

**EARLY CHILDHOOD INTERVENTIONS TO
PROMOTE WELLBEING AND PREVENT
MENTAL DISORDERS:**

**A review of research evidence and
recommendations for Canadian contexts**

By

Temitope Aina

PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF PUBLIC HEALTH

In the
Faculty of Health Sciences

SIMON FRASER UNIVERSITY

Fall 2016

Acknowledgements

I would like to express my profound gratitude to Dr. Charlotte Waddell, my senior supervisor for her constant encouragement, support and guidance particularly at those times when I doubted my ability to complete the project or program.

I would like to use this opportunity to remember and appreciate Dr. Elliot Goldner, whose sudden passing is still a shock. I am also grateful to Dr. Denise Zabkiewicz and Mr. Warren O' Briain for their important contributions and support over the years.

Special thanks to my family and friends most especially to my partner, Ojuolape, for her patience, positivity and for always reminding me that there is a light at the end of the tunnel. I am always in your debt. Thank you.

Background

Early childhood is a time of rapid growth and development. The foundations for healthy adulthood and life course development are also laid early in childhood when young people develop skills that enable them to understand and process the world around them (1). Human development involves complex interactions between genetic and environmental factors and children who grow up in environments that enhance their mental wellbeing have the best chance to achieve their potential as healthy, capable, productive adults (1).

The first few years of life are an exceptionally important period as they are when foundations for functioning are laid. It is within the first few years of life that children develop cognitive, social and emotional skills that foster an ability to relate well with others into adulthood (1). The development of these skills has been shown to affect to a large extent: how ready children will be to learn when they enter school; how well they will cope with pressures and challenges of everyday life; their likelihood of developing mental illness in later life; and even the possibility of interactions with the criminal justice system (2-5). Children who have significant disadvantages early in childhood are often affected in how prepared they are for school entry (6). Some children are particularly resilient when faced with significant stressors while others suffer lasting effects affecting their healthy development (1). As well, emotional and behavioural problems in childhood are often precursors of serious problems that people experience as adults such as substance misuse, anxiety, depression, domestic violence and even criminal behaviour (4,7).

In Canada, an estimated 12.6% of children aged 4-17 years are affected by mental disorders at any given time, with emotional and behavioural problems

such as anxiety disorders accounting for most of these (8). These disorders, where not prevented or treated early, are a significant contributor to morbidity and have a negative impact on the quality of life of an individual over their life-course (1). Addressing the mental health needs of young children could therefore have a tremendous ripple effect on the long-term overall health and wellbeing of the population.

There is evidence showing that interventions in early childhood can help to reduce risk factors and foster children's ability to cope with challenges and stressors throughout life (8-10). Along with this is the recognition that the cognitive and social-emotional aspects of a child's development can be modified through interventions, in turn leading to improvements in long-term outcomes (10). Interventions may be designed to confer protective effects and to mitigate some of the consequences associated with exposure to risk factors that can affect a child's development. There are various methods of trying to achieve this objective. Some interventions focus on specific groups who are particularly at risk, with the aim of decreasing or eliminating risk and the possible progression to future mental disorders. Other interventions focus on children who are already experiencing mental health challenges – which consist mainly of behavioural and emotional problems in this age group (8) – by identifying them in the early stages and equipping them and/or their caregivers to deal with the issues, thereby preventing future complications and progression (11). More broadly, there are interventions which are available to all members of a population which, when properly applied, serve to prevent the risk factors from developing in the first place (11).

It is critical that all children generally, but particularly children

potentially at risk, be reached as early as possible with mental health promotion and mental illness prevention efforts as it has been shown that early childhood problems establish pathways that subsequently become harder to influence as the children age (1,7). Failure to do so could have psychosocial and financial implications for society as a whole including less than optimal performance and participation in the workplace, greater costs associated with clinical treatment services and costs associated with the problem downstream through the criminal justice system (13,14). Interventions with young children have been shown to be particularly cost-effective – with economic investments made in early childhood development offering some of the best rates of return while being much cheaper than later treatment (14,15). In addition to the improved quality of life, there is therefore a compelling economic case for directing policy commitments and resources to interventions at the crucial early stages of life.

Perhaps the most fundamental question then becomes, what is the best way to intervene in this early period to ensure the best possible outcomes for the child, the family and society at large? This paper aims to provide possible answers to this question – based on research evidence on programs that have proven successful and that are applicable to the Canadian context. The interventions seek mainly to create optimum environments for children with the goal of helping to prevent or manage the problems and challenges that they face.

One factor has been repeatedly demonstrated to be most important when considering what environmental influences shape the wellbeing of young children – parenting (12,13). Remarkable consistency has been demonstrated across studies showing the relationship between early parental care and childhood behavioural, intellectual and emotional outcomes (12,15). Parenting

styles that are overly protective have been found to contribute to childhood emotional problems, while those that are harsher and perhaps even abusive are linked to behavioural problems in childhood (16). This suggests the great importance attached to trying to influence parenting styles if one seeks to improve wellbeing of the child. Therefore, most preventive programs at this level try to improve parenting styles (17).

For example, parents can be assisted to identify early behaviours that could signify problems for their children. They can also be encouraged to improve their skills and their responses to their child's behaviours – reinforcing positive behaviour and discouraging problematic behaviour in healthy ways (18). Parents also shape the early environment of the child and an environment that does not nurture or stimulate the child may contribute to future problems. Parents can be taught and encouraged to provide optimal environments for their children. A positive parent-child relationship is the ultimate goal of parenting programs, which results in improved parental understanding of how children develop cognitively, socially and emotionally (18).

Childcare is another important setting where young children in Canada spend considerable time, particularly in the preschool years. The impact of societal factors such as a shift to greater numbers of both parents holding full-time jobs has necessitated parents sharing the caregiving role with others (19). Childcare practitioners have thus assumed more important positions when it comes to contributions to child rearing. The numbers of children in childcare and the amount of time spent continues to grow (19). The childcare setting represents an important venue where social-emotional learning takes place, as well as where early attachments and relationships are formed. Some of the

earliest relationships that young children have, apart from those with their parents and siblings, are formed in the childcare setting, which includes attachments with their peers as well as with daycare workers (21). These are also places where children undergo challenging situations and may start to show early signs and symptoms of social-emotional problems. Children who are under stress at home may express frustrations and emotions in the childcare setting. Childcare providers report that many children in their care (in some cases as many as 30%) require specialized care and attention due to problems with behavioural and emotional regulation (20). These problems may be more prominent in disadvantaged neighbourhoods where parents have less spare time and may be compelled to work multiple jobs. There is also an increase in lone-parent households who have to rely on daycare centres more (21). Early childhood educators who are aware of, and know how to respond to the needs of these children, can help to set them on a path of mental wellness through the life course (22).

Many programs also focus on other elements of the child's environments such as interactions with siblings, peers, educators and living environments, as well as the ability to cope with complex emotions such as anger, sadness or anxiety. Such interventions may have overlapping goals and many have been shown to work best when multiple types of interventions are delivered across different sectors, leading to synergy in their effects (23,24). In terms of delivery, these interventions could be offered to a general population (universal programs); to specific subgroups who are at greater risk of mental disorders (selective); or to those that have begun to express early signs and symptoms of disorders (indicated) – although these groups are often not as clearly delineated

in practice and tend to overlap frequently (11). At the policy level, maximizing limited resources sometimes influences the scope, reach and delivery of interventions. Interventions that could be of benefit to a large number of children may need to be started in only a small way due to limited resources (25).

As part of the decision-making process for policymakers when considering investments in programs for young children, it is important to assess costs involved in implementation as well as the cost-benefit ratios of programs. As a society, the investment of significant resources in early childhood interventions that have been proven to work makes sense not only based on the short- and long-term outcomes demonstrated, but also based on economic benefits (14).

The economic benefits which accrue from early childhood interventions can come about in a variety of ways. For example, participants in parenting or home visitation programs develop skills and techniques that benefit them as well as all their children and may even be transferred to other descendants (through their children being more capable parents themselves). This, in turn could mean that there are fewer cases of child maltreatment and less interaction with child welfare and healthcare systems which results in sizeable benefits to the government. By recognizing and addressing mental health needs early, savings can be made that otherwise would have gone to addressing the impacts of crime. Cohen estimated the average cost of someone involved in a life of crime to society to be between \$1.3 and \$1.5 million over a lifetime (14). Some of these programs provide valuable benefits directly to the parents by reducing childcare costs (the time children spend participating is time that their parents don't have to pay for childcare). Improvements in academic and cognitive ability may in turn mean

that the children are more likely to obtain graduate high school and less likely to be arrested or convicted which could lead to greater productivity and participation in the workforce and savings in the justice system and to taxpayers.

This review focuses on interventions that demonstrate the best evidence for improving child development outcomes in the preschool age group (0-6 years) and that are feasible for implementation in the Canadian context. The goal is to inform policymaking as well as to underscore the importance of early years in public policy planning and investments.

Methods

Critical review methods were chosen to ensure that policy is guided by the best available research evidence, informed by methods from the *Cochrane Handbook of Systematic Reviews* (26). Randomized controlled trial (RCT) evidence was chosen as it is the “gold” standard for evaluating intervention effectiveness (26). Review articles were identified by hand searches and with the assistance of the librarian at the Faculty of Health Sciences, Simon Fraser University. Reference lists of the published systematic reviews involving intervention programs in early childhood related to mental health promotion or mental illness prevention were consulted. This allowed for introduction to the literature, identification of relevant search terms and key words, and quick identification of interventions that could have been missed by a database search.

A keyword search was also conducted across standard databases (e.g. PubMed, PsycInfo, Cochrane, Campbell Collaboration) to identify academic literature and compile research articles related to the research question. The keywords used for the database search were derived after multiple iterative

attempts using relevant terms as well as combining with those used in similar reviews. They were: “*early childhood intervention*”, “*psychosocial development*”, “*behavioural problems*”, “*social emotional wellbeing*”, “*cognitive development*”, “*parenting*”, “*randomized controlled trials*” “*peer reviewed journals*”, “*mental disorder prevention*” and “*mental health promotion*”.

The articles included were limited to those published in peer-reviewed publications between January 1990 and June 2016 and which contained RCT evidence.

The titles and abstracts identified from this search were then screened to determine their relevance to the subject. Of those, the articles deemed relevant and those identified from the systematic review reference lists were retrieved and assessed. Interventions were compiled and then individually assessed further to determine if they had been evaluated in a way that met the evidence threshold (see Table 1) for program inclusion. This assessment involved ascertaining whether the outcomes were evaluated using robust RCT methodology, including large enough sample sizes, and whether any positive results were also statistically significant. Attention was also paid to length of follow-up (programs had to follow children for at least one year) and to programs that had been evaluated in multiple (two or more) RCTs in different settings.

Table 1: Criteria set out to assess programs and interventions

Inclusion criteria	Exclusion criteria
Earliest interventions carried out at some point in the early childhood period when the children were between birth and age six years.	Treatment studies that focused on specific mental disorders
Studies contained outcomes which showed significant results when assessing improvements in child development, parenting ability and/or children’s home environments	Studies requiring that children have specific mental health diagnoses at the outset of intervention to qualify
RCT evaluation design prioritized as gold standard of	Non-RCTs were excluded

evidence when assessing programs	
RCTs with follow up of at least 1 year	
Interventions carried out in countries with similar economic profile to Canada (OECD nations)	
Evidence supporting the intervention published in peer-reviewed journals or by recognized government sources	

The outcomes identified in the studies were then examined to determine whether they relate to known early childhood development parameters, which assessed the behavioural, cognitive and emotional capabilities of children and/or parenting ability of their caregivers, or if they improved the early childhood home environments. All these factors, as mentioned earlier, have substantial effects on a child’s wellbeing. The outcomes identified as important were those that had been demonstrated to be consistently reliable and valid in assessing children. Multiple sources of information for assessing the outcomes were also required – such as parental reports, teacher/educator reports, child interviews, direct observation of parent-child interactions, or standardized assessments such as tests – due to bias or over- or under-estimation encountered with using a single source in children’s mental health. This allowed a determination of whether there was overall promotion of mental health and wellbeing and/or a reduction in mental disorder symptoms or diagnoses, thereby indicating the effectiveness of strategies to prevent mental disorders.

Interventions found to have produced equivocal results or those with unclearly defined outcomes and research methodology were removed. The interventions which met all these criteria were subsequently assessed in detail, including determining if they were economically viable and demonstrated Canadian scale-up potential.

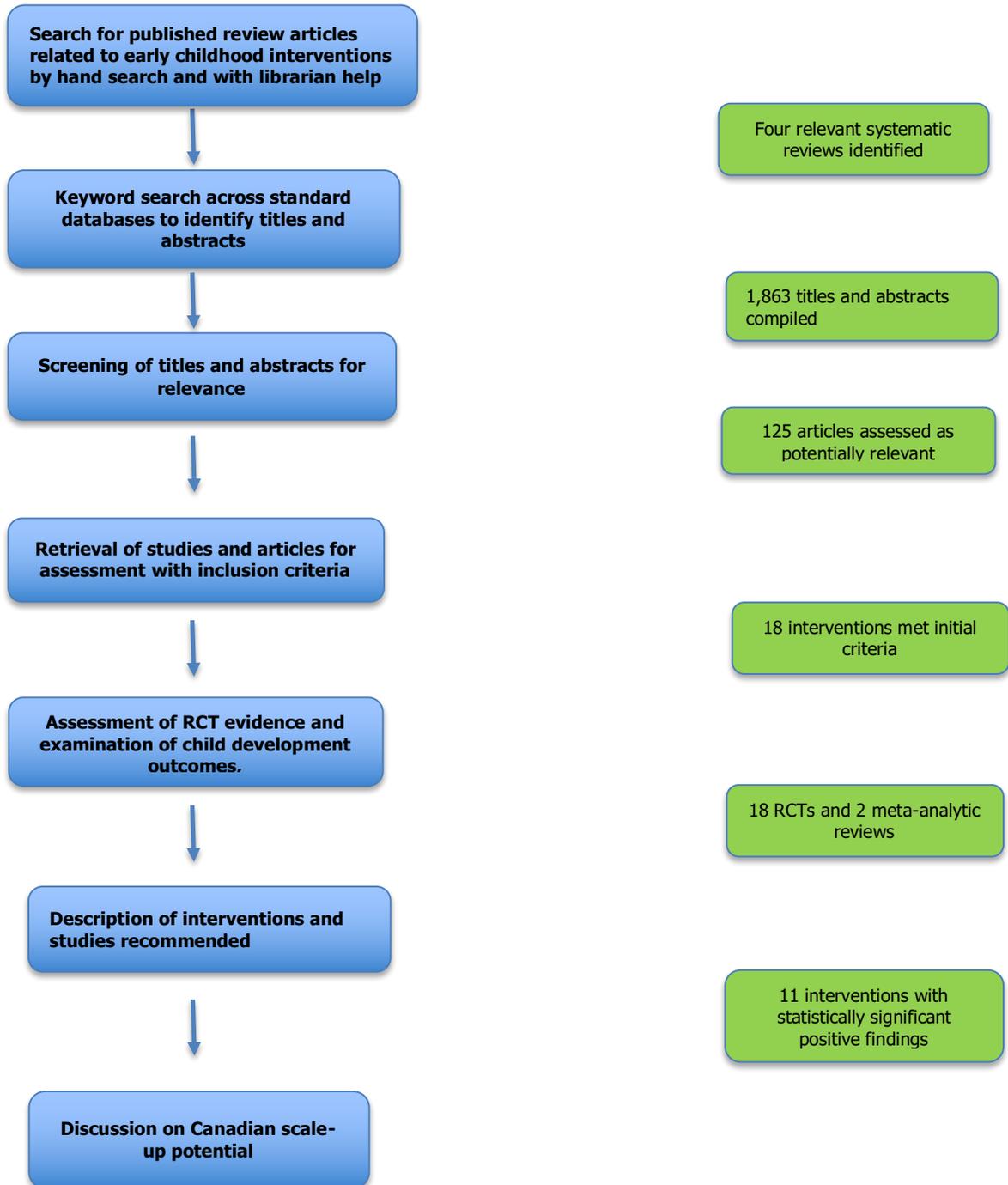
Programs were considered to be particularly promising if the conditions that determined their success could be replicated in Canada. This meant that interventions recommended were restricted to those that had been carried out either in Canada or in *Organization for Economic Co-operation and Development* (OECD) countries due to their similar profile to Canada (27).

A description of the interventions and summary of the findings can be found in Table 2. Each program was then examined and a description of the main evidence supporting its inclusion and outcomes measured was outlined.

Results

The results obtained are contained in figure 1. Blue bubbles represent the methodological steps taken while green bubbles represent the results.

Figure 1: Flow diagram showing steps involved in the review process and results obtained



A search for relevant systematic reviews yielded four that focused on early childhood interventions to improve mental health outcomes (28-31). A total of 18 RCTs and two meta-analytic reviews formed the evidence base for the programs recommended. Parental and children self-reports (through questionnaires) were the most common source of information, but studies also assessed participants through direct observation by researchers and individual interactions with children (in some cases outcomes relating to children were assessed with them taking standardized tests or measures), where feasible. The early childhood period was subdivided into the prenatal/early infancy stages and the toddler/preschool years. The interventions and the main RCT evidence supporting them are summarized below based on these age groups.

1. Early Childhood Interventions Starting Prenatally or in Early Infancy

In this period, young children are dependent on their caregivers for most of their needs. The best evidence of effectiveness exists for programs that specifically target socially- and economically-disadvantaged families. Home visiting and/or parent education interventions tend to show the best results particularly when administered by well-trained personnel. The description of the three most noteworthy interventions in the prenatal and early infancy period and a summary of their main findings are presented in Table 2. This summary derives from the RCTs examined and is followed by a more detailed description of these studies for each program.

Table 2 A description of the early childhood interventions spanning the period of infancy with summary of major studies and findings demonstrating their effectiveness

	Intervention description	Summary
Nurse-Family Partnership (NFP)	<p>Individual home visitation program for young, first-time mothers most of whom are teenagers, unmarried and low income.</p> <p>Participants received home visits from trained nurses approximately once per month from pregnancy until the child was age two years.</p> <p>Nurses teach positive health behaviours, competent care of children and maternal personal development and they also underwent regular supervision.</p>	<p>Five important RCTs described- three in the United States (New York, Tennessee & Colorado), one in Netherlands and one in Britain.</p> <p>All three US NFP trials showed a sustained pattern of sizable benefits on important child and maternal outcomes such as prenatal health behaviours, sensitive child care, child and adolescent functioning and maternal lifecourse.</p> <p>There were improved birth outcomes, improved parenting skills, an improved maternal outlook for the future. There was also a reduction in child maltreatment, an important precursor to many later mental health problems.</p>
Preparing for Life (PFL)	<p>Home-based program involved providing mothers with public health information through distribution of materials such as developmental toys, access to preschools and public health workshops as well as support from community health workers.</p> <p>High treatment group received home visits lasting one hour delivered by trained personnel (mentors) and group parent training through the <i>Triple P</i> program when child turned two years old</p>	<p>Major evidence base is RCT carried out in Dublin, Ireland.</p> <p>Participants showed significant improvements across a range of outcomes including cognitive, language and socio-emotional domains as well as general health and wellbeing.</p>
Abecedarian Project	<p>Longitudinal prospective study of the benefits of early childhood educational intervention within a childcare setting.</p> <p>Treatment provided in 2 phases during preschool and in the primary grades</p> <p>Children attended the program full day, year round until age 5 years for the preschool group and then a 3 year intervention for the primary group</p>	<p>Major evidence is an RCT in North Carolina, where the participants have been tracked for more than 30 years.</p> <p>Cognitive and educational benefits of the program have been consistently documented.</p> <p>Treated children scored significantly higher scores on intellectual and academic achievement indices than controls from the age of 18 months onwards.</p>

Long-term effects of the **Nurse-Family Partnership (NFP)** home visitation program conducted at multiple sites in the United States (New York, Tennessee, Colorado) as well as in Netherlands and England, have mostly shown it to be

beneficial for improving the lives of the women and children involved (32-36). The goals of the program were to improve pregnancy outcomes, foster improved parenting skills, improve child development, reduce child injuries, and improve the lives of the mothers themselves. Table 3 below shows the major NFP RCT conducted together with measures and important findings.

Table 3: Description of studies on NFP intervention with significant findings

RCT setting	Participants	Study Details and measures	Important findings
Elmira, New York (semi-rural community) (32)	300 women Ethnic make-up- 89% white, 11% black, no Asians or Hispanic Americans Average age of participants- 19 years old	Surveys conducted with mother and child at birth and when the child was one, two, four, 15, 19 & 23 years. Intervention group received NFP while the control group was provided developmental screening and referral to treatment for child under age two years. Measures in children included child abuse and neglect, arrest and conviction, substance use, high school graduation, economically productive activities Measures in mother included time spent on welfare, subsequent births, self-reported arrests and convictions.	48% less officially verified incidents of child abuse and neglect verified in the intervention group when compared to the control group (average of 0.26 incidents per nurse-visited child against 0.50 per control-group child) at age 15 years Significantly fewer lifetime arrests and convictions according to self-reports by age 19 (this effect was most prominent among the girls) although no significant effects were reported on high school graduation rates or substance use Among the women who participated, those nurse-visited reported fewer arrests and convictions (32)

<p>Memphis, Tennessee (highly disadvantaged neighbourhoods) (33)</p>	<p>743 women</p> <p>Ethnic make-up- 92% African American, 8% white non-Hispanic</p> <p>Average age of participants- 18 years old</p>	<p>Surveys conducted with mother and child at birth then at ages one, two, six, nine, 12 & 17 years</p> <p>Intervention group was provided with NFP services and the control group received developmental screening, referral to treatment for children under age two years and free transportation to scheduled prenatal appointments</p> <p>Measures in children included healthcare encounters and hospitalizations for injuries or ingestion, immunization rates, mental development, academic performance, conduct or behavioural problems, internalizing disorder such as depression or anxiety, substance use,</p> <p>Measures in mother included time spent on welfare, subsequent births, duration of relationship with current partner, time spent employed, intimate partner violence, substance use, incarceration, psychological distress</p>	<p>At child age two years, no significant effects on children's mental development or behavioral problems although it did show fewer health care encounters or hospitalizations (37). By age 12 years, 28% less likely to have internalizing disorder such as depression or anxiety (38)</p> <p>Statistically significant findings include nurse visited children less likely to have internalizing disorder (22.1%) than controls (30.9%) at age 12 years and less likely to have used cigarettes, alcohol or marijuana.</p> <p>Among the subsample of children whose mothers had prior low psychological resources, the nurse visited children made substantial gains in academic performance (reading and math) which were sustained over the follow-up period. (38)</p> <p>The mothers also spent less time on government assistance programs such as welfare and food stamps than did controls. (33)</p>
<p>Denver, Colorado</p>	<p>490 women</p> <p>Ethnic make-up- 46% Mexican American, 36% white, 15% African American</p> <p>Average age of participants was 20 years' old</p>	<p>Surveys conducted with mother and child at birth and when child at ages one, two, four, six and nine years</p> <p>Measures in children included language development (Preschool Language Scles-3), behavioural adaptation, emotional regulation, executive functioning, academic performance, conduct or behavioural problems (Child Behaviour Checklist), internalizing problems such as depression or anxiety, substance use,</p> <p>Measures in mother included welfare receipt, subsequent births, duration of relationship with partner, intimate partner violence, substance use, mental health,</p>	<p>A similar subsample of children whose mothers had prior low psychological resources (who made up 40% of participants) made sizable gains (as assessed by the researchers) in language development (standardized effect size of 0.31), behavioural adaptation (standardized effect size of 0.38), and executive functioning (standardized effect size of 0.47) at age 4 years old though not in emotional regulation. The findings here further strengthened those already observed in the Elmira and Memphis trials (39)</p> <p>Nurse-visited group had consistently better outcomes than the control group on emotional and behavioural outcomes but these did not reach statistically significant levels (39)</p>

<p>VoorZoog* trials, Netherlands (35)</p> <p>*VoorZorg is an adaptation of the NFP in Netherlands that was translated into Dutch language and integrated into the healthcare system. Consists of 40-60 structured visits.</p>	<p>460 women</p> <p>Ethnic make-up 7% black, 8% Hispanic or Creole, 15% Asian and 54% white non-Hispanic</p>	<p>Surveys were at intake, week 32 of pregnancy, two months, six months, 12 months and 24 months</p> <p>237 women were in the intervention group and received usual care with NFP services periodically until child's second birthday. 223 women in the control group received usual care</p> <p>Child protective services (CPS) reports were tracked as the primary outcome and the child's home environment and behaviour as the secondary outcome using the Home Observation Measurement of the Environment (IT-HOME)</p> <p>Maternal follow-up tracked intimate partner violence IPV through self-reported data</p>	<p>At 24 months of age, the children of nurse-visited mothers had a significant improvement in internalizing behaviour but no difference in externalizing behavior according to the Child Behaviour Check List (prevalence of 17% among the intervention group against 31% among controls).</p> <p>Their long-term home environments were also judged to be more significantly improved with measures to assess home environment of the child (Home Observation Measurement of the Environment) showing significantly more positive environments among intervention groups than among controls.</p> <p>11% of children in the intervention group as against 19% of children in the control group had a CPS report three years after birth (35)</p> <p>Women in the intervention group self-reported significantly less IPV victimization and perpetration than controls at 32 weeks pregnancy and 24 months after birth (40)</p>
<p>Family Nurse Partnership (FNP), Britain (41)</p> <p>*</p>	<p>1645 women</p> <p>Ethnic make-up 88% were white, 2% Asian, 4% black and 6% classified as "mixed"</p>	<p>Follow-up carried out when the children were at 24 months</p> <p>The intervention group comprised of 823 receiving the intervention while the control group had 822 women</p>	<p>No additional short-term benefits found by adding NFP to the usual level of care available.</p> <p>Longer-term follow-up necessary to establish if the program confers any positive effects for child development outcomes</p> <p>The program showed improvements in early child development particularly early language development (which was measured as a secondary outcome) at this stage. An impact across the study's four main short-term outcomes was not found. (41)</p>

Although the British NFP trial did not show short-term benefits over the usual level of care, it has been suggested by Olds (42) that some of the reasons for this could be that women with low prior psychological resources (a subgroup where NFP effects have been particularly prominent), were not clearly

differentiated in this study. He also remarked on the extensive services which make up the usual level of care in Britain and that the primary outcomes tracked are not those that previous NFP trials have claimed to affect (the British trials could have been further strengthened by guidance from findings of previous trials) (42).

The ***Preparing for Life (PFL)*** program is an early intervention initiative established in 2007 and designed by Northside Partnership (in conjunction with local agencies and community groups) in North Dublin, Ireland that aims to provide support for families from pregnancy until the child starts school. It is targeted at families living in deprived communities and the goal is to improve the school-readiness of young children by providing their parents with tools- such as through home visits, workshops, materials and access to professional support personnel that help to improve parenting techniques and the child's early development. Table 4 below shows the major RCT conducted with measures and important findings:

Table 4: Description of study supporting PFL intervention with significant findings

RCT setting	Participants	Study details and measures	Important findings
North Dublin, Ireland (43)	233 women	<p>Carried out by the University College Dublin Geary Institute at scheduled intervals when the child reached six, 12, 18, 24, 36 and 48 months old</p> <p>Mixed methods approach with longitudinal RCT design</p> <p>Random allocation of 115 women into high support treatment group and 118 women into low supports treatment group</p> <p>A comparison to a control group made up of families</p>	<p>Parents in the program reported that their children had better cognitive skills at 18 months and at ages two, three and four years old.</p> <p>At age four years old, a direct assessment using a standardized cognitive test revealed a 10-point IQ gap between children that took part in the program and those that did not (13% of children in the program scored below average on the test compared to 57% of children not receiving the intervention).</p> <p>There were also fewer behavioural problems at ages two, three and four years. Improvements were also observed in parenting measures with significant differences in parental self-efficacy and parental stress by 18 months. These findings were maintained through the 36</p>

		<p>from a different community with similar socioeconomic demographics that received usual services and no support from PFL program</p> <p>Data sources comprised of research visits involving questionnaires, observations and direct assessments.</p>	<p>month assessments.</p> <p>Some improvements were also noted in home environment assessments (measured by the HOME instrument).</p> <p>These findings were maintained through the 36 month assessments though by the 48 month assessments, there was a noticeable drop in some of the positive findings though most child development outcomes remained consistent (43)</p>
--	--	--	---

The ***Abecedarian Project*** started in 1971 and was a study in a childcare setting designed to determine the benefits of intensive educational interventions in early childhood instituted in socioeconomically disadvantaged families with children at risk of developmental delays or academic failure. Table 5 below shows the major RCT study conducted with measures and important findings:

Table 5: Description of study supporting Abecedarian Project intervention with significant findings

RCT setting	Participants	Study Details and measures	Important findings
North Carolina, USA	<p>109 eligible families with 111 infants (two sets of twins).</p> <p>Selection based on 13 socio-demographic factors</p> <p>98% of participants African American</p> <p>Average age of mother was 20 years old</p>	<p>Participants have been followed-up at regular intervals to age 30 years</p> <p>57 infants assigned to intervention group, which received full day centre-based childcare services. 54 infants assigned to controls received no services.</p> <p>Intervention provided in two phases- preschool and primary grade and children could receive both, one or neither.</p> <p>Key domains tracked at age 21 years include intellectual level, academic skills, degree of self-sufficiency, social adjustment (through negative outcomes like substance use, convictions, violence)</p>	<p>Significantly higher scores on intellectual and academic measures as young adults. Children with intervention demonstrated an 8-point increase in cognitive skills (44, 45).</p> <p>Treatment effects were largest during the preschool years and somewhat diminished during later childhood and adolescence (46)</p> <p>Preschool treatment associated with educationally meaningful effects on reading and math skills persisting into adulthood</p> <p>At age 30 years old, there was strong evidence for educational benefits but a mixed picture for economic or social-adjustment benefits (47)</p>

2. Early Childhood Interventions Starting in the Toddler/Preschool Years

The description of the seven more noteworthy interventions in toddlerhood and a summary of their main findings are presented in Table 6.

Table 6 A description of the early childhood interventions spanning the toddlerhood with summary of major studies and findings demonstrating their effectiveness

	Intervention description	Summary of study and findings
Positive Parenting Program (Triple P)	<p>Individual parenting program which can be delivered at multiple levels ranging from universal levels to all parents to specific levels delivered to parents of children with behavioural problems.</p> <p>Variety of forms: community centre, home, self-directed. Weekly (30-90 min) sessions with video/TV, workbook manuals.</p> <p>Delivered (unless self-directed) by psychologists/ nurses with accredited training</p>	<p>Two RCTs are described with the first carried out in Brisbane, Australia and the second in South Carolina. A meta-analysis showing the positive effects of Level 4 intervention of Triple P is also described</p> <p>Improvements noted in parenting practices, parent confidence, anxiety and stress and reduction in the levels of child maltreatment and child disruptive behaviours</p>
Family Check Up (FCU)	<p>Brief family support program offered in the home or community centres for at-risk families (socioeconomic, family and/or child risk factors).</p> <p>When children were age 2 and 3 years, caregivers were offered a Family Check Up and linked parenting support services- up to 6 sessions lasting between 20-60 minutes.</p> <p>Psychologists received 40 hour training and were regularly supervised</p>	<p>One major RCT is described as support for FCU</p> <p>Intervention effects occurred primarily among families reporting high problem behaviour at age 2 years with decreased behaviour problems.</p> <p>Improvements in caregivers' proactive and positive parenting skills also noted.</p> <p>Children demonstrated improvements in academic achievement and school readiness.</p>
Webster-Stratton Parents and Children Series ("Incredible Years")	<p>Group-based parenting program over 2-4 months at community centres for children with behaviour problems recruited from primary care settings.</p> <p>Weekly 2-hour groups with a video-series manual.</p> <p>Nurses/teachers had 6 months training and were regularly supervised.</p>	<p>Three RCTs and one meta-analytic review are described as the main evidence base supporting the inclusion of "Incredible Years".</p>
Head Start	<p>Centre-based program targeting at-risk children (economically disadvantaged) with comprehensive early childhood education, health, nutrition and parent involvement</p>	<p>The main study supporting the benefits of the intervention is from data by the Head Start Impact Study</p>

	Intervention description	Summary of study and findings
Research-Based Developmentally-Informed enrichment intervention (REDI)	<p>services</p> <p>A variation of the usual practice Head Start designed to enhance and strengthen the impacts in social-emotional skills and</p>	<p>Short-term benefits of the program are well documented where participants demonstrate an increase in cognitive and academic capacities (60) but there has been some controversy as to whether the program produces sustained or lasting benefits</p> <p>Higher IQ, short-term cognitive benefits (typically disappeared by third grade), higher graduation rates and college attendance (noted mainly among white children but not as prominent in black children), lower crime rates (60)</p>
Early Start Program	<p>Two to three year weekly home visiting program for at-risk families- low-income pregnant women and families with infants and toddlers.</p> <p>Delivered by family support workers with 5 weeks training.</p> <p>Federal monitors visit once every three years to ensure performance standards are adhered to.</p>	<p>Major evidence in support is a RCT evaluation carried out across all regions of the United States.</p> <p>Children involved did better in cognitive and language development and were less aggressive</p> <p>Parents displayed higher emotional engagement sustained attention with their children.</p>
High/Scope Perry Preschool Project	<p>Centre based group program over two years for preschool children in deprived neighborhoods</p> <p>Curriculum of 12 hours per week, delivered by trained early childhood educators during home visitation</p> <p>Educators were regularly supervised.</p>	<p>RCT in Michigan with follow up extending to 40 years is described</p> <p>Higher school achievement and higher literacy scores. Evidence of promotion of social, emotional, intellectual learning and development in participants.</p>
Brief Psychoeducational Parenting Program	<p>Four session psycho-educational group for parents of preschoolers with behaviour problems</p> <p>Two-month parenting program</p> <p>Two-hour group sessions every three weeks and a booster session 1 month later.</p> <p>Delivered by trained community staff facilitators in community agencies.</p>	<p>RCT in Toronto, Canada described</p> <p>Reduction in child hostility and aggression. Improvements in anxious behaviour. Improvements in parenting practices.</p>
Parent Education Program	<p>Three-month program for parents with shy/inhibited preschool children.</p> <p>1.5-hour sessions delivered every Two weeks by clinical psychologist in a community centre.</p>	<p>RCT in Australia described</p> <p>Significantly greater reduction in anxiety disorders. Reductions in parental and laboratory-observed measures of behavioural inhibition</p>

The ***Positive Parenting Program (Triple P)*** is a family support program for parents and caregivers of children and adolescents that has been in use for over 30 years. It aims to support parents by enhancing their parenting knowledge and skills and thus, encourage and empower families to address common social, emotional and behavioural problems in children. It uses a multi-level framework that attempts to tailor resources to the needs of the individual family recognizing that different parents, based on their circumstances, location, culture and family type, have different requirements regarding the type, intensity and mode of assistance they want (48). There are five levels of intervention which range from broader universal levels aimed at disseminating information about the program to the community (to normalize the process of seeking help by parents) and parents of young children who seek general advice on different aspects of parenting, to more specialized services that reach parents of children with specific mental disorders. Table 7 below shows the major RCTs conducted with measures and important findings

Table 7: Description of studies supporting Triple P intervention with significant findings

RCT setting	Participants	Study Details	Measures
Brisbane, Australia (low income areas) (49)	305 families of three year-olds with concerns about child's behaviour	<p>Surveys conducted with caregiver at one and three years after program's completion through questionnaires and direct observation</p> <p>Intervention families received Triple P services</p> <p>Control families received no intervention and no contact with research team during intervention period</p> <p>Data sources were through questionnaires and direct observation with their children</p>	<p>Outcomes showed sustained improvements at both one and three years post intervention with changes observed in the levels of disruptive behaviour in the intervention group based on observational and self-report measures</p> <p>Two thirds of children with clinically elevated measures pre-intervention moved into non-clinical range at three year follow-up (49)</p>
Meta-analysis of effectiveness of Triple P Level 4 (50)	Level 4 indicated if child has multiple behaviour problems in various settings	48 effect studies in which Triple P were used and 25 studies that focused on Level 4 were analyzed	Intervention reduced disruptive behaviours in children with improvements well maintained over time (50)
South Carolina, USA (51)	18 rural or semi-urban counties which involved full Triple P implementation	<p>Nine counties randomly assigned to Triple P services with 650 service providers trained to deliver Triple P services to parents of children 0-8 years</p> <p>The other 9 surrounding counties were used as controls and were provided with usual services but not Triple P</p> <p>Outcomes measured using official data from independent organizations like Child Protective Services, foster care system and hospitals</p>	The impacts assessed two years after random assignment showed that child maltreatment was reduced in the counties where the intervention was offered by 25% (11.6 cases per 1000 children against 15.5 cases in the control counties). (51)

The **Family Check-Up (FCU)** program involved families with young children deemed at-risk through income criteria and enrolled through a food supplement program in the United States. The target was to enhance the caregiver use of positive parenting strategies in early childhood to address and manage any problem behaviour exhibited by the toddlers, which would therefore

strengthen the parent-child relationship. This would serve to prevent the development of behaviour problems in children. Table 8 below shows the major RCT conducted with measures and important findings.

Table 8: Description of study supporting FCU intervention with significant findings

RCT setting	Participants	Study Details	Measures
Urban (Pittsburgh, PA), rural (Charlottesville, VA) and sub-urban (Eugene, OR) communities in the United States (52)	713 at-risk children and their primary caregivers Ethnic make-up of caregivers 50% European American, 28% African-American, 13% biracial and 9% classified as other	Follow-up carried out one, two and three years after intervention Caregivers of intervention group received family-centred interventions such as parental support services and the Family Check-Up when children were ages two and three years old Child Behaviour Checklist used to assess outcomes and mothers required to complete when children were ages two, three and four years old. Children also observed in structured and unstructured play activities with caregivers and siblings Academic achievement assessed by Woodcock-Johnson III Academic Skills composite	Outcomes showed a reduction in identified toddler problem behaviour, which was associated with strengthened positive behaviour support from caregivers. This effect was most prominent in the children that were deemed highest risk at age 2 years old (52) Intervention led to improvements in proactive parenting, a dimension of positive parental support that was associated with better behaviour control which led to lower levels of behaviour problems (53) Positive changes in parenting led by the intervention were associated with higher academic scores (54)

The **Webster-Stratton Parents and Children Series (“Incredible Years”)** is a program which started in the United Kingdom and seeks to address a variety of risk factors that affect the mental health of youths and adolescents in early childhood. It does this by attempting to strengthen the relationships between parents, teachers and children. The parenting component aims to enhance positive parenting techniques and improve their support networks. The teacher and child components aim to decrease children’s aggression and enhance their emotional regulation in the classroom and also increase proactive

teaching strategies. Another major goal is promoting and strengthening positive parent-teacher relationships. Service delivery was at a community and family centres by health visitors. Table 9 below shows the major RCTs conducted with measures and important findings.

Table 9: Description of studies supporting Incredible Years intervention with significant findings

RCT setting	Participants	Study Details	Measures
Meta-analytic review (55)		50 studies comparing intervention to comparison groups post-intervention to assess parent program for its ability to enhance prosocial and reduce disruptive behaviours	Across a wide range of families, child behaviour improved, with the most severe cases showing larger effects The authors considered the parent program “well-established”
Two RCT follow-ups carried out together in London, England (56)	The first involved 120 three to seven year-olds who were referred from clinics, had met the criteria for severe antisocial behaviour and who had been recommended for treatment (indicated approach In the other study, which instituted a selective approach, 109 four to six year olds who were screened as high-risk from the community due to increased antisocial behaviour	To determine its effectiveness in controlling antisocial behaviour and compare an indicated approach with a selective approach The participants received the intervention and the authors reassessed 93 of them when they were between 10 & 17 years old In the second study, the intervention group were reassessed between the ages of nine & 13 years old. Measures were for antisocial behavior (assessed through a diagnostic interview), antisocial characteristics (assessed through a questionnaire), reading achievement (through standardized tests) and parent-adolescent relationship quality (through parent report and direct observation for emotional warmth and supervision)	The indicated study approach showed improvements in both elements of antisocial personality compared with controls, improved reading ability and improved relationship with parents (although direct observation showed no differences). The selective approach with the high-risk children showed no significant improvement in long-term outcomes (56)
United Kingdom (57)	78 children with early onset conduct problems whose parents received the intervention when they were between three and eight years old	Follow-up was carried out after 8-12 years Families were enrolled in the intervention due to conduct problems exhibited by their children during the preschool years The assessments were through home interviews and individual assessments of the parents and teenagers separately	75% of the teenagers were found to exhibit minimal behaviour and emotional problems (57)

Other studies have also been conducted to assess the effectiveness of the intervention with children diagnosed with attention-deficit/hyperactivity disorder (58) – with consistently improved outcomes demonstrated.

The next three programs – *Head Start*, *Early Head Start* and the *High Scope Perry Preschool Program* – are conceptually similar and were developed with similar aims, so they will be addressed together. The **Head Start** program is a preschool program for socioeconomically disadvantaged children, which was conceived to help close the gap observed between them and their well-to-do peers. It started in 1965 in the United States where it was federally funded and run through social agencies. It has been a massive undertaking and more than 900,000 children (mainly 3- and 4- year olds) are still served every year (59). The goal is to provide a learning environment that nurtures the child in addition to a wide range of services, which include providing meals for participants and health services as well. Due to the expansive nature of the program and the diverse participants, finding suitable control groups has presented a challenge. But in 2002, a commissioned *Head Start Impact Study* (61) examined the long-term effects. *The Research-based, Developmentally Informed (REDI)* variant of *Head Start* appears to show even greater benefits than the usual practice *Head Start* and there is some early promise that its effects could be longer lasting (62). Some authors have also suggested that differences in research design help to explain why there is such a variation in the impacts of *Head Start* (63).

The **Early Head Start** program is a federally-funded program in the United States which started in 1995 and is targeted to low income pregnant women and primary caregivers of infants and toddlers. The intervention involved several variants with programs selecting a model involving home-based or

centre-based services or a combination of the two. The program has produced consistently positive findings though there have been a few questions about lasting effects and significance (65).

High/Scope Perry Preschool is another program that was based on *Head Start* and was carried out from 1962 through 1967 among low-income African American three- and four-year-old children in the public schools of Ypsilanti, Michigan in the United States. Its evaluation aimed to investigate the effects that a high quality preschool education program could have on socioeconomically disadvantaged young children known to be at high risk of school failure. Table 10 below outlines the RCT findings on these *Head Start* and related programs.

Table 10: Description of studies supporting Head Start, Early Head Start and High/Scope Perry

Preschool interventions with significant findings

Program	RCT setting	Participants	Study Details	Measures
Head Start	Head Start Impact Study (61)		Control group featured eligible 3- and 4-year old children that did not have access to <i>Head Start</i> but could enroll in other early childhood programs	Improved developmental outcomes in preschool including language and literacy benefits while in the program but few of the impacts remained by the end of third grade Higher graduation rates and college attendance (noted mainly among white children but not as prominent in black children), lower crime rates. (61)
Early Head Start	All regions of United States (64)	3001 families across 17 programs. The ethnic make-up of the participants was 37% white Non-Hispanic, 34% African-American non-Hispanic, 24% Hispanic and 5% from other backgrounds	Follow-up surveys were carried out when the children were 14, 24 & 36 months old 1513 families were assigned to receive the intervention and 1488 as controls. Families recruited were those that were under the federal poverty level and were expecting or had a child under 12 months of age. Control group families could access other services in the community but did not receive Early Head Start services Primary outcomes assessed were related to child development and parenting. Data sources included interviews with caregivers, direct observations of parent-child interactions and child assessments conducted when the children were 3 years old Child cognitive and language development measured using the Mental Development Index (MDI) and Peabody Picture Vocabulary Test. Child social-emotional development was measured using the Child Behaviour Checklist (CBCL). Parenting was assessed using five measures including the HOME scores.	Significant findings showed increased positive and non-punitive parenting (effect sizes for measures of parenting behavior showed impacts of Early Head Start ranged from .10 to .15), reduced rates of early problem behaviours particularly child internalizing problems Children performed better in cognitive and language development (effect sizes ranged from .10 to .13 for cognitive and language development outcomes), displayed higher emotional engagement of parent and sustained attention with play objects (effect sizes .20 for engagement and .16 for sustained attention), lower aggressive behavior than controls. (64)
High Scope Perry Preschool	Ypsilanti, Michigan (66)	123 low-income African American children assessed at high risk of school failure	Follow-up reports have been written when the children were ages 11, 14, 15, 19, 27 and even up until age 40 years old. 40 year follow up carried out in 2006 (61) 58 children were randomly assigned in the intervention group and received a comprehensive preschool program while the control group received none. The full reports cover the domains of education, crime prevention, economic performance, health and family relationships	Higher school achievement and higher literacy scores. Evidence of promotion of social, emotional, intellectual learning and development in participants Better college completion rates, lower crime and greater economic benefits associated with the intervention group as part of the lifetime effects (66)

The **Brief Psychoeducational Parenting Program (1-2-3 Kids)** is a group based intervention delivered to parents of three- and four-year-olds that were believed to be having trouble coping with and managing their toddler's behaviour. Its main objective was to determine if a program with four sessions could have significant effects on parents' behaviours, as most evidence-based programs at the time required a minimum of eight sessions. Facilitators were trained and a pilot program was run out of a university hospital in Toronto, Canada (where the program was also developed). RCT findings are described in Table 11 below.

Table 11: Description of study supporting Brief Psychoeducational Parenting Program intervention with significant findings

RCT setting	Participants	Study Details	Measures
Toronto, Canada (67)	222 primary caregivers mostly middle class	Caregivers were recruited through adverts placed at locations in the community where the parents of young children could see them Questionnaires on parenting practices and about their child's current behaviours prior to the start of the intervention	Intervention induced a 35% reduction in the number of families in the clinical range in contrast to a 7% reduction among controls Significant changes were demonstrated in positive parenting behaviours, compliant behaviours of children and appeared sustained at 1-year follow up. (67)

The **Parent Education for Preschool Children at Risk for Anxiety Disorders** program is an intervention carried out in Australia to evaluate whether educating parents of toddlers meeting the criteria for anxiety disorders would prove effective for preventing or reducing the progression of the condition. RCT findings for this final preschool program are outlined in Table 12 below.

Table 12: Description of study supporting Parent Education for Preschool-Aged Children at Risk for Anxiety Disorders intervention with significant findings

RCT setting	Participants	Study Details	Measures
Australia (68)	71 three to four year old children who demonstrated high levels of inhibition and parent currently with anxiety disorder	<p>RCT follow up at 6 months and 1 year</p> <p>Parents were recruited for the study through adverts in magazines, at childcare centres and at the community health centres</p> <p>Children had to meet the criteria of having at least one parent with an anxiety disorder diagnosis and score high on the behavioural inhibition laboratory assessment (questionnaire completed by both parents and also direct observation by trained personnel) to be included</p> <p>The eligible children were randomly allocated to either parent intervention or a 6-month waitlist. Parents in the control group received the intervention after all assessments had been completed</p>	Significantly greater reduction in anxiety disorders. The results (68) showed that by 6-month follow-up, 46.7% of children in the parent intervention group were free of anxiety disorder in contrast to only 6.7% of the control group. Reductions in parental and laboratory-observed measures of behavioural inhibition (68)

Discussion

Three programs in the prenatal/infancy period showed evidence of effectiveness based on the six RCTs outlined. In the toddler/preschool period, eight programs were identified with the support of 11 RCT studies and two meta-analytic reviews. All these programs showed potential for Canadian implementation and possible scale-up – by virtue of being conducted in high-income OECD countries.

There is also a wealth of economic data on the programs that indicate that there are strong economic arguments for their implementation in Canada. The major assessments done in this area are highlighted below.

The *Nurse-Family Partnership* has had extensive research into its economic benefits. Among the social benefits include reductions in child abuse, neglect, injuries, subsequent births during the mother's teen years, and improvement in cognitive and/or educational outcomes for children. These benefits in turn resulted in substantial public savings. An analysis by the RAND Corporation, found program costs per child of \$7,271 – with the total benefits to society per child amounting to \$9,151 among the lower risk sample (69). Cost benefits were even more prominent with higher risk families – with an estimated \$34,148 (in 2003 US dollars) net benefit per higher-risk family served, or \$41,419 in total benefits to society per child. Savings were mainly derived from averted healthcare, child services and justice system costs over 10 years following intervention completion. (69).

In the *Abecedarian Project*, the total cost of the program was estimated at about \$43,000 per child on average, whereas benefits totaled to \$162,000 per child (70).

The *Triple P-Positive Parenting Program* was found to be a “worthwhile use of limited health funds” by researchers in Queensland, Australia in order to reduce the prevalence of conduct disorder (71). They estimated that if *Triple P* only averted less than 1.5% of cases of conduct disorder, the program would already have paid for itself.

A cost effectiveness analysis of the *Incredible Years* program found the cost of bringing the average child with a conduct disorder below the clinical cut-off to be €2,784 (in 2010 Euros), and that the program offering significant net public savings when factoring in averted costs of possible unemployment, imprisonment, criminal activity and lack of educational attainment (72).

For the *Perry Preschool*, the children who participated over the course of two years were found to have done so at a cost of about \$19,000 on average (in 2010 US dollars), while the total benefits accrued reached \$300,000 (66). Heckman et al (73) also estimate the initial program costs at \$26,639 and the total benefits at \$165,053.

The fact that these programs have been extensively studied and found to be cost effective, along with their significant benefits for the mental health of children, was crucial in recommending them for implementation and scale-up in Canada. This information points to the potential for great benefits to Canadian society.

Canadian context

Some of the interventions recommended for Canadian implementation based on my findings have already been implemented to some degree in Canada but could benefit from further significant scale up.

The *Nurse-Family Partnership* is being implemented in British Columbia with the first Canadian RCT currently ongoing (74). British Columbia Health Authorities are also offering NFP while awaiting RCT findings (see www.childhealthpolicy.ca).

There have been quite a number of intensive childcare programs instituted in Canada with the *Perry Preschool* mainly and, to a lesser extent the *Abecedarian Project* forming the evidence backbone for their conception though with varying methodology and a lack of consistently rigorous high quality evaluations.

Triple P-Positive Parenting Program is one of the most recognized parenting programs worldwide. Implemented in 20 countries, it has reached over six million children and families has been adapted in 17 languages. It has been adopted by many agencies in Canadian provinces including Manitoba, Ontario and British Columbia. The province of Manitoba has funded a province-wide implementation of the program and a branch of government manages this process (75). In 2015, the Government of Prince Edward Island made a five-year commitment to make the program available to Islanders at low or no cost with greater than 40 already recruited.

The *Incredible Years* program has been implemented in Canada as well, wherein the Lakehead Regional Family Centre (LCFC) began offering it as part of its services in 1993 in Thunder Bay, Ontario. The agency has an annual caseload of over 1500 children and families every year (76). The researchers involved have provided detailed templates and recommendations to assist in its implementation in other areas of Canada (76) and aspects of their work have been evaluated with an RCT (77).

There are several programs in Canada that are conceptually similar to the *Early Head Start* and *Head Start* programs; however, a lack of rigorous evaluation using scientifically sound methods make them difficult to assess. There is an *Aboriginal Head Start* program that is national, federally funded and designed to address needs of Aboriginal preschool children and their families. Some of the studies are in early stages (78) and more rigorous evaluation in future should help to demonstrate effectiveness.

An evaluation of the *Brief Psychoeducational Parenting Program* was carried out at the University of Toronto (78), making this a particularly

promising approach. However, the evidence base is not as robust as for the more established programs on this list and more detailed long-term follow-up would be helpful. It could be quite useful as a first level intervention for parents experiencing difficulties, as facilitators can carry it out without specialized mental health training at centres in the community.

Conclusion

This review summarizes the best available research evidence on childhood interventions starting very early in life and why they would be valuable if instituted (or scaled-up) in Canada. These interventions are important not only to reduce the burden of mental health challenges and improve the quality of life for individuals but also because of their benefits to the larger society. The early childhood period represents one of great opportunity where relatively modest investments in evidence-backed interventions can help to improve a child's outlook and place them in a better position to achieve their potential.

All these programs are proven to be beneficial in improving outcomes and could be implemented in Canada. If the opportunity exists, I would suggest immediate implementation and/or scale-up of the *Nurse-Family Partnership* for the period of infancy and the *Triple P* for the toddler and preschool period. Some of the reasons for this include that they have both been evaluated by multiple RCTs among different and diverse populations so should prove to be effective in different provinces in Canada where the ethnic make-up of the populations differ; they both have clear and proven economic benefits and so should prove to be a judicious use of scarce resources; they have demonstrated their greatest effects among the most disadvantaged populations which are often the hardest

to reach with beneficial programs; and they are currently implemented to some degree, providing a level of institutional knowledge and trained experts who can assist with implementation in other areas and who will be capable of dealing with the complex challenges involved.

Strong evidence exists for the impact of interventions in infancy and toddlerhood. These interventions help shape children by equipping them and their caregivers with the tools to promote their wellbeing and prevent mental disorders. They also represent great returns on investment through increased productivity, reduced spending on treatment and the expensive consequences of inaction. The fact that many of these programs are being implemented in various forms already in Canada indicates that their benefits are recognized and appreciated by policy makers at different levels and that scale-up is possible. Canadian society takes the health and wellbeing of its children seriously and by working together, we can ensure that they are well prepared for future challenges.

References

- 1 Shonkoff, J., Phillips, D. *From Neurons to Neighborhoods: The Science of Early Childhood Development*. Washington, D.C.: National Research Council and Institute of Medicine, National Academy Press. 2000.
- 2 Heckman, J., Masterov, D. *The Productivity Argument for Investing in Young Children*. Kids Working Group Working Paper No. 5. Washington, D.C.: Committee for Economic Development. 2004.
- 3 Irwin L, Siddiqi A, Hertzman C: *Early child development: A powerful equalizer: Final report for the world health organization's commission on the social determinants of health*. Geneva: 2009.
- 4 Halfon N, Hochstein M. Life course health development: an integrated framework for developing health, policy, and research. *Milbank Q* 2002; 80:433-479.
- 5 Feinstein L, Duckworth K. *Development in the Early Years: Its Importance for School Performance and Adult Outcomes*. In Research Report 20.;2006
- 6 Commission on Social Determinants of Health, WHO: *Closing the Gap in a Generation. Health Equity Through Action on the Social Determinants of Health. FINAL REPORT 2011*
- 7 National Crime Prevention. *Pathways to prevention: developmental and early intervention approaches to crime in Australia*. Canberra: National Crime Prevention, Commonwealth Attorney-General's Department, 1999
- 8 Waddell C, Shepherd C, Schwartz, C, Barican J. *Child and youth Mental Disorders: Prevalence and evidence-based interventions*. Vancouver, BC. Children's Health Policy Centre, Simon Fraser University, 2014.
- 9 Hertzman C, Power C. Health and human development: understandings from

- life-course research. *Dev Neuropsychol* 2003; 24:719-744.
- 10 Hertzman C, Wiens M: Child development and long-term outcomes: a population health perspective and summary of successful interventions. *Soc Sci Med* 1996, 43:1083–1096
 - 11 Allen, Graham. *Early Intervention: Smart Investment, Massive Savings; the Second Independent Report to Her Majesty's Government*. The Stationery Office, 2011.
 - 12 Olds D, Sadler L, Kitzman H. Programs for parents of infants and toddlers: recent evidence from randomized trials. *J Child Psychol Psychiatry* 2007; 48:355- 391
 - 13 Richardson S, Prior M. *No time to lose: The wellbeing of Australia's children*. Melbourne: Melbourne University Press, 2005.
 - 14 Cohen, Mark A., and Alex R. Piquero. "New evidence on the monetary value of saving a high-risk youth." *Journal of Quantitative Criminology* 25, no. 1 (2009): 25-49.
 - 15 Bornstein, M. Parenting infants. In Marc H. Bornstein (Ed.), *Handbook of parenting*. Mahwah, New Jersey: Lawrence Erlbaum Associates. 1995: pp. 3–39
 - 16 Heckman J. *Invest in the very young*. Chicago: Ounce of Prevention Fund and the University of Chicago Harris School of Public Policy Analysis, 2000.
 - 17 Fox R, Platz D, Bentley K. Maternal factors related to parenting practices, developmental expectations, and perceptions of child behaviour problems. *J Genet Psychol* 1995; 156:431-441.
 - 18 Kumpfer, Karol L., and Barye Bluth. "Parent/child transactional processes predictive of resilience or vulnerability to "substance abuse disorders".

- Substance use & misuse* 39, no. 5 (2004): 671-698.
- 19 Ferrao, V. 'Paid Work' *Women in Canada: A Gender-based Statistical Report*.
Statistics Canada, 2010 Catalogue no. 89-503.
- 20 Bayer J, Sanson A, Hemphill S. Parent influences on early childhood
internalizing difficulties. *J Appl Dev Psychol* 2006; 27:542-559.
- 21 Bushnik, T. "Child care in Canada" *Children and Research Paper Series*.
Statistics Canada, 2006. Catalogue no. 89-599-MIE, No. 3.
www.statcan.gc.ca/pub/89-599-m/89-599-m2006003-eng.pdf
- 22 Canadian Mental Health Association, and Nancy Cohen. *Handle with Care:
Strategies for Promoting the Mental Health of Young Children in
Community-Based Child Care*. Canadian Mental Health Association, 2004.
- 23 Barlow J, Stewart-Brown S. Behavioral problems and group-based parent
education programs. *J Dev Behav Pediatr* 2000; 21:356-370.
- 24 Heckman, J.J., Cunha, F., Lochner, L., Masterov, D. *Interpreting the evidence
on life cycle skill formation*. In: Hanushek, E., Welch, F., (Eds.). *Handbook
of the Economics of Education*. North Holland: Amsterdam. 2006
- 25 Raver C, Knitzer J. Ready to Enter: *What Research Tells Policymakers About
Strategies to Promote Social and Emotional School Readiness Among Three-
and Four-Year-Old Children*. New York: National Center for Children in
Poverty; 2002
- 26 Higgins J, Green S (editors). *Cochrane Handbook for Systematic Reviews of
Interventions* Version 5.1.0 [updated March 2011]. The Cochrane
Collaboration, 2011. Available from www.handbook.cochrane.org
- 27 OECD (2016), *OECD Factbook 2015-2016: Economic, Environmental and
Social Statistics*, OECD Publishing, Paris. DOI:

<http://dx.doi.org/10.1787/factbook-2015-en>

- 28 Bayer, J., Hiscock, H., Scalzo, K., Mathers, M., McDonald, M., Morris, A., Wake, M. Systematic review of preventive interventions for children's mental health: what would work in Australian contexts? *Australian and New Zealand Journal of Psychiatry*. 2009. 43(8), 695-710.
- 29 Furlong M, McGilloway S, Bywater T, Hutchings J, Smith SM, Donnelly M. Behavioural and cognitive-behavioural group-based parenting programmes for early-onset conduct problems in children aged 3 to 12 years. *Cochrane Database of Systematic Reviews* 2012, Issue 2. Art.
- 30 Barlow J, Bergman H, Kornør H, Wei Y, Bennett C. Group-based parent training programmes for improving emotional and behavioural adjustment in young children. *Cochrane Database of Systematic Reviews* 2016, Issue 8. Art. No.: CD003680. DOI: 10.1002/14651858.CD003680.pub
- 31 Barlow J, Johnston I, Kendrick D, Polnay L, Stewart-Brown S. Individual and group-based parenting programmes for the treatment of physical child abuse and neglect. *Cochrane Database of Systematic Reviews* 2006, Issue 3. Art. No.: CD005463. DOI: 10.1002/14651858.CD005463.pub2
- 32 Eckenrode, John, Mary Campa, Dennis Luckey, Charles Henderson Jr., Robert Cole, Harriet Kitzman, Elizabeth Anson, Kimberly Sidora-Arcoleo, Jane Powers, and David Olds. "Long- term Effects of Prenatal and Infancy Nurse Home Visitation on the Life course of Youths: 19-Year Follow-up of a Randomized Trial." *Archives of Pediatric and Adolescent Medicine*, vol. 164, no. 1, January 2010, pp. 9-15.
- 33 Olds D, Kitzman H, Knudtson M, Anson E, Smith JA, Cole R. Effect of home visiting by nurses on maternal and child mortality: results of a 2-decade

- follow-up of a randomized clinical trial. *JAMA Pediatr.* 2014; 168(9): 800-806
- 34 Olds, D. L., Holmberg, J., Donelan-McCall, N., Luckey, D., Knudtson, M., & Robinson, J. (2014a). Effects of home visits by paraprofessionals and by nurses on children: Follow-up of a randomized trial at ages 6 and 9 years. *JAMA Pediatrics*, 168, 114–121.
- 35 Mejdoubi J, van den Heijkant SCCM, van Leerdam FJM, Heymans MW, Crijnen A, Hirasing RA (2015) The Effect of VoorZorg, the Dutch Nurse-Family Partnership, on Child Maltreatment and Development: A Randomized Controlled Trial. *PLoS ONE* 10(4): e0120182.
doi:10.1371/journal.pone.0120182
- 36 Robling, Michael, Marie-Jet Bekkers, Kerry Bell, Christopher C. Butler, Rebecca Cannings-John, Sue Channon, Belen Corbacho Martin et al. "Effectiveness of a nurse-led intensive home-visitation programme for first-time teenage mothers (Building Blocks): a pragmatic randomised controlled trial." *The Lancet* 387, no. 10014 (2016): 146-155.
- 37 Zielinsky, David S., John Eckenrode, and David Olds. "Nurse Home Visitation and the Prevention of Child Maltreatment: Impact on the Timing of Official Reports." *Development and Psychopathology*, vol. 21, 2009, pp. 441-453.
- 38 Luckey, Dennis W., David L. Olds, Weiming Zhang, Charles Henderson, Michael Knudtson John Eckenrode, Harriet Kitzman, Robert Cole, and Lisa Pettitt. "Revised Analysis of 15- Year Outcomes in the Elmira Trial of the Nurse-Family Partnership." Prevention Research Center for Family and Child Health, University of Colorado Department of Pediatrics, 2008

- 39 Olds, David L., Harriet Kitzman, Carole Hanks, Robert Cole, Elizabeth Anson, Kimberly Sidora-Arcoleo, Dennis W. Luckey et al. "Effects of nurse home visiting on maternal and child functioning: age-9 follow-up of a randomized trial." *Pediatrics* 120, no. 4 (2007): e832-e845.
- 40 Mejdoubi, Jamila, Silvia CCM van den Heijkant, Frank JM van Leerdam, Martijn W. Heymans, Remy A. Hirasing, and Alfons AM Crijnen. "Effect of nurse home visits vs. usual care on reducing intimate partner violence in young high-risk pregnant women: a randomized controlled trial." *PloS one* 8, no. 10 (2013): e78185.
- 41 Robling, Michael, Marie-Jet Bekkers, Kerry Bell, Christopher C. Butler, Rebecca Cannings-John, Sue Channon, Belen Corbacho Martin et al. "Effectiveness of a nurse-led intensive home-visitation programme for first-time teenage mothers (Building Blocks): a pragmatic randomised controlled trial." *The Lancet* 387, no. 10014 (2016): 146-155.
- 42 Olds, David. "Building evidence to improve maternal and child health." *The Lancet* 387, no. 10014 (2016): 105-107.
- 43 Doyle, O., UCD Geary Institute PFL Evaluation Team. Preparing for Life Early Childhood Intervention Final Report: Did *Preparing for Life* Improve Children's School Readiness? 2016 Retrieved from http://geary.ucd.ie/preparingforlife/wp-content/uploads/2016/09/5654_FP_UCD_Report_Final.pdf
- 44 Frances A., Craig T., Elizabeth P., Joseph S., Miller-Johnson, S. Early Childhood Education: Young Adult Outcomes From the Abecedarian Project, *Applied Developmental Science*, 2002: 6:1, 42-57
- 45 Ramey, C., Campbell, F. Preventive education for high-risk children:

- Cognitive consequences of the Carolina ABC. *American Journal of Mental Deficiency*, 1984: 88, 515–523.
- 46 Ramey, C., Campbell, F., Burchinal, M., Skinner, M., Gardner, D., Ramey, S. Persistent effects of early childhood education on high-risk children and their mothers. *Applied Developmental Science*, 2000:4, 2–14.
- 47 Campbell, F., Pungello, E., Burchinal, M., Kainz, K., Pan, Y., Wasik, B., Ramey, C. Adult outcomes as a function of an early childhood educational program: An Abecedarian project follow-up. *Developmental Psychology*, 2012: 48, 1033–1043
- 48 Karen M.T. Turner, Matthew R. Sanders, Dissemination of evidence-based parenting and family support strategies: Learning from the Triple P—Positive Parenting Program system approach. *Aggression and Violent Behavior*, Vol 11(2) 2006:176-19
- 49 Sanders, M. Bor, W. Morawska, A. Maintenance of treatment gains: A comparison of enhanced, standard, and self-directed Triple P-Positive Parenting Program. *Journal of Abnormal Child Psychology*, 35; 2007, 983–998
- 50 de Graaf, Ireen, Paula Speetjens, Filip Smit, Marianne de Wolff, and Louis Tavecchio. "Effectiveness of the Triple P Positive Parenting Program on behavioral problems in children: a meta-analysis." *Behavior Modification* (2008).
- 51 Prinz, Ronald J., Matthew R. Sanders, Cheri J. Shapiro, Daniel J. Whitaker, and John R. Lutzker. "Population-based prevention of child maltreatment: The US Triple P system population trial." *Prevention science* 10, no. 1 (2009): 1-12.

- 52 Dishion, T., Connell, A., Weaver, C., Shaw, D., Gardner, F., Wilson, M. The Family Check-Up with High-Risk Indigent Families: Preventing Problem Behavior by Increasing Parents' Positive Behavior Support in Early Childhood. *Child Development*, 2008; 79(5), 1395–1414.
- 53 Shelleby, Elizabeth C., Daniel S. Shaw, JeeWon Cheong, Hyein Chang, Frances Gardner, Thomas J. Dishion, and Melvin N. Wilson. "Behavioral control in at-risk toddlers: The influence of the Family Check-Up." *Journal of Clinical Child & Adolescent Psychology* 41, no. 3 (2012): 288-301.
- 54 Brennan, L. M., Shelleby, E. C., Shaw, D. S., Gardner, F. E. M., Dishion, T. J., & Wilson, M. N. (2013). Indirect effects of the family check-up on school-age academic achievement through improvements in parenting in early childhood. *Journal of Educational Psychology*, 105, 762–773
- 55 Menting, Ankie TA, Bram Orobio de Castro, and Walter Matthys. "Effectiveness of the Incredible Years parent training to modify disruptive and prosocial child behavior: A meta-analytic review." *Clinical Psychology Review* 33, no. 8 (2013): 901-913.
- 56 Scott, Stephen, Jackie Briskman, and Thomas G. O'Connor. "Early prevention of antisocial personality: long-term follow-up of two randomized controlled trials comparing indicated and selective approaches." *American Journal of Psychiatry* 171, no. 6 (2014): 649-657.
- 57 Webster-Stratton, Carolyn, Julie Rinaldi, and Jamila M. Reid. "Long-term outcomes of Incredible Years Parenting Program: Predictors of adolescent adjustment." *Child and Adolescent Mental Health* 16, no. 1 (2011): 38-46.
- 58 Webster-Stratton, Carolyn H., M. Jamila Reid, and Ted Beauchaine. "Combining parent and child training for young children with ADHD."

- Journal of Clinical Child & Adolescent Psychology* 40, no. 2 (2011): 191-203.
- 59 Barnett W, Hustedt J. Head Start's lasting benefits. *Infants Young Child*. 2005;18: 16-24.
- 60 Nelson, G., Westhues, A., & MacLeod, J. A meta-analysis of longitudinal research on preschool prevention programs for children (Article 31). *Prevention and Treatment*, 6. 2003
- 61 Puma M, Bell S, Cook R, Heid C, Broene P, Jenkins F, Mashburn A, Downer J. *Third Grade Follow-up to the Head Start Impact Study Final Report*, OPRE Report # 2012-45. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services. 2012
- 62 Nix R, Bierman K, Domitrovich C, Gill S. Promoting Children's Social-Emotional Skills in Preschool Can Enhance Academic and Behavioral Functioning in Kindergarten: Findings From Head Start REDI, *Early Education and Development*, 2013; 24:7, 1000-1019.
- 63 Shager, H. M., Schindler, H. S., Magnuson, K. A., Duncan, G. J., Yoshikawa, H., & Hart, C. M. (2012). Can research design explain variation in Head Start research results? A meta-analysis of cognitive and achievement outcomes. *Educational Evaluation and Policy Analysis*, 0162373712462453.
- 64 Love J, Kisker E, Ross C, *et al*. The effectiveness of early head start for 3-year-old children and their parents: lessons for policy and programs. *Dev Psychol*. 2005; 41:885-901
- 65 Fergusson D, Grant H, Horwood L, Ridder E. Randomized trial of the early

- start program of home visitation. *Pediatrics* 2005; 116:803-809
- 66 Schweinhart L. *The High/Scope Perry Preschool Study through age 40*. Ypsilanti, MI: High/Scope Press; 2006. Monograph of The High/Scope Perry Preschool Study, No. 8.
- 67 Bradley, Susan J., Darryle-Anne Jadaa, Joel Brody, Sarah Landy, Susan E. Tallett, William Watson, Barbara Shea, and Derek Stephens. "Brief psychoeducational parenting program: An evaluation and 1-year follow-up." *Journal of the American Academy of Child & Adolescent Psychiatry* 42, no. 10 (2003): 1171-1178..
- 68 Kennedy S, Rapee R, Edwards S. A selective intervention program for inhibited preschool-aged children of parents with an anxiety disorder: effects on current anxiety disorders and temperament. *J Am Acad Child Adolesc Psychiatry* 2009; 48:602-609
- 69 Karoly, A., Kilburn, R, Cannon, J. *Early Childhood Interventions: Proven Results, Future Promise*. Santa Monica, CA, USA: RAND Corporation, 2006; pp 87-121.
- 70 Masse, Leonard N.; and Barnett, W. Steven. *A Benefit-Cost Analysis of the Abecedarian Early Childhood Intervention*. New Brunswick, N.J.: National Institute for Early Education Research, 2002.
- 71 Mihalopoulos C, Sanders M, Turner K, Murphy-Brennan M, Carter R. Does the Triple P-Positive Parenting Program provide value for money? *Australian & New Zealand Journal Of Psychiatry*. 2007; 41(3):239-246.
- 72 O'Neill, D., McGilloway, S., Donnelly, M., Bywater, T., & Kelly, P. (2013). A cost-effectiveness analysis of the Incredible Years parenting programme in reducing childhood health inequalities. *The European Journal of Health*

Economics, 14(1), 85-94.

- 73 Heckman, James J.; Moon, Seong Hyeok; Pinto, Rodrigo; Savelyez, Peter; Yavitz, Adam. "The Rate of Return to the HighScope Perry Preschool Program." *Journal of Public Economics*, February 2010, Vol. 94, No. 1-2, pp. 114-28.
- 74 Jack, S., Catherine, N., Gonzalez, A., MacMillan, H., Sheehan, D., Waddell, C. Adapting, piloting and evaluating complex public health interventions: Lessons learned from the nurse-family partnership in Canadian public health settings. *Chronic Diseases and Injuries in Canada*, 2015: 35(8).
- 75 Manitoba, Healthy Child. "Manitoba Triple P Newsletter." Retrieved from <http://www.gov.mb.ca/triplep/pdf/fall2008.pdf> (2008).
- 76 Webster-Stratton, C. *The Incredible Years parents, teachers, and children's training series: Program content, methods, research and dissemination 1980-2011*. Seattle, WA: Incredible Years Inc. 2011
- 77 Taylor, T., Schmidt, F., Pepler, D., Hodgins, H. A comparison of eclectic treatment with Webster-Stratton's parents and children series in a children's mental health center: A randomized controlled trial, *Behavior Therapy*, Vol 29 (2); 1998, 221-240.
- 78 De la Cruz, A., McCarthy, P. Alberta aboriginal head start in urban and northern communities: Longitudinal study pilot phase. *Chronic Diseases in Canada*, 2010: 30(2)
- 79 Porzig-Drummond, Renata, Richard J. Stevenson, and Caroline Stevenson. "The 1-2-3 Magic parenting program and its effect on child problem behaviors and dysfunctional parenting: A randomized controlled trial." *Behaviour research and therapy* 58 (2014): 52-64.