different urban neighbourhoods in Chicago and about one third of the variance in social integration.” (2004, p. 80) Increased incidence of maternal depression has been associated with mothers, particularly those of single-parent families, who lack “core support” from informal sources such as “close relatives from outside the household, friends, neighbours, and finally, lay or professional helpers.” (Jack, 2000, p. 707) Perceived availability of informal support, even if not accessed, acts as a protective factor against stress and promotes the psycho-social wellbeing associated with social integration. Xue et al. indicate that “neighbourhood collective efficacy and organizational participation were associated with better mental health” with children after accounting for neighbourhood concentrated disadvantage, because these processes are associated with more societal control over problems such as crime and violence, buffering children from exposure. Parents also reported better mental health through participation in neighbourhood organizations. (Xue et al., 2005)
- **Neighbourhood structural characteristics, including crime levels, concentrated disadvantage, immigrant and aboriginal concentration, concentration of single-parent families and/or adolescent parent families, residential stability, demographic makeup,**

access to outdoor recreation, schools, primary care, and childcare: The physical manifestations of neighbourhood disorder, such as abandoned buildings and graffiti, can have a negative effect on the emotional wellbeing of children. (Franzini et al., 2008) Families of low income households in the United States and Great Britain are exposed to more air and sound pollution, including carcinogenic emissions like nitrogen dioxide, carbon monoxide and radon due to their neighbourhood proximity to factories and highways. Designated play spaces for young children are inversely related to social class, as is access to supermarkets, which is linked to healthier dietary intake. (Evans, 2004) In many poor urban neighbourhoods, the “presence of neighbourhood resources, such as libraries, child care, and youth programs, might promote child-wellbeing by providing stimulating and enriching activities.” (Kohen et al., 2002, p. 1844) Increased residential mobility was “associated with an increase in [healthcare] providers seen and reduced primary healthcare visits inferring reduced continuity,” (Jelleyman and Spender, 2008, p. 590) and high rates of moving were associated with increased behavioural problems during childhood, including indirect aggression and property offences. “Social disorganization theory” is used to understand the problem behaviours evidenced in many urban areas, as the structural characteristics of neighbourhoods, “such as poverty, residential instability, single parenthood, and ethnic heterogeneity, are of primary importance because they support or hinder the formation of neighbourhood social organization.” (Kohen et al., 2002, p. 1845) Maggi et al. indicate that “neighbourhood effects are stronger for cognitive and academic indicators than for behavioural and mental health measures.” (2010, p. 632) American research indicates higher levels of school failure for low-income children living in urban centres versus other settings. (Fantuzzo and McWayne, 2002) Hertzman and Kohen’s review of Canada’s National Longitudinal Study of Children and Youth indicated that children’s verbal ability scores were negatively associated with the proportion of poor households led by a single mother and decreased levels of neighbourhood cohesion, while “a high level of neighbourhood cohesion

indirectly improves children's language development through its positive effects on parental emotional distress, social support, and health." (2003, p. 4) In large Canadian cities like Vancouver, Toronto and Montreal, as many as two-thirds of renters cannot afford average rents, and a "significant proportion of lone-parent families, 90 percent of which are led by women, live in poverty." (Bryant et al., 2011, p. 52) An Ontario-based retrospective study found a positive association between neighbourhood affluence and educational attainment, but a "striking difference... in educational attainment of children from rental accommodations (very low) versus children from immigrant parents (very high)," (Boyle et al., 2007, p. 180) suggesting interesting variability between neighbourhood composition and household context. Neighbourhood of residence "is associated with health, achievement, and behavioural outcomes when individual-level income and education are controlled." (Bradley and Corwyn, 2002, p. 388)

- **"Sense of place" and "inside-ness" as constructs that affect children's sense of competence and confidence:** Children's connection to place and their feelings of safety overall will have an impact on their stress levels, and in turn, their life-long health. High degrees of residential transiency can make it difficult for children to establish connections to friends, neighbourhood and a sense of belonging and security. (Irwin et al., 2007; Lim and Calabrese Barton, 2010; and MacDonald-Carlson, 2003) Also, "local" social affiliations, especially between parents with young children, is affected by the number of children within a geographic area and the length of time a family lives there to engage in repetitive social interactions among neighbours. (Boyle et al., 2007)
- **How social and economic structures and agency create and reinforce health inequities or foster resilience:** In Chapter Two, the concepts and manifestations of health inequalities and inequities and their effect on ECD were outlined. The World Health Organization's

Commission on Early Child Development calls for a balanced approach to children's physical, cognitive and linguistic, social and emotional development, and that "in addition to economic circumstance, each component of child development is dependent on the nature of the environments in which children exist." (Marmot, 2007, p. 1157) Smith and Easterlow stress the contextual effects of place on health, and that "differential exposures to risks and unequal access to health-promoting environments underpins the spatial health divide." (2005, p. 174) These contextual effects include non-income dimensions of poverty, the links between social capital and wellbeing, and networks of resources that build or undermine resilience. Raphael et al. critique that few studies on population health consider the inter-relationships between structural issues (e.g., family or housing conditions, access to education and health care, employment status, working conditions, etc.) and health status, and instead focus on individualistic approaches. They propose an income inequality hypothesis within economically advanced countries as a determinant of population health, and that income will be especially important to levels of housing insecurity, food security and ECD. If government "intervenes to provide such basic needs to citizens, income may be less of a determinant of individual and population health." (Raphael et al., 2005, p. 228) This is the case in many northern European countries where more egalitarian and family-friendly policies have led to better population health outcomes, including ECD. (Hertzman, 2006; Marmot, 2007; Prilleltensky et al., 2001; and Raphael et al., 2005) Peoples' lives are shaped by material, psychosocial and political factors, and though "individuals are at the heart of empowerment, achieving a fairer distribution of power requires collective social action – the empowerment of nations, institutions and communities." (Marmot, 2007, p. 1155)

Since Bronfenbrenner, much scientific inquiry has been undertaken to better quantify and qualify the social and environmental factors that impact ECD, though "the literature mostly provides bits and pieces of [this] larger person-process-context-time tableaux." (Bradley

and Corwyn, 2002) Getting a complete picture of this complicated puzzle has proved challenging, for not only are there many pieces, but these factors interplay in place, space and time. Gatrell explicitly links health status to the “locations” we occupy, and views health as “the availability of resources, both personal and societal, that help us achieve our potential” (2002, p. 4), including the “basics” like access to nutritious, affordable food and water, decent housing, rewarding employment, as well as medical diagnostics and treatment. He contends that access is shaped by where an individual lives, works and plays. Smith and Easterlow promote a social model of health and the work of geographers in identifying the spatial dimensions of “the uneven incidence and systematically unequal effects of a wide range of health-damaging political, material and cultural processes.” (2005, p. 176) They point to a false dualism between contextual and compositional determinants of health, and suggest that “health discrimination,” as a product of powerful political decision-making, may provide a better explanation of the inequalities of health than the common view that health selection is rooted in the individual’s composition and behaviours. How social “difference” is made and perpetuated is well articulated in the literature, but “the possibility that people whose health is already compromised might actively be placed into deprivation is rarely entertained.” (Smith and Easterlow, 2005, p. 177) This is especially relevant for children who lack autonomy and the capacity to change their environments. Smith and Easterlow advocate for a contextual as well as compositional approach to deconstructing the health divide.

An attempt to map the compositional factors that affect ECD and the contextual forces that impact the accumulation of advantages or disadvantages in children within their physical and social environments was undertaken, using a child-centric, ecological approach. From the literature review, these factors were compiled into a taxonomy labeled the “Geographies of Early Childhood and Factors that Influence Development.” It builds on Keating’s “Predictors of Social Gradient” (2011), Raphael’s “Social Determinants of Health

Framework” (2009), Shonkoff’s “Biodevelopmental Framework” (2010) and Pati et al.’s “Model of Early Childhood Development leading to Early School Success” (2004), to inventory and outline predictors and resources that affect ECD. This taxonomy introduces geography to the process by placing the child at the centre of its ecology, and then classifying each factor within its appropriate scale, starting with “early life” (the body) and extending out to the “intimate habitat” (the household), the “civic habitat” (neighbourhoods and communities), and the “societal habitat” (the region, state, nation, and global scales).

Shonkoff highlights the difficulty of choosing which variables to include or omit when “designing a specific policy, program, or research project” to address the pathways of ECD. (2010, p. 358) This taxonomy was developed to be as inclusive as possible, compiling the variables used from across the ECD literature. The complexities of data collection associated with this taxonomy would be significant, as some variables are quantitative, while others are qualitative. Some data sets would be readily available through census tracts, while access to other data may be limited due to privacy implications associated with individual health records. Data on complex parameters like “parenting styles” and “family functioning” would require sophisticated qualitative inquiry and analysis. Operationalizing this taxonomy for evaluating optimal ECD may be impractical, but perhaps not impossible.

Though this taxonomy inventories life course development factors that affect ECD and classifies them within an appropriate scale, “each layer of the system is interdependent, and different environments may play more salient roles at various developmental stages.” (Halfon et al., 2010, p. 12) As such, there is merit in developing an inclusive taxonomy classified by scale, to understand better the interaction of factors and the complexity of the environments that impact ECD, rather than a list of compositional effects void of context.

A further step to enhancing the taxonomy would be to collaborate with developmental scientists to layer a timeline of critical developmental stages onto the life course factors and the settings (scales) in which they interplay. This would fulfill Bronfenbrenner's call

Early Life 0-5 (the Body)	Intimate Habitat (the Household - HH)			Civic Habitat (Neighbourhoods)		Societal Habitat (Region, State, Nation, Global)
	Material	Social (Relational)	Habitus	Environment	Resources	
Birth weight	Owner occupied	Education level	Smoking	"Safe-ness" (crime levels)	Grocers	Income distribution schemes
Prematurity	Population density	Marital status/ stability	Alcohol use	Green spaces	Art and recreational amenities	Unemployment insurance schemes
(Dis) Ability	Household income per capita	Parental occupation	Drug use	% HHs in poverty	Licensed daycare or child centres	Poverty reduction schemes
Gender	> 14 employed	Parenting style(s)	Diet	% HHs above or below middle income (class)	Primary healthcare access	Food security schemes
Birth order	Dependency (< 15 & > 64)	Socialization/ Family functioning	Physical fitness	Employment ratio to population	Paediatricians and child psycho-social	Home renovation schemes
Aboriginal status	>20 not graduated high school	Parental mental health	Hobbies, special interests	% of children 13-18 to pop.	Spiritual centres (churches, etc.)	Housing policies
Immigrant Status	% income spent on housing	Maternal attachment	Exposures (asbestos, lead, cold, mold)	% of children 7-12 to pop.	Schools	Maternity/paternity leaves
Ethnicity/ Race	Receiving government transfers	Presence of extended family	Exposure to violence	% of children <7 to pop.	Libraries	Early child care and education programs
Child-parent speech & reading	Dwelling requires major repair	Cultural / community association		% male single parent families	Friends and relatives nearby	Governance for children and youth
Nutrition	Food security issues	"Future Time Perspective"		% female single parent families	Networks and "collectivities"	Public health programs
Play	Residential mobility 1yr	Parental involvement with/in school		Cohesiveness or social exclusion		Connectedness of family services
Immunization & Well Baby records	Health and dental insurance	English as second language		"Social capital"		Type political regime (liberal, socialist, etc.)
Growth rate		Residential mobility 5yr		% Ethnicities/ Races		
EDI scores on 5 domains		Children <18		Residential mobility 5yr		

Table 3.1: Geographies of Early Childhood and the Factors that Influence Development

for a complete taxonomy to assess development in terms of environmentally relevant outcomes, but is out-of-scope for this thesis. The geographies of ECD are important to understanding the interplay of protective effects and/or risk exposures at various scales, especially during critical and sensitive periods of vulnerability, such that identifying and mapping these could provide a “forecast” of possible health issues in the future, and allow for the development of meaningful interventions and informed public policy that support family health. What exactly makes children resilient will be important to “any ecological assessment and may provide important clues to interventions that can help to protect children growing up in high-risk environments.” (Jack, 2000, p. 708)

3.3 Vulnerabilities vs. Resilience: Material, Social and Village Effects on ECD

As demonstrated by the literature, the factors that impact early childhood development (ECD), which operate at different scales, can be viewed as protective effects that build resilience, or risks that heighten vulnerability. By school age, development has been influenced by factors at three levels of society: family, neighbourhood/community/village, and the broader societal level. Socio-economic gradients in health across the life course begin as socio-economic gradients in ECD. Thus, the social environment is a fundamental determinant of ECD and, in turn, ECD is a determinant of health, wellbeing, and learning skills across the balance of the life course. (Maggi, 2010) Janus and Duku call for a comprehensive assessment of a child’s readiness to learn, by “involving the community, incorporating the context, and facilitating interpretation of both positive and negative results with reference to the environment where a child has been reared and where he or she will be educated.” (2007, p. 376) A challenge for geographers is to decipher between material and social effects as they interplay at various scales.

There is indisputable evidence that children raised in families of low socio-economic standing will face multiple challenges and that ECD outcomes will be non-optimal as compared to children of families with more resources. Yet, this is not always a self-fulfilling prophecy, and as Irwin et al. posit, “given similar challenging circumstances or risks to children’s health, why are many children able to develop well, despite adverse circumstances”? (2006, p. 353) Researchers have identified several factors that make children more resilient and moderate the influence of SES and child wellbeing, helping them, and their families, to cope with adversity:

a) personality/dispositional features such as self-esteem, locus of control, self-efficacy, optimism, stress reactivity, humour, active coping strategies, communication skills, cognitive competence, affective responses to others, and predictability; b) family characteristics, such as cohesion, shared values, patience, conflict, consistency of rules, orderliness, and the presence of supportive adults; and c) availability of external support systems. (Bradley and Corwyn, 2002, p. 388)

Many children who come from poor families face a higher risk of developmental vulnerability, as family income and parental education levels have a strong effect on risk. However, consistent parenting styles, safe neighbourhoods that have a strong sense of cohesion, and strong cultural identity can mitigate developmental vulnerability flowing from the effects of poverty. (Morley, 2005, p. 6) Prilleltensky et al. describe “compensatory mechanisms” within the child or its environment that buffer the presence of negative factors, leading to resilience. They cite family cohesion (whereby adults share values and parenting styles) and the availability of mentors as predictors of resilience in children, supportive adults from within or outside the household who can nurture self-esteem and self-efficacy in the child. (2001) A nurturing environment can buffer the negative effects of low family income on a child’s cognitive ability (Brooks-Gunn et al., 2000) and “fostering family environments that are stimulating, supportive and nurturing will benefit all children regardless of geography, ethnicity, language or societal circumstances.” (Maggi et al., p. 631)

Whether or not these “nurturing environments” can be produced (and reproduced) by families themselves at the household level seems to be a pivotal issue, as well as what social supports are available to address gaps, mitigate risks and enhance resilience in young children. As outlined in the literature, household income is only one measure of the complex factors that promote or hinder ECD, and Marmot and Wilkinson suggest that material conditions do not adequately explain health inequalities in rich countries – that “there are psychosocial pathways which act in addition to the direct effects of absolute material living standards,” such as anxiety, insecurity, depression, autonomy, control and social affiliation. (2001, p. 1233) As articulated by Prilleltensky et al., parents cannot solely be blamed for child neglect as they themselves have likely been abused and “subject to deteriorating social conditions due to economic trends that disempower the weak and the vulnerable,” such that seriously emotionally damaged parents “do not facilitate the enactment of protective mechanisms, whereas social services in neglected communities are often far from ideal.” (2001, p. 152)

If health and wellness outcomes are related to power and control as Prilleltensky et al. suggest, parents trying to function within the cycle of inter-generational poverty and their children are at great risk. Socially disadvantaged children often have needs that cross welfare, health and education sectors, and their families, who are faced with “the most challenging social circumstances are [the] least well equipped to navigate fragmented service systems with confusing eligibility requirements, and the places where they live have limited resources to meet their needs.” (Halfon et al., 2010, p. 16) For example, the study of Wuest et al. on the health of single mothers revealed that enforcing child support orders can be very stressful for mothers, particularly when they and their children’s safety and security may be threatened by their former partner. The extent to which the system facilitates enforcing child support payments without added hassle or risk to women and their children “influences the ways families can get basic necessities and how they create a safe and nurturing environment for themselves.” (2002, p.

805) So creating a nurturing environment is not solely limited to the household scale, as “the sources and possibilities for increasing health and wellness are co-determined by interacting factors within the family, community, and societal spheres,” and if power and control derive from “reciprocal determinism,” these are the opportunities that must be developed to increase power and control in families’ lives. (Prilleltensky et al., 2001, p. 155)

It has been determined that “place” matters to ECD. However, unraveling material effects such as poverty from social effects like neighbourhood cohesion has proved challenging, conceptually and methodologically. Sellström and Bremberg (2006) conducted a systematic review of multilevel studies to discern the significance of neighbourhood context to child and adolescent health and wellbeing in high income countries. Risk of low birth weight, child injury and abuse were higher in materially deprived areas. However, on average, ten percent of variation in health outcomes could be explained as neighbourhood effects after controlling for household variables, a conservative estimate that may have been underestimated due to methodological fallacies. Social supports for mothers had a protective effect on birth weight; and informal social control at the neighbourhood level had a positive effect on children’s mental health and behavior.

From a social perspective, “neighbourhoods matter most when other risk factors are present, such as family poverty or mental health problems within families.” (Shonkoff and Phillips, 2000, p. 336) Leventhal and Brooks-Gunn propose three classes of neighbourhood mediators that mitigate the effects of poverty on child wellbeing: “a) institutional resources (e.g., schools, child care facilities, medical facilities, employment opportunities), b) relationships (the characteristics of parents and support networks available to assist parents, and c) norms/collective efficacy.” (in Bradley and Corwyn, 2002, p. 389) Collective efficacy is the degree to which neighbourhood residents monitor the behavior of others, like children and

youth, according to shared social standards (such as respect for property). Indeed “not all poor neighbourhoods were characterized by disordered environments” (Kohen et al., 2002, p. 1853) and “communities perceived to have strong informal and formal social support systems [have been] described as ‘poor but decent place [s] to live.’” (Jack, 2000, p. 712)

With respect to neighbourhood risk factors, there is growing evidence to support that higher concentrations of lone parent families in a given neighbourhood is associated with higher rates of children with behavioural problems. Boyle and Lipman posit that the multiple stressors and demands that single parents face “could weaken their involvement in community life and, in turn, weaken the institutional and social supports available to children in particular neighbourhoods.” (2002, p. 386) Lone parent families are also apt to rent rather than own housing, and move more frequently, so they are typically less invested, financially and socially, in the neighbourhoods where they live, in turn hindering social organization. Interestingly, Boyle and Lipman’s study on behavioural problems of children and between-neighbourhood differences revealed that three quarters of the variation could not be attributed to the socio-economic structural characteristics of the family, suggesting that contextual effects may be at play, opening up the prospect of identifying “neighbourhood process variables that may explain this variation [which may] be amenable to an intervention.” (2002, p. 387)

Hanson et al. suggest that neighbourhoods can “function as moderators of the effects of parental behavior on elementary-school-related child outcomes.” (2011, p. 98) Social capital has been identified as an important construct that can influence individual health, but one that operates at both the household and neighbourhood scales. Terrion describes social capital as operating in three dimensions: *bonding*, which provides families with a sense of belonging, emotional support and solidarity; *bridging*, which are connections outside of the immediate family with people who share similar beliefs, values, life experience and social capital; and

linking, where individuals forge alliances “with sympathetic individuals in positions of power” in order to acquire information, ideas and resources from beyond the immediate network or neighbourhood. (2006, p. 158) Drukker et al. describe five health-related pathways influenced by social capital: more rapid diffusion of health information, social control over deviant behaviours, increased likelihood that healthy behaviours are adopted, “increased access to local services and amenities, and psychosocial processes such as affective support, self-esteem and mutual respect.” (2003, p. 826) They also identify residential stability and home ownership as key factors in fostering social capital and social cohesion, at a minimum to preserve local property values. Residential stability is important to allow time for relationships to establish, as “social capital is developed and maintained by repeated and varied exchanges between relatively equal members of a community, which fosters a collective sense of trust and mutual respect.” (Jack, 2000, p. 709)

Findings suggest that neighbourhood advantage acts as a protective factor for children at both high and low socio-economic risk. (Hertzman and Kohen, 2003, Kohen et al., 2002, and Oliver et al., 2007) Socio-economic diversity can be a powerful indicator of neighbourhood health, as the “presence or absence of affluent, high-income neighbours, rather than poor neighbours,” is associated with better child health outcomes. (Shonkoff and Phillips, 2010, p. 333) Hertzman and Kohen (2003) suggest that the day-to-day contact of parents within a neighbourhood can result in the “transmission of parenting behaviours,” which could help explain why the presence of more affluent (and usually educated) families has a positive influence on the health of children in mixed socio-economic neighbourhoods. Also, the presence of mentors outside of the household can have a positive effect on children’s relational development: making new friends and how they relate to other children, and how they relate to family, teachers and other authority figures. (Terrion, 2006)

Kiernan et al. (2008) conducted a study to evaluate the school readiness of children living in an urban, disadvantaged area in Ireland. They found differences in the pathways between poverty and school readiness based on context variability, suggesting there are potential mediating influences to children's health at the household and neighbourhood scales. These include access to preschool and childcare, and social supports for parents. Similarly, Hanson et al. (2011) conducted a study in the United States to identify neighbourhood community risk influences on preschool children's development and school readiness. They sampled from children coming from low-income households who were identified as at risk of poor school performance. Most of them were enrolled in the Head Start preschool program. Higher maternal education (above high school), and corresponding goals and expectations for their pre-school aged children, was a strong predictor of both academic achievement and social participation. Children's access to print and other literacy related materials was a predictor of academic achievement. Neighbourhood economic hardship had a negative effect on academic achievement, but opportunities for learning and living enrichment, like preschool and parental supports, were identified as warranted, targeted interventions. Reynolds' study of the effectiveness of the Chicago-based Child-Parent Centres supports preschool as a way of providing children from poor households with a "cognitive advantage" and parents with "family support" which has been correlated with increased social competence in disadvantaged children. (2000)

Kohen et al. (2002) examined the association of neighbourhood income, physical and social disorder on the verbal and behavioural competencies of 3,350 Canadian preschoolers. Verbal ability scores were negatively associated with living in poor neighbourhoods with low social cohesion and positively associated with living in places with more affluent residents. Behavioural problem scores were associated with neighbourhoods with low cohesion, high unemployment and fewer affluent residents. Household income was

significantly correlated with neighbourhood unemployment and neighbourhood cohesion.” (Kohen et al., 2002, p. 1850) Providing stimulating and enriching activities via neighbourhood resources such as libraries and child care might promote child wellbeing. Identifying areas where children are at risk of developmental deficiencies enables the deployment of resources and interventions.

An internationally recognized tool for measuring children’s early development and “readiness to learn” upon school entry is the Early Development Instrument (EDI). The EDI measures children’s developmental health at Kindergarten age, prior to entry into Grade One, based on five domains of competence: Physical Health and Wellbeing, Social Competence, Emotional Maturity, Language and Cognitive Development, and Communication Skills and General Knowledge. Oliver et al. (2007) conducted a multilevel analysis of neighbourhood effects to see if they influenced Vancouver kindergarten children’s readiness to learn. They measured ECD outcomes with EDI data against neighbourhood level census data variables. In this study, English as a second language was an important predictor of readiness to learn in all five domains of competence (though it should be noted that 32% of Vancouver’s population is now of Asian descent, an important compositional factor of that city). It was found that “although family-level characteristics carry the most weight in shaping children’s readiness to learn, neighbourhood-level factors are independently associated with early development outcomes, particularly physical health and wellbeing, language and cognitive development, and communications skills and general knowledge.” (Oliver et al., 2007, p. 848) The most important neighbourhood factors were: median household income (on emotional health and maturity and language and cognitive development); the percentage of single-parent families (for all EDI subscales, except communications skills and general knowledge); the percentage of the population that had not moved in five years (for language and cognitive development and

communications skills and general knowledge); and percentage of residents with no high-school certificate (for communication skills and general knowledge).

Lapointe et al. (2007) used hierarchical linear modeling (HLM) to examine the relationship between neighbourhood environment and school readiness for Kindergarten children across the province of British Columbia (BC). Neighbourhood context data was taken from 2001 Canada Census data and compared to EDI data from all of BC's 59 school districts for years 2000 to 2005, resulting in a sample of 53,059 children with an average age of 5.7 years. Of these, 18 percent were identified as English as a second language and seven percent as Aboriginal. The proportion of multiple family households, or "extended families" was a significant neighbourhood predictor of emotional maturity. Income was a strong predictor of physical health and wellbeing at both the household and neighbourhood levels. At the neighbourhood level, the proportion of affluent males and males in management level occupations were positive predictors of emotional maturity. The proportion of females in primary occupations was a negative predictor of physical health and wellbeing. The proportion of residents of Aboriginal status was a significant negative predictor of communication skills and general knowledge, physical health and wellbeing, and social competence. The proportion of residents with a university level education was a significant predictor of physical health and wellbeing and communications skills and general knowledge. Interestingly, these families were also "more likely to be immigrants or first-generation Canadians and less likely to be Canadian citizens." (p. 489) Several emerging themes from the study included the need to "more fully appreciate the difference between social and material deprivation;" (p. 489-90) the protective effects of social capital, extended family and cultural values; how neighbourhood heterogeneity in income can have a positive effect on children's outcomes; and how these forces converge as collective socialization which can promote school readiness in children.

Janus and Duku (2007) conducted a study of over 10,000 children from six diverse communities in Canada, largely from middle-income backgrounds (rather than exclusively disadvantaged populations as typically found in studies to date). They looked at SES, family structure, parent health, child health and involvement in literacy as predictor variables of school readiness as measured by the EDI. Children's sub-optimal health, male gender and coming from a family with low income contributed most strongly to vulnerability to school entry, followed by coming from a broken family, not looking at books and parental smoking. Income was a more powerful contributor to vulnerability than maternal education. The disruption of family structure results in worse outcomes for boys than girls, while family "intactness," especially from birth to age six, is a strong protective factor. Language and communication scores were negatively impacted by elevated numbers of siblings in a family, while this had a positive impact on emotional maturity. Infrequent reading or looking at books by the child was more strongly associated with vulnerability than the lack of frequent reading with parents, so it is crucial that reading materials be accessible to young children. Children's likelihood to be vulnerable increased 1.3 times in households where parents smoked, with negative effects on their physical health and cognitive development. Differences in functional health status of children

alone [was] responsible for a comparable proportion (to racial differences) of the gap between children at school entry in all areas of development and academic testing (about half of a standard deviation), and therefore health status among children with special needs is a more serious issue than currently acknowledged." (Janus and Duku, 2007, p. 395)

One of the most powerful illustrations of neighbourhood effect is the Hertzman et al. (2010) study of EDI results of Canadian five-year olds in British Columbia, which illustrated more than a 16-fold inequality in developmental vulnerability attributable to neighbourhood socio-economic characteristics. Hertzman indicates that the wide range can be attributed to local geography, which "defines unique combinations of factors that support or undermine early

childhood development.” (Hertzman et al., 2010, p. 37) They go on to suggest, however, that “more than half of the neighbourhood variation in vulnerability is not explained by socio-economic context.” (Hertzman et al., 2010, p. 38) This further complicates the debate between the influence of the household on ECD versus the influence of the neighbourhood, and whether neighbourhoods can have a health promoting influence on children who come from deprived households. “While the highest proportions of vulnerability are found in the most deprived neighbourhoods, the [greatest] number of vulnerable children [is] spread throughout middle-class neighbourhoods... [children who] will tend to be less healthy and to experience ongoing developmental challenges” without additional support. (Morley, 2005, p. 6) Though much of the literature focuses on the struggles of children of lower SES neighbourhoods, they are not the only ones at risk. Teasing out whether these children’s vulnerabilities are due to material or social factors, and the interplay between household and neighbourhood effects is of critical importance.

“It takes a whole village to raise a child.” – Igbo and Yoruba (Nigerian) Proverb. Since the 1960s, North American social fabric and the concept of “family” have changed as more women entered the workforce, increasing the need for other forms of child care, and divorce rates rose, leading to more single-parent families or blended families. The effects of globalization have led to greater migration for employment, such that family members are often separated by great distances. The information age and social media have changed the nature of “communities” such that they are no longer necessarily defined as a physical geographic catchment, the traditional concept of “neighbourhood.” Arguably, this has placed significant strain on North American families of all socio-economic statuses, as neo-liberal governments have done little to help families cope with changing economic, social and cultural norms over the past 50 years. “The working-class (and near poor) and often-cohesive neighbourhoods, where families had lived and shared childrearing responsibilities, seemed to be disappearing,

replaced by poorer and less cohesive neighbourhoods in cities on the one hand, and middle-class (and also not particularly cohesive) neighbourhoods in the suburbs on the other hand.” (Kohen et al., 2002, p. 1844) Research continues to demonstrate the importance of cohesive neighbourhoods to family coping and ECD, and how “the effects of social capital on health [help] to improve the quality of life in general and [protect] vulnerable individuals from the negative impact of stressful life events and circumstances.” (Jack, 2000, p. 709)

Outside of North America and its nuclear household model, the extended family and other informal kinship, clan, and friendship relationships play a significant role in the upbringing of children, and provide a robust support network for parents, especially if both work in some capacity. The degree to which these “village effects” can be mimicked, “the collective of weak ties, peripheral partners, consequential strangers who offer advice, bring children to the heights of learning, provide role models for emulation and shape famil[ies]’ experiences,” (Fingerman, 2009, p. 23) may be pivotal to the survival of the modern family. Social support networks and a sense of “hope that they are not alone in managing their stresses” have been proposed as protective factors for families’ coping with adversities and stress. (Terrion, p. 156-7) The Lapointe et al. study of 2007 identified three potential sources of social wealth within the population of British Columbia, namely, stability, culture and heterogeneity. They demonstrated that the dispersal of familial responsibilities across multi-family units of first-generation Canadian families (primarily Asian) created a stable and secure environment for young children, and at the neighbourhood level, clearly demonstrated benefits of the extended family on early childhood development and school readiness. With respect to the developed world, there is a substantive collection of literature around the importance of social networks and social capital that may further contextualize how ECD can be enabled, versus social deprivation and isolation which can have a detrimental effect on families. (Campbell & Murray, 2004; Haflon et al., 2010; Hertzman, 2010; Moore 2012; and Shaw et al, 2001)

Though income inequalities are greatly influenced by contextual forces like social and economic policy, most are rising in developed nations. So addressing them through social welfare income redistribution may be impossible and perhaps ineffective, given the pervasive inter-generational nature of poverty and associated social determinants of health. (Coburn, 2004; Keating, 2011; Lapointe et al., 2007; Raphael 2005 and 2009; Shaw et al., 2001 and Victora, 2003) Thus, the “distinction between material and social wealth becomes central [whereby] the redistribution of social wealth is an approachable goal.” (Lapointe et al., 2007, p. 490) There is a need to “more fully appreciate the difference between social and material deprivation” as there are “several significant neighbourhood predictor variables focused on barriers to the collective socialization process.” (Lapointe et al., 2007, p. 489-490) Marmot and Wilkinson call for added urgency given that “psychosocial factors, unlike many of the direct effects of material factors, exacerbate other social problems, including levels of violence and the gradient in educational performance.” (2001, p. 1235) If social wealth (e.g., social capital, neighbourhood cohesion, village effects) can have a mediating effect on material deprivation or other risk factors associated with the household, leading to positive outcomes for ECD, then it stands to reason that “once disentangled, methods for making these social benefits accessible to higher risk populations should become the focus” of policy and public health programming and interventions. (Lapointe et al, 2007, p. 490)

The following chapter outlines the results of an exploratory cross-sectional study undertaken to investigate the effects of social determinants of health on ECD in the Kingston, Frontenac, Lennox & Addington (KFL&A) public health planning areas and catchment region. The study examines material deprivation, social deprivation and combined factors against 2006 Early Development Instrument (EDI) scores, to see if there is evidence of social determinants, or village effects, having a mediating influence on material deprivation, and in which areas of early developmental competence.

Chapter IV:

A Comparative Quantitative Analysis of the Effects of Material Deprivation, Social Deprivation and Combined Factors on Early Childhood Development in the KFL&A Catchment Area

“The pupil can only educate himself. Teachers are the custodians of apparatus upon which he himself must turn and twist to acquire the excellencies that distinguish the better from the poorer of God's vessels.” – Martin H. Fischer, Physician and Author

Early childhood development (ECD) is foundational to adult health and wellness. If the five percent of Canadian children born with clinically detectable developmental disabilities grows to over 25 percent by school age, it behooves researchers to recognize how children's environments lead to these developmental deficits. This exploratory study is grounded by a

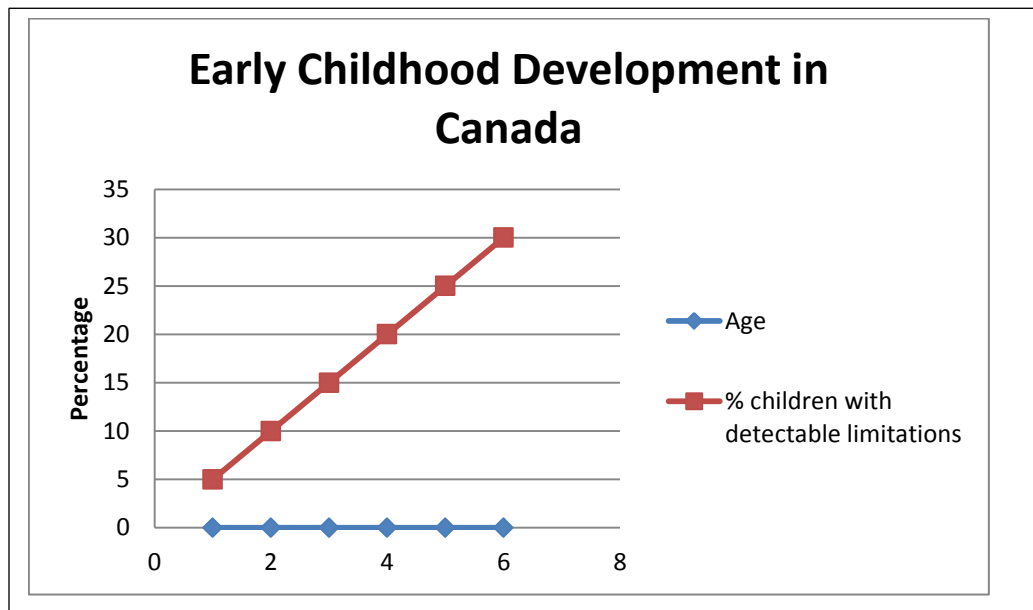


Figure 4.1: Percentage of Canadian Children with Clinically Detectable Developmental Limitations (Hertzman, 2010)

Neo-materialist perspective (Raphael et al., 2005) to demonstrate that ECD is not only affected by material deprivation, but also by social deprivation, the product of deeper structural and horizontal influences at the community level and the state. Cummins et al. suggest that there

exists a “mutually reinforcing and reciprocal relationship between people and place,” (2007, p. 1825) arguing for a relational view of context and space to understand better how place affects the health of individuals and populations over the life-course. They emphasize nodes and networks, area definitions that are dynamic, with characteristics such as declining or advancing instead of deprived or affluent, imbued with social power relations and cultural meaning. These are characteristics filled with subtleties, difficult to quantify, as “child development is likely influenced by processes occurring at a variety of overlapping contexts such as school district, community, neighbourhood, city, health region and province.” (Oliver et al., 2007, p. 865) For the purpose of this thesis, the mediating effects of social determinants at the neighbourhood level are termed “village effects” – when the influence of neighbourhoods and/or community can have a health promoting and protective influence on children who come from deprived households. Recognizing the importance of these characteristics, this thesis attempts to collapse the false dualism between composition and context, (McIntyre et al., 2002) by first unpacking the effects of material deprivation, typically ascribed to the household; social deprivation, often associated with the neighbourhood and/or community; and re-combined them to appreciate their cumulative effect on ECD.

The determinants of health relevant to the domains of ECD as demonstrated in previous empirical study findings are highlighted in Table 4.1 to provide contextual background for the study on the effects of material and social deprivation in the Kingston, Frontenac, Lennox & Addington (KFL&A) public health catchment area. In the table, social determinants of health (SDH) are classified as follows: protective effects or risks; by type – material, social or structural effects; and by scale – at the household (HH), neighbourhood (NH) and/or other scale. Details about the studies can be found in chapter three.

EDI Domain: Physical Health & Wellbeing				
Protective Effects	Risks	Type	Scale	Source
Normal birth weight	Low birth weight	Material & Social	HH & NH	Sellstrom & Bremburg, 2006
Safety practices	Risk of injury	Material	HH & NH	Sellstrom & Bremburg, 2006
Maternal education above high school	Maternal education at or below high school	Material & Social	HH	Hanson et al., 2011; Lapointe et al., 2007
Affluence (HH income)	Poverty (HH income)	Material	HH & NH	Janus & Duku, 2007; Lapointe et al., 2007
Parent(s) non-smokers	Parent(s) smokers	Social	HH	Janus & Duku, 2007
Intact family	Single parent	Material & Social	HH & NH	Oliver et al., 2007
EDI Domain: Language & Cognitive Development				
Protective Effects	Risks	Type	Scale	Source
Reading and social exchanges	Lack of books, conversation	Social	HH	Bradley and Corwyn, 2002
Maternal education above high school	Maternal ed. at or below high school	Material & Social	HH	Hanson et al., 2011; Kohen et al., 2002
Intact family	Single parent	Material & Social	HH & NH	Oliver et al., 2007
Low household pop. density	High household pop. density	Material & Social	HH	Janus & Duku, 2007; Kohen et al., 2002
Affluence (HH income)	Poverty (HH income)	Material & Social	HH & NH	Kohen et al., 2002; Oliver et al., 2007
High cohesion	Low cohesion	Social	NH	Kohen et al., 2002
Residential stability (no moves in 5 yrs)	Residential instability	Social	NH	Oliver et al., 2007
EDI Domain: Communication Skills & General Knowledge				
Protective Effects	Risks	Type	Scale	Source
Parents with interactive work (e.g. manager)	Parents with non-interactive work (e.g., factory)	Social	HH	Bradley and Corwyn, 2002; Lapointe et al., 2007
Attending preschool	Informal or no child care	Social & Structural	NH & State	Kiernan et al., 2008; Reynolds, 2000
Married parents	Divorced or separated parents	Social	HH	Kiernan et al., 2008
Maternal education above high school	Maternal ed. at or below high school	M & So	HH	Hanson et al., 2011; Lapointe et al., 2007; Oliver et al., 2007
Residential stability (no moves in 5 yrs)	Residential instability	Social	NH	Lapointe et al., 2007; Oliver et al., 2007

EDI Domain: Social Knowledge & Competence				
Protective Effects	Risks	Type	Scale	Source
Healthy parents (non-smokers)	Unhealthy parents (smokers)	Material	HH	Janus & Duku, 2007; Kiernan et al., 2008
Positive parenting	Negative parenting	Social	HH	Kiernan et al., 2008
Intact family	Single parent	Social	HH & NH	Boyle & Lipman, 2002; Janus & Duku, 2007; Oliver et al., 2007; Sellstrom and Bremburg, 2006
High informal social control	Low informal social control	Social	NH	Boyle & Lipman, 2002; Sellstrom and Bremburg, 2006
High cohesion	Low cohesion	Social	NH	Kohen et al., 2002
Affluence (HH income)	Poverty (HH income)	Material & Social	HH & NH	Boyle & Lipman, 2002; Kohen et al., 2002
Low unemployment	High unemployment	Material & Social	HH & NH	Kohen et al., 2002
Maternal education above high school	Maternal education at or below high school	Material & Social	HH	Hanson et al., 2011; Janus & Duku, 2007
EDI Domain: Emotional Health & Maturity				
Protective Effects	Risks	Type	Scale	Source
Healthy parents	Unhealthy parents	Material	HH	Kiernan et al., 2008
Positive parenting	Negative parenting	Social	HH	Kiernan et al., 2008
Intact family	Single parent	Material & Social	HH & NH	Boyle & Lipman, 2002; Kohen et al., 2002; Oliver et al., 2007; Sellstrom and Bremburg, 2006
Extended family	Nuclear family	Social	HH & NH	Lapointe et al., 2007
Affluence (HH income)	Poverty (HH income)	Material & Social	HH & NH	Boyle & Lipman, 2002; Janus & Duku, 2007; Lapointe et al.; Oliver et al., 2007
Maternal education above high school	Maternal ed. at or below high school	Material & Social	HH	Hanson et al., 2011
More siblings	Fewer siblings	Material & Social	HH	Boyle & Lipman, 2002; Janus & Duku, 2007

Table 4.1: Determinants of Health Relevant to the Domains of Early Childhood Development

4.1 Hypothesis

The goal of this thesis is to use an ecological approach to unravel the pathways of early childhood development (ECD) and identify the resources required to support and optimize children's socialization and readiness to learn upon school entry. Specifically, this investigation strives to understand better the effects of social determinants of health on ECD – material and social deprivation – and whether social determinants can mitigate the effects of material deprivation. It is hypothesized that by collapsing the dualism between composition and context in ECD by first unpacking the effects of material deprivation, typically ascribed to the household; social deprivation, typically ascribed to the neighbourhood; and re-combining them, a more specific differentiation of their effect on children's readiness to learn can be achieved.

A specific exploratory study was undertaken to investigate the effects of material deprivation, social deprivation and combined factors on ECD in the KFL&A Public Health catchment area to determine if there is evidence of village effects – whether the influence of social determinants at the neighbourhood scale can have a health promoting and protective influence on children when other risk factors are present within the household. Thesis questions are as follows:

- Are the five domains of ECD influenced differently by material and social determinants of health?
- What household (family-level) characteristics carry the most weight in shaping children's socialization and readiness to learn? How do these compare to other studies of ECD?
- Are there neighbourhood factors that are independently associated with early development outcomes? How do these compare to other studies of ECD?
- Can village effects mitigate the effects of material deprivation?

4.2 Methodology

A cross-sectional study was conducted to investigate the effects of material deprivation, social deprivation and combined factors on ECD in the KFL&A Public Health catchment area. The effects of SDH, as measured by 2006 Census Canada data, were correlated to ECD in the KFL&A catchment area using the 2006 Early Development Instrument (EDI) scores as outcome measures for the region's most developmentally vulnerable children. "The EDI reflects developmental outcomes and milestones children should be able to achieve under optimal circumstances in physical and socio-emotional health as well as their cognitive development." (Janus and Duku, 2007, p. 381) The EDI has been used since 1999 by teachers in select communities across Ontario, British Columbia, Manitoba, Saskatchewan and New Brunswick, and serves as a robust tool for assessing children's developmental health in the Canadian context. It measures children's developmental health prior to Grade One based on five domains of competence: physical health and wellbeing, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge. The EDI average scores for each developmental area are divided into four categories based on children's readiness for school: *very ready* (representing the highest scores), *ready*, *at risk*, and *vulnerable* (representing the lowest scores at 10% and below). This study includes only those children deemed vulnerable, that is the percentage of those children who scored low on at least one domain out of a sample of 1,574 children about to enter Grade One. The strength of the EDI is that it includes a wide range of domains.

For most behaviour and health issues, children with diagnosable conditions represent about 3 to 5 % of the population. The EDI's mandate is to identify areas of weakness in groups of children, not to diagnose a serious problem. Therefore a margin of the 10th percentile was chosen as close enough to capture children who were struggling, but not only those who were doing so visibly as to have already been identified. (Janus and Duku, 2007, p. 385)

The importance of SDH in population health research has led to the development of several deprivation indices, tools to help identify areas of material and social deprivation. SDH that impact ECD in this study are classified as material deprivation, social deprivation and combined factors, as defined by the Pampalon Deprivation Index (Pampalon et al., 2009), and the Ontario Marginalization Index, or ONMarg.⁹ SDH data that are common to

Pampalon Deprivation Index (Q1 to 5 with 5 being the most deprived)	ON-Marg applies to areas, not individual people. Scores for each dimension are available for every census tract and dissemination area in Ontario, except where data are suppressed, in quintiles (Q1 to 5 with 5 being the most deprived)			
Material Deprivation	Residential Instability	Material Deprivation	Dependency	Ethnic Concentration
% Education (not graduated high school)	Living alone	Aged 20+ who did not graduate high school	Seniors >64	Recent immigrants (5 yrs)
Employment ratio (to population)	Youth (< 17) <i>reverse coded</i>	Lone parent family	Dependency ratio (age 0-14 and 65+/ age 15-64)	Self-identified as a visible minority
Income (reference value income)	Population density: persons per dwelling <i>reverse coded</i>	Receiving government transfers	Aged >14 participating in the labour force <i>reverse coded</i>	
Social Deprivation	Apartment building	Aged > 15 unemployed		
Family Structure (% single-parent families)	Married or single/divorced/widowed <i>Married reverse coded</i>	Low income (based on Stats Can's LICO: Low Income Cut-off)		
Persons living alone (%)	Home owned or not (Owner-occupied house <i>reverse coded</i>)	Living in a dwelling that requires major repair		
Marital Status	Residential mobility (past 5 yrs)			

Table 4.2: Social Determinants of Health in the Deprivation Indices – Pampalon and ONMarg

⁹ The *Ontario Marginalization Index* (ON-Marg) is a census- and geographically-based index that can be used for planning and needs assessment, resource allocation, monitoring of inequities and research. Sourced July 2012 from <http://www.crunch.mcmaster.ca/ontario-marginalization-index>.

both indices are matched by colour code: “employment” in green; “income” in pink; “educational attainment” in orange; “marital status” in blue and similarly, “family structure” in turquoise; and “persons living alone” in yellow (which is not relevant to the study of children). As per the following table, material deprivation is associated with Pampalon’s *Material Deprivation Index* and the ONMarg dimension of *Material Deprivation*. Social deprivation is associated with Pampalon’s *Social Deprivation Index* and the ONMarg dimension of *Residential Instability*. The ONMarg dimension of *Ethnic Concentration* will be studied as an independent variable, based on the protective village effects discovered in the Lapointe et al. 2007 study. The ONMarg dimension of *Dependency* will also be studied as an independent variable, given little equivalent Pampalon data.

The basic spatial unit of analysis is the neighbourhood level as defined by each of the 314 Canada Census Dissemination Areas (DAs) of the KFL&A Public Health planning area using 2006 Canada Census data. Principal Component Analysis (Carstairs, 1981; Charlton et al., 2010; Cummins et al., 2005; and Luginaah et al., 2001) is the foundation for the dimensions of the PDI and the ONMarg. For each indicator, a factor score is produced, representing the value of the component for each DA. DAs are then ranked according to their factor score, from the most (Q1) to the least (Q5) privileged and divided into quintiles based on the population of all of the DAs. In theory, each quintile represents about 20 percent of the DA’s population.

The Pampalon Index values are calibrated by Pampalon et al. and redistributed by the Canadian Institute for Health Information in the form of published tables for each CMA in Canada. These are open-access. The ONMarg Index values come from the Centre for Research on Inner City Health in the form of published tables for each CMA in Ontario and are open-access. In KFL&A, the EDI data are managed by the Limestone Advisory for Child

Care Programs which provided the data in an aggregate form (see below for more details and Appendix B for permission to use the data in this thesis in the form in which it is presented).

The original study methodology called for cross-tabulation and comparison of EDI scores for each of the catchment area's 314 DAs in order to cross-tabulate EDI competency data at the neighbourhood level. DA level data are used to reduce the incidence of *ecological fallacy*¹⁰ that would be present if data were used at the planning sub-unit level (comprising 17 areas with considerable intra-unit variance). Also, a numerator of only 17 lacks statistical power. However, due to issues of privacy associated with small sample sizes in certain DAs, the EDI data were not released at the DA level. Rather, 2006 Canada Census data for the Pampalon and ONMarg indices were compiled by postal codes and single-linked to each DA. These data were then given to the Limestone Advisory for Child Care Programs to match EDI scores by postal code with the data generated for the five quintiles of deprivation.

The Pampalon and ONMarg data were maintained as separate data sets. Excel files with separate cross tabulations were generated for each of the deprivation index dimensions (Pampalon material deprivation, social deprivation and combined; and ONMarg material deprivation, residential instability, dependency, ethnic concentration, and combined). Cross tabulations were generated for each of the five quintiles with the lowest 10th percentiles of each of the EDI five domains of competence, as well as scores for "low on at least one domain." Pearson Chi-square tests were conducted with the number of valid cases against the expected frequencies (likelihood ratio) to ensure validity of association

¹⁰ *Ecological fallacy* is a geographic and epidemiological concept that refers to a logical fallacy inherent in making causal inferences from group data to individual characteristics, behaviours, and situations. (Schwartz, 1994)

between the area of developmental vulnerability and the area of deprivation (material, social, or combined). When the EDI data were matched to the Pampalon and ONMarg data by postal code, some data had to be removed as null or lacking a postal code. As such, the quintiles do not represent a perfect 20 percent of the sample population, but are statistically relevant as representing 80 percent or more of the population by quintile.

By aggregating the social determinants of health into quintiles, privacy requirements for EDI data were met, though it was no longer possible to map the EDI data by neighbourhood. This was deemed a reasonable trade off to allow for a statistically robust study of the effects of material, social and combined deprivation on ECD in the KFL&A public health catchment area. A map of the Pampalon and ONMarg deprivation data is provided in Appendix C to illustrate the usefulness of these tools in exploring levels of deprivation at the neighbourhood level. Ideally, EDI scores would have been mapped at the neighbourhood level as well, to identify areas at risk of developmental vulnerability and explore relationships between ECD and deprivation, but this was not possible given the aggregated nature of the EDI data.

EDI scores act as outcome measures of predictor variables of children's readiness to learn. Based on much of the ECD literature and the social gradient of health theory, the assumption is that EDI scores will be directly correlated to both material and social deprivation, such that the highest deprivation quintiles (Q4 and 5) would see the highest percentages of the most developmentally vulnerable children within them, and Q1 and Q2 the lowest. EDI scores cannot be averaged across quintiles as they are the outcome measures relevant only to the sample of children within each quintile. For analytical purposes, a reference score is calculated based on the range between the lowest and highest quintile value for each EDI dimension of competency, then divided by 2. In the

discussion of the results, each table contains a column labeled *reference value* and comparison is made between the reference values and the quintile values for each EDI dimension of competency.

In examining the data, variations in percentages of vulnerability based on quintile that do not follow an ascending pattern from Q1 to Q5 were of particular interest, as they suggest increased risk factors or protective effects at work. Once these were identified, of interest was the type of deprivation as defined by SDH indicators (social and/or material deprivation), suggesting the nature of said increased risk factors or protective effects. Finally, the scale in which these social determinants of health occurred (the household or the neighbourhood) was of interest, to determine how household and neighbourhood effects influence children's early development.

4.3 Study Results

This section will address whether the five domains of ECD as defined by EDI scores (outcomes) are influenced differently by material and social determinants of health (as risk or protective factors). Study results are presented as the effects of material deprivation on ECD, the effects of social deprivation, other ONMarg data which does not have equivalent Pampalon data sets (i.e., dependency and ethnic concentration) and combined effects of social and material deprivation on ECD. Percentages of vulnerability based on EDI results that do not follow an ascending pattern from Q1 to Q5 are highlighted as having practical significance (Oleckno, 2002, P. 154) – protective factors in green, and additional risk factors in yellow – as are differentials of five percent or more above the reference value, representing a significant area of risk or protection for that particular quintile.

4.3.1 The Effects of Material Deprivation on Early Childhood Development

The Pampalon Material Deprivation index is based on 2006 Census data on education (percentage not graduated from high school), employment ratio to population, and mean income. The ONMarg Material Deprivation Index includes 2006 Census data on persons over 20 years of age not graduated from high school, persons over 15 years of age not employed, lone parent families, receiving government transfers, low income household (based on LICO), and living in a dwelling that requires major repair.

Pampalon's Material Deprivation									
% of children in 10th Percentile (Vulnerable)	Reference value	Q1	Q2	Q3	Q4	Q5	Valid Cases n=	Pearson Chi2	Likelihood Ratio
Physical Health & Wellbeing	13.2%	7.4%	9.7%	10.0%	12.7%	19.0%	1572	24.622	23.451
Social K. & Competence	9.1%	5.7%	10.2%	5.9%	11.9%	12.5%	1574	13.661	14.334
Emotional Health & Maturity	12.7%	12.3%	8.6%	9.2%	9.9%	16.7%	1548	21.043	22.447
Language & Cognitive Dev.	8.8%	6.1%	9.5%	10.0%	10.2%	11.6%	1574	5.089	5.466
Comm. Skills & General K.	9.3%	4.8%	10.0%	9.2%	12.3%	13.7%	1573	14.196	15.338
Low in One or More Domains	26.5%	20.0%	22.9%	23.8%	28.8%	33.0%	1574	20.145	20.053

Figure 4.2: Data Summary – EDI Scores in Pampalon's 5 Quintiles of Material Deprivation

ONMarg's Material Deprivation									
% of children in 10th Percentile (Vulnerable)	Reference value	Q1	Q2	Q3	Q4	Q5	Valid Cases n=	Pearson Chi2	Likelihood Ratio
Physical Health & Wellbeing	12.8%	5.8%	9.7%	10.9%	12.7%	19.7%	1572	37.103	35.807
Social K. & Competence	9.6%	6.2%	8.5%	6.9%	12.4%	12.9%	1572	14.169	14.268
Emotional Health & Maturity	11.5%	8.4%	10.7%	9.3%	11.0%	14.6%	1546	7.763	7.748
Language & Cognitive Dev.	9.5%	6.2%	10.0%	7.3%	12.8%	12.4%	1573	12.130	12.628
Comm. Skills & General K.	10.3%	5.5%	10.3%	8.1%	11.2%	15.0%	1572	18.104	18.657
Low in One or More Domains	26.6%	18.5%	24.2%	20.5%	28.3%	34.7%	1574	29.621	29.321

Figure 4.3: Data Summary – EDI Scores in ONMarg's 5 Quintiles of Material Deprivation

4.3.1 a) Physical Health & Wellbeing

With respect to the effects of material deprivation on children's physical health and wellbeing, according to the Pampalon Index (see Figure 4.2), the percentage of

children with developmental vulnerability rose steadily from 7.4 percent in Q1 to 19.0 percent in Q5, with little variation between Q2 and Q4. Vulnerability rose sharply in Q5. These findings are further supported by the ONMarg material deprivation data (see Figure 4.3), where the percentage of children with developmental vulnerability in physical health and wellbeing rose steadily from 5.8 percent in Q1 to 19.7 percent in Q5, with almost identical variation between Q2, Q3 and Q4 when compared to the Pampalon data. Vulnerability rose sharply in Q5. With the steepest of gradients between Q1 and Q5 of the five domains of competence, and a reference value of 13.2 percent, physical health and wellbeing represents the most significant area of developmental vulnerability associated with material deprivation.

4.3.1 b) Social Knowledge & Competence

With respect to the effects of material deprivation on children's social knowledge and competence, the percentage of vulnerable children did not follow a gradient and was variable between quintiles. According to the Pampalon Index (Figure 4.2), Q2 showed higher vulnerability than Q3. Meanwhile, protective factors seem at work in Q3 at 3.2 percent less vulnerable than the reference value. These findings are supported by the ONMarg data (Figure 4.3), where vulnerability is higher in Q2 than Q3, and Q3 scores are almost three percent lower than the reference value. Vulnerability in Q5 was just over three percent above the reference value in both indices. Based on the reference value, 9.3 percent of the KFL&A child population is vulnerable to developmental issues associated with material deprivation in the domain of social knowledge and competence.

4.3.1 c) Emotional Health & Maturity

With respect to the effects of material deprivation on children's emotional health and maturity, the percentage of vulnerable children did not follow a gradient and was variable between quintiles. The Pampalon data (Figure 4.2) indicates that children in Q1 were less emotionally healthy and mature than children in Q2, Q3, and Q4, scoring only 0.4 percent below the reference value. Q5 scored four percent over the reference value. In the ONMarg data (Figure 4.3), Q2 showed higher vulnerability than Q3. Q5 scored three percent over the reference value. Based on the reference value, 12 percent of the KFL&A child population is vulnerable to developmental issues associated with material deprivation in the domain of emotional health and maturity, representing the second most significant area of vulnerability.

4.3.1 d) Language and Cognitive Development

With respect to the effects of material deprivation on children's language and cognitive development, the Pampalon data (Figure 4.2) indicates a soft but consistent gradient from Q2 to Q5 with little variability. The ONMarg data (Figure 4.3) suggests children in Q3 are protected in this area of competency while Q2 is at risk. Based on the reference value, 9.2 percent of the KFL&A child population is vulnerable to developmental issues associated with material deprivation in the domain of language and cognitive development.

4.3.1 e) Communication Skills and General Knowledge

With respect to the effects of material deprivation on children's communication skills and general knowledge, the percentage of vulnerable children did not follow a

gradient and was variable between quintiles in both the Pampalon (Figure 4.2) and ONMarg data (Figure 4.3). Q1 emerged with strong competencies, almost five percent above the reference value. Q3 exhibited slightly higher competency than Q2, suggesting a mild protective factor(s) for Q3 and a risk factor(s) to Q2. Based on the reference value, 9.8 percent of the KFL&A child population is vulnerable to developmental health issues associated with material deprivation in the domain of communication skills and general knowledge.

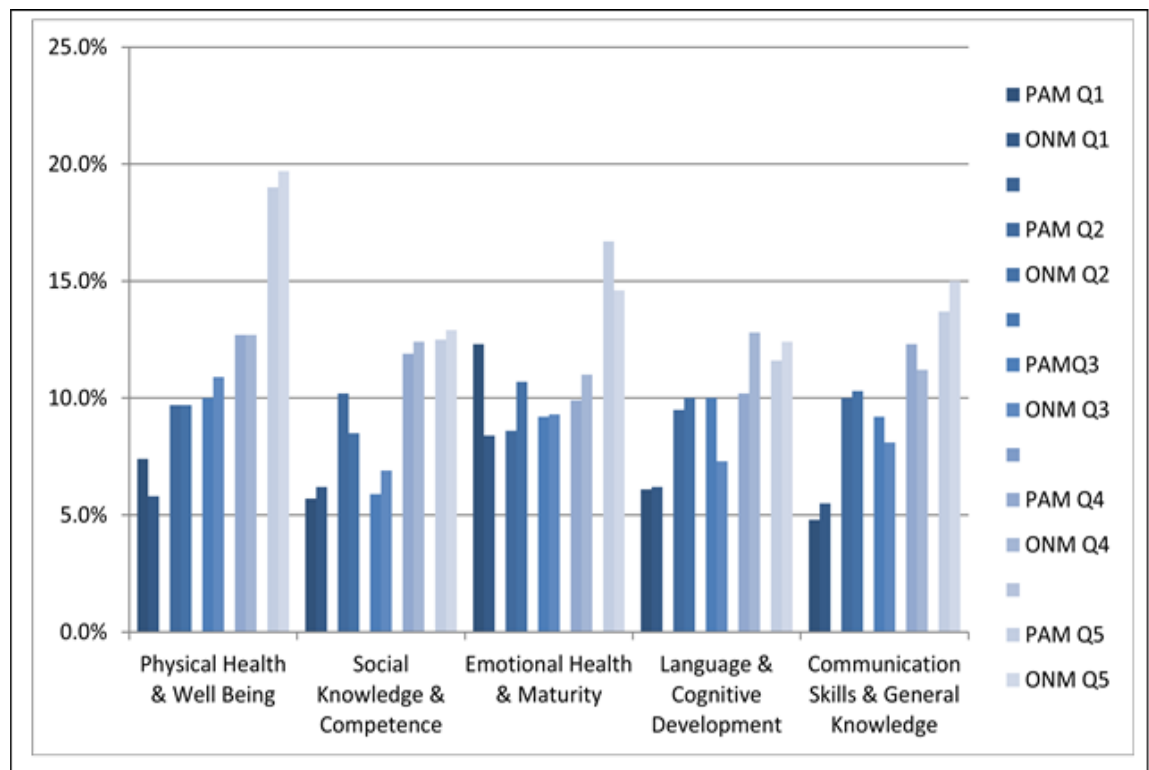


Figure 4.4: EDI Scores of All Children Studied in Pampalon and ONMarg's 5 Quintiles of Material Deprivation

4.3.1 f) EDI Low in One or More Domains:

With respect to the effects of material deprivation, the percentage of vulnerable children with EDI scores low in one or more domains (see Figure 4.4) did not follow a gradient and was variable across quintiles in both indices. Based on a reference

value of 26.5 percent, one in four children entering Grade One in the KFL&A catchment area are vulnerable to multiple developmental issues associated with material deprivation, especially in Q5. Q3 exhibited protective qualities. These effects will be examined in greater detail in the discussion section that follows.

4.3.2 The Effects of Social Deprivation on Early Childhood Development

Pampalon’s Social Deprivation index includes 2006 Census data on marital status, persons living alone, and family structure (percentage of single-parent families). ONMarg’s Residential Instability index includes 2006 Census data on marital status, persons living alone, population density, number of children under 18, home ownership, living in an apartment building, and whether the family has moved within the past 5 years. The two indices do not match well in the category of social deprivation generally.

P-Soc: Pampalon's Social Deprivation									
% of children in 10th Percentile (Vulnerable)	Referen- ce value	Q1	Q2	Q3	Q4	Q5	Valid Cases n=	Pear- son Chi2	Likli- hood Ratio
Physical Health & Wellbeing	13.7%	6.5%	9.2%	12.2%	13.8%	20.8%	1572	29.591	28.621
Social K. & Competence	10.4%	8.4%	10.8%	5.9%	8.3%	14.8%	1574	14.319	13.858
Emotional Health & Maturity	11.4%	8.4%	12.3%	11.3%	10.4%	14.3%	1548	11.800	14.312
Language & Cognitive Dev.	10.4%	6.8%	10.6%	8.3%	8.7%	13.9%	1574	8.685	8.418
Comm. Skills & General K.	12.4%	8.4%	8.2%	8.3%	11.6%	16.5%	1573	15.696	14.427
Low in One or More Domains	28.5%	19.4%	24.3%	24.0%	26.4%	37.6%	1574	27.346	26.485

Figure 4.5: Data Summary – EDI Scores in Pampalon's 5 Quintiles of Social Deprivation

O-RI: ONMarg's Residential Instability									
% of children in 10th Percentile (Vulnerable)	Referen- ce value	Q1	Q2	Q3	Q4	Q5	Valid Cases n=	Pear- son Chi2	Likli- hood Ratio
Physical Health & Wellbeing	13.1%	8.3%	8.2%	14.0%	13.3%	17.9%	1572	22.432	21.363
Social K. & Competence	10.8%	10.8%	5.8%	7.8%	7.7%	15.7%	1572	18.344	17.529
Emotional Health & Maturity	10.9%	12.3%	9.9%	8.2%	10.4%	13.5%	1546	4.798	5.053
Language & Cognitive Dev.	11.3%	8.3%	7.2%	12.1%	8.0%	15.3%	1573	14.249	13.496
Comm. Skills & General K.	9.1%	8.6%	4.1%	13.2%	12.1%	14.0%	1572	21.097	23.733
Low in One or More Domains	27.1%	23.0%	18.4%	28.3%	24.9%	35.8%	1574	24.148	23.720

Figure 4.6: Data Summary – EDI Scores in ONMarg's 5 Quintiles of Residential Instability

4.3.2 a) Physical Health & Wellbeing

With respect to the effects of social deprivation on children's physical health and wellbeing, the percentage of vulnerable children in the Pampalon data (see Figure 4.5) rose steadily from 6.5 percent in Q1 to 20.8 percent in Q5. Vulnerability rose sharply in Q5, seven percent from the reference value. Q1 emerged with strong competencies, a full seven percent above the reference value. In the ONMarg residential instability data (see Figure 4.6), the percentage of children vulnerable to developmental challenges in the domain of physical health and wellbeing rose from 8.3 percent in Q1 to 17.9 percent in Q5, but did not follow a gradient and there is variability amongst the quintiles. Once again, vulnerability rose sharply in Q5, almost five percent above the reference value. Q3 exhibited slightly higher vulnerability than Q4, suggesting residential instability acted as a stronger risk factor for Q3 and there were protective factors at work in Q4 which scored at the reference value in both indices. With the overall steepest gradient between Q1 and Q5 of all five developmental domains of competence, and based on the reference value, 13.4 percent of the KFL&A child population is vulnerable to issues within the domain of physical health and wellbeing associated with social deprivation and residential instability, representing the most significant area of vulnerability within the EDI scores for Q3, Q4 and Q5.

4.3.2 b) Social Knowledge & Competence

With respect to the effects of social deprivation (Figure 4.5) and residential instability (Figure 4.6) on children's social knowledge and competence, the percentage of vulnerable children did not follow a gradient and was variable between quintiles. Interestingly, Q1 scored at the reference value while Q3 and Q4 scored below,

indicating that social deprivation and residential instability acts as a significant risk factor for Q1 and Q5, but there are protective influences within the Q3 and Q4 groups. Q2 was negatively impacted by social deprivation, but was protected by residential stability. Based on the reference value, 10.6 percent of the KFL&A child population is vulnerable to issues within the domain of social knowledge and competence associated with social deprivation and residential instability.

4.3.2 c) Emotional Health & Maturity

With respect to the effects of social deprivation (Figure 4.5) and residential instability (Figure 4.6) on children's emotional health and maturity, the percentage of vulnerable children did not follow a gradient and was variable between quintiles. Q2 was negatively impacted by social deprivation and Q1 was negatively impacted by residential instability. Protective factors were at work in both the Q3 and Q4 groups. Based on the reference value, 11.2 percent of the KFL&A child population was vulnerable to developmental issues within the domain of emotional health and maturity associated with social deprivation and residential instability, representing the second most significant area of vulnerability.

4.3.2 d) Language and Cognitive Development

With respect to the effects of social deprivation (Figure 4.5) and residential instability (Figure 4.6) on children's language and cognitive development, the percentage of vulnerable children did not follow a gradient and was variable between quintiles. Q2 was negatively impacted by social deprivation. Q3 was negatively impacted by residential instability. Q4 was protected by residential stability. Both Q3 and Q4

showed protective effects related to social determinants. Based on the reference value, 10.9 percent of the KFL&A child population was vulnerable to developmental health issues within the domain of language and cognitive development associated with social deprivation and residential instability, representing the third most significant area of vulnerability.

4.3.2 e) Communication Skills and General Knowledge

With respect to the effects of social deprivation (Figure 4.5) and residential instability (Figure 4.6) on children's communication skills and general knowledge, the percentage of vulnerable children did not follow a gradient and was variable between quintiles. Residential stability had a significant protective effect on the Q2 group (five percent below the reference value). There appeared to be protective effects from social determinants in Q3 and Q4. Based on the reference value, 10.8 percent of the KFL&A child population is vulnerable to developmental issues within the domain of communication skills and general knowledge associated with social deprivation and residential instability.

4.3.2 f) EDI Low in One or More Domains

With respect to the effects of social deprivation and residential instability, the percentage of vulnerable children with EDI scores low in one or more domains did not follow a gradient and was variable between quintiles (see Figure 4.7). Q5 faced multiple vulnerabilities, scoring almost ten percent above the reference value. Based on the reference value, 28 percent of children entering Grade One in the KFL&A catchment area are vulnerable to multiple developmental issues associated with

social deprivation and/or residential instability, especially Q5, while protective effects seem to be at work in Q3 and Q4.

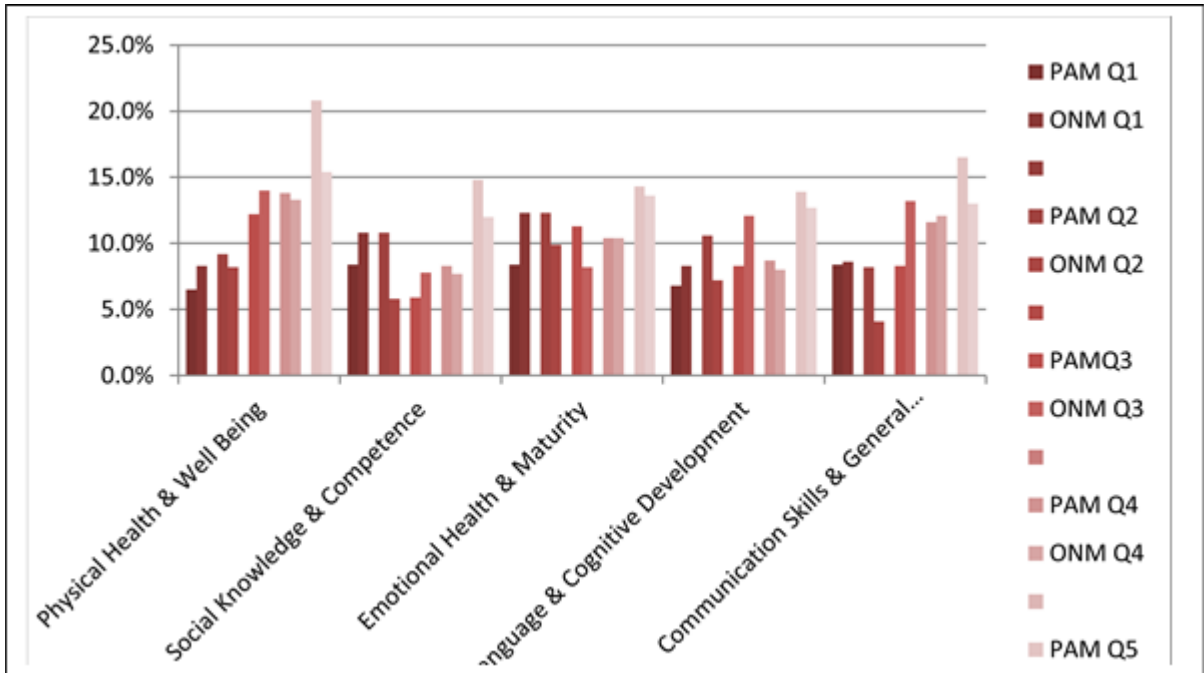


Figure 4.7: EDI Scores of All Children Studied in Quintiles for Pampalon's Social Deprivation and ONMarg's Residential Instability

4.3.3 Other ONMarg Data

4.3.3. a) Dependency

ONMarg also contains data on dependency (see Figure 4.8): the number of dependents younger than 14 or over 65 years of age, and employment status of those 14 to 64. These data uniformly suggest that dependency seems to level off the protective qualities associated with higher socio-economic status, given Q1 and Q2 vulnerability is higher than the reference value in all domains of competence. There are protective effects for all domains in Q4. Q5 is less vulnerable than the reference value in social knowledge and competence, emotional health and maturity, and language and cognitive development.

O-Dep: ONMarg's Dependency Index									
% of children in 10th Percentile (Vulnerable)	Reference value	Q1	Q2	Q3	Q4	Q5	Valid Cases n=	Pearson Chi2	Likelihood Ratio
Physical Health & Wellbeing	9.9%	13.3%	14.2%	12.6%	5.6%	11.5%	1572	16.316	17.209
Social K. & Competence	9.5%	10.8%	9.9%	8.1%	8.8%	8.8%	1572	2.070	2.246
Emotional Health & Maturity	10.7%	10.6%	11.8%	12.0%	9.3%	10.2%	1546	1.756	1.984
Language & Cognitive Dev.	9.4%	11.1%	9.7%	9.7%	7.6%	9.9%	1573	2.332	2.579
Comm. Skills & General K.	10.0%	10.8%	10.3%	7.7%	9.6%	12.3%	1572	3.768	4.042
Low in One or More Domains	24.3%	26.3%	25.9%	26.1%	22.3%	25.4%	1574	2.777	2.713

Figure 4.8: EDI Scores in Quintiles for ONMarg's Dependency Index

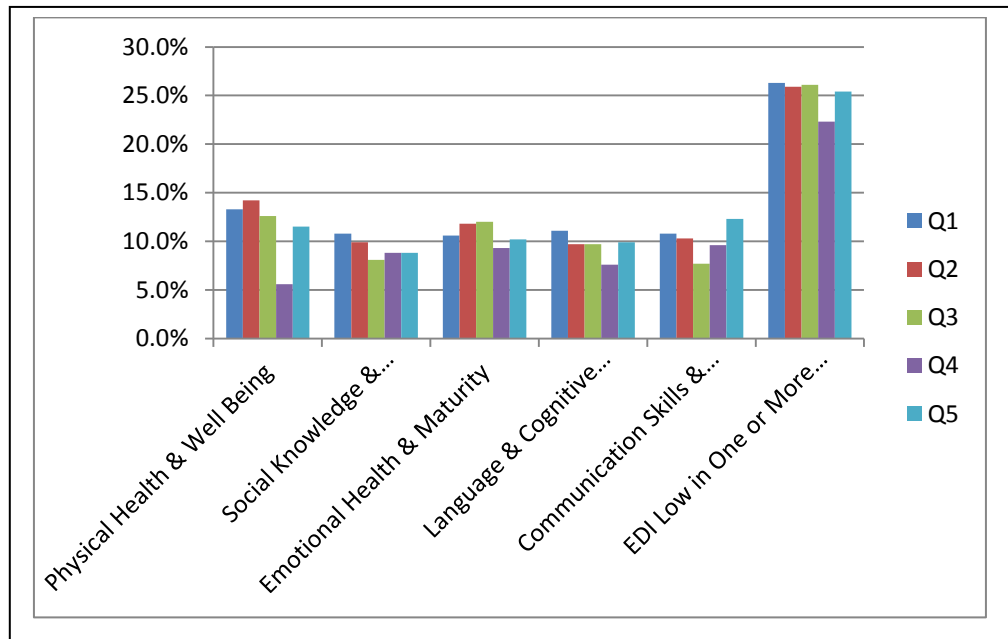


Figure 4.9: Chart of EDI Scores of All Children Studied in Quintiles for ONMarg's Dependency Index

4.3.3. b) Ethnic Concentration

ONMarg contains data on ethnic concentration (see Figure 4.10), specifically recent immigrants (within 5 years) and self-identified visible minorities. In Q1, three domains of competence were negatively impacted by the influence of ethnic concentration: social knowledge and competence, emotional health and maturity, and communication skills and general knowledge. It had a protective effect on Q3 scores in all domains, and protective effects in Q4 for social knowledge and

competence, emotional health and maturity, and language and cognitive development. It had a negative effect on Q5 in all domains, though rates above the reference value were not substantial for social knowledge and competence, emotional health and maturity, and language and cognitive development, perhaps indicating protective effects similar to those in Q4.

O-EC: ONMarg's Ethnic Concentration									
% of children in 10th Percentile (Vulnerable)	Reference value	Q1	Q2	Q3	Q4	Q5	Valid Cases n=	Pearson Chi2	Likelihood Ratio
Physical Health & Wellbeing	12.1%	10.9%	7.4%	9.9%	12.4%	16.8%	1572	19.776	18.707
Social K. & Competence	9.8%	10.2%	7.8%	7.8%	8.8%	11.8%	1572	4.783	4.880
Emotional Health & Maturity	11.0%	11.8%	9.1%	10.6%	9.6%	12.9%	1546	3.480	3.683
Language & Cognitive Dev.	10.2%	9.0%	9.2%	7.8%	9.1%	12.6%	1573	5.324	5.314
Comm. Skills & General K.	9.4%	11.3%	8.5%	5.7%	11.1%	13.1%	1572	11.622	12.605
Low in One or More Domains	26.7%	24.8%	19.9%	22.3%	24.0%	33.4%	1574	20.286	19.805

Figure 4.10: EDI Scores in Quintiles for ONMarg's Ethnic Concentration Index

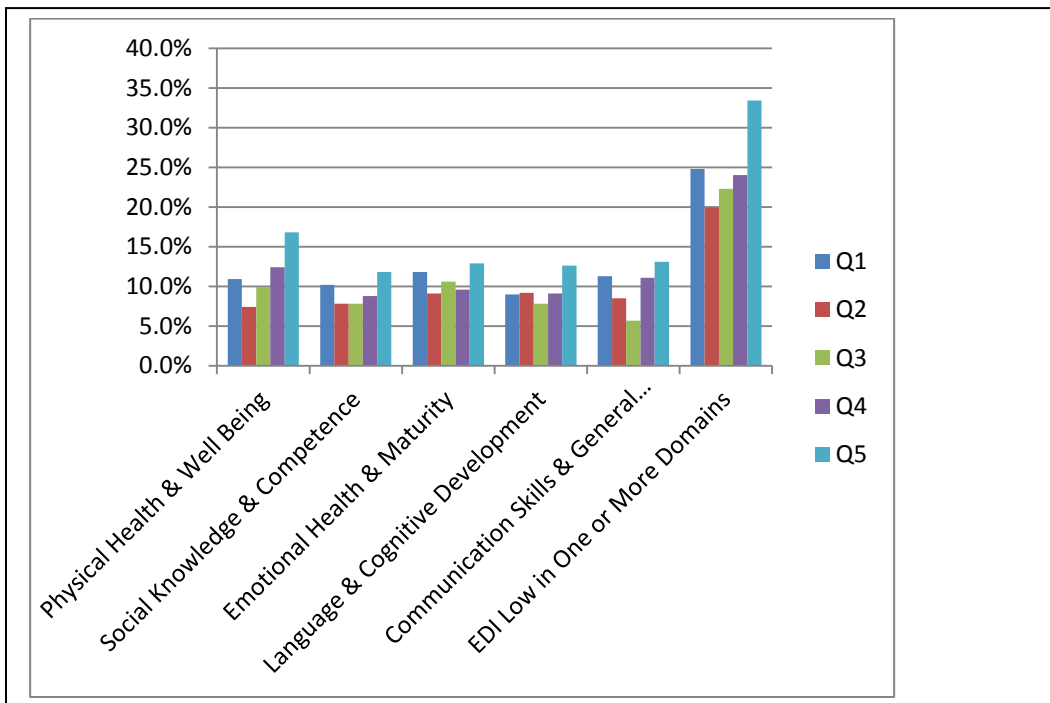


Figure 4.11: Chart of EDI Scores of All Children Studied in Quintiles for ONMarg's Ethnic Concentration Index

4.3.4 Combined Effects of Social and Material Deprivation on ECD

Given that the social determinants of health data are scored by deprivation indices, the following section attempts to discern whether the combination of social deprivation with the material deprivation indices helps or hinders the statistical significance by domain of competence and quintile (see Figure 4.12). Where the addition of social determinants to material deprivation in the Pampalon data raises the percentage of children vulnerable in a particular domain of competency, it acts as an additional and relevant risk factor (highlighted in yellow). When it lowers the percentage of vulnerability in EDI scores, the assumption is that village effects may be having a mediating effect against material deprivation and act as a protective factor (highlighted in green).

		CIHI5Cmb - Pampalon's Combined Deprivation							
% of children in 10th Percentile (Vulnerable)	Reference value	Q1	Q2	Q3	Q4	Q5	Valid Cases n=	Pearson Chi2	Likelihood Ratio
Physical Health & Wellbeing	14.0%	7.5%	7.9%	9.6%	17.6%	20.5%	1572	39.931	38.118
Social K. & Competence	10.3%	6.8%	8.5%	8.6%	11.1%	13.7%	1574	10.416	9.997
Emotional Health & Maturity	12.7%	10.3%	9.4%	10.9%	10.3%	16.0%	1548	14.942	16.756
Language & Cognitive Dev.	9.5%	6.2%	8.5%	10.5%	12.6%	12.7%	1574	8.445	8.807
Comm. Skills & General K.	11.1%	6.5%	6.6%	11.5%	12.1%	15.7%	1573	21.246	21.071
Low in One or More Domains	28.8%	20.5%	20.3%	24.3%	29.6%	37.2%	1574	35.233	34.252

Figure 4.12: EDI Scores in Pampalon's 5 quintiles of Material and Social Deprivation Combined

When Pampalon's material and social deprivation indices are combined, Q5 is still the most vulnerable in all areas of developmental health, but social deprivation increases vulnerability in all domains except emotional health and maturity, cumulatively impacting EDI low in one or more domains by 7.2 percent. The only other significant effects are that social determinants have a mediating effect on the previous areas of risk in Q1 and Q2, and the opposite is true in Q3 and Q4, where social deprivation increases vulnerability in areas previously scored as protective (e.g., social knowledge and competency and emotional health and maturity).

A similar comparison was conducted with the ONMarg data (see Figure 4.13), by combining the dimensions of residential instability, dependency, and ethnic composition with the material deprivation data. Though the reference values by domain of competence are very similar in the combined deprivation indices for Pampalon and ONMarg (less than 1.5 percent), the distribution of significant risks and protective factors is quite different. In the combined ONMarg indices, Q5 is also the most vulnerable in all areas of developmental health, but mediating social factors raised EDI scores in all domains save language and cognitive development. In Q4, mediating social factors raised EDI scores in all domains. The reverse was true in Q3 as social factors increased vulnerability scores in all domains.

% of children in 10th Percentile (Vulnerable)	ONMarg Combined Deprivation						Valid Cases n=
	Reference value	Q1	Q2	Q3	Q4	Q5	
Physical Health & Wellbeing	13.1%	9.6%	9.9%	11.9%	11.0%	16.5%	1572
Social K. & Competence	10.0%	9.5%	8.0%	7.7%	9.4%	12.3%	1574
Emotional Health & Maturity	11.4%	10.8%	10.4%	10.0%	10.1%	12.8%	1548
Language & Cognitive Dev.	10.7%	8.7%	9.0%	9.2%	9.4%	12.6%	1574
Comm. Skills & General K.	11.0%	9.1%	8.3%	8.7%	11.0%	13.6%	1573
Low in One or More Domains	27.2%	23.2%	22.1%	24.3%	24.9%	32.3%	1574

Figure 4.13: EDI Scores in ONMarg's 5 Quintiles of Material Deprivation, Residential Instability, Dependency, and Ethnic Composition Combined

Combined ONMarg indices raised vulnerability scores in Q1 in all domains save emotional health and maturity, where social factors had a mediating effect. Q2 scores improved due to the mediating effects of social determinants in emotional health and maturity, language and cognitive development, and communications skills and general knowledge.

Based on the social determinants of health literature and the health gradient effect, the assumption is that EDI scores will be directly correlated to both material and social deprivation, such that the highest deprivation quintiles (Q4 and Q5) would see the highest percentages of the most vulnerable children within them. Overall, the data suggest that the

five domains of ECD are influenced differently by material and social determinants of health. The ONMarg data provide evidence that social deprivation and residential instability had a slightly greater impact than material deprivation, on average, on children's vulnerability as expressed by EDI scores, and that vulnerability was present in all quintiles, not just the most impoverished. This is not unlike Janus and Duku's findings, where "the gradient in children's health and school readiness is also present in a predominantly middle-class population." (2007, p. 399) There is also evidence of social determinants – perhaps village effects (though this cannot be confirmed without data at the neighbourhood level) – having a mediating effect against material deprivation on Q3, Q4 and Q5, which will be outlined in the discussion section that follows. The significance of these findings with respect to policy development around ECD will be discussed in Chapter Five.

4.4 Discussion

The primary thesis question is whether the five domains of ECD are influenced differently by material and social determinants of health. In this study, ECD vulnerability does not always follow the social gradient of health and variability in scores exists by quintile and type of deprivation (social or material deprivation). The confirmation of social determinants having a mediating effect against material deprivation, and the evidence of village effects, is also considered.

All of the variables used in the combined Pampalon deprivation index are included in the ONMarg combined index. ONMarg uses significantly more social variables, which are important in trying to determine the presence of "village effects" such as extended family as caregivers and mentors, and other protective effects stemming from social determinants at the neighbourhood level. A series of tables were created from a master table of all of the

EDI vulnerability scores that highlight the most significant factors that affect ECD (as risk or protective factors) against EDI-scored development outcomes in this study. These tables help to understand better what household (family-level) characteristics may have the most effect in shaping children’s socialization and readiness to learn, and surmise the neighbourhood factors that appear to be associated with early development outcomes. To enhance validity, the study results are compared to other recent studies of ECD.

EDI Outcome: Physical Health & Wellbeing				
Quin- tile	Deprivation Index	Vulnerability vs. Reference Value	Factors: Protective or Risk	Scale HH: Household NH: Neighbourhood VE: Village Effect
Q5	Pampalon Material Deprivation Index	+5.8%	Risk	HH
Q5	ONMarg Material Deprivation Index	+6.9%	Risk	HH
Q5	Pampalon Social Deprivation Index	+7.1%	Risk	HH & NH
Q5	ONMarg Residential Instability Index	+4.8%	Risk	HH & NH
Q2	ONMarg Dependency Index	+4.3%	Risk	HH
Q1	ONMarg Dependency Index	+3.4%	Risk	HH
Q3	ONMarg Ethnic Concentration Index	-2.2%	Protective	HH & NH (VE?)

Table 4.3: Social Determinants and their Effect(s) on Physical Health & Wellbeing (EDI Outcome)

Physical health and wellbeing (see Table 4.3) is the domain most significantly impacted by household (family-level) characteristics in shaping children’s socialization and readiness to learn, especially for Q5. Material factors include family structure (single parent families), income, unemployment, education level (graduated high school or not), receiving government transfers, and living in a dwelling that requires major repair. These findings are in keeping with the Oliver et al. (2007) and Janus and Duku (2007) studies, which identified an increased percentage of single-parent families as having a negative effect on children’s physical health and wellbeing. Further, women’s income tends to deteriorate more after a marital break-up than men’s, so there may be added variability with respect to income of single-parent families headed by women that needs to be addressed in further studies. That being said, Lapointe et al. (2007) and Janus and Duku (2007) also add income as a

predictor of physical health and wellbeing of children. This may be indirectly influenced by parental education, which is also a strong predictor variable in the Lapointe et al. study. Two significant predictor variables of children's physical health and wellbeing that were not included in the Kingston study are low-birth weight (Sellstrom and Bremburg, 2006) and parental smoking (Janus and Duku, 2007), both of which are strongly associated with low social economic status in terms of nutrition and lifestyle behaviours.

Social deprivation and residential instability (Table 4.3) also has a significant negative effect on Q5 children's physical health and wellbeing. It should be noted that in the Pampalon social deprivation index, both marital status and percentage of single-parent families are used, possibly over-emphasizing this association. Marital status is also used as a variable in the ONMarg residential instability data, along with population density, number of children in the household (less than 17 years of age), whether the home is an apartment building or not, whether the home is owned or not, and residential mobility in the past five years. Residential instability is more common for single parents of low income as they are more likely to rent and have to move more frequently, so these results are in keeping with the literature.

For Q1 and Q2, dependency (Table 4.3) increased the risk of vulnerability with physical health and wellbeing. This household factor is associated with the number of children under 14 years of age and seniors in a household as well as the number of able bodied people unemployed. It can be assumed that the greater number of dependents in a household leads to resources (financial and social) being spread more thinly, perhaps accounting for the increased vulnerability, though there is little in the literature that speaks to this specifically.

For Q3, ethnic concentration (Table 4.3) as a neighbourhood factor has a positive impact on physical health and wellbeing. The Lapointe et al. (2007) study in British Columbia (where the immigrant population is far more significant than in the Kingston area) highlighted the protective effects of social capital and cohesion, and how heterogeneous neighbourhoods (mixed class) can have a positive effect on the development of children from poorer households. This phenomenon may be at work in the Kingston area, where social determinants at the neighbourhood level mitigate the effects of material deprivation, but without information on neighbourhood composition, this correlation cannot be confirmed.

EDI Outcome: Social Knowledge & Competence				
Quin- tile	Deprivation Index	Vulnerability vs. Reference Value	Factors: Protective or Risk	Scale HH: Household NH: Neighbourhood VE: Village Effect
Q5	Pampalon Social Deprivation Index	+4.4%	Risk	HH & NH
Q5	ONMarg Residential Instability Index	+4.9%	Risk	HH & NH
Q2	Pampalon Material Deprivation Index	+1.1%	Risk	HH
Q2	ONMarg Dependency Index	+0.4%	Risk	HH
Q2	Pampalon Social Deprivation Index	+0.4%	Risk	HH & NH
Q1	ONMarg Dependency Index	+1.3%	Risk	HH
Q5	ONMarg Dependency Index	-0.7%	Protective	HH
Q4	ONMarg Residential Instability Index	-4.3%	Protective	HH & NH
Q4	ONMarg Dependency Index	-3.1%	Protective	HH
Q3	Pampalon Material Deprivation Index	-3.2%	Protective	HH
Q3	ONMarg Material Deprivation Index	-2.7%	Protective	HH
Q3	ONMarg Dependency Index	-1.4%	Protective	HH
Q3	Pampalon Social Deprivation Index	-4.5%	Protective	HH & NH
Q3	ONMarg Residential Instability Index	-3.0%	Protective	HH & NH
Q3	O-Ethnic Concentration	-1.8%	Protective	HH & NH (VE?)
Q3				
Q2	ONMarg Residential Instability Index	-5.0%	Protective	HH & NH (VE?)

Table 4.4: Social Determinants and their Effect(s) on Social Knowledge & Competence (EDI Outcome)

EDI scores for social knowledge and competence (see Table 4.4) are highly variable by quintile. In the literature, the percentage of single parent households is believed to be the most important household factor influencing this domain of competence. (Janus and Duku, 2007; and Oliver et al., 2007) This is evidenced in the Kingston study for Q5 children, as Pampalon's social index and ONMarg's residential instability index track marital status and family composition. The scores for Q2 are highly variable. Material factor(s) contributed to increased risk (1.1% above the reference value). The literature indicates that in the case of a marital breakup, women's income is typically eroded more than men's, so future studies on ECD should endeavour to compare outcomes for female-headed households and male-headed households separately. Hanson et al. (2011) identify maternal education as a significant predictor of children's social participation. The parental education variable is included in Pampalon's Material Deprivation Index, though once again, it may be important to analyze it based on gender.

Conversely, household and neighbourhood factors provided significant protective effects for Q2 children (ONMarg residential instability is 5.0% below the reference value). These protective factors are not present in the Pampalon social deprivation index, which includes percentage of single parents and marital status. So neighbourhood factors, such as residential stability, may provide a protective effect within the Q2 group with respect to the development of social knowledge. Important protective effects on social skills and competence (Table 4.4) are present for Q4 and especially Q3 children (all material and social determinants indices and data for Q3 show protective forces at work). For Q4, residential stability acted as a protective measure as did the presence of dependents. Social supports for parents, including extended family, are identified as positively influencing children's social competence, especially for families of lower socio-economic

status, (Hanson et al., 2011; Kiernan et al., 2008; Reynolds, 2000; and Sellstrom and Bremburg, 2006) as does neighbourhood heterogeneity (class) and cohesion. (Lapointe et al., 2007) In the Kingston study, it is the results on social competence for the Q3 and Q4 groups that show the strongest evidence of village effects – protective effects at the neighbourhood level where household risks may be present. Both Q3 and Q4 may live in mixed neighbourhoods, providing a protective influence through collective socialization, though neighbourhood data would be required to support this hypothesis. In the case of Q4, the presence of elder relatives may provide additional support by way of child care, for example. Whether or not children attended pre-school or day care is also an important predictor of increased social skills in the literature (Hanson et al., 2011; Kiernan et al., 2008; and Reynolds, 2000) and should be included as a variable in future studies about ECD.

EDI Outcome: Emotional Health & Maturity				
Quin -tile	Deprivation Index	Vulnerability vs. Reference Value	Factors: Protective or Risk	Scale HH: Household NH: Neighbourhood VE: Village Effect
Q5	Pampalon Material Deprivation Index	+4.0%	Risk	HH
Q5	ONMarg Material Deprivation Index	+3.1%	Risk	HH
Q2	Pampalon Social Deprivation Index	+0.9%	Risk	HH & NH
Q2	ONMarg Dependency Index	+1.1%	Risk	HH
Q1	ONMarg Residential Instability Index	+1.4%	Risk	HH/NH
Q1	ONMarg Dependency Index	+0.1%	Risk	HH
Q5	ONMarg Dependency Index	-0.5%	Protective	HH
Q4	Pampalon Material Deprivation Index	-2.8%	Protective	HH
Q4	ONMarg Material Deprivation Index	-0.5%	Protective	HH
Q4	O-Dependency	-1.4%	Protective	HH
Q4	Pampalon Social Deprivation Index	-1.0%	Protective	HH/NH (VE?)
Q4	ONMarg Residential Instability Index	-0.5%	Protective	
Q3	Pampalon Material Deprivation Index	-3.5%	Protective	HH
Q3	ONMarg Material Deprivation Index	-2.2%	Protective	HH/NH (VE?)
Q3	ONMarg Residential Instability Index	-2.7%	Protective	

Table 4.5: Social Determinants and their Effect(s) on Emotional Health & Maturity (EDI Outcome)

EDI scores for emotional health and maturity (see Table 4.5) are highly variable by quintile, similar to the social competence data. As is the case in the literature, material deprivation has a negative effect on children's emotional health, as illustrated by the Kingston data where vulnerability for children in Q5 is three to four percent above the reference value. Oliver et al. (2007) cite median household income as a powerful predictor of emotional health in children, as well as the percentage of single parent households. (Janus and Duku, 2007; and Oliver et al., 2007) In 2006, 15 percent of households in the KFL & A catchment were headed by single parents. Research shows that single parents are three times more likely to suffer from depression (Maggie et al., 2010), which has a particularly deleterious effect on the emotional health of young children.

Increased vulnerability in the emotional health of children stemming from factors associated with residential instability and the Pampalon social deprivation index was found in the Q1 and Q2 groups. They are also negatively impacted by the ONMarg dependency index. Kohen et al. (2002) identify unemployment at the household level and low social cohesion at the neighbourhood level as having a negative effect on children's emotional health, factors which may be at work in Q1 and Q2 children in Kingston.

Significant protective effects on emotional health and maturity are present for children of Q3 and especially Q4 (Table 4.5). Family structure, parents' education and residential stability are important factors promoting emotional health in young children. (Janus and Duku, 2007; Lapointe et al., 2007; and Oliver et al., 2007) Social supports for parents, including extended families, are identified as positively influencing children's emotional wellbeing and parental mental health, especially for families of lower socio-economic status. (Hanson et al., 2011; Kiernan et al., 2008; Reynolds, 2000; and Sellstrom and Bremburg, 2006) Janus and Duku (2007) found evidence that higher numbers of

siblings increase emotional maturity, which may be a protective force at work based on Q4 and Q5 dependency data, as could the presence of elders. Sellstrom and Bremburg (2006) cite informal social control at the neighbourhood level as having a protective influence on children's mental health and behaviour. Similarly, village effects – how social determinants can have a mediating effect on household risks – seem to be at work in Kingston's Q3 and Q4 children. Ethnic concentration does not have a significant impact on Kingston children's emotional wellness. Whether or not children attended pre-school or day care is also a significant predictor of better behavioural outcomes in the literature (Hanson et al., 2011; Kiernan et al., 2008; and Reynolds, 2000) and should be included as a variable in future studies about ECD.

EDI scores for language and cognitive development (see Table 4.6) are highly variable by quintile. Q5 showed a 3.5 to 4 percent increased risk associated with social deprivation and residential instability. Factors strongly associated as predictors of language and cognitive development include median income (Oliver et al, 2007), family marital status (Janus and Duku, 2007), maternal level of education (Hanson et al., 2011) and residential stability (Oliver et al., 2007), so the Kingston Q5 group is in keeping with the literature. Janus and Duku (2007) cite smoking in the household as increasing the risk of cognitive vulnerability in children by 1.3 times, which may be an issue in Kingston. Q1 showed a mild increase in vulnerability associated with dependency. Janus and Duku (2007) cite evidence that increased numbers of siblings in a family leads to decreased language skills and cognitive ability, so this may be at work in the Q1 group. Q2 also showed a mild increase in risk of vulnerability associated with social and material deprivation, and dependency. In this case, the effect of a lone parent headed family may be the most important variable, as it is present in both Pampalon's social deprivation and the ONMarg material deprivation index.

EDI Outcome: Language & Cognitive Development				
Quin-tile	Deprivation Index	Vulnerability vs. Reference Value	Factors: Protective or Risk	Scale HH: Household NH: Neighbourhood VE: Village Effect
Q5	ONMarg Dependency Index	+0.5%	Risk	HH
Q5	Pampalon Social Deprivation Index	+3.5%	Risk	HH & NH
Q5	ONMarg Residential Instability Index	+4.0%	Risk	HH & NH
Q5	ONMarg Ethnic Concentration Index	+0.5%	Risk	HH & NH
Q2	ONMarg Material Deprivation Index	+0.5%	Risk	HH
Q2	ONMarg Dependency Index	+0.3%	Risk	HH
Q2	Pampalon Social Deprivation Index	+0.2%	Risk	HH & NH
Q1	ONMarg Dependency Index	+1.7%	Risk	HH
Q4	Pampalon Social Deprivation Index	-1.7%	Protective	HH & NH
Q4	ONMarg Residential Instability Index	-3.3%	Protective	HH/NH (VE?)
Q4	ONMarg Dependency Index	-1.8%	Protective	HH/NH
Q3	ONMarg Material Deprivation Index	-2.2%	Protective	HH
Q3	Pampalon Social Deprivation Index	-2.1%	Protective	HH & NH (VE?)
Q2	ONMarg Residential Instability Index	-3.8%	Protective	HH/NH

Table 4.6: Social Determinants and their Effect(s) on Language & Cognitive Development (EDI Outcome)

Residential stability, however, has a protective effect on Q2 children, scoring 3.8 percent below the reference value (see Table 4.6). Residential stability and social factors have a protective effect on Q4, while social and material protective factors are at work with Q3. Marital status (intact family) is potentially a protective factor for Q2, Q3 and Q4. There is evidence that professional parents who have a high level of education (above high school) are four times more likely to engage in verbal conversations with their children (Evans, 2004), leading to increased language and cognitive skills. Parental education is a factor tracked in the ONMarg material deprivation index, which may be a protective factor for children of Q3 who scored 2.2 percent below the reference value for vulnerability in this domain. At the neighbourhood level, residential stability has a protective effect on Q2 and Q4, suggesting that social cohesion may act as a village effect, an important predictor variable of language and cognitive development. (Kohen et al., 2002) Household data on

smoking and the profession of parents would be helpful to the study of ECD, as would the presence of social cohesion at the neighbourhood level.

EDI Outcome: Communication Skills and General Knowledge				
Quin- tile	Deprivation Index	Vulnerability vs. Reference Value	Factors: Protective or Risk	Scale HH: Household NH: Neighbourhood VE: Village Effect
Q5	Pampalon Material Deprivation Index	+4.4%	Risk	HH
Q5	ONMarg Material Deprivation Index	+4.3%	Risk	HH
Q5	Pampalon Social Deprivation Index	+4.1%	Risk	HH & NH
Q5	ONMarg Residential Instability Index	+8.7%	Risk	HH & NH
Q3	ONMarg Residential Instability Index	+4.1%	Risk	H & NH
Q1	ONMarg Dependency Index	+0.8%	Risk	HH
Q4	ONMarg Dependency Index	-1.8%	Protective	HH (VE?)
Q4	Pampalon Social Deprivation Index	-0.8%	Protective	HH & NH (VE?)
Q3	Pampalon Social Deprivation Index	-4.1%	Protective	HH & NH (VE?)
Q2	Pampalon Social Deprivation Index	-4.2%	Protective	HH & NH (VE?)
Q2	ONMarg Residential Instability Index	-5.0%	Protective	HH & NH (VE?)
Q1	Pampalon Material Deprivation Index	-4.5%	Protective	HH
Q1	ONMarg Material Deprivation Index	-4.8%	Protective	HH

Table 4.7: Social Determinants and their Effect(s) on Communication Skills and General Knowledge (EDI Outcome)

EDI scores for communication skills and general knowledge (see Table 4.7) are highly variable by quintile. Q5 showed significant increased risk associated with material and social deprivation and residential instability. Factors strongly associated as predictors of communication skills and general knowledge include parental level of education (Hanson et al., 2011; and Lapointe et al., 2007), residential stability (Boyle et al., 2007; and Oliver et al., 2007), and the availability of reading materials (e.g., books, magazines, and computers), (Janus and Duku, 2007) so the Kingston Q5 group is in keeping with the literature. Boyle et al. (2007) and Oliver et al. (2007) flag home ownership as a significant predictor variable of children's competence in communication skills and general knowledge, data that are tracked by the ONMarg residential instability index. Kingston's Q5 group

scored 8.7 percent above the reference value as vulnerable in this domain, the highest vulnerability score of the study, suggesting that living in rented accommodations and frequent moving has a negative impact on ECD. Residential instability also has a negative effect in the Q3 group, scoring 4.1 percent above the reference value as vulnerable in this domain.

However, Q3 experienced protective effects associated with Pampalon's social deprivation index status (4.1% below the reference value), which tracks family structure and marital status (see Table 4.7). Intact families also have a protective effect on Q2 and Q4 as expressed by social deprivation, respectively, 4.2 percent and 0.8 percent below the reference value. Residential stability has a highly protective effect in Q2 (5% below the reference value), an index that tracks home ownership. The inverse applies to the Q5 data. Q1 is highly protected in this domain by material variables at the household level (income, parental education, employment), suggesting that parents have the means to provide learning tools (e.g., reading materials) and are more likely to engage in their children's early education. (Boyle et al., 2007) Dependency has a protective effect on Q4, possibly suggesting the protective influence of the extended family (Lapointe et al. (2007). In this domain of competence, the effects of the household are more important than neighbourhood effects, but this study did not collect data on whether children attended preschool or early childhood education centres, which have a positive effect on communication skills and general knowledge, especially for families of lower socio-economic status. (Hanson et al., 2011; Kiernan et al., 2008; Reynolds, 2000; and Sellstrom and Bremburg, 2006)

The comparative quantitative analysis of the effects of material deprivation, social deprivation and combined factors on ECD in the KFL&A catchment area confirms the

existence of mediating effects of social determinants at the neighbourhood level. However, the use of deprivation indices, which group determinants of health variables together, make it difficult to ascertain definitively what specific variables are at play. Based on study results and in comparison to similar studies, it is suggested that the village effects that may be at work in the Kingston area include: the presence of extended family as social, and possibly material, supports in child rearing; social cohesion associated with ethnic concentration; and social cohesion and high informal control in neighbourhoods of high residential stability and socio-economic heterogeneity. Additional data on whether children and parents have access to early child development programs and centres would have been useful, as this is a significant outcome predictor of ECD indicators, as well as the ability to discern gender with respect to the analysis of household income and parental education.

The Kingston study further highlights the importance of residential stability to ECD. Home ownership and “growing roots” in a neighbourhood have significant protective effects on ECD. Residential instability is a significant risk factor for lower SES families and/or single parent families, which follows Raphael’s income inequality hypothesis (2005). Prilleltensky et al. (2001) highlight how power and control factor heavily in a family’s ability to raise resilient children, and to rise above intergenerational poverty and neighbourhood degradation. (Moore, 2012) Housing and food security are important factors that impact a growing number of Canadian families and needs to be addressed by policy at the provincial and federal levels. (Fotso, 2005 and Raphael, 2009)

With respect to the areas of social competency and emotional health, the Kingston study may have generated more questions than it answered around children’s competency in higher income quintiles, as Q1 and Q2 showed vulnerability above the reference value in these areas, while Q3 and Q4 showed protective factors at work. Q5 showed increased

vulnerability. The concept of independent play (or lack-thereof) for young children has been associated with children's social competency and emotional health, (Fantuzzo and McWayne, 2002; Irwin et al., 2007; and Jack, 2000) and warrants further study. Independent play is often curtailed by parents of children living in deprived neighbourhoods due to fears over safety, while independent play can be stunted in more affluent families because parents intervene in conflict situations (e.g., children arguing over a toy) and prescribe their children's social activities (e.g., organized play dates, visits to the parks, etc.). Based on other studies of ECD, it is possible that the role of independent play affects the social competency and emotional health scores of Q1, Q2 and Q5 children in the Kingston area, though neighbourhood level data would be required to confirm this hypothesis.

The issue of parental mental health (e.g., depression), particularly in single-parent households of all socio-economic statuses, is of concern and warrants further study. Single parents would likely benefit from residential stability, additional social supports and access to early child development programs, and high quality child care (as seen in British and American ECEC programs for parents and their children), to help raise healthy and happy children who have the tools to be successful in life. Janus and Duku (2007) emphasize that non-cognitive skills are as important to children as cognitive ones. Bronfenbrenner's (1979) second context to child rearing states that *how* children use the skills they have acquired within the household context is of particular importance to their social integration outside of the household, on the playground, in the neighbourhood and in the classroom.

“Although the African proverb, ‘It takes a village to raise a child,’ perhaps has been overly used in public discourse regarding children's early development and education... this proverb [comes] to mind as [it] underscores the influence of children's neighbourhood

communities on their development.” (Hanson et al., 2011, p. 98) The Kingston study supports the premise that while the highest proportions of early childhood developmental vulnerability are found within the lowest quintiles (the most deprived neighbourhoods), the largest number of vulnerable children are spread throughout the middle-class in a variety of neighbourhoods. (Herzman et al., 2002; and Morley, 2005) As such, tools like the Early Development Instrument are valuable to public health practitioners and educators to identify and assist vulnerable children and their families. Fostering cohesive neighbourhoods that support ECD within the Canadian context will be discussed in the following chapter.

Chapter V:

The Influence of Community on Early Childhood Development (ECD) and Policy Recommendations to Foster Healthy Children in Canada

“There can be no keener revelation of a society's soul than the way in which it treats its children.” (Nelson Mandela, Former President of the African National Congress and Nobel Peace Prize Recipient, 1993)

5.1 Relationships between ECD, Risks and Protective Factors in the KFL&A Area

The goal of this thesis was to collapse the dualism between composition and context in ECD, by first unpacking the effects of material deprivation, typically ascribed to the household; social deprivation, typically ascribed to the neighbourhood; and re-combining them to understand better their effect on children's readiness to learn upon school entry. Ideally, this study would have been pursued at the household unit of scale, placing the EDI test scores within the household at the postal code level and aggregating to the neighbourhood DA level. Then hierarchical multivariate modeling could be used to examine the relationship between contextual and individual determinants of health (Rajaratnam et al., 2006; and Subramanian et al., 2003) via census data and developmental health outcomes via EDI data. Due to concerns over privacy, it was felt that stakeholders would not be comfortable with this approach, though the researcher was willing to sign confidentiality agreements as well as undergo a review by the Queen's University General Ethics Review Board. In future, this would be the preferred methodology and access to EDI data, perhaps by assignment of unique identifier numbers to postal codes and EDI data, to further anonymize test scores. With the EDI data linked to quintiles, the issue of ecological fallacy is significantly diminished. However, determining levels of protective factors or increased risk at the neighbourhood and/or community level is not possible without a geographic unit of analysis.

There is likely minimal selection bias as all children in the KFL&A catchment area were tested with the Early Development Instrument (EDI) prior to school entry (Grade One) and included in the study, save where small numbers were suppressed and/or combined. As this study was not conducted at the neighbourhood level, but rather EDI scores matched to determinants of health data in quintiles, there is reasonable confidence of internal validity. The Pampalon and ONMarg index data were based on 2006 Canada Census data, as 2011 data were not yet released when the thesis was undertaken. If the study was updated with the latest Census data, there might be some variation in the specifics of the findings. However, in terms of generalizability and the relevance of the study results to populations outside of KFL&A, external validity is achieved by comparison to other studies in Canada. The Kingston study results are in keeping with recent Canadian studies on ECD, though the Kingston area does not exhibit the ethnic diversity or magnitude of larger cities, so the relationships derived from the ONMarg ethnic concentration index should be interpreted with caution.

The use of deprivation indices to study the effects of social determinants of health on ECD presented challenges to the interpretation of the data. Within the deprivation indices, social determinants of health are grouped into categories (material deprivation, social deprivation, residential instability, dependency and ethnic concentration), which provide an excellent view of overall neighbourhood deprivation, but confound the magnitude of association between exposure and child developmental health outcomes. For example, the ONMarg material deprivation index includes data on parental education and whether the household is run by a lone parent. Both are significant predictors of child developmental health outcomes, but in different areas of competency. It would be useful to examine these factors separately.

Further, the nature of the index categories is problematic to the study of ECD. For instance, while a parent's education may have an associated material effect on household income, it also has a strong social effect on child rearing, especially in the domains of language and communication. Context around the social determinants of health variables used in the deprivation indices can also be problematic. For example, the ONMarg measures dependency, but the census data lack context and do not discern whether a senior relative in the household contributes income by way of their pension and/or provides childcare to the family, which has a monetary and social value. The assumption is that an increased number of dependents – children, seniors or unemployed able-bodied persons – imply that finite household resources have to be dispersed among more individuals.

Though not pertinent to the KFL&A study *per se*, the definition of neighbourhoods is a limitation to the study of ECD in general. The joining of selected census tracts may result in neighbourhoods that are inappropriate for capturing the scale at which social processes important to child development operate. The selection of appropriate neighbourhoods is further complicated by a lack of theory that can guide the selection of neighbourhood units for children. “More grounded, qualitative research on the daily space- time patterns of young children's daily activities is needed to inform theory development.” (Oliver et al., 2007, p. 864)

These confounders call for the development of an index of factors specific to children's developmental health at a variety of scales. The Geographies of Early Childhood and Factors that Influence Development taxonomy (see chapter three) attempts to map the compositional factors that affect ECD and the contextual forces that impact the accumulation of advantages or disadvantages in children within their physical and social environments using a child-centric, ecological approach. This taxonomy can be used as a starting point for future research in ECD, and acts as a contribution to the field.

The second contribution of this thesis relates to critical reviews of existing Canadian studies on ECD and further validation of the usefulness of the EDI tool in measuring ECD. It is hoped that this study, which investigates early childhood developmental outcomes for the KLF&A area using 2006 data, can be replicated with subsequent Census Canada data to identify trends in the region, acting as a baseline to discern longitudinal effects associated with educational and public health interventions in future.

The population-based character of EDI data collection is indispensable because it produces neighbourhood vulnerability rates that are not subject to random error, as they would be if children had merely been sampled from neighbourhoods. Thus positive and negative outliers are exactly that, and not statistical artifacts. When a given neighbourhood is found to be a positive or negative outlier on three successive waves of EDI, one can say with confidence that it has characteristics that are worth exploring. (Hertzman, 2010, p. 38)

As well, it helps to articulate the benefit of using the EDI, which is now available across most Canadian provinces and can serve as a tool to compare ECD rates across the country. Ideally, implementation of the tool, with sensitivity to cultural differences, might also be used to enable comparisons between nations, in developed and developing countries.

The final contribution of this thesis to the study of ECD relates to the identification of risk factors and protective dynamics, or “village effects,” that can build resistance and competence in ECD. As with other studies, there is no doubt that the children of the lowest socio-economic standing in the KFL&A area face multiple challenges to developmental health, particularly in the area of physical health and wellbeing. Their issues are compounded by mythelation and inter-generational effects. The social and health systems of Ontario are not well designed to deal with the complexity of their needs which are impacted by social, material and structural effects.

The families that are most disadvantaged by the fragmentation of the service system are those that are most vulnerable – whether because they lack the skills

and confidence to navigate the system, or because they are unfamiliar with the culture and language, or because they are isolated and lack the social networks that would help them find and use the services that are available, or because they have multiple problems and need help from many sources. (Moore, 2012, p. 9)

There were other interesting findings around the village effects at work in the KFL&A area that acted as protective factors for ECD when risks associated with material deprivation were present. As outlined in chapter four, these included the presence of extended family as social, and possibly material, supports in child rearing; social cohesion associated with ethnic concentration; and social cohesion and high informal control in neighbourhoods of high residential stability and socio-economic heterogeneity.

The findings of this thesis suggest that the following areas are of importance to fostering ECD and might be addressed by researchers, public health practitioners, policy makers and municipal planners: housing and food security; the opportunities for children to engage in independent play; early childhood education and care programs; and social inclusion, supports, and relational neighbourhoods.

Housing (Prince, 1998; and Shapcott, 2009) and food security (Tarasuk, 2009) are important factors and their impact “have become strikingly apparent across Canada... [what is needed are] strong social and political movements with the aim of forcing policymakers to enact health-supporting public policy.” (Bryant et al., 2011, p. 54) This study showed residential stability and home ownership as having a protective influence on ECD, warranting more study. Affordable, stable housing for families, particularly single-parent headed households and those of low SES, would improve the social and material conditions of children in the region, and perhaps produce a trickle-down effect whereby more disposable household income might be used to foster better nutrition and more educational and recreational opportunities. Residential

mobility is “one of the many pathways between poverty and health, with the potential to inform policies that effect housing and household economics [such that] services might better be placed to mitigate the mechanisms whereby transience contributes to social exclusion and related health effects.” (Jelleyman and Spencer, 2008, p. 591) Research also shows that mixed socio-economic neighbourhoods have a protective effect on children of lower SES families, so the implementation of affordable housing projects might take this into consideration when selecting neighbourhood locations.

The role of independent play is correlated with social competency and emotional health scores of children. Peer-play interactions for children are critical to their social and emotional development and the presence of safe places like parks and recreation centres within neighbourhoods are important to parents’ perspective of safety and their willingness to let their children engage in independent play. (Fantuzzo and McWayne, 2002, Irwin et al., 2006; and Larson, 1999) In the Kingston context, more research is needed to determine the protective factors at work in the Q3 and Q4 groups within the domains of social competency and emotional health and why deficiencies in developmental health exist for Q1 and Q2. As an equalizer for all socio-demographic strata, “neighbourhood programming focused on health opportunities that support [children’s] need to run, jump and engage in social connections with friends during play and in the after-school hours” (Irwin et al., 2006, p. 357) might increase developmental health. Also of interest and a subject for further research is whether the number of children in a neighbourhood has an effect on socialization different from effects of siblings at the household level.

In 1970, the Royal Commission on the Status of Women called for “immediate action” on childcare, yet Canada still does not have a universal early childhood education and care (ECEC) program. (Friendly and Prentice, 2009) “From a child development perspective,

centre-based care [i.e., the Early Head Start Program] was found in US research to have better effects on children's cognitive, behavioural and social development than home-based, unregulated care." (Amoroso, 2010, p. 43) The WHO's report *Closing the Gap in a Generation* recommends that "governments build universal coverage of a comprehensive package of quality early child development programmes and services for children, mothers, and other caregivers, regardless of ability to pay." (WHO, 2008, p. 202) In Quebec, childcare is a citizenship right for women, providing regulated, educational child care at less than ten dollars a day to one in three children in that province. (Amoroso, 2010) High quality child care and education programs have the dual benefit of providing stimulating learning environments for children, which increases their cognitive and social skills, but also increases mothers' ability to participate in the workforce, furthering economic security for their families.

In terms of the value of this investment, Shonkoff argues that "neuroscience indicate[s] that providing supportive conditions for ECD is more effective and less costly than attempting to address the consequences of early adversity later." (2009, p. 3) Funding for ECEC programs are not just expenditure line items in social programming – economists argue that investment in ECD for countries rich or poor will yield the greatest returns: more literate and numerate populations with better health status and lower inequality and that "every dollar spent to help a child reach school age while thriving can generate up to \$17 in benefits to society over the following four decades." (Irwin et al., 2007, p. 16) This fact was articulated in the Canadian Population Health Initiative report *Improving the Health of Canadians*, and that a country can expect an economic return of up to eight dollars for every dollar invested in early childhood development. (Canadian Population Health Initiative, 2004) ECEC is important for all Canadians, not just children, "for the economy and the knowledge society; for family support, equity, and social solidarity and democratic practice." (Friendly and Prentice, 2009, p. 7)

Investment in universal, quality childcare generates a 100 percent gain through increased tax revenues, and decreased social, educational and health costs. (Morley, 2005, p. 4) The Kingston study supports the premise that while the highest proportions of early childhood developmental vulnerability are found within the lowest quintiles (the most deprived households), the largest number of vulnerable children are spread throughout the middle-class in a variety of neighbourhoods. Clearly, the middle class also struggles with issues such as affordable and high quality childcare, and the assumption that the market will provide services which can be purchased has proven erroneous, given the pronounced and persistent deficit of regulated childcare spaces in Canada. (Catalyst 2012 and Friendly, 2008) Given that all modern Canadian studies on ECD concur that one in four children are at risk of developmental deficiencies before commencement of school, what further evidence is needed to emphasize the urgent need for a universal early childhood education and care program? Reducing inequities in children's health can be achieved through "comprehensive programs for early childhood education and care." (Denny and Brownell, 2010, p. S5)

Social inclusion and supports for parents are also important to ECD. From this thesis it can be surmised that all parents, but especially single parent led and lower SES households, benefit from residential stability, additional social supports and access to early child development programs and high quality child care. This has been borne out in several countries where family centres support children's education as well as parental participation and learning.

Most parents do their best to help their children have a fair chance in school and at work. But many parents themselves need help, for they are struggling too. Communities, governments, and societies can band together to give all children and families a fair chance – to provide the childcare and education programs needed for those without them, to provide assistance for families to benefit from them, and to make sure that all programs are of high quality and effective. As the world becomes more complex and the marketplace becomes even more global, nations need to ensure their survivability by looking after their children so that both can participate and compete effectively in the world economy. (Young, 2002, p. 16)

The issue of parental mental health (e.g., depression), particularly in single-parent households of all socio-economic statuses, is of concern and warrants further study given its effect on children's emotional wellbeing and development of social competence. Maternal depression, particularly in the early months, can interfere with attachment and lead to serious developmental issues in children. (Lieberman and Ghosh-Ippen, 2011; and Olds, 1997) Research demonstrates that high parental involvement in children's academic pursuits leads to better performance, and that parents with a "positive outlook" tend to practice more positive parenting, leading to better outcomes, even in more materially deprived families. More gender-based research is needed on parents, "focused on mental health and wellness... [which involves] defining the parameters of emotional and behavioural health, identifying characteristics of people and settings associated with healthy outcomes, and understanding the processes underlying their occurrence." (Lerner and Benson, 2003, p. 132)

There exists strong evidence that lone-parent households at all socio-economic levels, are vulnerable, resulting in children with behavioural issues and non-optimal social and emotional development. This is especially the case for single mothers, whose income tends to deteriorate with a marital breakup. (Liu and Chen, 2006) "If neighbourhood social processes can be shown to account for a substantial portion of variation, then interventions aimed at changing these processes might have the potential for achieving meaningful effects." (Boyle and Lipman, 2002, p. 386) Large concentrations of single parent families at the neighbourhood level "may signify the need to enhance community resources (e.g., housing, recreation, health care, etc.) and to engage in community development efforts to reduce social problems." (Boyle and Lipman, 2002, p. 387) More research is needed in this area, as "understanding the processes and factors that enable most individuals to respond to daily challenges can inform the design of interventions that might introduce or increase the elements necessary for effective coping in those at risk." (Lerner and Benson, 2003, p. 135)

As well, neighbourhood cohesiveness, or lack thereof, is not definitively linked to socioeconomic status, which raises important structural concerns over how neighbourhoods relate. “As societies reach a certain threshold (characterized by Omran’s epidemiological transition), health status becomes determined more by social (dis)advantage than by material scarcity” (Macinko and Starfield, 2001, p. 399), so building social capital at the neighbourhood level, often termed social cohesion, becomes more important, including trust, helpfulness of others, shared values, cooperation, perceived reciprocity and collective efficacy, leading to higher informal social control. This is an example of what has been termed the “village effect” – when “resource rich and safe communities with consistent norms and values can be used by the primary caregivers to provide their children with many positive opportunities... to help them ‘raise’ their children... [such that] other significant individuals or institutions may compensate for lost or missing resources.” (Davis-Kean and Eccles, 2000, p. 14-15) From the KFL&A study on ECD, it can be deduced that “effective interventions that enable families to build social capital may also provide the protective factors to mitigate these risks. Further research into the impact of social capital – how it is generated, how it is grown and how it is most effectively used – and the role of communication in these processes is necessary.” (Terrion, 2006, p. 174) The following section discusses what processes and policies can help to build healthy communities in the Canadian context.

5.2 Building Healthy Communities

It is argued throughout this thesis that fostering ECD through healthy families and communities in Canada will result in a decrease in health risks to the life course, resulting in increased wellness and productivity and decreased health and social welfare costs. (Amoroso, 2010; Friendly and Prentice, 2009; Haddad, 2010; Haflon et al., 2010; Hertzman, 2006; Labonte and Laverack, 2001; Lavis, 2002; Lawrence, 2004; Morley, 2005; Raphael et al., 2005 and

2008; and Raphael, 2009) Early childhood programs that improve educational attainment are seen as sound investments because “they increase labour market participation, which then increases income, which then increases lifetime health expectancy and which, as a whole, may increase economic growth.” (Labonte and Laverack, 2001, p. 111) The discourse around child poverty and child investment has been used by different Canadian governments to frame policy and social programming over the past several decades, particularly children’s “potential for human capital,” but few have reflected a “child-centered perspective” that also addresses “the way in which gender, class and race intersect to exponentially disadvantage certain groups of people.” (Amoroso, 2010, p. 30) Child investment programming should be viewed holistically and the risk of vulnerability as a phenomenon not unique to the poor. (Armstrong, 2009) However, neo-liberal economic policy in Canada has led to social and health systems which are increasingly based on an individualistic approach to health and welfare such that the emphasis on accountability for the wellbeing of young children is with the family (household), not the community. This has profound policy implications – a paradigm shift would be required to promote village effects and relational neighbourhoods if we are to address the social determinants of health that lead to inequities and variability in ECD.

This thesis leads to the identification of five policy recommendations to foster ECD through healthy communities. The first is to redesign governance and accountability for ECD. The issues that affect Canadian families and their ability to provide optimal developmental outcomes for their children cross many ministries: health, education, social services, housing, municipal affairs, finance, and are variable by province. When it comes to the welfare of children, currently, “the challenge is one of adopting an environmental perspective when agencies have traditionally understood their role to be limited to providing one-on-one client services.” (Hertzman and Kohen, 2003, p. 5) It is recommended that a child-centric approach to

ECD be implemented and that coordination and accountability be raised to the federal level and implemented at the local level.

Practically, this would entail a stewardship function for the Public Health Agency of Canada and the development of a new External Advisory Body, perhaps called the National Council for Families. Public health, with a national mandate, implements policy at the local level, such that some of the needed infrastructure and communication networks are already in place. Membership on the Council would be cross-sectoral and at a variety of scales (e.g., a National Council, but also councils at the local level for each Public Health Unit). Their mandate would be to design Whole-Family Services, given that “well-integrated, community-based interventions reduce whole-system costs whilst improving or maintaining health outcomes.... It is more or equally effective and less expensive to offer comprehensive, proactive packages of care rather than on-demand, fragmented services.” (Procter et al., 2000, p. 339) This builds on the concept of comprehensive primary health care as espoused by the Alma Ata Declaration of 1978, where health systems, which are the relations between institutions and populations, should emphasize community participation, be proactive in anticipating risks within a population (rather than reactive to demand), move from episodic to continuous care, and “undertake other enabling functions such as stewardship, financing and resource generation” across government agencies responsible for the health of families. (Frenk, 2009, p. 171) These groups, dedicated to the needs of Canadian families, would oversee all policy that impacts ECD, including the following policy recommendations, to enable the promotion of “wellbeing as the explicit desired outcome across different policy arenas, including accessibility policies, provision of urban amenities, regional management, and so forth.” (Fleuret and Atkinson, 2007, p. 115)

Second, as discussed in detail in the previous section, a housing strategy is needed to foster residential stability at an affordable rate, and provide families in need with a way to own

their own homes. (Bryant, 2009; and Shapcott, 2009) The financial and psychological impacts are tremendous, allowing for more financial security, disposable income and a means of settling into a community, because “poverty and inequalities in wealth and access to resources are the major causes of ill-health. The challenge is to develop strategies to work with communities to overcome social deprivation and enhance health and wellbeing.” (Campbell and Murray, 2004, p. 194)

Third, a food security strategy needs to be developed. Across Canada, the use of food banks by families is on the rise. (McIntyre and Rondeau, 2009; and Tarasuk, 2009) Given the important role that nutrition plays in children’s physical and cognitive development, and the intergenerational effects of poverty on health, this is a basic need that children cannot do without. As well, health practitioners could be more vigilant in discerning whether children are getting the nutrition they require, and help families access community resources should they find themselves in need. There is still a great deal of stigma associated with food insecurity and these barriers need to be torn down. Prilleltensky et al. critique the individualistic nature of interventions to promote child wellness stemming from liberal policies as “adult-centric and psycho-centric,” with accountability stemming from parents’ failure to provide or children’s “bad luck” in life, which furthers hopelessness. They call for policies and programmes that empower children and their families to access valued resources, participate in self-determination, and promote competence and self-efficacy. (2001, p. 152) Communities that make universal child welfare a priority reduce the stigma. For example, childcare centres and schools can incorporate universal programs like “Breakfast Clubs” to ensure children start their day able to learn, involving community businesses in local sponsorship programs and community garden projects for families and their children. However, it is critical that these programs include outreach components that are sensitive to the stigma associated with food insecurity, and that

those most in need can access them in a way they are comfortable with and that is compatible with their ability to participate.

Fourth, a universal early child education and care (ECEC) program is needed across Canada, the merits of which have been discussed in the previous section. In addressing the school-readiness gap, “a universal prevention, albeit targeted at the individual population characteristics, likely has larger chances of success than the individual intervention.” (Janus and Duku, 2007, p. 399)

Finally, community-based service frameworks need to be developed to mitigate the risk of social isolation, (Connor et al., 2003; Easterling et al., 2003; Halfon et al., 2010; Hertzman, 2010; Jupp, 2012; Katz et al, 2007; MacDonald-Carlson, 2003; Matheson et al., 2009; Melton and Thompson, 2002; Moore, 2012; Murphy-Berman and Melton, 2002; and Small et al., 2002) organized at the neighbourhood and/or community level, that involve consultation with community members and empower them to develop solutions to their unique issues. Family-level interventions may be regarded as paternalistic, but neighbourhood-based interventions that provide “widely accessible parenting supports based on delivering stimuli to enhance children’s developmental capacities, may be more effective and readily accepted.” (Oliver et al., 2007, p. 865) Hertzman emphasizes the importance of residential communities (where families live) and relational communities (social ties to those with a common identity) in providing multiple forms of support critical to ECD, including tangible goods and services, emotional connections, gap analysis, problem solving and ingenuity at the local level, where grassroots organizations and governments can play a role. As in Sweden, Canada could develop a “hub approach” to early childhood programming at the local level to support families with young children and youth, a focal point for “a larger system of community programs and meeting spaces... and a delivery model that is not only multidimensional and accessible, but

also culturally appropriate and holistic.” (Ball, 2004, p. 50) There are also several centre-based early childhood development program success stories from which Canada can learn (e.g., Belfield et al., 2006; Delottinville, 2012; and Reynolds, 2000).

More research is needed to define the optimal balance between population and geographic location of ECEC programs to ensure access for all families in Canada. “Future neighbourhood-effects research would benefit from undertaking resident surveys, ethnographies, and neighbourhood observation to provide a more robust measurement of neighbourhood processes and mechanisms thought to influence children. Access to services at the neighbourhood level could also be implemented in future neighbourhood research.” (Oliver et al., 2007, p. 865) It is important to note that many of the most vulnerable families are fearful of possible reprimands associated with social programming for the safety of children. (Melton et al., 2002) They need to be engaged in the development of social programming. Community-based research at the local level may reveal new solutions to old problems, by consulting with parents, their children, and other community members about how their ability to cope as families could be enhanced and what social supports would help *them*. However, examining such relationships in exquisite detail to unravel the causes of ill health can be complicated, expensive, and uncomfortable for those in the community content with the status quo, such that significant cohort studies to disaggregate populations by gender, class, and race are rarely undertaken. Shukla explains:

This strand of public health offers concrete options to tackle existing health problems, but also holds up a mirror to society, a provocative and discomfoting mirror, allowing society to understand that these problems are not ‘accidents’ but are arising as a systematic consequence of the deliberate social and economic choices being made, which benefit a few and marginalize many. (Shukla, 2007, p. 7)

Perhaps international studies on ECD in both developed and developing countries may provide rich insights by crossing class, gender and cultural divides to determine what makes children more resilient. Capacity building and community attachment are identified as policy goals in the Ottawa Charter for Health Promotion (WHO 1986) to strengthen community action such that “vision building may be health promoting for the hopefulness it rekindles.” (Labonte and Laverack, 2001, p. 125) Labonte calls for community-based research in Canada, “action-oriented project[s] in which residents discuss and analyse the findings, talk about how their living circumstances (ranging from food, housing and the stresses of poverty or stigmatization...) might relate to their poorer health, and what steps can be taken locally and provincially to shift these health determinants in a more positive direction.” (Labonte, 1997, p. 22)

Recognition of the importance of social determinants of health to the wellbeing of Canadian families “means that government social policy, not just health policy, is fundamentally important for health equity” (Marmot, 2007, p. 1160) as the empowerment of families within their communities to have control over their lives, a political voice, and opportunities to participate in decision making processes that affect them and their children. (Amoroso, 2010; Friendly and Prentice, 2009; Graham, 2007; Haddad, 2010; Haflon et al., 2010; Hertzman, 2006; Kraftl et al., 2012; Labonte and Laverack, 2001; Lavis, 2002; Lawrence, 2004; Lynch et al., 2010; Macinko and Starfield, 2001; Marmot and Wilkinson, 2001; Matheson et al., 2009; Östlin et al., 2004; Phelan et al., 2010; Prilleltensky et al., 2001; Proctor et al., 2000; Rajaratnam et al., 2006; Raphael et al., 2005 and 2008; Raphael, 2008; Shonkoff, 2010; Sturmberg, 2011; Victora et al., 2003; and Young, 2002) Civil society can act in promoting protective factors for children and “initiate government, non-government and community action on the social determinants of developmental health.” (Hertzman, 2010., p. 36) Given what is now known about the impact of ECD on the life course, measures of children’s developmental health can serve as key

predictors of future national health. “The epidemic of childhood obesity, with its predictably serious adult health consequences, along with the growing rates of mental health problems in children and adolescents that result in a low-performing and increasingly disabled workforce are forcing policy makers to connect the dots between childhood adversity and national wellbeing.” (Halfon et al., 2010, p. 16)

5.3 Conclusion: Promoting Family Wellbeing to Mitigate Future Health Risks

Family *is* a social determinant of health. (McNeill, 2010) Fleuret and Atkinson (2007) suggest that the concept of “wellbeing” redefine the health agenda by making it the target of policy and what is to be achieved to optimize the wellbeing of Canadian families. As demonstrated in this thesis, geography can provide a lens through which the spaces and places of the wellbeing of families can be discerned, as well as the processes and interactions that produce wellbeing at various scales. As ECD and child health trajectories are influenced by protective and promoting factors, as well as risks, a better understanding of both can inform targeted, place-based initiatives and services to shift the curve of populations at risk. The local scale – the ecological niches where people live, work, study and play – namely “communities,” are critical to understanding the etiology of disease and how to build effective public health policies and programmes that “are informed by an understanding of the potential importance of place for health.” (Curtis and Jones, 1998, p. 667) Leung et al note that “much modern epidemiology still fails to attend to context because disease can be more easily attributed to individual lifestyles and behaviours that are divorced from the social milieus that influence them.” (2004, p. 501) This thesis confirms that children’s developmental vulnerability relates to social as well as material deprivation, and issues with social and behavioural development are present within all socio-economic strata. A great challenge to Canadian policy makers is to

ensure that families are engaged in and have access to supports and services that will foster the early development of their children.

Health geography can contribute to understanding better the risks associated with ECD by mapping the household and neighbourhood effects of material and social deprivation at the neighbourhood level. This knowledge can then be used by public health and other policy makers to develop programming to mitigate risk. It can also identify protective factors at the neighbourhood level – village effects – that with further qualitative research, may lend insight into how residential neighbourhoods can be transformed into safe, cohesive, relational communities, dedicated to overcoming the barriers of material and social deprivation and providing the supports needed to foster healthy and happy children. Improving ECD features prominently in the World Health Organization’s 2009 report from the Commission on the Social Determinants of Health. Universal service provision means support for all Canadian families, and especially those in greatest need, and if we can screen the whole population via the 18-Month Well Baby check and the EDI, we can offer “more intensive services to help poorer ECD outcomes in the future.” (Lynch et al., 2010, p. 1245) It also provides a tool to develop shared accountability at the local level and can “help catalyze cross-sector innovation and improvement efforts that are necessary if service providers are going to combine forces to address more fundamental causes of adversity and provide more systemic kinds of support.” (Halfon et al., 2010, p. 17) Across Canada’s entire socioeconomic spectrum, “early identification and intervention are likely to increase the developmental and educational gains for the child, improve the functioning of the family, and reap long-term benefits for society.” (Morley, 2005, p. 5)

There are many barriers in Canada to addressing the social determinants of health that impact ECD, as “dominant ideologies typical of the health sciences, public attitudes towards personal responsibility and increasing market influence all work against having a social determinants of health agenda implemented.” (Raphael et al., 2008, p. 232) Indeed, “institutional and social barriers reflect and reinforce conceptual ones,” (Lawrence, 2004, p. 496) including a lack of meaningful information transfer between professionals, politicians and the public. “The distinction between potential and actual health status can be the foundation for a new interpretation of health which includes the way ecological, social and psychological factors transgress traditional disciplinary boundaries... in order to address specific issues that may only be pertinent in specific situations.” (Lawrence, 2004, p. 498) ECD *is* health potential. With the wellness of families as a primary objective, public health, social services and primary health care must work together to address issues that may be out of their “general frame of reference – locally emergent but varied solutions that achieve less well defined, but potentially more relevant outcomes.” (Sturmburg, 2011, p. 528) Partnerships can provide and “sustain innovative approaches to solving complex problems and ultimately reduce inequality.” (Dummer, 2008, p. 1180) Achieving better developmental outcomes for children, especially those at high-risk, will be “achieved through the coordinated application of a unified, science-based framework across agencies and sectors, not through continuing attempts to foster improved interagency cooperation amongst disparate systems that are guided by divergent, historical traditions rather than contemporary knowledge.” (Shonkoff, 2010, p. 364) This will only be achieved through bold policy renewal that prioritizes the wellness of all families in Canada.

Raphael posits provocative questions: “In societies where public policy is heavily influenced by those with wealth and power... who benefits from the professional and public communities holding certain views about the determinants of health?” (2006, p. 663) And “should we focus on presenting research evidence to effect policy change or should we focus on

political activity to create more progressive public policy?” (2006, p. 665) The policy recommendations emerging from this thesis are not new. *The Toronto Charter on the Social Determinants of Health* (see Appendix A) is “a tool for promoting health and social justice... and can be an impetus for change, notably by municipal council endorsement, followed by political action.” (Raphael and Curry-Stevens, 2009, p. 374) The crafting of the Charter dates back a decade.

Further to this, Canada is a signatory to international covenants that guarantee the provision of citizen supports around social determinants of health, like the *Universal Declaration on Human Rights*¹¹ and the *Commitments of the United Nations World Summit for Social Development*,¹² and as applicable to ECD specifically, the *Education for All Declaration*¹³ and the United Nations Convention on the Rights of the Child, which “provides a vision that firmly places children at the centre, in the context of their families, their community, and their culture.” (Morley, 2005, p. 12) The excuse has been made that the nature of governments’ sight lines – three to four years of policy development and implementation – are not sufficient to bring about the changes that are needed in Canada to reverse the trend of rising income inequalities and subsequent health inequalities. Amongst the public and the media, there is a general lack of awareness of the importance of ECD and how the plight of Canadian families has worsened over the past decade. Perhaps then, public health professionals, primary care providers, educators, childcare workers, parents and their children must join forces in a concerted effort to draw public attention to the plight of Canadian families, to launch a movement to bring about inter-sectoral and pan-government cooperation that understands that current risks to the life course start with our children. All Canadians should be concerned about the health of families because “society not only reflects the collective success of families and their capacity to prepare

¹¹ United Nations, New York, 1948.

¹² United Nations, Copenhagen, 1995.

¹³ UNESCO World Conference on Education for All, Jomtien, Thailand, 1990.

the next generation but, through the decisions of governments and institutions, powerfully shapes the social environment in which families live.” (McNeill, 2010, p. 62) Canadian governments at all levels must be cognizant that our “children are the living messages we send to a time we will not see.” (John W. Whitehead, Attorney and Founder of the Rutherford Institute)

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Appendix A

Strengthening the Social Determinants of Health: The Toronto Charter for a Healthy Canada

From November 29 to December 1, 2002 a conference of over 400 Canadian social and health policy experts, community representatives, and health researchers met at York University in Toronto, Canada to: a) consider the state of ten key social or societal determinants of health across Canada; b) explore the implications of these conditions for the health of Canadians; and c) outline policy directions to improve the health of Canadians by influencing the quality of these determinants of health. The conference took place at a time when Canadian social and health policies were undergoing profound changes related to shifting political, economic, and social conditions.

Ten social determinants of health—early life, education, employment and working conditions, food security, health services, housing, income and income distribution, social exclusion, the social safety net, and unemployment and job insecurity were chosen on the basis of their prominence in Health Canada and World Health Organization policy statements and documents.

The conference was a response to accumulating evidence that growing social and economic inequalities among Canadians are contributing to higher health care costs and other social burdens. Indeed, the Kirby Report on the Federal Role in Health Care points out that 75% of our health is determined by physical, social, and economic environments. Evidence was also accumulating that a high level of poverty—an outcome of the growing gap between rich and poor—has profound societal effects as poor children are at higher risk for health and learning problems in childhood, adolescence, and later life, and are less likely to achieve their full potential as contributors to Canadian society.

The Social Determinants of Health Across the Life-Span Conference coincided with the release of the Romanow Report on the Future of Health Care in Canada that called for strengthening the Canadian health care system by expanding its coverage, resisting privatization, and increasing financial investment. The report also discusses the importance of economic and social determinants of health. The evidence heard at the conference reinforced the view that immediate and long-term improvements in the health of Canadians depend upon investments that address the sources of health and disease.

The participants at the Social Determinants of Health Across the Life-Span Conference therefore resolve:

Whereas the evidence is overwhelming that the health of Canadians is profoundly affected by the social and economic determinants of health, including—but not restricted to—early life, education, employment and working conditions, food security, health care services, housing, income and its distribution, social exclusion, the social safety net, and unemployment and employment security; and

Whereas the evidence presented at the conference clearly indicates that the state and quality of these key determinants of health are linked to Canada's political, economic and social environments and that many governments across Canada have not responded adequately to the growing threats to the health of Canadians in general, and the most vulnerable in particular; and

Whereas these social determinants of health are also human rights as defined in the Universal Declaration of Human Rights and the International Covenant on Economic, Social and Cultural Rights, which Canada is obliged to protect and promote; and

Whereas the evidence presented indicates that investments in the basic social determinants of health will profoundly improve the health of Canadians most exposed to health threatening conditions—the poor, the marginalized, and those Canadians excluded from participation in aspects of Canadian society by virtue of their living conditions—therefore providing health benefits for all Canadians; and

Whereas the evidence presented to us has indicated the following to be the case:

1. **Early childhood development** is threatened by the lack of affordable licensed childcare and continuing high levels of family poverty. It has been demonstrated that licensed quality childcare improves developmental and health outcomes of Canadian children in general, and children-at-risk in particular. Yet, while a national childcare program has been promised, 90% of Canadian families with children lack access to such care.
2. **Education** as delivered through public education systems has helped to make Canada a world leader in educational outcomes but our education systems are now at risk due to funding instability and poorly developed curriculum in many provinces. These conditions may weaken the trend toward greater number of students graduating despite evidence that those who do so show significantly better health and family functioning than non-graduates.
3. **Employment and working conditions** are deteriorating for some groups—especially young families—with potential attendant health risks. One in three adult jobs are now either peripheral or precarious as a result of increasing contracting out of core jobs and privatization of public employment. These jobs are often temporary, with low pay and high stress. Precarious working situations are directly related to the weakening of labour legislation in many jurisdictions. These changes threaten the gains made by workers in the past, jeopardizing their health and wellbeing.
4. **Food security** among Canadians and their families is declining as a result of policies that reduce income and other resources available to low-income Canadians. In Canada, food insecurity exists among 10.2% of Canadian households representing 3 million people. Monthly food bank use is 747,665 or 2.4% of the total Canadian population, which is double the 1989 figure; 41% of the food bank users or 305,000 are children under the age of 18.
5. **Health care services** can become a social determinant of health by being reorganized to support health. Many examples of effective—but all-too-rarely implemented—means of preventing deterioration among the ill through chronic disease management and rehabilitation are available. Screening that has been carefully assessed for its effectiveness can support health. Preventing disease in the first place by promoting the social and living conditions that support healthy lifestyles has also been neglected. While the Romanow Report reaffirmed the principles of the Canada Health Act, missing were strong statements about the important roles public health, health promotion, and long-term care play in supporting health.
6. **Housing shortages** are creating a crisis of homelessness and housing insecurity in Canada. Lack of affordable housing is weakening other social determinants of health as many Canadians are spending more of their income on shelter. More than 18% of Canadians live in unacceptable housing situations and one in every five renter households spent 50% or more of their income on housing in 1996, an increase of 43% since 1991.
7. **Income and its equitable distribution** have deteriorated during the past decade. Despite a 7-year stretch of unprecedented economic growth, almost half of Canadian families have seen little benefit as their wages have stagnated. Governments at all levels have let the after-tax-and-transfer income gap between rich and poor grow from 4.8:1 in 1989 to 5.3:1 in 2000. The growing vulnerability of lower-income Canadians threatens early childhood, education, food security, housing, social inclusion, and ultimately, health. Low-income Canadians are twice as likely to report poor health as compared to high-income Canadians.
8. **Social exclusion** is becoming increasingly common among many Canadians. Social exclusion is the process by which Canadians are denied opportunities to participate in many aspects of cultural, economic, social, and political life. It is especially prevalent among those who are poor, Aboriginal people, New Canadians, and members of racialized—or non-white—groups. As our racialized composition grows, it is unacceptable that these groups earn 30% less than whites and are twice as likely to be poor. These trends contribute to social and political instability in our society.

9. **Social safety nets** are changing in character as a result of shifting federal and provincial priorities. The 1990s have seen a weakening of these nets that constitute threats to both the health and wellbeing of the vulnerable. The social economy may provide opportunities for community organizations to provide services in more democratic, transparent and community-sensitive ways. It may be, however, unable to meet emerging needs without further burdening caregivers in the community, many of whom are women, or inadequately compensating them.
10. **Unemployment** continues at high levels and **employment security** is weakening due to the growth of precarious, unstable, and non-advancing jobs. Higher stress, increasing hours of work, and increasing numbers of low-income jobs are the mechanisms that link employment insecurity and unemployment to poor health outcomes. Unionized jobs are the most likely to help avoid these health-threatening conditions.
11. **Canadian women, Aboriginal people, Canadians of colour, and New Canadians** are especially vulnerable to the health-threatening effects of these deteriorating conditions. This is most clear regarding income and its distribution, employment and working conditions, housing affordability, and the state of the social safety net.

It is therefore resolved that:

Governments at all levels should review their current economic, social, and service policies to consider the impacts of their policies upon these social determinants of health. Areas of special importance are the provision of adequate income and social assistance levels, provision of affordable housing, development of quality childcare arrangements, and enforcement of anti-discrimination laws and human rights codes. It is also important to increase support for the social infrastructure including public education, social and health services, and improvement of job security and working conditions;

Public health and health care associations and agencies should educate their members and staff about the impacts of governmental decisions upon the social determinants of health and advocate for the creation of positive health promoting conditions. Particularly important is these associations and agencies joining current debates about Canadian health and social policy decisions and their impacts upon population health;

The media should begin to seriously cover the rapidly expanding findings concerning the importance of the social determinants of health and their impacts upon the health of Canadians. This would strike a balance between the predominant coverage of health from a biomedical and lifestyle perspective. It would also help educate the Canadian public about the potential health impacts of various governmental decisions and improve the potential for public involvement in public policymaking; and that

Immediate Action

As a means of moving this agenda forward, the conference recommends that Canada's federal and provincial/territorial governments immediately address the sources of health and the root causes of illness by matching the \$1.5 billion targeted for diagnostic services in the Romanow Report on the Future of Health Care in Canada and allocating this amount towards two essential determinants of health for children and families: 1) affordable, safe housing; and 2) a universal system of high quality educational childcare; and

Long-Term Action

Similar to governmental actions in response to the Acheson Inquiry into Health Inequalities in the United Kingdom, the federal government should establish a Social Determinants of Health Task Force to consider these findings and work to address the issues raised at this conference. The Task Force would operate to identify and advocate for policies by all levels of government to support population health. The federal and provincial governments would respond to these recommendations in a formal manner through annual reports on the status of these social determinants of health.

So resolved, this December 1, 2002, in Toronto, Canada, and Ratified, February 10, 2003.
(D. Raphael, 2009, pp. 378-381)

Appendix B

Letter regarding the Use of Early Development Index (EDI) Data



April 11, 2013

Ms. Candice M. Christmas
Master of Arts Candidate
Queen's University
68 Regent Street
Kingston, Ontario
K7L 4J7

RE: Use of 2006 Early Development Instrument Data

To whom it may concern:

Please let this letter serve to confirm that Early Development Instrument (EDI) data for 2006 was provided in aggregate form to Ms. Christmas for the purpose of her Master's thesis entitled *Disentangling the Effects of Material and Social Deprivation on Early Childhood Development in the Kingston, Frontenac, Lennox and Addington Public Health Planning Area*.

Yours truly,

A handwritten signature in cursive script that reads "Laurie Dixon" followed by a horizontal line.

Laurie Dixon
Data Analysis Coordinator – Kingston and the Islands
Limestone Advisory for Child Care Programs
The Ontario Early Years Centre for Kingston & the Islands
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Appendix C

Maps of Deprivation in the KFL&A Catchment Area

Map of Material Deprivation (Pampalon)



Legend:

- Q1 (Least Deprived) 
- Q2 
- Q3 
- Q4 
- Q5 (Most Deprived) 

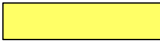




Note: White areas indicate data was missed or suppressed.

Maps of Deprivation in the KFL&A Catchment Area

Map of Material Deprivation (OnMarg)



Legend:

- Q1 (Least Deprived) 
- Q2 
- Q3 
- Q4 
- Q5 (Most Deprived) 

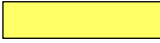




Note: White areas indicate data was missed or suppressed.

Maps of Deprivation in the KFL&A Catchment Area

Map of Social Deprivation (Pampalon)



Legend:

- Q1 (Least Deprived) 
- Q2 
- Q3 
- Q4 
- Q5 (Most Deprived) 

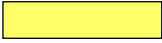




Note: White areas indicate data was missed or suppressed.

Maps of Deprivation in the KFL&A Catchment Area

Map of Residential Instability (ONMarg)



Legend:

- Q1 (Least Deprived) 
- Q2 
- Q3 
- Q4 
- Q5 (Most Deprived) 

Note: White areas indicate data was missed or suppressed.