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Early Childhood Development (ECD) Literature Review

(Factors that influence early childhood development, home visitation and community-based collaborative programs, as well as the features of those programs or interventions that promote health equity)

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Prepared for the Trail Area Health and Environment Committee (THEC)

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Early Childhood Development (ECD) Literature Review

MAIN DOCUMENT

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PREFACE

This literature review explored the research on requested early child development (ECD) topics, specifically the factors affecting healthy early child development, the benefits and effectiveness of in-home visiting and community-based collaborative initiatives, and the features of ECD interventions that promote equity of outcomes.^a As per the terms of reference, this review does not attempt to speak to, describe, or evaluate programs within Trail or other communities. Some evaluative comments emerge in this review; it should be noted that any such statements come from the literature itself and not from an assessment carried out by the authors of this review. Any evaluative comments should be considered within the context of the section within which they appear and attributed to the researcher(s) of that work.

OVERVIEW

The Trail Area Health and Environment Committee (THEC) has a goal, approved through community consultation in 2010, to reduce the average blood lead levels for children 6 to 36 months in Trail to 4 µg/dL by 2015.¹ THEC seeks to ascertain whether more can be done at a family or community level to help improve early childhood development (ECD) and children's health outcomes in the population and thereby create resilience or protection, or offset in some way the potential negative impacts from children's exposure to low levels of lead. For this reason, a scoping review of the literature was undertaken to map evidence-based information pertaining to ECD factors, in-home visitation, and interventions aimed at fostering healthy ECD through in-home visits and community-based collaborative programs. Features of community and home visiting programs or interventions that may promote health equity are also of interest. Lead, other heavy metals, and chemical agents are not the focus of this review.

With respect to factors that influence ECD, evidence is grouped by seven categories: health and safety; education; material well-being, equity; family and peer relationships; participation; subjective well-being; behaviours and risks; and environment. In each category, the assembled evidence speaks to the global pool of knowledge and a number of conclusions stand out. For example, in relation to health and safety, responsiveness and appropriate maternal-infant interaction are vital parenting tools with wide-ranging benefits for the child, from better cognitive and psychosocial development to protection from disease and mortality. Interventions are effective in enhancing maternal responsiveness, resulting in better child health and development, especially for the neediest populations.

With respect to home visitation programs and their role in ECD, evidence is reported by eight domains in which programs aim to improve outcomes: general; child development and school readiness; child health; maternal health; positive parenting practices; reductions in child maltreatment; reductions in juvenile delinquency, family violence, and crime; low income, disadvantaged mothers, families; and teen

^a Technically, this literature review could be described as a scoping or mapping review. This type of review provides an assessment of the literature where the aims are to identify the nature and extent of the research evidence and provide an overview of the type, extent, and quantity of research available on a given topic. By 'mapping' or categorizing existing research, this type of literature review can identify themes and trends related to a topic as well as potential research gaps and future research needs. It does not include a formal assessment of the quality of the literature.

moms, at-risk moms. Key findings were summarized for each domain. For example, in the domain entitled “low income, disadvantaged mothers”, several systematic reviews conclude that home visiting is considered to be a promising intervention for socially disadvantaged families with young children. Various programs are effective in mitigating various adverse early child experiences, and factors such as parental engagement, agency partnership, etc., play a role in successful program outcomes. Initiatives involving hubs, networks, and coalitions are wide-ranging, and evidence suggests that programs involving collaboration, a good mix of partners, strong leadership, and efficient structures result in better outcomes. Examples of hubs, networks, and collaborative practice from several countries and regions are included.

In contemplating features of home visiting interventions that may promote equity, research has highlighted aspects such as facilitators (e.g., accessibility of courses) and barriers (e.g., parents’ resources, stigma around attending groups, and accessibility of venues).

This review summarizes a wealth of information regarding healthy ECD, but to be clear, this review is not intended to be comprehensive in its scope of factors related to healthy ECD, the related evidence base or programs; it is intended to provide an overview of the evidence-based literature and a selection of community-based collaborative programs designed to improve maternal nutrition, breastfeeding, attachment, etc. In this review, evidence is assembled rather than assessed as a way to identify the diverse variety of factors, activities, and programs that contribute to healthy ECD. In addition to presenting a selection of programs tailored to address social, biological, and environmental determinants of children’s health, this review includes evidence-based programs and promising practices related to material well-being, with a focus on low income, socially disadvantaged groups or families at risk. Programs range from home improvement loan programs (Norway), to partnering with bakeries to provide breakfast in schools in low income areas (US), to in-home nutrition interventions on children’s dietary outcomes by relative social disadvantage (US), to toddler fairs for children’s dental and hearing screening for hard-to-reach families (Canada).

Ideally, best practice programs designed for small communities that can be implemented through feasible, collaborative agency are of particular interest in this review. These programs serve to illustrate the benefits of community collaborative initiatives, including in-home visits towards the promotion of healthy ECD. Specific programs are described that could be developed to further promote healthy ECD. Other programs rated as “promising” or “good ideas” and/or implemented at a broader scale (e.g., regionally-administered) are also considered. Generally, home visiting is one of several service strategies embedded in a comprehensive, high-quality early childhood system that promotes maternal, infant and early childhood health, safety and development; strong parent-child relationships; and responsible parenting among mothers and fathers.

For this review, the scientific literature was scoped using select databases available through the University of British Columbia; grey literature was scoped mainly using online portals, resource libraries, and annotated lists. The majority of programs were identified through portals of best practices such as the Public Health Agency of Canada’s Best Practices site² along with a variety of other peer reviewed or scholarly resources.

SECTION I: INTRODUCTION

The early years lay the foundation of healthy child development and life-long learning.³⁻⁵ With respect to children's early environmental exposures, the history of research on lead neurotoxicity is extensive and evidence of adverse effects at lower and lower levels of exposure continues to grow.⁶ In 2013, Health Canada produced a State of Science report on lead and concluded that *"there is sufficient evidence that blood lead levels below 5 µg/dL are associated with adverse health effects"* and *"additional measures to further reduce exposures of lead to Canadians are warranted."*⁷ In 2012, the US CDC published a statement on the lack of evidence that any blood lead level (BLL) can be considered to be "safe".⁸ In June 2012 the National Toxicology Program concluded that adverse health effects occur at levels below even 5 µg/dL.⁹

Chronic lead poisoning in children shows a strong association with neurodevelopmental effects such as decreased IQ, attention deficit and impaired motor coordination.^{7, 10} Prenatal lead and cadmium exposure has also shown to influence infant neurodevelopment at 6 months of age.¹¹ In a recent study of early childhood lead exposure on educational test performance among Connecticut schoolchildren, Edwards et al. (2013) showed that the magnitude of decreases in test scores associated with lead indicate important implications of early childhood lead exposure on academic performance at fourth grade.¹² In a 2012 prospective study, Huang et al. reported that low-level postnatal BLLs in children at 2 to 5 years may have delayed effects on neurodevelopment in those at 5 to 8 years.¹³ Limited Canadian data indicate that school drinking water can be an important component of children's overall exposure to lead.¹⁴ Recent research suggests that the relative contribution of lead in water to lead in blood is expected to become increasingly important.¹⁵

Strategies to mitigate the impact of lead include primary prevention of exposure through emissions reduction and secondary interventions such as in-home visitation programs that have education components for lead reduction exposure. Internationally, the World Health Organization manages children's environmental health information and programs, including lead initiatives.¹⁶ In Canada, lead awareness and reduction information is provided through Health Canada.^{17, 18} In the community of Trail, British Columbia, the Trail Area Health and Environment Program provides information and supports at a local level to help prevent lead exposure and promote children's healthy development.¹⁹ In the United States, the Environmental Protection Agency²⁰ and Centers for Disease Control and Prevention²¹ have key roles in lead prevention. Various state and county lead intervention programs have been established, for example the Childhood Lead Poisoning Prevention Program - Community Capacity Project (Milwaukee, IL)²²; the Chronic Lead Poisoning Team Intervention Program (Milwaukee, IL)²³; Lead Safe Babies (Philadelphia, PA)²⁴; the Philadelphia Lead Safe Homes Study²⁵; Childhood Lead Poisoning Prevention (St. Louis, MO)^{22, 26}; the Invest in Children Primary Lead Prevention Project (Cleveland, OH)²⁷; Lead Poisoning and Prevention Program (Hartford, CT)²⁸; Alameda County Healthy Homes (Oakland, CA)²⁹; the Niagara County Childhood Lead Poisoning Prevention Program (Niagara County, NY)³⁰; Community Participatory Lead Reduction Initiative (Grand Rapids, MI)³¹; Girls Take Charge to get the Lead Out (Omaha, NE)³²; and Lead Free Wheels (Ann Arbor, MI).³³ An example of a program internationally is the Lead Reduction Program (Broken Hill, Australia).³⁴

Lanphear, who collaborated with Yeoh et al. (2012) in a systematic literature review of the efficacy of lead hazard controls to reduce children's BLLs,³⁵⁻³⁷ points to the need for effective, evidence-based methods for reducing lead in house dust, soil, water, and consumer products, and notes that trials are required to establish the most effective intervention for prevention of lead exposure. Primary prevention of exposure is critical, supplemented with evidence-based secondary measures specific to

lead. Additionally, healthy child development strategies may include evidence-based early childhood development program components generally to offset environmental challenges that may be present in communities. In earlier research, it was stated also that enriched environments during development may be protective against lead-induced neurotoxicity.³⁸

In the community of Trail, efforts have been successful at lowering BLLs of the most vulnerable population, children aged 6 months to 3 years, from an average of 13 µg/dL in 1989 to about 5 µg/dL today.¹ Trail Area Health and Environment Program (THEP) activities include:^b

- reduction of emissions from the smelter,
- soil testing and remediation,
- primary prevention home visits and education from public health nurses and “healthy homes” program staff,
- children’s blood lead testing and case follow-up support for families (as needed),
- education for families and the community,
- involvement in a community coalition to enhance early childhood development, and
- ecological remediation.

These activities serve as a continuum of interventions from primary to secondary as well as from ecosystem to community to family. The focus of interventions is on primary prevention of children’s lead exposure within a context of helping improve the health and well-being of young children in the community.

The Trail Area Health and Environment Committee (THEC) has a goal, approved through community consultation in 2010, to reduce the average BLL in Trail to 4 µg/dL by 2015.¹ Teck, a lead-zinc smelter refinery in Trail, has an enhanced program to reduce “fugitive” emissions on its site which is anticipated to help in the BLL reduction goal. THEC also seeks to ascertain whether more can be done, at a family or community level, to help improve early childhood development (ECD) and/or children’s health outcomes in the population and thereby create resilience or protection, or offset in some way the potential negative impacts from children’s exposure to low levels of lead. For this reason, a literature scoping review was undertaken to examine: (1) evidence-based information pertaining to factors other than blood lead levels that influence ECD, (2) in-home visiting and community-based collaborative programs aimed at improving ECD and children’s health, and (3) features of those interventions that may promote health equity.^c The goal of the review was to identify the best evidence available, focusing on published systematic reviews. In the absence of systematic reviews, other reviews were considered along with randomized controlled trials in order to gain an understanding of the state of evidence related to factors influencing healthy child development.

^b See Program Diagram at <http://www.thep.ca/pages/about-the-program/> for a visual summary of the program areas.

^c Literature Search Proposal, available upon request.

SECTION II: METHODOLOGY

i. Elements of the Scoping Review

The primary goal of this scoping review of the literature was to locate scholarly journal articles and grey literature with content relevant to early childhood development, interventions, and community-based collaborative programs designed to promote healthy child development. The search included scoping of features of interventions and/or programs that may promote equity. Since systematic reviews and meta-analyses provide strong, evidence-based direction by synthesizing findings in a transparent way and providing a global pool of knowledge, they formed the majority of content of this review. Other reviews and randomized controlled trials were included to supplement topics either where systematic reviews were scant or reviews/trials provided useful additional perspective and evidence. Various background documents were included to contextualize topics.

The underlying aim of the scoping review was to identify papers that may be useful in reporting about healthy child development factors (excluding blood lead/heavy metals and chemical agents); family in-home visits and community-based collaborative interventions aimed at improving early child development and children's health outcomes; and features of interventions that may promote health equity or protect against increased inequities.

Key search statements used to locate articles are provided (Appendix I). Additional terms and combinations were used to fine-tune results. A date restriction, 2000 January -2013 June, was imposed, and English-only material was included.^d The scientific literature was scoped primarily using select databases (Table 1a); grey literature was scoped mainly using online portals, resource libraries, and annotated lists (Table 1b).

Portals included documented and ranked programs ranging from good ideas to evidence-based practices. Best effort was made to review all programs noted in portals, compendiums, etc., although with so many initiatives only a cursory review could be completed to identify and group resources. Too, best effort was made to select programs with community-based collaborative aspects, although some home visiting programs, etc., were included due to best practice ranking, but may not exhibit collaborative components. Where possible, programs promoting equity or targeting inequity were grouped separately but in this review, programs may be included which have equity/inequity components that are not specifically identified and grouped. More review of specific practices may be required to identify equity features or features of interventions that promote health equity or protect against increased inequities.

^d For some European community-based collaborative programs

Table II.a: Databases used to search for scientific literature

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| <ul style="list-style-type: none"> ➤ <i>Cochrane Database of Systematic Reviews</i> <ul style="list-style-type: none"> • UBC online subscription with full-text access to regularly updated systematic reviews by the Cochrane Collaboration. |
| <ul style="list-style-type: none"> ➤ <i>Ebsco</i> <ul style="list-style-type: none"> • UBC online subscription with access to approximately 70 databases including Academic Search Complete, Academic Search Premier, CINAHL, ERIC, Family & Society Studies Worldwide, Medline, PSYInfo and Social Work Abstracts |
| <ul style="list-style-type: none"> ➤ <i>Google Scholar (and Google)</i> <ul style="list-style-type: none"> • Freely available Internet search engine (http://scholar.google.com) specifically for scholarly journal articles, books, dissertations, and technical reports. Google, itself, provides an additional search tool for grey literature, particularly, and book chapters, misc reports |
| <ul style="list-style-type: none"> ➤ <i>Health Evidence</i> <ul style="list-style-type: none"> • Freely available portal (http://www.healthevidence.org/) supported by McMaster University for access to 3,185 quality-rated systematic reviews evaluating the effectiveness of public health interventions. |
| <ul style="list-style-type: none"> ➤ <i>Web of Science</i> <ul style="list-style-type: none"> • UBC online subscription with full-text access sciences, social sciences, arts, and humanities literature and proceedings of international conferences, symposia, seminars, colloquia, workshops, and conventions. This resource was used to locate miscellaneous sources not found in other sources and to extend citation chaining where possible. |

Table I.b: Portals, annotated lists, compendiums, and other resources used to search grey literature

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| <ul style="list-style-type: none"> ➤ <i>Portals</i> <ul style="list-style-type: none"> • Blueprints for Healthy Youth Development. Boulder, CO • Building Blocks. Commissioner for Children and Young People Western Australia • California Evidence-Based Clearinghouse, CEBC4. Los Angeles, CA • Canadian Best Practices – Maternal and Child Health. Public Health Agency of Canada. Ottawa, ON • Health Innovation Portal - Search for Innovative Practices. Toronto, ON: Health Council of Canada. • Healthy Communities Institute (various state and county databases), e.g., <ul style="list-style-type: none"> ▪ Arizona Health Matters - Promising practices online portal ▪ DC Health Matters - Promising practices online portal ▪ Health Matters in San Francisco – Promising practices online portal ▪ Healthy Kern County - Promising practices online portal ▪ Healthy San Bernadino County - Promising practices online portal ▪ Healthy Sonoma - Promising practices online portal • HOME visiting evidence of effectiveness. U.S. Department of Health and Human Services. Washington, DC. • National Association of County and City Health Officials (NACCHO) Model Practice Search. Washington, DC |
|---|

- [Office of Juvenile Justice and Delinquency Prevention Strategic Planning Tool](#). Washington, DC
- [Prevention and Early Intervention Network](#). Dublin, Ireland
- [Promising Practices Network on children, families and communities](#). Alhambra, CA
- [Promising Practices Profiles](#) (no longer updated). Australia
- [Substance Abuse and Mental Health Services Administration \(SAMHSA\) Model Programs - National Registry of Evidence-based Programs and Practices](#)
- [What Works Clearinghouse](#). Washington, DC. U.S. Department of Education

➤ *Resource Libraries, etc.:*

- *Centre for Environmental Health Equity* (<http://www.cehe.ca/children>)
- *Centre of Excellence for Early Childhood Development – online encyclopedia* (<http://www.excellence-earlychildhood.ca/home.asp>)
- *Human Early Learning Partnership (in-house database)*
- *National Collaborating Centre for Determinants of Health* <http://nccdh.ca/resources/library/> and http://nccdh.ca/images/uploads/Environ_Report_EN.pdf
- *National Collaborating Centre for Environmental Health* (<http://ncceh.ca> and http://www.ncceh.ca/sites/default/files/Community_Planning_Equity_Lens_Aug_2011.pdf)
- *Select government health websites by region/jurisdiction; select not-for-profit health/child development websites by region/jurisdiction*

➤ *Compendiums, Annotated Lists, etc.:*

- Anglin M. [Literature review: the role of families and communities in building children's literacy skills](#). Toronto, ON: Frontier College; 2008.
- Armstrong L, Flynn RJ. [Summary of evidence-based prevention programs](#). Ottawa, ON: University of Ottawa; 2007.
- Association of State & Territorial Dental Directors (Feb). [Best practice approaches - prevention and control of early childhood tooth decay](#). Sparks, VA; 2013.
- Bamber J, Owens S, Schonfeld H, Ghate D, Fullerton D. [Effective community development programmes. A review of the international evidence base](#). Dublin, Ireland: Centre for Effective Services; 2010.
- Center for Mental Health in Schools at UCLA. [Annotated "lists" of empirically supported/evidence based interventions for school-aged children and adolescents](#). Los Angeles, CA.
- Child Wellbeing & Child Protection - NSW Interagency Guidelines. [Key prevention and early intervention programs in NSW](#). North Sidney, NSW Government, Family and Community Services.
- Coalition for Evidence-Based Policy. [Social programs that work. What works in social policy? Findings from well-conducted randomized controlled trials](#). Washington, DC.
- Department of Health Promotion and Education. [Strengthening America's Families](#). Salt Lake City, UT: University of Utah.
- Duke Endowment. [Evidence-based programs in North Carolina and South Carolina](#). Charlotte, NC: Duke Endowment; 2008.
- Centre for Effective Services. [Prevention and Early Intervention Initiative in Republic of](#)

- [Ireland and Northern Ireland](#). Dublin, Ireland, CES.
- Glassheim B. [A guide to evidence-based mental health practices for children, adolescents and their families](#). Saginaw, MI: Saginaw County Community Mental Health Authority; 2006.
 - Health Council of Canada (2011). [Understanding and improving aboriginal maternal and child health in Canada: compendium of promising practices](#). Toronto, ON,
 - Her Majesty's Government (UK). [Early intervention: the next steps](#). London, UK; 2011.
 - Howse RB, Trivette CM, Shindelar L, Dunst CJ, North Carolina Partnership for Children Inc. [The Smart Start Resource Guide of evidence-based and evidence: a summary of evidence](#). Raleigh, NC.
 - Illinois Criminal Justice Information Authority. [Smarter solutions for crime reduction: an online resource for policymakers and practitioners](#). Chicago, IL.
 - Lyn, A. [Middle childhood matters: an inventory of full-week after-school programs for children 6-12 years in Toronto](#). Toronto, ON: Community Social Planning Council of Toronto and Middle Childhood Matters Coalition; 2010.
 - Ontario Health Promotion E-Bulletin. [Introducing a series of new Maternal and Infant Health Interventions to the Canadian Best Practices Portal](#). OHPE Bulletin. 2013;796.
 - Ontario Physical Health and Education Activities. [Mental health promotion and physical activity. Recommended reading and references](#). Toronto, ON: OPHEA.
 - Partnership for Results. [School-based & after school programs for Children](#). Auburn, NY: Partnership for Results; 2005.
 - Ramage J. [Early intervention and prevention in family support. Synthesis report. Peer review seminar](#); May 30-Jun 1; Belfast, N Ireland: EuroChild, European Union. European Platform for Investing in Children; 2012.
 - Rice et al. (2011). [What works in combating childhood obesity: an anthology of the literature on effective whole-system approaches](#). London, UK: Centre for Excellence and Outcomes in Children and Young People's Services.
 - Strode, A. [A summary of best and promising mental health practices for select consumer populations](#). Spokane, WA: Washington Institute for Mental Illness Research and Training; 2003.
 - Tully L. [Early intervention strategies for children and young people 8 to 14 years. Literature review](#). Ashfield, NSW: NSW Department of Community Services, Centre for Parenting & Research; 2007.
 - U.S. Department of Agriculture. [Childhood obesity: a resource list for educators and researchers](#). Beltsville, MD: National Agricultural Library, Food and Nutrition Information Center; 2013 Jun.
 - U.S. Department of Justice, U.S. Department of Health and Human Services. [Evidence-based practices for children exposed to violence: a selection from federal databases](#). Washington, DC: DHHS; 2011.
 - Williams A. [Compendium of inspiring practices. Early intervention and prevention in family and parenting support](#). Brussels, Belgium: Eurochild; 2012
 - Yannacci J, Rivard JC. [Matrix of children's evidence-based interventions](#). Alexandria, VA: NASMHPD Research Institute, Center for Mental Health Quality and Accountability; 2006 Apr.

Bibliographies of retrieved articles were reviewed, and select authors were searched forward and backward to uncover additional literature. Web of Science was used for citation chaining and mapping for particularly relevant articles. Google was used to locate grey literature with search specific controls (e.g., file type, institution, title phrases).

The following parameters guided the selection of literature for review:

- * Literature from programs offered in Canada, United States, Europe, Australia, Britain, Northern Ireland, Republic of Ireland, Scotland, New Zealand and other countries in the Western world
- * Programs conducted in a variety of settings such as in-home, community centres, public health units/departments, care centres, etc.; not-for-profit
- * Programs delivered by a variety of facilitators ranging from health professionals to community health workers
- * Programs delivered within the last 10 years
- * Programs with community-based collaborative features
- * Programs noting sensitivity to cultural diversity, education, literacy and socioeconomic status (note: where low income or socially disadvantaged foci were identified, these programs were grouped for independent consideration)
- * Programs not specific to special needs, disabilities, disorders (e.g., FASD, autism)
- * Findings presented in English^e

Literature review results were separated into two broad categories: (i) evidence-based papers pertaining to healthy child development, home visiting, and community-based collaboration, and (ii) programs themselves, with home visiting and community-based collaboration aspects. Accordingly, information is presented in this review that, first, relates to the evidence base and, second, highlights related programs. It was not possible to scrutinize the evidence base associated with each program and that was not the aim of the scoping review.

To further examine the evidence base and programs related to healthy child development, a framework was developed that distinguishes healthy child development as follows: Health and Safety; Education; Material Well-Being; Family and Peer Relationships; Participation; Subjective Well-being; Behaviours and Risks; and Environment. This framework incorporates the dimensions of child and youth health and well-being included in the “Child and Youth Health and Well-Being Indicators Project: CIHI and B.C. PHO Joint Summary Report (2013)”³⁹ and is based primarily on the work of “Building Blocks: best practice programs that improve the well-being of children and young people - Commissioner for Children and Young People Western Australia (2012).”⁴⁰ Descriptions of the developmental domains are adapted from the Commissioner’s report. The framework is presented in Section III.

(2) Limitations of the Scoping Review

There are limitations to this review and five important ones are identified.

First, the breadth of the topics included in this review makes it difficult to claim comprehensiveness in identifying related systematic reviews or, in the absence of those, meta-analyses and randomized trials. Therefore, what is reported should be considered a guide to potential areas to concentrate, and further research and literature should be explored as interests are narrowed.

Second, some topics overlap – for example, home visiting programs aimed at improving aspects of maternal health may be targeted at low income or at-risk women, so related reviews may be described under any of the following: “2d. *Maternal health*”, “2h. *Low income, disadvantaged mothers, families*”, or “2i. *Teen moms, at-risk moms*”. In most cases, reviews were categorized first by target population, but if there was not a clearly identified group to whom the intervention was directed, then a broader

^e With some exceptions

category was selected to place the review. Duplication was avoided; however some publications have been cited within two categories due to relevance in both.

Third, some topics have multiple components or sub-topics – for example, child health has various related areas such as *health and safety, healthy nutrition, physical activity, dental, built environment*. In some cases it was challenging to ensure that all areas were adequately addressed and properly categorized or cross-categorized.

Fourth, the focus of the literature review was mainly high income countries, with publications in English. Special populations such as children with special needs, disabilities, disorders, were not considered within the context of this review.

Fifth, this review is based heavily on summaries of abstracts and excerpts from publications. Excerpts and statements have been attributed to authors, and any portion of this review that is cited should acknowledge primary sources.

Overall, it is believed that this overview includes key publications for topics -- the majority being systematic reviews -- so that meaningful conclusions can be drawn from this work. The evidence reported in this overview would be applicable to children's programs and services in Canada and other western developed countries.

SECTION III: RESULTS

(1) *Factors that influence children’s healthy development (excluding blood lead/heavy metals, pesticides/chemical agents)*

Children’s development is influenced by a complex set of biological, social and environmental factors interacting over the life course. Boivin et al. (2012) state that “early child development is an emergent property of multiple levels of influence in the complex social ecosystems where children grow up, live, and learn.”⁴¹ Boivin et al. (2012) and Evangelou (2009) provide an extensive review of the evidence that identifies the best supportive contexts for children’s early learning and development, focusing on interaction and relationships as well as physical surroundings.⁴² Kilburn (2013) discusses the growing body of evidence that psychological health, in addition to physical health, in childhood is associated with long-term outcomes and she also examines the implementation and effectiveness of policies that aim to promote child health.⁴³ The Harvard report (2010), “*The foundations of lifelong health are built in early childhood*”, provides a summary of multi-level macro to micro influences and also a framework for action.⁴⁴ The foundations of lifelong health refer to three domains of influence that establish a context within which the early roots of physical and mental well-being are either nourished or disrupted⁴⁴:

- *A stable and responsive environment of relationships. This domain underscores the extent to which young children need consistent, nurturing, and protective interactions with adults that enhance their learning and behavioral self-regulation as well as help them develop adaptive capacities that promote well-regulated stress response systems.*
- *Safe and supportive physical, chemical, and built environments. This domain highlights the importance of physical and emotional spaces that are free from toxins and fear, allow active exploration without significant risk of harm, and provide supports for families raising young children.*
- *Sound and appropriate nutrition. This domain emphasizes the foundational importance of health-promoting food intake.*

In addition to this literature, other reviews are noted below to provide further context and evidence relating to a variety of determinants affecting children’s development. For this report, the following framework is used to present findings from the literature to enable a relatively detailed investigation of determinants within main categories:

A. Health and Safety

- abuse, neglect
- breastfeeding
- dental health, oral care
- early environment (pre/peri-natal: adversity, stress, gene-environment, intimate partner violence, attachment...)
- injury prevention
- nutrition, healthy eating, feeding, sleep
- physical/mental health (activity/inactivity, obesity)
- respiratory health (asthma)

B. Education

- child care, education (pre-school, kindergarten...)
- language, literacy

- C. Material well-being, equity (low income, socially disadvantaged, rural)^f
- childcare, education (pre-school, kindergarten)
 - dental health, oral care
 - family support (parenting, pre/peri-natal...)
 - housing, homelessness
 - hubs, networks
- D. Family and Peer Relationships
- parent education, supportive parenting
- E. Participation
- after school programs, arts
 - community leaders, healthy communities, social capital
 - mentoring
- F. Subjective Well-being
- social competence, cognitive/prosocial behaviour
 - mental health, well-being, anxiety
- G. Behaviours and Risks
- internalizing or externalizing behaviour, aggression, bullying, crime
 - substance abuse
- H. Environment
- air quality
 - built environment
 - gardens, markets
 - neighbourhoods, place, socioeconomic status

As noted in Section 2, this framework incorporates the dimensions of child and youth health and well-being included in the “Child and Youth Health and Well-Being Indicators Project: CIHI and B.C. PHO Joint Summary Report (2013)”³⁹ and is based primarily on the work of “Building Blocks: best practice programs that improve the well-being of children and young people - Commissioner for Children and Young People Western Australia (2012).”⁴⁰

^f Each section within this category includes programs which have low income/socially disadvantage aspects; there may be additional programs noted in other categories with these aspects, but select programs have been identified here.

1.A. Health and Safety

Being healthy and safe is strongly related to a child's well-being. In this review, the Health and Safety domain includes aspects such as the pre- and perinatal/family environment (adversity, stress, gene-environment interactions), maternal sensitivity, attachment, breastfeeding, nutrition, physical health (activity/inactivity and obesity), and respiratory health (asthma). This domain also includes child maltreatment (abuse, neglect) and injury prevention. Home visiting programs and their impact on children's health and safety are discussed primarily within Section II.

a. Abuse and Neglect

Boivin et al. (2012) produced a consensus document on the literature relating to adverse childhood experiences such as abuse, neglect, chronic poverty, family dysfunction, etc. that lead to poor mental health and unhealthy behaviours, and the evidence for the effectiveness of a variety of interventions to mitigate the adverse effects of environmental influences on the developing child.⁴¹ Hertzman (2013) elaborated on the significance of early childhood adversity and how social environments 'get under the skin' early in life.^{45, 46} Responsiveness and appropriate maternal-infant interaction are vital parenting tools with wide-ranging benefits for the child, from better cognitive and psychosocial development to protection from disease and mortality.⁴⁷ Interventions are effective in enhancing maternal responsiveness, resulting in better child health and development, especially for the neediest populations.

A selection of programs aimed at ameliorating aspects of the family environment, etc., to prevent or curb abuse and neglect is provided (Appendix II.1.A.a).

b. Breastfeeding

Benefits conferred by breastfeeding are supported by the review by Shulze and Carlisle (2010), but with a note that some benefits may be overstated.⁴⁸ The systematic review by Kramer and Kakuma (2001)⁴⁹ demonstrated no apparent risks in recommending exclusive breastfeeding for the first 6 months of life, and the systematic review by Arentz et al. (2004)⁵⁰ suggests that breastfeeding seems to have a small but consistent protective effect against obesity in children. The systematic review by Sikorski et al. (2003)⁵¹ supports the conclusion that supplementary breastfeeding support should be provided as part of routine health service provision, and Renfrew et al. (2005)⁵² report in their systematic review that to enable women to breastfeed changes are needed such as coordination of national with local policy; ongoing monitoring of rates of variation in infant feeding; requires coordination and support at various levels. These findings are further supported by U.S. Preventive Services Task Force recommendation on interventions during pregnancy and after birth to promote and support breastfeeding.⁵³

Health advantages of breastfeeding and the nutritional composition of breast milk are reasons that advisory bodies recommend this form of infant feeding as best practice.⁵⁴ In a systematic review by Tidswell and Langley-Evans (2011), they reported that breastfeeding helps to protect children up to seven years of age from developing asthma, but the evidence showed the benefits were not significant in reducing the risk of allergic reaction (e.g., allergic rhinitis, allergic asthma, or atopic dermatitis).⁵⁴ Delgado and Matijasevich (2013) conducted a systematic review to identify studies describing the global prevalence of breastfeeding up to two years of age or beyond and its effects on child growth and development.⁵⁵ Authors reported no association was found with child development and concluded "that

evidence on the medium-term effects of breastfeeding up to two years of age or beyond is scarce and contradictory.”⁵⁵

In a systematic review to investigate the impact of breastfeeding education on exclusive breastfeeding rates, Sarah et al. (2013) reported that education and/or support increased exclusive breastfeeding rates and decreased no breastfeeding rates at birth, less than 1 month and 1-5 months.⁵⁶ Combined individual and group counseling appeared to be superior to individual or group counseling alone.

A worldwide program that encourages maternity hospitals to implement a ten-step breastfeeding component is the Baby Friendly Initiative of the World Health Organization and UNICEF.⁵⁷ Many evidence-based early care and family environment programs have breastfeeding components and a selection of programs is provided (Appendix II.1.A.b). Additional information regarding the impact of home visiting on breastfeeding outcomes is reported in Section II.

c. Dental Health, Oral Care

Early childhood caries is an infectious disease involving a combination of factors, including social, behavioural, microbiologic, environmental, and clinical factors.^{44, 58} The disease occurs worldwide, afflicts predominantly disadvantaged children,⁵⁹ and can affect children’s social and emotional functioning and economic productivity later in life.⁶⁰⁻⁶² Guarnizo-Herreno and Wehby (2012) reported that dental problems are significantly associated with reductions in school performance and psychosocial well-being, such that improving dental health may benefit child academic achievement and cognitive and psychosocial development.⁶³

There are factors occurring during the first year of life affect early childhood caries experience.⁶⁴ Key risk indicators noted by Leong et al. (2013) were infant feeding practices, maternal circumstances and oral health, and infant-related oral health behaviours.⁶⁴ As for topical agents for caries prevention, only 2.26 percent fluoride varnish is recommended for children younger than six years.⁶⁵ The analysis of controlled clinical trial data by Hujoel (2013) identified vitamin D as a promising caries-preventive agent, leading to a low-certainty conclusion that vitamin D may reduce the incidence of caries.⁶⁶ Randomized, controlled trials appear to show benefit of home visiting programs on utilization of dental services to improve dental literacy and introduce children and their families to dental prevention.^{67, 68}

There is increasingly emphasis on social determinants of oral health – i.e., moving beyond focus on individual risk factors approaches.^{69, 70} Programs aimed at improving dental health of children are varied, including mobile dental clinics (Peel Region, Ontario) and child health fairs (Waterloo, Ontario) (Appendix II.1.A.c).

d. Early Environment (stress, supportive parenting, etc.)

Findings suggest that early adverse conditions have lasting implications for physical health, and that continued exposure to increased levels of stress in adolescence might be a mechanism by which early adversity impacts later physical health.⁷¹⁻⁷⁶ Glasheen et al. (2010) conducted a systematic review to assess the evidence of the effect of postnatal maternal anxiety on children and noted that the strongest evidence was in somatic and psychological outcomes, but the evidence for an effect of postnatal maternal anxiety on child development was inconclusive.⁷⁷ In a later systematic review by Kingston et al. (2013) who conducted a systematic review of studies assessing the effect of prenatal and postpartum maternal psychological distress, findings suggest that prenatal distress can adversely affect cognitive,

behavioural, and psychomotor development, and that postpartum distress contributes to cognitive and socioemotional development.⁷⁸

Data from animal and human studies indicate that the prenatal environment plays a significant role in shaping children's neurocognitive development. In particular, two experiences relatively common in pregnancy - an unhealthy maternal diet and psychosocial distress - significantly affect children's future neurodevelopment.⁷⁹

The association between the home environment and children's temperament can be genetically or environmentally mediated.⁸⁰⁻⁸² Associations between maternal sensitivity and internalizing problems have been reported, confirming the importance of sensitive parenting for positive development in the preschool years.⁸³ Early intervention with young children and caregivers living with Intimate Partner Violence (IPV) provides a significant buffer to the negative effects that witnessing IPV have on children's development and their relationships with caregivers.⁸⁴ Interventions have been shown to be effective in enhancing children's attachment quality.⁸⁵ Systematic review evidence indicates that father's involvement has an impact on their children's social, behavioural and psychological outcomes,⁸⁶ and maternal employment may have variable effects on pre-school children's health.⁸⁷ A meta-analysis by Wilson and Durbin (2010) indicated that paternal depression has a significant and deleterious effect on parenting behaviors by fathers.⁸⁸

Growing up in orphanages is reported to have a substantial impact (lowering) on IQ compared to growing up in (foster) families.⁸⁹ More research is needed to detect the causes of the large IQ delays and to test ways of improving the intellectual development. Christoffersen (2012) reported that adopted children scored higher on IQ, school-performance, and lack of behavioural problems than their non-adopted siblings or peers who stayed behind in orphanages or foster homes.⁹⁰

To ascertain whether tactile stimulation is an effective intervention to support mental and physical health in physically healthy infants, Underdown et al. (2010) published a systematic review that indicated some evidence of benefits on mother-infant interaction, sleeping and crying, and on hormones influencing stress levels.⁹¹ *"In the absence of evidence of harm, these findings support the use of infant massage in the community, particularly in contexts where infant stimulation is poor."*⁹¹ Brownlee et al. (2013) indicated there is preliminary support for the efficacy of strength and resilience based interventions for understanding and promoting positive development in children and adolescents.⁹²

The Infant Health and Development Program (IHDP) was an evaluation of a comprehensive early childhood intervention for premature and low birth weight infants, designed to reduce the infants' health and developmental problems.⁹³ The intervention conducted by IHDP combined early childhood development and family support services with pediatric follow-up. Findings for cognitive development at 24 and 36 months were reported as "proven" according to promising practices criteria, and "promising" for behavioural changes. Through age 18, the intervention showed effects that are "promising" on cognitive development and achievement. There were no effects on health status, including growth. Other programs supporting early environment are provided (Appendix II.1.A.d).

e. Injury Prevention

Childhood injuries have significant impact on child health. Pearson et al. (2012) reported mixed results in their systematic review about the effectiveness of programs that provided information, advice or education about the prevention of unintentional injuries to children under 15 years during outdoor play

and leisure.⁹⁴ Dowswell and Towner (2002) state that there is a known association between social deprivation and risk of death from unintentional injury in childhood, but there is scant evidence relating to the prevention of child pedestrian injury or the impact of interventions in different social groups.⁹⁵ More recently, Rothman et al. (2013) conducted a systematic review of walking and child pedestrian injury and the built environment, reporting that that traffic calming and presence of playgrounds/recreation areas were consistently associated with more walking and less pedestrian injury.⁹⁶ Several built environment features were associated with more walking, but with increased injury.

A number of community-based programs to prevent injuries in children were examined by systematic review, but conclusions were similar: lack of research and limitations in the research methodology.⁹⁷⁻⁹⁹ Similarly, community-based programs to promote children's use of bicycle helmet and car seat restraints or prevent falls or poisoning in children showed some evidence to support the effectiveness of interventions, however there were study design limitations^{100, 101} or a lack of research studies.^{102, 103}

For studies of use of protective equipment to prevent childhood injury, some evidence suggests that more extensive educational programs (such as health fairs and media campaigns) increase their use, but methodological weaknesses of most of the studies included in the systematic review make it hard to draw conclusions about effectiveness of programs.^{94, 104} The Nurse-Family Partnership is a widely-known evidence-based program designed to address a variety of child health outcomes and it includes an injury prevention component. It is listed as a best practice program within the Public Health Agency of Canada portal¹⁰⁵ and the HomVEE review.¹⁰⁶ This program and others are noted (Appendix II.1.A.e).

f. Nutrition

Nutrition is an important determinant of health, and during the early years, parents have a strong influence on their children's diets, food choices and development of eating habits. There is growing recognition of the need to increase consumption of fruit and vegetables by children, given their known beneficial effects for health. Knai et al. (2006) conducted a systematic review of individual- and population-based interventions and promotion programs that encouraged the consumption of a diet relatively higher in fruit and/or vegetables in children, and reported strong evidence in favor of multi-component interventions to increase fruit and vegetable consumption in children.¹⁰⁷ Delgado et al. (2011) conducted a systematic review and meta-analysis of primary school interventions to promote fruit and vegetable consumption. Meta-analysis showed that computer-based interventions were effective in increasing fruit and vegetable consumption, but multicomponent interventions and free/subsidized fruit and vegetable interventions were not effective.¹⁰⁸ In a systematic review by Evans et al. (2012), school-based interventions were reported to moderately improve fruit intake but have minimal impact on vegetable intake.¹⁰⁹ Hendrie et al. (2013) reported that interventions that target an increase in children's dairy food or calcium intake could potentially increase children's dairy food intake by about one serving daily.¹¹⁰

Smithers et al. 2011 conducted a systematic review to examine associations between children's diet and nutrition, health, and development and their findings were as follows: *"In cross-sectional analyses, mixed associations were found between nutrient intake, nutritional biomarkers, and anthropometry. Birth cohort data showed healthier dietary patterns were associated with better lean mass, cognition, and behavior, but not with bone mass or body mass index at later ages."*¹¹¹ Few studies have characterized the diets of children under five years of age and linked diet with health.

Parents are believed to have a strong influence on children's eating behaviours. In a systematic review, Wang et al. (2011) investigated the resemblance in child and parental dietary intake, reporting *“resemblance is weak, and it varied considerably across studies, nutrients, foods and parent–child pairs.”*¹¹²

In a systematic review by Peters et al. (2012),¹¹³ the aim was to investigate the effectiveness of interventions that target parent nutrition knowledge and/or parenting practices with parents of young children aged two to five years in the development of healthy dietary habits. Due to the limited number of good quality studies little information could be reported on parental understanding of healthy diets and specific parenting styles and feeding practices. However, Manning (2013) demonstrated the effectiveness of an ecological approach to promote healthy food choices in early childhood education through an educational workshop series in three YMCA child care centres located in the Greater Toronto area.¹¹⁴ As well, Heim et al. (2011) noted that community-based interventions that provide activities to engage parents may provide added benefit by improving the home food environment.¹¹⁵

With regard to research specific to low income or socially disadvantaged groups and nutrition, Oldroyd et al. (2008) conducted a systematic review on the effectiveness of nutrition interventions on dietary outcomes by relative social disadvantage.¹¹⁶ The objective was to determine whether nutrition interventions widen dietary inequalities across socioeconomic status groups and authors found only limited evidence that nutrition interventions widen dietary inequalities.¹¹⁶ Due to small numbers of included studies, the possibility that nutrition interventions widen inequalities cannot be excluded.

Food subsidy programs are one strategy to promote healthy nutrition and to reduce socioeconomic inequalities in health. Black et al.'s (2012) systematic review summarized the evidence for the health and nutritional impacts of food subsidy programs among disadvantaged families from high income countries.¹¹⁷ Evidence for the effectiveness of food subsidy programs on the health and nutrition of men or children was lacking.¹¹⁷ The improved intake of targeted nutrients and foods, such as fruit and vegetables, could potentially reduce the rate of non-communicable diseases in adults, if the changes in diet are sustained. Thus, food subsidy programs for pregnant women and children should aim to focus on improving nutritional status in the longer term.

In British Columbia, The B.C. Farmers' Market Nutrition Coupon Project is a program involving partnering of farmers' markets with a community agency that works to provide nutrition, cooking, or healthy lifestyle skills building programs to lower income British Columbians.¹¹⁸ This program and several others are listed in Appendix II.1.A.f.

g. Physical/Mental Health (activity/inactivity, obesity, sleep)

Childhood overweight/obesity is recognized as an increasing health problem. Efforts to prevent the development of overweight and obesity have increasingly focused early in the life course as it is recognized that both metabolic and behavioural patterns are often established within the first few years of life. The Early Prevention of Obesity in CHildren (EPOCH) Collaboration, formed in 2009 has a key objective to determine if early intervention for childhood obesity impacts on body mass index (BMI) z scores at age 18-24 months.¹¹⁹ The Collaboration is also investigating whether early intervention has an

impact on children's dietary quality, TV viewing time, duration of breastfeeding, and parenting styles. Results are not yet available.

Determining early-life risk factors for obesity in later life is essential in order to effectively target preventative interventions to reduce obesity. Huang et al. (2007) reviewed the scientific evidence for prenatal programming of childhood overweight and obesity and concluded that there is support for prenatal programming of childhood overweight and obesity.¹²⁰ *"The biological mechanisms mediating these relationships are unknown but may be partially related to programming of insulin, leptin, and glucocorticoid resistance in utero."*¹²⁰

In a systematic review to investigate current evidence to determine whether the timing of introducing solid foods is associated with obesity in infancy and childhood, Moorcroft et al. (2011) summarized the evidence, stating that no clear association between the age of introduction of solid foods and obesity was found.¹²¹ They state that it is likely that a whole family approach to obesity prevention will be most effective.

Early systematic review evidence to assess the effectiveness of interventions designed to prevent obesity in childhood was inconclusive, due in part to limited quality data.¹²² Additional systematic reviews were carried out to assess the evidence of the effectiveness of interventions to promote physical activity in children and adolescents, and some evidence was found for potentially effective strategies to increase children's levels of physical activity.¹²³⁻¹²⁵ Limited evidence for an effect was found for interventions targeting children from low-socioeconomic populations, and environmental interventions. Strong evidence was found that school-based interventions with involvement of the family or community and multi-component interventions can increase physical activity in adolescents.^{123, 124}

Ciampa et al. (2010) assessed the evidence for interventions designed to prevent or reduce overweight and obesity in children younger than two years.¹²⁶ Few published studies attempted to intervene among children younger than two years to prevent or reduce obesity. Limited evidence suggests that interventions may improve dietary intake and parental attitudes and knowledge about nutrition for children in this age group.

The systematic review by Prentice-Dunn and Prentice-Dunn (2012) of the associations of physical activity and sedentary behavior to childhood overweight and obesity in cross-sectional studies from the last ten years revealed that physical activity was related negatively to child weight status in some studies; however, it was not associated in others. In general, sedentary behaviors were positively associated with weight status.¹²⁷

As stated earlier, the early years represent a critical period for promoting physical activity; however the amount of physical activity needed for healthy growth and development is not clear. Timmons et al. (2012) summarized the available evidence to determine the relationship between physical activity and measures of adiposity, bone and skeletal health, motor skill development, psychosocial health, cognitive development, and cardiometabolic health indicators in infants, toddlers, and preschoolers.¹²⁸ *"In infants, there was low- to moderate-quality evidence to suggest that increased or higher physical activity was positively associated with improved measures of adiposity, motor skill development, and cognitive development. In toddlers, there was moderate-quality evidence to suggest that increased or higher physical activity was positively associated with bone and skeletal health. In preschoolers, there was low- to high-quality evidence on the relationship between increased or higher physical activity and improved*

measures of adiposity, motor skill development, psychosocial health, and cardiometabolic health indicators.”¹²⁸

Regarding the impact of childhood obesity on morbidity and mortality in adulthood, although there is a consistent body of evidence for associations between childhood BMI and cardiovascular outcomes, there is a lack of evidence for effects independent of adult BMI.¹²⁹

With the number of systematic reviews related to childhood overweight and obesity, the remaining literature was further categorized to break out findings.

Obesity Interventions and Settings

Hesketh and Campbell (2010)¹³⁰ report that behaviours that contribute to obesity can be positively impacted in a range of settings. Bleitch et al. (2013)¹³¹ indicate that *“the strength of evidence is moderate that a combined diet and physical activity intervention conducted in the community with a school component is more effective at preventing obesity or overweight.”* Findings reported by Kesten et al. (2011)¹³² suggest that interventions aimed at pre-adolescent girls may reduce the risk factors associated with childhood overweight and obesity. Regarding the effectiveness of home-based child obesity prevention programs, Showell et al. (2013)¹³³ report that the strength of the evidence is low. A randomized controlled trial by Wen et al. (2012)¹³⁴ stated that home-based early intervention delivered by trained community nurses was effective in reducing mean BMI for children at age 2. Understanding of parental influences and physical activity levels in children is limited.¹³⁵ Longer interventions that include parental participation seem to have greater success.¹³⁶ Skouteris et al. (2012)¹³⁷ suggest that parent-child relationships are important in explaining the unhealthy trend of childhood obesity. In reviewing the literature on weight-related issues for children in out-of-home care, Skouteris et al. (2011) reported that there is a lack of strategies or interventions designed specifically to combat overweight and obesity in children in out-of-home care.¹³⁸

Knowlden and Sharma (2012) systematically analyzed family and home-based randomized control trials aimed at treating overweight and obesity in children ages 2-7 years.¹³⁹ Among the identified studies, eight produced significant outcomes. The majority of the program incorporated educational sessions targeting parents as the primary modality for intervention delivery. Less than one-quarter of the interventions included home visitations; however, all of the interventions included home-based activities to reinforce behaviour modification.

Barnes (2012) proposes strategies to reduce childhood obesity in Ontario and its associated health problems by taking a health equity and social determinants of health approach¹⁴⁰ - for example, reducing childhood obesity through poverty reduction, early environment initiatives, addressing neighbourhood factors, and enhancing coordination. Others avenues have been to investigate home-based and community-based interventions on weight, physical activity, behaviour, etc., as noted.

Obesity/Physical Activity Intervention Program Components

A systematic review by Sargent et al. (2011) on components of primary care interventions to treat childhood overweight and obesity provided evidence for: training for health professionals before intervention delivery; behaviour change options; effecting behaviour change via a combination of counselling, education, written resources, support and motivation; and tailoring intensity according to whether behavioural, anthropometric or metabolic changes are the priority.¹⁴¹

Weight-related health interventions that require parent participation more effectively reduce body mass indexes of child and adolescent participants and longer interventions that include parent participation appear to have greater success.¹³⁶ Brown et al. (2013) suggested that intervention studies examine the mediating effects of interventions (i.e. cognitive/psychological, social environmental) so the most effective strategies can be implemented in future programs.¹⁴²

The number of activity promotion programs aimed at improving children's physical health has been increasing perhaps faster than any other type of program (Appendix II.1.A.g).

Physical Activity and Motor development

Riethmuller et al. (2009) systematically reviewed evidence from controlled trials on the efficacy of motor development interventions in young children.¹⁴³ Their review highlights the limited quantity and quality of interventions to improve motor development in young children and authors made these recommendations: (1) both teachers and researchers should be involved in the implementation of an intervention; (2) parental involvement is critical to ensuring transfer of knowledge from the intervention setting to the home environment; and (3) interventions should be methodologically sound.¹⁴³

Physical Activity, After School Transport, and the Built Environment

After school is a critical period in the physical activity and sedentary behaviour patterns of young people. In a systematic review by Beets et al. (2009), limited evidence suggests that after-school programs can improve physical activity levels and other health-related aspects.¹⁴⁴ Atkin et al. (2011) completed a systematic review of interventions to promote physical activity in young people conducted in the hours immediately after school and reported that evidence suggests that single-behaviour interventions may be most effective during these hours.¹⁴⁵ Authors also conclude that limitations in study design, lack of statistical power and problems with implementation have likely hindered the effectiveness of interventions in the after-school setting to date.

Active school transport may be an important source of children's physical activity. Faulkner et al. (2009) conducted a systematic review of active school transport, physical activity levels and body weight of children and youth.¹⁴⁶ Studies demonstrated that active school commuters tended to be more physically active overall than passive commuters. However, evidence for the impact of active school transport in promoting healthy body weights for children and youth is not compelling.

Sandercock et al. (2010) reviewed the available literature assessing differences in physical activity levels of children living in different built environments classified according to land use within developed countries.¹⁴⁷ The literature does not show major differences in the physical activity levels between children from rural or urban areas. Where studied, the suburban built environment appears most conducive to promoting physical activity. As for the association of the primary school built environment (e.g., playground availability) and childhood weight, results are inconclusive.¹⁴⁸

Physical Activity and Social Networks

The systematic review by Macdonald-Wallis et al. (2012) synthesized findings from various social network analyses of child and adolescent physical activity, to determine the extent to which social network structure is associated with physical activity behaviors.¹⁴⁹ "Three research themes were

*identified: (1) friendship similarities in physical activity; (2) peer group influences on physical activity; and (3) social preference (i.e., popularity) and physical activity. Synthesis of findings across studies found strong evidence for similarities in physical activity levels between an individual and their friends and within peer groups. There was mixed evidence for an association between social preference and physical activity levels. Conclusions: Friendship plays an important role in shaping physical activity behaviors. Physical activity interventions targeted at peer groups and that account for the influence of friendship groups might have utility as a means of increasing youth physical activity.*¹⁴⁹

Tracking Physical Activity

Jones et al. (2013) completed one of the first systematic reviews to investigate the evidence of tracking of physical activity and sedentary behavior specifically during early childhood (aged 0–5.9 years).¹⁵⁰ *“This review highlights the importance of establishing recommended levels of physical activity and sedentary behavior during the early years of life. Based on this review, the following recommendations are made: (1) early childhood should be targeted as a critical time to promote healthy lifestyle behaviors through methodologically sound prevention studies; and (2) future tracking studies should assess a broad range of sedentary behaviors using objective measures.”*¹⁵⁰

Active Video Games

Active video games (AVG) have gained interest as a way to increase physical activity in children. The systematic review by LeBlanc et al. (2013) aimed to explain the relationship between active video games and nine health and behavioural indicators in children.¹⁵¹ *“Controlled studies show that AVGs acutely increase light- to moderate-intensity physical activity; however, the findings about if or how AVG lead to increases in habitual physical activity or decreases in sedentary behaviour are less clear. Although AVGs may elicit some health benefits in special populations, there is not sufficient evidence to recommend AVGs as a means of increasing daily physical activity.”*¹⁵¹

Television, Screen Media Use

Thakkar et al. (2006) conducted a systematic review of experimental trials for the effects of television viewing by infants and preschoolers.¹⁵² Findings suggested that educational television programs are successful in broadening young children's knowledge, affecting their racial attitudes, and increasing their imaginativeness. There is insufficient experimental evidence for effects of viewing these programs on either children's prosocial behavior or their aggressive behavior. Finally, there is some evidence that viewing cartoons has a negative effect on children's attentional abilities. The studies presented here focus only on content.

Screen-media use among young children is disproportionately high among children from lower-income families and racial/ethnic minorities, and may have adverse effects on obesity risk. In order to identify strategies to reduce TV viewing or total screen time among children under 12 years of age, Schmidt et al. (2012) conducted a systematic review.¹⁵³ Of 47 studies that met our inclusion criteria, twenty-nine achieved significant reductions in TV viewing or screen-media use.¹⁵³ Studies utilizing electronic TV monitoring devices, contingent feedback systems, and clinic-based counseling were most effective, however more studies focusing on young children, minorities, and where there is long-term (>6 month)

follow-up data may help increase the effectiveness of existing strategies for screen time reduction and extend them to different populations.

Participation, Physical Activity Benefits

In consideration of psychological and social benefits of participation in sport for children and adolescents, Eime et al.'s (2013) systematic review indicated that *“there were many different psychological and social health benefits reported, with the most commonly being improved self-esteem, social interaction followed by fewer depressive symptoms. Sport may be associated with improved psychosocial health above and beyond improvements attributable to participation in physical activity. Specifically, team sport seems to be associated with improved health outcomes compared to individual activities, due to the social nature of the participation.”*¹⁵⁴ It is recommended that community sport participation is advocated as a form of leisure time physical activity for children and adolescents, in an effort to not only improve physical health in relation to such matters as the obesity crisis, but also to enhance psychological and social health outcomes.

With respect to whether exercise can improve self-esteem in children and young people, Ekeland et al. (2005), in a synthesis of several small, low quality trials, indicated that exercise may have short term beneficial effects on self-esteem in children and adolescents.¹⁵⁵

Sleep

Douglas and Hill (2013) carried out a systematic review to determine whether behavioural interventions for sleep, when applied by parents to infants younger than six months, improve maternal and infant outcomes.¹⁵⁶ Interventions have not been shown to decrease infant crying, prevent sleep and behavioural problems in later childhood, or protect against postnatal depression. *“In addition, behavioral interventions for infant sleep, applied as a population strategy of prevention from the first weeks and months, risk unintended outcomes, including increased amounts of problem crying, premature cessation of breastfeeding, worsened maternal anxiety, and, if the infant is required to sleep either day or night in a room separate from the caregiver, an increased risk of SIDS. The belief that behavioural intervention for sleep in the first six months of life improves outcomes for mothers and babies is historically constructed, overlooks feeding problems, and biases interpretation of data.”*¹⁵⁶

h. Respiratory Health (asthma)

Asthma is an increasingly prevalent chronic respiratory disease, particularly among children and certain minority groups. There is consistent evidence of effectiveness for self-management education and comprehensive home-based interventions¹⁵⁷⁻¹⁶⁰ Home-based, multi-trigger, multi-component interventions with an environmental focus and which include home visits by trained professionals have been shown to be effective.^{161, 162} Generally, the home setting enables educators to reach populations such as the economically disadvantaged that may experience barriers to care such as lack of transportation.¹⁶³ Welsh et al (2011), however, reported inconsistent evidence for home-based asthma educational interventions compared with standard care or education delivered outside of the home.¹⁶³ Several programs aimed at improving air quality, home environment, etc., are available within portals of ‘best practices’; because asthma is not a focus of this review, the list of programs provided is limited (Appendix II.1.A.h).

1.B. Education

From early childhood through to late adolescence, education is fundamental to future outcomes of children and young people. In this review, the Education domain covers pre-school and primary education and includes programs aimed at improving outcomes in academic achievement, and literacy.

a. Early Care and Education

Participation in early care and education (ECE) programs has become common for three and four-year olds. Studies have documented a positive relationship between ECE programs and child development outcomes.^{164, 165} Most programs were created in order to: (1) improve children's health and overall development; (2) provide support to families; (3) decrease gaps in school readiness; and (4) reduce the negative outcomes associated with living in poor neighbourhoods. Early Head Start,¹⁶⁶ Sure Start,¹⁶⁷ Better Beginnings, Better Futures,¹⁶⁵ and Toronto First Duty¹⁶⁸ are examples of integrated approaches to early childhood services. For projects such as Better Beginnings, Better Futures and Toronto First Duty, integration has multiple social aims including healthier parenting, work-family balance, community development, promotion of equity and social justice through effective and culturally-competent programming as well as other aims noted previously.¹⁶⁸

Systematic reviews of the scientific literature demonstrate effectiveness of programs such as Head Start in preventing developmental delay, as assessed by reductions in retention in grade and placement in special education.¹⁶⁹ For particular features of programs found to be effective, Gray and McCormick (2005) stated that programs should (1) employ more centre-based or mixed centre-based and home visiting models, (2) monitor standards of quality, (3) become more family focused and culturally competent, and (4) broaden the focus of their evaluations for the best return on investments in early childhood.¹⁷⁰ Halgunseth and Peterson (2009) echo that early childhood education programs must be respectful of the cultural and ethnic ideals of the families they serve.¹⁷¹

Studies on the economic returns on investment in early childhood development have shown larger returns from government investment incurred in early childhood compared to adulthood.¹⁷²⁻¹⁷⁵ Evidence indicates that return on public investment in the education for children in poverty or low income families is higher.¹⁷⁶ Her Majesty's Government (UK) (2011) state that early childhood development interventions have the potential to bring about wide ranging human capital benefits for children through to adulthood.¹⁷⁷ However, D'Onise et al. (2010) note in their systematic review of the evidence for child health effects of centre-based preschool intervention programs that the potential for early childhood interventions to improve population health across a range of health outcomes is somewhat weak.¹⁷⁸ They suggest that there is some support for the role of early childhood interventions to improve adult health behaviours but not chronic disease outcomes.¹⁷⁹ For a listing of a variety of early care and education programs, please see Appendix II.1.B.a.

b. Language and Literacy

There is robust evidence of the impact of family literacy, language and numeracy interventions on children's learning, particularly in the case of literacy, and these interventions can have a positive impact on the most disadvantaged families. Community-based early childhood literacy programs play an essential role in developing the literacy skills of both pre-school and school-aged children.¹⁸⁰ Balla-Boudreau et al. (2011) conducted an online survey of 200 Canadian early literacy organizations and reported that the programs surveyed are doing well to support early literacy development in their communities.^{181, 182} In British Columbia, the Vancouver Public Library has adopted the Raising a Reader

and the Parent-Child Mother Goose programs. In the Yukon, Canada, a Dolly Parton Imagination Library has been established to ensure that every child would have books, regardless of their family's income, similar to the intent of this literacy initiative first introduced within East Tennessee. More programs are listed in Appendix II.1.B.b.

The meta-analytic review by Sénéchal and Levesque (2008) focused on intervention studies that tested whether parent-child reading activities would enhance children's reading acquisition.¹⁸³ Results were clear: *"parent involvement has a positive effect on children's reading acquisition. Further analyses revealed that interventions in which parents tutored their children using specific literacy activities produced larger effects than those in which parents listened to their children read books."*¹⁸³

DeWalt and Hink (2009) reviewed the relationship between parent and child literacy and child health outcomes and interventions designed to improve child health outcomes for children or parents with low literacy skills.¹⁸⁴ Child and parent literacy appeared to be associated with important health outcomes. *"Children with low literacy generally had worse health behaviors. Parents with low literacy had less health knowledge and had behaviors that were less advantageous for their children's health compared with parents with higher literacy."* *"Interventions found that improving written materials can increase health knowledge, and combining good written materials with brief counseling can improve behaviors including adherence."*¹⁸⁴

Sanders et al. (2009) reported that low caregiver literacy is associated with poor preventive care behaviours and poor child health outcomes.¹⁸⁵ Future research should aim to ameliorate literacy-associated child health disparities.

The research synthesis by Mol and Bus (2011) examined whether the association between print exposure and components of reading grows stronger across development.¹⁸⁶ *"For all measures in the outcome domains of reading comprehension and technical reading and spelling, moderate to strong correlations with print exposure were found. The outcomes support an upward spiral of causality: Children who are more proficient in comprehension and technical reading and spelling skills read more; because of more print exposure, their comprehension and technical reading and spelling skills improved more with each year of education."*¹⁸⁶ Authors concluded *"that shared book reading to pre-conventional readers may be part of a continuum of out-of-school reading experiences that facilitate children's language, reading, and spelling achievement throughout their development."*

1.C. Material Well-being

A family's material circumstances can exert a strong influence on children's well-being. Family income and housing are examples of material well-being that can help build an important foundation for a child's life.

a. Low income

Lower socioeconomic status is widely accepted to have deleterious effects on the well-being and development of children and adolescents. The theory that family poverty adversely affects children's health, intellectual capabilities, academic achievement, and behaviour is well-documented.¹⁸⁷ Housing instability during the first five years of a child's life is significantly associated with increases in attention problems, and internalizing and externalizing behaviour, notably among poor children.¹⁸⁸ Various policies and interventions can attenuate poverty's negative influence on child development.^{187, 189, 190} For

example, policies to improve the mental health of mothers with young children and their home environments can “*change the economic gradient*” in child behaviour.¹⁹¹ Population-level early interventions such as home visiting and high-quality early child care provide evidence of effectiveness in reducing developmental vulnerability, preventing developmental delay and improving school readiness.¹⁹² The evidence base is limited with respect to the association of early childhood low income/socioeconomic status with physical health status in later childhood and adolescence.¹⁹³

An important lesson that Conti and Heckman (2012) cite in relation to shaping future policies to improve the health of individuals and communities is that inequalities open up early in life and early intervention is far more effective than later remediation.¹⁹⁴ In Appendix II.1.C.a, programs with a low income component have been identified and classified according to categories including early care and health, dental health, family support, hubs, networks, and physical/mental health.

Spencer (2004) carried out a preliminary systematic review of literature to address the question—among rich nations (or states within nations) what is the evidence that income inequality and differences in macro-level social policy affect rates of infant mortality and low birthweight (LBW)?¹⁹⁵ *“The findings, taking account of the methodological limitations of the review and of the included studies, suggest a statistically significant association between IMR and higher income inequality and other indicators of less re-distributive social policy. Only three studies examined the association of income inequality with LBW and, although they suggest a significant association, further studies will be needed to confirm this finding.”*¹⁹⁵

Childhood disadvantage has lasting negative effects on children's health and well-being. Systematic review methods were used by Attree (2004) to assess a group of qualitative studies that prioritize children's perspectives on growing up in disadvantage, exploring the social resources that they typically draw upon.¹⁹⁶ *“Children and young people describe aspects of family relationships, friendships and neighbourhoods that help to mitigate the impact of disadvantage on their well-being. However, their accounts demonstrate that such resources are not always and unambiguously experienced as supportive and protective. This systematic review highlights the value of social resources available to children living in poor circumstances, but also points up their limitations.”*¹⁹⁶

In a meta-synthesis of qualitative evidence, Attree (2005) explored parents' experiences of informal and formal support networks, considering their strengths and weaknesses in the context of poverty.¹⁹⁷ The review suggested that naturally occurring support systems do provide both material and emotional help to parents, but that such support has certain inherent drawbacks. It is not universally available and, in some circumstances, carries negative associations for poor families. In conclusion, this paper suggests that formal support services have the potential to fill gaps in informal support systems for poor families, but only if these are provided in ways which are sensitive to their needs. Therefore, parents' perspectives are essential to informing service design, development and evaluation in health and social care.¹⁹⁷

Galobardes et al. (2008) updated their 2004 systematic review on the association between childhood socioeconomic circumstances and cause-specific mortality, and confirmed that mortality risk for all causes was higher among those who experienced poorer socioeconomic circumstances during childhood.^{198, 199}

To determine the association between social disadvantage and infant health, Weightman et al. (2012) carried out a systematic review and meta-analyses.²⁰⁰ Although there was no clear pattern for failure to

thrive, there was a social gradient noted for low birth weight, premature birth, and stillbirth (increasing odds ratio with higher deprivation index).

Lower socioeconomic status is widely accepted to have deleterious effects on the well-being and development of children and adolescents. While socioeconomic status is largely determined by combinations of variables such as parental education level, marital status, and income, socioeconomic status may also interact with other variables mediating or moderating the influence of socioeconomic status on children's behavior and cognitive development. Letourneau et al. (2013) conducted a meta-analysis of research on the relationship between composite measures of socioeconomic status and developmental outcomes for children and adolescents between the ages of birth to 19 years of age.²⁰¹ The results revealed very small to small, but significant effects of socioeconomic status on aspects of the three outcome variables of literacy and language, aggression, and internalizing behaviours including depression. Many other factors come in to play that may better explain the small, but significant relationship between socioeconomic status and development.

Neighbourhood social capital is believed to influence the association between neighbourhood deprivation and health in children and adolescents. Vyncke et al. (2013) reviewed the role of social capital in health inequalities and the social gradient in health and well-being of children and adolescents.²⁰² The review foci were: (1) the mediating role of neighbourhood social capital in the relationship between socioeconomic status and health-related outcomes in children and adolescents and (2) the interaction between neighbourhood social capital and socioeconomic characteristics in relation to health-related outcomes in children and adolescents. The findings are mixed but suggest that neighbourhood social capital might play a role in the health gradient among children and adolescents.

As to whether there is evidence in relation to an association between low income/socioeconomic status and physical health in later childhood/adolescence, Spencer et al.'s (2013) systematic review showed that, in contrast to the extensive literature on the impact of poor childhood social circumstances on adult health, the evidence base is limited.¹⁹³ The literature points to some associations of early low income/socioeconomic status with later poor health status, but this area requires further study.

As for evidence of effectiveness of home visiting models implemented in tribal communities, the amount of research available is small and in the review by Del Grosso et al. (2012), none of the programs included met the U.S. Department of Health and Human Services criteria.²⁰³

b. Environmental Injustice, Housing

In a 2013 paper, Landrigan writes *“Environmental injustice is the inequitable and disproportionately heavy exposure of poor, minority, and disenfranchised populations to toxic chemicals and other environmental hazards.”*²⁰⁴ Poor children confront widespread environmental inequities.²⁰⁵ Children in low income households may be exposed to more family instability and they may receive less social support, have less access to books, while the air and water they consume may be more polluted. Low income neighbourhoods may have fewer municipal services and also greater physical deterioration. Evans (2004) suggests that *“the accumulation of multiple environmental risks rather than singular risk exposure may be an especially pathogenic aspect of childhood poverty.”*²⁰⁵ More minority and poor families live in communities with landfills, hazardous waste facilities, incinerators, industrial plants, and old housing with poor indoor air quality and lead-based paint, and greater attention is being paid to matters of environmental healthy inequity. There has been growth in Canadian research documenting the health disparities and environmental injustices and impacts of environmental hazards across

locations since the 1990s.²⁰⁶ Low income and minority communities may be perceived as less powerful to defend against sources of environmental contamination, and communities and advocacy groups can play an important role in promoting healthier environments for children.²⁰⁷

Links between poor housing and poor health indicate that housing improvement may be an important mechanism through which public investment can lead to health improvement. Housing investment which improves thermal comfort in the home can lead to health improvements and may promote improved social relationships within and beyond the household. In addition, there is some suggestion that provision of adequate, affordable warmth may reduce absences from school or work.²⁰⁸ Sufficient evidence now shows that specific housing interventions can improve certain health outcomes.^{209, 210} As early as 2002, the U.S. Task Force on Community Preventive Services recommended housing subsidy programs for low income families, which provide rental vouchers for use in the private housing market and allow families choice in residential location. This recommendation was based on outcomes of improved neighborhood safety and families' reduced exposure to violence. The Task Force concluded that insufficient evidence was available on which to base a recommendation for or against creation of mixed-income housing developments that provide safe and affordable housing in neighborhoods with adequate goods and services.²¹¹ Albert (2013) described how a locally developed model of integrated, place-based service delivery is a solution to addressing the needs of vulnerable children and families in our communities.²¹²

Programs designed to assist with aspects of housing for low income families are noted in Appendix II.1.C.b.

1.D. Family and Peer Relationships

Infant-mother/father relationships and children's relationships with family and peers are key to their well-being. For most infants and children, their family is the main source of security and support which fosters development in many key areas such as social and emotional competence. Various infant and child development programs are provided in best practices portals noted in Section II - Methodology. A selection is included in Appendix II.1.D.

a. Parent Education, Supportive Parenting

Odgers et al. (2012) report *"a graded relationship between neighborhood socioeconomic status and children's antisocial behaviour that (a) can be observed at school entry, (b) widens across childhood, (c) remains after controlling for family-level socioeconomic status and risk, and (d) is completely mediated by maternal warmth and parental monitoring."*²¹³

Karreman et al. (2006) conducted a meta-analysis to examine the strength of the relation between parenting (positive control, negative control and responsiveness) and self-regulation in preschoolers.²¹⁴ Results revealed significant associations between both types of parental control and self-regulation. There was no significant association between self-regulation and responsiveness.

Parenting programs have the potential to improve the health and well-being of parents and children. A challenge for providers is to recruit and retain parents in programs. Mytton et al. (2013), by way of a systematic review of the literature on facilitators and barriers to engagement in parenting programs, identified a number of facilitators (e.g., opportunity to learn skills, using trusted or known people to lead

the course, meeting others and exchanging , accessibility of the course, well trained deliverers) and barriers (competing demands on parents' time and resources, experiences of group dynamics, stigma and gender issues around attending groups, accessibility of venues).²¹⁵
A selection of parenting programs is listed in Appendix II.1.D.a.

1.E. Participation

“Participation in community activities provides opportunities for children to learn new skills, build community networks and express their opinions.”⁴⁰ Background information included for this domain and the programs that have been identified highlight ways that children can be encouraged to participate in their communities, engage in mentoring, etc., and avoid becoming socially isolated.

a. After School Programs, Arts

Zief et al. (2006) state that collected evidence of after-school programs is not sufficient to make any policy or programming recommendations, but they note that some areas of promise do exist (supervision and participation).²¹⁶ On the other hand, Vandell et al. (2007) report that regular participation in high-quality after-school programs is linked to significant gains in standardized test scores and work habits as well as reductions in behavioural problems and substance use.²¹⁷

The City of Toronto is working to develop a provincial strategy for after-school hours in Ontario.²¹⁸ A goal is for the sustainability of an accessible quality after-school system through core government funding and subsidies to support a network of community-based programming for children ages 6 to 12. Out of school-time programs may range from those emphasizing community leadership to sports/arts/music to karate, to describe only a few. A unique discovery centre that allows for children's activities either scheduled through school or outside of school hours is Munchkinland in Parksville/Qualicum, British Columbia.

Lifter et al. (2011)²¹⁹ present a review about the importance of play in early intervention and how play is regarded in terms of fostering social competence and prosocial behaviour. After-school time programs where children participate in various activities can contribute to healthy development in a number of realms – e.g., physical, social, emotional.

Social competence and cognitive/prosocial behaviour may be tapped through programs such as Big Brothers, Big Sisters, Boys and Girls Clubs of Canada, Cadets, and other mentoring-type programs (Appendix II.1.E.a).

1.F. Subjective Well-being

Subjective well-being is a category used in this report to draw out how children feel about themselves, others, and their environment. Examples of mental health issues include anxiety, depression or grief and loss.

a. Mental Health, Well-Being, Anxiety

Boivin et al. (2012) summarized a significant body of evidence (longitudinal, etc.) regarding early life experiences and mental health.⁴¹ Various factors such as poverty, trauma, and inadequate treatment have been shown to have particular impact children's social, emotional and mental health.²²⁰ A

comprehensive review by Fisak et al. (2011) of the effectiveness of child and adolescent anxiety prevention programs indicate that provider type can moderate program effectiveness, while program duration, participant age, gender, and program type (universal versus targeted) were not found to moderate program effectiveness.²²¹ Ttofi and Farrington (2012) presented results from two systematic/meta-analytic reviews of longitudinal studies on the association of school bullying (perpetration and victimization) with adverse health and criminal outcomes later in life.²²² Significant associations between the two predictors and the outcomes are found even after controlling for other major childhood risk factors that are measured before school bullying. The results indicate that effective antibullying programs should be encouraged.²²² They could be viewed as a form of early crime prevention as well as an early form of public health promotion.

In childhood, mental health problems primarily consist of behaviour and emotional problems. Bayer et al. (2009) undertook a systematic review to identify evidence-based preventive interventions for behavioural and emotional problems of children aged 0-8 years.²²³ *“Among effective programs, three US programs have the best balance of evidence: in infancy, the individual Nurse Home Visitation Program; at preschool age, the individual Family Check Up; at school age, the Good Behaviour Game class program. Three parenting programs in England and Australia are also worthy of highlight: the Incredible Years group format, Triple P individual format, and Parent Education Program group format.”*²²³

In Appendix II.1.F.a, there is a list of programs aimed at strengthening children’s mental health and well-being. For example, “Children in the Middle”²²⁴ helps children coping with parents undergoing divorce; the “Olweus Bullying Prevention Program”²²⁵ is a violence prevention program for children facing bullying and other anxiety-provoking issues. Various programs in this domain promote emotion fitness, optimistic thinking, or paths to alternative thinking.

1.G. Behaviours and Risks

Physical activity and healthy eating are examples of healthy behaviours that contribute to children’s well-being. Conversely, substance abuse (drugs, alcohol, etc.) and aggression are risky behaviours which can have a negative effect on children’s health and well-being.

a. Internalizing or Externalizing Behaviour, Aggression, Bullying, Crime

Chronic involvement in bullying is associated with many intrapersonal, interpersonal, and academic problems, and even sporadic experiences of bullying are harmful.²²⁶ Various interventions have been developed and have been adopted by countries world-wide (Appendix II.1.G.a).

b. Smoking, Substance Abuse

For smoking, there is increasing evidence that contact with other smokers, particularly in the family, is a strong determinant of risk of smoking uptake. Jo (2011) reported that parental and sibling smoking is a strong and significant determinant of the risk of smoking uptake by children and young people and, as such, is a major and entirely avoidable health risk.²²⁷ Various intervention programs address smoking reduction/cessation, with an aim to protect children from exposure to smoking behaviour, especially by family members.

Niccols et al. (2012) reviewed the effectiveness of integrated programs for mothers with substance abuse issues.²²⁸ A specific substance use treatment and at least one parenting or child service were used

and through cohort studies and randomized trials it was shown that integrated programs were associated with improvements in parenting skills.

Broning et al. (2012) report that there is early evidence for the effectiveness of preventive interventions in childhood and adolescence for children from substance-affected families.²²⁹ Promising interventions to reduce risk behaviour in adolescents or young adults appear to be those that address multiple domains of influence on risk behaviour,²³⁰ and family-based interventions and combined interventions.²³¹ School-based interventions have been noted as effective in providing knowledge about substance use,²³¹ while little has been reported on programs conducted in different cultures.

Although the focus of this review is primarily children, rather than youth, a selection of programs with a youth-focus is listed, primarily because youth seem to be the main target of such programs (Appendix II.1.G.b).

1.H. Environment

Environmental drivers of health are important to elucidate, and linking the environment to adverse health children's health outcomes is critical. There is concern about adequate protection of children's health from chemicals in the environment. Reports from the largest companies in the United States shows that toys and other children's products contain low levels of dozens of industrial chemicals, some of "high concern".²³² For example, "*cobalt in plastic building blocks and baby bibs, ethylene glycol in dolls, methyl ethyl ketone in clothing, antimony in high chairs and booster seats, parabens in baby wipes, D4 in baby creams.*"²³² In Canada, as of 2005 there were over 23,000 substances in commercial use yet to be fully evaluated.²³³ Ongoingly, researchers are identifying statistically significant associations between various chemicals and health, for example urinary Bisphenol A levels and measures of adiposity in children and adolescents.^{234, 235} In the United States, costs for treatment of childhood illnesses linked to toxic environmental exposures is estimated to be over \$76 billion.²³⁶

A primer on children's health and the environment, prepared by the Canadian Partnership for Children's Health and Environment (CPCHE), details environmental exposures and health effects of concern to children and what can be done.²³³ In 2010 Health Canada published a national strategic framework on children's environmental health.²³⁷ Researchers are beginning to propose new methodologies for estimating risk in ways that can facilitate development of practice guidelines or other evidence-based recommendations for prevention.²³⁶ Makri et al. (2004) summarized available literature relating to maturation of biological processes in children.²³⁸ Essentially the work provides insight regarding pediatric sensitivity to environmental chemicals, and may be useful for evaluating developmental trends of susceptibility, and for identifying time periods and/or chemical classes of particular concern.

As to whether exposure to pesticides during pregnancy and/or early childhood is associated with neurodevelopmental outcomes in children, Burns et al. (2013) reported that no particular pesticide was identified as causally related to adverse neurodevelopmental outcomes in infants and children.²³⁹

In addition to the danger of toxic chemical exposures as an environmental threat to child health,²⁴⁰⁻²⁴⁷ there is evidence that the way a child's physical environment is designed, built, and maintained can also significantly affect the risk of disease, disability and injury.^{44, 148, 248-250} Cities and communities can provide a physical environment that contributes to all children thriving, through promoting social connectedness, feelings of safety, freedom of movement, access to natural areas and green space and

diverse opportunities for play. The built environment and various exposures in relation to children's health are explored further as follows: air quality; built environment; gardens, greenspace, etc.; neighbourhoods, place, and socioeconomic status.

a. Air Quality

Children are both more exposed and particularly vulnerable to air contaminants.²⁵¹ Current epidemiological evidence suggests that early-life exposure to persistent organic pollutants can adversely influence immune and respiratory systems development.²⁵² Exposures in utero and in the first few years of life have disproportionate effects.²⁵³ Relative to their body weight, children breathe more air, drink more water, and eat more food than adults; their exposure and behaviours increase their exposure (e.g., they are closer to the ground, they play vigorously outdoors). Immune systems of young children may be less able to endure toxicants. Epigenetics research raises concerns that environmental exposures may affect not just today's children, but also our children's children.²⁵³

There is growing concern about the health effects of ambient air pollution in children. Regarding the adverse effects of air pollution on the health of Canadian children, Koranteng et al. (2007) pointed to evidence from Canadian studies which suggests that air pollution may cause adverse respiratory health effects in children and adverse pregnancy outcomes, and may contribute to infant mortality in Canada.²⁵⁴ In May 2013, Newman et al. reported a statistically significant association between traffic-related air pollution exposure in a child's first year of life and attention deficit/hyperactivity disorder symptoms at seven years of age.²⁵⁵ Chiu et al. (2013) found an association between black carbon traffic particles and attention measures at 7-14 years of age.²⁵⁶

Children residing in rural settings may encounter air contaminants from agricultural activities (e.g., confined animal feeding operations) but these contaminants and many others (e.g., diesel exhaust, biomass burning, solvents, and veterinary antibiotics) remain largely understudied with respect to their impact on children.

A number of programs have been initiated to improve air quality and foster children's healthy development such as AirNow²⁵⁷; Clean School Bus USA²⁵⁸; and Project Green Fleet^{259, 260}; and many others.²⁶¹⁻²⁶⁵ For more, see Appendix II.1.H.a.

Children's exposure to environmental tobacco smoke also presents concern.²⁶⁶ A cross-sectional descriptive study conducted in Manitoba to describe the factors associated with providing a smoke-free home for kindergarten children found that being better educated, living with a partner, and having a higher income were associated with smoke-free homes.²⁶⁷ Smoke-free indoor public environments are enforced through national legislation and such regulations have been shown to reduce secondhand smoke exposure and, consequently, respiratory and cardiovascular morbidity. Evidence of particular health benefit in children is now emerging, including reductions in low birthweight deliveries, preterm birth and asthma exacerbations.²⁶⁸ A systematic review and meta-analysis by Leonardi-Bee et al. (2008) to determine the effects of environmental tobacco smoke exposure on birth outcomes indicated that exposure of non-smoking pregnant women to environmental tobacco smoke "reduces mean birthweight and increases the risk of low birthweight, but has no clear effect on gestation or the risk of being small for gestational age."²⁶⁹ Further, passive smoking may be implicated in deteriorating cardiovascular status

in children because of their partially developed physiological systems.²⁷⁰ Been et al. (2013) aim to comprehensively assess the impact of smoke-free legislation on fetal, infant and childhood outcomes.²⁶⁸

In order to reduce children's secondhand smoke exposure, various programs have been developed- for example, STARSS (Start Thinking about Reducing Secondhand Smoke)²⁷¹ and Smoking? Not in Mama's House!²⁷² Others are listed in Appendix II.1.H.a.

b. Built Environment

The built environment has been identified as a significant determinant of health and there is growing recognition of the importance of the built environment in influencing people's health-related decisions (e.g., whether to walk or drive). There has been strong interest in ensuring that built environments are safe for children and have features that promote their healthy development (e.g., safe routes to school). Moore (2012) states that *"there is evidence of the importance of geography and physical environment for children's health and well-being; that place matters for children; that social support and networks matter for people's well-being; that locational disadvantages lead to poorer outcomes for children."*²⁷³

*"The built environment in which children live, play and interact affects wellbeing as children need safe spaces to relax, have fun, explore and be active."*²⁷⁴ Jackson et al. (2013) argue that *"much work needs to be done in the area of healthy built environments, including research on how to reap the benefits of healthy built environments and an increased focus on building healthy environments."*²⁷⁴

Further work needs to be done to specify *"which factors at which levels matter to which aspects of healthy child development."*²⁴⁹ There are clues to suggest that there are initiatives that can be undertaken at the neighbourhood level and that such efforts should target language and cognitive skills, communication skills and physical health and well-being.^{275, 276} Initiatives can be targeted at older children (i.e., age three years and up), as they have a greater geographical range than younger children. For promoting healthy child development among younger children, the focus should be directed to the household level and on outcomes related to social knowledge and competence and emotional health and maturity.²⁴⁹ Dunn states that *"It will be challenging for public policy to address housing affordability, quality, security and design issues. But even more challenging will be penetrating into the domestic lives of families to ensure that very young children get the kind of early stimulation needed to promote healthy child development."*²⁴⁹

Community design has been more closely scrutinized in terms of association with impact on health indices such as obesity, diabetes, heart disease, asthma, cancer and depression.^{274, 277} In Nova Scotia, planners surveyed on the question of whether and how rural planners should address health issues, reported that health is important to address in planning practice²⁷⁸ but there are barriers to implementation (e.g., government silos) and practice (e.g., roles of planners).

Smart Growth involves looking at communities *"not only as places to live but as vehicles to promote health and well-being,"*²⁷⁹ and in Canada as well as the United States, this movement has been working for more than a decade to foster sustainability principles across the country through education, research and capacity building. The Child Friendly city framework was established by Unicef (2004),²⁸⁰ and McAllister (2009) describes four major issues that are critical to the creation and maintenance of a child-friendly community: safety, greenspace, access, and integration.²⁸¹ Also, there has been more effort to include children in planning processes so that the voice of children may be heard with respect to community design. The 'Vertical Living Kids' research project interviewed children aged 8–12 to elicit

their views on local environments, to get children involved in design so that contemporary strategic planning is not child-blind.²⁸²

Pabayo et al. (2012) examined the combined influence of poverty and dangerousness of the neighbourhood on active transportation to school among a cohort of children followed throughout the early school years.²⁸³ Authors report that *“Since active transportation is most likely to be adopted by those living in poverty and because it is also associated with unsafe environments, some children are experiencing environmental injustice in relation to active transportation.”* Interventions may be implemented to reduce environmental injustice through improvements in road safety. Yiannakoulias et al. (2011)²⁸⁴ investigated the effects of urban change on the risk of child pedestrian injury in Edmonton, Alberta, a city that has experienced large economic and population growth following the expansion of the oil and gas industry in Canada. Areas with higher proportions of families on low incomes had higher injury incidence.

Various programs have been initiated that are intended to address issues of the built environment. Many include green engineering and community designs to encourage active transportation and healthy neighbourhoods. Examples include “Safe Routes to School”,²⁸⁵ “Sunday Parkways”,²⁸⁶ and “Walking School Bus”.^{287, 288} In some cases, partnerships have been developed to focus on creating “transportation justice” for “transit dependent” populations. For example, the Bay Area Transportation Justice Working Group is a collaboration of economic and environmental justice, public and environmental health, transportation and land use, labour, homeless, housing, and youth organizations.²⁸⁹ These organizations have partnered to define a regional transportation agenda and to advocate for improved social and economic equity in transportation planning, funding, and policy-making.

More on this and a list of other programs is provided in Appendix II.1.H.b.

c. Gardens, greenspace, etc.

Some population studies have suggested positive effects of greenspace on various indicators of health,²⁹⁰ however there are limited large-scale epidemiological studies assessing this relationship, specifically for populations of young people and in the Canadian context. Quynh et al. (2013), who examined the relationship between exposure to public natural space and positive emotional well-being among young adolescent Canadians, reported that over half of Canadian youth reported positive emotional well-being.²⁹⁰ Relationships between measures of natural space and positive emotional well-being were weak and lacked consistency overall, but modest protective effects were observed in small cities. Positive emotional well-being was more strongly associated with other factors including demographic characteristics, family affluence, and perceptions of neighbourhood surroundings.

Blair (2009)²⁹¹ in a review of the literature on children’s gardening, reported positive outcomes of school-gardening initiatives in the areas of science achievement and food behaviour, but he did not demonstrate that children’s environmental attitude or social behaviour consistently improves with gardening. Qualitative studies documented a wider range of positive social outcomes and environmental behaviours. In one particular study of a school-community garden program, Schmidt et al. (2011)²⁹² stated that it resulted in promoted site transformation, life skills, community building, food security, school food service, curriculum developments, infrastructure development, extension master gardener collaboration, climate impact, future needs, and sustainability. McCormack (2010)²⁹³ completed a review

of farmers' markets and community gardens on nutrition-related outcomes, but findings were hampered due to few well-designed studies.

Whether community gardens, community kitchens, and food box programs are effective options for food-insecure families is uncertain. An evaluation of the uptake and perceptions of community gardens, community kitchens, and food box programs among food-insecure families identified two themes for non-participation. First, families expressed that programs were not accessible because they lacked the knowledge of how or where to participate or because programs were not in their neighbourhoods. Second, programs lacked fit for families, as they were not suited to busy schedules, interests, or needs. This information suggests that these programs may not be effective options for these families to improve their food access.²⁹⁴

To foster gardening and greenspace projects, various programs have developed in many areas, from community market farms, buying local, children's gardening, to "greening" areas (Appendix II.1.H.c).

d. Neighbourhoods, Place, Socioeconomic Status

Growing up in a poor neighbourhood has negative effects on children and adolescents. In the literature it has been concluded that the risk of low birth weight, childhood injury and abuse, and teenage pregnancy or criminality double in poor areas. Sellstrom and Bremberg (2006) demonstrated that interventions in underprivileged neighbourhoods can reduce health risks to children, especially in families that lack resources.²⁹⁵

Community building and social change involves working to change policies, develop new programs, and expand capacity and partnerships to tackle issues such as affordable housing, sprawl, lack of greenspace, and more. A sample of programs intended to build healthy neighbourhoods and healthy families are provided in Appendix II.1.H.d.

As to whether residential mobility in childhood may have an adverse association with health outcomes through the life course, Jelleyman and Spencer (2008) assessed the evidence.²⁹⁶ *"Outcomes identified in association with residential mobility included: higher levels of behavioural and emotional problems; increased teenage pregnancy rates; accelerated initiation of illicit drug use; adolescent depression; reduced continuity of healthcare. ...Residential mobility interacts at neighbourhood, family and individual levels in cumulative and compounding ways with significance for the wellbeing of children."*²⁹⁶

SECTION III: RESULTS (continued)**(2) Family in-home visits aimed at improving early childhood development and children's health outcomes**

Note: Additional information on family in-home visits is included in Section 1 (Healthy Child Development)

Generally, home visiting is one of several service strategies embedded in a comprehensive, high-quality early childhood system that promotes maternal, infant and early childhood health, safety and development; strong parent-child relationships; and responsible parenting among mothers and fathers. Home visiting programs may be established to prevent a range of adverse child health outcomes potentially associated with social disadvantage, while other programs may emphasize 'family wellness', including the cognitive and intellectual development of children, parenting skills and support, positive maternal mental health and use of other health services.²⁹⁷

In this synthesis of home visiting literature, information has been extracted primarily from systematic reviews. Where the literature is scant with respect to systematic reviews or other evidence reviews, randomized controlled trial evidence is reported where available. The following categories are used to frame the home visiting literature findings:

- 2.A. [General](#) (e.g., multi-component programs; target populations, modes of delivery, etc.)
- 2.B. [Child development and school readiness](#) (early education, cognitive and intellectual development)
- 2.C. [Child health](#) (health and safety, injury prevention, healthy nutrition, physical activity, obesity)
- 2.D. [Maternal health](#) (pre- and post-natal, breastfeeding, attachment, self-sufficiency)
- 2.E. [Positive parenting practices](#) (parent education and support, family functioning)
- 2.F. [Reductions in child maltreatment](#) (abuse, neglect)
- 2.G. [Reductions in juvenile delinquency, family violence, and crime](#)
- 2.H. [Low income, disadvantaged mothers, families](#)
- 2.I. [Teen moms, at-risk moms](#)

These categories reflect home visiting program aims such as early literacy and school readiness, child safety and injury prevention, reduction in child abuse and neglect, or target populations such as low income families or teen moms.

2.A. General (e.g., multi-component programs; target populations, modes of delivery, etc.)

A number of reviews investigate multiple outcomes, various target populations, etc., and the aim of this section is to introduce general research findings to date with respect to home visiting, starting with earlier reviews and culminating with the most recent.

In 2001 Ciliska et al. assessed the evidence for the effectiveness of public health nursing interventions delivered by home visiting of clients in the pre- and postnatal period. In their systematic review, they reported positive outcomes including "improvement in children's mental development, mental health and physical growth, reduction in the mother's depression, improvement in maternal employment, education, nutrition and other health habits, and government cost saving. There was no proven impact

on low birth weight, gestational age or neonatal morbidity or mortality.”²⁹⁸ Programs significantly benefitted clients considered to be at-risk due to factors such as low income and low educational achievement.²⁹⁸

Bull et al. (2004)²⁹⁷ investigated several questions in relation to home visiting and reported that there was

- (i) good evidence to suggest that home visiting can have an impact in reducing rates of childhood injury; parenting or mother-child interaction;
- (ii) some evidence to suggest a beneficial impact of home visiting on measures of intellectual development in children; breastfeeding; children’s diets; detection and management of postnatal depression; and
- (iii) insufficient evidence to suggest that home visiting programs can have a beneficial impact on low birth weight or other pregnancy outcomes; immunization or hospital admission rates; access to social support; maternal life course development such as participation in education or employment, spacing of subsequent pregnancies, or child abuse. However, with respect to the latter, the Task Force on Community Preventive Services recommends early child home visiting for preventing child abuse and neglect, based on strong evidence of effectiveness.²⁹⁹

In investigating the question of how home visiting programs are best delivered, Bull et al. reported that home visiting interventions that focus on a small range of outcomes appear to be less effective than interventions with a more comprehensive approach.²⁹⁷ Also, evidence suggests that more intensive programs of home visiting have greater impact, but there was no clear evidence on whether home visiting is more effective when delivered by professionals rather than lay people.²⁹⁷

In Sweet and Applebaum’s 2004 meta-analytic review to assess the effectiveness of home visiting as a strategy for helping families across a range of outcomes, they did not find that any one characteristic to be consistently related to outcome.³⁰⁰ Similarly, Zercher and Spiker (2004) concluded that *“research on home visitation programs has not been able to show that these programs have a strong and consistent effect on participating children and families, but modest effects have been repeatedly reported. Programs that are designed and implemented with greater rigour seem to provide better results. These results may include changes in parental health and safety behaviour, parenting and discipline and parental life course. Home visitation programs also appear to offer greater benefits to certain subgroups of families, such as low-income single teen mothers. On the whole, home visitation programs have not been shown to result in large changes in important child outcomes, such as birth weight, cognitive development or behaviour problems.”*³⁰¹

Russell et al. (2007) reviewed home visiting programs focusing on traditional outcomes such as child maltreatment prevention, as well as programs focusing on nontraditional outcomes, such as community connection.³⁰² Conclusions about program effectiveness could not be drawn from the evidence and authors noted the need for rigorous documentation of program implementation to facilitate evaluation. Similarly, Olds et al. (2007) stated that few programs have met standards for there to be certainty with regard to what aspects of home visiting lead to successful outcomes, but they reported that evidence is mounting that indicates that *“programs delivered by professionals, especially nurse home visiting programs for pregnant women and parents of young children, produce replicable effects on children’s health and development, and that these programs can be reliably reproduced with different populations living in a variety of community settings.”*³⁰³ Reading (2005) summarized early randomized, controlled trial findings of Olds et al. (1998; 2002; 2004)³⁰⁴⁻³⁰⁶ by stating that the trials had *“beneficial effects on the mother’s functioning and the child’s social, emotional and psychomotor development.*

Effects for nurse delivered programmes were stronger and more child-centred than for the paraprofessionals. ³⁰⁷ Further, Donelan-McCall and Olds (2012) indicated that home visiting programs with the greatest promise to improve pregnancy outcomes, parental life-course, child abuse and neglect rates, compromised caregiving, and children's social and emotional problems have employed professional home visitors, in particular nurses. ³⁰⁸

In 2007 Saskatchewan's Ministry of Education, in collaboration with the Universities of Saskatchewan and Regina, assessed the evidence of home visiting programs similar to that of KidsFirst. ³⁰⁹ KidsFirst is a paraprofessional home visiting program launched in 2002 that provides support and services to vulnerable families with young children (aged 0-5) in Saskatchewan. ³¹⁰ In examining the evidence for programs with similar aims to build capacity in families, promote healthy child development and facilitate goal achievement for parents, the review showed *"varying, mixed or inconsistent results."* ³⁰⁹ *"On the whole, the benefits to children and their parents were usually modest. In areas such as prenatal outcomes, signs of improvement due to programs similar to KidsFirst were rare."* ³⁰⁹

Korfmacher et al. (2008) sought to clarify what factors influenced parent involvement and they noted these to be parent characteristics, qualities of the home visitor, and program features. ³¹¹

The National Collaborating Centre for Determinants of Health (NCCDH) synthesized evidence of public health early child home visiting programs in a 2008 discussion paper. ³¹² In addition to pointing to mixed results of home visiting programs as reported in the literature, the authors included a summary of key components of successful home visiting programs. These components were: program fidelity; theoretically-grounded frameworks; delivery by professionals (although there is mention that teams consisting of a nurse and a paraprofessional can be effective); maintenance of enrolment; and pre- and postnatal aspects, running for a minimum of one year and of high intensity – programs with these components tend to be more effective, leading to better outcomes. Also, evidence indicated that programs that reached vulnerable or at-risk families may provide more benefit. These conclusions are similar to those of Kitzman (2007) who investigated whether program outcomes differ according to program characteristics. ³¹³ Specific to characteristics of participants, she noted that there is evidence to suggest that mothers with the fewest personal and social resources benefit more from home visit programs. As well, Kitzman stated that family engagement and investment in program objectives are critical; establishing quality relationships is important, however a constructed friendship alone is not sufficient to produce the anticipated outcomes; and that the impact of multi-dimensional home visiting programs lasts long after the intervention ends. ^{313,g}

Paulsell (2012) discussed the need for guidance for policymakers and practitioners to effectively implement and sustain high-fidelity programs, as well as adapt program models to different populations and contexts. ³¹⁵ Strategies are required to help avoid program attrition and enable programs to provide

^g An example of a large, multi-dimensional program is the large U.S. initiative called the Maternal, Infant and Early Childhood Home Visiting Program, which is responsive to the needs of children and families in communities at-risk, has the opportunity to affect changes that will improve the health and well-being of vulnerable populations by addressing child development within a framework of life course development. ³¹⁴ Supplee L, Adirim T. Evidence-based home visiting to enhance child health and child development and to support families. Washington, DC: American Psychological Association; 2012; Available from: <http://www.apa.org/pi/families/resources/newsletter/2012/07/home-visiting.aspx>. The Nurse-Family Partnership is another example of a multifaceted program designed to prevent a range of health and social problems and promote healthy development and independence in families.

the services intended. Supportive supervision, fidelity monitoring, and a positive organizational climate are important for developing successful evidence-based programs.

In a 2012 synthesis of evidence of the impact of home visiting, Spiker reported that home visiting is effective for children's cognitive and behavioural outcomes (e.g., Early Head Start, The Nurse-Family Partnership and The Infant Health and Developmental program); that home visiting is not significantly effective in improving pregnancy outcomes; that some components help to improve child's health and development and mothers' sensitivity to child cues; and that there is inconsistency in the results with respect to reductions in child maltreatment.³¹⁶ Spiker stated that the efficacy of home visiting programs also depends upon the population targeted, providers and home visit content. As reported in the NCCDH report,³¹² home visiting programs targeted at vulnerable or at-risk subgroups (e.g., parents living in poverty or parents with psychological difficulties) are generally more effective, and larger positive effects of home visiting programs are usually found when participants are fully involved and when nurses and/or other professionals deliver services to families instead of paraprofessionals.³¹⁶ This enables implementation of home visiting programs with a high degree of fidelity that can be sustained over time. Spiker goes on to report that *"With regard to home visit content, programs tend to be more effective when services are comprehensive in focus, components are implemented with rigour, and when they target families' multiple needs. Finally, home visiting programs that promote high quality parent-child relationships and combined with high-quality early education programs are most likely to result in better school readiness outcomes for children."*

In 2013, Filene et al. used a component-based, domain-specific approach to determine which characteristics most strongly predict home visiting program outcomes.³¹⁷ They reported significant and positive outcomes for maternal life course, child cognitive skills, and parent behaviors and skills, but no consistent pattern of effective components for birth outcomes, child physical health, and child maltreatment.

The King's College London review of the research evidence (2013)³¹⁸ on the impact of home visiting on families indicated that health visitors can have a positive impact on health and that success was related to three main areas:

- i. organising health visiting services to support best practice (single, holistic form of provision, centred upon universal service)
- ii. delivering proven programs and interventions to promote health and well-being (including collaboration with other community provision), and
- iii. having a suitably skilled and trained workforce.³¹⁸

Peacock et al. (2013) concluded from their systematic review that home visiting by paraprofessionals holds promise for socially high-risk families with young children, and initiating the intervention prenatally and increasing the number of visits improves development and health outcomes for particular groups of children.³¹⁹

The home visiting evidence of effectiveness review by Avellar et al. (2013) provided detailed evidence-based information for programs that serve pregnant women or families with children from birth to age 5 and the programs aim to improve outcomes in at least one of the following eight domains:

- i. Child health
- ii. Child development and school readiness
- iii. Family economic self-sufficiency
- iv. Linkages and referrals

- v. Maternal health
- vi. Positive parenting practices
- vii. Reductions in child maltreatment
- viii. Reductions in juvenile delinquency, family violence, and crime.³²⁰

As of August 2013, the HomVEE team had prioritized 35 program models for the review to determine which met the U.S. Department of Health and Human Services (DHHS) criteria for an evidence-based early childhood home visiting service delivery model.³²¹ The HomVEE team reported on quality of outcome measures, type of impact (favourable, unfavourable, ambiguous), duration of impacts, replication of impacts, and magnitude of impacts. The following is an excerpt of the HomVEE executive summary:

Overall, HomVEE identified 14 home visiting models that meet the DHHS criteria for an evidence-based early childhood home visiting service delivery model: (1) Child FIRST, (2) Early Head Start-Home Visiting, (3) Early Intervention Program for Adolescent Mothers (EIP), (4) Early Start (New Zealand), (5) Family Check-Up, (6) Healthy Families America (HFA), (7) Healthy Steps, (8) Home Instruction for Parents of Preschool Youngsters (HIPPY), (9) Maternal Early Childhood Sustained Home Visiting Program, (10) Nurse Family Partnership (NFP), (11) Oklahoma's Community-Based Family Resource and Support (CBFRS) Program, (12) Parents as Teachers (PAT), (13) Play and Learning Strategies (PALS) Infant, and (14) SafeCare Augmented. All of them have at least one high- or moderate-quality study with at least two favorable, statistically significant impacts in two different domains or two or more high- or moderate-quality studies using non- overlapping analytic study samples with one or more statistically significant, favorable impacts in the same domain.^{320h}

The literature is further reviewed and reported by specific domain in the following sections to provide a clearer synthesis regarding program components, content, delivery, target population, etc.

2.B. Child Development and School Readiness (early education, cognitive and intellectual development)

Home visiting models address child development and school readiness by engaging parents in activities designed to improve child functioning across developmental domains, educating parents about child development and strategies to enhance school readiness (such as literacy activities), promoting positive parent-child interactions, and linking families to center-based early childhood care and education experiences.

The literature indicates overall benefit of home visiting programs on school readiness and child development outcomes. Gaylor and Spiker (2012) reviewed seven home visiting program models across 16 studies that measured child development and school readiness outcomes and they concluded that there were positive impacts on young children's development and behaviour.³²² As noted in the

^h See Tables 2 and 3 in Avellar et al. (2013)320. Avellar S, Paulsell D, Sama-Miller E, Grosso PD. Home visiting evidence of effectiveness: executive summary. Washington, DC: U.S. Department of Health and Human Services; 2013 Sep. Available from: <http://homvee.acf.hhs.gov/Default.aspx>.

previous section, Spiker's 2012 synthesis of evidence indicated that home visiting is effective for children's cognitive and behavioural outcomes (e.g., Early Head Start, The Nurse-Family Partnership and The Infant Health and Developmental program).³¹⁶ Findings reported by Zhai et al. (2013) suggest that, regardless of geographic region, Head Start and pre-K participants had higher academic skills at school entry than did their counterparts.³²³ Karoly 2010 reported favourable economic returns for programs that focused on home visiting or parent education as well as for programs that combined those services with early childhood education.¹⁶⁴ Earlier findings from systematic reviews suggested effectiveness of home visiting programs in preventing developmental delay, as assessed by reductions in retention in grade and placement in special education.¹⁶⁹

In the HomVee review of research on 32 home visiting program models there were 16 program models with high- or moderate-quality studies that measured outcomes in the child development and school readiness domain. Of these, 12 had favourable effects on primary outcome measures (e.g., direct observations of behaviour), and 5 had favourable effects on secondary outcome measures (e.g., parent or teacher reports).³²⁴

2.C. Child Health (birth outcomes, health care, immunizations, healthy nutrition, physical activity, obesity)

Home visiting programs that begin during a mother's pregnancy generally aim to improve birth outcomes by linking mothers to prenatal health care and providing them with information about fetal development. Postnatal programs ensure that children have access to health care, receive immunizations, etc. Some programs also provide information to parents about ways to support physical health, such as the importance of nutritious meals and physical activity.³²⁵ In this section, sub-categories will be used to highlight areas: general program models, birthweight, nutrition, physical health, dental health, and immunization.

General Program Models

In the HomVee evidence review, of the 14 home visiting program models that met the U.S. Department of Health and Human Services criteria for an evidence-based early childhood home visiting service delivery model and with high- or moderate-quality studies that measured outcomes in the child health domain, five had favourable effects on primary outcome measures (birth outcomes and counts of health care service),ⁱ and six had favourable effects on secondary outcome measures (parent reports about children's health and use of health care services).^j ³²⁵

Birthweight

With respect to effectiveness of paraprofessional home-visiting programs on health outcomes of young children from disadvantaged families, Peacock et al. (2013) reported significant improvements in reduced incidence of low birth weights.³¹⁹

ⁱ Early Intervention Program (EIP) for Adolescent Mothers; Early Start (New Zealand); Healthy Families America; Healthy Steps; Nurse-Family Partnership

^j Early Start (New Zealand); Healthy Families America; Maternal Early Childhood Sustained Home-Visiting Program (MECSH); Nurse-Family Partnership

Nutrition

Regarding evidence relating to home visiting and child health - specifically, nutrition - two randomized controlled trials of home visiting components provided to disadvantaged groups to encourage fruit and vegetable intake for children under five did not show significantly increased overall fruit intake in the short term.¹⁹² Scheiwe et al. (2010) conducted four-year follow-up of a randomized controlled trial where the intervention used monthly home visits from trained volunteers to improve infant feeding practices among a sample of low income mothers in two disadvantaged London boroughs. Authors reported that there was little evidence that the intervention had an important effect on children's current BMI, caries levels or consumption of fruit and vegetables, however, mothers from the intervention group had better nutritional knowledge and confidence.³²⁶ The review by Bull et al. in 2004 stated that there is some evidence to suggest a beneficial impact of home visiting on children's diets.²⁹⁷

Physical Health

For children's physical health and obesity, Wen et al. (2012) reported findings from a randomized, controlled trial on home-based early intervention delivered by trained community nurses to target children's body mass index (BMI) and noted it was effective in reducing mean BMI for children at age 2.¹³⁴ The systematic review by Skouteris et al. (2012) revealed that parent-child relationships (e.g., in feeding, eating, and play) are important in explaining childhood obesity and that prevention/intervention (home visiting) strategies should be bi-directional in that they focus on interactions and influences of parent and child.¹³⁷

With respect to home visiting components aimed at housing interventions to reduce indoor allergens and improve children's health, there is sufficient evidence that multi-faceted in-home interventions for asthma tailored to the individual are effective in controlling asthma symptoms and reducing other measures of asthma morbidity.^{159, 160, 209, 210, 327-329} These interventions include home environmental assessment and education delivered by home visiting.

Dental health

Specific to dental health and impact of home visiting, this topic was not extensively searched, however a selection of randomized, controlled trials appear to show benefit of home visiting programs on utilization of dental services to improve dental literacy and introduce children and their families to dental prevention,^{67, 68} and to reduce early childhood caries in a low income community.³³⁰

Immunization

Kendrick et al. (2000) completed a systematic review to evaluate the effectiveness of home visiting programs on the uptake of childhood immunization.³³¹ Their conclusion was that home visiting programs have not been shown to be effective in increasing the uptake of immunization. Bull et al. (2004) also reported that there was insufficient evidence of the impact of home visiting on immunization or hospital admission rates.²⁹⁷ However a 2009 randomized, controlled trial by Hambidge et al. indicated that a stepped intervention of tracking and case management improved infant immunization status and receipt of preventive care in a population of high-risk urban infants of low socioeconomic status.³³²

2.D. Maternal Health (pre- and post-natal, breastfeeding, attachment, self-sufficiency)

Home visiting programs aimed at improving maternal health provide mothers with health information and guidance during pregnancy and after the child's birth.

The HomVEE programs with high- or moderate-quality studies measuring outcomes for maternal health that had favourable effects on primary outcome measures included: Child FIRST; Family Check-Up; Healthy Families America; Maternal Early Childhood Sustained Home Visiting Program; Nurse-Family Partnership; and Oklahoma's Community-Based Family Resource and Support (CBFRS) Program.³²⁰ Within the Canadian Best Practices portal (Public Health Agency of Canada), the following programs with maternal health home visiting components include: Born Equal – Growing Healthy; Early Start; Family Thriving Program; Healthy Families America; Healthy Start (Oregon); Nurse-Family Partnership.² The criteria used to distinguish these "best practice" interventions are found here: <http://cbpp-pcpe.phac-aspc.gc.ca/our-process/>.

Home visiting programs aimed at promoting breastfeeding have been examined through systematic review, and Bull et al. (2004) reported that there is some evidence to suggest a beneficial impact of home visiting on breastfeeding. As well, additional randomized, controlled trials provide support for home visiting programs with breastfeeding components, such as initiation of breastfeeding,³³³ duration of exclusive breastfeeding,³³⁴⁻³³⁶ and helping young mothers meet breastfeeding and healthy feeding guidelines.³³⁷ Further findings specific to low income, disadvantaged, at-risk mothers and their health are reported in section 2h.

To date, there is limited evidence that home visiting programs impact maternal depression³³⁸⁻³⁴³ However, Tandon et al. (2011; 2013) reported that for home visiting programs that serve low income pregnant women at-risk for postnatal depression, integrating mental health interventions into home visiting appears to be a promising approach for preventing postnatal depression.^{344, 345}

In terms of whether additional prenatal care in the home can improve birth outcomes for women with a prior preterm delivery, a randomized clinical trial by Lutembacher et al. (2013) suggests that the intervention may limit some risk factors and shorten intrapartum length of stay, but other evidence is scant.³⁴⁶ As for the impact of universal postnatal nurse home visiting on emergency care, Dodge et al. (2013) completed a randomized, controlled trial of a population-level intervention to test program effectiveness in reducing infant emergency medical care between birth and age 12 months. Authors reported that *"This brief, universal, postnatal nurse home visiting program improves population-level infant health care outcomes for the first 12 months of life. Nurse home visiting can be implemented universally at high fidelity with positive impacts on infant emergency health care that are similar to those of longer, more intensive home visiting programs."*³⁴⁷

2.E. Positive Parenting Practices (parent education and support, family functioning)

Several home visiting programs are designed to promote positive parenting practices. As to the evidence of effectiveness, many programs have demonstrated benefits and statistically significant impact.³²⁰ Home visiting programs that include at least one postnatal visit are associated with improved quality of the home environment and improved parenting.^{298, 303, 348-350}

Parenting interventions, most commonly provided within the home using multi-faceted interventions, are effective in reducing unintentional child injury, and there is fairly consistent evidence that they also

improve home safety.³⁵¹⁻³⁵⁴ This evidence relates mainly to interventions provided to families from disadvantaged populations, who are at-risk of adverse child health outcomes.

2.F. Reductions in Child Maltreatment (abuse, neglect)

Home visiting programs designed to prevent or reduce the incidence of child abuse and neglect generally involve professionals or paraprofessionals who work with parents to improve knowledge, skills, and behaviors that are associated with maltreatment. Many efforts to reduce family violence are documented in the published literature. Segal et al. (2012) write that *“despite decades of experience with program delivery, more than sixty published controlled trials, and more than thirty published literature reviews, there is still uncertainty surrounding the performance of these programs.”*³⁵⁵ The authors go on to suggest that evaluation should include a logic model to investigate stated objectives in relation to a theory or mechanism of change underpinning the home visiting program consistent with the target population as use of a theory-driven approach in evaluating programs may decrease the variation in results.³⁵⁵

With respect to home visiting designed to prevent or ameliorate child physical abuse and neglect, Barlow et al. (2006) completed a review of systematic reviews and stated, *“There was limited evidence of the effectiveness of services in improving objective measures of abuse and neglect, due in part to methodological issues involved in their measurement, but good evidence of modest benefits in improving a range of outcomes that are associated with physical abuse and neglect, including parental and family functioning and child development. The results also showed some interventions (e.g., media-based and perinatal coaching) to be ineffective with high-risk families.”*³⁵⁶

Bilukha et al. published a systematic review in 2005 on the effectiveness of early childhood home visiting in preventing violence. From this and earlier work,^{299, 357, 358} the U.S. Task Force on Community Preventive Services recommended early childhood home visiting for preventing child abuse and neglect, on the basis of strong evidence of effectiveness.²⁹⁹ The Task Force found insufficient evidence to determine the effectiveness of early childhood home visiting in preventing violence by visited children, violence by visited parents, intimate partner violence in visited families, or behavioural interventions and counseling to prevent child abuse and neglect.^{299, 359} With respect to the latter, Selph et al. (2013) reviewed new evidence on the effectiveness of behavioural interventions and counseling in health care settings for reducing child abuse and neglect and related health outcomes, as well as adverse effects of interventions. They concluded *“Risk assessment and behavioral interventions in pediatric clinics reduced abuse and neglect outcomes for young children. Early childhood home visitation also reduced abuse and neglect, but results were inconsistent.”*

In regard to childhood injury, an early systematic review of randomized, controlled trials by Roberts et al. (1996) concluded that home visiting programs have the potential to significantly reduce the rates of childhood injury.³⁶⁰ The program “Early Start” was associated with small to moderate benefits in a range of areas relating to child abuse, physical punishment, child behavior, and parenting competence.^{361, 362} There was little evidence to suggest that the Early Start program had benefits that extended to the level of parents or family overall.³⁶¹

A systematic review of reviews was carried out by Mikton and Butchart (2009) to assess effectiveness of universal and selective child maltreatment prevention interventions, focusing on seven main types of interventions: home visiting, parent education, child sex abuse prevention, abusive head trauma

prevention, multi-component interventions, media-based interventions, and support and mutual aid groups.³⁶³ Their findings were as follows: *“Four of the seven -- home-visiting, parent education, abusive head trauma prevention and multi-component interventions -- show promise in preventing actual child maltreatment. Three of them -- home visiting, parent education and child sexual abuse prevention -- appear effective in reducing risk factors for child maltreatment, although these conclusions are tentative due to the methodological shortcomings of the reviews and outcome evaluation studies they draw on.”*³⁶³ In effect, some home visiting programs designed to prevent child maltreatment indicate some promise, but there is inconclusiveness about reductions in maltreatment and improvements in child and family well-being.³⁶⁴ However, rigorous research indicates that home visiting has the potential for positive results among high-risk families, particularly on health care usage and child development.¹⁰⁶ Not surprisingly, with variation in evidence of effectiveness, there is variation in the cost effectiveness of home visiting programs for the prevention of maltreatment.³⁶⁵ *“The most cost-effective programs use professional home visitors in a multidisciplinary team, target high risk populations and include more than just home visiting.”*³⁶⁵

Randomized trial evidence provided by LeCroy and Krysik (2011) showed significant results for home visiting effectiveness as a means of improving parental, child, and maternal outcomes and preventing child abuse and neglect through parenting support, improving mental health and coping strategies, etc.³⁶⁶ McIntosh et al. (2009) provided evidence to suggest that, *“within the context of regular home visits, specially trained home visitors can increase maternal sensitivity and infant cooperativeness and are better able to identify infants in need of removal from the home for child protection.”*³⁶⁷ Further, Moss et al. (2011) *“demonstrated the efficacy of short-term attachment-based home visit intervention in enhancing parental sensitivity, improving child security, and reducing disorganization for children in the early childhood period.”*³⁶⁸

In the context of Aboriginal communities and reduction of family violence, Shea et al. (2010) completed a systematic review of interventions and approaches and reported a low level of evidence for most studies including those involving home visiting for high risk families.³⁶⁹⁻³⁷³

2.G. Reductions in Juvenile Delinquency, Family Violence, and Crime

To reduce juvenile delinquency, family violence, and crime, home visiting models may seek to reduce risky parental behaviors by addressing mental health, self-efficacy, and self-sufficiency. Many home visiting program models provide parenting education and parent-child interaction activities to strengthen parents' capacity to manage their children's behaviours and set children on a positive path, apart from juvenile delinquency.

The Better Beginnings, Better Futures program operates in eight Ontario communities and is designed to prevent young children in low income, high risk neighbourhoods from experiencing poor developmental outcomes. Better Beginnings is listed as a “best practice” model within the Public Health Agency of Canada's (PHAC) Best Practices portal and it includes child-focused programs to enrich children's social and academic environments, as well as parent- and family-focused programs for parent support and education.² There are a number of other programs listed in the PHAC Best Practices portal related to preventing violence, such as COPEing with Toddler Behaviour, DARE to be You, Family Thriving Program, Fast Track, etc.

Various programs that seek to reduce risk parental behaviours or support positive parent-child interaction are evaluated in the HomVEE review of evidence.³⁷⁴ Of four home visiting program models met the U.S. Department of Health and Human standards for the high or moderate ratings, none had favorable effects on primary outcome measures. Two (Healthy Families America and Nurse-Family Partnership) had favorable effects on secondary outcome measures.

In looking at research that specifically looked at reduction outcomes, research by Olds et al. (2004; 2002) showed long-term effects of nurse home visiting on children's criminal and antisocial behavior.^{304, 375} Authors stated that the program produced reductions in arrests, convictions, emergent substance use, and promiscuous sexual activity of 15-year-old children whose nurse-visited mothers were low income and unmarried when they registered in the study during pregnancy.^{375, 376}

2.H. Low Income, Disadvantaged Mothers, Families

Social disadvantage can have a significant impact on early child development, health and wellbeing. What happens during this critical period is important for all aspects of development. Caregiving competence and the quality of the environment play an important role in supporting development in young children and parents have an important role to play in optimising child development and mitigating the negative effects of social disadvantage. Home-based child development programmes aim to optimise children's developmental outcomes through educating, training and supporting parents in their own home to provide a more nurturing and stimulating environment for their child. Miller et al. (2012)³⁷⁷

A number of home visiting programs target those at-risk or have program components focused on supporting socially disadvantaged or at-risk moms. Home visiting may be embedded within a universal child health system or designed specifically to support certain populations.^{336, 378} Whether by universal design or targeted intervention, home visiting is considered to be a promising intervention for socially disadvantaged families with young children.^{314, 319, 379} Moore et al. (2012) describe the importance of how home visiting services are delivered to vulnerable families and children, and what is known about effective ways of engaging with vulnerable parents and families - for example, parent involvement is important to understand in home visiting programs.²⁷³ Widdup et al. (2012) highlighted the challenges of ensuring equitable access to a universal post-natal home visiting program and effect on ongoing use of child and family nurses services for Aboriginal and non-Aboriginal infants.³⁸⁰

Hodnett and Roberts (2000) stated that babies born in socioeconomic disadvantage are likely to be at higher risk of injury, abuse and neglect, and to have health problems in infancy.³⁵⁰ In their systematic review they assessed the effects of programs offering additional home-based support for women who had recently given birth and who were socially disadvantaged.³⁵⁰ Authors concluded that postnatal home-based support programs appeared to have no risks and may have benefits for socially disadvantaged mothers and their children, possibly including reduced rates of child injury.

Kitzman (2007) investigated the outcomes of home visiting programs for low income families and summarized results based on maternal outcomes, child health and development, and outcomes in general. She pointed to reviews by Kendrick,³⁵⁴ Olds,^{375, 381} and Gomby^{382, 383} that conclude that home visiting can be an effective strategy to improve health of children from socially disadvantaged families.

She also points to inconsistency in findings, such that different programs and different levels of program implementation have resulted in different outcomes.³¹³

The review by Russell et al. (2007)³⁰² concluded that *“home visiting programs represent a promising—but still largely untested and undocumented—strategy for strengthening parents and communities and fostering positive developmental outcomes for children.”* Lynn (2011)³³⁶ conducted a randomized controlled trial of sustained nurse home visiting, noting that it showed trends to enhanced outcomes in many (breastfeeding, children’s mental development, women’s experience of motherhood), but not all, areas. KidsFirst Regina (2011),³⁰⁹ a program which provides support and services to vulnerable families with young children, reported mixed or inconsistent results in a review of paraprofessional and professional home visiting programs in Canada and in the United States. In a systematic review by Miller et al. (2012) to determine the effects of home-based programs aimed specifically at improving developmental outcomes for preschool children from socially disadvantaged families, there was insufficient evidence of the effectiveness of home-based interventions that are specifically targeted at improving developmental outcomes for preschool children from socially disadvantaged families.³⁷⁷

Antenatal care is generally thought to be an effective method of improving pregnancy outcomes. Hollowell et al. (2011) conducted a systematic review to assess the effectiveness of specific antenatal care programs in reducing infant mortality in low income and vulnerable groups of women. Authors assessed effects on infant mortality, and *“of the fifteen studies which met inclusion criteria, only one was considered to demonstrate a beneficial effect on an outcome of interest. Six interventions were considered ‘promising’. Overall, there was insufficient evidence of adequate quality to recommend routine implementation of any of the programs as a means of reducing infant mortality in disadvantaged/vulnerable women.”*³⁸⁴

Peacock et al.’s 2013 systematic review of the effectiveness of home visiting programs on child outcomes provides a recent summary of significant improvements to the development and health of young children as a result of home-visiting. These improvements include: *“(a) prevention of child abuse in some cases, particularly when the intervention is initiated prenatally; (b) developmental benefits in relation to cognition and problem behaviours, and less consistently with language skills; and (c) reduced incidence of low birth weights and health problems in older children, and increased incidence of appropriate weight gain in early childhood. However, overall home-visiting programs are limited in improving the lives of socially high-risk children who live in disadvantaged families.”*³¹⁹

Leung et al.’s evaluation (2013) of the Healthy Start Visit Program provided evidence that this program was able to make services more accessible to disadvantaged Chinese parents with preschool children.³⁷⁸ Results indicated significant increase in child cognitive measures, child school readiness, child oral health practices; decreases in child sedentary activities, child home injury, and hospital visits; decreases in parenting stress and child behavior problems and increases in social support.

2.1. Teen Moms, At-Risk Moms

Teen moms, first-time moms, and at-risk moms face various challenges, and home visiting programs may focus on prenatal and postpartum health care for this population, or on providing preventive mental health intervention, etc. There are systematic reviews available which investigate home visiting effectiveness in relation to first-time moms, moms with substance abuse issues, etc. This overview does not attempt to examine home visiting literature specific to preterm birth and low birth weight, however

the results of two related systematic reviews are reported here: Goyal et al. (2013) reported that home visiting for preterm infants promotes improved parent-infant interaction, but there was limited evidence regarding the outcomes of infant development, morbidity, abuse/neglect, and growth/nutrition³⁸⁵; and Issel et al. (2011) stated that more evidence suggests that prenatal home visiting may improve the use of prenatal care, whereas less evidence exists that it improves neonatal birth weight or gestational age.³⁸⁶ Based on a retrospective cohort study, Goyal et al. (2013) reported that a higher dosage of intervention among at-risk, first time mothers enrolled prenatally in home visiting was associated with reduced likelihood of adverse pregnancy outcomes.³⁸⁷

As to the effectiveness of home visiting pre- and postnatally for women with an alcohol or drug problem, reviews indicated that there was insufficient evidence to recommend the routine use of home visits for pregnant or postpartum women with a drug or alcohol problem.^{388, 389} An earlier review by Drummond et al. (2002) also reported overall lack of impact, differential effects by program site, along with challenges in appropriate measurement, design, etc.³⁹⁰ Nievar et al. (2010) state, however, that home visiting programs with more frequent visitation for at-risk families had higher success rates, and in general, programs showed a positive effect on maternal behaviour.³⁹¹

In a randomized, controlled trial of a home visit program for adolescent mothers, Aracena et al. (2009) reported *“higher scores for the intervention group on the mothers’ mental health and nutritional state, as well as on the children’s levels of linguistic development.”*³⁹² A randomized, controlled trial of the effect of a paraprofessional home-visiting intervention on American Indian teen mothers suggested that the intervention improved parenting and infant outcomes.³⁹³ Ferguson and Vanderpool’s study (2013) of a maternal, infant, and early childhood home visiting program on parental risk factors suggested that families who were deemed at-risk for adverse pregnancy and child health outcomes benefitted from participation in the home visiting program.³⁷⁹ Positive program aspects included providing social support, fostering parental knowledge, skill development and problem solving, and connecting parents with community resources. The Families First home visiting program aimed at improving the well-being of at-risk families with preschool children reported increased positive parenting outcomes; decreased hostile parenting; no change in the overall score for mother’s psychological well-being but three of the six subscales were improved; purpose in life; environmental mastery; self-acceptance; increased social support; increased neighbourhood cohesion. No differences were found between program and comparison groups for neighbourhood safety, maternal depression, use of community services, families’ participation in voluntary organizations, delayed child development and reading sessions with children.³⁹⁴

A list of some select home visiting programs is included in Appendix II.2.A.

SECTION III: RESULTS (continued)**(3) Community-based collaborative interventions aimed at improving early childhood development and children's health outcomes at a population level**

Community-based collaborative intervention involves partnerships between early childhood organizations, practitioners, government (municipalities, regional districts, province), parent groups, researchers, etc., in delivering programs to children, parents, and families.

"...the collaboration partnership is one strategic way of assembling each entity to bring forth its most useful resources..."³⁹⁵

Examples of community-based collaborative programs include McClure et al. (2005) *"Community-based programmes to prevent falls in children"*¹⁰³; Turner et al. (2004) *"Community-based programmes to prevent pedestrian injuries in children 0-14 years"*⁹⁷; Turner et al. (2005) *"Community-based programs to promote car seat restraints in children 0-16 years."*¹⁰¹ These are discussed in 1.A. Health and Safety: e. Injury Prevention. With a number of studies that were systematically reviewed, there tended to be lack of research and limitations in the research methodology to draw strong conclusions. More of the discussion here covers general aspects and findings in relation to collaborative partnerships.

Armstrong et al. (2006)³⁹⁶ present an argument for the development of multisectoral partnerships, where disciplines and sectors collaborate to inform policy and practice. By working across different policy and program sectors, health disparities and underlying social determinants can be addressed. Research indicates that early childhood intervention programs have a greater impact on the life chances of children when there is effective collaboration between the program, parents, and the community.³⁹⁷³⁹⁸ Enablers for multisectoral collaboration have been cited as: a powerful shared vision of the problem to be addressed and what success would look like in solving it; strong relationships and an effective mix of partners; leadership; adequate, sustainable and flexible resources; and efficient structures and processes to do the work of collaboration.^{399, 400} With respect to the research on the development of multisectoral collaborations designed to support early childhood development in rural communities, similar enablers for success were identified: skills, knowledge and resources of internal and external leaders.⁴⁰¹ Goodall and Vorhaus (2011)⁴⁰² state that partnership and multi-agency arrangements are an essential component of a comprehensive strategy for parental engagement – "an evidence-based model that looks to build relationships across the family, the school, and the community can improve outcomes for low income and socially culturally marginalized families."

Hayes et al. (2012) states that local partnerships delivering environmental interventions result in health gain, although more evidence is needed.⁴⁰³ Milton et al. (2012)⁴⁰⁴ state that more evidence is needed to determine the population health impact of initiatives that aim to engage communities, although their synthesis found that initiatives did have positive impacts on housing, crime, social capital and community empowerment. Head and Stanley (2007)⁴⁰⁵ confirm that the network approach of the Australian Research Alliance for Children and Youth (ARACY) which includes stakeholders from three sectors - research, government policy, and professional practice – is making a difference in attracting support for evidence-based advice about effective early intervention. Also, in an evaluation of the Australian Government's Communities for Children program, Purcal et al. (2011)⁴⁰⁶ report that the program increased the number of agencies working together to support families with young children (0-5 years), and it enhanced the working relationships between providers. These outcomes assisted the engagement of disadvantaged families into the early intervention program and helped to increase their

trust of service providers. In Sweden integrated family centres provide high quality and educational services that are available to all families.⁴⁰⁷ In these centres there is co-location of the health service with the social service and the open pre-school. Compliance of professionals is a significant element that facilitates positive parenting.⁴⁰⁸

In the US, the National Education Association, which has formed multisectoral partnerships in sixteen communities to advance student learning, reports that these partnership programs can have a powerful impact.⁴⁰⁹ In California, the Children's Outcome Project promotes integrated, multisectoral place-based initiatives to improve the health and well-being of children.⁴¹⁰ In Ontario, Child Family Centres demonstrate an increasingly coordinated and integrated system of child and families supports. Integrated centres are seen as catalysts to facilitate networking of the family literacy environment which can ultimately help create more literate communities.⁴¹¹ In places like North Rhine-Westphalia, childcare centres have been developed into family centres in order to foster integration of services which is considered to have highly positive effects on the development of children and on the prevention of child neglect and maltreatment.⁴¹²

Saewyc and Stewart (2006) identified that multi-strategy approaches, especially those which incorporate community development/coalition building and multisectoral collaboration, appear to be more effective than single strategies.⁴¹³ Collaboration and multi-layered interventions can contribute to enhanced outcomes for families and neighbourhoods.⁴¹⁴ Child and family hubs can strengthen children's social capital in those communities with few social facilities.⁴¹⁵ Moore and Fry (2011) synthesized the literature on place-based approaches to meeting the needs of young children and their families and proposed a framework for a comprehensive community-based approach with these characteristics: universal; tiered, multi-level; place-based; relational; partnership-based; governance-structure.²⁷³

Increasingly, community-based participatory research (CBPR) is being used to study and address environmental justice.⁴¹⁶ CBPR is an approach for translating evidence-based models and research knowledge from child health into interventions.⁴¹⁷ Academic-community partnerships using CBPR principles may support increased dissemination of evidence-based practices to community-based organizations.⁴¹⁸ For example, in New Hampshire, academic-community partners collaborated to translate science and best practices into social action and policy change to address childhood lead poisoning and demonstrated that broad-based partnerships can be enhanced by CBPR attributes.⁴¹⁹

Too, in relation to CBPR, children's participation in consultation has become an important element of planning and community development strategies of government and community organizations.⁴²⁰ Researchers have noted positive effects on children's personal and social development for those participating in planning councils,⁴²¹ but in some cases children feel that their voices have not been heard and there are barriers to their participation.^{420, 422}

Community-based collaborative programs are listed in Appendix II.3.A. Coalitions, hubs, and multisectoral partnership initiatives aimed at helping children, families and communities in regions of Canada are separated from international initiatives.^k

^k Key Canadian sources of best-practice programs include the maternal and child health portal of the Public Health Agency of Canada^k and the Health Innovation Portal of the Health Council of Canada. In the US, the Healthy Communities Institute support several state and county best practices portals which are populated by an impressive number of programs. The Eurochild publication by Williams (2012) is a useful compendium of inspiring practices incorporating initiatives across Europe.

SECTION III: RESULTS (continued)

- (4) *Features of interventions in (2) or (3) above that may promote health equity or protect against increased inequities (Note: See Section III.1.C – Healthy Child Development - Material Well-Being, where features of programs relating to low income, equity/inequity are covered.)*

In considering equity in health, Whitehead and Dahlgren, in a 2006 World Health Report,⁴²³ discussed ten principles for policy action:

1. *Policies should strive to level up, not level down*
2. *The three main approaches to reducing social inequities in health are interdependent and should build on one another: focusing on people in poverty only, narrowing the health divide and reducing social inequities throughout the whole population*
3. *Population health policies should have the dual purpose of promoting health gains in the population as a whole and reducing health inequities*
4. *Actions should be concerned with tackling the social determinants of health inequities*
5. *Stated policy intentions are not enough: the possibility of actions doing harm must be monitored*
6. *Select appropriate tools to measure the extent of inequities and the progress towards goals*
7. *Make concerted efforts to give a voice to the voiceless*
8. *Wherever possible, social inequities in health should be described and analysed separately for men and women*
9. *Relate differences in health by ethnic background or geography to socioeconomic background*
10. *Health systems should be built on equity principles*

Overall, more review of programs in this section is necessary to identify specific features of programs reported to be effective. To better understand the nature and extent of inequities, ‘equity proofing’ or health equity audits may serve as tools.¹ Health equity tools have been summarized by the Equity Lens for Public Health project at the University of Victoria: <http://www.uvic.ca/research/projects/elph/>.

As for general observations of programs noted, some serve low income groups in urban centres; some focus on socially disadvantaged persons in smaller communities; some programs provide services for Aboriginal, immigrant, or non-English speaking populations specifically. For example, the Inner-City Response Team⁴²⁵ in Vancouver’s poor inner city is home to many Aboriginal families, as well as immigrant populations, and many families in this area struggle with poverty, drug abuse, violence, street crime, and disorder. The response program seeks to involve family and community in building a safety net around the child—working across traditional service silos with community members and service providers to achieve successful outcomes for these children. Sheway⁴²⁶ is a program also offered within the Downtown Eastside of Vancouver for prenatal care and a range of other supports during pregnancy for low income women. Another urban program is the Boyle Street Co-op program in Edmonton which connects people living in poverty with the things they need, such as prenatal support and outreach for women. The Healthy Baby program in Manitoba⁴²⁷ is a financial assistance program available to

¹ For more on this, please see BC Ministry of Health’s Core Programs Evidence Review “Equity Lens” (e.g., The Health Equity Audit and Equity Lens sections p. 28-29, with table) as useful resources.⁴²⁴ Pedersen S, Barr V, Wortman J, Rootman I, Public Health Association of British Columbia. CORE Public health functions for BC. Evidence review: equity lens. Victoria, BC: British Columbia Ministry of Health; 2007 Jul. Available from: <http://www.health.gov.bc.ca/public-health/pdf/equity-lens-evidence-review.pdf>.

communities province-wide and offers pre- and post-natal support to families with an income less than \$32,000. KidsFirst⁴²⁸, a federally-funded, provincially-run intervention program for vulnerable families with young children (aged 0-5) in Saskatchewan, offers support and services in nine areas identified as having high levels of need: Meadow Lake, Moose Jaw, Nipawin, Northern Saskatchewan, North Battleford, Yorkton and selected neighbourhoods in Prince Albert, Regina and Saskatoon. In the Yukon, partnership between the Rendezvous Rotary Club of Whitehorse and the Yukon Literacy Coalition provides Yukon children one free book every month, mailed directly to their home, until the age of 5 which enables every child to have books, regardless of their family's income.

Some initiatives have developed in smaller communities, such as Rimbey, Alberta (population just over 2,000)⁴²⁹ where a neighbourhood place hosts a community wellness group concerned with the issue of domestic violence, bullying, and suicide in the community. In Rimbey, there is also an after school program which provides quality care for children. The town of Blackfalds, Alberta, with a population similar to Trail, British Columbia (just over 7,000)⁴³⁰ has partnered with various agencies, groups and organizations to create resources for its residents. Through collaboration, the town operates 15 community social housing units, has a centre for immigrants and refugees, a food bank program, an optimist club, block parents, neighbourhood watch, a skateboard park and water spray park, a stepping stones program to help pregnant and parenting youth, and connection to the John Howard Society - a restorative process for offenders. Common elements of the programs that enabled their development and success appear to be collaboration, sustained funding, and leadership.

With respect to more specific findings related to the literature on interventions or programs with features that may promote health equity, an abstract listing of programs is available on request so that more investigation of these programs can be undertaken by the Trail Area Health and Environment Committee.

SECTION IV: DISCUSSION

More than 200 systematic reviews were considered in this scoping review along with almost 500 intervention programs that had home- or community-based components. As a result, this review serves as a thick resource of evidence-based reviews tied to ECD and also provides useful links to online portals to search for evidence-based programs. In conducting the scoping review, some key systematic reviews stood out with regard to their contribution to broadly answering the questions regarding factors that influence healthy ECD, home visiting effectiveness, best practice community-based, collaborative intervention models, and features of programs that promote equity. For example, Evangelou et al.'s (2009) summary of the literature pertaining to early years learning and development is a comprehensive review of evidence in respect to the process of development for children and best supportive contexts for children's early learning and development.⁴² Peacock et al.'s (2013) review on the influence of home visiting on disadvantaged populations provides evidence that home visiting by paraprofessionals holds promise for socially high-risk families with young children, and initiating interventions prenatally with high-frequency visits improves development and health outcomes for particular groups of children.³¹⁹ Avellar et al.'s (2013) review provides detailed evidence-based information for programs that serve pregnant women or families with children from birth to age five.³²⁰ In Avellar et al.'s review, the HomVEE team prioritized 35 program models to determine which met established criteria for an evidence-based early childhood home visiting service delivery model.³²¹ The HomVEE team reported on quality of outcome measures, type of impact (favourable, unfavourable, ambiguous), duration of impacts, replication of impacts, and magnitude of impacts.

Certainly, many other foundational reviews are included and inform the global pool of knowledge in key ECD areas. Various reviews provide evidence for more specific areas, such as Gaylor and Spiker (2012)³²² and Spiker's (2012)³¹⁶ synthesis of evidence of home visiting programs on school readiness and child development outcomes, in which they concluded that there were positive impacts on young children's development and behaviour. Or, Goyal et al.'s (2013) systematic review in which they reported that home visiting for preterm infants promotes improved parent-infant interaction.³⁸⁵ Or, Sellstrom and Bremberg's (2006) review which demonstrated that interventions in underprivileged neighbourhoods can reduce health risks to children, especially in families that lack resources.²⁹⁵ Many more studies provide sufficient level evidence for various aspects of ECD and home visiting, although some research gaps exist. For example in considering children's nutrition, multi-component interventions and educational workshops to promote healthy food choices in early childhood education appear to be effective, and community-based interventions that provide activities to engage parents may provide added benefit by improving the home food environment but more research is needed to clarify effective community-based components and nutrition programs.

As for the question of what factors influence ECD other than lead, it is evident that the literature provides a wealth of evidence on social, biological, and environmental determinants. As for the question "What is the evidence for programs that promote ECD?", many promising practices emerged, of which nutrition, healthy eating, and activity programs seemed particularly abundant. Areas of children's health such as physical health, obesity, and nutrition have seen rapid growth in the number of intervention programs. Despite a large number of intervention programs with home- or community-based components for these health areas, the literature does not provide robust evidence of effectiveness for many specific components. The growing number of programs and focus in these areas reflects the increasing obesity trend among children and the strong interest in addressing the health issue through home- and community-based efforts. Review of the literature suggests that home visiting strategies should focus on interactions and influences of parent and child in targeting obesity and that

early intervention delivered by trained community nurses to target children's body mass index (BMI) may be effective in reducing mean BMI.¹³⁴ Active school commuting by children may increase their level of physical activity, however evidence for the impact of active school transport or participating in after-school programs in promoting healthy body weights for children is not strong.¹⁴⁶ Similarly, active video games increase physical activity levels in children in the short term, but whether they lead to increases in habitual physical activity or decreases in sedentary behavior, the evidence is less clear.¹⁵¹ The importance of the built environment and “smart”, “age-friendly” city design can exert a strong influence in children’s health. Important steps in fostering healthier environments include creating partnerships in neighbourhood planning, and engaging children and families in planning processes to ensure program and service access.

In considering the evidence for community-based collaborative programs, these programs tended to be fewer in number and, in some cases, lacked a body of evidence. McClure et al. (2005)¹⁰³ and Turner et al. (2004; 2005)^{97, 101} reviewed a selection of community-based programs designed to prevent injuries in children (falls, pedestrian injuries bicycle injuries, etc.) and reported that there tended to be lack of research and limitations in the research methodology to draw strong conclusions. With other studies of factors influencing ECD or home visiting interventions, common issues include lack of well-designed studies resulting in evidence that remains inconclusive. For example, McCormack’s (2010) review of farmers’ markets and community gardens on nutrition-related outcomes for children cited insufficient evidence because findings were hampered due to few well-designed studies.²⁹³ Studies of interventions designed to reduce child maltreatment have not been particularly successful in establishing a strong body of evidence, to the degree that Segal (2012) suggested that evaluation should use a theory-driven approach in evaluating programs as this may decrease the variation in results.³⁵⁵

With respect to programs or components of programs intended to promote equity or mitigate inequity to pinpoint successful aspects, still further review is required to identify features of interventions that promote health equity or protect against increased inequities. Some wide-ranging evidence of practices involving hubs and networks suggests that this is a promising avenue to pursue.

All in all, a fair amount of evidence is presented in this scoping review with respect to influences on ECD, home visiting components, and intervention programs. This scoping review reveals and presents a multitude of programs that tie with factors affecting healthy child development. Several home visiting programs provide strong evidence for their positive impact on children and families in the areas of parental education, maternal and child health, for example. Program components and structure have been investigated and a number of items important to program success have been identified such as well-trained program staff, parental engagement, program duration and sustainability, and program development that is multisectoral in nature involving a variety of stakeholders. Benefits have been experienced by socioeconomically disadvantaged children and families as well, with proportionate universality being a best practice offering accessible programs and services to all.^m Best effort was made to review all programs found within portals, compendiums, etc., but as noted in Section II, this scoping review does not claim to be exhaustive in identifying resources. By narrowing on domains and programs of potential interest, this will allow deeper investigation of elements of programs and feasibility of collaboration and implementation in a specific community. By brainstorming goals and anticipated outcomes, and by considering which areas may resonate positively with prospective partners and groups, the way to move forward and work with the evidence can be clarified.

^m For more on universal proportionality, see the Human Early Learning Partnership’s Proportionate Universality brief, found here: <http://earlylearning.ubc.ca/documents/70/>.

Some issues to consider in relation to this review include: what are current offerings for children and families in the community of Trail, apart from the continuum of services provided by THEP; has there been an environmental scan of what other agencies, organizations, and schools offer; what nutrition and activity programs are in place; does school programming offer after school activities for children and youth; have there been opportunities for children's voice at planning tables with respect to built environment or community design; what child and youth mentoring programs exist within Trail; are there municipal statistics compiled that enable detailed profiling of populations and areas within the community; what do data indicate for body weight of Trail children and their state of physical and mental health; are there community designs enabling safe routes to school; and are there Smart Growth²⁷⁹ initiatives and/or Child Friendly City²⁸¹ principles in place? Depending on areas of interest of the Trail Area Health and Environment Program with regard to programs and evidence, there can be discussion of how evidence-based interventions may 'fit' goals and community of Trail.

Although there is insufficient evidence regarding some programs, it may of interest to discuss areas that have not had time to accumulate sufficient evidence – e.g., a Munchkinland Discovery Centre⁴³¹ similar to that established in Parksville/Qualicum, or Lead Free Wheels.³³ If there are evidence-based programs that require community- or municipal collaboration, it may be a future step to consider whether there are government-owned tracts of land that may be reconstituted for community or children's gardens; what government, corporation, and/or agency funding is available for partnership-based initiatives; or a horticultural society that may be open to collaborative ideas to promote food gardens; as examples.

In developing prevention programs and health promotion programs, much work is involved, and hopefully this scoping review serves as a foundational document to to highlight best practices and assist pursuit of change to supplement and complement early childhood development activities within Traild offset environmental challenges that may be present.

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SECTION VI: APPENDICES (provided by separate file)

